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Indonesia MICE green building project with value engineering and its influential factors: an SEM-PLS approach

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Abstract
The MICE industry is considered one with high economic attractiveness for investors. Regulations and user requests for a new building are required to meet green building standards. The Green Building Council Indonesia issues Greenship's green building certification system. A minimum of 56 points is required for additional investment costs but will result in savings in operations to get a platinum rating. This paper aims to determine what factors are influential in optimising construction costs through the value engineering method to achieve a green building rating tool with life cycle costs using Structural Equation Modelling. The finding is that energy is the most influential factor in obtaining platinum rating certification, which requires value engineering and lifecycle cost analysis to achieve optimal investment costs with additional costs from 7.494% to 4.689%. The novelty of this research is that the selection of materials/machines and working methods of the green concept that saves energy needs to be carried out from the beginning of the design to achieve a feasible payback period for new investments, which will be the commitment of the owner to build a green MICE.

Keywords:
Green Building;
MICE;
SEM Smart-PLS;
Value Engineering;

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INTRODUCTION

Meeting, Incentive, Convention, and Exhibition (MICE) is a place for meetings and exhibitions broadly, which includes various types of meetings, incentives, conventions, exhibitions, event venues, and other meeting places. For example, a meeting can call a mix-use building, as shown in Figure 1 shows, on the ground floor up to the 5th floor for exhibitions, in the middle of the building for incentives, on the 6th floor for meeting and conventions, known as Mix-Use Building [1]. The meeting, incentive travel, convention, and exhibition (MICE) industry is considered one of the industries with strong economic attractiveness, which has developed rapidly in China in recent years [2][3].

Tourism with visitors intended for business (MICE/business visitors) is different in terms of needs, handling tourism with the aim of recreational visitors (leisure visitors). Investors are interested in building places that can be used for MICE activities that are integrated with supporting facilities such as hotels, restaurants and malls because MICE visitors are willing to pay more than visitors for recreational purposes, even MICE visitors can come from abroad which will bring in foreign exchange which will have an impact in the Indonesian economic sector, especially in Indonesia there is no integrated MICE building so that it will accelerate the return on investment [4].

The tourism sector is growing steadily in Indonesia, the second largest foreign exchange earner and the main driver of the Indonesian economy. According to the World Travel & Tourism Council, Indonesia's tourism industry is the twentieth largest in the world, smaller than Thailand and Australia [5].

Figure 1. Mix-Use Building Design For MICE

The increase in costs for the construction of a Green Building concept building has been studied to increase construction costs ranging from 4.5% to 7% compared to conventional buildings. Still, it results in rental prices that have premiums that can be higher, between 5% to 10% [6, 7, 8].

Based on a case study of Green Building in Poland whereby following Green Building standards, the trend has been to increase profits by 26% per year [9] and with green technology innovation that will make changes to the structure of energy consumption according to the energy requirements used, which will eventually increase the company's performance in a sustainable manner [10].

For buildings to be built for MICE activities that can be used internationally, it would be better if this building had a green building certificate. The certification that will be taken is the certification in Indonesia, namely the Greenship certification issued by the Green Building Council Indonesia (GBCI) [11]. To get a platinum rating from Greenship certification, it is necessary to research what factors affect the rating. Green Building is a building that pays attention to the concept of conservation that has functions and benefits for human life. The fundamental aspect of the green building development concept is prioritising the principles of multifunction, sustainability, and resource saving, which consists of various natural environment features. In general, two things differentiate between green buildings and gray buildings. First, Green building is related to or imitates natural ecosystems, whereas gray building is the result of engineering or human thinking that does not take inspiration or follow natural ecology. Second, Green building is multifunctional, meaning that it can provide more than one type of service to the community [12].

Value Engineering can be an invaluable tool in the civil engineering construction industry. Value Engineering has tremendous benefits in both cost savings and project improvement areas.

However, with value engineering, the cost is expected to increase because a conventional building that becomes green can be optimised. Value Engineering has several stages in the process, so it is necessary to know at which phase the factors of value engineering influence cost performance [13].

Several independent factors will affect several dependent factors used in the study based on structural equation models in the performance of various industries, combined with value engineering to obtain cost optimization and LCCA shows the payback period so that research can quickly find out the influencing factors in assessing a cost performance [14].

MATERIAL AND METHODS

Green Building Rating Standard

Most countries have developed green building rating tools that are based on social, environmental, and economic dimensions [15]. What is meant by green buildings can be in stages as the design, construction, and operation of buildings with maximum conservation of resources (energy, land, water, and materials), pollution reduction, environmental protection, and providing a place for healthy and comfortable people indoor space [15][16].

Greenship

There are several Greenship rating tools, new buildings, existing building, interior, home, and neighborhood. The building certification system in Indonesia for new buildings can be carried out in the design and construction stages called the Greenship New Building. The project team can create a comprehensive green building with innovative and creative approaches and ideas from the design to operational stages in obtaining certification.

Greenship New Building Certification, there are 2 (two) stages of assessment: are two stages of assessment:

a. Stages of Design Recognition (DR) that has a maximum score of 77 points. If the building is still in the design phase, the performance of the final design and planning will be assessed against the Greenship assessment tool.
b. Stages of Final Assessment (FA) that has a maximum score of 101 points. In the final stage, the overall performance of the building is assessed thoroughly both from the design and construction aspects based on the Greenship assessment tool.

The rating from Design Recognition (DR) and Final Assessment (FA) is in Table 1.

Table 1. Rating DR and FA

Rating	Percentage	Score Minimum DR	Score Minimum FA
Platinum	73%	56	74
Gold	57%	43	58
Silver	46%	35	46
Bronze	35%	27	35

Source: [11]

Factors Affecting Green Building

There are Eligibility provisions and six assessment categories to get the Greenship New Building certification. Each category consists of several criteria that contain Prerequisites and Credit Points. There are six categories, namely Appropriate Site Development (Table 2), Energy Efficiency and Conservation (Table 3), Water Conservation (Table 4), Material Resources and Cycles (Table 5), Indoor Health and Comfort (Table 6) and Building and Environmental Management (Table 7). To find out which green building criteria will have an effect, all criteria are used as research variables. [17][18].

Table 2. Appropriate Site Development

Factor	Indicator	Points
Basic Green Area	E.1.1	2
Site Selection	E.1.2	2
Community Accessibility	E.1.3	2
Public Transportation	E.1.4	2
Bicycle Facility	E.1.5	2
Site Landscaping	E.1.6	2
Microclimate	E.1.7	2
Stormwater Management	E.1.8	2
Total Category		17

Source: [11]

Table 3. Energy Efficiency and Conservation

Factor	Indicator	Points
Electrical Sub Metering	E.2.1	Prerequisite
OTTV Calculation	E.2.2	Prerequisite
Energy Efficiency Measures	E.2.3	20
Natural Lighting	E.2.4	4
Ventilation	E.2.5	1
Climate Change Impact	E.2.6	1
On Site Renewable Energy	E.2.7	5 (Bonus)
Total Category		26

Source: [11]

Table 4. Water Conservation

Factor	Indicator	Points
Water Metering	E.3.1	Prerequisite
Water Calculation	E.3.2	Prerequisite
Water Use Reduction	E.3.3	8
Water Fixtures	E.3.4	3
Water Recycling	E.3.5	3
Alternative Water Resources	E.3.6	2
Rainwater Harvesting	E.3.7	3
Water Efficiency Landscaping	E.3.8	2
Total Category		21

Table 5. Material Resources and Cycle

Factor	Indicator	Points
Fundamental Refrigerant	E.4.1	Prerequisite
Building and Material Reuse	E.4.2	2
Environmentally Friendly Material	E.4.3	3
Non ODS Usage	E.4.4	2
Certified Wood	E.4.5	2
Prefab Material	E.4.6	3
Regional Material	E.4.7	2
Total Category		14

Source: [11]

Table 6. Indoor Health and Comfort

Factor	Indicator	Points
Outdoor Air Introduction	E.5.1	Prerequisite
CO_2 Monitoring	E.5.2	1
Environmental Tobacco Smoke Control	E.5.3	2
Chemical Pollutant	E.5.4	3
Outside View	E.5.5	1
Visual Comfort	E.5.6	1
Thermal Comfort	E.5.7	1
Acoustic Level	E.5.8	1
Total category		10

Source: [11]

Table 7.Building and Environmental Management

Factor	Indicator	Points
Basic Waste Management	E.6.1	Prerequisite
GP as a Member of Project Team	E.6.2	1
Pollution of Construction Activity	E.6.3	2
Advanced Waste Management	E.6.4	2
Proper Commissioning	E.6.5	3
Green Building Submission Data	E.6.6	2
Fit Out Agreement	E.6.7	1
Occupant Survey	E.6.8	1
Total category		13

Source: [11]

SEM Smart-PLS

Structural equation modelling (SEM) Smart-PLS (Partial Least Square) is a 2-step procedure that deals with building and testing measurement models and building and testing of the structural model. The first outside measurement model is concerned with measuring convergent validity with individual item reliability (>0.700), aggregated reliability (>0.700), and mean extracted variance (AVE>0.500). In addition, in this model discriminatory reliability is measured in terms of cross-loading, and the variable correlation was evaluated. The inner structure of the two models relates to the coefficient of determination (R^2), the model's goodness of fit, and hypothesis testing [19, 20, 21].

Value Engineering

Building stages can be evaluated in three stages design (architectural, structural, mechanical, electrical, and other works), construction (architectural, structural, mechanical, electrical, and other works), and operation (maintenance, energy, employee, and other work) [22][23]. These are the phases in value engineering [24] as follows: Preparation, Information, Function Analysis, Creative, Evaluation, Development, Presentation, Implementation and Follow-up [25][26] and to find out which phase will have an effect.

Lifecycle Cost Analysis

This stage is carried out using Life Cycle Cost Analysis (LCCA) which is based on the analysis of the value of money against time based on the estimated rate of interest and the duration of the plan life to know the long-term benefits of several alternative innovations that have been determined both from the aspects of initial cost prediction (Initial Cost), Energy costs, repair costs (Replacement /Repair Cost), maintenance and operational costs (Maintenance and Operational) and prediction of residual costs (Salvage Cost), then a cumulative analysis of costs is carried out - costs and benefits that may be obtained over the life of the alternative to be selected [27] and to find out which costs will have an effect, this cost is used as a research variable

Preparation Questionnaire

This research consists of six stages. The first stage of this research is to conduct a literature review of previous studies. The second stage is Interviews with green building construction experts. The third stage entails developing a questionnaire based on the indicators (6 categories and 46 criteria as explained in the item Factors Affecting Green Building above) are transformed into research variables that are assessed using a Likert scale as the measurement scale. The fourth stage involved the distribution of questionnaires. The fifth stage is the survey results about Greenship factors and sub–factors that contribute to the Questionnaire parameter.

The survey results are then interpreted using descriptive analysis, and the research data was gathered through a questionnaire survey distributed throughout the construction industry for a model. In the sixth stage, a model was created to test the relationship between project cost (Value Engineering and Lifecycle Cost Analysis) and influential factors. Structural Equation Modelling (SEM) is used to examine the proposed research model. SEM analysis with Smart-PLS was used to estimate the measurement and structural model for quality and fit. LLCA (E) covers engineering works, LCCA (C) covers construction works, and LLCA (O) covers operation works.

Respondent's Profiles

There are 80 respondents with background education from a diploma to master's degree and with positions at work from site engineer to project director who answered a list of questions related to the factors in Greenship and the eight stages in value engineering. Determining the data population is based not only on journal literacy but also on the validity of the experts so that the population is right on target. After the data is collected, it is checked and grouped based on education (diploma to doctorate) and position (site engineer to the director).

Structural Equation Modelling

The Greenship New Building certification system consists of Eligibility provisions and six assessment categories. There are six categories: Appropriate Site Development (ASD=E1), Energy Efficiency and Conservation (EEC=E2), Water Conservation (WAC=E3), Material Resources and Cycle (MRC=E4), Indoor Health and Comfort (IHC=E5) and Building and Environmental Management (BEM=E6) with criteria as shown in Table 2 up to Table 7. There are three stages in building construction, namely Engineering (E), Construction (C) and Operation (O). In Engineering there are Architectural Works (EA), Structural Works (ES), Mechanical Works (EM), Electrical Works (EE) and Others Works (EO). Likewise, in Construction work, there are Architectural Works (OA), Structural Works (OS), Mechanical Works (OM), Electrical Works (OE) and other Works (OO). Whereas in Operation, there is work related to Energy (OE), Maintenance (OM), Operation (OO) and Worker/Staff (OW). For the 8 phases of value engineering, indicators will be named from VE1 up to VE 8 so that the structural model is as shown in Figure 2 and the whole research method analysis as shown in Figure 3 [28].

RESULT AND DISCUSSION

By using SMART-PLS, there are Outer Loading Analysis and Inner Loading Analysis

Outer Loading Analysis

In phase I, with the calculation of the Smart PLS program. The Smart-PLS results from the Calculate PLS command where the PLS Algorithm produces a Path Coefficient with an Outer Loading value > 0.5 is still acceptable and will be removed from the diagram that has an outer loading value < 0.5. All indicators whose outer loading. Value is > 0.5 based on the outer loading validity is stated that all indicators have convergent validity as Average Variance Extracted (AVE) as shown in Table 8.

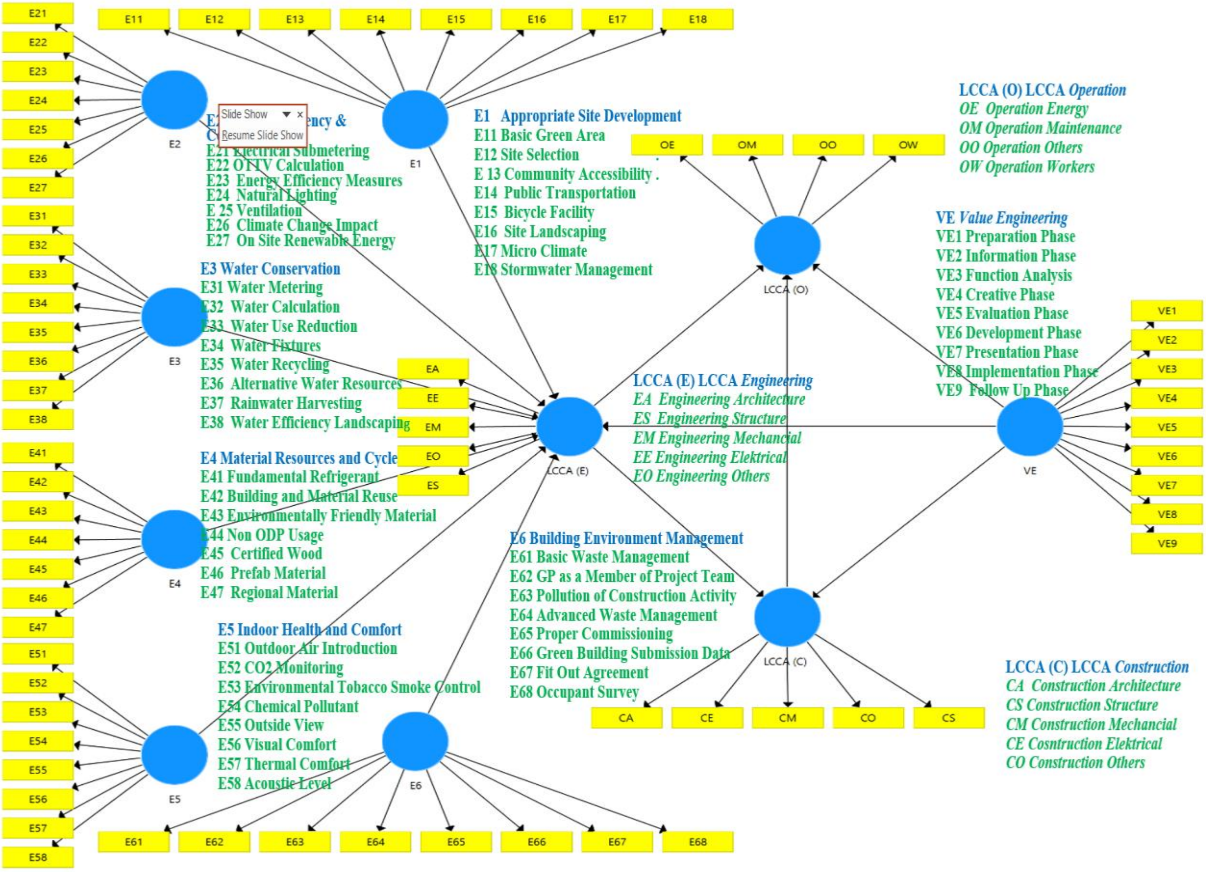

Figure 2. Structural Model Green Building Before Calculate by SEM

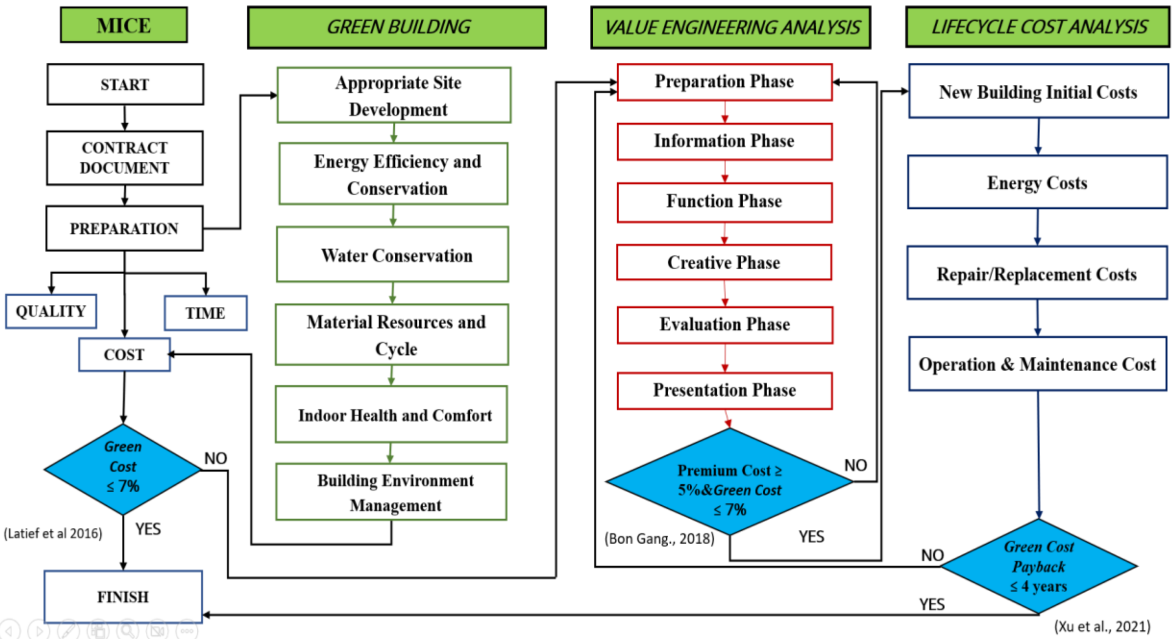

Figure 3. Flow chart of the whole analyses

The next step is to conduct an analysis of Construct Reliability. Construct Reliability is measuring the reliability of the latent variable construct. The value that is considered reliable must be above 0.70. Construct reliability is the same as Cronbach alpha, as shown in Table 9.

Table 8. Average Variance Extracted

Factor	Average Variance Extracted (AVE)
E12	0.628
E15	0.593
E16	0.637
E17	0.645
E18	0.643
E22	0.566
E23	0.795
E24	0.512
E27	0.819
E33	0.762
E34	0.647
E37	0.747
E42	0.789
E44	0.844
E46	0.503
E52	0.784
E53	0.587
E54	0.553
E56	0.774
E58	0.711
E62	0.748
E63	0.732
E64	0.529
E66	0.720
E68	0.575
EE	0.821
ES	0.788
VE1	0.870
VE2	0.871
VE3	0.815
VE4	0.830
VE5	0.844
VE6	0.937
VE7	0.920
VE8	0.897
VE9	0.775

Table 9. Convergent Validity – Cronbach Alpha

Factor	Average Variance Extracted (AVE)
E12	0.597
E15	0.534
E18	0.492
E23	0.612
E27	0.607
E33	0.599
E34	0.572
E37	0.531
E42	0.582
E44	0.572
E46	0.513
E52	0.562
E53	0.527
E54	0.055
E62	0.887
E63	0.799
E64	0.703
VE1	0.871
VE2	0.871
VE3	0.819
VE4	0.828
VE5	0.844
VE6	0.937
VE7	0.920
VE8	0.896
VE9	0.774

Inner Loading Analysis

The next step is to find the coefficient of T Statistics as a research hypothesis testing. Where the Smart-PLS result or output from the PLS calculation command produces T Statistics. The result of the statistical T value is 1.96, so it can be concluded that there is a significant effect, as shown in Table 10.

And if what is displayed is the P-value of the loading factor and path coefficient. For the results of P-Value <0.05, all indicators forming the construct are declared valid so that they can be used to test hypotheses at the structural measurement stage, as shown in Table 11. The value of R - Square, which is the goodness-fit-model test, is the result of the research. The R Square value of the joint effect on LCCA (E) is 0.718 with an adjusted R square value of 0.691, it can be explained that all independent variables simultaneously affect LCCA (E) by 0.691 or 69.1%. Because adjusted R Square 69.1% >50%, the influence of all independent variables on LCCA (E) is strong.

Table 10. T Statistic Value

Factor	T Statistic Value
E12	13.077
E15	10.251
E16	8.651
E17	29.350
E18	5.908
E22	27.645
E23	5.213
E24	9.623
E27	15.065
E33	11.535
E34	3.401
E37	28.697
E42	8.497
E44	8.897
E46	24.079
E52	10.744
E53	6.342
E54	22.493
E56	19.295
E58	16.839
E62	14.709
E63	16.788
E64	69.494
E66	40.634
E68	33.830
EE	9.026
ES	13.077
VE1	10.251
VE2	8.651
VE3	29.350
VE4	5.908
VE5	27.645
VE6	5.213
VE7	9.623
VE8	15.065
VE9	11.535

Table 11. P Value

Factor	T Value
E12	0.000
E15	0.000
E16	0.000
E17	0.000
E18	0.000
E22	0.000
E23	0.000
E24	0.000
E27	0.000
E33	0.000
E34	0.000
E37	0.000
E42	0.000
E44	0.001
E46	0.000
E52	0.000
E53	0.000
E54	0.000
E56	0.000
E58	0.000
E62	0.000
E63	0.000
E64	0.000
E66	0.000
E68	0.000
EE	0.000
ES	0.000
VE1	0.000
VE2	0.000
VE3	0.000
VE4	0.000
VE5	0.000
VE5	0.000
VE5	0.000
VE8	0.000
VE9	0.000

Results of the Platinum Model Green Building Analysis as follows: LCCA (E) = 0.859 E12 + 0.769 E15 + 0.689 E18 + 0.881 E22 + 0.895 E23 + 0.884 E27 + 0.810 E33 + 0.637 E34 + 0.764 E37 + 0.838 E42 + 0.823 E44 + 0.538 E46 + 0.909 E52 + 0.759 E53 + 0.790 E54 + 0.887 E62 + 0.799 E63 + 0.673 E64 + 0.871 VE1 + 0.871 VE2 + 0.819 VE3 + 0.828 VE4 + 0.844 VE5 + 0.937 VE6 + 0.920 VE7 + 0.896 VE8 + 0.774 VE9.

Based on the answers from 80 respondents and the Smart-PLS process, it was found that 17 of the influential factors out of 46 Greenship factors as shown in Table 12 and all phases in value engineering as shown in Table 13 affect the life cycle cost analysis (Engineering) in achieving a platinum rating.

Value Engineering

The initial cost of the building is being built in PIK2, Banten Province. The total gross floor area of 560,000 M2 for MICE activities is IDR 5,057,670,000,000, as shown in Table 14; where there is work that exceeds 20% as MEP services works, so the value engineering can be done.

Table 12. 17 Of the Influential Out of 46 Greenship Factors

Variable	Factor Greenship (GBCI)	Points
E12	Site Selection	2
E15	Bicycle Facility	2
E18	Stormwater Management	3
E 23	Energy Efficiency Measures	20
E 27	On Site Renewable Energy	5
E 33	Water Use Reduction	8
E 34	Water Fixtures	3
E37	Rainwater Harvesting	3
E42	Building and Material Reuse	2
E44	Non ODP Usage	2
E 46	Prefab Material	3
E52	CO_2 Monitoring	1
E53	Environmental Tobacco Smoke Control	2
E54	Chemical Pollutant	3
E62	GP as a Member of Project Team	1
E63	Pollution of Construction Activity	2
E64	Advanced Waste Management	2
	Total Platinum	64

Table 13. All Phase Value Engineering

Variable	Factor Value Engineering
VE 1	Preparation Phase
VE 2	Information Phase
VE 3	Function Analysis Phase
VE 4	Creative Phase
VE 5	Evaluation Phase
VE 6	Development Phase
VE 7	Presentation Phase
VE 8	Implementation Phase
VE 9	Follow-Up Phase

Table 14. Initial Cost of MICE Building

Works Description	Initial Cost IDR	%
Preliminaries	536,964,000,000	10.6%
Project Site Preparation & Vacuuming System	46,000,000,000	0.9%
Basement Foundation & Piling Works	575,470,000,000	11.4%
Structural Works	1,338,265,000,000	26.5%
Architectural Works & Finishes	800,208,000,000	15.8%
MEP Services	1,546,565,000,000	30.6%
External & Infrastructure Works	178,043,000,000	3.5%
Other Packages	36,155,000,000	0.7%
Total	5,057,670,000,000	100.0%

From Table 14, the initial cost of the largest breakdown of costs is mechanical and electrical work of 30.6%. For work that has a weight above 20%, value engineering can be carried out. The most influential factor E 23 = Energy Efficiency Measures = 20 points. Based on value engineering and the most influential factors, the focus on energy will be more certain to obtain a Greenship platinum rating. [29].

The total additional costs for making energy costs related to green costs = IDR 5,436,706,191,458 - IDR 5,057,670,000,000 = IDR 379,036,191,458 = 7.494% as shown in Table 15.

Table 15. Total Additional Green Cost

Works Description	Initial Cost IDR	Worth to Green Building IDR
Preliminaries	536,964,000,000	536,964,000,000
Project Site Preparation & Vacuuming System	46,000,000,000	46,000,000,000
Basement Foundation & Piling Works	575,470,000,000	575,470,000,000
Structural Works	1,338,265,000,000	1,338,265,000,000
Architectural Works & Finishes	800,208,000,000	907,953,638,400
MEP Services	1,546,565,000,000	1,817,855,553,058
External & Infrastructure Works	178,043,000,000	178,043,000,000
Other Packages	36,155,000,000	36,155,000,000
Total Investment	5,057,670,000,000	5,436,706,191,458
Total Additional Cost		7.494%

Table 16. Cost Breakdown of Additional Cost Before Value Engineering

Works Description	Initial Cost IDR	Worth to Green Building IDR
Preliminaries	536,964,000,000	536,964,000,000
Project Site Preparation & Vacuuming System	46,000,000,000	46,000,000,000
Basement Foundation & Piling Works	575,470,000,000	575,470,000,000
Structural Works	1,338,265,000,000	1,338,265,000,000
Architectural Works & Finishes	800,208,000,000	800,208,000,000
Glass replacement on Building Envelope		107,745,638,400
MEP Services	1,546,565,000,000	1,546,565,000,000
Additional cost on Chiller		60,522,553,058
Additional cost on BMS		154,224,000,000
Additional Cost on PV		56,544,000,000
External & Infrastructure Works	178,043,000,000	178,043,000,000
Other Packages	36,155,000,000	36,155,000,000
Total Investment	5,057,670,000,000	5,436,706,191,458

The details are as follows: for the replacement of glass in the building envelope from single glass to double glass there is an additional fee IDR 107,745,638,400. This glass replacement is to reduce the Overall Thermal Transfer Value (OTTV) from 35.00 W/m2 to 18.71 W/m2 which will reduce the capacity of the Chiller. Reducing chiller capacity will reduce energy costs in operations. Even though the chiller capacity to be used has decreased, the chiller investment costs have increased because of the chiller meeting the green criteria of IDR 60,522,553,058. So that the amount of energy consumption can be managed properly, the function of the Building Management System is increased so that there is an additional cost of IDR 154,224,000,000. To reduce energy costs, solar photovoltaic (PV) technology is installed on the roof of the building with an additional cost of IDR 56,544,000,000 as shown in Table 16.

This research uses the Function Analysis System from the value engineering stage to analyse energy optimisation. Energy optimisation is carried out on a) the air conditioning system that will be used because the energy cost of a building is the highest from the air conditioning machine, b) the AC load, which will be evaluated from the load of the glass envelope building as Overall Thermal Transfer Value (OTTV), c) other energy besides AC which requires energy management d) alternative energy sources as renewable energy.

Concerning energy optimisation that the author focuses on cost, an analysis was carried out on the causes of the cooling load, capacity and partial load of the chiller used to cool the room, building management systems, and alternative energy sources to reduce additional costs.

Table 17. Cost Breakdown of Additional Cost After Value Engineering

Works Description	Initial Cost IDR	Worth to Green Building IDR
Preliminaries	536,964,000,000	536,964,000,000
Project Site Preparation & Vacuuming System	46,000,000,000	46,000,000,000
Basement Foundation & Piling Works	575,470,000,000	575,470,000,000
Structural Works	1,338,265,000,000	1,338,265,000,000
Architectural Works & Finishes	800,208,000,000	800,208,000,000
Glass replacement on Building Envelope		107,745,638,400
MEP Services	1,546,565,000,000	1,546,565,000,000
Additional cost on Chiller		33,073,749,979
Additional cost on BMS		61,200,000,000
Additional Cost on PV		35,154,000,000
External & Infrastructure Works	178,043,000,000	178,043,000,000
Other Packages	36,155,000,000	36,155,000,000
Total Investment	5,057,670,000,000	5,294,843,388,379
Total additional cost		4.689%

With details of reducing additional costs to IDR 5,294,843,388,379 - IDR 5,057,670,000 = IDR 237,173,388,379 = 4.689% consisting of replacing glass IDR 107,745,638,400, using the best price with a different brand of equipment but with the same quality so that the additional cost for the chiller drops to IDR 33,073,749,979, for the Building Management System it becomes IDR 61,200,000,000 and the PV becomes IDR 35,154,000,000, as shown in Table 17.

CONCLUSION

There are several ways to select the factors that affect costs. From the results of the SEM-PLS, there are 17 variables or influencing factors for a lifecycle cost analysis for a platinum grade. The most influential factor in getting green certification is energy. The design of this building must be improved to meet the EEC2 prerequisite with improvements to the OTTV, cooling loads from the air conditioning, and lighting installations. Decreasing the value of OTTV from the national standard of 35 W/M² to become 21.06 W/M², and there is an additional cost of IDR 107,745,638,400, - by modifying the building envelope.

The total energy consumption of buildings decreased from Kwh/year from 43,222,692.07 to 29,110,483.10 or energy-saving 14,112,208.96. The points achieved because of savings from the total energy consumption of 11 points, 32.65% of energy-saving minus 10% = 22.65% divided by 2%. With the additional point achieved because of savings from the total energy consumption of 11 points so the total points criteria achieved will be 66 or platinum rating and with the conversion of 1 kwh = 0.891 kg and energy savings of 14,112,208.96 kwh/year, there is a reduction in CO2 emissions of 12,573,978.82 kg. With Pareto's law, mechanical and electrical work that is more than 20% of the weight of the initial budget is feasible for value engineering. With FAST diagrams for energy optimization, the total additional cost to make the energy-related green costs IDR 379,036,191,458 (7.494%) can be reduced to IDR 237,173,388,379 (4.689%). The additional cost can be returned in three years and ten months. The other value of green buildings is that it is possible to create MICE Green Building itself as an attraction for business visitors/tourists. For example, by exposing the green energy utilities or the green water supply (recycled water installation) or demonstrating the stand-alone power supply's energy-saving properties. It is good and to show how those green facilities could contribute to the green environment and at the same time also save money.

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