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Soft Cost Elements: Exploring Management Components of Project Costs in Green Building Projects

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Abstract:	This paper reveals the non-technical elements that affect construction project costs, known as soft cost elements (SCEs). These elusive elements have received little attention although it is significant in influencing management decisions of a project. There is much interest in the mitigation of cost for green projects, but the focus is generally leaning towards hard cost aspects. Information about SCEs remains obscure. Qualitative approach is adopted in this research using face-to-face unstructured interviews with 12 respondents consisting of green building project experts who have been involved in many projects certified by the Malaysia Green Building Index (GBI). A total of 4 project cost datasheets were also analyzed to confirm the SCEs in the project budget and to enable a clear definition of the SCEs term. The results show that SCEs are tangible and not hidden in nature. Although they constitute smaller percentage in the project cost, the implications of SCEs are far-reaching and can influence critical management decisions. There are 8 SCEs identified which are divided into 3 main categories: 1) Design Influence (project brief preparation, consultant fees and green certification); 2) Authority Requirement (pre-development charges and contribution charges); and 3) Development Provision (marketing, project overheads and security of funding). This study is practical and relevant for both green and conventional construction project, with an addition of 'green certification' element for green building projects. The paper provides new insight into the understated elements that drive project cost from a managerial perspective and indicates key areas for future studies on project cost.
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Response to Reviewers:	

Dec 23, 2020

Dear Editor of the Environmental Impact Assessment Review

Enclosed is the revised paper after improvement based on the reviewers' comments. The title has been slightly improved from **"Soft Cost Elements: Exploring Management Components of Project Costs in Green development Projects"** to **"Soft Cost Elements: Exploring Management Components of Project Costs in Green Building Projects".**

The correction list is also attached for reference.

This paper is my original unpublished work and it has not been submitted to any other journal for reviews.

Sincerely,
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REVISION LIST

A. Reviewer #1

No.	Comment	*Feedback*
1.	This an overall well-written and interesting manuscript. Based on 12 interviews with experts and a review of cost data sheet, it contributes with novel information to the literature on soft costs associated with green building development projects. Before publication, it is suggested to address the following points:	*Thank you for your comment.*
	The literature on soft costs in green projects and technologies is significantly broader than outlines in the manuscript. For example, providing a few references to the soft cost literature in sectors such as renewable energy (e.g. wind power and photovoltaics, passive houses, energy efficiency in buildings) would embed the manuscript more comprehensively and help to establish linkages with closely related literature streams.	*The literature on soft costs on sectors related to renewable energy has been added under section 1 (introduction), in 3rd paragraph. Additional information on soft cost percentage based on past studies are also added in section 2.1 (paragraph 1, lines 7 - 8) and 2.2. (paragraph 2, lines 6 - 13)*
	In the reviewer's point of views, the discussion chapter is the main part of the manuscript in need for revision. For this revision, it is proposed to more clearly provide guidance to the reader in interpreting the results as well as outline the contribution of the paper in relation to the existing literature on soft cost in green development projects. Currently, the discussion chapter largely reads like another literature review and it is not clear how the findings obtained from the interview / cost data sheets provide novel insights.	*The overall discussion in Section 5 has been revised.*
	It would also be valuable to highlight the implications of the findings for future research, as well as for practitioners.	*The implications of the findings for future research are included in Section 5 'Discussion and Conclusion'*
2.	It is proposed to define 'Green projects' more clearly (e.g. Green building projects') to delineate the scope of the manuscript more precisely.	*All 'green projects' have been replaced with 'green building project". This include in the title in which 'green development projects' is now changed to 'green building projects'.*

3.	It is recommended to have the manuscript proof-read by a professional English-language editor. In particular, throughout the paper articles (‘the’, ‘a’) are missing.	*Manuscript has been proof-read by professional English language editor.*
4.	Figure 1 is rather simple, and it is suggested to display this information in a table-format and complement it with additional brief explanations of the different soft-cost categories	*Figure 1 has been replaced with Table 1 which comprised of brief explanation of the soft cost categories*

B. Reviewer #2

No.	Comment	*Feedback*
1.	Overall discussion of research finding should present with the additional table of finding as research finding, additional discussion based on figure and detail analysis related to theoretical empirical study. The finding, table not discussed in detail and comparatively to analytical theory of the study.	*The findings which previously illustrated as Figure 1 has been replaced with Table 1. Elaboration on Table 2 and 3 have been revised (Section 4.2, paragraph 2 and 3). The overall discussion in Section 5 has been further improved.*

Soft Cost Elements: Exploring Management Components of Project Costs in Green Building Projects

Abstract

This paper reveals the non-technical elements that affect construction project costs, known as soft cost elements (SCEs). These elusive elements have received little attention although they are significant in influencing management decisions of a project. There is much interest in the mitigation of cost for green projects, but the focus is generally leaning towards hard cost aspects. Information about SCEs remains obscure. Qualitative approach is adopted in this research using face-to-face unstructured interviews with 12 respondents consisting of green building project experts who have been involved in many projects certified by the Malaysia Green Building Index (GBI). A total of 4 project cost datasheets were also analysed to confirm the SCEs in the project budget and to enable a clear definition of the SCEs term. The results show that SCEs are tangible and not hidden in nature. Although they constitute smaller percentage in the project cost, the implications of SCEs are far-reaching and can influence critical management decisions. There are 8 SCEs identified which are divided into 3 main categories: 1) Design Influence (project brief preparation, consultant fees and green certification); 2) Authority Requirement (pre-development charges and contribution charges); and 3) Development Provision (marketing, project overheads and security of funding). This study is practical and relevant for both green and conventional construction project, with an additional of 'green certification' element for green projects. The paper provides new insight into the understated elements that drive project cost from a managerial perspective and indicates key areas for future studies on project cost.

Keywords: Green building project, soft cost element, project cost, management decisions, Malaysia

Paper type: Research Paper

1. Introduction

Research on green building projects has increased rapidly in the last decade focussing more on green design and technology (Konis and Selkowitz, 2017; Darko et al., 2017), occupants' satisfaction and comfort (Liang et al., 2014), barriers and enablers (Abidin et al., 2013), management of green building project (Azizi et al., 2014) and rating tool (Chen et al., 2017). While most of the green-related research skewed towards technical aspects of project development, research on non-technical aspects or soft aspects such as people influence in project, (Hoffman and Henn, 2008), management and administrative decisions are slow in receiving their deserving attention (Azizi and Abidin, 2012). The complex nature of the technical work and extensive involvement of various parties in a construction project necessitate better management and administration approach to keep the work on track and budget in line (Yap et al. 2019).

Cost increment has been identified as the main barrier in implementing green building projects (Chan et al., 2018). Cost is categorized into hard cost and soft cost. Hard costs are cost for physical items that incur actual and direct costs such as building elements, material, and technology (Kubba, 2012). These costs are visible and easily identifiable as they form between 70 to 80 percent of project costs (Victoria et al., 2017), thus, have been the focus of many studies aiming to explore and improve project cost (Bohari et al., 2017). Soft costs, which include non-physical expenses such as certifications and fees (Taemthong and Chaisaard, 2019) or indirect costs (Kubba, 2012), have been sporadically discussed and the elements that fall within this category remain elusive. Costs involved in management, approval process and documentation are usually treated as less significant compared to the hard cost counterpart (Abidin and Azizi, 2016). Cost related to management and control of a project is difficult to quantify and the elements that constitute this 'soft' side of project cost remains unclear (Hoffman and Henn, 2008). In this paper, the elements of non-physical expenses are dubbed as Soft Cost Elements (SCEs). Victoria et al. (2017) indicated that while tangible costs dominate total project cost, the design and management of the project, which may be smaller in cost percentage, can have major impact on the overall project performance. SCEs are associated with the management and facilitation of the overall project and decisions. These elements underlay decisions leading to the outcome of the hard cost (Azizi et al., 2015). The benefit of appreciating SCEs is beyond monetary value as it ensures that the project is managed in an effective manner and all requirements of hard aspects are catered for. Limited research has explored the soft part of cost consideration in green building projects, although many admitted that soft elements constitute fundamental administration aspects to drive the project forward.

Soft cost is also evident from the use of technologies. Within technologies installation, soft cost is defined as non-hardware costs (Beck and Rai, 2020). Although technologies are commonly seen as hard cost, there are management costs that incur within the adoption of the technologies which affect the price of the technology itself. Differ from building cost in which soft cost takes relatively smaller portion as compared to hard cost, in technology installations such as solar photovoltaic (PV) system, the soft cost accounts for 52% – 70% of the overall cost (Beck and Rai, 2020). The soft cost also accounts for 21% of total cost for renewable energy wind farms (Chen et al., 2016). So, it makes sense that soft cost is a major driver of renewable energy system prices (Ardani et al., 2013). By improving the soft costs (through better permit process, inspection, overhead), the cost of PV installation can be reduced (Burkhardt et al., 2015). Similarly, soft costs in building also cover the non-technical aspects of the project. However, due to the magnitude of the project that require a

combination of various hard elements such as materials, technologies and products, the percentage of hard cost far outweighs the soft elements, which basically covers the management requirements. Soft cost covers all aspects related to application, certification, consultancy, and design cost (Uğur and Leblebici, 2018). The variation in the soft cost can lead to cost differences. Policymakers can support soft cost reduction in various ways such as standardizing permitting fees and procedures (Burkhardt et al., 2015). Thus, soft cost and hard cost are closely connected and only by combining them that the whole cost is accurately determined.

Malaysia has shown commitment towards green development through various forms of policies, regulations, and economic instruments (Abdul-Aziz and Ofori, 2012). Despite these, implementation of green building projects in Malaysia is still limited as it is predisposed to variables such as building design procedures, government policies, types of projects and stakeholder perceptions (Sharif, et al., 2017). There are still many factors hindering green development in the country which can be grouped into financial barriers, human barriers, management barriers, technical barriers, and institutional barriers (Ahmad et al., 2019, Abidin et al., 2013). Three categories of barriers (financial, human and management) are related to the soft aspect in construction projects, which indicate the importance of SCEs in alleviating the barriers of green development. To fully understand these barriers and effectively address them, there is a need to explore the basic elements inseminating the proliferation of such barriers at root level.

This paper explores the soft elements that would influence cost in green building project. This paper also focuses on identifying the elements of soft cost and not the expenses caused by the elements. Through literature, four possible elements of soft cost have been identified which are then examined against empirical evidence base. Drawing on the experiences of twelve experts who have been involved in various green building projects and supported with evidence from four cost datasheets, the study unveils the elements of soft cost and imparts a full explanation of its description. The paper provides new insight into elements that drive project cost from a managerial perspective and indicates key areas for future studies on green building project cost.

2. Literature review

2.1. Cost issues in Green Projects

Previous studies have cited the existence of cost differences in constructing green buildings as compared to their conventional counterparts. This cost difference is due to additional design and construction cost related to green components which is referred to as green cost premium (Hwang et al., 2017). Turner and Frankel (2008) indicated the green cost premium for green buildings fall within the range of 1 – 4 percent while others (Dwaikat and Ali, 2016; Bohari et al., 2017) have given greater range of cost variation between less than 1 percent to more than 20 percent. Uğur and Leblebici (2018) indicated the additional cost premium of 7.43% and 9.43% between gold and platinum LEED certified buildings. Victoria et al. (2017) discovered that building elements are responsible for over 70% of total project cost. Thus, it makes sense that many scholars tend to focus on tangible elements or hard elements that relate to direct cost. Dwaikat and Ali (2016) stated that the range of cost premium variations does not solely lie on hard building elements, but one must delve into the management and delivery of green buildings, that is the soft aspect of the project.

Cost issue, as an obstacle to green building project, should be addressed by ensuring the cost premiums are reduced further or at no cost difference than conventional projects (Yudelson, 2009). The cost premiums found in green building projects are often due to active design strategies which involve the acquisition of expensive green materials and technology (Ping and Chen, 2016; Chan et al., 2018). In addition, green building is viewed as more complex due to design and certification requirement, which reflects the need for specialised consultants (Hakkinen and Belloni, 2011). However, cost premiums can be minimised through integrating passive design (Zhang et al., 2011), increasing competition among local green technology suppliers and introducing government incentives (Chan et al., 2018). With good planning and management, green buildings may have little or no added cost to the project (Kats, 2006).

While a few studies have debated on the cost premium dilemma (Mekala et al., 2015; Balaban and Puppim de Oliveira, 2016), many industry practitioners remain sceptical with cost issue (Bohari et al., 2017). Similarly, in Malaysia, research has found that majority of construction firms are reluctant to participate in green building development due to the cost factor (Ahmad et al., 2019)). While most scholars focus on hard cost in reducing green cost premium, the aspect of soft cost must also be attended for. Azizi et al. (2015) highlighted the importance of focussing on soft elements as it can impose various financial risks relating to design, permission, and certifying processes of the project execution that can lead to expensive delays and increase in cost premium.

2.2. Soft Cost Elements (SCEs)

Project elements can be divided into hard and soft elements, where hard elements are the physical construction entities and soft elements are managerial services such as design and certification (Yudelson, 2009). The term ‘cost’ is attached to denote the expenses caused by these elements. Soft cost is associated with the ‘off-site’ costs not directly related to labour or construction materials that can fluctuate as project progresses, design and administrative service costs, planning and design costs (Kubba, 2012). There is no clear definition of SCEs from previous studies, however, it can be deduced that SCEs are associated with indirect and hidden elements that relate to management and service aspects of a project.

SCEs are crucial because they are responsible for effectively managing the project and have a domino effect on hard cost elements. Azizi and Abidin (2012) stated that the effective management of the green building is crucial as it shall affect project costs and decisions. Cost premiums in green building projects are reinforced by ‘soft aspects’ such as management support, experience of designers and proper planning, which influence the level of cost variation (Shen et al., 2017). Uğur and Leblebici (2018) conduct a study to compare the cost premium between gold and platinum LEED certified buildings in Turkey and discovered that the share of soft cost in total construction cost increased by 0.84% and 1.31% respectively. A study by Ade and Rehm (2020) discovered that there are 12% cost premium for green certification in which only 1% if for the additional soft cost and the remaining 11% are related to hard cost. This percentage however focus on green certification as the element of soft cost. Apart from certification, soft cost also covers all aspects related to application, consultancy, and design cost (Uğur and Leblebici, 2018). These other elements of soft cost that are more difficult to conceive due to its indirect and hidden nature. Although few sources have supported the existence of soft elements in construction projects, the element itself has been sporadically discussed. There are four potential elements of soft costs which have been

identified from the literature, namely insurance, design cost, green certification, and project provision.

Green buildings may incur multiple risks throughout the various stages of the project such as financial, legal, reliability of new technology, material availability and building performance (Azizi et al., 2011). Insurance policies are important as an incentive to support green building projects due to their higher perceived risks (Gabe, 2008). Having adequate insurance policy will ensure the project is fully protected. Due to the unique qualities that green buildings possess, standard insurance products need to be enhanced to cover newfound risks (Holbrook, 2009). Green building projects often necessitate additional architectural and engineering fees due to the complexity in design and rigorous design exercises to comply with green certification requirements (Kubba, 2012). As the work involves in green building projects often extend beyond conventional norms, the services rendered in design also grow. Means (2010) estimated that design cost for green building can be 5 percent more than the conventional counterparts. Design fees are largely paid upfront which means the fees are invested when developers are still facing uncertainty regarding the project success. From a cost perspective, design costs represent just a fraction of development cost, but its outcome can determine the size and distribution of project spend (Chegut et al., 2015).

Green certification is also identified as one of the soft elements in construction projects. Registering for a green building certification has many desirable benefits that come at a specified fee. All green rating tools charge their price according to the project size and rating level applied for. The higher the rating level desired, the more expensive the certification fee will be (GBI, 2019). While the certification fees are relatively small, the decision to register for a green certification provides many other consequences to the project entirety (Teng et al., 2016). Applying for green certification involves certain documentation activities, which is an aspect of soft elements as it influences the management of the project delivery. Northbridge Environmental Management Consultants (2003) reported that an average of 226 hours is needed to complete all proper documentation to register and certify a green building project.

Project provision refers to service-based works required for project approvals and other necessary requirements for building occupation. Project provision focuses on two aspects. Firstly, it is on documentation and activities to get approval for project plans and any charges or fees required for processing the documents. The cost incurred can be in the form of layout and building plan fee, planning permission application (to municipal council) and engineering-related plan fee. This cost incurs before project begins. Secondly, any charges paid to the service providers before the building can be occupied. This cost incurs at the end of the construction phase and usually for service connection and testing of utilities and infrastructure such as for water supply, electricity supply, sewerage line and telecommunication lines. Maruani and Amit-Cohen (2011) stated that the cost of project provision depends on the size of the project and basically involves third parties such as the local authority and service providers who will determine the cost of the provisions. Means (2010) indicated that the cost range for project provisions is between 0.5 – 1.5 percent of construction cost in green projects.

3. Methodology

A qualitative approach is adopted in this research to explore the obscure aspects of project

cost. There is limited discussion on what constitutes SCEs. Literature provides four potential SCEs to serve as a base for this exploratory research. This study takes the ontological assumption which embraces the idea of a subjective reality as seen by the research participant. As the nature of enquiry was exploratory, it demands high flexibility and responsiveness. Using face-to-face unstructured interviews, twelve (12) respondents consisting of green building experts (project consultants) with high experience in GBI certified green building projects in Malaysia, were approached. The respondents are identified as R1 to R12. The respondents were selected using purposeful sampling which was later supported by snowball sampling. Creswell (2012) stated that it is common for qualitative interviews to be conducted between five to twenty-five interviews. The study focused on gathering the opinions of leading senior level practitioners to ensure a reliable knowledge base and to provide information-rich narratives (Patton, 2014). Three selection criteria were imposed to ensure that suitable information-rich respondents were recruited: 1) involvement in certified green building projects, 2) senior level project consultants, and 3) more than 10 years in the industry. All twelve respondents have between 20 and 30 years of construction work experience, hold top management positions and have extensive knowledge in green building projects. The respondents comprised of seven architects, three engineers, one quantity surveyor and one town planner. While the respondents' demographic background was varied, this was not a cause for concern as the research focussed on information-gathering of green building project practices and required practical insight from management level practitioners. All the respondents had relevant knowledge on green building projects and were able to contribute to the study from design, planning, procurement, and implementation aspects.

Each interview ranged between 40 and 60 minutes. An aide-memoire was used as a brief set of prompts to guide the interview and the discussion was recorded using a voice recording application for further analysis. The rich data was used to explore the general perceptions and experiences of green building experts to expose the indistinct elements linked to materialisation of cost. Interviews were transcribed verbatim and thematically analysed using both deductive (guided by literature) and inductive (emerging from the data) approaches (Patton, 2014). This allowed the data to be systematically organised, reduced, refined, and interpreted. Commonalities and differences in the transcripts were identified and coded, and then arranged into themes to allow pattern recognition and deduct early conclusions. The data reached a point of saturation at the eleventh interview as no new findings were further revealed (Creswell, 2012). A subsequent twelfth interview was conducted to confirm that the findings had stabled.

In addition to the interviews, 4 project cost datasheets were also analysed to confirm the SCEs in the project budget and to enable a clear definition of the SCEs term. The cost datasheets are from recently completed green building projects located in Kuala Lumpur, the capital city of Malaysia. They provide an elemental cost breakdown of the projects and allow clear segregation of cost, dividing hard and soft elements of the project.

4. Research Findings

The literature suggests 4 potential SCEs in green projects namely insurance, design cost, green certification, and project provision. From the interviews and cost datasheets, a total of 8 SCEs have been identified, which are grouped into 3 main categories. The suggested SCEs

from the literature were renamed and assigned under each main category, while insurance is excluded from the list. The cost datasheet provides a percentage breakdown of the SCEs and enables a clear definition of SCEs. This section is discussed in two aspects: 1) categorisation of SCEs, and 2) cost distribution of SCEs and SCE definition.

4.1. Categorisation of SCEs

The study discovered 8 SCEs namely project brief preparation, consultant fees, green certification, pre-development charges, contribution charges, marketing, project overheads and security of funding. These SCEs are discussed under three categories namely Design Influence, Authority Requirement and Development Provision.

4.1.1 Design Influence

Design Influence refers to the soft elements that would influence project decision especially in deciding the project requirements that would set the course of project delivery. Within Design Influence category, the consultants play a major role in influencing the SCE's impact through performing their design duties and in negotiating their fees. There are 3 SCEs under this category, namely project brief preparation, fee structure and green certification.

The implementation of construction projects is driven by choices made by the project clientele. All interviewees noted that project control, which is the degree of authority vested in the consultant, is valuable in exerting influence on critical decisions for the project. Having a clear project brief will assist in project control and assuring client's commitment for the project. As asserted by respondent R4, project brief is limited by the client's financial limitation and any changes to it depends on client's comfort to accept the associated costs and risks of the proposed change. R11 expressed that good consultants were expected to be able to balance business interests and environmental welfare when designing building solutions in accordance with the project brief. The project brief will set in motion all other actions in the project and by extension, the project budget and cost. There are costs associated with the preparation of the project brief such as conducting a market survey and feasibility study. Any changes to project brief will cause delay in developing project design and project cost estimates. As this preparation begins at project initiation and may change as design is being developed, it is difficult to determine how this element may affect the project cost.

The respondents also acknowledged that consultant fees have some bearing on the consultants' commitment to the project. The arrangement of fees normally reflects the level of work responsibility due for. According to one of the respondents, it is not unusual for developers to ask the architect to hire other consultants who played a smaller and more temporal role in the project. While these consultants are important to execute key tasks in the project delivery, they have little to no influence on the project strategy. The main players that are influential to decide on the project outcome are the architects and engineers as they hold the biggest responsibilities compared to other consultants. Consultant fee is one of the obvious SCEs in which the amount can be quantifiable, and the fee percentage is known once the consultants are engaged. Respondent R8 indicated that this cost is allocated for the service of the consultant in terms of design, management, and project administration. The fee arrangement usually follows the pre-set guide by the professional body. However, the fees can be negotiated based on the complexity of the project. In green building projects, a negotiated fee is preferred as compared to a fixed rate (Respondent R12). Regardless of a fixed or negotiated fee, this cost will be known early in the project with slight variations

depending on the final project cost. R10 accentuated that because the consultant fee was proportional to project cost, there was no reason for the engineers to be concerned with downsizing the mechanical costs or increasing the operating energy efficiency unless there were incentives in place to optimize cost.

There are many green rating tools available in Malaysia as they may choose to register with the local tools such as the Malaysia GBI or obtain other international tools such as USA's LEED. Depending on which rating tool the project intends to pursue and which level of certification they want to obtain, there are many criteria they would have to fulfil. These criteria would have a significant influence on the project design to ensure that the rating points can be collected. Respondent R1 asserted that the cost risks in green projects are mostly defined by the building specification, project scope and quality standard as expected by the green rating tools to satisfy certification requirements. Developers are required to pay a registration fee when applying for green certification. The fee, which includes a design assessment and completion assessment, varies according to the project size. Fee is also applied when the certification needs to be renewed (Respondent R6).

4.1.2 Authority Requirement

Authority Requirement constitutes the obligations and requisites set forth by the authorising local council as a condition precedent to project approval. Depending on the location of the project, the fees or charges payable to the local authority for obtaining various project approvals vary. There are two SCEs under this category namely, planning approval and contribution charges. This aspect is similar with the 'project provision' identified from literature earlier. Despite these elements representing a cost themselves, they also affect the project by bringing about change to the project design to satisfy the authority's planning requirement.

There are many expenses incurred during planning approval, which refers to pre-development charges. It is basically monies collected from land developers by the municipality for assessing the compliance of the project with the authority requirements before providing project approval. The respondents explained that pre-development charges are common charges placed by the local authority on any new development. It varies according to the decreeing local authority and depends on project size. Respondent R3 informed that these charges are the first expenses of the developer after confirming the project feasibility and are necessary to establish the project start. The charges are usually about 30% of the difference in land value before and after conversion of land use. In addition, the local authority charges a submission fee to developers for every development project application. In Kuala Lumpur for example, the municipal council has set their processing fee at a fixed rate of Ringgit Malaysia (RM) 40 (≈USD9.50) for the first 1000sqft, RM 20 (≈USD4.70) for subsequent 1000sqft of the first 5000sqft and RM 10 (≈USD2.40) for each 1000sqft balance thereof (Respondent R5). The charges incurred for planning approval include survey and mapping costs, layout and building plan, planning permission application (municipal council) and engineering related plans such as earthwork, drainage and sanitary. Respondent R8 suggested that these costs be alleviated for green building projects as a way of supporting the administrative costs involved in achieving green certification. While these are nominal costs, they were strong indicators of the local authority's development agenda. Respondent R12 pointed out the importance of including sustainability goals in the local authority overall development plan so that an organized ecosystem could be achieved.

Contribution charges are paid to the service providers towards the end of the construction period before the project is deemed fit for occupation. The charges are usually for connection and testing of utilities and infrastructure such as for water supply, electricity supply, sewerage service, fire inspection and testing and telecommunication line. While the contribution is generally small, it is important to include this cost as part of the project outlay. For example, the respondent highlighted the Improvement Service Fund (ISF), a fund collected by the Government under the Street, Drainage and Building Act 1974 (Act 133, Part VI: Section 132). Respondent R3 explained that the funds were essential to assist the city council to maintain and improve basic amenities such as public roads, as well as finance repair works brought by the new development. Respondent R4 provided an example of the City Council of Petaling Jaya in the state of Selangor, Malaysia, where the council imposes an ISF payment of RM500 (≈USD119) for every apartment unit above RM100,000 (≈USD23,800). Respondent R3 further clarified that for areas where there were plans for infrastructure development in the future, the local authority requires that developers pay a contribution fee to support the projects because the new infrastructure would benefit their project. The respondents however, indicated that it is unclear how the sum was determined and remain inconsistent across projects and authorities. As this SCE varies, it was difficult to estimate the appropriate cost allowance in the project budget and had to be assumed as a lump sum based on past projects.

4.1.3 Development Provision

Development Provision represents elements that are necessary for project establishment but do not directly affect the project design. These elements support the project's business strategy and serve the administrative purpose for project implementation. There are 3 SCEs under this category namely, marketing, project overheads and security of funding.

Marketing is usually handled by a different team in a project either by the internal sales and marketing department or outsourced to marketing agencies. Respondent R3 revealed that for every construction project, a budget will be allocated for marketing purposes. This is usually a lump sum figure meant for any marketing activities and materials related to the project promotion. The size of the budget depends on the intended publicity. For green projects, Respondent R1 and R2 agreed that the market for green buildings is lower than that of conventional buildings due to its higher selling or renting price. As such, marketing plays a major role in promoting the green building project to increase awareness, interest and to attract potential buyers.

Part of the project cost distribution includes the provision for project overheads such as staff and operation expenses. Respondent R3 explained that although staff salary is an office overhead instead of project overhead, a cost is often allowed for supporting staffing stipends in every project budget. Operation expenses refer to running office costs and project contingencies. As the exact expenditure for this is unclear, a ballpark sum was usually estimated.

Security of funding plays a vital role in determining project feasibility. The respondents informed that loans of up to 70% are usually obtained to cover the project cost, while the remaining 30% are mostly absorbed by the developer. Respondent R4 recounted that for projects where the developer intends to sell the building unit, this 30% will be collected from the buyers of the units sold. In cases where the developer intends to occupy the building, the 30% is supported by the developer's own reserves. Where cost is involved, it often affects the

project direction and decisions thereon. Respondent R6 explained that loans hinge on the risk level that the project is exposed to. While a creative pro-green design solution is always desirable, consultants are restricted by the potential risks affecting security of funding.

In general, the respondents agreed that there are many administrative costs incurred in a construction project that are being absorbed by the client. Some of the obvious soft costs such as green certification, consultant fees, pre-development charges, contribution charges and marketing can be quantified clearly based on percentage, although the percentage varies depending on location and size of the project. Security of funding basically involves the amount of interest payable to the financial institution. The amount depends on the agreement between the two signatory parties. Project overhead is difficult to quantify as it involves the number of employees and the fluctuating use of project utilities. Cost relating to project brief incurs early to set the project in motion. Insurance, which was suggested earlier based on literature, was excluded from the list of SCEs. The respondents generally agreed that although insurance do have bearing on the project cost, it was mainly absorbed by the main contractor under the 'Contractor All-Risk Insurance'. The SCEs identified have direct and indirect impact to the client. Table 1 presents the description for the SCEs relevant to green building projects.

Table 1
SCEs in Green Building Projects

SCEs	Description
Design Influence Elements that would influence project decision especially in deciding the project requirements that would set the course of project delivery	
Project Brief Preparation	Costs incur due to the determination of project viability and to provide client's general requirement or direction at the initial stage of the project planning
Consultant Fees	Fees paid to the consultants for the services they provide, usually in the form of design, costing, management, and administration of the project.
Green Certification	Fees paid for registration and certification obtained from established green rating tool
Authority Requirement Elements that constitute the obligations and requisites set forth by the authorising local council as a condition precedent to project approval and charges paid for connections with service providers	
Pre-development Charges	Collection by the municipality and other local authorities for assessing project compliance before project approval is granted
Contribution Charges	Charges paid to the service providers for connection and testing of utilities and infrastructure prior to practical completion
Development Provision Elements that are necessary for project establishment but do not directly affect the project design. These elements support project's business strategy and serve the administrative purpose for project implementation	
Marketing	An allocation to promote and market the projects
Project Overheads	A provision to support additional stipend for staff and operation expenses
Security of Funding	The amount obtained from loan to ensure adequate fund reserve and

	the amount of interest payable to the financial institution.

4.2. Cost Distribution of Soft Element and SCE definition

There are four cost datasheets obtained for document review to identify and confirm the existence of SCEs in the project budget and to distinguish the category of the elements. The cost datasheets were obtained from four different green building projects. The documents verified that project development costs encompass many elements beyond the physical building which can be included as part of SCEs. Table 2 identifies the category of each SCE. Table 3 presents that percentage of SCEs based on Gross Development Value (GDV) and Building Works (BW).

Table 2
Identification of SCEs in project cost distribution.

Management components	SCEs sub-category	SCE category
Contribution to water, electric and telecommunication supply	Contribution charges	Authority Requirement
Contribution to Improvement Service Fund (ISF) (road)	Contribution charges	Authority Requirement
Contribution to ISF (drain)	Contribution charges	Authority Requirement
Contribution to Sewerage Services	Contribution charges	Authority Requirement
Planning approval charges	Pre-development charges	Authority Requirement
Other local authority fees and charges	Pre-development charges	Authority Requirement
Sales and marketing	Marketing	Development Provision
Project Overheads	Project Overheads	Development Provision
Bridging Finance	Security of funding	Development Provision
Green certification	Green certification	Design Influence
Professional fees	Consultants' fees	Design Influence

Table 3
Percentage breakdown of SCEs in project cost.
Note: GDV: Gross Development Value; BW: Building Works

Management components	Percentage Breakdown
Contribution to water, electric and telecommunication supply	0.1 - 1% of GDV
Contribution to ISF (road)	0.1 - 0.5% of GDV
Contribution to ISF (drain)	0.1 - 0.5% of GDV
Contribution to Sewerage Services	$\leq$ 1% of GDV
Planning approval charges	1 - 2% of GDV
Other local authority fees and charges	0.25 – 0.70% of GDV
Sales and marketing	1 - 3% of GDV
Project Overhead	1 - 2% of BW
Bridging Finance	20 - 70% of BW or Interest rate 6 – 9% of loan amount

Green certification	<2% of BW (depending on the rating level)
Professional fees	7 - 10% of BW

Table 3 summarised the percentages of SCE, which can either be based on the GDV or BW. The costs borne by the developers under GDV are those incurred or expected to incur at planning stage of the project, and they are unaffected by other parties in the project such as the consultants and the contractors. Except if the sales and marketing is handled by internal department, the percentages based on GDV are the amount set aside to deal with the external parties of the project, such as the local authority, service providers and marketing agencies. From Table 2, out of 11 SCEs, 6 SCEs are under Authority Requirement. Items under Authority Requirement are based of GDV percentages. Only sales and marketing are parked under Development Provision. For SCEs based on GDV, the highest percentages for sales and marketing that can ranged between 1 – 3% of GDV. Individually, for SCEs under Authority Requirements, the percentages are less than 1% only, which reinforced that SCEs constitute small fractions of development cost. However, without the approvals obtained under Authority Requirement, the project will not be able to proceed.

Percentage of SCEs which are calculated as fractions of BW are project overhead, bridging finance, green certification, and professional fees. The highest percentage is for the security of funding (bridging finance) which can constitute from 20% to 70% of BW. This amount depends on the financial capital needed and monies available from the client or developer's reserves to kick-start the project. Payments on interest are usually between 6 to 9 percent of the full amount. The rest covers basically less than 2% for project overheads, less than 2% for green certification (depending on the intended rating level) and less than 10% for professional fees. It confirms that the individual SCEs as fractions of BW are 10% or lower including the interest rate for loan amount. The highest cost percentage for SCEs (based on BW) is between 7% - 10% (for consultants' or professional fees). This is followed by the loan interest (6 – 9%). Green certification, which is specific for green building project, only constitutes 2% of the BW.

It is also discovered that not all SCEs can be found in the cost datasheets. Only SCEs related to the management of the project are visible in the cost datasheet either as part of project GDV or BW. All elements under Authority Requirement and Development Provision are clearly indicated in the cost datasheet while only two elements under Design Influence appear in the cost datasheet namely, consultants' fees and green certification. SCE which remained hidden is the project brief preparation.

There are two outliers in the above findings: 1) project brief preparation and 2) security of funding. Project brief preparation is hidden in nature as it happens prior to project initiation and continue to develop in more specific at the early stage of project planning. As such, the cost of preparing the brief is not recorded in the project cost. The cost is absorbed by the client's or developer's firm as part of their business strategy, and not as part of the project requirement. Security of funding is the project pillar. Without it, the project will not be in existence. Thus, it is only natural that it constitutes a large percentage (20 to 70%) of the BW. Funding is a project provision and a necessity, but it does not affect the management process of the project. The security of funding can also be viewed as the interest rate percentage because the extra amount that the developers shall pay is the loan interest. The loan amount itself shall offset each other. Without the two outliers, SCEs can be defined as the elements relevant to the management and administrative process of the project, which do not contribute to activities associated with the physical erection of the facility on site. They are tangible

costs with smaller percentages in project cost or gross development value and borne by the project client or project developer.

5. Discussion and Conclusion

Each construction projects begins with the establishment of client's needs and wants in the form of project brief before the engagement of the project consultants. All local authority requirements must be fulfilled and allocation for development provision will depend on the project needs. Any decision on direction of the design must be made early in the project. The above actions relate to soft elements for a construction project. Past research acknowledged the existence of these soft elements in the form on non-technical and managerial aspects of projects (Beck and Rai, 2020; Uğur and Leblebici, 2018; Shen et al., 2017; Azizi and Abidin, 2012). This research goes beyond that by unveiling the various components of SCEs, group them into three categories and produce the SCEs distribution according to building works and development value.

This study confirms that the components of SCEs remain the same for green and conventional projects. This is because each SCE forms an integral part of project planning and process. The only difference is the green certification addition. Although the percentage of green certification is less than 2% (depending on the rating target), it has a knock-on effect on other SCEs, although it may not be obvious. For example, the professional fees may need to add percentage for green consultant, or the design may change to incorporate green requirements. One can argue that achieving green certification is the cause of increase in soft costs and hard cost, and it is beyond the fee charges for the certification. This finding is consistent with the study done by Uğur and Leblebici (2018) and Ade and Rehm (2020), in which the decision on green certification shall have the impact on green cost premium which includes both hard and soft cost. Although soft cost is still comparatively small as compared to hard cost (less than 1.5% of the cost premium increment), it is still present and thus, bear an impact on the project cost, and ultimately, project decision. Thus, this study recommends improving the elements that would be affected by the green certification rating criteria to reduce green cost premium. Green cost premium has been the main barrier to green building project acceptance and implementation. From this study, the elements that would mostly be affected by the green certification is grouped under Design Influence which also includes professional fees and project brief.

The visible Design Influence items of SCEs are green certification and professional fees. Professional fees are paid to various consultants for the services rendered. Integral in that service is design and management, both part of soft elements of a project. There has been a perception that fees to the consultants will be different for green projects due to the complexity of green design (Gambatese et al., 2007). Although this study confirms that professional fees take the biggest percentage of SCE, the fees are still competitive and similar with conventional projects. The roles and responsibilities of project consultants in green projects are generally similar with conventional projects. The fixed fee set by the professional bodies are still applied to green building projects, but the negotiated rate can cause fluctuations in the percentage. Abidin and Shariffuddin (2019) indicate that although consultants prefer the negotiated fee for green building, in most cases there is no additional

charge being imposed to the professional fees due to green measures because they are bound by their professional ethics. Based on above finding, green cost premium is not affected by the professional fees of standard group of consultants such as architect, quantity surveyor and engineers. The percentage of professional fee will only be affected due to addition of consultant such as the need for green facilitator. However, green certification decision will affect green cost premium if the professionals are unable to deliver as expected. In green projects, additional requirements to the design are expected because of the need to comply to green certification criteria, and this require consultant's knowledge and expertise in green practices (Azizi et. al, 2015). According to Uğur and Leblebici (2018), decision for gold and platinum projects increase the percentage of construction cost by 7.43% and 9.43% in which 0.84% and 1.31% are soft cost. The main contributor to project cost increment relates to design-related factor for incorporating alternative system, application of new materials and technology. Thus, the role of the consultants is crucial to reduce project cost because their experience and knowledge in green design will ensure the project does not overdesign. Overdesign is one of the causes of green cost addition (Wu et al, 2020). Working in 'silo' practice in which the designers design without collaboration with the other designers contributes to overdesign (Azizi et al, 2017). Soft cost can be reduced through improvement in project process including knowledge generation and learning and interaction with various parties (Strupeit, 2017).

Project brief has the tendency to change due to clients' incomplete information and changing requirements as more input is added to the design concept and budget refinement (Mahat and Adnan, 2018). Poor definition of performance objectives in design brief is also one of the causal factors of poor green building performance because it leads to poor boundary definition and design assumptions (Tuohy and Murphy, 2015). While project brief clarity has always been recognised as an important element for project success (Hui, et al., 2017), it has never been identified as a soft element affecting the management decision for green building projects. This study identified project brief as one of the SCE that influences design but, categorises it as the only hidden SCE. Due to the nature of project brief, in which they are absorbed by the client and prepared at project initiation stage, it is understandable why project brief has been previously passed as SCE and why this study identified it as hidden. This is the only SCE that is not formed as part of project cost, nonetheless, this study acknowledges the importance of this element in determining the course of the project, its design and cost.

Although there are only two SCEs under Authority Requirement, it has been further split into several items in the cost distribution sheet to cater for different external party requirements. This study confirms that each item under this category is less than 2% of GDV and accumulatively, it can take nearly 5% of GDV, which can make an impact on the overall project cost. Unlike Development Provision and Design Influence in which the developer has control over the output, elements under Authority Requirement deals with external party such as local authority and service provider who set the price of their services. Developers must operate within a regulatory framework of the local statutory planning system to obtain project approval (Maruani and Amit-Cohen, 2011). The elements under Authority Requirement are usually consistent in practice, regardless for conventional or green building. This justifies that elements under Authority Requirement are not part of the green cost premium as they are not affected by the green certification requirement and the fees are set by external party.

However, the fees chargeable by the local authority varies from one state to another. Variation in local authority permit fees can affect the project planning and can have an impact on the project cost. Burkhardt et al (2015) suggest streamlining of local authority regime. By streamlining the fees across states, it enables better project cost estimation from the early stage. Promoting green building projects requires collaboration from various stakeholders (Abidin, 2010). Although this study highlights that the cost related to Authority Requirement is beyond the control of the developers, it still constitutes nearly 5% of GDV. This is where the local authority can play their role in pushing green building projects, either by streamlining their fees across states or by introducing incentives or rebate to reduce the fees, leading to reduction in total project costs.

Development Provision relates to the developers own arrangement. This element relates to tactical planning to promote the project (Fam et al, 2008) and to support the project progress (Assaf et al., 2001). It depends on how much they are willing to allocate for each SCE. Marketing for example, takes about 1 – 3% of GDV, while project overheads takes about 1 -2 % of GDV. These two elements are within the developer's control, but not the loan interest. However, the amount of loan to be secured are within developer's planning. Given the magnitude of cost and risk associated with construction development projects, funding and project financing are the utmost important elements to be secured. Thus, it is logical that the percentage of securing funding is between 20 to 70% of the BW. Chirkunova et al. (2016) stated that the external funding for construction projects can increase up to 80%.

Other industries, such as renewable energy system, has begun appreciating the importance of soft cost and its impact on the total cost ((Beck and Rai, 2020; Chen et al., 2016). In construction industry, soft costs had received less attention than its hard cost counterpart, although their importance have been highlighted by various authors (Taemthong and Chaisaard, 2019; Victoria et al., 2017; Azizi and Abidin; 2012). This study confirms that SCEs cover small percentage in project cost, however, each element serves crucial function in the project progress. For example, if Authority Requirement are not met, the project will not be allowed to continue. Design Influence affects the building design and project planning. At the centre of Design Influence is the professionals who are responsible to transform clients brief into project design and to incorporate green certification requirements in the design. Lastly, Development Provision ensures the project is secured either in terms of funds, people commitment or obtaining buyers. The importance of soft cost lies beyond monetary value as it ensures that the project is managed in an effective manner and all requirements of hard aspects are catered for. It is crucial to ensure the management aspects of the projects are efficient and the client's commitment towards green building projects are maintained throughout the course of the project (Olanipekun et al., 2017) to avoid wastages in cost and project performance (Seyis et al., 2016).

Apart from bridging finance (security of funding), all SCEs constitute less than 10% of GDV or BW. This confirms that soft cost only represents small portion of project cost as compared to its hard cost counterpart which usually ranged between 70 – 80% of project cost (Victoria et al, 2017). All SCEs, except for the project brief, are not hidden and not intangible as they appear in the cost datasheet or project cost breakdown. However, most of them do not form part of the project cost, but part of a larger project scope called gross development value. Project brief is the only element that can be considered hidden as the cost is not included in the project budget and cost breakdown. All soft costs are being borne by the project developers or project clients, but appointed project consultants are deemed to be involved in

managing the Authority Requirement and Development Provision including any requirement for green certification. As such, this study defines SCE as the elements relevant to the management and administrative process of the project, which do not contribute to activities associated with the physical erection of the facility on site. SCE constitutes tangible costs with smaller percentages in project cost or gross development value. Despite this, the implications of SCEs on green building projects are far-reaching and can influence management decision in oblique ways.

The findings confirm that SCEs are fundamental in the project planning, design, and overall management of the construction projects. Most of the SCEs occur at the early stage of the projects and thus, have bearing on the direction of the project. As green cost premium has been identified as one of the barriers to green building project (Hwang et al., 2017), it is crucial to unveil where the source of cost increment lies. Past research has pointed at green certification requirement as the cause of green cost premium and hard costs have been the focal of most study due to the obvious reason of added design and new technology application. (Dwaikat and Ali, 2016; Bohari et al., 2017). This study unveiled the implication of SCEs in project costs. As mentioned before, SCEs have smaller percentage based on GDV and BW. However, the decisions and actions related to SCEs can have significant impact on the hard cost aspects especially in influencing project design. Among all SCEs, developers can reduce further the percentage of SCE by re-strategizing the Development Provision category. Consultants are the key players in planning and designing the project. The professional fees for most consultants remain similar with conventional project fees. It is crucial to engage consultants with the right knowledge and experience to avoid overdesign, unnecessary application of active design and technology. This is the cause of increment in hard cost. The effect of SCEs by the project consultant lies in the services they rendered. There are three categories of external parties involved in project SCEs, which are local authority, service provider and financial institution. Developers have no choice but to pay the fees, bank interest, or any charges by this group of stakeholders. Without this payment, the project cannot proceed. This in an area in which external parties can be proactive in promoting more green building in the construction industry. The cost of design and construction was not higher for green buildings compared to conventional buildings when cost strategies, management and environmental design were integrated to the project development process from the very beginning (Ugur and Leblebici, 2018). The paper provides new insight into the understated elements that drive project cost from a managerial perspective and can be used as a base reference for future studies on project cost.

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Highlights

- Soft cost elements (SCEs) are non-technical elements that affect project costs
- SCEs constitute a small percentage of Building Works and Gross Development Value
- All SCEs, except for the project brief, are not hidden and not intangible
- Green certification is the only SCEs relevant to green development projects

Article Title Page

Title: SOFT COST ELEMENTS: EXPLORING MANAGEMENT COMPONENTS OF PROJECT COSTS IN GREEN BUILDING PROJECTS

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Soft Cost Elements: Exploring Management Components of Project Costs in Green Building Projects

Abstract

This paper reveals the non-technical elements that affect construction project costs, known as soft cost elements (SCEs). These elusive elements have received little attention although they are significant in influencing management decisions of a project. There is much interest in the mitigation of cost for green projects, but the focus is generally leaning towards hard cost aspects. Information about SCEs remains obscure. Qualitative approach is adopted in this research using face-to-face unstructured interviews with 12 respondents consisting of green building project experts who have been involved in many projects certified by the Malaysia Green Building Index (GBI). A total of 4 project cost datasheets were also analysed to confirm the SCEs in the project budget and to enable a clear definition of the SCEs term. The results show that SCEs are tangible and not hidden in nature. Although they constitute smaller percentage in the project cost, the implications of SCEs are far-reaching and can influence critical management decisions. There are 8 SCEs identified which are divided into 3 main categories: 1) Design Influence (project brief preparation, consultant fees and green certification); 2) Authority Requirement (pre-development charges and contribution charges); and 3) Development Provision (marketing, project overheads and security of funding). This study is practical and relevant for both green and conventional construction project, with an additional of ‘green certification’ element for green projects. The paper provides new insight into the understated elements that drive project cost from a managerial perspective and indicates key areas for future studies on project cost.

Keywords: Green building project, soft cost element, project cost, management decisions, Malaysia

Paper type: Research Paper

1. Introduction

Research on green building projects has increased rapidly in the last decade focussing more on green design and technology (Konis and Selkowitz, 2017; Darko et al., 2017), occupants' satisfaction and comfort (Liang et al., 2014), barriers and enablers (Abidin et al., 2013), management of green building project (Azizi et al., 2014) and rating tool (Chen et al., 2017). While most of the green-related research skewed towards technical aspects of project development, research on non-technical aspects or soft aspects such as people influence in project, (Hoffman and Henn, 2008), management and administrative decisions are slow in receiving their deserving attention (Azizi and Abidin, 2012). The complex nature of the technical work and extensive involvement of various parties in a construction project necessitate better management and administration approach to keep the work on track and budget in line (Yap et al. 2019).

Cost increment has been identified as the main barrier in implementing green building projects (Chan et al., 2018). Cost is categorized into hard cost and soft cost. Hard costs are cost for physical items that incur actual and direct costs such as building elements, material, and technology (Kubba, 2012). These costs are visible and easily identifiable as they form between 70 to 80 percent of project costs (Victoria et al., 2017), thus, have been the focus of many studies aiming to explore and improve project cost (Bohari et al., 2017). Soft costs, which include non-physical expenses such as certifications and fees (Taemthong and Chaisaard, 2019) or indirect costs (Kubba, 2012), have been sporadically discussed and the elements that fall within this category remain elusive. Costs involved in management, approval process and documentation are usually treated as less significant compared to the hard cost counterpart (Abidin and Azizi, 2016). Cost related to management and control of a project is difficult to quantify and the elements that constitute this 'soft' side of project cost remains unclear (Hoffman and Henn, 2008). In this paper, the elements of non-physical expenses are dubbed as Soft Cost Elements (SCEs). Victoria et al. (2017) indicated that while tangible costs dominate total project cost, the design and management of the project, which may be smaller in cost percentage, can have major impact on the overall project performance. SCEs are associated with the management and facilitation of the overall project and decisions. These elements underlay decisions leading to the outcome of the hard cost (Azizi et al., 2015). The benefit of appreciating SCEs is beyond monetary value as it ensures that the project is managed in an effective manner and all requirements of hard aspects are catered for. Limited research has explored the soft part of cost consideration in green building projects, although many admitted that soft elements constitute fundamental administration aspects to drive the project forward.

Soft cost is also evident from the use of technologies. Within technologies installation, soft cost is defined as non-hardware costs (Beck and Rai, 2020). Although technologies are commonly seen as hard cost, there are management costs that incur within the adoption of the technologies which affect the price of the technology itself. Differ from building cost in which soft cost takes relatively smaller portion as compared to hard cost, in technology installations such as solar photovoltaic (PV) system, the soft cost accounts for 52% – 70% of the overall cost (Beck and Rai, 2020). The soft cost also accounts for 21% of total cost for renewable energy wind farms (Chen et al., 2016). So, it makes sense that soft cost is a major driver of renewable energy system prices (Ardani et al., 2013). By improving the soft costs (through better permit process, inspection, overhead), the cost of PV installation can be reduced (Burkhardt et al., 2015). Similarly, soft costs in building also cover the non-technical aspects of the project. However, due to the magnitude of the project that require a

combination of various hard elements such as materials, technologies and products, the percentage of hard cost far outweighs the soft elements, which basically covers the management requirements. Soft cost covers all aspects related to application, certification, consultancy, and design cost (Uğur and Leblebici, 2018). The variation in the soft cost can lead to cost differences. Policymakers can support soft cost reduction in various ways such as standardizing permitting fees and procedures (Burkhardt et al., 2015). Thus, soft cost and hard cost are closely connected and only by combining them that the whole cost is accurately determined.

Malaysia has shown commitment towards green development through various forms of policies, regulations, and economic instruments (Abdul-Aziz and Ofori, 2012). Despite these, implementation of green building projects in Malaysia is still limited as it is predisposed to variables such as building design procedures, government policies, types of projects and stakeholder perceptions (Sharif, et al., 2017). There are still many factors hindering green development in the country which can be grouped into financial barriers, human barriers, management barriers, technical barriers, and institutional barriers (Ahmad et al., 2019, Abidin et al., 2013). Three categories of barriers (financial, human and management) are related to the soft aspect in construction projects, which indicate the importance of SCEs in alleviating the barriers of green development. To fully understand these barriers and effectively address them, there is a need to explore the basic elements inseminating the proliferation of such barriers at root level.

This paper explores the soft elements that would influence cost in green building project. This paper also focuses on identifying the elements of soft cost and not the expenses caused by the elements. Through literature, four possible elements of soft cost have been identified which are then examined against empirical evidence base. Drawing on the experiences of twelve experts who have been involved in various green building projects and supported with evidence from four cost datasheets, the study unveils the elements of soft cost and imparts a full explanation of its description. The paper provides new insight into elements that drive project cost from a managerial perspective and indicates key areas for future studies on green building project cost.

2. Literature review

2.1. Cost issues in Green Projects

Previous studies have cited the existence of cost differences in constructing green buildings as compared to their conventional counterparts. This cost difference is due to additional design and construction cost related to green components which is referred to as green cost premium (Hwang et al., 2017). Turner and Frankel (2008) indicated the green cost premium for green buildings fall within the range of 1 – 4 percent while others (Dwaikat and Ali, 2016; Bohari et al., 2017) have given greater range of cost variation between less than 1 percent to more than 20 percent. Uğur and Leblebici (2018) indicated the additional cost premium of 7.43% and 9.43% between gold and platinum LEED certified buildings. Victoria et al. (2017) discovered that building elements are responsible for over 70% of total project cost. Thus, it makes sense that many scholars tend to focus on tangible elements or hard elements that relate to direct cost. Dwaikat and Ali (2016) stated that the range of cost premium variations does not solely lie on hard building elements, but one must delve into the management and delivery of green buildings, that is the soft aspect of the project.

Cost issue, as an obstacle to green building project, should be addressed by ensuring the cost premiums are reduced further or at no cost difference than conventional projects (Yudelson, 2009). The cost premiums found in green building projects are often due to active design strategies which involve the acquisition of expensive green materials and technology (Ping and Chen, 2016; Chan et al., 2018). In addition, green building is viewed as more complex due to design and certification requirement, which reflects the need for specialised consultants (Hakkinen and Belloni, 2011). However, cost premiums can be minimised through integrating passive design (Zhang et al., 2011), increasing competition among local green technology suppliers and introducing government incentives (Chan et al., 2018). With good planning and management, green buildings may have little or no added cost to the project (Kats, 2006).

While a few studies have debated on the cost premium dilemma (Mekala et al., 2015; Balaban and Puppim de Oliveira, 2016), many industry practitioners remain sceptical with cost issue (Bohari et al., 2017). Similarly, in Malaysia, research has found that majority of construction firms are reluctant to participate in green building development due to the cost factor (Ahmad et al., 2019)). While most scholars focus on hard cost in reducing green cost premium, the aspect of soft cost must also be attended for. Azizi et al. (2015) highlighted the importance of focussing on soft elements as it can impose various financial risks relating to design, permission, and certifying processes of the project execution that can lead to expensive delays and increase in cost premium.

2.2. Soft Cost Elements (SCEs)

Project elements can be divided into hard and soft elements, where hard elements are the physical construction entities and soft elements are managerial services such as design and certification (Yudelson, 2009). The term ‘cost’ is attached to denote the expenses caused by these elements. Soft cost is associated with the ‘off-site’ costs not directly related to labour or construction materials that can fluctuate as project progresses, design and administrative service costs, planning and design costs (Kubba, 2012). There is no clear definition of SCEs from previous studies, however, it can be deduced that SCEs are associated with indirect and hidden elements that relate to management and service aspects of a project.

SCEs are crucial because they are responsible for effectively managing the project and have a domino effect on hard cost elements. Azizi and Abidin (2012) stated that the effective management of the green building is crucial as it shall affect project costs and decisions. Cost premiums in green building projects are reinforced by ‘soft aspects’ such as management support, experience of designers and proper planning, which influence the level of cost variation (Shen et al., 2017). Uğur and Leblebici (2018) conduct a study to compare the cost premium between gold and platinum LEED certified buildings in Turkey and discovered that the share of soft cost in total construction cost increased by 0.84% and 1.31% respectively. A study by Ade and Rehm (2020) discovered that there are 12% cost premium for green certification in which only 1% if for the additional soft cost and the remaining 11% are related to hard cost. This percentage however focus on green certification as the element of soft cost. Apart from certification, soft cost also covers all aspects related to application, consultancy, and design cost (Uğur and Leblebici, 2018). These other elements of soft cost that are more difficult to conceive due to its indirect and hidden nature. Although few sources have supported the existence of soft elements in construction projects, the element itself has been sporadically discussed. There are four potential elements of soft costs which have been

identified from the literature, namely insurance, design cost, green certification, and project provision.

Green buildings may incur multiple risks throughout the various stages of the project such as financial, legal, reliability of new technology, material availability and building performance (Azizi et al., 2011). Insurance policies are important as an incentive to support green building projects due to their higher perceived risks (Gabe, 2008). Having adequate insurance policy will ensure the project is fully protected. Due to the unique qualities that green buildings possess, standard insurance products need to be enhanced to cover newfound risks (Holbrook, 2009). Green building projects often necessitate additional architectural and engineering fees due to the complexity in design and rigorous design exercises to comply with green certification requirements (Kubba, 2012). As the work involves in green building projects often extend beyond conventional norms, the services rendered in design also grow. Means (2010) estimated that design cost for green building can be 5 percent more than the conventional counterparts. Design fees are largely paid upfront which means the fees are invested when developers are still facing uncertainty regarding the project success. From a cost perspective, design costs represent just a fraction of development cost, but its outcome can determine the size and distribution of project spend (Chegut et al., 2015).

Green certification is also identified as one of the soft elements in construction projects. Registering for a green building certification has many desirable benefits that come at a specified fee. All green rating tools charge their price according to the project size and rating level applied for. The higher the rating level desired, the more expensive the certification fee will be (GBI, 2019). While the certification fees are relatively small, the decision to register for a green certification provides many other consequences to the project entirety (Teng et al., 2016). Applying for green certification involves certain documentation activities, which is an aspect of soft elements as it influences the management of the project delivery. Northbridge Environmental Management Consultants (2003) reported that an average of 226 hours is needed to complete all proper documentation to register and certify a green building project.

Project provision refers to service-based works required for project approvals and other necessary requirements for building occupation. Project provision focuses on two aspects. Firstly, it is on documentation and activities to get approval for project plans and any charges or fees required for processing the documents. The cost incurred can be in the form of layout and building plan fee, planning permission application (to municipal council) and engineering-related plan fee. This cost incurs before project begins. Secondly, any charges paid to the service providers before the building can be occupied. This cost incurs at the end of the construction phase and usually for service connection and testing of utilities and infrastructure such as for water supply, electricity supply, sewerage line and telecommunication lines. Maruani and Amit-Cohen (2011) stated that the cost of project provision depends on the size of the project and basically involves third parties such as the local authority and service providers who will determine the cost of the provisions. Means (2010) indicated that the cost range for project provisions is between 0.5 – 1.5 percent of construction cost in green projects.

3. Methodology

A qualitative approach is adopted in this research to explore the obscure aspects of project

cost. There is limited discussion on what constitutes SCEs. Literature provides four potential SCEs to serve as a base for this exploratory research. This study takes the ontological assumption which embraces the idea of a subjective reality as seen by the research participant. As the nature of enquiry was exploratory, it demands high flexibility and responsiveness. Using face-to-face unstructured interviews, twelve (12) respondents consisting of green building experts (project consultants) with high experience in GBI certified green building projects in Malaysia, were approached. The respondents are identified as R1 to R12. The respondents were selected using purposeful sampling which was later supported by snowball sampling. Creswell (2012) stated that it is common for qualitative interviews to be conducted between five to twenty-five interviews. The study focused on gathering the opinions of leading senior level practitioners to ensure a reliable knowledge base and to provide information-rich narratives (Patton, 2014). Three selection criteria were imposed to ensure that suitable information-rich respondents were recruited: 1) involvement in certified green building projects, 2) senior level project consultants, and 3) more than 10 years in the industry. All twelve respondents have between 20 and 30 years of construction work experience, hold top management positions and have extensive knowledge in green building projects. The respondents comprised of seven architects, three engineers, one quantity surveyor and one town planner. While the respondents' demographic background was varied, this was not a cause for concern as the research focussed on information-gathering of green building project practices and required practical insight from management level practitioners. All the respondents had relevant knowledge on green building projects and were able to contribute to the study from design, planning, procurement, and implementation aspects.

Each interview ranged between 40 and 60 minutes. An aide-memoire was used as a brief set of prompts to guide the interview and the discussion was recorded using a voice recording application for further analysis. The rich data was used to explore the general perceptions and experiences of green building experts to expose the indistinct elements linked to materialisation of cost. Interviews were transcribed verbatim and thematically analysed using both deductive (guided by literature) and inductive (emerging from the data) approaches (Patton, 2014). This allowed the data to be systematically organised, reduced, refined, and interpreted. Commonalities and differences in the transcripts were identified and coded, and then arranged into themes to allow pattern recognition and deduct early conclusions. The data reached a point of saturation at the eleventh interview as no new findings were further revealed (Creswell, 2012). A subsequent twelfth interview was conducted to confirm that the findings had stabled.

In addition to the interviews, 4 project cost datasheets were also analysed to confirm the SCEs in the project budget and to enable a clear definition of the SCEs term. The cost datasheets are from recently completed green building projects located in Kuala Lumpur, the capital city of Malaysia. They provide an elemental cost breakdown of the projects and allow clear segregation of cost, dividing hard and soft elements of the project.

4. Research Findings

The literature suggests 4 potential SCEs in green projects namely insurance, design cost, green certification, and project provision. From the interviews and cost datasheets, a total of 8 SCEs have been identified, which are grouped into 3 main categories. The suggested SCEs

from the literature were renamed and assigned under each main category, while insurance is excluded from the list. The cost datasheet provides a percentage breakdown of the SCEs and enables a clear definition of SCEs. This section is discussed in two aspects: 1) categorisation of SCEs, and 2) cost distribution of SCEs and SCE definition.

4.1. Categorisation of SCEs

The study discovered 8 SCEs namely project brief preparation, consultant fees, green certification, pre-development charges, contribution charges, marketing, project overheads and security of funding. These SCEs are discussed under three categories namely Design Influence, Authority Requirement and Development Provision.

4.1.1 Design Influence

Design Influence refers to the soft elements that would influence project decision especially in deciding the project requirements that would set the course of project delivery. Within Design Influence category, the consultants play a major role in influencing the SCE's impact through performing their design duties and in negotiating their fees. There are 3 SCEs under this category, namely project brief preparation, fee structure and green certification.

The implementation of construction projects is driven by choices made by the project clientele. All interviewees noted that project control, which is the degree of authority vested in the consultant, is valuable in exerting influence on critical decisions for the project. Having a clear project brief will assist in project control and assuring client's commitment for the project. As asserted by respondent R4, project brief is limited by the client's financial limitation and any changes to it depends on client's comfort to accept the associated costs and risks of the proposed change. R11 expressed that good consultants were expected to be able to balance business interests and environmental welfare when designing building solutions in accordance with the project brief. The project brief will set in motion all other actions in the project and by extension, the project budget and cost. There are costs associated with the preparation of the project brief such as conducting a market survey and feasibility study. Any changes to project brief will cause delay in developing project design and project cost estimates. As this preparation begins at project initiation and may change as design is being developed, it is difficult to determine how this element may affect the project cost.

The respondents also acknowledged that consultant fees have some bearing on the consultants' commitment to the project. The arrangement of fees normally reflects the level of work responsibility due for. According to one of the respondents, it is not unusual for developers to ask the architect to hire other consultants who played a smaller and more temporal role in the project. While these consultants are important to execute key tasks in the project delivery, they have little to no influence on the project strategy. The main players that are influential to decide on the project outcome are the architects and engineers as they hold the biggest responsibilities compared to other consultants. Consultant fee is one of the obvious SCEs in which the amount can be quantifiable, and the fee percentage is known once the consultants are engaged. Respondent R8 indicated that this cost is allocated for the service of the consultant in terms of design, management, and project administration. The fee arrangement usually follows the pre-set guide by the professional body. However, the fees can be negotiated based on the complexity of the project. In green building projects, a negotiated fee is preferred as compared to a fixed rate (Respondent R12). Regardless of a fixed or negotiated fee, this cost will be known early in the project with slight variations

depending on the final project cost. R10 accentuated that because the consultant fee was proportional to project cost, there was no reason for the engineers to be concerned with downsizing the mechanical costs or increasing the operating energy efficiency unless there were incentives in place to optimize cost.

There are many green rating tools available in Malaysia as they may choose to register with the local tools such as the Malaysia GBI or obtain other international tools such as USA's LEED. Depending on which rating tool the project intends to pursue and which level of certification they want to obtain, there are many criteria they would have to fulfil. These criteria would have a significant influence on the project design to ensure that the rating points can be collected. Respondent R1 asserted that the cost risks in green projects are mostly defined by the building specification, project scope and quality standard as expected by the green rating tools to satisfy certification requirements. Developers are required to pay a registration fee when applying for green certification. The fee, which includes a design assessment and completion assessment, varies according to the project size. Fee is also applied when the certification needs to be renewed (Respondent R6).

4.1.2 Authority Requirement

Authority Requirement constitutes the obligations and requisites set forth by the authorising local council as a condition precedent to project approval. Depending on the location of the project, the fees or charges payable to the local authority for obtaining various project approvals vary. There are two SCEs under this category namely, planning approval and contribution charges. This aspect is similar with the 'project provision' identified from literature. Despite these elements representing a cost themselves, they also affect the project by bringing about change to the project design to satisfy the authority's planning requirement.

There are many expenses incurred during planning approval, which refers to pre-development charges. It is basically monies collected from land developers by the municipality for assessing the compliance of the project with the authority requirements before providing project approval. The respondents explained that pre-development charges are common charges placed by the local authority on any new development. It varies according to the decreeing local authority and depends on project size. Respondent R3 informed that these charges are the first expenses of the developer after confirming the project feasibility and are necessary to establish the project start. The charges are usually about 30% of the difference in land value before and after conversion of land use. In addition, the local authority charges a submission fee to developers for every development project application. In Kuala Lumpur for example, the municipal council has set their processing fee at a fixed rate of Ringgit Malaysia (RM) 40 (≈USD9.50) for the first 1000sqft, RM 20 (≈USD4.70) for subsequent 1000sqft of the first 5000sqft and RM 10 (≈USD2.40) for each 1000sqft balance thereof (Respondent R5). The charges incurred for planning approval include survey and mapping costs, layout and building plan, planning permission application (municipal council) and engineering related plans such as earthwork, drainage and sanitary. Respondent R8 suggested that these costs be alleviated for green building projects as a way of supporting the administrative costs involved in achieving green certification. While these are nominal costs, they were strong indicators of the local authority's development agenda. Respondent R12 pointed out the importance of including sustainability goals in the local authority overall development plan so that an organized ecosystem could be achieved.

Contribution charges are paid to the service providers towards the end of the construction

period before the project is deemed fit for occupation. The charges are usually for connection and testing of utilities and infrastructure such as for water supply, electricity supply, sewerage service, fire inspection and testing and telecommunication line. While the contribution is generally small, it is important to include this cost as part of the project outlay. For example, the respondent highlighted the Improvement Service Fund (ISF), a fund collected by the Government under the Street, Drainage and Building Act 1974 (Act 133, Part VI: Section 132). Respondent R3 explained that the funds were essential to assist the city council to maintain and improve basic amenities such as public roads, as well as finance repair works brought by the new development. Respondent R4 provided an example of the City Council of Petaling Jaya in the state of Selangor, Malaysia, where the council imposes an ISF payment of RM500 (≈USD119) for every apartment unit above RM100,000 (≈USD23,800). Respondent R3 further clarified that for areas where there were plans for infrastructure development in the future, the local authority requires that developers pay a contribution fee to support the projects because the new infrastructure would benefit their project. The respondents however, indicated that it is unclear how the sum was determined and remain inconsistent across projects and authorities. As this SCE varies, it was difficult to estimate the appropriate cost allowance in the project budget and had to be assumed as a lump sum based on past projects.

4.1.3 Development Provision

Development Provision represents elements that are necessary for project establishment but do not directly affect the project design. These elements support the project's business strategy and serve the administrative purpose for project implementation. There are 3 SCEs under this category namely, marketing, project overheads and security of funding.

Marketing is usually handled by a different team in a project either by the internal sales and marketing department or outsourced to marketing agencies. Respondent R3 revealed that for every construction project, a budget will be allocated for marketing purposes. This is usually a lump sum figure meant for any marketing activities and materials related to the project promotion. The size of the budget depends on the intended publicity. For green projects, Respondent R1 and R2 agreed that the market for green buildings is lower than that of conventional buildings due to its higher selling or renting price. As such, marketing plays a major role in promoting the green building project to increase awareness, interest and to attract potential buyers.

Part of the project cost distribution includes the provision for project overheads such as staff and operation expenses. Respondent R3 explained that although staff salary is an office overhead instead of project overhead, a cost is often allowed for supporting staffing stipends in every project budget. Operation expenses refer to running office costs and project contingencies. As the exact expenditure for this is unclear, a ballpark sum was usually estimated.

Security of funding plays a vital role in determining project feasibility. The respondents informed that loans of up to 70% are usually obtained to cover the project cost, while the remaining 30% are mostly absorbed by the developer. Respondent R4 recounted that for projects where the developer intends to sell the building unit, this 30% will be collected from the buyers of the units sold. In cases where the developer intends to occupy the building, the 30% is supported by the developer's own reserves. Where cost is involved, it often affects the project direction and decisions thereon. Respondent R6 explained that loans hinge on the risk

level that the project is exposed to. While a creative pro-green design solution is always desirable, consultants are restricted by the potential risks affecting security of funding.

The respondents agreed that there are many administrative costs incurred in a construction project that are being absorbed by the client. Some of the obvious soft costs such as green certification, consultant fees, pre-development charges, contribution charges and marketing can be quantified clearly based on percentage, although the percentage varies depending on location and size of the project. Security of funding basically involves the amount of interest payable to the financial institution. The amount depends on the agreement between the two signatory parties. Project overhead is difficult to quantify as it involves the number of employees and the fluctuating use of project utilities. Cost relating to project brief incurs early to set the project in motion. Insurance, which was suggested earlier based on literature, was excluded from the list of SCEs. The respondents generally agreed that although insurance do have bearing on the project cost, it was mainly absorbed by the main contractor under the 'Contractor All-Risk Insurance'. The SCEs identified have direct and indirect impact to the client. Table 1 presents the description for the SCEs relevant to green building projects.

Table 1
SCEs in Green Building Projects

SCEs	Description
Design Influence Elements that would influence project decision especially in deciding the project requirements that would set the course of project delivery	
Project Brief Preparation	Costs incur due to the determination of project viability and to provide client's general requirement or direction at the initial stage of the project planning
Consultant Fees	Fees paid to the consultants for the services they provide, usually in the form of design, costing, management, and administration of the project.
Green Certification	Fees paid for registration and certification obtained from established green rating tool
Authority Requirement Elements that constitute the obligations and requisites set forth by the authorising local council as a condition precedent to project approval and charges paid for connections with service providers	
Pre-development Charges	Collection by the municipality and other local authorities for assessing project compliance before project approval is granted
Contribution Charges	Charges paid to the service providers for connection and testing of utilities and infrastructure prior to practical completion
Development Provision Elements that are necessary for project establishment but do not directly affect the project design. These elements support project's business strategy and serve the administrative purpose for project implementation	
Marketing	An allocation to promote and market the projects
Project Overheads	A provision to support additional stipend for staff and operation expenses
Security of Funding	The amount obtained from loan to ensure adequate fund reserve and the amount of interest payable to the financial institution.

4.2. Cost Distribution of Soft Element and SCE definition

There are four cost datasheets obtained for document review to identify and confirm the existence of SCEs in the project budget and to distinguish the category of the elements. The cost datasheets were obtained from four different green building projects. The documents verified that project development costs encompass many elements beyond the physical building which can be included as part of SCEs. Table 2 identifies the category of each SCE. Table 3 presents that percentage of SCEs based on Gross Development Value (GDV) and Building Works (BW).

Table 2
Identification of SCEs in project cost distribution.

Management components	SCEs sub-category	SCE category
Contribution to water, electric and telecommunication supply	Contribution charges	Authority Requirement
Contribution to Improvement Service Fund (ISF) (road)	Contribution charges	Authority Requirement
Contribution to ISF (drain)	Contribution charges	Authority Requirement
Contribution to Sewerage Services	Contribution charges	Authority Requirement
Planning approval charges	Pre-development charges	Authority Requirement
Other local authority fees and charges	Pre-development charges	Authority Requirement
Sales and marketing	Marketing	Development Provision
Project Overheads	Project Overheads	Development Provision
Bridging Finance	Security of funding	Development Provision
Green certification	Green certification	Design Influence
Professional fees	Consultants' fees	Design Influence

Table 3
Percentage breakdown of SCEs in project cost.
Note: GDV: Gross Development Value; BW: Building Works

Management components	Percentage Breakdown
Contribution to water, electric and telecommunication supply	0.1 - 1% of GDV
Contribution to ISF (road)	0.1 - 0.5% of GDV
Contribution to ISF (drain)	0.1 - 0.5% of GDV
Contribution to Sewerage Services	$\leq$ 1% of GDV
Planning approval charges	1 - 2% of GDV
Other local authority fees and charges	0.25 – 0.70% of GDV
Sales and marketing	1 - 3% of GDV
Project Overhead	1 - 2% of BW
Bridging Finance	20 - 70% of BW or Interest rate 6 – 9% of loan amount
Green certification	<2% of BW (depending on the rating level)
Professional fees	7 - 10% of BW

Table 3 summarised the percentages of SCE, which can either be based on the GDV or BW. The costs borne by the developers under GDV are those incurred or expected to incur at

planning stage of the project, and they are unaffected by other parties in the project such as the consultants and the contractors. Except if the sales and marketing is handled by internal department, the percentages based on GDV are the amount set aside to deal with the external parties of the project, such as the local authority, service providers and marketing agencies. From Table 2, out of 11 SCEs, 6 SCEs are under Authority Requirement. Items under Authority Requirement are based of GDV percentages. Only sales and marketing are parked under Development Provision. For SCEs based on GDV, the highest percentages for sales and marketing that can ranged between 1 – 3% of GDV. Individually, for SCEs under Authority Requirements, the percentages are less than 1% only, which reinforced that SCEs constitute small fractions of development cost. However, without the approvals obtained under Authority Requirement, the project will not be able to proceed.

Percentage of SCEs which are calculated as fractions of BW are project overhead, bridging finance, green certification, and professional fees. The highest percentage is for the security of funding (bridging finance) which can constitute from 20% to 70% of BW. This amount depends on the financial capital needed and monies available from the client or developer's reserves to kick-start the project. Payments on interest are usually between 6 to 9 percent of the full amount. The rest covers basically less than 2% for project overheads, less than 2% for green certification (depending on the intended rating level) and less than 10% for professional fees. It confirms that the individual SCEs as fractions of BW are 10% or lower including the interest rate for loan amount. The highest cost percentage for SCEs (based on BW) is between 7% - 10% (for consultants' or professional fees). This is followed by the loan interest (6 – 9%). Green certification, which is specific for green building project, only constitutes 2% of the BW.

It is also discovered that not all SCEs can be found in the cost datasheets. Only SCEs related to the management of the project are visible in the cost datasheet either as part of project GDV or BW. All elements under Authority Requirement and Development Provision are clearly indicated in the cost datasheet while only two elements under Design Influence appear in the cost datasheet namely, consultants' fees and green certification. SCE which remained hidden is the project brief preparation.

There are two outliers in the above findings: 1) project brief preparation and 2) security of funding. Project brief preparation is hidden in nature as it happens prior to project initiation and continue to develop in more specific at the early stage of project planning. As such, the cost of preparing the brief is not recorded in the project cost. The cost is absorbed by the client's or developer's firm as part of their business strategy, and not as part of the project requirement. Security of funding is the project pillar. Without it, the project will not be in existence. Thus, it is only natural that it constitutes a large percentage (20 to 70%) of the BW. Funding is a project provision and a necessity, but it does not affect the management process of the project. The security of funding can also be viewed as the interest rate percentage because the extra amount that the developers shall pay is the loan interest. The loan amount itself shall offset each other. Without the two outliers, SCEs can be defined as the elements relevant to the management and administrative process of the project, which do not contribute to activities associated with the physical erection of the facility on site. They are tangible costs with smaller percentages in project cost or gross development value and borne by the project client or project developer.

5. Discussion and Conclusion

Each construction projects begins with the establishment of client's needs and wants in the form of project brief before the engagement of the project consultants. All local authority requirements must be fulfilled and allocation for development provision will depend on the project needs. Any decision on direction of the design must be made early in the project. The above actions relate to soft elements for a construction project. Past research acknowledged the existence of these soft elements in the form on non-technical and managerial aspects of projects (Beck and Rai, 2020; Uğur and Leblebici, 2018; Shen et al., 2017; Azizi and Abidin, 2012). This research goes beyond that by unveiling the various components of SCEs, group them into three categories and produce the SCEs distribution according to building works and development value.

This study confirms that the components of SCEs remain the same for green and conventional projects. This is because each SCE forms an integral part of project planning and process. The only difference is the green certification addition. Although the percentage of green certification is less than 2% (depending on the rating target), it has a knock-on effect on other SCEs, although it may not be obvious. For example, the professional fees may need to add percentage for green consultant, or the design may change to incorporate green requirements. One can argue that achieving green certification is the cause of increase in soft costs and hard cost, and it is beyond the fee charges for the certification. This finding is consistent with the study done by Uğur and Leblebici (2018) and Ade and Rehm (2020), in which the decision on green certification shall have the impact on green cost premium which includes both hard and soft cost. Although soft cost is still comparatively small as compared to hard cost (less than 1.5% of the cost premium increment), it is still present and thus, bear an impact on the project cost, and ultimately, project decision. Thus, this study recommends improving the elements that would be affected by the green certification rating criteria to reduce green cost premium. Green cost premium has been the main barrier to green building project acceptance and implementation. From this study, the elements that would mostly be affected by the green certification is grouped under Design Influence which also includes professional fees and project brief.

The visible Design Influence items of SCEs are green certification and professional fees. Professional fees are paid to various consultants for the services rendered. Integral in that service is design and management, both part of soft elements of a project. There has been a perception that fees to the consultants will be different for green projects due to the complexity of green design (Gambatese et al., 2007). Although this study confirms that professional fees take the biggest percentage of SCE, the fees are still competitive and similar with conventional projects. The roles and responsibilities of project consultants in green projects are generally similar with conventional projects. The fixed fee set by the professional bodies are still applied to green building projects, but the negotiated rate can cause fluctuations in the percentage. Abidin and Shariffuddin (2019) indicate that although consultants prefer the negotiated fee for green building, in most cases there is no additional charge being imposed to the professional fees due to green measures because they are bound by their professional ethics. Based on above finding, green cost premium is not affected by the professional fees of standard group of consultants such as architect, quantity surveyor and engineers. The percentage of professional fee will only be affected due to addition of consultant such as the need for green facilitator. However, green certification decision will

affect green cost premium if the professionals are unable to deliver as expected. In green projects, additional requirements to the design are expected because of the need to comply to green certification criteria, and this require consultant's knowledge and expertise in green practices (Azizi et. al, 2015). According to Uğur and Leblebici (2018), decision for gold and platinum projects increase the percentage of construction cost by 7.43% and 9.43% in which 0.84% and 1.31% are soft cost. The main contributor to project cost increment relates to design-related factor for incorporating alternative system, application of new materials and technology. Thus, the role of the consultants is crucial to reduce project cost because their experience and knowledge in green design will ensure the project does not overdesign. Overdesign is one of the causes of green cost addition (Wu et al, 2020). Working in 'silo' practice in which the designers design without collaboration with the other designers contributes to overdesign (Azizi et al, 2017). Soft cost can be reduced through improvement in project process including knowledge generation and learning and interaction with various parties (Strupeit, 2017).

Project brief has the tendency to change due to clients' incomplete information and changing requirements as more input is added to the design concept and budget refinement (Mahat and Adnan, 2018). Poor definition of performance objectives in design brief is also one of the causal factors of poor green building performance because it leads to poor boundary definition and design assumptions (Tuohy and Murphy, 2015). While project brief clarity has always been recognised as an important element for project success (Hui, et al., 2017), it has never been identified as a soft element affecting the management decision for green building projects. This study identified project brief as one of the SCE that influences design but, categorises it as the only hidden SCE. Due to the nature of project brief, in which they are absorbed by the client and prepared at project initiation stage, it is understandable why project brief has been previously passed as SCE and why this study identified it as hidden. This is the only SCE that is not formed as part of project cost, nonetheless, this study acknowledges the importance of this element in determining the course of the project, its design and cost.

Although there are only two SCEs under Authority Requirement, it has been further split into several items in the cost distribution sheet to cater for different external party requirements. This study confirms that each item under this category is less than 2% of GDV and accumulatively, it can take nearly 5% of GDV, which can make an impact on the overall project cost. Unlike Development Provision and Design Influence in which the developer has control over the output, elements under Authority Requirement deals with external party such as local authority and service provider who set the price of their services. Developers must operate within a regulatory framework of the local statutory planning system to obtain project approval (Maruani and Amit-Cohen, 2011). The elements under Authority Requirement are usually consistent in practice, regardless for conventional or green building. This justifies that elements under Authority Requirement are not part of the green cost premium as they are not affected by the green certification requirement and the fees are set by external party. However, the fees chargeable by the local authority varies from one state to another. Variation in local authority permit fees can affect the project planning and can have an impact on the project cost. Burkhardt et al (2015) suggest streamlining of local authority regime. By streamlining the fees across states, it enables better project cost estimation from the early stage. Promoting green building projects requires collaboration from various

stakeholders (Abidin, 2010). Although this study highlights that the cost related to Authority Requirement is beyond the control of the developers, it still constitutes nearly 5% of GDV. This is where the local authority can play their role in pushing green building projects, either by streamlining their fees across states or by introducing incentives or rebate to reduce the fees, leading to reduction in total project costs.

Development Provision relates to the developers own arrangement. This element relates to tactical planning to promote the project (Fam et al, 2008) and to support the project progress (Assaf et al., 2001). It depends on how much they are willing to allocate for each SCE. Marketing for example, takes about 1 – 3% of GDV, while project overheads takes about 1 -2 % of GDV. These two elements are within the developer's control, but not the loan interest. However, the amount of loan to be secured are within developer's planning. Given the magnitude of cost and risk associated with construction development projects, funding and project financing are the utmost important elements to be secured. Thus, it is logical that the percentage of securing funding is between 20 to 70% of the BW. Chirkunova et al. (2016) stated that the external funding for construction projects can increase up to 80%.

Other industries, such as renewable energy system, has begun appreciating the importance of soft cost and its impact on the total cost ((Beck and Rai, 2020; Chen et al., 2016). In construction industry, soft costs had received less attention than its hard cost counterpart, although their importance have been highlighted by various authors (Taemthong and Chaisaard, 2019; Victoria et al., 2017; Azizi and Abidin; 2012). This study confirms that SCEs cover small percentage in project cost, however, each element serves crucial function in the project progress. For example, if Authority Requirement are not met, the project will not be allowed to continue. Design Influence affects the building design and project planning. At the centre of Design Influence is the professionals who are responsible to transform clients brief into project design and to incorporate green certification requirements in the design. Lastly, Development Provision ensures the project is secured either in terms of funds, people commitment or obtaining buyers. The importance of soft cost lies beyond monetary value as it ensures that the project is managed in an effective manner and all requirements of hard aspects are catered for. It is crucial to ensure the management aspects of the projects are efficient and the client's commitment towards green building projects are maintained throughout the course of the project (Olanipekun et al., 2017) to avoid wastages in cost and project performance (Seyis et al., 2016).

Apart from bridging finance (security of funding), all SCEs constitute less than 10% of GDV or BW. This confirms that soft cost only represents small portion of project cost as compared to its hard cost counterpart which usually ranged between 70 – 80% of project cost (Victoria et al, 2017). All SCEs, except for the project brief, are not hidden and not intangible as they appear in the cost datasheet or project cost breakdown. However, most of them do not form part of the project cost, but part of a larger project scope called gross development value. Project brief is the only element that can be considered hidden as the cost is not included in the project budget and cost breakdown. All soft costs are being borne by the project developers or project clients, but appointed project consultants are deemed to be involved in managing the Authority Requirement and Development Provision including any requirement for green certification. As such, this study defines SCE as the elements relevant to the management and administrative process of the project, which do not contribute to activities associated with the physical erection of the facility on site. SCE constitutes tangible costs with smaller percentages in project cost or gross development value. Despite this, the

implications of SCEs on green building projects are far-reaching and can influence management decision in oblique ways.

The findings confirm that SCEs are fundamental in the project planning, design, and overall management of the construction projects. Most of the SCEs occur at the early stage of the projects and thus, have bearing on the direction of the project. As green cost premium has been identified as one of the barriers to green building project (Hwang et al., 2017), it is crucial to unveil where the source of cost increment lies. Past research has pointed at green certification requirement as the cause of green cost premium and hard costs have been the focal of most study due to the obvious reason of added design and new technology application. (Dwaikat and Ali, 2016; Bohari et al., 2017). This study unveiled the implication of SCEs in project costs. As mentioned before, SCEs have smaller percentage based on GDV and BW. However, the decisions and actions related to SCEs can have significant impact on the hard cost aspects especially in influencing project design. Among all SCEs, developers can reduce further the percentage of SCE by re-strategizing the Development Provision category. Consultants are the key players in planning and designing the project. The professional fees for most consultants remain similar with conventional project fees. It is crucial to engage consultants with the right knowledge and experience to avoid overdesign, unnecessary application of active design and technology. This is the cause of increment in hard cost. The effect of SCEs by the project consultant lies in the services they rendered. There are three categories of external parties involved in project SCEs, which are local authority, service provider and financial institution. Developers have no choice but to pay the fees, bank interest, or any charges by this group of stakeholders. Without this payment, the project cannot proceed. This in an area in which external parties can be proactive in promoting more green building in the construction industry. The cost of design and construction was not higher for green buildings compared to conventional buildings when cost strategies, management and environmental design were integrated to the project development process from the very beginning (Ugur and Leblebici, 2018). The paper provides new insight into the understated elements that drive project cost from a managerial perspective and can be used as a base reference for future studies on project cost.

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Declaration of interests

☒ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

☐The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

CRediT author statement

Abidin, N.Z.: Conceptualization, Writing – Original, Editing, Supervision, Project admistration **Azizi, N.Z.M.**: Methodology, Investigation, Data curation, Writing-Review.