

In a Commercial Restaurant Construction Project in Eastern Indonesia, Alternative Materials Based on Value Engineering for Architectural Work

Putri Dwi Rahayu¹, Budi Witjaksana², Dika Ayu Safitri³

Civil Engineering Master's Study Program, Faculty of Engineering Universitas
17 Agustus 1945 Surabaya

Corresponding Author: Putri Dwi Rahayu, 1472400067@surel.untag-sby.ac.id
budiwitjaksana@untag-sby.ac.id ; dika-ayu@untag-sby.ac.id

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ABSTRACT

Commercial construction projects in Eastern Indonesia have to deal with high costs for getting materials, difficult transportation issues, and a Construction Cost Index that is much higher than the average for the whole country. This study looks into the following question: What different building designs and materials can be suggested using Value Engineering (VE) for the Mie Gacoan Sorong-Nangka restaurant construction project, while still making sure the building works as well as it was planned to. A descriptive quantitative method was used, based on the SAVE International six-phase Job Plan. During the function analysis stage, the Cost-to-Worth Ratio (C/W) was used to find granite tile products that had extra costs, which means their C/W was higher than 1.00.. The suggested options were Asia Tile Brown Oak, Granite Tile Grey Matte Lokal, Arna Wood Plank Brown Walnut, Essenza Absolute Black, and Asia Tile Outdoor Wood Brown. All other options worked just as well as the floor coverings and looked good together with the restaurant's modern industrial style. A Life Cycle Cost (LCC) analysis over 10 years, using a 6% discount rate, showed that the alternatives were more economical. The analysis found cost savings of between 25.55% and 26.81% for each pair of materials. The total cost saved from implementing VE reached IDR 12,665,548.50, which is 21.81% of the existing granite tile budget that was reviewed. These results show that VE is a useful and real-world method for choosing the best building materials in commercial restaurant projects in Eastern Indonesia, where there are specific transportation and supply challenges

INTRODUCTION

Commercial construction in the eastern parts of Indonesia faces different economic and logistical problems that aren't common in the more developed western areas of the country. The Sorong Regency in the Southwest part of Papua Province has one of the highest Construction Cost Index (IKK) values in Indonesia. This is because getting materials is more expensive, the delivery process takes longer, and there isn't enough local supply to meet the demand (Badan Pusat Statistik Provinsi Papua Barat, 2024). In this case, carefully planning cost savings during the design stage can lead to big financial gains without affecting how well the building works as long as any changes to materials or design are based on careful analysis of their purpose, not just trying to save money randomly.

Value Engineering (VE) is a methodical approach to analysis created by Lawrence D. Miles at General Electric aimed to find the lowest possible cost to achieve a needed function (SAVE International, 2007; Dell'Isola, 1997). Unlike regular value management or design optimization, value engineering is based on function analysis. This means looking carefully at what each part of a building needs to do its main function before checking if different materials or design choices can do the same job at a lower cost over the building's whole life. The core VE value equation is:

$$\text{Value (V)} = \text{Function (F)} / \text{Cost (C)}$$

In commercial building projects, things like floor coverings, wall cladding, and ceiling systems are considered high-cost elements in the finishing work of a building (Meilasari et al., 2023; Sihite & Setiawan, 2024). In the Mie Gacoan Sorong-Nangka restaurant project, there is a commercial space of 509.4 square meters that can accommodate 180 seats, and the architectural work for this area has a total budget of IDR 849,736,345.71. Of this, the finishes for the floor, walls, and ceiling make up 74.50%, which is IDR 633,014,041.21. In this group, premium granite tiles were found to have a Cost-to-Worth Ratio (C/W) higher than 1.00, which shows that there is extra cost involved – this is the main rule for something to be considered for Value Engineering (Dell'Isola, 1997).

The use of VE in commercial construction projects in Eastern Indonesia is not well covered in academic studies. Before, other people looked at different kinds of buildings. They studied hospitals (Rani, 2024; Sihite & Setiawan, 2024), university buildings (Devita, 2022; Chamzawi et al., 2025), shopping centers (Bahri, 2018), and homes (Diah et al., 2024). A review done by Lin and others in 2023 showed that there are not many studies on small to medium-sized VE projects in developing areas, especially in eastern Indonesia, published in international journals. This clearly shows why this study is needed.

Value Engineering in Construction Projects

Value Engineering is a method, according to SAVE International from 2007, that focuses on getting the necessary functions done at the lowest possible cost over the whole life of a product, while still meeting the needed standards for performance, reliability, quality, and safety. The main thing that makes it different is that it focuses more on what a part does rather than what it is made

of. A component is explained by its function first, not by the material it's made from. This method makes sure that any changes suggested keep the system working properly without spending money on things that don't help meet the needed performance.

VE has recorded cost reductions ranging from 5% to 30% in construction projects, regardless of the type of project or where it is located (Sihite & Setiawan, 2024; Chamzawi et al., 2025). Asa et al. (2025) found that using a VE-informed approach for basement construction at BRI Tower Jakarta saved USD 257,010.56, which is 26.7% of the original cost. Diah et al. (2024) saved 51.10% on the Villa Holly Pecatu residential project by making smart changes to the materials used in the walls, roof, doors, and floors. In architectural finishing projects, Sihite & Setiawan (2024) managed to save 5.94% on hospital construction costs, whereas Bahri (2018) found savings of IDR 1,797,509,359, which is 2.86%, on the Transmart Carrefour Padang commercial building.

Function Analysis and Cost-to-Worth Ratio

Function analysis is the main part of value engineering. Each part of a building is described with an action word and a thing that can be measured, like 'cover floor,' 'enclose space,' or 'transmit load.' These parts are grouped into either basic function, which are necessary for the building to work properly, or secondary functions, which help but can be replaced. The Cost-to-Worth Ratio is then computed as:

$$\text{C/W Ratio} = \text{Actual Cost (C)} / \text{Minimum Worth (W)}$$

The minimum worth (W) is the lowest price in the market where the basic function can still be done. A cost-to-weight ratio higher than 1.00 shows that the product includes extra costs—like those from brand name, looks, or other non-functional features instead of just what's needed to work properly (Dell'Isola, 1997). Items that have the highest customer to warehouse ratio are given priority for VE analysis.

Life Cycle Cost Analysis (LCCA)

Life Cycle Cost Analysis looks at the total cost of a material or system throughout its useful life. It includes the cost of buying it at first (C_0) and the ongoing expenses for repairs and maintenance (C_t) over time. These costs are adjusted to show their value today. The formulation applied in this study is:

$$\text{LCC} = C_0 + (C_t \times \text{PWF})$$

$$\text{PWF} = [1 - (1 + i)^{-n}] / i$$

Where n is the analysis period in years and i is the annual discount rate. Dell'Isola (1997) says that looking at the total cost over time is important when comparing materials that need different amounts of care. A material that costs less at first might end up being more expensive in the long run if it needs more frequent repairs or upkeep.

Construction Logistics in Eastern Indonesia

The Sorong Regency is one of the most expensive places in Indonesia for construction projects. Muhammad and Hanaoka (2023) found that unequal distribution of goods between Eastern and Western Indonesia causes problems in the supply chain and leads to bigger price differences between regions.

Rauzana and Dharma (2022) found that delays in getting materials were a main reason for construction delays in parts of eastern Indonesia. They also said that high freight costs and uncertainty about moving goods between islands made it harder to get materials from outside Papua, increasing the risk of problems with getting supplies on time. These factors show that choosing materials that are available locally or across the country through value engineering is really useful. It helps lower the risk of getting materials and also reduces the starting cost.

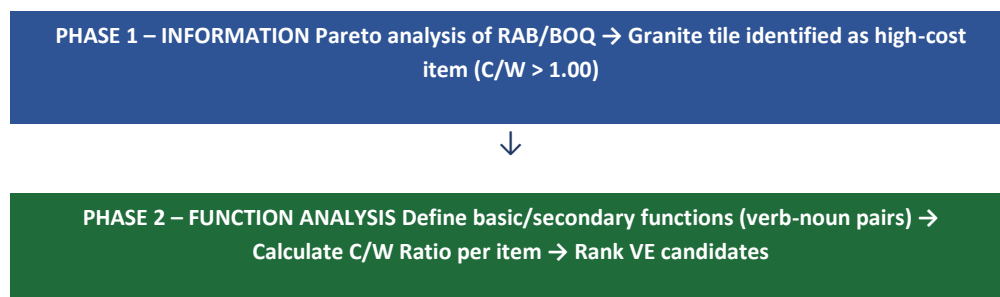
THEORETICAL REVIEW

Value Engineering is defined by SAVE International (2007) as a systematic approach that seeks to achieve required functions at the lowest life-cycle cost consistent with performance, reliability, quality, and safety requirements. Its distinguishing characteristic is the primacy of function analysis over material specification: a component is first described by what it does, not what it is. This approach ensures that any proposed modification preserves the functional integrity of the system while eliminating costs that do not contribute to required performance.

VE has documented cost savings of between 5% and 30% in construction projects across project typologies and geographic contexts (Sihite & Setiawan, 2024; Chamzawi et al., 2025). Asa et al. (2025) reported savings of USD 257,010.56 (26.7%) on basement construction at BRI Tower Jakarta through VE-informed methodology substitution. Diah et al. (2024) achieved 51.10% savings on the Villa Holly Pecatu residential project via systematic material substitution in walls, roofing, doors, and floors. In architectural finishing works specifically, Sihite & Setiawan (2024) achieved 5.94% savings on hospital construction, while Bahri (2018) reported IDR 1,797,509,359 (2.86%) savings on the Transmart Carrefour Padang commercial project.

METHODOLOGY

A descriptive quantitative research design was used, following the six-phase VE Job Plan from SAVE International (2007). This paper looks at Phases 2 to 5, which include Function Analysis, Creative, Evaluation, and Development, specifically for the granite tile part of the Mie Gacoan Sorong–Nangka project. The first phase, called the Information Phase, found that granite tiles were a high-cost item using Pareto analysis, and this finding is shared in the companion paper that answers the first main question of the larger study. Figure 1 presents the research workflow.



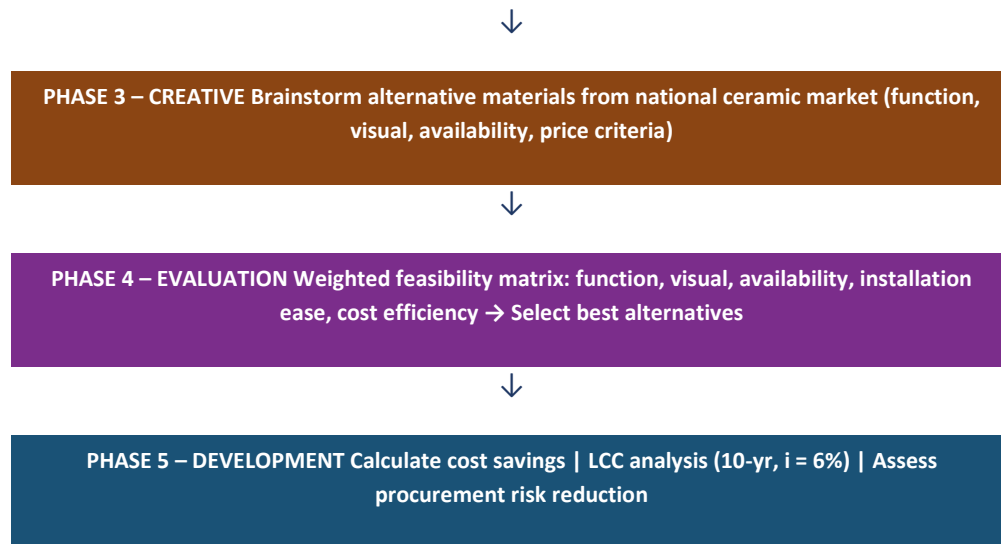


Figure 1. Value Engineering Job Plan Research Workflow

Project Description

The Mie Gacoan Sorong-Nangka restaurant is a one-story commercial building that covers an area of 509.4 square meters. It is situated on Jalan Nangka, in Malawili, Sorong Regency, Southwest Papua Province. The building has 180 dining seats spread across different areas: 85.4 square meters indoors, 205.25 square meters semi-outdoors, and 125.5 square meters outdoors. The kitchen, which is 148.75 square meters, supports the dining areas. Total architectural work cost was IDR 849,736,345.71. The main sources of data included: (i) the project's Bill of Quantities and Budget Plan; (ii) the Sorong Regency Unit Price Standard from 2024, which was modified according to the relevant local IKK; and (iii) a survey of retail prices for ceramic tiles across the national market in 2025.

Function Analysis Phase

Basic and secondary functions were set for each granite tile item using pairs of active verbs and measurable nouns (for example, 'cover floor surface'). The lowest value (W) for each item was set based on the price of the cheapest material available in the country that can do the same job. The C/W Ratio was calculated using Equation 2. All items that had a C/W ratio higher than 1.00 were considered as VE candidates; the items with the biggest ratios and the largest price differences were given the highest priority.

Creative Phase

Alternative materials were obtained only from brands that are widely available across the country and commonly found in the Indonesian market, with a focus on products that can be easily sourced through the Sorong procurement system to lower the risk in the supply chain. The selection was based on four factors: first, the material had to work like a floor covering; second, it needed to look similar to the current material in terms of design pattern, color, and how it feels to the touch; third, it had to be available to buy; and fourth, its cost had to be less than what was already specified. No material that had a C/W value of 1.00 or lower was given more creative attention.

Evaluation Phase

During the evaluation stage, a weighted feasibility matrix was used to assess five factors: (1) how well something works, (2) how it looks and fits with the surroundings, (3) how easy it is to get in the market, (4) how simple it is to install, and (5) how much it costs. Each criterion was looked at in a non-numerical way, and the general judgment about how feasible something was was given as Feasible, Highly Feasible, or Not Feasible. The matrix was filled out by two different evaluators; all of them had to agree that a material was feasible before it could move on to the Development Phase.

Life Cycle Cost Analysis

The LCC was calculated over a 10-year period using a 6% annual discount rate, which matched the Bank Indonesia lending rate that was in effect when the analysis was done. Annual maintenance costs were determined using technical information about how to properly maintain finishing materials and checked against data from local contractors. The cost is IDR 30,000 per square meter per year for premium granite tiles, which need regular cleaning, polishing, and grout repairs. For homogeneous tiles and other locally made granite tile options, the cost is IDR 22,000 per square meter per year. The Present Worth Factor was:

$$PWF = [1 - (1.06)^{-10}] / 0.06 = 7.3601$$

RESULTS AND DISCUSSION

Function Analysis: Cost-to-Worth Ratio

Table shows the results of analyzing the functions for the six granite tile items that were chosen as potential value engineering candidates after the Pareto screening done during the Information Phase. All six items had cost-to-weight ratios higher than 1.00, showing that there was a consistent amount of extra cost that wasn't needed. The highest ratio was found for Roman dMerbau Walnut (C/W = 1.50). This means the unit price is IDR 372,900 per square meter, compared to a functional value of IDR 248,600 per square meter. The extra cost of IDR 124,300 per square meter comes from the brand's specifications, not from how well it performs its basic functions. Roman dMaine Grey had the smallest ratio (C/W = 1.24), showing a lower extra cost that wasn't needed.

Table Function Analysis and Cost-to-Worth Ratio of Selected Granite Tile Items

No.	Existing Material	Basic Function	Actual Cost C (IDR/m ²)	Min. Worth W (IDR/m ²)	C/W Ratio
1	Valentino Virginia Brown	Cover floor surface	293,800	214,700	1.37
2	Invinity Alphine Natural	Cover floor surface	293,800	220,350	1.33
3	Roman dMaine Grey	Cover floor surface	203,400	163,850	1.24
4	Roman dMerbau Walnut	Cover floor surface	372,900	248,600	1.50
5	Roman Alaska Night	Cover floor surface	271,200	203,400	1.33

No.	Existing Material	Basic Function	Actual Cost C (IDR/m ²)	Min. Worth W (IDR/m ²)	C/W Ratio
6	Roman dCedrus Rosato	Cover floor surface	293,800	214,700	1.37

Creative Phase: Proposed VE Material Alternatives

During the creative process, six different alternative materials were created based on the C/W ratio rankings. The selection criteria focused on materials that match the modern industrial look of the Mie Gacoan brand, like warm wood grain colors, dark tile accents, and grey service areas, while also making sure the materials were affordable and easily found in the national market. Table 2 gives a summary of the different options and compares their unit prices.

Table Creative Phase – VE Material Alternatives and Unit Price Comparison

No.	Existing Material	VE Alternative	Existing (IDR/m ²)	VE Price (IDR/m ²)	Unit Saving (IDR/m ²)	Saving (%)
1	Valentino Virginia Brown	Asia Tile Brown Oak	293,800	214,700	79,100	26.92%
2	Invinity Alphine Natural	Asia Tile Brown Oak	293,800	220,350	73,450	24.99%
3	Roman dMaine Grey	Granite Tile Grey Matte Lokal	203,400	163,850	39,550	19.44%
4	Roman dMerbau Walnut	Arna Wood Plank Brown Walnut	372,900	248,600	124,300	33.33%
5	Roman Alaska Night	Essenza Absolute Black	271,200	203,400	67,800	24.99%
6	Roman dCedrus Rosato	Asia Tile Outdoor Wood Brown	293,800	214,700	79,100	26.92%

Roman dMerbau Walnut had the highest potential for saving money per square meter, with a cost saving of IDR 124,300. Next were the two materials that looked like brown oak, each offering a saving of IDR 79,100 per square meter. The grey matte tile had the lowest saving potential at IDR 39,550 per square meter. Arna Wood Plank Brown Walnut is an alternative to Roman Merbau Walnut, and it was noted for matching very well with the existing material in terms of wood grain pattern and color saturation.

Evaluation Phase: Weighted Feasibility Matrix

Table 3 shows the visual and functional compatibility check, and Table 4 shows the weighted evaluation matrix. All six options were given a rating of Feasible or Highly Feasible. Arna Wood Plank Brown Walnut (used instead of Roman dMerbau Walnut) was the only option that was rated as Highly Feasible.

This was because it offered the biggest savings in cost and had a visual match that was classified as Very Close to the original specification.

Table Visual and Functional Compatibility of VE Alternatives

No.	Existing Material	VE Alternative	Visual Similarity	Functional Compliance	Feasibility
1	Valentino Virginia Brown	Asia Tile Brown Oak	Wood grain & warm brown – near equivalent	Suitable	Feasible
2	Invinity Alphine Natural	Asia Tile Brown Oak	Natural wood texture – near equivalent	Suitable	Feasible
3	Roman dMaine Grey	Granite Tile Grey Matte Lokal	Grey matte minimalist – similar	Suitable	Feasible
4	Roman dMerbau Walnut	Arna Wood Plank Brown Walnut	Wood grain & color – very close to existing	Suitable	Highly Feasible
5	Roman Alaska Night	Essenza Absolute Black	Dark modern character preserved	Suitable	Feasible
6	Roman dCedrus Rosato	Asia Tile Outdoor Wood Brown	Outdoor wood plank appearance – similar	Suitable	Feasible

Table Weighted Evaluation Matrix – VE Alternative Materials

No.	Existing Material	VE Alternative	Function	Visual	Availability	Ease of Install.	Cost Efficiency	Overall
1	Valentino Virginia Brown	Asia Tile Brown Oak	✓	Near equiv.	Easy	Similar	Good	Feasible
2	Invinity Alphine Natural	Asia Tile Brown Oak	✓	Near equiv.	Easy	Similar	Good	Feasible
3	Roman dMaine Grey	Granite Tile Grey Matte Lokal	✓	Similar	Easy	Similar	Moderate	Feasible
4	Roman dMerbau Walnut	Arna Wood Plank Brown Walnut	✓	Very close	Available	Similar	Excellent	Highly Feasible
5	Roman Alaska Night	Essenza Absolute Black	✓	Near equiv.	Easy	Similar	Good	Feasible
6	Roman dCedrus Rosato	Asia Tile Outdoor Wood Brown	✓	Similar	Available	Similar	Good	Feasible

Development Phase: Cost Savings Calculation

Table shows the detailed cost savings achieved by using different VE options for all six granite tile items. The total savings are IDR 12,665,548.50 compared to the existing granite tile cost of IDR 58,080,644.00, which is a 21.81% decrease. In the overall project, this part takes up 2.00% of the budget for finishing the floors, walls, and ceilings, and 1.49% of the total cost for architectural work. Table 6 provides the summary recapitulation.

Table Itemised Cost Savings – Existing vs. VE Alternative Materials

No.	Existing Material	Vol. (m ²)	Total Existing (IDR)	Total VE (IDR)	Saving (IDR)	Saving (%)
1	Valentino Virginia Brown	24.14	7,092,332	5,182,858	1,909,474	26.92%
2	Invinity Alphine Natural	8.45	2,482,610	1,861,957	620,653	25.00%
3	Roman dMaine Grey	43.62	8,872,308	7,147,587	1,724,721	19.44%
4	Roman dMerbau Walnut	57.40	21,404,460	14,269,540	7,134,920	33.34%
5	Roman Alaska Night	10.15	2,751,680	2,064,510	687,170	24.97%
6	Roman dCedrus Rosato	23.78	6,459,444	5,103,683	1,355,761	20.99%

Table Value Engineering Cost Saving Summary Recapitulation

No.	Description	Value
1	Total architectural work cost	IDR 849,736,345.71
2	Floor, wall & ceiling finishing work cost	IDR 633,014,041.21
3	Total existing granite tile cost (analyzed items)	IDR 58,080,644.00
4	Total VE alternative granite tile cost	IDR 45,415,095.50
5	Total VE cost saving	IDR 12,665,548.50
6	% saving vs. existing granite tile cost	21.81%
7	% saving vs. floor/wall/ceiling work cost	2.00%
8	% saving vs. total architectural work cost	1.49%

Life Cycle Cost Analysis

Table 7 presents the LCC comparison across all six material pairs for a 10-year analysis horizon ($i = 6\%$, $PWF = 7.3601$). In every case, the VE alternative produced a lower LCC than the existing material. LCC savings ranged from 25.55% (Roman dMaine Grey / Granite Tile Grey Matte Lokal) to 26.81% (Valentino Virginia Brown / Asia Tile Brown Oak). The LCC advantage reflects

both lower initial procurement cost and a reduced annual maintenance cost assumption for the alternatives (IDR 22,000 vs. IDR 30,000 per m² per year).

Table Life Cycle Cost Analysis – Existing vs. VE Alternatives (10 Years, i = 6%, PWF = 7.3601)

No.	Existing Material	VE Alternative	C _o Existing (IDR)	C _o Alt. (IDR)	LCC Existing (IDR)	LCC Alt. (IDR)	LCC Saving (IDR)	% Saving
1	Valentino Virginia Brown	Asia Tile Brown Oak	7,092,332	5,182,858	12,422,507	9,091,653	3,330,854	26.81%
2	Invinity Alpine Natural	Asia Tile Wood Brown	2,482,610	1,861,958	4,348,392	3,230,198	1,118,194	25.72%
3	Roman dMaine Grey	Granite Tile Grey Matte Lokal	8,872,308	7,147,587	15,538,010	11,567,382	3,970,628	25.55%
4	Roman dMerbau Walnut	Arna Wood Plank Brown Walnut	21,404,460	14,269,540	37,496,350	27,602,180	9,894,170	26.39%
5	Roman Alaska Night	Essenza Absolute Black	2,751,680	2,064,510	4,820,441	3,581,992	1,238,449	25.69%
6	Roman dCedrus Rosato	Asia Tile Outdoor Wood Brown	6,459,444	5,103,683	11,313,060	8,288,474	3,024,586	26.74%

Function Analysis: Interpretation of C/W Ratio Findings

The C/W ratios found in this study, which are between 1.24 and 1.50, match the results from similar commercial construction VE studies in Indonesia. Bahri (2018) found similar high price levels in the Transmart Carrefour Padang project; Devita (2022) also observed the same trends in university building architectural projects. In this study, the highest ratio is 1.50 for Roman dMerbau Walnut. This shows that the item is priced 50% higher than its actual use value. The extra cost is because of its famous brand name and special looks, not because it works better in any way. This is exactly the kind of extra cost that the VE function analysis is made to find and remove.

In the Sorong construction setting, this specification pattern has a combined drawback. Premium tiles that are imported cost more per piece and take longer to ship between islands. They also have limited availability and are riskier to buy because of the way they are sourced (Muhammad & Hanaoka, 2023; Rauzana & Dharma, 2022). The VE alternatives found in this study – brands that are widely available across the country and have well-developed delivery systems in Indonesia – help reduce both costs and risks related to getting

supplies, which is an important discovery that goes beyond the cost reductions shown in Tables.

Visual and Functional Compatibility of Alternatives

The evaluation showed that all six options worked equally well for covering the floor and looked good with the restaurant's design ideas. The most important rule for designing a commercial franchise restaurant is keeping the brand's look and feel the same everywhere—in the case of Mie Gacoan, this means a modern industrial style shown through warm wooden floors, dark colored walls, and light grey areas where service happens. The suggested options meet this requirement, with Arna Wood Plank Brown Walnut being the best fit. It is rated as Very Close in appearance to Roman dMerbau Walnut.

This finding backs up the theory proposed by Dell'Isola in 1997, which says that secondary functions, like specific brand details and design choices, can often be achieved in a cheaper way through different methods, as long as the main function is clearly understood and kept the same. For construction managers and design consultants working on franchise restaurant projects in growing markets, using high-cost imported floor tiles is usually based on usual buying practices rather than real need. Checking the design details carefully through value engineering can save money without lowering the quality or style that the franchise owner expects.

Economic Significance of LCC Findings

The LCC savings of 25.55 to 26.81% over ten years are higher than the initial buying savings, which range from 19.44 to 33.33% for each material pair. This shows that the cost benefits of the VE options last throughout the building's lifetime. This is because of the mix of a lower starting cost and less frequent maintenance needed each year. This finding matches Dell'Isola's (1997) LCCA principles and supports the LCC results found by Rani (2024) and Sihite & Setiawan (2024) in their studies on value engineering in hospital construction. For building owners and developers who run commercial restaurant chains in Eastern Indonesia, using a complete life-cycle cost approach actually makes the financial argument for replacing materials with more efficient ones stronger, not weaker. Decision-makers who choose not to consider VE alternatives just because they don't like the look may end up paying 25 to 27% more over the 10-year period for the flooring they select.

Comparative Assessment

The overall initial cost savings of 21.81% from the granite tile budget matches the savings seen in similar studies. Devita (2022) found similar cost reductions in university building projects. Chamzawi et al. (2025) also achieved savings of 18.14% by using value engineering on a 12-storey academic building. The total amount—IDR 12,665,548.50—shows a significant direct saving on a project of this size, especially since the VE analysis was specifically focused on the six tile items with the highest cost-to-work ratio. A complete VE study covering all parts of the architectural finishing budget, like wall cladding, ceiling systems, outside paving, and sanitary finishes, should result in much bigger total savings. This matches what Lin et al. found in 2023, which shows that studies focusing on narrow areas of VE usually don't capture the full optimization possibilities within a project.

CONCLUSION AND RECOMMENDATION

This study looked at how Value Engineering can be used to find and suggest different materials for the construction of a commercial restaurant in the Mie Gacoan Sorong–Nangka project located in Eastern Indonesia. The following conclusions are drawn:

1. All six granite tile items tested during the function analysis had Cost-to-Worth Ratios above 1.00 (ranging from 1.24 to 1.50), showing that there are extra costs in the current architectural specifications that aren't needed. Roman dMerbau Walnut had the highest ratio of 1.50, which means it costs 50% more than its actual useful value.
2. Six different materials were checked to see if they could work just as well as the original. These materials are Asia Tile Brown Oak, Granite Tile Grey Matte Lokal, Arna Wood Plank Brown Walnut, Essenza Absolute Black, and Asia Tile Outdoor Wood Brown. They were looked at to make sure they look and perform the same way. All six options were considered feasible or very feasible in the weighted evaluation matrix, and the Arna Wood Plank Brown Walnut received the highest overall score.
3. Using VE alternatives saves an initial cost of IDR 12,665,548.50, which is 21.81% of the total budget for granite tiles. This cost saving is achieved without affecting how well the building works or the look of the restaurant.
4. A 10-year Life Cycle Cost analysis shows that the value engineering options are more economical in the long run. These options save between 25.55% and 26.81% in costs compared to other materials. The savings come from lower initial costs to buy the materials and less money spent on maintenance each year.
5. Using locally available tiles instead of imported high-quality ones helps lower the risk of getting supplies in the Sorong area, which is a smart way to manage risks. This approach supports the VE suggestion not just because it saves money, but also because it makes the supply process more reliable.

These results show that Value Engineering is a good, useful, and supported method for choosing the best materials in building projects in commercial construction. It works well in the real-world conditions and financial limits that are typical in Eastern Indonesia. Future research should look into: first, applying value engineering analysis to the entire finishing budget of similar projects; second, including actual procurement risk costs like shipping and chances of delays into the life cycle cost model; and third, checking if value engineering can be used during the early design stages to make better decisions in projects with high IKK levels.

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