
The Role of Product Life Cycle Cost-Based Pricing in Achieving Financial Sustainability

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ABSTRACT: This study examines the role of Product Life Cycle Cost-Based Valuing (LCC-Based Pricing) in achieving pecuniary sustainability by integrating all costs sustained throughout the invention's life cycle. These costs encompass from study, expansion, and product design to business, marketing, spreading, after-sales amenities, and final clearance. Adopting a widespread life cycle perspective empowers the purpose of selling amounts that more truthfully reflect the merchandise's total cost whereas supportive more effective management decision-making. To undertake the examination objective, an expressive-analytical approach was laboring, accompanied by a pragmatic case study accompanied at Al-Zawraa State Establishment. Solar panels stayed selected as the submission case, and estimating conclusions derived from the outmoded costing methodology were equated with those attained using the Merchandise Life Cycle Cost-Based Pricing attitude. The discoveries determine that Invention Life Rotation Costing affords a more complete and accurate quantity of merchandise costs than predictable costing systems, as it apprehensions all costs acquired over the perfect life cycle of the merchandise. Accordingly, this approach simplifies more representative evaluating decisions, improves cost supervision efficiency, and toughens managerial administrative in pricing, scheduling, and control. Additionally, the grades indicate that implementing Merchandise Life Cycle Cost-Based Pricing increases financial sustainability by educational profitability, sponsoring more efficient supply utilization, and emphasizing the commercial unit's inexpensive situation and long-term capability in an gradually dynamic occupational environment.

KEYWORDS: Product Life Cycle Costing, Product Life Cycle Cost-Based Pricing, Financial Sustainability.

INTRODUCTION

Success in modern companies is inextricably tied to their ability to innovate and create new products and services. Profitability is not only about increasing the performance of existing products, but also creating new products that attract customers to encourage business growth, increase profit margins and increase customer loyalty. Competitors can replicate a company's competitive advantages and force it to compete mostly on price in traditional product and service markets without ongoing innovation. In this way, companies such as Apple have had excellent profitability with innovative products that efficiently serve customer needs (Vella et al, 2026:2) With the growing emphasis on environmental issues, the use of Total Life-Cycle Costing (LCC) by companies has increased to evaluate the total costs associated with a product throughout its life cycle. The costs include all the expenses incurred from design and development stage to manufacturing, marketing, distribution, maintenance and final disposal. This is a method known as cradle-to-grave (Hichem et al, 2026:48) cost management. What is more, the process of innovation itself requires large amounts of money, thus it is essential to establish adequate accounting systems to monitor research and development expenses, evaluate the success of new products, and predict the future costs of production early in order to meet the strategic and profit objectives of the economic unit (Atkinson et al., 2012, p. 301).

1. RESEARCH METHODOLOGY

1.1 Research Problem

In the current highly competitive business environment, economic units face the growing challenges brought about by the rapid technological advancements and the continuously changing customer expectations. These changes have reduced the effectiveness of traditional pricing methods based mainly on manufacturing costs, since such approaches often do not provide enough support for long-term profitability and financial sustainability. Most traditional pricing practices do not take into account a large portion of the costs that are incurred throughout the product life cycle, such as costs for research and development, product design,

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production, marketing, distribution, after-sale services, and end-of-life disposal. So, organizations need more comprehensive pricing approaches that take into account the total cost of the product over its life span. One of such approaches is Product Life Cycle Cost-Based Pricing. This approach enables to establish prices which better reflect total product costs and support sustainable profitability. Thus, the present study seeks to answer the following research question:

Does product life cycle cost-based pricing contribute to the financial sustainability of economic units?

1.2 The Importance of Study

The importance of this study is that it emphasizes the need to use modern management accounting practices that allow economic units to adequately respond to increasing market competition and at the same time improve their financial sustainability. Organizations can make more accurate selling price decisions, improve the quality of managerial decision making, improve competitive performance, increase profitability, optimize resource utilization, and support long-term organizational continuity and financial success by incorporating all costs associated with the product life cycle into pricing decisions.

1.3 The Objectives of Study

The purpose of this study is to explore the role of Product Life Cycle Cost-Based Pricing in attaining financial sustainability with the following objectives:

1. To examine the concept and significance of Product Life Cycle Cost Based Pricing
2. To describe the stages of the product life cycle and to explain how these stages affect the total cost of the product.
3. To study the role of pricing based on life cycle cost in the effective decision making on pricing.
4. To analyze the contribution of this pricing approach in improving profitability and enhancing financial sustainability in economic units.
5. To develop an applied framework demonstrating the determination of product selling prices using the Product Life Cycle Cost-Based Pricing approach.

1.4 Research Hypothesis

The study hypothesizes that the Product Life Cycle Cost Based Pricing has a positive role in financial sustainability in economic units through setting the selling prices that reflect the total cost of the product life cycle, which leads to sustainable profitability.

2. LITERATURE REVIEW

2.1 Product Life Cycle Costing

Product Life Cycle Costing (LCC) is considered a strategic management accounting technique used to assess and manage investment projects by establishing all costs and revenues linked to a product during its economic life. The main aim of this approach is to reduce the total cost by providing complete information on the real costs incurred in each stage of the product life cycle to support managerial decisions regarding planning, control and performance evaluation. Unlike traditional financial accounting, which mainly emphasizes acquisition costs, depreciation, and the residual value of assets in accordance with accounting standards, Life Cycle Costing considers the broader economic implications of investment decisions, which are often overlooked by conventional accounting methods because of their complexity. Consequently, LCC has become an important component of strategic cost management by emphasizing long-term cost reduction, improving product and process design, and enhancing integration among the various functions of the economic unit (Spickova & Myskova, 2015 : 343). The concept of the product life cycle refers to the entire sequence of stages through which a product passes from its inception to its final disposal. The Product Life Cycle theory was first introduced by Harvard professor Raymond Vernon in 1966 through his work on international investment and international trade in relation to the product life cycle. Vernon explained the product life cycle from a marketing perspective by comparing the life of a product to that of a human being, progressing through the stages of introduction, growth, maturity, and decline. (Casella et al,2025:6886) Accordingly, a product passes through the stages of development, market introduction, growth, maturity, and eventual decline. As management thought evolved, the concept was broadened to encompass all stages of the product's existence, beginning with planning, development, and design, followed by production and utilization, and ending with final disposal. Consequently, the product life cycle has become a comprehensive framework for understanding and managing product-related costs and managerial decisions throughout all stages of its life (Wang & Ke, 2016: 212). Life Cycle Costing differs from traditional accounting systems, which primarily focus on periodic profit reporting on a monthly, quarterly, or annual basis. Instead, LCC emphasizes tracking cumulative costs and revenues throughout the entire product life cycle, with greater attention given to overall product profitability rather than short-term financial results (Alotaibi et al., 2021 : 442). Life Cycle Costing is a cost management approach used to identify and monitor product costs throughout the entire life cycle of a product. The product life cycle covers all stages from product design and the procurement of raw materials

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required for production to product delivery and the provision of related services. (Rosemann et al., 2026:2512) These stages include: (1) research and development; (2) product design, including prototype development, target costing, and testing; (3) manufacturing, inspection, packaging, and storage; (4) marketing, promotion, and distribution; and (5) sales and customer service. Traditionally, cost management concentrated primarily on the third stage, namely manufacturing. However, the strategic orientation of contemporary management accounting has expanded its focus to encompass the management of costs incurred before manufacturing, during production, and after manufacturing throughout the product's entire life cycle. This broader perspective requires particular attention to the product design stage because decisions made during this phase determine the majority of the costs that will be incurred during the subsequent stages of the product life cycle (Blocher et al., 2015:13).

Product Life Cycle Costing (LCC) therefore provides a different view from traditional costing systems such as job order costing, process costing and Activity-Based Costing (ABC). Traditional systems are mainly focused on measurement and allocation of manufacturing costs, but LCC is focused on cost management throughout the whole product life cycle. The significance of this approach has become more and more apparent in today's competitive business environment. To achieve a sustainable competitive advantage, companies need a thorough understanding and strategic management of costs at all stages of the product life cycle (Hamdan, 2024: 68).

The concept and scope of Product Life Cycle Costing differs depending on the angle from which it is viewed. It can be studied from the point of view of the producer, the consumer or the market. The key to understanding these three perspectives and their relationships to each other is that they provide a holistic view of how to find opportunities to best manage and reduce costs. Thus, the effective management of costs must consider each perspective and the various phases and costs related to it (Alotaibi et al., 2021: 443). From a marketing point of view, the product life cycle begins with the introduction of the product into the market and ends with the decline of the product. From the manufacturer's perspective, it begins with product development and concludes with after-sales service. The life cycle begins with the purchase of the product and ends with the final disposal of the product after its use from the consumer's point of view (Aksu & Apak, 2014: 238). The different perspectives of the product life cycle stages are summarized in TABLE 1.

Table 1. Stages of the Creation Life Cycle from Dissimilar Perspectives

Marketing Perspective	Manufacturer's Perspective	Consumer's Perspective
Product introduction	Product idea generation or concept development	Product purchase
Rapid growth	Product design	Product use
Growth	Product development and improvement	Support services
Maturity	Production	Maintenance
Decline	Logistics support and after-sales services	Product disposal

Source: CONTUK, F. Y. (2018). Product Life Cycle Costing Method: A General Evaluation. Social Sciences Researches in the Globalizing World, p. 744.

Researcher's View: The researcher opines that Product Life Cycle Costing is one of the most important strategic management accounting approaches in the current business environment as it provides a holistic view of costs throughout the entire product life cycle instead of focusing only on the production stage. This methodology improves the accuracy of measuring the costs and provides pricing, planning and control decisions that increase the utilization of resources and thus helps to achieve a sustainable competitive advantage. In addition, the researcher says that the cost control from product design until its final disposal allows economic units to maximize profitability and to achieve financial sustainability in an ever-changing business environment.

2.2 Financial Sustainability

Financial sustainability is one of the key dimensions of economic sustainability, which has received increased attention in the context of the Triple Bottom Line (TBL) approach proposed by Elkington in 1997. This framework highlights that the sustainability of economic units is not limited to profitability but also includes the balanced integration of the economic, environmental and social dimensions, ensuring the organization's capacity to create value in the long term. From this point of view, financial sustainability is a significant part of economic sustainability as it reflects the ability of the economic entity to maintain its financial resources, maintain profitability, generate sufficient cash flows and strengthen the ability to fulfill its financial obligations in the short and long term (Gleißner et al., 2022, : 471).

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Financial sustainability has also been conceptualized as the capacity of a country to fulfill its present and future financial obligations and to endure financial crises with no threat to financial stability. It is an approach based on the management and scheduling of public debt to keep the public debt-to-GDP ratio at a targeted level or to restore it to a sustainable level through the implementation of fiscal reforms and economic policies, usually over a five-year period, with the aim of forecasting future financial conditions and achieving sustainable economic prosperity (Al-Obaidi & Al-Obaidi, 2024: 62).

Financial sustainability at the organizational level is the ability of an economic unit to achieve its objectives and maintain long-term financial stability through its income-generating activities, without continuous dependence on external financing sources. It also reflects the organization's ability to meet all its operating and financial costs including all its financing costs and interest obligations, thus ensuring the efficient and effective continuity of its operations and its stable insertion in the financial system, and not relying on grants or concessional loans provided by donor agencies. (Aljumah et al, 2026:7413) Financial sustainability is a key component of effective financial management, referring to the ability of the organization to manage its financial resources and achieve a balance between revenues and expenditures (Ali Kurdi, 2024, p. 203). Its purpose is to increase the financial resilience of economic units, improve their competitive position, and ensure the continuity of their operations in the long term (Candrasari & Murwaningsari, 2024 : 217).

Financial sustainability is a dynamic concept and its content depends on the objectives and the type of activity of an economic unit. It is a dynamic activity of constantly evaluating the determination of organizational resources, financial priorities, and the external environment rather than describing a static condition. Leon (2001) defines financial sustainability as the capacity of an economic unit to produce revenues that are consistent with demand levels, enabling the continuity of its operations at a steady or growing rate while fulfilling its intended objectives and producing a financial surplus (Shair, 2026:102) Similarly, the Organisation for Economic Co-operation and Development (OECD) says that financial sustainability is achieved when an economic unit is able to cover all its financial expenditures with adequate investments in its human resources and intellectual capital. (Al-Waeli, 2026:37) This makes it possible to implement long-term strategic plans and to meet the expectations of different stakeholders. Thus, financial sustainability can be described as the ability of an economic unit to efficiently obtain and manage its financial resources in a way that ensures the continuity of its activities and helps to achieve its strategic objectives and increase its ability to respond to future changes (Hameed & Al-Mashhadani, 2024: 533).

2.3 Achieving Financial Sustainability through Product Life Cycle Cost-Based Pricing

As global competition increases and the profit margins of suppliers continue to shrink, the traditional management approach is no longer sufficient to ensure the continuity of economic units (Doroh et al, 2026:2). Therefore, the cost of all incurred costs in the product life cycle starting from the research and development to production and marketing to the after-sales and post-delivery service costs should be included in pricing the product more accurately. This kind of approach helps organizations to set prices for selling which are in line with the actual cost of the product and support sustainable profitability (Pazarceveren & Dede, 2015: 128). Life Cycle Costing (LCC) is regarded as a strategic cost management approach which emphasizes all costs associated with a product or service during its entire life cycle. This approach is commonly referred to as cradle-to-grave costing as it captures the costs incurred from the initial stage of research and development to the final stage of terminating customer support services (Maher et al., 2011: 117). Compared to traditional costing methods that focus mainly on manufacturing costs, LCC offers a more comprehensive and long-term perspective of product profitability. It also stresses the importance of the decisions made in the early design phase, because these decisions play a very important role in the future production, maintenance and service costs. Thus, this approach contributes to strategic planning, reduces the total cost of life cycle and strengthens the competitive position of the economic unit (Blocher et al., 2015: 545).

Product Life Cycle Costing is fundamentally different from traditional costing systems. The conventional systems mainly measure the costs incurred in the production stage and treats the costs of product development as period expenses and recognizes them directly in the income statement. The financial reports are prepared on monthly, quarterly or annual accounting periods. On the other hand, Product Life Cycle Costing takes a comprehensive approach by including both the costs incurred before and after production (Jakobsen&Tambo, 2026:2) It includes the cost of manufacturing along with selling, marketing, administrative and the cost incurred by the user. The cost of developing the product is included in the total cost of the product. In addition, its reporting framework covers the entire product life cycle, from the product idea and design stage to its final disposal. A holistic view of this sort enhances cost management and profitability. The product life cycle is a strategic planning framework that includes stages of introduction, growth, maturity and decline. The primary objective of this strategy is to enhance competitive performance and maximize the economic value of the product by implementing appropriate marketing and production decisions in each stage of the product life cycle, thereby maximizing organizational profitability (CONTUK, 2018: 746).

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Pricing models are developed using a set of mathematical relationships and equations to determine appropriate prices for products that achieve organizational objectives especially for newly developed products. The pricing models are built on the comprehensive information generated by the Life Cycle Costing approach. LCC provides accurate information on the total cost of the product, that is, all costs from the development stage to the end of its economic life, including acquisition, operating, maintenance, and other life cycle costs. This information forms the basis for pricing decisions that maximize profitability (Wei, 2024: 456). This kind of information is especially useful when it comes to pricing decisions in industries where a lot of money is spent before production begins. Product life cycle budgeting enables organizations to price products so that all costs incurred throughout the entire value chain, not simply those of production and customer service, can be recovered. This approach has also become more important, as more stringent environmental regulations require companies to reclaim, recycle or safely dispose of products at the end of their useful lives. As a result, the costs associated with product recovery and recycling have become a component of product cost that must be taken into account when designing the product and developing the pricing policy to achieve an appropriate trade-off between manufacturing costs, end-of-life costs, and environmental compliance requirements (Maher et al., 2011: 117). Product Life Cycle Costing therefore, offers comprehensive information that helps management plan more effectively at all stages of the product life cycle, supports more accurate pricing decisions and helps to evaluate the profitability of a product over its entire life cycle, thereby contributing to the achievement of strategic objectives, maximization of organizational value and attainment of long-term financial sustainability (CONTUK, 2018: 745).

Researcher's Perspective: With the help of the above, the researcher thinks that the fundamental connection between Product Life Cycle Cost-Based Pricing and financial sustainability is that this method can guard economic units against liquidity shortfalls and future spending shocks. The life cycle approach incorporates future costs, such as maintenance and warranty obligations, and environmental commitments into the current pricing structure, serving as a proactive financial management tool, whereas traditional pricing methods focus primarily on recovering immediate production costs, possibly overstating short-term profitability. A comprehensive allocation of costs of this magnitude allows for complete recovery of capital investments and stable and balanced cash flows over time. This allows economic units to meet their financial obligations without having to resort to emergency borrowing. Therefore, it contributes to the long-term sustainable profitability, strengthens the continuity of the organization and improves its long-term competitiveness. Table 2 Comparison between traditional pricing and Product Life Cycle Cost-Based Pricing.

Table 2. Comparison Between Traditional Pricing and Product Life Cycle Cost-Based Pricing (LCC) and Their Impact on Financial Sustainability

Comparison Criterion	Traditional Pricing	Product Life Cycle Cost-Based Pricing (LCC)
Cost Coverage	Focuses primarily on direct production and manufacturing costs.	Incorporates all costs associated with the product, from research and development to the end of its life cycle.
Pricing Basis	Determines the selling price based on current costs plus a predetermined profit margin.	Establishes the selling price based on total life cycle costs to ensure that all current and future expected costs are covered.
Profitability Measurement	May not accurately reflect the product's long-term profitability.	Provides a more comprehensive measure of profitability by matching revenues with costs throughout the entire product life cycle.
Financial Risk Management	Increases the likelihood of unforeseen future costs that may reduce profitability.	Supports the anticipation and incorporation of future costs into pricing decisions, thereby reducing financial risk.
Managerial Decision-Making	Relies primarily on short-term financial information.	Supports strategic decisions related to pricing, planning, and cost management.
Impact on Financial Sustainability	May result in fluctuations in profitability and cash flows because not all costs are considered.	Enhances financial sustainability by improving cost management, supporting stable profitability, and strengthening the continuity of the economic unit.

Source: Prepared by the researcher founded on the literature studied.

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3. EMPIRICAL APPLICATION

In the current economic situation, renewable energy, particularly solar energy, is one of the principal strategic pillars for achieving sustainable development. For this purpose, Al-Zawraa State Company was chosen as a case study to evaluate the effectiveness and reliability of costing systems, and the 450-watt solar panel production line was selected as the unit of analysis.

This empirical study aims to identify and analyze the real production costs of a single 450-watt solar panel and to compare two pricing methods, the traditional pricing method, which takes into account only the manufacturing phase and the Product Life Cycle Cost-Based Pricing (LCC) method, which considers the research and development, product design, environmental obligations and recycling costs. The comparison is meant to show what impact do these approaches have on the accuracy of pricing, on the achievement of financial sustainability and of the targeted break-even point of the economic unit.

3.1 Analysis of Direct Material and Operating Costs (Per Solar Panel)

Table 3 presents the straight raw resources used in the manufacture of one solar panel, composed with their respective amounts and costs spoken in Iraqi Dinars dinars.

Table (3): Raw Material Cost for a 450-Watt Solar Panel

No.	Description	Unit of Measure	Quantity	Unit Cost dinars	Amount dinars
1	Solar Cells	Cell	72	1,285	92,520
2	Glass	m ²	1	15,800	15,800
3	Adhesive Insulation	m ²	2	9,450	18,900
4	Tedlar Sheet	m ²	2	7,350	14,700
5	Adhesive Tape	m	2	80	160
6	Connecting Wire	m	8	335	2,680
7	Aluminum Frame	m	6	270	1,620
8	Corner Bracket	Piece	4	660	2,640
9	Junction Box	Piece	1	5,350	5,350
10	Double-Sided Adhesive Tape	m	2	135	270
11	Silicone	Tube	1	110	110
12	Thermal Label	Piece	1	60	60
Total					154,810

Source: Prepared by the researcher based on the detailed cost statement and the reports of the Quality Division, the Research and Development (R&D) Division, and the Marketing Department of Al-Zawraa Company.

3.2 Price Determination under the Traditional Costing System

Under the traditional costing approach, only the costs incurred within the manufacturing process are assigned to the product, whereas all other expenditures are treated as period expenses. Accordingly, the creation cost includes direct materials, direct labor, industrial overhead, and the allocated managerial and marketing costs rummage-sale for pricing drives.

Table 4. Cost of a 450-Watt Solar Panel under the Traditional Costing System

No.	Cost Component	Amount dinars
1	Direct Material Cost	154,810
2	Direct Labor Cost	332,500
3	Manufacturing Overhead	46,250
4	Administrative and Marketing Costs	14,250
Total Cost		547,810

Source: Prepared by the researcher based on the detailed cost statement and the reports of the Quality Division, the Research and Development (R&D) Division, and the Marketing Department of Al-Zawraa Company.

The vending price under the old-style costing system was strong-minded by applying a **15% ¹profit margin** to the total creation cost.

¹ The percentage was determined based on data obtained from the Marketing Department of Al-Zawraa Company.

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Profit = Total Cost × 15%

= 547,810 × 15% = 82,171.5 dinars

Selling Price = Total Cost + Profit

= 547,810 + 82,171.5 = 629,982 dinars

3.3 Price Determination Based on Product Life Cycle Costing (LCC)

Product Life Cycle Cost Based Pricing (LCC) is a modern pricing technique which considers all costs incurred over the product life cycle starting from research and development and design to after sales, recycling and final disposal. This approach, in taking a life cycle perspective, provides a more comprehensive foundation for setting product cost and a suitable selling price.

Table 5. Cost of a 450-Watt Solar Panel under the Product Life Cycle Costing (LCC) System

No.	Life Cycle Stage	Amount dinars
1	Research and Development Costs	18,500
2	Product Design and Engineering Costs	14,200
3	Direct Material Cost	154,810
4	Direct Labor Cost	332,500
5	Manufacturing Overhead	46,250
6	Administrative and Marketing Costs	14,250
7	Recycling and End-of-Life Disposal Costs	3,990
Total Life Cycle Cost		584,500

Source: Prepared by the researcher based on the detailed cost statement and the reports of the Quality Division, the Research and Development (R&D) Division, and the Marketing Department of Al-Zawraa Company.

Table 6. Selling Price Based on Product Life Cycle Costing

Description	Amount
Total Product Life Cycle Cost	584,500
Profit Margin (15%)	87,675
Proposed Selling Price	672,175

Source: Prepared by the researcher based on the above data.

3.4 Comparative Analysis and the Pricing Gap

Table 7 presents a contrast between the old-style pricing method and the Product Life Cycle Cost-Based Valuing (LCC) method for the solar panel.

Table 7. Contrast of Valuing Results under the Old-style Costing Approach and the LCC Approach

Description	Traditional Pricing	Life Cycle Cost-Based Pricing (LCC)
Total Cost dinars	547,810	584,500
Profit Margin (15%)	82,172	87,675
Selling Price dinars	629,982	672,175
Difference in Total Cost dinars	—	36,690
Difference in Selling Price dinars	—	42,193

Source: Prepared by the researcher based on the above data.

Table 7 shows a significant price difference between the two procedures. In the traditional costing system, product costing is based on the cost incurred during the production process with the total cost of dinars 547,810. An alternative to this is the Product Life Cycle Costing (LCC) approach, which recognizes the total life cycle cost of the product as dinars 584,500, an increase of dinars 36,690. The difference is due to the LCC approach covering costs not covered in the traditional system, such as research and development, product design, after-sales activities, recycling and environmental obligations.

As a result, the conventional costing method gives the selling price less than the total economic cost of the product. The calculated selling price of dinars 629,982 may appear to create an accounting profit but it does not generate sufficient financial resources to

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recover investments at the pre-production and post-production stages or meet future environmental obligations. Such restriction may have negative consequences on the long-term financial sustainability of the economic unit.

On the other hand, the selling price according to the Product Life Cycle Cost-Based Pricing (LCC) approach is 672,175 dinars, which is greater than the traditional selling price by 42,193 dinars. This difference should not be seen only as a price increase, but as the addition of all costs accumulated during the whole life cycle of the product. Hence, the LCC approach generates adequate financial resources to fund future product development, to meet environmental and regulatory requirements and to enhance the long-term competitiveness of the economic unit.

3.5 Break-Even Analysis

The basic philosophy of break-even analysis is quite different for the two approaches. The traditional costing system is mainly directed to operational break-even, while the Product Life Cycle Costing (LCC) approach is directed to comprehensive strategic break-even taking into account the total costs incurred in the entire life cycle of the product.

$$\text{Break-even Units} = \frac{\text{Fixed Costs}}{\text{Selling Price per Unit} - \text{Variable Cost per Unit}}$$

4.5.1 Traditional Costing Approach (Operational Break-Even)

The traditional costing approach considers the costs incurred before the production, like research and development and product design, and post-production costs, such as marketing and product disposal, as period expenses. Therefore, these costs are charged directly to the income statement, and not allocated to the product for the calculation of the operating break-even point.

The total fixed costs excluded from the product cost are calculated as follows:

$$\text{Excluded Fixed Costs} = 18,500 + 14,200 + 14,250 + 3,990 = \text{dinars } 50,940$$

The calculated target selling price is **dinars 613,594**, while the total variable (manufacturing) costs amount to **dinars 533,560**.

4.5.2 Product Life Cycle Costing (LCC) Approach (Strategic Break-Even)

The philosophy of break-even analysis under the **Product Life Cycle Costing (LCC)** approach differs fundamentally from that of the traditional costing system. Under LCC, all costs incurred throughout the product's life cycle are assigned to the product, beginning with the research and development and design stages, continuing through production and marketing, and extending to after-sales activities, recycling, and final disposal. Consequently, all expenditures are treated as product costs rather than period expenses.

Based on the findings of the present study, the total product life cycle cost amounts to **dinars 584,500**. By applying a **15% profit margin**, the proposed selling price is **dinars 672,175**.

Since the objective of break-even analysis under the LCC approach is to determine the minimum level of sales required to recover all costs incurred throughout the product's life cycle, the break-even sales value is equal to the total life cycle cost:

$$\text{Break-even Sales} = 584,500$$

Accordingly, the break-even point under the Product Life Cycle Costing approach is **dinars 584,500**, representing the sales level at which all product life cycle costs are fully recovered without generating either profit or loss. Profit is generated only when sales exceed this break-even level.

Table 8. Comparison of Break-Even Indicators

Comparison Criterion	Traditional Pricing	Product Life Cycle Cost-Based Pricing (LCC)
Break-Even Sales dinars	390,644	584,500
Break-Even Perspective	Focuses on operational break-even within the manufacturing stage only.	Focuses on strategic break-even by considering the product's entire life cycle.

Source: Prepared by the researcher based on the above data.

Table 8 reveals a substantial difference between the break-even measures generated under the traditional costing system and the Product Life Cycle Costing (LCC) approach. Under the traditional approach, the break-even sales value amounts to dinars 390,644, which may give management the impression that break-even can be achieved at a relatively low level of sales. However, this indicator does not fully reflect the economic reality because it considers only production-related costs while excluding research and development, product design, after-sales activities, and recycling costs, which together amount to dinars 50,940. These costs are documented as period incidentals rather than being allocated to the product.

The other hand, the break-even sales value for the Product Life Cycle Costing (LCC) approach is DINARS 584,500 (the real break-even level when all costs incurred during the product's entire life cycle are included). This approach provides a broader basis to

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determine the minimum sales to recover all cash outflows associated with the pre-production, production and post-production stages.

These results suggest that the traditional break-even measure may cause wrong production and pricing decisions, since some of the true costs of the product are overlooked in the analysis. Such limitation can have negative effects on the long-term financial sustainability of the economic unit. The other hand, the Product Life Cycle Costing method provides a more accurate measure of financial performance and assists management to formulate pricing and production planning policies that ensure full cost recovery while improving organizational continuity and sustainable profitability in a competitive business environment.

4. CONCLUSIONS

1. The results indicate that Product Life Cycle Cost-Based Pricing is a more comprehensive and accurate measure of product cost because it includes all costs incurred throughout the product life cycle, from research and development to final disposal.
2. From the study, it can be seen that the traditional costing approach does not fully reflect the actual economic cost of the product, because the approach focuses more on production costs and excludes pre-production and post-production costs which can lead to inaccurate pricing decisions.
3. Product Life Cycle Cost-Based Pricing helps recover all costs associated with the product and sustains long-term sustainable profitability by helping establish more realistic selling prices.
4. The Product Life Cycle Costing approach provides more accurate information to support managerial decisions on pricing, planning and control and thus results in improved effectiveness of cost management.
5. The use of the Product Life Cycle Costing increases the competitiveness of economic units by improving the utilization of resources and reducing unnecessary costs in the different stages of the product life cycle.
6. The study confirms that Product Life Cycle Cost-Based Pricing is effective in achieving financial sustainability by enabling the continuity of economic units, enhancing their ability to generate sustainable profits, and improving their capacity to meet current and future financial obligations.

5. RECOMMENDATIONS

1. Economic units should embrace Product Life Cycle Cost-Based Pricing as a modern pricing approach which assists in achieving financial sustainability.
2. When setting selling prices, organizations need to identify and include all costs from the product life cycle, not just based on production costs.
3. Cost accounting systems need to be developed further to facilitate the implementation of Product Life Cycle Costing and hence provide accurate and relevant information for managerial decision making.
4. The research and development and product design stages need to be given more attention because the decisions taken at these stages are very important for the costs incurred in the subsequent phases of the product life cycle.
5. Continuous training should be provided for accounting and management personnel to strengthen their capabilities in applying contemporary cost management techniques in line with developments in the business environment.
6. Further empirical research should be encouraged to examine the relationship between Product Life Cycle Costing and financial sustainability while integrating this approach with other strategic management accounting techniques to enhance cost management practices and improve the financial performance of economic units.

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