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Article

Achieving Cost Leadership through the Use of Attribute-Based Costing Technique – An Applied Study

Narmin Jaza Shaswar[1,*], Jarjees Mustafa Khdeer[2]

[1,2]Department of Accounting, College of Administration and Economics, Salahaddin University-Erbil, Kurdistan Region, Iraq.
[1,*]Corresponding author: narmin.shaswar@su.edu.krd
[2]Email: Jarjees.khdeer@su.edu.krd

Abstract: The study seeks to clarify the role of Attribute -based costing in achieving cost leadership in industrial companies. It examines the relationship between the two variables through an applied study conducted at Al-Hilal Company for Red Brick Manufacturing, by analyzing the factory's cost statements with the aim of determining costs according to the Attributes required and desired by the company's customers in order to achieve cost leadership. The study reached a set of conclusions, the most important of which is that Attribute -based costing plays a significant role in achieving cost leadership in industrial companies. In conclusion, the researchers recommend adopting modern costing techniques rather than relying on traditional methods of cost measurement, due to the role these techniques play in achieving cost leadership.
Keywords: cost leadership; Attribute -based costing; control cost; ABCII; Attributes

1. Introduction

The Attribute-based costing technique is of great importance to economic units, as it reflects the external aspect of cost—namely, the Attributes desired by customers in a product or service. Various perspectives exist on defining the Attribute-based costing technique. One definition describes it as method through which product costs are determined based on analyzing the product into a series of basic Attributes, then breaking these down into secondary and sub- Attribute s, and identifying the cost of adding each Attribute accurately by determining the cost of the activities required to implement each one. The total product cost is then determined by aggregating the costs of all Attribute s [1-5]. It has also been defined as a technique that identifies the characteristics and Attributes constituting a product and aggregates the costs associated with these Attributes to determine the cost per unit of the product [6, 7].

Besides, it as one of the strategic management techniques based on product features and Attributes, linking internal and external variables with customer expectations and the available capabilities of the company, to help management make appropriate decisions that enhance the economic unit's value and create additional value for customers [8-10]. Among these techniques, Attribute -based costing emerges as a strategic tool that links customer requirements with product costs by analyzing the specifications and technical features that directly influence production cost, [11, 12]. This approach helps determine the actual cost of each product specification, supporting more effective design and development decisions that balance customer expectations with the pursuit of cost leadership. Accordingly, this research seeks to clarify the role of Attribute-based costing in achieving cost leadership. In fact, it considers a product as a bundle or set of specifications. Each Attribute represents a distinct sub-product that can be executed at different levels of completion. Accordingly, the customer's benefit varies depending on the level of completion achieved for each Attribute. This level is determined based on customer needs and the price they are willing to pay for the expected benefits, [13-15].

2. Methodology

2.1. Research Design

This study used a descriptive–analytical approach combined with an applied case study method. The descriptive approach is used to show the theoretical framework related to cost leadership and Attribute-based costing, while the analytical approach is used to examine the relationship between the study variables in a real industrial setting. The case study method permits an in-depth analysis of cost data within the chosen company to evaluate the practical applicability of Attribute-based costing in attaining cost leadership.

2.2. Population and Sample

The research population consists of industrial companies operating in the manufacturing sector. The applied study was conducted at Al-Hilal Company for Red Brick Manufacturing, which was purposely selected as the research sample due to the availability of financial and cost data and the relevance of its production processes to the objectives of the research. To achieve the research objective, a basic hypothesis was formulated stating that is industrial companies can achieve cost leadership through the adoption of Attribute -based costing.

2.3. The practical section

In this section, the study determines product costs based on the Attributes required by customers, and through that, achieve cost leadership. To reach cost leadership, we compare the company's product costs after applying the technique with the product costs before applying it, as well as comparing them with the costs of competing companies' products. After visiting the company and reviewing the accounting system in place at Hilal Al-Shamal Company, it became clear that the company operates according to the Unified Accounting System in accordance with the requirements of the Iraqi Companies Law. The study sample company relies on electronic accounting information systems that transmit information across units using an internet-based network. The software analyzes digital inputs and converts them into the required accounting information outputs (general reports).

Below is the company's cost list

Table 1. Total Costs for 2024 – Hilal Al-Shamal Company (Amounts in Iraqi Dinars)*

Cost Elements	Partial Amount	Total Amount
Raw materials and inputs	2,665,045,000	
Direct salaries and wages	240,500,000	
Total Direct Costs		2,905,545,000
Indirect Industrial Costs		
Electricity used in production	678,669,000	
Water used in production	426,367,000	
Workers' supplies in factory	378,833,000	
Black oil	5,970,498,000	
Machinery and equipment maintenance	3,700,146,000	
Fuel and oils	2,984,724,000	
Depreciation of machinery and factory equipment	263,928,000	
Total Indirect Industrial Costs		14,412,165,000
Manufacturing Cost		17,317,710,000

Cost Elements	Partial Amount	Total Amount
Administrative and Marketing Expenses		
Administrative & marketing salaries	1,044,000,000	
Consulting services	98,942,000	
Miscellaneous	999,897,000	
Admin & marketing workers' supplies (30%)	162,357,000	
Transportation, delegation, and communication	478,148,000	
Rental of fixed assets	849,987,000	
Insurance	29,587,000	
Accounting services	224,809,000	
Other service expenses	585,701,000	
Depreciation of furniture & office tools	99,435,000	
Donations and contributions	250,756,000	
Government fees	103,896,000	
Advertising, printing, and hospitality	77,214,000	
Total Administrative & Marketing Expenses		5,004,729,000
Total Costs for 2024		22,322,439,000

*Source: Prepared by the researchers based on the company’s financial statements.

The company's total production during 2024 amounted to (99,511,896) bricks, including three types:

Republican Brick: 95,523,981 units

Load-Bearing Brick: 91,154 units

Partition Brick: 3,896,761 units

The company determines the unit cost by calculating the production share (percentage) of each product type within the total product mix, as shown in the table below

Table 2. Product Mix Percentage*

Brick Type	Units Produced During 2024	Weight	Weighted Factor	Measurement Units	Production Mix %
Republican	95,523,981	2.38	×1	95,523,981	85%
Load-Bearing Block	91,154	14.2	×6	546,924	0.5%
Partitions	3,896,761	9.95	×4	15,587,044	14.5%
Total	99,511,896	–	–	111,657,949	100%

*Source: Prepared by the researchers based on the company’s statements.

Through Table 2, it can be observed that the production mix percentage was determined by dividing the measurement units of each product by the total measurement units and multiplying by 100.

The cost of each product type was determined as follows:

Cost Allocation Based on Mix %

Republican Brick share of total cost:

22,322,439,000 × 85% = 18,974,073,150IQD

Load-Bearing Brick share of total cost:

22,322,439,000 × 0.5% = 111,612,195IQD

Partition Brick share of total cost:

22,322,439,000 × 14.5% = 3,236,753,655IQD

After determining the cost share of each type, the unit cost is calculated as follows:

18,853,073,150 ÷ 95,523,981 = 198.63 IQD per Republican brick

111,612,195 ÷ 91,154 = 1,224.44 IQD per Load-Bearing brick

3,236,753,655 ÷ 3,896,761 = 830.63 IQD per Partition brick

2.4. Determining the Relative Importance of Each Product Attribute

The application of Attribute-Based Costing in industrial companies passes through several key stages which after identifying the basic Attributes required by customers, it is necessary to determine the relative importance of each Attribute. To achieve this, the researchers assessed the importance of each Attribute from the customer's perspective to determine an optimal product configuration aligned with customer preferences. A questionnaire was prepared to determine the importance level of each Attribute based on customer (user) preferences. It was distributed to a sample of 25 contractors, of which 21 responses were received and analyzed. The results are shown in the table 3.

Table 3. Relative Importance of Attributes*

Product	External Appearance	Performance	Dimensions	Safety	Total
Republican	30%	25%	20%	25%	100%
Load-Bearing Brick	35%	25%	20%	20%	100%
Partition Brick	30%	30%	20%	20%	100%

*Source: Prepared by the researchers

The above table shows the importance of each product produced by the research sample. It can be observed that external appearance represents an importance to customers of 30% for the first and third products, while it accounts for 35% for the second product. Meanwhile, the performance specification represents an importance to customers of 25% for the first and second products, whereas it accounts for 35% for the third product. The dimension Attribute represents an importance to customers of 25% for all products. As for the safety and security Attribute, it represents an importance to customers of 25% for the first product and 20% for both the second and third products. In the nest step, based on interviews with the production engineers, the components linked to each Attribute were identified as shown in the table 4.

Table 4. Components Related to Each Attribute *

No.	Component	Appearance	Performance	Dimensions	Safety
1	Portland cement	25%	35%	10%	30%

No.	Component	Appearance	Performance	Dimensions	Safety
2	Sand	25%	35%	10%	30%
3	Water	20%	50%	30%	–
4	Aggregate	25%	35%	10%	30%
5	Other additives	25%	25%	25%	25%

*Source: Prepared by the researchers

These costs include the value of the raw materials consumed in each component of the product, according to its association with each of the product attributes (external appearance, performance, dimensions, and safety). After consulting the production engineer regarding the use of alternative materials without affecting product quality, the production-volume related costs were identified as shown in the table 5.

Table 5. Production-Volume Related Costs for the Republican Brick Product*

Component	External Appearance	Performance	Dimensions	Safety	Total	Formation ratio
Portland cement	99,106,361	138,748,905	39,642,545	118,927,633	396,425,444	17.5%
Sand	192,549,501	269,569,302	77,019,800	231,059,402	770,198,005	34%
Water	18,122,306	45,305,765	27,183,459	—	90,611,530	4%
Gravel	240,686,876	336,961,627	96,274,751	288,824,252	962,747,506	42.5%
Other additives	11,326,441	11,326,441	11,326,441	11,326,442	45,305,765	2%
Total	561,791,485	801,912,040	251,446,996	650,137,729	2,265,288,250	100%

*Source: Prepared by the researchers

The above table shows that the production of Republican bricks according to customer-required Attributes depends on four primary material types: Portland cement, sand, water, and gravel, in addition to other additives.

The total production cost of this product according to the required Attributes amounted to IQD 2,265,288,250.

This total was distributed across the product components based on each component’s proportional contribution to the product, according to the production engineer’s assessment. The allocation of each component’s cost across Attributes was based on the proportional contribution of that component to each Attribute, as shown in Table 4. The same approach was adopted in calculating production-volume related costs for the remaining two products. Regarding the second product, referred to as bearing block, the production-volume related costs were as shown in table 6.

Table 6. Production-Volume Related Costs for the Bearing Block Product*

Component	External Appearance	Performance	Dimensions	Safety	Total
Portland cement	582,979	816,170	233,191	699,574	2,331,914
Sand	1,132,644	1,585,702	453,058	1,359,173	4,530,577
Water	106,602	266,504	159,903	—	533,009
Gravel	1,415,805	1,982,127	566,322	1,698,967	5,663,221
Other additives	66,626	66,626	66,626	66,626	266,504

Component	External Appearance	Performance	Dimensions	Safety	Total
Total	3,304,656	4,717,129	1,479,100	3,824,340	13,325,225

*Source: Prepared by the researchers

The table above illustrates the costs associated with each of the product's Attributes. The cost related to the external appearance Attribute amounted to IQD 3,304,656, while the cost allocated to the performance Attribute reached IQD 4,717,129. The cost allocated to the dimension's Attribute amounted to IQD 1,479,100, whereas the cost related to the safety Attribute totaled IQD 3,824,340. These costs represent the total production-volume related costs for producing 91,154 bricks. The third and final product produced by the company is the partition brick, which is manufactured using the same material components. The production-volume related costs for this product according to customer-defined Attributes are shown in the table 7.

Table 7. Production-Volume Related Costs for Partition Bricks*

Component	External Appearance	Performance	Dimensions	Safety	Total
Portland cement	16,906,379	23,668,931	6,762,552	20,287,655	67,625,517
Sand	32,846,680	45,985,351	13,138,672	39,416,015	131,386,718
Water	3,091,452	7,728,631	4,637,178	—	15,457,261
Gravel	41,058,350	57,481,689	16,423,340	49,270,019	164,233,398
Other additives	1,932,158	1,932,158	1,932,158	1,932,157	7,728,631
Total	95,835,019	136,796,760	42,893,900	110,905,846	386,431,525

*Source: Prepared by the researchers

The table above shows the production-volume related costs of the partition brick. The cost associated with the external appearance Attribute amounted to IQD 95,835,019, while the cost of the performance specification amounted to IQD 136,796,760. The cost related to the dimension's Attribute reached IQD 42,893,900. As for the safety Attribute, its cost totalled IQD 110,905,846. These costs represent the cost of producing 3,896,761 bricks.

After identifying the production-volume related costs, it is necessary to determine the activity-related costs, which include direct labour costs and manufacturing overheads (excluding depreciation). The company calculates labour wages on a fixed monthly basis, which represents a weakness in cost allocation, as labour is charged in total without distinguishing between value-adding and non-value-adding time. There are 30 workers employed in rotational shifts, except on Fridays, working eight hours per shift (day or night), with a fixed monthly wage of IQD 600,000 per worker. Thus, the total annual labour cost amounts to IQD 216,000,000. The labor and wages cost amounted to (24,500,000) Iraqi dinars per year according to the factory records. However, part of this cost represents idle time costs resulting from delays in the arrival of materials, machine and equipment breakdowns, and other related factors. For the purpose of calculating labor costs accurately, it is necessary to identify the activities required to achieve each product Attribute and determine the time needed to perform them. These activities and time requirements were identified through the researcher's field observation within the factory and in cooperation with the production supervising engineer. After determining the time required to perform each activity, the researcher presented the results in the table below.

Table 8. Time Required to Perform Activities Related to Each Attribute *

Specification	Required Activities	% of Time	Total %
External Appearance	Selecting and testing compliant raw materials	6%	
	Cleaning and inspecting moulds	5%	
	Controlling mould humidity	3%	

Specification	Required Activities	% of Time	Total %
	Drying bricks in controlled environment	7%	
	Visual inspection for each batch	2%	
	Arranging bricks systematically	9%	
	Total		32%
Performance	Selecting and testing compliant raw materials	6%	
	Adjusting mixing ratios accurately	4%	
	Monitoring moisture during mixing	5%	
	Monitoring compression process	4%	
	Drying bricks in controlled environment	7%	
	Total		26%
Dimensions	Selecting and testing compliant raw materials	6%	
	Adjusting mixing ratios	4%	
	Cleaning and inspecting moulds	5%	
	Controlled drying	7%	
	Periodic dimensional testing	1%	
	Total		23%
Safety	Accurate mixing	4%	
	Monitoring compression process	4%	
	Pressure & bending strength testing	3%	
	Safe storage	8%	
	Total		19%
	Grand Total		100%

*Source: Prepared by the researchers

After identifying the percentage of time required for each Attribute, labour costs were allocated accordingly, and the resulting allocations were presented in the table 9.

Table 9. Labour Cost per Product Attribute *

Product	External Appearance	Performance	Dimensions	Safety	Total
Republican	58,752,000	47,736,000	42,228,000	34,884,000	183,600,000
Load-bearing Block	345,600	280,800	248,400	205,200	1,080,000
Partition Block	10,022,400	8,143,200	7,203,600	5,950,800	31,320,000

Product	External Appearance	Performance	Dimensions	Safety	Total
Total	69,120,000	56,160,000	49,680,000	41,040,000	216,000,000

*Source: prepared by the researchers

The table above illustrates the labour cost allocated to each product specification. The researchers allocated labour costs by multiplying the percentage of time required to fulfil each Attribute by the total annual labour cost. As for allocating labour costs across the three products, the researchers relied on the production-mix ratio of each product.

Regarding indirect manufacturing costs (excluding depreciation), they amounted to IQD 14,148,237,000. These costs were allocated to the products using the Activity-Based Costing (ABC) system. Table 10 was created as the basis for allocating indirect manufacturing costs to the necessary activities.

Table (10): Basis for Allocating Indirect Manufacturing Cost Elements to the Necessary Activities.

Activity	Associated elements	Cost driver
Quarrying & Storage	Industrial electricity 5% + Worker supplies 22% + Black oil 3% + Plant & equipment maintenance 13% + Fuel & lubricants 45% + Plant & equipment depreciation 10%	Handling equipment operating hours
Soil preparation	Industrial electricity 7% + Water used for production 60% + Worker supplies 15% + Black oil 2% + Plant & equipment maintenance 12% + Plant & equipment depreciation 15%	Mixer operating hours
Molding & Shaping (Molds)	Industrial electricity 30% + Water used for production 30% + Worker supplies 20% + Black oil 2% + Plant & equipment maintenance 30% + Plant & equipment depreciation 30%	Number of bricks
Drying	Industrial electricity 20% + Worker supplies 10% + Black oil 5% + Plant & equipment maintenance 10% + Plant & equipment depreciation 10%	Fan operating hours
Transferring Dry Bricks to Kiln	Industrial electricity 5% + Black oil 3% + Plant & equipment maintenance 8% + Fuel & lubricants 25% + Plant & equipment depreciation 3%	Equally
Firing (Burning)	Industrial electricity 25% + Water used for production 5% + Worker supplies 23% + Black oil 85% + Plant & equipment maintenance 20% + Fuel & lubricants 20% + Plant & equipment depreciation 25%	Kiln operating hours

Cooling, Wrapping & Packing	Industrial electricity 13% + Water used for production 5% + Worker supplies 10% + Plant & equipment maintenance 7% + Fuel & lubricants 10% + Plant & equipment depreciation 7%	Specific percentage

After identifying the necessary activities, the cost elements associated with each activity, and the appropriate cost driver, the cost of each activity can be determined by allocating the relevant portion of indirect manufacturing costs. The results are presented in Table 11

Table (11) allocation of Activity Costs.

Cost Elements	Quarry and Storage	Soil Preparation	Molding and Forming (Molds)	Drying	Transfer to Kiln	Firing (Kilns)	Cooling, Wrapping, and Packaging
Industrial Electricity	28,843,432.5	40,380,805.5	173,060,595	115,373,730	28,843,432.5	144,217,162.5	46,149,492
Production Water	–	217,447,170	108,723,585	–	–	18,120,597.5	18,120,597.5
Employee-Related Expenses	70,841,771	48,301,207.5	64,401,610	32,200,805	–	74,061,851.5	32,200,805
Heavy Fuel Oil	151,772,277	101,181,518	101,181,518	252,953,795	151,772,277	4,300,214,515	–
Machinery and Equipment Maintenance	408,866,133	377,414,892	943,537,230	314,512,410	251,609,928	629,024,820	220,158,687
Fuel and Lubricants	1,141,656,930	–	–	–	634,253,850	507,403,080	253,701,540
Depreciation of Machinery and Equipment	22,433,880	33,650,820	67,301,640	22,433,880	6,730,164	56,084,700	15,703,716
Total	1,824,414,423.5	818,376,413	1,458,206,178	737,474,620	1,073,209,651.5	5,729,126,726.5	586,034,837.5

After determining the cost assigned to each activity, these activity costs should be allocated to the product Attributes. To accomplish this, it is necessary to determine the annual quantity of the cost driver for each activity. This information were obtained through consultations with production supervisors. The results are presented in Table (12).

Table (12) Allocation of Activity Costs to Product Attributes

Activities	External Appearance	Performance	Dimensions	Durability	Total
Quarry and Storage	114,025,901	342,077,704	684,155,409	684,155,409	1,824,414,423
Soil Preparation	68,198,034	204,594,103	272,792,138	272,792,138	818,376,413
Molding and Forming (Molds)	364,551,544.5	364,551,544.5	364,551,544.5	364,551,544.5	1,458,206,178
Drying	132,745,432	162,244,416	206,492,894	235,991,878	737,474,620
Transfer of Dried Bricks to the Kiln	268,302,412.8	268,302,412.8	268,302,412.8	268,302,412.8	1,073,209,651
Firing (Kilns)	818,446,675	1,227,670,013	1,636,893,350	2,046,116,688	5,729,126,726
Cooling, Wrapping, and Packaging	87,905,226	175,810,451	146,508,709	175,810,451	586,034,837
Total	1,854,175,225.3	2,745,250,644.3	3,579,696,457.3	4,047,720,521.3	12,226,842,850

The above table illustrates the allocation of indirect manufacturing costs to the product Attributes. For the quarry and storage activity, costs were allocated based on the operating hours of the material-handling equipment (4,000 hours). Durability and dimensions each accounted for 1,500 hours, performance 750 hours, and external appearance 250 hours.

For the soil preparation activity, costs were allocated based on mixer operating hours (3,000 hours). Durability and dimensions each received 1,000 hours, performance 750 hours, and external appearance 250 hours. For the molding and forming activity, costs were distributed equally among all Attributes because all Attributes benefit equally.

The drying activity, costs were allocated based on fan operating hours (approximately 2,500 hours). Durability received 800 hours, dimensions 700 hours, performance 550 hours, and external appearance 450 hours. The transfer of dried bricks to the kiln was allocated equally among all specifications. The firing (kiln) activity was allocated based on kiln operating hours (approximately 3,500 hours): durability 1,250 hours, dimensions 1,000 hours, performance 750 hours, and external appearance 500 hours. The cooling, wrapping, and packaging activity was allocated according to the estimated benefit percentages: 30% for durability, 25% for dimensions, 30% for performance, and 15% for external appearance.

After allocation each specification's share of indirect manufacturing costs, these costs were added to direct labor costs under the heading 'Activity Cost' in the table below table.

Table (13). Allocation of Activity Costs to Product Attributes

Details	External Appearance	Performance	Dimensions	Durability
Direct Labor Cost	69,120,000	56,160,000	49,680,000	41,040,000
Activity Costs	1,854,175,225.3	2,745,250,644.3	3,579,696,457.3	4,047,720,521.3
Total	1,923,295,225.3	2,801,410,644.3	3,629,376,457.3	4,088,760,521.3

Finally, activity costs were allocated to the products manufactured by the study sample based on the production mix ratio of each product type (Table 14).

Table (14). Allocation of Attribute Costs to Products

Specifications	Total Amount (IQD)	Republic Brick (85%)	Load-Bearing Brick (0.5%)	Partition Brick (14.5%)
External Appearance	1,923,295,225.3	1,634,800,941.505	9,616,476.126	278,877,807.669
Performance	2,801,410,644.3	2,381,199,047.655	14,007,053.222	406,204,543.423
Dimensions	3,629,376,457.3	3,084,969,988.705	18,146,882.287	526,259,586.308
Durability	4,088,760,521.3	3,475,446,443.105	20,443,802.606	592,870,275.589
Total	12,442,842,848.20	10,576,416,420.970	62,214,214.241	1,804,212,212.989

*Source: prepared by the researchers

Table 15. Energy-Related Costs

Product	**External Appearance**	**Performance**	**Dimensions**	**Safety**	**Total**
Republican	71,788,416	58,328,088	51,597,924	42,624,372	224,338,800
Load-bearing Block	422,284.8	343,106.4	303,517.2	250,731.6	1,319,640
Partition Block	12,246,259.2	9,950,085.6	8,801,998.8	7,271,216.4	38,269,560
Total	84,456,960	68,621,280	60,703,440	50,146,320	263,928,000

*Source: prepared by the researchers

Decision-related costs include administrative and marketing expenses. These costs were allocated to product Attributes based on the relative importance weighting of each specification, while cost allocation across products relied on each product's proportional share of the production mix. The allocation is presented in table 14.

Table 16. Decision-Related Costs

Product	External Appearance	Performance	Dimensions	Safety	Total
Republican	1,276,205,895	1,063,504,912.5	850,803,930	1,063,504,912.5	4,254,019,650
Load-bearing Block	8,758,275.75	6,255,911.25	5,004,729	5,004,729	25,023,645
Partition Block	217,705,711.5	217,705,711.5	145,137,141	145,137,141	725,685,705
Total	1,502,669,882.25	1,287,466,535.25	1,000,945,800	1,213,646,782.5	5,004,729,000

*Source: prepared by the researchers

3. Results and Discussion

Following the determination of the cost per unit of the company's products, it was observed that the application of the Attribute-based costing technique contributed to reducing the cost of both the Republican brick and the Partition brick when compared with the traditional costing approach previously used by the company. This reduction is attributed to deficiencies and distortions inherent in the company's conventional costing method. After determining the decision-related costs, the total cost of each product produced by the sample company was calculated, as shown in the table 17.

Table 17. Cost of Republican-Type Bricks According to Attributes*

Attribute-based Cost Components	External Appearance	Performance	Dimensions	Safety	Total
Cost related to production volume	561,791,485	801,912,040	251,446,996	650,137,729	2,265,288,250
Cost related to activities	1,634,800,941.505	2,381,199,047.655	3,084,969,988.705	3,475,446,443.105	10,576,416,420.970
Cost related to energy	71,788,416	58,328,088	51,597,924	42,624,372	224,338,800
Decision-related cost	1,276,205,895	1,063,504,912.5	850,803,930	1,063,504,912.5	4,254,019,650
Total	3,544,586,737.505	4,304,944,088.155	4,238,818,838.705	5,231,713,456.605	17,320,063,120.970

*Source: Prepared by the researchers

The above table shows that the total cost of producing the Republican-type brick amounted to IQD (17,320,063,120.970). This total was distributed across the required Attributes. The specification “external appearance” accounted for IQD (3,544,586,737.505), while the total cost of the “performance” Attribute reached IQD (4,304,944,088.155). The total cost of the “dimensions” Attribute amounted to IQD (4,238,818,838.705), whereas the total cost of the “safety” Attribute amounted to IQD (5,231,713,456.605), Tables 18, 19.

Table 18. Cost of Load-Bearing Brick According to Attributes*

Attribute-based Cost Components	External Appearance	Performance	Dimensions	Safety	Total
Cost related to production volume	3,304,656	4,717,129	1,479,100	3,824,340	13,325,225
Cost related to activities	9,616,476.126	14,007,053.222	18,146,882.287	20,443,802.606	62,214,214.241
Cost related to energy	422,284.8	343,106.4	303,517.2	250,731.6	1,319,640
Decision-related cost	8,758,275.75	6,255,911.25	5,004,729	5,004,729	25,023,645
Total	22,101,692.676	25,323,199.872	24,934,228.487	29,523,603.207	101,882,724,241

*Source: Prepared by the researchers

Table 19. Cost of Partition Brick According to Attributes*

Attribute-based Cost Components	External Appearance	Performance	Dimensions	Safety	Total
Cost related to production volume	95,835,019	136,796,760	42,893,900	110,905,846	386,431,525
Cost related to activities	278,877,807.669	406,204,543.423	526,259,586.308	592,870,275.589	1,804,212,212.989

Attribute-based Cost Components	**External Appearance**	**Performance**	**Dimensions**	**Safety**	**Total**
Cost related to energy	12,246,259.2	9,950,085.6	8,801,998.8	7,271,216.4	38,269,560
Decision-related cost	217,705,711.5	217,705,711.5	145,137,141	145,137,141	725,685,705
Total	604,664,797.369	770,657,100.523	723,092,626.108	856,184,478.989	2,954,599,002.989

*Source: Prepared by the researchers

The researchers then determined the unit cost for each product by dividing each product's total Attribute-based cost by the total quantity produced. Results are shown in the table 20.

Table 20. Cost per Brick for Each Product Type*

Product	Total Cost	Units Produced	Unit Cost
Republican Brick	17,320,063,120.970	95,523,981	181.316 IQD
Load-Bearing Brick	101,882,724.241	91,154	1,117.699 IQD
Partition Brick	2,954,599,002.989	3,896,761	758.219 IQD

*Source: Prepared by the researchers

4. Conclusions

Based on the research findings, the Attribute-based costing technique is a method that analyses the product into a chain of Attribute s, determining the cost of each Attribute separately in order to reach the total cost of the product. Cost leadership refers to an organization's ability to achieve lower costs than competitors by improving productivity and efficiency, reducing waste, and strictly controlling costs. it contributes to increasing a company's market share, enabling it to achieve above-average profitability over extended periods due to increased sales quantities.

Applying the Attribute-based costing technique contributed significantly to achieving cost leadership in the case company. It should pursue cost leadership, because doing so provides multiple advantages including maintaining and protecting its market share. Given that Attribute-based costing contributes to accurately determining product costs, the researchers recommend that industrial firms in the Kurdistan Region—including the case company—adopt this technique.

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Conflict of interest

The author declares that they do not have any conflict of interest.

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Authors Contributions

both authors contributed in writing, data analysis, research idea and all other steps of the MS.

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