the validity of internal support and facilitating

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The Validity of Internal Support and Facilitating Content on Sustainable Green Building Management in Indonesia

D P Retno [1,2], **M A Wibowo**[1], **and J U D Hatmoko**[1]

[1] Department of Civil Engineering, Diponegoro University - Indonesia
[2] Department of Civil Engineering, Islamic University of Riau - Indonesia
Corresponding author: deddy.purnomo@eng.uir.ac.id

Abstract. The operation and maintenance phase is one of the most important and longest phase in the green building life cycle. In this phase, the existence of internal support and facilitating that is oriented towards sustainable green management can have a major impact on building performance. Its existence is both a support and a catalyst for other processes to be undertaken during this phase. This study aims to assess the content validity in the preparation of a questionnaire for the assessment instrument for internal support and facilitating of sustainable green management, particularly the operation and maintenance phase of buildings in Indonesia. Internal support and facilitation is divided into 3 key variables in this research: leadership, policy, and people. Meanwhile, the study stage consists of instrument design, expert panel determination, and content validity quantification. The method used in the content validity analysis consists of: I-CVI, S-CVI, CVR and Kappa statistical coefficient. Based on the results of the study, the number of indicators that meet the requirements is as follows: four indicators on the leadership variable, six indicators on the policy variable and five indicators for the people variable.

1. Introduction

The building sector is the largest source of greenhouse gas emissions worldwide. There is already a lot of evidence showing that increasing global warming and climate change have a tremendous impact on human survival and this requires urgent action to avoid the consequences of potentially serious negative impacts for future generations [1].

Awareness of the severe effects that the construction sector has on the environment is now widely recognized. Likewise, there have been many efforts aimed at various tools to control and guide the development of environmental sustainability [2]. This is based on the fact that the existence of green buildings is considered a solution that can be used to overcome the consequences of these negative impacts. Indonesia as a developing country also cares about this. Currently there are more than 100 buildings that have received green building certification and more than 3000 buildings have met green building standards [3]. Regarding the green building, the challenge going forward is how to maintain existing performance, especially from the management side.

Green building requires a continuous maintenance in order to maintain its performance [4]. In order to produce sustainable green building performance, green building management requires sustainable green support and facilitation that comes from the internal organization itself. To creating efficiency in the application of green core practices in the construction and building sector, all stakeholders have to

apply certain practices at the company level, this practice is known as internal support & facilitation practice [5].

So far, sustainable green support and facilitating has been widely applied in several industrial sectors outside of construction and building. Its existence has proven to play an important role in the successful application of the sustainable green concept [6]. Several studies have shown that sustainable green support and facilitating has a significantly positive impact on the expected results, such as seen in the case of US manufacturing companies and automotive companies in Spain. Zhu et al. (2013), Suggested that the need to implement and facilitate green practices is a core practice that affects the successful application of sustainable green concepts in industry [7].

This study will review internal support and facilitating in the operation and maintenance phase of green buildings, especially in Indonesia. This phase is one of the important phases in the green building life cycle because it plays a long-term role in determining the success of sustainable green management and supporting the improvement of existing building performance. In the operation and maintenance stage, the existence of internal support and facilitation that is oriented towards sustainable green management can have a very big impact on buildings. Its existence supports other processes that will be taken during the building's life cycle.

This study is a preliminary study which aims to assess the validity of content in the development of a questionnaire instrument related to internal support and facilitating sustainable green management at the operation and maintenance stage of buildings in Indonesia. Therefore, this study tries to identify internal variables and indicators for sustainable green support and facilitating, especially in Indonesia. By using the modified Delphi technique and content validity analysis equipped with a kappa coefficient.

The outcome of this study is intended to provide an overview of the constituent variables and indicators of internal support and facilitating needed by an organization in the management of green buildings.

2. Methodology

Researchers conducting complex studies need reliable and valid instruments [8]. One of the characteristics of an instrument that can be said to be valid is that it can measure what it should be measured [9], so that the resulting variables can be interpreted and the resulting relationships explained in a more theoretical way. The stages of this study are presented in Figure 1.
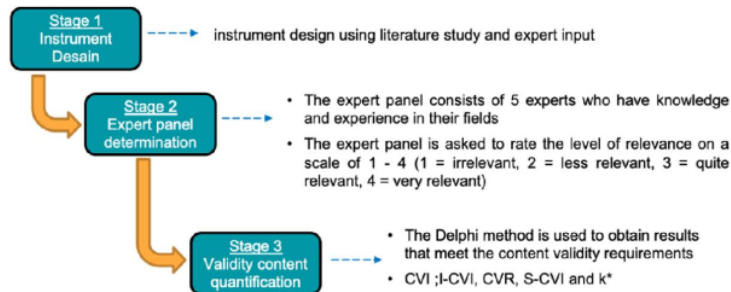

Figure 1. Study Stages

2.1 Instrument Design

Instrument development can be carried out in 3 steps, namely identifying content domains, creating sample items, then proceeding with making instruments [10], [11]. Where the construction of domain content can be identified through literature review, content analysis, and / or by interviewing respondents or focus groups [10].

This study identifies the content domain through literature review. This is done in order to assist in identifying gaps in the research construct. Where in making sample items and to bridge the gap in the studies to be carried out, it is also necessary to pay attention to construct developments by considering input from academics and practitioners who are experts in their fields. In this study, conducted a review of 3 main variables in internal support and facilitating of sustainable green building management. These variables are leadership, policy and people. Variable constituent indicators based on literature review taken from various sources. Then the results of the identification are compiled and grouped based on the variables used to produce a sample item that will be developed into an instrument.

2.2 Expert Panel

The next phase is the expert assessment phase to confirm the items presented and ensure the validity of the content of the assessment instrument. Selection of domain experts must be made based on certain criteria such as expert knowledge, special training, or professional experience that is correlated with the subject under study [10].

In determining the content validity, it is recommended to involve at least 3 experts [10], [12] Although there is no limitation on the maximum number of experts used so far, it is also not possible to involve more than 10 experts in the process because an increase in the number of experts reduces the chance of agreement [13].This study uses 5 experts consisting of academics and practitioners who have knowledge, experience and expertise in the management of the operational phase and maintenance of green buildings. Then the expert panel was asked to provide a subjective assessment based on their professional experience of the question items given. The modified Delphi technique was used in this study. Where the Delphi process is carried out in several stages until a consensus is obtained based on an assessment of the validity of each item being asked. The validity test for each of these stages uses CVI, S-CVI, CVR and Kappa statistics.

2.3 Quantification of Content Validity

The existence of content validity on an instrument and relevance assessment are important steps needed in developing research instruments. Validity is a measure of an instrument's ability to measure the properties of the construct under study and is an important factor in choosing an instrument. In general, the measure of the instrument's ability is determined in three forms of validity, namely content, construct, and criteria [14], [15]. Since content validity is a prerequisite for other validity, content should be given the highest priority during instrument development [14].

The content validity is a measuring instrument level whose content is sufficient to represent the universe of all relevant items studied [16]. Validity is defined as the extent to which the instrument can measure what it means [15], [17] A new questionnaire survey instrument must be rigorously tested to ensure that it is a valid instrument [12], [18]. In general, there are 3 validities that can be determined by content, criteria and construct [8]. Content validity is obtained through estimation results based on testing the appropriateness or relevance of the test content through rational analysis by a competent panel or through expert judgment [19]. So at this stage the expert panel is asked to provide their views on the points on the items used in building research instruments [10]. Content validity refers to the success of the researcher in creating a measurement item that includes the content domain of the variable being measured [15], so that the measurement results can meet the variables of accuracy.

2.3.1 Content Validity Index (CVI)

The CVI instrument is used to assess each instrument item regarding its relevance to existing constructs [20]. CVI is the most widely used approach to content validity in instrument development [12], [14]. There are 2 quantitative approaches in calculating CVI, which are calculated for all individual items (I-CVI) and the overall scale (S-CVI) [13], [20]. For CVI, a panel of experts was asked to rate each scale item in terms of its relevance to the underlying construction [10]. Where a 4-point scale is used to avoid neutral points. The four points used along the ranking continuum items 1 = irrelevant, 2 = somewhat relevant, 3 = moderately relevant, 4 = highly relevant [10], [20].

The difference between I-CVI and S-CVI is: the I-CVI is a calculation of the relevance of each item by calculating the number of experts who give a rating of 3 or 4 for the relevance of each item divided by the total number of experts. Whereas S-CVI is the proportion of total items on the instrument that reach a rating of 3 or 4 by content experts. The principle of assessment for I-CVI ranges from values 0 to 1. If I-CVI> 0.79 then the item is categorized as relevant, between 0.70 - 0.79, the item is categorized as requiring revision, and if the value is <0.70 items those that fall into the category should be removed [14]. In the calculation of I-CVI it is recommended that the I-CVI value is 1.00 in the case of five or fewer expert panel participants, whereas in the case of six or more expert panel participants, the I-CVI value should not be less than 0.78 [10].

S-CVI is used to ensure the content validity of the overall scale. Generally, can be conceptualized in two ways S-CVI (Universal Agreement) and S-CVI (Average). S-CVI (Universal Agreement) reflects the proportion of items on an instrument that achieve a rating of 3 or 4 by all experts on the panel [10]. S-CVI (Average) is a liberal interpretation of the validity index of the scales, and is calculated using the I-CVI. S-CVI (Average) emphasizes on average item quality and not on the average performance of the experts[10]. In the S-CVI assessment, it is recommended that the minimum S-CVI value be 0.8 to reflect the validity of the content[10], [13]

Content validity can also be complemented by using a panel assessment and evaluation method based on a ratio or known as the content validity ratio (CVR). CVR represents a proportional level of approval by experts in assessing an item as important [21]. Where a 3 point scale is recommended for rating each item; 1 = unnecessary; 2 = useful but not important; and 3 = essential [21]. In order to evaluate the items of utmost importance, the CVR values will be compared with the CVR critical table that has been revised by Ayre and Scally [26]

Table 1 shows the relationship between the number of experts and the acceptable cut off score of CVI.

Table1. The number of experts and the implications for an acceptable cut-off score of CVI [22]

Number of experts	Acceptable CVI values	Source of recommendation Davis
Two experts	At least 0.80	Davis (1992)
Three to five experts	Should be 1	Polit & Beck (2006), Polit et al., (2007)
At least six experts	At least 0.83	Polit & Beck (2006), Polit et al., (2007)
Six to eight experts	At least 0.83	Lynn (1986)
At least nine experts	At least 0.78	Lynn (1986)

*2.3.2 Modified Kappa Coefficient (K *)*
Although many researchers use CVI to estimate the validity of content, the use of this index does not consider the possibility of an increase in value due to coincidences. To take into account the expert agreement, the score is then converted into a modified kappa value [23]. Therefore, CVI and K * can provide a measurable method for evaluating the level of agreement among content experts [20].

3. Results and Discussion
3.1 Draft Instrument Development
Based on several publications it can be concluded that internal green support and facilitating is a series of activities and actions to support and facilitate an organization in achieving its green goals.[6], [24]–[27]. The draft instrument was prepared based on a literature review. The results of the internal support and facilitating literature review were compiled based on three main variables, namely leadership [28], policy [26] and people [29], [30].

Table 2. Design Instrument

Variable & Indicator	Reference
Leadership	
1 Commitment and leadership patterns	[6], [26], [31], [32]
2 Strategic direction of sustainable facility management	[26], [33]
3 Environmental care is described in the company's vision or mission.	[24], [26]
4 Involvement in designing and implementing effective performance measurement and management systems	[25]
Policy	
1 Compliance with legal, environmental and audit program requirements	[26]
2 Operation and maintenance protocols for buildings, electrical and mechanical equipment	[24], [33], [34]
3 An organizational structure that supports sustainable environmental management	[32], [35]
4 Cross-functional integration between departments for sustainable greening	[6]
5 Adopting a green rating system	[29]
6 Environmental management system and ISO 14001 certification	[6]
People	
1 Availability of maintenance resources	[30], [33]
2 Continuous staff competency training and development	[6], [27], [30], [32]
3 Compensation, rewards, and recognition of work performance	[25]
4 Occupant behavior change	[29]
5 Encouraging the use of biodegradable materials	[24]
6 Partnerships with local communities	[25]
7 Focus on community input	[31]

The leadership variable is defined as requirements that leaders must have to influence a group in order to achieve the sustainable green goals of the organization [28]. The policy variable is defined as a series of concepts are used as guidelines and basis for implementation plans to anticipate and reduce the environmental impact of building operations, as well as promote sustainable development to organizations [26]. While the people variable is defined as activities and fulfillment of organizational needs aimed at individuals / groups, both as users / officers / communities that are related to the sustainability of sustainable green principles in buildings [29], [30]. In this study, leadership variables consist of four indicators, policy consists of six indicators and people consists of seven indicators. With details for each indicator as in Table 2.

3.2 Expert Panel
The success of the content validity analysis really depends on the quality of the expert panel rather than the number [23]. This is because the results of the analysis really depend on the expert's view of the content of the research study.

Table 3. Expert Panel

Panel of Expert	Contribution/ Experience
R1	An expert who has a background in architecture and environmental education. More than 20 years of experience in building management and contractors
R2	An expert with an environmental master's education background who has experience in developing green building ratings in Indonesia and works as a green building consultant with more than 10 years of experience
R3	An expert with a civil engineering background and a master's degree in architecture with more than 10 years of experience as a green building auditor and trainer for experts in the green building sector
R4	A building physicist with 34 years of experience. He has a doctoral background in architecture and works as a lecturer and green building consultant
R5	An expert with a background in civil engineering professor with 33 years' experience in education, consultant and auditor in sustainable building

The expert panel consists of five experts who are considered relevant to the field of study with more than 10 years of experience. As for the arrangement of the expert panel as shown in Table 3. Experts who are in the panel, will be asked to evaluate the relevance of each item presented.

3.3 Content Validity Analysis

This study uses the modified Delphi technique with 2 rounds. Figure 2 shows the results of the content validity analysis for each item. Based on the results of the assessment, almost all items presented have a full number in agreement with each expert (value 5), except for items shared with local communities (worth 4) and focus on community input (score 2).

No	Statement	R1	R2	R3	R4	R5	No. in Agreement	I-CVI	I-CVI Interpretation	CVR	CVR Interpretation	Pe	k*	k* Interpretation
A. Leadership														
1	Commitment and leadership patterns	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
2	Strategic direction of sustainable facility management	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
3	Environmental care is described in the company's vision or mission.	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
4	Involvement in designing and implementing effective performance measurement and management systems	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
B. Policy														
1	Compliance with legal, environmental and audit program requirements	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
2	Operation and maintenance protocols for buildings, electrical and mechanical equipment	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
3	An organizational structure that supports sustainable environmental management	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
4	Cross-functional integration between departments for sustainable greening	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
5	Adopting a green rating system	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
6	Environmental management system and ISO 14001 certification	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
C. People														
1	Availability of maintenance resources	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
2	Continuous staff competency training and development	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
3	Compensation, rewards, and recognition of work performance	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
4	Occupant behaviour change	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
5	Encouraging the use of biodegradable materials	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
6	Partnerships with local communities	1	1	1	0	1	4	0.8	Eliminated	0.6	Eliminated	0.156	0.76	Excellent
7	Focus on community input	1	0	1	0	0	2	0.4	Eliminated	-0.2	Eliminated	0.313	0.13	Eliminated
							S-CVI (Average)	0.95	Excellent Content Validity					

Figure 2. Delphi-Round 1

Based on figure 2, it can also be seen that the leadership variable and the policy variable both have met the requirements requested. However, in the people variable, 2 items were found, namely partnership with local community and focusing on community input and I-CVI <1.00 and CVR <1.00

so that the two items must be eliminated. Overall (S-CVI = 0.95) can be categorized as excellent content validity.

In the first round of Delphi, based on the existing score. It can be seen that the conclusion of the expert panel argues that the partnership with local communities and focusing on community input is considered inappropriate to be included in the indicators of people in forming sustainable internal support and facilitating in the operation and maintenance phase of sustainable green building in Indonesia.

No	Statement	Assessment Interpretation					No. in Agreement	I-CVI	I-CVI Interpretation	CVR	CVR Interpretation	Pc	k*	k* Interpretation
		R1	R2	R3	R4	R5								
A. Leadership														
1	Commitment and leadership patterns	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
2	Strategic direction of sustainable facility management	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
3	Environmental care is described in the company's vision or mission.	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
4	Involvement in designing and implementing effective performance measurement and management systems	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
B. Policy														
1	Compliance with legal, environmental and audit program	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
2	Operation and maintenance protocols for buildings, electrical and mechanical equipment	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
3	An organizational structure that supports sustainable environmental management	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
4	Cross-functional integration between departments for sustainable greening	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
5	Adopting a green rating system	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
6	Environmental management system and ISO 14001 certification	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
C. People														
1	Availability of maintenance resources	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
2	Continuous staff competency training and development	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
3	Compensation, rewards, and recognition of work performance	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
4	Occupant behaviour change	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
5	Encouraging the use of biodegradable materials	1	1	1	1	1	5	1	Relevant	1	Remained	0.031	1.00	Excellent
							S-CVI (Average)	1.00	Excellent Content Validity					

Figure 3. Delphi-Round 2

In the second round of Delphi, all items received a proper assessment according to the expert panel. This is indicated by the results that all existing items have met the specified validity content requirements (I-CVI, CVR, S-VI, and k *). So that all existing items can be maintained and no need to be eliminated. For details on the results of the analysis of the second round of Delphi can be seen in detail in table 4.

Table 4. Recapitulation

Support & Facilitating

A. Leadership

  1 Commitment and leadership patterns

  2 Strategic direction of sustainable facility management

  3 Environmental care is described in the company's vision or mission.

  4 Involvement in designing and implementing effective performance measurement and management systems

B. Policy

  1 Compliance with legal, environmental and audit program requirements

  2 Operation and maintenance protocols for buildings, electrical and mechanical equipment

  3 An organizational structure that supports sustainable environmental management

  4 Cross-functional integration between departments for sustainable greening

  5 Adopting a green rating system

  6 Environmental management system and ISO 14001 certification

C. People

  1 Availability of maintenance resources

  2 Continuous staff competency training and development

  3 Compensation, rewards, and recognition of work performance

  4 Occupant behavior change

  5 Encouraging the use of biodegradable materials

Table 4 is a tabulation of the final results of the analysis carried out. The leadership variable consists of four indicators, the policy variable consists of six indicators and the people variable consists of five indicators. So that in the future the results of this analysis will be used to build a questionnaire that will be distributed to a wider range of respondents in order to produce an assessment model for internal support and facilitating that can support sustainable green building management.

4. Conclusions

Based on the results of the study that has been done, it can be concluded that the indicators that meet the requirements to be used in answering the objectives of the study are as follows: 4 indicators on the leadership aspect, consisting of 1). commitment and leadership patterns, 2). strategic direction of sustainable facility management, 3). environmental awareness is described in the company's vision or mission, and 4). involvement in designing and implementing effective performance measurement and management systems. 6 indicators on the policy aspect consist of 1). compliance with legal, environmental, and audit program requirements. 2). operation and maintenance protocols for buildings, electrical and mechanical equipment, 3). organizational structure that supports sustainable environmental management, 4). cross-functional integration between departments for sustainable greening, 5). adopting a green rating system, 6). environmental management system and ISO 14001 certification, and 5 indicators on the variables of people aspect which consist of 1). availability of maintenance resources, 2). continuous staff training and competency development, 3). compensation, rewards, and recognition of work performance, 4). occupant behavior change, and 5). encourage the use of biodegradable materials. This study is a preliminary study, and there are opportunities for further

studies. Especially to see the relationship between the level of influence between indicators and variables that exist with a wider scope of respondents.

5. References

[1] S N Kamaruzzaman, E C W Lou, N Zainon, N S M Zaid, and P F Wong 2016 Environmental Assessment Schemes For Non-Domestic Building Refurbishment In The Malaysian Context *Ecol. Indic.*, Vol. 69 pp. 548–558

[2] T Khodadadzadeh 2017 Green building project management: Obstacles and solutions for sustainable development," *Sustain. Dev.*, vol. 20, no. 5, pp. 335–349, 2017, doi: 10.1002/sd.492.

[3] Green Building Council Indonesia 2019 *Studi IFC dan GBC Indonesia: Bangunan Gedung Hijau 30-80% Lebih Hemat Air & Listrik* [Online]. Available: https://blog.gbcindonesia.org/studi-ifc-dan-gbc-indonesia-bangunan-gedung-hijau-30-80-lebih-hemat-air-listrik.html. [Accessed: 01-Nov-2020].

[4] N N Zainol et al 2014 Critical Factors That Lead to Green Building Operations and Maintenance Problems In Malaysia: A Preliminary Study *Advanced Materials Research*, Vol. 935 pp. 23–26

[5] S Seuring and M Müller 2008 From a Literature Review to A Conceptual Framework for Sustainable Supply Chain Management *J. Clean. Prod.* Vol. 16 (15) pp. 1699–1710

[6] S Balasubramanian and V Shukla 2017 Green Supply Chain Management: An Empirical Investigation on The Construction Sector *Supply Chain Manag.* Vol. 22 (1), pp. 58–81

[7] Q Zhu, J Sarkis, and K H Lai 2013 Institutional-Based Antecedents and Performance Outcomes of Internal and External Green Supply Chain Management Practices *J. Purch. Supply Manag.*, Vol. 19 (2) pp. 106–117

[8] N R Aravamudhan and R Krishnaveni, 2015 Establishing and Reporting Content Validity Evidence of New Training and Development Capacity Builiding Scale (TDCBS) *Management*, Vol. 20 (1) pp. 131–158

[9] R R DeVellis 2017 *SCALE DEVELOPMENT : Theory and Application, 4th edition.* (USA: SAGE Publications)

[10] V K Shrotryia and U Dhanda 2019 Content Validity of Assessment Instrument For Employee Engagement *SAGE Open* vol. 9 (1) pp. 1-7

[11] V Zamanzadeh, M Rassouli, A Abbaszadeh, H A Majd, A Nikanfar, and A Ghahramanian, 2014 Details of Content Validity and Objectifying it in Instrument Development *Nurs. Pract. Today Nurs* Vol. 3 (1) pp. 163–171

[12] I B Rodrigues, J D Adachi, K A Beattie, and J C MacDermid 2017 Development and Validation of A New Tool to Measure The Facilitators, Barriers and Preferences to Exercise In People With Osteoporosis *BMC Musculoskelet. Disord.* Vol. 18 (540) pp. 1-9

[13] D F Polit and C T Beck 2006 The Content Validity Index: Are You Sure You Know What's Being Reported? Critique and Recommendations *Res. Nurs. Heal.* Vol. 29 (5), pp. 489–497

[14] V Zamanzadeh, A Ghahramanian, M Rassouli, A Abbaszadeh, H Alavi-Majd, and A R Nikanfar 2015 Design and Implementation Content Validity Study: Development of an instrument for measuring Patient-Centered Communication *J. Caring Sci.* Vol. 4 (2) pp. 165–178

[15] M A Badri, D Davis, and D Davis 1995 A Study of Measuring The Critical Factors of Quality Management *Int. J. Qual. Reliab. Manag.* Vol. 12 (2) pp. 36–53

[16] D R Cooper and P S Schindler 2013 *Business Research Methods Twelfth ed.* (New York: McGraw Hill Education)

[17] E G Carmines and R A Zeller 1979 *Reliability and Validity Assessment, Volume 17.* (USA: Sage Publivations, inc)

[18] D. Collins 2003 Pretesting Survey Instruments: An Overview of Cognitive Methods *Qual. Life Res.* Vol. 12 pp. 229–238

[19] Hendryadi 2017 Validitas Isi: Tahap Awal Pengembangan Kuesioner *J. Ris. Manaj. dan Bisnis*

          Fak. Ekon. UNIAT, Vol. 2 (2) pp. 169–178

[20] N A H Hadzaman, R Takim, A H Nawawi, and N M Yusuwan 2018 Content Validity of Governing In Building Information Modelling (BIM) Implementation Assessment Instrument in *IOP Conference Series: Earth and Environmental Science, 2018* Vol. 140 (1)

[21] C H Lawshe 1975 A Quantitative Approach to Content Validity in *Personnel Psycology*, Vol. 28 pp. 563–575.

[22] M S B Yusoff 2019 ABC of Content Validation and Content Validity Index Calculation *Educ. Med. J.* Vol. 11 (2), pp. 49–54

[23] I S Mohammad, T K Yen, and R. A Jalil 2019 Content Validation of the User Attitudinal Component and Factors in Green Building *Int. J. Built Environ. Sustain.* Vol. 7 (1) pp. 21–35

[24] M N Razali and M Y Hamid 2017 Assessing Green Property Management Implementation Among Commercial Buildings In Malaysia *WIT Trans. Ecol. Environ.* Vol. 226 pp. 827–835

[25] T K Baaki, M R Baharum, and A S Ali 2016 A Review of Sustainable Facilities Management Knowledge and Practice *MATEC Web Conf.*, Vol. 66, p. 00075

[26] A B Jabbour, C Jabbour, K Govindan, D Kannan, and A F Arantes 2014 Mixed Methodology to Analyze The Relationship Between Maturity of Environmental Management and The Adoption of Green Supply Chain Management In Brazil *Resour. Conserv. Recycl.*, Vol. 92, pp. 255–267

[27] S Ganisen et al. 2015 Facility Management Variables that Influence Sustainability of Building Facilities *J. Teknol.*, Vol. 75 (10) pp. 27–38

[28] B G Hwang 2018 Leadership Development in Green Construction Projects in *Performance and Improvement of Green Construction Projects*, Elsevier, pp. 283–295.

[29] B C M Leung 2018 Greening Existing Buildings [Geb] Strategies *Energy Reports* Vol. 4, pp. 159–206

[30] E M A Zawawi, S N Kamaruzzaman, A S Ali, and R Sulaiman 2010 Assessment of Building Maintenance Management In Malaysia: Resolving Using A Solution Diagram *J. Retail Leis. Prop.* Vol. 9 (4) pp. 349–356

[31] C L Redman 2014 Should Sustainability and Resilience Be Combined or Remain Distinct Pursuits? *Ecol. Soc.*, Vol. 19 (2)

[32] B Chanter and P Swallow 2007 *Building Maintenance Management*, *Second Edition* (UK: Blackwell)

[33] H H Y Lee and D Scott 2009 Strategic and Operational Factors' Influence on The Management of Building Maintenance Operation Processes In Sports and Leisure Facilities, Hong Kong *J. Retail Leis. Prop.*, Vol. 8 (1), pp. 25–37

[34] D Roychowdhury, R V Murthy, and Jose P D 2015 Facilitating Green Building Adoption - An Optimization Based Decision Support Tool *SSRN IIMB-WP no. 485*

[35] A Bakri, I H Zakaria, R Kassim, and A N A Ahmad 2018 Adoption of The Systematic Facilities Management Approach to The Sustainable Performance of Mosque *Int. J. Technol.*, Vol 9 (8) pp. 1542–1550

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