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Title of research article

Applicability of the Activity-Based Costing (ABC) System to Measure the Strategic Performance of Small and Medium-Sized Enterprises: A Case Study of Grands Moulins du Sud (G.M.S.)

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Keywords Activity-Based Costing (ABC), performance measurement, strategic evaluation, cost management, SMEs, Algeria.

Abstract

This study investigates the applicability of the Activity-Based Costing (ABC) system as a strategic tool for measuring performance in small and medium-sized enterprises (SMEs), using Grands Moulins du Sud (G.M.S.) as a case study. The choice of G.M.S. is justified by its active role in Algeria's local economy and the limited scholarly focus on emerging and developing enterprises. Primary data were collected through structured interviews with departmental heads and staff members, complemented by institutional documents and performance indicators covering the period 2018–2019.

The findings demonstrate that the ABC system enhances accuracy in cost allocation, particularly within the flour production units, contributing to cost reduction and more informed pricing decisions. Although pricing remains constrained by Algerian state regulations—especially due to subsidies on raw materials such as wheat and barley—the ABC model provides a more analytical and transparent framework for evaluating cost behavior and strategic performance.

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1. Introduction

As Tom Peters famously stated, "What can be measured can be accomplished." Performance measurement indicators play an instrumental role in providing management with clear and reliable insights into organizational efficiency and effectiveness. They serve as diagnostic tools that inform corrective actions, foster operational excellence, and reinforce competitive positioning.

Strategic performance management integrates various dimensions of organizational performance—including financial, environmental, social, and employee metrics—into a unified decision-making framework. Several analytical models have been developed to align corporate profitability and growth objectives with stakeholder expectations.

Among these models, the Activity-Based Costing (ABC) system—introduced by Cooper and Kaplan in 1987—marked a paradigm shift in management accounting. The ABC system emerged as a response to the inadequacies of traditional costing methods, which failed to reflect the complexity of modern production and service environments. By assigning indirect costs based on activities rather than arbitrary allocation bases, ABC provides more accurate and actionable information for strategic decision-making.

Accordingly, this research seeks to address the following key question: **What is the impact of implementing the Activity-Based Costing (ABC) model on the measurement of strategic performance in small and medium-sized enterprises, with reference to the case of Grands Moulins du Sud (G.M.S.)?**

To answer this question, the following hypotheses were formulated:

- The evaluation of strategic performance at G.M.S. primarily relies on the traditional total-costing method.
- G.M.S. employs both financial and non-financial indicators to assess strategic performance.
- Implementing the ABC model enhances strategic performance by improving cost accuracy and decision quality within SMEs.

2. Review of Related Literature

2.1 Study by Mebbani Youcef (2015): "The ABC Method—Concepts and Placement"

Mebbani (2015) examined the conceptual foundations and operational implications of the Activity-Based Costing approach. His study, divided into two parts, compared traditional costing systems with the ABC model through an applied case analysis of a livestock feed manufacturing firm. The researcher identified 58 activities and 176 related tasks, consolidating 18 organizational departments into seven responsibility centers.

The study concluded that ABC enables a more precise understanding of cost causation, allowing management to identify value-creating activities and optimize resource allocation. Mebbani further emphasized that management accounting evolves contextually, and that ABC represents an adaptive response to changing technological, structural, and strategic environments. Nevertheless, he cautioned that altering cost systems without revising management practices may limit the method's impact on overall performance.

2.2 Study by Bouarioua Rabia (2019): "Accounting by Activity as the Core of Management Accounting"

Bouarioua (2019) argued for the institutionalization of activity-based accounting as a strategic necessity for Algerian firms. Using process mapping and in-depth interviews with operational managers at METALENG, the study identified key activities, tasks, and drivers influencing cost behavior.

The research demonstrated that adopting ABC allowed for a more dynamic understanding of indirect cost allocation, replacing arbitrary distribution keys with activity drivers that reflect actual resource consumption. This transition facilitated more equitable and realistic cost structures, strengthened process control, and enhanced organizational transparency. The study also underscored the role of ABC in promoting teamwork and identifying non–value-added activities, contributing to continuous improvement and long-term competitiveness.

2.3 Study by Gregory Wegmann (2019): "Activity-Based Practices Based on Cost Accounting: A Strategic Cost Management Approach"

Wegmann (2019) explored the strategic dimension of ABC as part of the broader framework of Strategic Cost Management (SCM). His conceptual model integrates four analytical dimensions—external stakeholders, time, cost improvement, and simplification—within three overarching objectives: cost diversification, expanded analytical scope, and complexity optimization.

The study confirmed that ABC serves as a strategic management tool that guides organizational strategy, monitors the achievement of strategic goals, and supports innovation through evidence-based decision-making. Wegmann concluded that despite its methodological limitations, ABC's versatility and cross-functional perspective make it an essential mechanism for linking operational efficiency with strategic performance.

2.4 Study by Simon Alcouffe (2019): "La Faible Diffusion des Innovations en Contrôle de Gestion est-elle Vraiment Paradoxale? Une Méta-analyse du Lien entre Diversité des Produits et Adoption de la Méthode ABC"

Alcouffe (2019) examined the paradox surrounding the limited diffusion of management control innovations, focusing on the relationship between product diversity and the adoption of the Activity-Based Costing (ABC) method. Using a meta-analytic approach, the researcher conducted a quantitative synthesis of 24 empirical studies selected from an initial pool of 159 publications that met specific inclusion criteria—particularly those addressing the relationship between product variety and ABC adoption. The data were processed using Stata 13, following preliminary preparation and coding in Excel.

The methodological rigor of the study was ensured through independent double-coding by two researchers, followed by collaborative reconciliation to eliminate discrepancies. The findings revealed two key theoretical and managerial contributions. First, the study helped clarify the so-called "innovation paradox" in management control by identifying the contextual factors influencing the diffusion of ABC systems. Second, it addressed the gap in accumulated knowledge concerning the determinants of ABC adoption, emphasizing *adequacy*—the principle that an effective costing system must align with contextual organizational variables to ensure sustainability and utility.

The meta-analysis confirmed that organizations adopt ABC systems primarily when product diversity introduces complexity that renders traditional costing systems inadequate. The study further argued that rational organizational behavior underlies the adoption of management innovations, particularly when these systems respond to technical and strategic needs. However, Alcouffe cautioned against the exclusively technical-rational interpretation of innovation, highlighting that mimetic behaviors, institutional pressures, and power dynamics within organizations also play significant roles in the adoption process.

The researcher concluded that the flexibility of the ABC method allows for the integration of multiple analytical dimensions. For instance, *customer-based ABC* can be merged with simplified approaches, while *time-driven ABC* (TDABC) complements comprehensive cost management systems by utilizing time as a primary cost driver. Nonetheless, this adaptability risks diluting methodological rigor, particularly when simplified ABC models deviate from the principle of achieving the highest possible accuracy in cost analysis.

2.5 Study by Muhammad Samir Dahrib (2017): "The Importance of Implementing the Activity-Based Costing (ABC) System in Rationalizing Product Costs and Improving Administrative Decisions: An Applied Study at the Iraqi Seed Production Company – Ghammas Site"

Dahrib (2017) conducted an applied study at the Iraqi Seed Production Company (Ghammas Site) to evaluate the role of the ABC system in improving cost rationalization and managerial decision-making. The study employed a combined descriptive and analytical methodology, encompassing both theoretical review and practical application.

The results revealed that the company's traditional costing system was insufficient for accurate product-level cost determination, leading to misallocation of indirect costs and distorted profitability estimates. The absence

of detailed activity identification and cost tracing mechanisms prevented the organization from distinguishing between value-adding and non–value-adding activities.

The researcher emphasized the need to adopt modern costing systems such as ABC, which can provide a granular understanding of cost behavior and enhance decision-making accuracy. Moreover, Dahrib highlighted the importance of establishing production service cost centers to capture indirect manufacturing costs effectively. He further recommended continuous professional development through specialized training programs for financial managers and cost accountants in Activity-Based Management (ABM) and Activity-Based Budgeting (ABB) to ensure successful implementation.

The study concluded that the adoption of ABC could significantly improve cost transparency, support strategic decision-making, and align organizational practices with international cost management standards.

2.6 Study by Ariwa Muhad (2018): "Measuring and Evaluating Performance in the Healthcare Sector within a Governance Framework Using the Activity-Based Costing (ABC) System"

Muhad (2018) explored the integration of the Activity-Based Costing system within healthcare institutions, emphasizing its role in enhancing performance measurement and governance. The study was conducted in selected public hospitals to assess how ABC could be applied to improve accountability, cost efficiency, and service delivery.

The research employed a mixed-methods approach, combining quantitative cost data with qualitative insights from interviews and administrative reports. Muhad demonstrated that ABC facilitates more precise resource allocation by identifying the cost drivers associated with clinical and administrative activities. This enables healthcare managers to assess the true cost of medical procedures, laboratory services, and patient care activities with greater accuracy.

From a governance perspective, the study showed that ABC strengthens transparency by linking costs to specific operational activities and outcomes. This alignment supports decision-making related to budgeting, performance monitoring, and strategic resource planning. The implementation of ABC within a governance framework allows hospital administrators to shift from traditional expenditure-based control toward activity-focused accountability, thereby promoting efficiency and effectiveness in the use of public resources.

The study concluded that ABC represents a powerful management tool for the healthcare sector in emerging economies. Its adoption enhances cost control, supports evidence-based policy decisions, and reinforces institutional governance—particularly when accompanied by managerial training and organizational restructuring.

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2.7 Study by Ariwa Muhad (2018): "Measuring and Evaluating Performance in the Healthcare Sector within a Governance Framework Using the Activity-Based Costing (ABC) System"

In this study, Muhad (2018) sought to employ the Activity-Based Costing (ABC) system within a governance framework to evaluate and measure performance in the healthcare sector. The researcher aimed to propose a model capable of accurately determining the cost of services provided by hospitals and adapting these calculations to principles of good governance.

The model was developed through three structured stages. In the **first stage**, the researcher identified and analyzed the indirect cost elements commonly found in hospital operations and determined the appropriate cost drivers for allocating these costs based on specific activities. The **second stage** involved mapping the core activities within hospitals and defining the cost drivers that best reflect the relationship between these activities and the final cost object—namely, the patient. The **final stage** entailed constructing a matrix that illustrates the degree to which each activity benefits from various types of indirect costs, thereby offering a comprehensive and transparent cost allocation scheme.

The findings demonstrated that traditional costing systems—based on the assumption that products or services directly consume resources—are inherently less effective than the ABC system, which recognizes that services consume *activities*, and activities in turn consume *resources*. This conceptual shift provides a more realistic representation of cost behavior within complex organizations such as healthcare institutions. The study also concluded that the growing importance of ABC in healthcare management corresponds to the increasing expenditure in the health sector, primarily driven by the rising demand for medical services.

By integrating ABC within a governance framework, the researcher highlighted how the model enhances accountability, resource transparency, and efficiency. The study ultimately underscored that ABC provides decision-makers with the analytical foundation necessary to align financial management with the principles of institutional governance, quality improvement, and sustainable resource utilization.

3. Theoretical Literature Review

3.1 Introduction to Strategic Performance Measurement and Evaluation

Organizational success depends largely on the ability of top management to achieve strategic objectives effectively. The attainment of such objectives can only be validated through systematic performance measurement and evaluation processes. Performance measurement represents a critical managerial function that enables organizations to assess the extent to which pre-defined goals have been achieved.

As Sabry (n.d.) emphasizes, performance evaluation serves as an essential mechanism for revealing the efficiency and effectiveness of internal activities. It allows management to identify areas requiring improvement and to implement corrective actions aimed at enhancing overall organizational performance. The evolution of competitive markets and operational complexity has thus necessitated the modernization of traditional evaluation systems. Contemporary approaches increasingly emphasize the alignment of performance evaluation with corporate strategy, stakeholder expectations, and sustainable outcomes.

3.2 Modern Management Tools Contributing to Strategic Performance Evaluation

Recent managerial paradigms have introduced a range of modern tools designed to link organizational performance evaluation to strategic objectives. These frameworks integrate both **financial** and **non-financial** indicators to provide a comprehensive understanding of organizational success. As noted by Saleh Elias (n.d.), these instruments enhance managerial control, support long-term decision-making, and enable organizations to adapt dynamically to environmental challenges.

Table 1 summarizes several widely recognized management tools that contribute to strategic performance measurement and evaluation.

Table 1. Modern Management Tools for Evaluating Strategic Performance

Tool	Definition
SWOT Analysis (Strengths, Weaknesses, Opportunities, and Threats)	A systematic framework for identifying internal strengths and weaknesses that shape an organization's competitive position, as well as external opportunities and threats that influence its strategic direction.
Competitive Advantage Analysis	A method for determining the competitive strategy (e.g., cost leadership, differentiation, or market focus) that enables a firm to outperform its rivals.
Six Sigma	Originating from Total Quality Management, Six Sigma is a statistical and managerial framework developed by Motorola to reduce variability, enhance quality, and support strategic decision-making beyond operational improvement programs.
Activity-Based Costing (ABC)	A cost accounting methodology that improves accuracy by assigning costs to products and services based on the activities they consume, rather than on production volume alone. It recognizes that diverse products and customer segments exert varying demands on resources.

Activity-Based Management (ABM)	A system focused on enhancing customer satisfaction and profitability through activity analysis, pricing strategies, process optimization, and the elimination of non–value-adding activities.
Tableau de Bord (Performance Dashboard)	Originating in France, this performance evaluation tool compiles key indicators for monitoring activities at different managerial levels. It allows decision-makers to assess past and current performance and anticipate future developments.
American Management Accounting Standards Committee Model	A comprehensive framework encompassing six categories of strategic performance indicators: environmental, market and customer, competitive, internal operations, human resources, and financial metrics.
Balanced Scorecard (BSC)	Developed by Kaplan and Norton (1992), the BSC integrates four perspectives—financial, customer, internal process, and learning and growth—providing a balanced and forward-looking view of performance in relation to strategic goals.

Source: Moqalled, M. M. A. (2010). *Selected Tools for Rationalizing Strategic Cost Management (Target Costing, Activity-Based Costing, Value Chain).* PhD Thesis, Suez Canal University.

2.3. Strategic Performance Measurement Models

Historically, numerous models have been proposed for measuring strategic performance, most of which were limited to financial indicators while neglecting non-financial dimensions that significantly influence organizational success. In 1992, Robert Kaplan and David Norton introduced the **Balanced Scorecard (BSC)** as an innovative framework for comprehensive performance measurement. This model emerged as a response to the shortcomings of purely financial metrics, emphasizing the integration of financial and non-financial indicators to evaluate both current operations and long-term strategic progress.

Kaplan and Norton defined the Balanced Scorecard as "a management system that translates an organization's vision and strategy into a coherent set of performance measures." The framework encompasses **four interrelated dimensions**—financial, customer, internal business processes, and learning and growth—that collectively provide a balanced representation of organizational performance and guide strategic decision-making.

Table 2. Strategic Performance Measures

Value-Added Measures	Stakeholder Metrics	Productivity Measures	Financial Metrics
Added value returns	Growth and sales expansion	Total productivity = Output / Production factor	Liquidity ratios
Return on value added to ROI	Customer satisfaction	Multifactor productivity = Output / Specific factor	Leverage ratios
Efficiency of asset utilization	Supplier relations	Workforce turnover and internal promotions	Profitability ratios
Organizational development	Employee engagement	Resource utilization efficiency	Activity rates

Source: Adapted from Sabila Qas Hash & Ali Razaq Jiyad Al-Abed (2010), *The Impact of Organizational Trust on Strategic Performance Using the Balanced Scorecard Model: An Applied Study at the Southern Cement Company in Kufa*, *Al-Qadisiyah Journal of Administrative and Economic Sciences*, 12(2), p. 7.

Measuring Strategic Performance Using the Activity-Based Costing (ABC) System

The **Activity-Based Costing (ABC)** system provides a comprehensive framework for linking cost management with strategic performance evaluation. Unlike traditional systems that primarily emphasize financial indicators, ABC incorporates both **financial and non-financial performance measures**, including cost, time, quality, and quantity metrics.

The ABC approach allows each organization to develop a tailored set of performance indicators based on its operational context. For instance:

- To assess **profitability**, a company may employ metrics such as average sales volume or average cost per product.
- To evaluate **time efficiency**, it may use indicators like average production cycle duration or order fulfillment time.
- For **quality performance**, measures may include defect rates, the percentage of rework, or the number of inspections per production batch.

Through **cost driver analysis**, ABC offers new insights into the behavior of costs by identifying the underlying activities that generate them. This analytical capability strengthens planning and budgeting by establishing **activity-based budgets**, which serve as effective tools for performance evaluation and control.

As noted by Mohammed Ali Al-Sayediya, activity-based budgeting (ABB) derived from the ABC framework not only improves the precision of cost estimation but also enhances organizational accountability by linking financial planning to operational performance.

3. Field Study

3.1. Overview of Grands Moulins du Sud (G.M.S.)

The empirical part of this study focuses on *Grands Moulins du Sud (G.M.S.)*, a medium-sized Algerian enterprise operating in the agri-food sector. This section provides a contextual overview of the company, its structure, operations, and strategic orientation, with special attention to the semolina and flour production unit that forms the core of this case study.

The information presented here is based on **interviews** with department managers and engineers, as well as internal documents supplied by the company's administrative departments.

3.2. Historical Background and Legal Structure

Grands Moulins du Sud (G.M.S.) commenced operations in stages, beginning in 1999 with its legal incorporation. The company qualifies as a **medium-sized enterprise (MSE)** in accordance with the classification criteria of Algeria's Guiding Law for the Promotion of Small and Medium-Sized Enterprises (Law No. 18/01, December 1, 2001).

Established as a **limited liability company** with a capital of **139 million Algerian dinars**, G.M.S. represents a joint venture between Algerian and Emirati partners. The enterprise is strategically located in the municipality of **Oumache**, within the **Ourlal district of Biskra Province**, southeastern Algeria. Its proximity to the **Vegetable and Dry Grain Cooperative** ensures a steady supply of essential raw materials—specifically soft and hard wheat.

The choice of Oumache as the company's operational base was driven by multiple factors, particularly **fiscal incentives**, as G.M.S. benefited from the tax exemptions granted under **Legislative Decree No. 12-93**. The company occupies a **total area of 54,225 m²**, of which **4,920 m²** is covered infrastructure—comprising **2,850 m²** for the flour and semolina unit and **2,070 m²** for the couscous production unit.

3.3. Economic and Strategic Importance

G.M.S. holds significant economic relevance, as its products—semolina, flour, and animal feed—are staple commodities in Algeria's domestic market. The company's competitive strength is derived from its **technological capacity**, **product quality**, and **strategic location** at the "Gateway to the South," connecting the northern and southern regions of the country.

The company contributes to **local employment**, supports **regional food security**, and helps **stabilize consumer prices** through competitive supply. Its management has articulated a set of strategic goals aimed at consolidating market leadership and enhancing operational efficiency, including:

- Maintaining leadership in its field of specialization.
- Conducting continuous market research and aligning commercial strategies with consumer needs.
- Expanding production capacity through forward and backward integration.
- Reducing production costs via economies of scale.
- Enhancing customer satisfaction through quality and service innovation.

3.4. Product Range of the Semolina and Flour Unit

The semolina and flour unit of G.M.S. produces a diversified portfolio designed to cater to different consumer segments and price sensitivities. Its daily production capacity is approximately **5,300 quintals**, divided between **3,300 quintals of flour** and **2,000 quintals of semolina**.

Table 3. Product Range of the Semolina and Flour Unit at G.M.S.

No.	Product	Type	Bag Size
01	Flour	Normal "Bread"	25 / 50 kg
		Excellent	1 / 2 / 5 / 10 / 25 / 50 kg
02	Semolina	Rough	25 kg
		Normal (Second Class)	25 kg
		Excellent	5 / 10 / 25 kg
		High (SSSF)	10 / 25 kg
03	Bran	—	50 / 100 kg

Source: Compiled from the Materials Accounting Department, G.M.S.

3.5. Production Infrastructure and Technology

The semolina and flour unit of *Grands Moulins du Sud* is distinguished by its **advanced production technology** and fully **automated manufacturing processes**. Automation extends across all stages of production—from raw material intake and cleaning to grinding, sifting, and packaging.

Recently, the company upgraded its **wheat-cleaning technology**, introducing high-efficiency mechanical separators and optical sorting systems to ensure product purity and reduce material waste. The facility's automation is integrated with digital control panels, enabling precise monitoring of production parameters and enhancing operational efficiency.

This high level of technological sophistication has allowed G.M.S. to maintain consistent product quality, achieve economies of scale, and strengthen its competitive position in the Algerian milling industry.

3.6. Production and Marketing Analysis of the Semolina and Flour Unit

3.6.1. Production Capacity and Technology

The **Semolina and Flour Unit** of *Grands Moulins du Sud (G.M.S.)* is recognized as one of the largest privately owned milling operations in southeastern Algeria, with a production capacity comparable to that of the renowned **Riyadh-Sétif** industrial branches. The facility is equipped with **state-of-the-art machinery** supplied by the Swiss company **Bühler**, a global leader in grain milling technology. Bühler equipment is internationally acclaimed for its precision, efficiency, and durability, ensuring superior quality control and consistency in production output.

The **theoretical production capacity** of the semolina mill is estimated at **220 tons per day**, while the flour mill's theoretical capacity reaches **330 tons per day**, yielding a combined milling capacity of *550* **tons per day**. This capacity is **expandable to 1,000 tons per day** through the addition of new processing lines and storage infrastructure. The plant's advanced technology and scalable design position G.M.S. as a regional hub for flour and semolina production.

3.6.2. Stages of Flour and Semolina Production

The production process at G.M.S. follows a highly organized and automated sequence of stages designed to maximize efficiency and product quality. The major stages are summarized below:

Stage 1: Raw Material Reception

Upon arrival, the raw materials—comprising *durum* and *soft wheat*—are subjected to an initial cleaning process to remove impurities such as metallic fragments, stones, sticks, and other foreign materials. After inspection, the cleaned wheat is stored in **dedicated silos** under controlled conditions to preserve quality prior to processing.

Stage 2: Milling Preparation

In this stage, the wheat undergoes a secondary cleaning to eliminate residual husks, broken grains, and dust particles. Subsequently, **water conditioning** is applied to adjust the grain's moisture content to the optimal level for milling. The grain is then left to rest for a specific duration, allowing for uniform hydration before grinding.

Stage 3: Milling (Grinding)

Following the resting phase, the conditioned wheat is transferred to the milling machines. The **milling process** separates the kernel into its main components: *bran* (a by-product) and *endosperm*, which is processed into *semolina* and *flour*. During sifting, the output is refined into various grades of semolina and flour, depending on the wheat type and granulation standards. By-products such as bran are stored for later sale as livestock feed. The finished intermediates are stored in designated **product silos** for subsequent packaging.

Stage 4: Finishing and Packaging

In the final stage, the semolina and flour are packaged in bags of different sizes to meet diverse market demands. Packaging is fully automated to ensure precision, hygiene, and efficiency in handling. The final products are then distributed to wholesalers, retailers, and institutional clients.

3.6.3. Marketing Framework of the Flour and Semolina Unit

Effective marketing is a key determinant of competitiveness in the milling industry. The marketing strategy of G.M.S. integrates the classic **4Ps framework**—Product, Price, Promotion, and Place (Distribution)—as follows:

a) Product Policy

Product quality and diversity are central to the company's competitive advantage. The semolina and flour unit produces a wide range of products, including *bread flour, fine semolina, couscous-grade semolina,* and *bran*. Each product category comprises several variants tailored to different market segments and packaging preferences.
To maintain quality standards, G.M.S. operates an **in-house quality control laboratory**, which performs regular testing for moisture, protein content, color, and particle size distribution. This ensures compliance with both national and international quality benchmarks.

b) Pricing Policy

Pricing constitutes one of the most influential elements of the company's marketing mix. Product prices are determined using a **cost-plus pricing model**, which incorporates raw material costs, production expenses, and a profit margin.
Although the company's pricing strategy aligns closely with that of competitors, G.M.S. often maintains slightly lower prices to reinforce its market position and stimulate customer loyalty. Given the price sensitivity of the Algerian flour market, the firm acknowledges the **inverse relationship between price and sales volume**—that is, increases in price tend to reduce sales quantities, while price reductions enhance market share.

c) Promotion Policy

Despite the critical role of promotion in expanding brand visibility and customer base, G.M.S. has historically invested minimally in promotional activities. This strategic decision stems from the company's strong market position and consistent product demand, which reduce the necessity for aggressive advertising. Nevertheless, in a competitive and liberalized market, the introduction of **targeted promotional campaigns**—particularly digital and B2B marketing—could further strengthen brand identity and sales growth.

d) Distribution Policy

The company's current distribution framework is relatively limited in scope and geographic coverage. However, intensifying competition in both local and national markets underscores the need for a **comprehensive distribution strategy**. G.M.S. primarily employs direct distribution to wholesalers and institutional buyers but plans to expand its network through **regional distributors** and **retail partnerships** to ensure continuity of supply and broader market penetration.

3.7. Cost Accounting System at Grands Moulins du Sud and Its Impact on Strategic Performance

This section examines the **traditional cost accounting practices** used at *Grands Moulins du Sud* and their implications for strategic performance. Although G.M.S. represents the main operational unit within the larger *Grands Moulins du Sud* group, its **flour and semolina production line** serves as the focal point for cost analysis due to its substantial contribution to the company's total output.

Currently, the organization employs the **total (absorption) costing method** to determine the unit cost of production. The methodology relies on data provided by multiple departments, allowing the calculation of **unit costs** and the identification of cost behavior patterns.

3.7.1. Classification and Allocation of General Costs

The unit classifies general production costs into **variable** and **fixed** components, following the structure of cost accounts (Group 6) based on their degree of variability. Once classified, costs are allocated proportionally to production quantities to determine the **unit cost**.

For instance, the calculation of specific unit costs is as follows:

- **Unit cost of water consumed:**
  936,477.09÷695,237.85=1.34 DZD/unit936,477.09 \div 695,237.85 = 1.34 \, \text{DZD/unit}936,477.09÷695,237.85=1.34DZD/unit
- **Unit cost of electricity consumed:**
  8,682,983.71÷695,237.85=12.48 DZD/unit8,682,983.71 \div 695,237.85 = 12.48 \, \text{DZD/unit}8,682,983.71÷695,237.85=12.48DZD/unit

These examples demonstrate the company's reliance on **direct consumption-based allocation** for certain variable expenses.

3.7.2. Determination of Variable Costs

The accurate determination of variable costs poses a significant challenge for most large and medium-sized enterprises. In the case of G.M.S., the complexity of multiple production lines and interrelated overheads complicates precise cost attribution. Therefore, in this study, the researcher undertook a systematic effort to estimate and analyze variable costs using available operational and financial documentation.

The implementation of an **Activity-Based Costing (ABC)** approach in this context would allow for a more accurate tracing of variable costs to specific activities, thereby improving cost visibility, enhancing pricing decisions, and strengthening overall strategic performance management.

3.8. Production Cost Analysis under the Total Costing Method

3.8.1. Determining the Cost of Premium Flour Production

In this section, the researcher presents a detailed analysis of the production cost of **premium flour**, which represents the primary output of the semolina and flour production line at *Grands Moulins du Sud (G.M.S.)*. The calculation follows the conventional **total (absorption) costing method**, which attributes all production costs—both direct and indirect—to the cost of goods manufactured.

Step 1: Identification of Production Inputs

The total cost of premium flour production is determined using the following relationships:

- **Cost of Durum Wheat Purchased**
  =Quantity Produced×Unit Purchase Price per Quintal= \text{Quantity Produced} \times \text{Unit Purchase Price per Quintal}=Quantity Produced×Unit Purchase Price per Quintal
  =352,038.10×2,684.69=945,113,166.70 DZD= 352{,}038.10 \times 2{,}684.69 = 945{,}113{,}166.70 \, \text{DZD}=352,038.10×2,684.69=945,113,166.70DZD
- **Revenue from Slurry (SSSF)**
  =Quantity Produced×Unit Selling Price per Quintal= \text{Quantity Produced} \times \text{Unit Selling Price per Quintal}=Quantity Produced×Unit Selling Price per Quintal
  =2,113.80×1,890.57=3,996,286.86 DZD= 2{,}113.80 \times 1{,}890.57 = 3{,}996{,}286.86 \, \text{DZD}=2,113.80×1,890.57=3,996,286.86DZD
- **Revenue from Bran (SON)**
  =Quantity Produced×Unit Selling Price per Quintal= \text{Quantity Produced} \times \text{Unit Selling Price per Quintal}=Quantity Produced×Unit Selling Price per Quintal
  =4,709.03×1,689.62=7,956,471.26 DZD= 4{,}709.03 \times 1{,}689.62 = 7{,}956{,}471.26 \, \text{DZD}=4,709.03×1,689.62=7,956,471.26DZD

Accordingly, the **cost of producing one quintal of premium flour** is calculated as:

Cost per Quintal of Premium Flour=Wheat Purchase Cost−SSSF Revenue−SON RevenueQuantity of Premium Flour Produced\text{Cost per Quintal of Premium Flour} = \frac{\text{Wheat Purchase Cost} - \text{SSSF Revenue} - \text{SON Revenue}}{\text{Quantity of Premium Flour Produced}}Cost per Quintal of Premium Flour=Quantity of Premium Flour ProducedWheat Purchase Cost−SSSF Revenue−SON Revenue =945,113,166.70−3,996,286.86−7,956,471.26345,215.27=2,703.12 DZD= \frac{945{,}113{,}166.70 - 3{,}996{,}286.86 - 7{,}956{,}471.26}{345{,}215.27} = 2{,}703.12 \, \text{DZD}=345,215.27945,113,166.70−3,996,286.86−7,956,471.26=2,703.12DZD

Table 4. Determining the Cost of Producing Premium Flour (2019)

Nature	Cost of Purchasing Durum Wheat	Selling Price of Slurry (SSSF)	Selling Price of Bran (SON)	Cost of Producing Premium Flour
Production (quintal)	352,038.10	2,113.80	4,709.03	345,215.27
Unit Cost	2,684.69	1,890.57	1,689.62	2,703.12

(DZD/quintal)				
Total Amount (DZD)	945,113,166.70	-3,996,286.86	-7,956,471.26	933,160,408.60

Source: Compiled by the researcher from the Finance and Accounting Department, *G.M.S.*

The table above demonstrates the process of computing the total cost of premium flour production for the fiscal year 2019. The calculation integrates both material purchase costs and the offsetting revenues generated from by-products such as slurry and bran.

3.8.2. Cost Price Determination for 25 kg Premium Flour Bags

At this stage, the researcher calculates the **cost price of the 25 kg premium flour package**, which represents the standard retail product line. The following steps were applied:

Step 1: Cost of Raw Materials

Based on production data, the cost of raw materials required to produce one quintal (100 kg) of premium flour—equivalent to four 25 kg bags—was computed as follows:

- Cost of one quintal of flour before packaging: **2,703.12 DZD**
- Cost of four 25 kg bags (packaging material): **120.04 DZD**
- Cost of 2.4 g of thread for sewing four bags (0.6 g per bag): **22.94 DZD**
- Cost of four product labels (cards) per quintal: **1.00 DZD**

Step 2: Calculation of Total Production Cost

The total cost price is determined using the following equation:

Cost per Quintal of Premium Flour=(Material Cost+Packaging Cost)+(Variable Cost)+(Fixed Cost)\text{Cost per Quintal of Premium Flour} = (\text{Material Cost} + \text{Packaging Cost}) + (\text{Variable Cost}) + (\text{Fixed Cost})Cost per Quintal of Premium Flour=(Material Cost+Packaging Cost)+(Variable Cost)+(Fixed Cost)

Applying the actual data, the researcher obtained:

Cost per Quintal=(2,874.10−172.47−70.37)=3,089.94 DZD\text{Cost per Quintal} = (2{,}874.10 - 172.47 - 70.37) = 3{,}089.94 \, \text{DZD}Cost per Quintal=(2,874.10−172.47−70.37)=3,089.94DZD

Where:

- **CV (Variable Cost)** = 172.47 DZD
- **CF (Fixed Cost)** = 70.37 DZD

This calculation highlights the contribution of both variable and fixed components to the final production cost under the total costing system.

3.9. Application of the Activity-Based Costing (ABC) Method: A Proposed Model for G.M.S.

The researcher proposes the application of the **Activity-Based Costing (ABC)** system as a modern management control tool to improve the accuracy of cost measurement and enhance the strategic performance evaluation framework of *Grands Moulins du Sud*.

Unlike traditional total costing methods—which allocate overheads based on a single volume-based metric—the ABC system assigns **indirect costs to products** based on the actual activities that generate them. This approach provides more accurate cost information and supports informed decision-making, especially in multi-product environments like the flour and semolina unit.

By implementing the ABC model, G.M.S. can establish a more robust **cost-information base** to improve performance evaluation, optimize resource use, and enhance managerial control.

3.9.1. Identification of Activities and Cost Drivers in the Flour and Semolina Unit

The implementation process follows three main stages, beginning with the identification of direct costs and proceeding to activity and cost-driver mapping.

Stage 1: Determining Direct Costs

To allocate direct costs to specific cost objects within the flour and semolina unit, the following data were obtained from the Finance and Accounting Department for the fiscal year 2019:

Table 5. Direct Costs of the Flour and Semolina Unit (2019)

Account Number	Description	Total Amount (DZD)
601100	Soft Wheat	68,621,065.00
601120	Flour Improver	4,774,110.00
601150	Local Durum Wheat	795,622,635.26
601160	Imported Durum Wheat	22,859,706.25
602611	Caps & Bags	48,236,457.23
602612	Thread	349,236.97
602613	Product Cards	378,514.78
602614	Small Envelopes	2,195,826.24
602615	Adhesives	5,066,756.41
Total		**948,104,308.14**

Source: Finance and Accounting Department, *Grands Moulins du Sud.*

These items represent the **direct production costs** that can be traced directly to the finished products. In the subsequent stages, these data will serve as the foundation for identifying **activity cost pools** and determining **appropriate cost drivers** under the proposed ABC model.

3.10. Application of the Activity-Based Costing (ABC) Model in the Flour and Semolina Unit

3.10.1. Stage 2: Identifying Activities in the Flour and Semolina Unit

In the second stage of ABC implementation, each **activity** performed within the *Grands Moulins du Sud (G.M.S.)* production line was identified, analyzed, and classified according to its operational function, cost behavior, and relevance to managerial decision-making. A comprehensive **activity dictionary** was developed to detail each activity's objectives, input-output relationships, and its contribution to product value creation.

This process allowed for distinguishing **value-adding** from **non-value-adding activities**, ensuring that only activities contributing directly to production were retained for cost allocation. Unlike traditional costing methods—which often distribute overheads across all activities, regardless of relevance—the ABC approach assigns costs exclusively to activities that support the production and delivery of goods.

Each activity was further examined in terms of:

- Its **cost behavior** (fixed, variable, or mixed);
- Its **interdependence** with other activities; and
- Its **impact** on operational and strategic decision-making.

Through this analysis, redundant or nonproductive activities were identified and excluded from cost allocation, thereby improving accuracy and transparency in product cost determination.

3.10.2. Stage 3: Identifying Cost Drivers in the Flour and Semolina Unit

A **cost driver** is defined as the measurable event or factor that causes a change in the cost of an activity. Determining appropriate cost drivers is crucial for establishing a causal relationship between resource consumption and activity performance.

Following **Maria Major's (2002)** analytical framework, two fundamental decisions were taken in this stage:

1. Determining the **number of cost drivers** necessary to represent the organization's activities effectively; and
2. Selecting **types of cost drivers** that optimize accuracy while minimizing implementation costs.

With the participation of departmental heads and financial managers, relevant **activity drivers** were identified. It was observed that several activities shared common cost drivers, underscoring the interconnected nature of production processes. The selected cost drivers reflect operational realities such as the number of production orders, bags filled, examinations conducted, and maintenance operations performed.

3.10.3. Stage 4: Tracing Costs to Activity Centers

The fourth stage involves assigning resource costs to **activity centers**, which in the ABC system represent logical groupings of interrelated tasks rather than the traditional departmental cost centers. Costs were traced to activities using **first-level resource drivers**—metrics that indicate the direct relationship between resource consumption and activity execution.

In instances where a direct assignment was not feasible, resource drivers were employed as allocation bases. Moreover, where activities were classified as either **primary** (directly contributing to production) or **secondary** (supporting primary operations), secondary activity costs were reassigned to the primary activities that utilized their services.

This analytical precision highlights the ABC system's strength in defining the **causal relationships** between indirect costs and final products—particularly the relationship between **supporting activities** (e.g., maintenance, administration, quality control) and production outputs.

Table 6. Grouping Activities into Cost Centers

Causes of Cost	Cost Centers	Collective Activities
Number of orders	Order preparation, purchasing durum and soft wheat, distribution of finished products, receiving customer orders	A12, A11, A31, A30
Quintal (unit of measurement)	Issuing a production order for the flour line	A21, A22
Number of bags	Product packaging and design	A23
Number of examinations	Quality control and inspection	A24
Number of maintenance operations	Maintenance of machinery, spare parts management	A25
Number of completed operations	Accounting, payroll, invoicing, and administrative processing	A33

Source: Prepared by the researcher based on the activity matrix and cost-driver analysis, *G.M.S.*

The table above demonstrates the logical grouping of related activities into cost centers, ensuring a consistent and transparent allocation framework.

3.10.4. Stage 5: Assigning Activity Costs to Products

The final stage in the ABC application process involves assigning the accumulated **activity costs** to products based on the extent of their consumption of each activity. In essence, **activities consume resources**, and **products consume activities**. Therefore, indirect costs are traced to products through cost-driver rates derived from the relationship between each activity and its corresponding driver.

The **indirect cost rate** for each activity is calculated as:

Cost Driver Rate=Total Cost of the ActivityTotal Quantity of the Cost Driver\text{Cost Driver Rate} = \frac{\text{Total Cost of the Activity}}{\text{Total Quantity of the Cost Driver}}Cost Driver Rate=Total Quantity of the Cost DriverTotal Cost of the Activity

This rate is then used to distribute the total activity cost across individual products proportionally to their consumption of the activity. Unlike the traditional method—which applies a single overhead rate based on production volume—the ABC system applies multiple, activity-specific rates derived from the strength of the correlation between each driver and cost consumption (Autres, *Analytical Capabilities and Management Control*, Vuibert Edition).

Numerical Illustration

Using the numerical data available for the *Flour and Semolina Unit*, the **unit cost rate** for the principal cost driver, "number of orders," was determined as follows:

Unit Cost for Cost Driver=296,780,674.56193,212,726.32=1.5360\text{Unit Cost for Cost Driver} = \frac{296,780,674.56}{193,212,726.32} = 1.5360Unit Cost for Cost Driver=193,212,726.32296,780,674.56=1.5360

This rate serves as the foundation for further allocation of costs across other activity centers and production lines.

3.10.5. Determining Cost Drivers by Cost Center

Using organizational data, cost-driver values were calculated for each activity center in the flour and semolina production lines. The proportional distribution of production capacity—**58% for flour** and **42% for semolina**—was applied to allocate the corresponding costs.

Table 7. Determining Cost Drivers for Cost Centers According to Production Lines

Cause of Cost	Total Cost Driver Size (Center)	Flour Production Line (58%)	Semolina Production Line (42%)
Number of orders	193,212,726.32	112,063,381.26	81,149,345.06
Quintal of product	74,650,203.32	43,297,117.92	31,353,085.40
Number of bags	625,231.12	362,634.05	262,597.07
Number of examinations	956,256.56	554,628.80	401,627.76
Number of maintenance operations	10,646,889.78	6,175,196.07	4,471,693.71
Number of completed operations	16,689,367.46	9,679,833.12	7,009,534.34

Source: Based on internal accounting data, *Grands Moulins du Sud (G.M.S.).*

The results presented in Table 7 illustrate the disaggregation of cost-driver quantities across both production lines, reflecting the operational proportionality between the flour and semolina units. This proportional allocation ensures that each product line bears its fair share of activity-based costs according to its actual resource consumption.

The subsequent stage—**Stage 6 (not shown here)**—would integrate these activity-level costs to calculate the **final cost per product unit**, offering a more accurate measure of cost performance and enabling the company to compare traditional costing results with the ABC-based model.

3.11. Determination of the Cost Price Using the Activity-Based Costing (ABC) System

In this section, the researcher calculates and compares the production cost of the flour and semolina units under the **Activity-Based Costing (ABC)** system with that derived from the traditional total costing approach. This analysis provides a clear perspective on the effect of ABC implementation on unit costs and performance evaluation within *Grands Moulins du Sud (G.M.S.).*

Table 8. Determining the Cost Price According to the Activity-Based Costing (ABC) System

Statement	Flour Production Line	Semolina Production Line
Total Costs (DZD)	1,313,871,450.97	1,771,836,422.67
Number of Units Produced	74,650,203.32	43,297,117.92
Cost Price (DZD/quintal)	625,231.12	362,634.05

Source: Compiled by the researcher based on company financial data.

4. Results and Discussion

The comparative analysis between the **traditional total costing method** and the **activity-based costing system** reveals significant differences in the accuracy and structure of cost measurement at the *Grands Moulins du Sud (G.M.S.).* The findings are summarized as follows:

1. **Reduction in Unit Cost through ABC Implementation**
   The study demonstrates that the **unit cost of premium flour** decreased from **3,089.94 DZD/quintal** under the traditional system to **2,932.09 DZD/quintal** under the ABC model—reflecting a deviation of **157.85 DZD/quintal**.
   Similarly, the **cost of semolina** decreased from **2,752.46 DZD/quintal** (traditional costing) to **2,669.82 DZD/quintal** (ABC), also showing a **reduction of 82.64 DZD/quintal**.
   These reductions confirm that the ABC system more accurately identifies and allocates indirect costs, avoiding the distortions inherent in traditional overhead absorption methods.
2. **Enhanced Cost Accuracy and Control**
   The ABC model provided a more precise understanding of **cost behavior**, particularly regarding indirect costs related to maintenance, quality control, and administrative activities. The improved traceability of these costs to individual products enabled management to identify inefficiencies and potential areas for cost optimization.
3. **Improved Pricing Decision Framework**
   The findings indicate that ABC supports **more rational and data-driven pricing decisions**. Given that Algeria's flour and grain sector is subject to government regulation and raw material subsidies (especially for wheat and barley), pricing decisions are often constrained by statutory guidelines.
   However, through ABC, G.M.S. was able to determine its **true cost base** and thereby reassess its **pricing margins**, ensuring profitability while maintaining compliance with state-imposed price controls.
4. **Strategic Implications for Performance Management**
   The introduction of ABC not only enhanced cost visibility but also reinforced strategic decision-making by linking **cost drivers to performance indicators**. The approach revealed hidden cost relation-

ships, allowing managers to reduce non–value-adding activities and redirect resources toward value-creating operations. This alignment supports continuous improvement and competitive advantage.

5. **Organizational Impact**
   The analysis demonstrates that adopting the ABC system results in better **resource utilization**, **performance accountability**, and **information reliability**, all of which contribute to more effective managerial decisions. The system's capability to capture the complexity of modern production processes positions it as a critical tool for strategic performance evaluation within Algerian industrial enterprises.

Interpretation and Implications

Through comparative evaluation, it becomes evident that the **Activity-Based Costing (ABC)** system offers a superior alternative to the total costing method in accurately determining product costs and guiding pricing decisions.
The traditional system fails to fully account for the complex network of indirect expenses—particularly administrative, maintenance, and quality control costs—leading to inflated or misleading cost data.

By contrast, the ABC model:

- Provides **granular insight** into cost drivers;
- Enables **realistic pricing** aligned with market and regulatory conditions;
- Supports **strategic planning** by identifying unprofitable or inefficient activities;
- Enhances **transparency and accountability** within the organization.

Ultimately, the results confirm that the **implementation of ABC** improves both the **accuracy of cost measurement** and the **quality of managerial decision-making**, contributing to better financial control and competitive positioning for *Grands Moulins du Sud*.

5. Conclusion

The study affirms the **applicability and effectiveness** of the Activity-Based Costing (ABC) system in evaluating strategic performance within small and medium-sized enterprises in Algeria. When compared with the traditional total costing method, ABC provides a more nuanced and reliable basis for cost control, pricing, and performance measurement.

For *Grands Moulins du Sud (G.M.S.)*, adopting the ABC system led to tangible reductions in unit costs, improved the allocation of indirect expenses, and enhanced the precision of managerial decisions. The findings underscore the importance of integrating ABC within the company's **strategic management framework**, particularly for industries characterized by complex production processes and significant overhead structures.

Ethical Considerations

This research was conducted in accordance with established ethical principles of academic integrity and research transparency. All procedures involving data collection and analysis were carried out with the full consent of the organization studied (*Grands Moulins du Sud*). Prior authorization was obtained from company management to access relevant financial and operational data. The participants involved in the interviews—department heads and employees—were informed of the research objectives and their right to confidentiality and anonymity. No personal data were disclosed, and all information was used solely for academic purposes. The study adhered to the ethical standards of the University of El Oued and complied with international guidelines for responsible research in management and social sciences.

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Conflict of Interest

The authors declare that there is **no conflict of interest** related to the publication of this article. The study was conducted independently, and no financial or professional relationships influenced the research outcomes or interpretations presented herein.

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