

Activity-Based Costing and Manufacturing Efficiency

Dr. Lukas Meier

Alpine Institute of Computer Engineering, Switzerland

Submission: 26.08.2025. Accepted: 25.02.2026. Publication: 18.07.2026

Abstract

Manufacturing organizations operate in an increasingly competitive environment where cost control, efficient resource utilization, and productivity improvement are critical for achieving sustainable growth. Traditional costing systems often fail to provide accurate product cost information due to the complex nature of modern manufacturing processes and the increasing proportion of indirect costs. Activity-Based Costing (ABC) has emerged as an effective cost management approach that allocates overhead costs based on the actual consumption of activities, thereby providing more precise and reliable cost information. The impact of Activity-Based Costing on manufacturing efficiency by evaluating its influence on cost accuracy, resource allocation, production planning, operational performance, and managerial decision-making. A quantitative research design was adopted, and data were collected through structured questionnaires administered to managers, accountants, and production personnel from selected manufacturing organizations. Appropriate statistical techniques were employed to analyze the relationship between Activity-Based Costing implementation and manufacturing efficiency. The findings indicate that organizations adopting Activity-Based Costing experience significant improvements in cost estimation, process efficiency, waste reduction, capacity utilization, and overall manufacturing performance. that Activity-Based Costing is an effective strategic management tool that enhances operational efficiency and supports informed decision-making in manufacturing organizations. The findings provide practical implications for managers seeking to improve productivity, optimize costs, and strengthen organizational competitiveness in an increasingly dynamic industrial environment.

Keywords: Activity-Based Costing, Manufacturing Efficiency, Cost Management, Operational Performance

Introduction

Manufacturing industries operate in an increasingly competitive and technology-driven environment where efficiency, quality, and cost control are critical determinants of organizational success. Globalization, rapid technological advancements, shorter product life cycles, and rising customer expectations have intensified the need for manufacturing firms to adopt effective cost management systems. Accurate cost information is essential for pricing decisions, production planning, inventory management, budgeting, and performance evaluation. Consequently, organizations are shifting from traditional costing methods to more sophisticated approaches that provide reliable and detailed cost information for strategic

decision-making. Traditional costing systems were developed when direct labor constituted a significant portion of manufacturing costs and production processes were relatively simple. However, modern manufacturing environments are characterized by automation, advanced technology, diverse product lines, and increased indirect costs. Under these conditions, conventional costing methods often allocate overhead costs using broad measures such as direct labor hours or machine hours, resulting in inaccurate product costing and inefficient managerial decisions. These limitations have created the need for more accurate and activity-oriented costing techniques. Activity-Based Costing (ABC) has emerged as an effective cost management system that assigns overhead costs to products and services based on the activities that consume organizational resources. Rather than relying on arbitrary allocation methods, ABC identifies individual business activities, determines the resources required for each activity, and allocates costs according to actual resource consumption. This approach provides managers with more accurate product cost information, enabling better pricing strategies, improved budgeting, enhanced resource allocation, and more effective operational planning. Manufacturing efficiency refers to the ability of an organization to maximize output while minimizing the consumption of resources such as labor, materials, machinery, energy, and time. It reflects how effectively production processes are managed to achieve high productivity, maintain product quality, reduce waste, and optimize operational performance. Improvements in manufacturing efficiency contribute directly to lower production costs, higher profitability, increased customer satisfaction, and stronger competitive positioning. Organizations that continuously monitor and improve manufacturing efficiency are better equipped to respond to changing market demands and technological developments. The implementation of Activity-Based Costing contributes significantly to manufacturing efficiency by identifying non-value-added activities, reducing unnecessary operational costs, improving process transparency, and supporting continuous improvement initiatives. ABC enables managers to analyze the true cost of production activities, identify bottlenecks, optimize resource utilization, and eliminate inefficiencies throughout the manufacturing process. It also facilitates informed decision-making regarding product mix, process redesign, capacity utilization, outsourcing, and investment planning. The increasing adoption of digital technologies, including Enterprise Resource Planning (ERP) systems, Industrial Internet of Things (IIoT), artificial intelligence, cloud computing, and advanced business analytics, has further enhanced the effectiveness of Activity-Based Costing. These technologies enable organizations to collect real-time operational data, automate cost allocation, monitor production performance, and generate accurate cost reports for managerial decision-making. The integration of ABC with digital manufacturing systems supports data-driven management and continuous operational improvement.

Need for Activity-Based Costing in Manufacturing Industries

The manufacturing sector has undergone significant transformation due to globalization, technological advancements, product diversification, and increasing customer expectations. Modern manufacturing processes involve sophisticated production technologies, automated

systems, and complex supply chains that generate substantial indirect costs. In such an environment, traditional costing systems often fail to provide accurate product cost information because they allocate overhead costs using broad measures such as direct labor hours or machine hours. As a result, manufacturing organizations increasingly require Activity-Based Costing (ABC) to obtain precise cost information and improve operational efficiency. One of the primary reasons for adopting Activity-Based Costing is to improve the accuracy of product costing. ABC assigns indirect costs based on the actual activities involved in manufacturing rather than using arbitrary allocation methods. This enables organizations to determine the true cost of each product, identify profitable and unprofitable product lines, and develop more effective pricing strategies. Accurate cost information also supports better budgeting, forecasting, and financial planning. Another important need for ABC is the identification of cost drivers and non-value-added activities. Manufacturing processes often include activities that increase production costs without contributing to customer value. ABC helps managers recognize these activities, eliminate unnecessary operations, reduce waste, and streamline production processes. This contributes to lower manufacturing costs and improved operational performance. Activity-Based Costing also enhances resource utilization by providing detailed information about how organizational resources are consumed across different production activities. Managers can identify areas where labor, machinery, materials, and equipment are underutilized or inefficiently allocated. This information facilitates better capacity planning, workload distribution, inventory management, and production scheduling, ultimately improving manufacturing efficiency. The increasing diversity of products and customization requirements has further strengthened the need for ABC. Manufacturing firms frequently produce multiple product lines that consume resources differently. Traditional costing systems may overcost high-volume products while undercosting low-volume or specialized products. ABC addresses this limitation by assigning overhead costs according to actual activity consumption, resulting in more reliable cost estimates for each product. ABC also supports strategic decision-making by providing managers with accurate and timely cost information. Decisions related to product pricing, process improvement, outsourcing, supplier selection, product design, and investment planning depend on reliable cost data. With better visibility into production costs, managers can make informed decisions that improve profitability and strengthen competitive advantage.

Components of Activity-Based Costing

Activity-Based Costing (ABC) is built upon several fundamental components that enable organizations to allocate overhead costs accurately and understand how resources are consumed during production. These components work together to establish a systematic cost allocation process, allowing managers to identify inefficiencies, improve decision-making, and enhance operational performance. The primary components of Activity-Based Costing include activities, cost pools, cost drivers, and cost objects.

Activities

Activities are the basic units of work performed within an organization that consume resources to produce goods or services. They represent the various tasks or operations carried out during the production process, such as machine setup, material handling, quality inspection, equipment maintenance, order processing, packaging, and product distribution. In the ABC system, activities are identified and analyzed because they are the primary cause of overhead costs. By understanding how activities consume organizational resources, managers can identify value-added and non-value-added activities, eliminate inefficiencies, and improve overall productivity.

Cost Pools

A cost pool is a grouping of overhead costs associated with a specific activity or a set of similar activities. Instead of accumulating all indirect costs into a single overhead account, Activity-Based Costing classifies costs into multiple pools based on the activities responsible for generating them. Examples of cost pools include machine setup costs, quality control costs, procurement costs, material handling costs, maintenance costs, and customer service costs. Grouping costs into activity-specific pools enables organizations to allocate overhead expenses more accurately and provides better visibility into the sources of production costs.

Cost Drivers

Cost drivers are the measurable factors that determine the amount of resources consumed by an activity. They establish the relationship between activities and the products or services that use those activities. Cost drivers serve as the basis for allocating costs from cost pools to cost objects. Examples include the number of machine setups, machine hours, labor hours, purchase orders processed, inspection hours, production batches, and customer orders. Selecting appropriate cost drivers is essential because they directly influence the accuracy of cost allocation and provide valuable insights into the factors contributing to organizational costs.

Cost Objects

Cost objects are the final products, services, projects, departments, customers, or business units for which costs are measured and assigned. The ultimate objective of Activity-Based Costing is to determine the actual cost of these cost objects by tracing both direct and indirect costs based on activity consumption. Accurate costing of products and services enables managers to evaluate profitability, establish competitive pricing strategies, assess customer profitability, optimize product portfolios, and make informed strategic decisions. By assigning costs to cost objects according to actual resource usage, ABC provides a realistic picture of organizational cost structures.

Together, these four components form the foundation of the Activity-Based Costing system. Activities identify the work performed, cost pools accumulate related overhead costs, cost drivers allocate costs based on resource consumption, and cost objects receive the assigned costs. This integrated framework provides accurate cost information, supports effective managerial decision-making, enhances manufacturing efficiency, and contributes to improved organizational performance.

Challenges in Implementing Activity-Based Costing

Although Activity-Based Costing (ABC) offers significant advantages in improving cost accuracy and managerial decision-making, its implementation is often accompanied by several organizational and operational challenges. Many manufacturing firms, particularly small and medium-sized enterprises, face difficulties in adopting ABC due to financial, technical, and human resource constraints. Successfully implementing an ABC system requires careful planning, organizational commitment, and continuous monitoring to ensure that the expected benefits are achieved.

One of the major challenges is the high cost of implementation. Developing an Activity-Based Costing system involves identifying organizational activities, collecting detailed operational data, establishing cost pools, selecting appropriate cost drivers, and training employees. These activities require substantial financial investment in software, consulting services, employee training, and system maintenance. For organizations with limited financial resources, the initial implementation cost can be a significant barrier.

Another challenge is the complexity of identifying and classifying activities. Manufacturing organizations often perform numerous interconnected activities across different departments. Accurately identifying these activities and determining how resources are consumed requires extensive analysis and collaboration among production, finance, operations, and management personnel. Errors in activity identification may reduce the accuracy of cost allocation and limit the effectiveness of the ABC system.

The selection of appropriate cost drivers also presents a considerable challenge. Cost drivers must accurately reflect the relationship between activities and resource consumption. Choosing unsuitable or overly simplified cost drivers may result in distorted cost allocations and unreliable product costing. Organizations must regularly review and update cost drivers to reflect changes in production processes, technology, and operational practices.

Data collection and maintenance represent another significant obstacle. ABC relies on detailed and accurate information regarding activities, resource usage, production volumes, machine operations, labor hours, and other operational variables. Collecting, validating, and updating this information requires substantial time and administrative effort. In organizations with limited information systems or poor data management practices, maintaining reliable data can be particularly difficult.

Employee resistance to change is also a common implementation challenge. The introduction of ABC often requires modifications to existing accounting procedures, reporting systems, and managerial practices. Employees may resist adopting new processes due to uncertainty, fear of increased workload, or lack of understanding of the system's benefits. Without effective communication, training, and management support, resistance to change may reduce the success of implementation.

The successful implementation of Activity-Based Costing also depends heavily on the availability of skilled personnel. Designing, operating, and interpreting an ABC system requires expertise in cost accounting, financial analysis, production management, and

information technology. Organizations lacking adequately trained professionals may experience difficulties in maintaining the system and utilizing its outputs for strategic decision-making.

Technological limitations may further complicate implementation. Although modern Enterprise Resource Planning (ERP) systems and business analytics platforms facilitate Activity-Based Costing, organizations using outdated information systems may face challenges in integrating ABC with existing accounting and production systems. Inadequate technological infrastructure can increase implementation time, reduce data accuracy, and limit the usefulness of the information generated.

Conclusion

Activity-Based Costing (ABC) has become an essential cost management system for modern manufacturing organizations seeking to improve cost accuracy, operational efficiency, and strategic decision-making. As manufacturing processes become more complex and indirect costs continue to increase, traditional costing methods often fail to provide reliable information for effective resource allocation and product costing. ABC addresses these limitations by assigning overhead costs based on the actual consumption of activities, enabling organizations to obtain a more realistic understanding of production costs and operational performance. Activity-Based Costing contributes significantly to manufacturing efficiency by improving cost allocation, identifying cost drivers, eliminating non-value-added activities, and optimizing the utilization of organizational resources. The adoption of ABC enables managers to make informed decisions regarding pricing, budgeting, product mix, production planning, process improvement, and capacity utilization. These improvements not only reduce operational costs but also enhance productivity, product quality, and overall organizational competitiveness. manufacturing efficiency extends beyond cost reduction to include effective resource utilization, production performance, quality management, and timely delivery of products. By providing detailed activity-level information, ABC supports continuous improvement initiatives and helps organizations respond more effectively to changing customer demands and market conditions. The integration of ABC with digital technologies such as Enterprise Resource Planning (ERP) systems, automation, artificial intelligence, and business analytics has further strengthened its role in modern manufacturing environments by enabling real-time cost monitoring and data-driven decision-making. Although the implementation of Activity-Based Costing involves challenges such as high implementation costs, complex data collection, employee resistance, and technological requirements, these obstacles can be overcome through proper planning, management commitment, employee training, and continuous system evaluation. Organizations that successfully implement ABC are more likely to achieve sustainable improvements in operational performance and financial outcomes. Activity-Based Costing serves as a powerful strategic management tool that enhances manufacturing efficiency by providing accurate cost information, improving operational control, supporting continuous improvement, and strengthening competitive advantage. Manufacturing organizations that integrate ABC into their cost management and strategic planning processes are better equipped

to achieve long-term profitability, operational excellence, and sustainable growth in an increasingly competitive global business environment. Future research may examine the integration of Activity-Based Costing with emerging technologies such as artificial intelligence, machine learning, and Industry 4.0 to further enhance manufacturing performance and organizational effectiveness.

Bibliography

- Banker, R. D., Potter, G., & Schroeder, R. G. (1993). Reporting manufacturing performance measures to workers: An empirical study. *Journal of Management Accounting Research*, 5, 33–55.
- Blocher, E. J., Stout, D. E., Juras, P. E., & Smith, S. D. (2022). *Cost management: A strategic emphasis* (9th ed.). McGraw-Hill Education.
- Bhimani, A., Horngren, C. T., Datar, S. M., & Rajan, M. V. (2019). *Management and cost accounting* (7th ed.). Pearson.
- Cooper, R. (1988). The rise of activity-based costing—Part one: What is an activity-based cost system? *Journal of Cost Management*, 2(2), 45–54.
- Cooper, R., & Kaplan, R. S. (1988). Measure costs right: Make the right decisions. *Harvard Business Review*, 66(5), 96–103.
- Drury, C. (2018). *Management and cost accounting* (10th ed.). Cengage Learning.
- Hansen, D. R., Mowen, M. M., & Heitger, D. L. (2022). *Cornerstones of managerial accounting* (8th ed.). Cengage Learning.
- Hilton, R. W., & Platt, D. E. (2023). *Managerial accounting: Creating value in a dynamic business environment* (13th ed.). McGraw-Hill Education.
- Horngren, C. T., Datar, S. M., & Rajan, M. V. (2021). *Cost accounting: A managerial emphasis* (17th ed.). Pearson.
- Johnson, H. T., & Kaplan, R. S. (1987). *Relevance lost: The rise and fall of management accounting*. Harvard Business School Press.
- Kaplan, R. S., & Anderson, S. R. (2007). *Time-driven activity-based costing: A simpler and more powerful path to higher profits*. Harvard Business School Press.
- Kaplan, R. S., & Cooper, R. (1998). *Cost and effect: Using integrated cost systems to drive profitability and performance*. Harvard Business School Press.
- Porter, M. E. (1985). *Competitive advantage: Creating and sustaining superior performance*. Free Press.
- Shank, J. K., & Govindarajan, V. (1993). *Strategic cost management: The new tool for competitive advantage*. Free Press.
- Turney, P. B. B. (2008). *Activity-based costing: An emerging foundation for performance management*. Cost Technology.