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# Versatility of the Quantity Surveying Profession in Singapore in Terms of Sustainable Construction: A Comprehensive Review

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The main objective of this study was to determine the Versatility of the Quantity Surveying Profession in Singapore in Terms of Sustainable Construction. This study aims to investigate the current integration of sustainable construction practices by Quantity Surveyors in Singapore in terms of evolving roles, the challenges they face in doing so, and the extent of their involvement in implementing sustainable construction. The researcher utilized a combination of quantitative and descriptive research techniques to gather data and distribute a survey questionnaire via google forms and email. The survey targeted 70 Quantity Surveyors currently working in Singapore, with diverse backgrounds, and used an ANOVA Test to analyze the significant difference in the perceptions of the participants based on their years of work experience as a Quantity Surveyor. The findings of this study revealed that Quantity Surveyors in Singapore have demonstrated versatility in the context of sustainable construction, adapting to the evolving roles and responsibilities of the modern construction industry. Despite facing challenges in transitioning from conventional construction practices to more sustainable methods, it is crucial for them to adapt to these changes to ensure the continuity of their profession and to remain relevant in the industry. Although they are not yet fully involved in the implementation of sustainable construction, Quantity Surveyors recognize the need for continuous professional development and the adoption of new skills to meet the changing demands of the industry.

**Keywords:** Versatility, Quantity Surveying, Singapore, Sustainable Construction, Evolving Roles.

## 1. Introduction

Sustainable construction is often seen as a solution to the social, economic, and environmental challenges faced by the construction industry [1], [2]. The role of Quantity Surveyors aligns with sustainable construction in terms of cost management and operation. However, to

effectively fulfil these roles requires an understanding of what sustainable construction entails and the necessary skills [3], [4].

The implementation of sustainable construction varies between countries. For example, in Australia, lack of measurement tools for sustainability and skilled professionals such as quantity surveyors within the sector [2]. In Sri Lanka, quantity surveyors need to focus on upskilling areas like technology adoption, environmental services knowledge, ethics practice, and costing methodologies for effective participation in sustainable construction efforts [3].

The shift towards sustainable architecture in the Philippines is crucial for climate change resilience, environmental preservation, energy efficiency, and water management [5]. As a result, Quantity Surveyors are challenged to use renewable resources and adopt sustainable construction practices in their projects. They must find innovative ways to incorporate environmentally friendly materials, reduce waste, and promote energy efficiency throughout the construction process.

In Singapore, the philosophy of sustainability has been well integrated into Singapore's built environment. The Ministry of Foreign Affairs [6] also emphasizes the critical importance of implementing sustainable construction in Singapore due to its limited natural resources, however, the construction industry has undergone a period of rapid transformation, moving from the traditional design and construction method to new delivery methods suitable for sustainable construction.

This indeed provides an opportunity for Quantity Surveyors to go beyond their current roles to acclimatize to the new requirements in the industry. Thus, it is necessary for the present Quantity Surveyors to further enhance their skills and core competencies and be Versatile enough with a full spectrum of Sustainable Construction.

## 2. Methodology:

### 2.1) Population, Sample Size and Sampling Technique

The researcher employed purposive sampling, a non-probability sampling method, to gather data from a representative sample of Quantity Surveying Professionals in Singapore. The objective was to select 70 respondents from this group; however, the actual number of participants was determined based on the outcome of the questionnaire survey.

### 2.2) Description of the Respondents

This research focused on Quantity Surveyors who were currently employed in Singapore and represented a wide array of backgrounds. Quantity surveyors are indispensable contributors to construction projects and provide financial management expertise and technical guidance. Their responsibilities encompass both office-based work and occasional site visits, as they often manage multiple projects simultaneously from a central location. Quantity surveyors can continue working well into their traditional retirement years, as their duties are non-physically demanding and can be performed in an office environment. Their ability to work longer is influenced by their health, personal circumstances, and decision to remain in the profession. Compared with other construction industry professionals, the office-centric nature of their work makes the role of Quantity Surveyors more suitable for older individuals.

2.3) Research Instrument

The researcher carried out the study using a survey questionnaire distributed via email through Google Forms because it was considered the most suitable method for gathering all necessary information from the respondents. This study employed quantitative research, which entails the process of collecting and analyzing numerical data to identify patterns, test relationships, and generalize results to larger populations [7]. Specifically, the study used descriptive research, which aimed to provide an overall summary of the study's variables. The first frame of the questionnaire gathered demographic information, such as gender, age, position, years of experience as a Quantity Surveyor, and industry sector involvement. The second frame focuses on evaluating the level of versatility among Quantity Surveyors in Singapore regarding the implementation of sustainable construction practices.

2.4) Validity and Reliability of the Instrument

The newly developed questionnaire was reviewed and validated by three Construction Management experts, all of whom were Quantity Surveyors with extensive experience working in Singapore and holding Chartered Membership in the Royal Institution of Chartered Surveyors (RICS), Australian Institute of Quantity Surveyors (AIQS), Philippine Institute of Certified Quantity Surveyors (PICQS), and New Zealand Institute of Quantity Surveyors Inc. (NZIQS).

The researcher employed the Cronbach's Alpha Test to determine the reliability of the newly designed questionnaire. The responses were tested for reliability using the Cronbach Alpha formula as shown below:

$$\alpha = \left(\frac{k}{k-1}\right)\left(1 - \frac{\sum_{i=1}^{k} \alpha_{y1}^2}{\alpha_x^2}\right) \quad (1a)$$

where: k = number of test item

$\alpha_x^2$ = number of item variance

$\alpha_{y1}^2$ = variance of total score

Using the formula, Cronbach's alpha was computed to evaluate the internal consistency of the data. Cronbach's alpha values were interpreted as follows:

Table 1: Cronbach's α Interpretation

| Cronbach's α | Internal Consistency Interpretation |
|---|---|
| 0.90 and above | Excellent/Outstanding |
| 0.80 to 0.89 | Good |
| 0.70 to 0.79 | Acceptable/Allowable |
| 0.60 to 0.69 | Questionable/Ambiguous |
| 0.50 to 0.59 | Poor/Bad |
| Below 0.50 | Unacceptable/Unsatisfactory |

The Cronbach's alpha of 0.936 achieved in the study demonstrated exceptional internal consistency. This indicates that the survey questionnaire employed in the study was highly dependable and consistent in assessing various aspects related to evolving roles, challenges, professional development, and level of involvement for Quantity Surveyors engaged in sustainable construction implementation in Singapore.

### 2.5) Data Analysis Procedure

The present study utilized a questionnaire with a Likert scale to assess the attitudes, opinions, and perceptions of the participants. The questionnaire contained five sections: demographic information of the participants, their awareness of the role of quantity surveyors in sustainable construction, the challenges faced by quantity surveyors in implementing sustainable construction practices, professional development achieved by quantity surveyors due to these challenges, and their level of involvement in implementation efforts. The researcher assigned numerical values to the descriptive ratings on a five-point Likert scale to facilitate data computation and handling.

Participants were asked to rate their level of agreement or disagreement with a series of statements about the Evolving Roles, Challenges faced, and Professional Development of quantity surveyors in sustainable construction in Singapore. The criteria for each level of agreement were explained and described to ensure clarity.

Table 2: Likert Scale Rating No. 1

| Descriptive Rating | Numerical Rating | Rating Scale |
|---|---|---|
| Strongly Agree | 5 | 4.21-5.00 |
| Agree | 4 | 3.41-4.20 |
| Neither agree nor disagree | 3 | 2.61-3.40 |
| Disagree | 2 | 1.81-2.60 |
| Strongly Disagree | 1 | 1.00-1.80 |

Similarly, participants were asked to indicate their engagements with several statements highlighting Level of Involvement to implementing sustainable construction practices in Singapore.

Table 3: Likert Scale Rating No. 2

| Descriptive Rating | Numerical Rating | Rating Scale |
|---|---|---|
| Very Great Extent | 5 | 4.21-5.00 |
| Great Extent | 4 | 3.41-4.20 |
| Moderate Extent | 3 | 2.61-3.40 |
| Small Extent | 2 | 1.81-2.60 |
| Not at All | 1 | 1.00-1.80 |

### 2.6) Statistical Treatment of Data

The study utilized various statistical tools and techniques, including Frequency and Percentage Distribution, Mean, and Analysis of Variance Test. The ANOVA analysis aimed to examine significant differences in the roles, challenges, professional development, and involvement in sustainable construction among quantity surveyors in Singapore, based on factors such as gender, age, job position, and experience. ANOVA determines the F-statistic, which represents the ratio of the variation among groups compared to the variation within groups. The p-value

indicates the probability of obtaining the calculated F-statistic, assuming no disparity between the group means. When the p-value is less than 0.05, it signifies a statistically significant distinction between the groups.

## 3. Results and Discussions:

### 3.1) Demographic Profile of the Respondents

Table 3 depicts the demographic profile of the 70 participants, who held various roles in the Quantity Surveying Profession and were working in Singapore's construction industry during the data collection period. The majority of the respondents were female, representing 53 or 75.7% of the total participants. Furthermore, 37 or 52.9% of the participants were Quantity Surveyors, and 32 or 45.7% had 10 years and below of working experience as a QS.

Table 3: Demographic Profile of the Respondents

| Demographic Profile | Frequency | % |
|---|---|---|
| Gender | | |
| Male | 17 | 24.30% |
| Female | 53 | 75.70% |
| Position | | |
| Quantity Surveyor | 37 | 52.90% |
| Senior QS | 21 | 30.00% |
| Contracts Manager | 12 | 17.10% |
| Years of Working Experience as a QS | | |
| 10 years and below | 32 | 45.70% |
| 11-14 years | 20 | 28.60% |
| 15 years and above | 18 | 25.70% |

### 3.2) Assessment on the Versatility of the Quantity Surveying Profession in Sustainable Construction in Singapore in terms of:

#### 3.2.1) Evolving Roles

Table 4: Degree of affirmation of the Respondent's

Awareness on the Evolving Roles of a Quantity Surveyor in a Sustainable Construction in Singapore

| Evolving Roles | Mean | Verbal Interpretation |
|---|---|---|
| 1. Quantifying the environmental impact of the project | 4.23 | Strongly Agree |
| 2. Providing cost estimates for alternative green building technology | 4.49 | Strongly Agree |
| 3. Advising on the cost of achieving green rating/ green star system | 4.44 | Strongly Agree |
| 4. Advising on resource efficiency during material selection and construction | 4.43 | Strongly Agree |
| 5. Valuing the sustainability of the property | 4.30 | Strongly Agree |

| | | |
|---|---|---|
| 6. Designing for minimum waste | 4.14 | Agree |
| 7. Recommending prefabrication or pre-assembly where possible | 4.31 | Strongly Agree |
| 8. Sustainability strategy development | 4.21 | Strongly Agree |
| Grand Mean | 4.32 | Strongly Agree |

Table 4 shows that the respondents obtained a grand mean score of 4.32, indicating that they Strongly Agreed with the evolving roles of quantity surveyors in sustainable construction in Singapore. This suggests a high level of awareness among the majority of quantity surveyors in Singapore regarding their evolving role in sustainable construction.

3.2.2) Challenges Faced

Table 5: Degree of affirmation on the Challenges faced by a Quantity Surveyor in the implementation of sustainable construction practices in Singapore

| Challenges Faced | Mean | Verbal Interpretation |
|---|---|---|
| 1. High initial investment costs | 4.25 | Strongly Agree |
| 2. Long pay-back period | 3.86 | Agree |
| 3. Uncertainty in cost savings | 3.89 | Agree |
| 4. Lack of building codes on sustainability | 3.51 | Agree |
| 5. Low awareness among stakeholders on sustainable construction practices | 3.74 | Agree |
| 6. Expensive sustainable construction materials | 4.07 | Agree |
| 7. Insufficient cost database for construction services and products | 3.86 | Agree |
| 8. Limited skills and competencies on sustainable construction practices | 3.96 | Agree |
| 9. Lack of enforcement of sustainable construction policies | 3.77 | Agree |
| 10. Lack of awareness of benefits in sustainable construction involved | 3.73 | Agree |
| 11. Lack of incentives from government | 3.57 | Agree |
| 12. Lack of education and knowledge in sustainable design | 3.74 | Agree |
| 13. Limited research on sustainable construction practices | 3.84 | Agree |
| 14. Culture of the construction industry such as resisting the establishment of new norms and practices and sticking to current approaches in projects. | 3.87 | Agree |
| Grand Mean | 3.83 | Agree |

Table 5 reveals a grand mean score of 3.83, which suggests that a significant number of respondents Agreed that they faced various challenges in the implementation of sustainable construction in Singapore.

3.2.3) Professional Development Achieved

Table 6: Degree of affirmation on the Professional Development achieved by quantity surveyors due to the evolving roles and challenges encountered in implementing sustainable construction in Singapore

| Professional Development Achieved | Mean | Verbal Interpretation |
|---|---|---|
| 1. Green Building Expertise | 4.43 | Strongly Agree |
| 2. Regulatory Compliance | 4.46 | Strongly Agree |
| 3. Technological Adaptation | 4.27 | Strongly Agree |
| 4. Cost Management for Sustainable Projects | 4.60 | Strongly Agree |
| 5. Continuing Education | 4.54 | Strongly Agree |
| Risk Analysis | 4.39 | Strongly Agree |
| 6. Collaboration with multidisciplinary teams | 4.57 | Strongly Agree |
| 7. Advisory Role | 4.39 | Strongly Agree |
| 8. Ethics Consideration and Corporate Social Responsibility | 4.36 | Strongly Agree |
| Grand Mean | 4.46 | Strongly Agree |

The results presented in Table 6 demonstrate a grand mean score of 4.46, indicating that all respondents strongly agreed with the importance of various professional development opportunities owing to the evolving roles and challenges faced by quantity surveyors in implementing sustainable construction in Singapore.

3.2.4) Level of Involvement of a QS

Table 7: Level of involvement of a Quantity Surveyor in the implementation of sustainable construction in Singapore

| Statement | Mean | Verbal Interpretation |
|---|---|---|
| 1. In the last five years, I have been directly involved in LIFECYCLE ASSESSMENT of a construction project | 2.67 | Moderate Extent |
| 2. In the last five years, I have been directly practicing RESOURCE, REUSE AND RECYCLING in a construction project | 2.99 | Moderate Extent |
| 3. In the last five years, I have been directly USING RENEWABLE RESOURCES in preference to non-renewable resources in a construction project | 2.86 | Moderate Extent |
| 4. In the last five years, I have been directly ADOPTING POLICES AND PRACTICES that advance | 3.26 | Moderate Extent |

| | | |
|---|---|---|
| sustainability in a construction project | | |
| 5. In the last five years, I have been directly USING SERVICIABILITY AND MAINTAINBILITY to promote sustainability. | 3.09 | Moderate Extent |
| 6. In the last five years, I have been directly involved in SOURCING OUT AND PURCHASING ENVIRONMENTALLY CERTIFIED MATERIALS. | 3.40 | Moderate Extent |
| 7. In the last five years, I have been directly involved in IDENTIFYING AND MANAGING SUSTAINABILITY RELATED RISKS. | 3.00 | Moderate Extent |
| 8. In the last five years, I have been directly involved in ADVISING TO CLIENT AND STAKEHOLDERS, guiding them to understand, appreciate, and ultimately implement sustainable practices in their projects. | 2.97 | Moderate Extent |
| Grand Mean | 3.03 | Moderate Extent |

As shown in Table 7, a grand mean score of 3.03 was obtained, which suggests that quantity surveyors in Singapore have generally engaged in sustainable construction to a Moderate Extent over the past five years.

3.3) Significant difference on the assessment of the respondents when grouped according to Years of Working Experience as a QS:

3.3.1) Evolving roles of a Quantity Surveyor in a sustainable construction in Singapore.

Table 8: Significant Difference on the Respondent's Assessment on the Evolving roles of a Quantity Surveyor in a Sustainable Construction in Singapore when grouped according to Years of Working Experience as a QS.

| Indicator | F-computed | p-value |
|---|---|---|
| 1. Quantifying the environmental impact of the project | 0.1528 | 0.8586 |
| 2. Providing cost estimates for alternative green building technology | 0.6568 | 0.5218 |
| 3. Advising on the cost of achieving green rating/ green star system | 0.5937 | 0.5552 |
| 4. Advising on resource efficiency during material selection and construction | 0.5441 | 0.5829 |
| 5. Valuing the sustainability of the property | 0.159 | 0.8533 |
| 6. Designing for minimum waste | 0.7714 | 0.4664 |

| | | |
|---|---|---|
| 7. Recommending prefabrication or pre-assembly where possible | 0.1197 | 0.8874 |
| 8. Sustainability strategy development | 1.2697 | 0.2876 |

Table 8 presents the results of the assessment of the respondents on the evolving roles of a quantity surveyor in sustainable construction in Singapore, grouped by years of experience as a QS.

The data was analyzed using the Analysis of Variance (ANOVA) test, and the p-values obtained from the study ranged from 0.05 to 0.8874. It can be concluded that none of the p-values greater than 0.05 are statistically significant.

3.3.2) Challenges faced by a Quantity Surveyor in a sustainable construction in Singapore.

Table 9: Significant Difference on the Respondent's Assessment on the Challenges faced by a Quantity Surveyor in a Sustainable Construction in Singapore when grouped according to Years of Working Experience as a QS.

| Indicator | F-computed | p-value |
|---|---|---|
| 1. High initial investment costs | 1.8465 | 0.1657 |
| 2. Long pay-back period | 0.4865 | 0.6169 |
| 3. Uncertainty in cost savings | 0.4235 | 0.6565 |
| 4. Lack of building codes on sustainability | 0.7642 | 0.4697 |
| 5. Low awareness among stakeholders on sustainable construction practices | 0.3439 | 0.7102 |
| 6. Expensive sustainable construction materials | 3.1412 | 0.04966 |
| 7. Insufficient cost database for construction services and products | 2.0978 | 0.1307 |
| 8. Limited skills and competencies on sustainable construction practices | 0.1859 | 0.8308 |
| 9. Lack of enforcement of sustainable construction policies | 0.2049 | 0.8153 |
| 10.Lack of awareness of benefits in sustainable construction involved | 0.2616 | 0.7706 |
| 11.Lack of incentives from government | 0.2505 | 0.7791 |
| 12.Lack of education and knowledge in sustainable design | 0.2775 | 0.7586 |
| 13.Limited research on sustainable construction practices | 1.7681 | 0.1785 |
| 14.Culture of the construction industry | 5.8471 | 0.0046 |

Table 9 depicts the level of agreement among the respondents, grouped by years of experience, regarding the challenges faced by quantity surveyors in implementing sustainable construction practices in Singapore.

The data collected through the study were subjected to an Analysis of Variance (ANOVA) test, which revealed that the p-values falling within the range of 0.8308 to 0.05 are not statistically significant. On the other hand, p-values within the range of 0.05 to 0.0046, which are less than 0.05, are deemed statistically significant as per the study's findings.

3.3.3) Professional Development Achieved by a Quantity Surveyor in a sustainable construction in Singapore.

Table 10. Significant Difference on the Respondent's Assessment on the Professional Development Achieved by a Quantity Surveyor in a Sustainable Construction in Singapore when grouped according to Years of Working Experience as a QS.

| Indicator | F-computed | p-value |
|---|---|---|
| 1. Green Building Expertise | 1.4335 | 0.2457 |
| 2. Regulatory Compliance | 1.0788 | 0.3458 |
| 3. Technological Adaptation | 3.2664 | 0.0435 |
| 4. Cost Management for Sustainable Projects | 1.8768 | 0.161 |
| 5. Continuing Education | 0.4097 | 0.6655 |
| 6. Risk Analysis | 1.538 | 0.2223 |
| 7. Collaboration with multidisciplinary teams | 0.5868 | 0.5589 |
| 8. Advisory Role | 0.1719 | 0.8424 |
| 9. Ethics Consideration and Corporate Social Responsibility | 1.2377 | 0.2966 |

Table 10 demonstrates a Significant Difference in the assessment of respondents on the degree of affirmation of professional development achieved by a quantity surveyor in the implementation of sustainable construction in Singapore, when the respondents are grouped according to their Years of Experience.

The Analysis of Variance (ANOVA) test reveals that all calculated p-values from the gathered data of the study, which range from 0.05 to 0.8424, are greater than 0.05 and, therefore, not statistically significant. However, the indicator "Technological Adaptation" has a calculated p-value of 0.0435 from the gathered data of the study, which is less than 0.05 and is statistically significant.

3.3.4) Level of Involvement of a QS

Table 11: Significant Difference on the Respondent's Assessment on Level of Involvement of a Quantity Surveyor in a Sustainable Construction in Singapore when grouped according to Years of Experience as a QS.

| Statement<br>In the last five years,<br>I have been directly involved in | F-computed | p-value |
|---|---|---|
| 1. LIFECYCLE ASSESSMENT of a construction project | 0.03602 | 0.9646 |

| | | |
|---|---|---|
| 2. RESOURCE, REUSE AND RECYCLING in a construction project | 1.1067 | 0.3366 |
| 3. USING RENEWABLE RESOURCES in preference to non-renewable resources in a construction project | 0.2646 | 0.7683 |
| 4. ADOPTING POLICES AND PRACTICES that advance sustainability in a construction project | 1.0325 | 0.3617 |
| 5. USING SERVICIABILITY AND MAINTAINBILITY to promote sustainability | 0.3117 | 0.7332 |
| 6. SOURCING OUT AND PURCHASING ENVIRONMENTALLY CERTIFIED MATERIALS. | 2.335 | 0.1046 |
| 7. IDENTIFYING AND MANAGING SUSTAINABILITY RELATED RISKS. | 1.1138 | 0.3343 |
| 8. ADVISING TO CLIENT AND STAKEHOLDERS, guiding them to understand, appreciate, and ultimately implement sustainable practices in their projects. | 1.7687 | 0.1784 |

Table 11 reveals the outcomes of the evaluation of the respondents' perceptions regarding the level of engagement of a quantity surveyor in implementing sustainable construction in Singapore, categorized by the years of experience.

The analysis of variance (ANOVA) test was used to determine statistical significance, and all p-values obtained from the collected data were between 0.05 and 0.9646. Differences were considered statistically insignificant at any value greater than 0.05.

## 4. Conclusions and Recommendations:

4.1) Quantity Surveyors in Singapore have exhibited versatility in the context of Sustainable Construction, adapting to the evolving roles and responsibilities in the modern construction industry. Despite encountering challenges in transitioning from traditional construction practices to more sustainable approaches, it is crucial for them to adapt to these changes to ensure the continuity of their profession and to remain relevant in the industry. Although they are not yet fully involved in the implementation of Sustainable Construction, Quantity Surveyors acknowledge the need for continuous professional development and adoption of new skills to meet the changing demands of the industry.

4.2) Quantity surveyors in Singapore have encountered challenges in implementing sustainable construction initiatives, with significant differences in their awareness based on position and years of experience. Therefore, stakeholders are recommended to identify actions and solutions to address these challenges, which hinder sustainable construction efforts involving quantity surveyors with varied backgrounds. The following actions are recommended:

4.2.1) Quantity Surveyors must take proactive measures to address the uncertainties surrounding cost savings and encourage the widespread adoption of sustainable construction practices. Despite the long-term benefits that are evident, stakeholders often hesitate because of concerns about financial risks. To alleviate this hesitation, Quantity Surveyors should clearly communicate the distinctions between the uncertainties of sustainable construction and those associated with traditional construction risks and demonstrate how careful planning and analysis can mitigate certain factors. Additionally, Quantity Surveyors should emphasize the importance of employing durable, low-maintenance materials and designing energy-efficient buildings that incorporate passive strategies to maximize cost savings and reduce uncertainty in this area.

4.2.2) Quantity Surveyors should collaborate with professional organizations to develop a dedicated sustainable construction cost database. They should encourage data sharing among Quantity Surveyors and construction firms, which eventually can help build a more reliable database over time.

4.2.3) Quantity Surveyors can help address the lack of enforcement by advocating for more effective enforcement strategies. This includes engaging with regulatory bodies to highlight the necessity for diligent enforcement, calling for significant transparency, proposing more substantial financial penalties to motivate compliance and establish an equal opportunity, and ensuring that the enforcement department has sufficient resources to conduct regular site inspections and occasional audits.

4.2.4) Employers should actively develop and promote targeted training and mentorship programs to help surveyors with less experience acquire the necessary skills and competencies to navigate the ever-changing sustainable construction landscape. To this end, Senior Quantity Surveyors should be encouraged to share their insights and best practices to foster knowledge transfer and cross-generational collaboration.

4.3) Quantity Surveyors in Singapore have come to recognize the significance of continuing professional development in addressing the evolving responsibilities and challenges they encounter when implementing sustainable construction practices, despite facing some resistance from experienced Quantity Surveyors who are resistant to technological adaptation. To stay current with industry trends and client expectations, it is recommended that Quantity Surveyors incorporate sustainable design principles and become proficient in BIM software capable of accurately modelling the long-term costs of sustainable choices. Moreover, Quantity Surveyors should engage in continuous professional development programs that focus on sustainable practices.

4.4) While this study is centred on Singapore, it is suggested that future research be broadened to other countries to obtain a more extensive understanding of the versatility of quantity surveyors worldwide over time. To accomplish this, additional studies that employ both qualitative and quantitative methods should be conducted to discover the emerging sustainable construction roles and responsibilities of quantity surveyors in the built environment.

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