

Implementation of a Process Costing System integrated with an Enterprise Resource Planning (ERP) System

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ABSTRACT

This study examines the implementation of process costing systems in manufacturing companies and their integration with Enterprise Resource Planning (ERP). The objectives are to explain the process costing concept, describe the integration mechanism with ERP, and analyze resulting benefits in efficiency and accuracy. A qualitative descriptive method is employed using literature review and a case study of a manufacturing company that has implemented ERP (e.g., PT Indofood Sukses Makmur Tbk.). Findings indicate that ERP integration enables automatic, real-time calculation of production costs, reduces manual input errors, speeds up cost reporting, and increases transparency of cost flows between departments. ERP also serves as a single source of truth, facilitating audit trails and cost control. In conclusion, ERP implementation in process cost accounting yields operational efficiencies and more accurate data to support managerial decision-making.

INTRODUCTION

The manufacturing industry is characterized by production processes that operate continuously and generate large volumes of output. These conditions require companies to have a production cost determination system that is able to accurately reflect costs at every stage of the process. Accurate cost information is essential for management in setting selling prices, controlling production costs, and evaluating overall operational performance.

One cost accounting method commonly used in the manufacturing industry is the process costing system. This system is designed to accumulate production costs by department or production process stage over a specific period. Through the implementation of process costing, companies can determine the cost per unit of product in a more systematic and structured manner, thereby supporting more effective cost planning and control.

However, in practice, the implementation of process costing systems in many companies is still carried out manually or by using separate applications across departments. This condition often leads to various problems, such as delays in cost reporting, inconsistencies in data between departments, and a high potential for recording errors. In addition, non-integrated systems make it difficult for management to obtain cost information quickly and comprehensively.

Along with the increasing complexity of business activities and demands for efficiency, companies are required to utilize information technology in managing their business processes. Information technology not only serves as a data recording tool but also as a means to integrate various operational functions within the company. The integration of information systems is a crucial factor in improving the effectiveness of control and the quality of managerial information. Enterprise Resource Planning (ERP) is an integrated information system that combines various core company functions, such as production, inventory, accounting, and finance, into a single unified platform. Through ERP, data generated from each operational activity can be accessed in real time and shared across all related departments. This enables data consistency and information transparency in corporate management.

Integrating the process costing system into ERP provides companies with opportunities to improve the accuracy of production cost calculations. The recording of raw material costs, labor costs, and manufacturing overhead can be carried out automatically in accordance with the ongoing production process flow. As a result, the cost information produced becomes more reliable and can be used as a basis for more accurate decision-making.

In addition to improving accuracy, the implementation of ERP in the process costing system also has an impact on the efficiency of reporting and cost control. Production cost reports can be generated more quickly and in a timely manner without requiring complex data reconciliation processes. This condition enables management to continuously evaluate costs and exercise operational control.

Based on the above discussion, the implementation of a process costing system integrated with an Enterprise Resource Planning (ERP) system is an

important subject for further study. This research is expected to provide an understanding of the concepts, integration processes, and benefits of ERP implementation in supporting process costing systems, particularly in improving efficiency, the accuracy of cost information, and the quality of managerial decision-making in manufacturing companies.

LITERATURE REVIEW

Definition of the Process Costing System

The process costing system is a cost accounting method used by companies that produce goods on a mass, repetitive, and homogeneous basis. This system is commonly applied in manufacturing companies where the production process operates continuously without distinguishing the characteristics of individual product units. Under this approach, production costs are accumulated over a certain period and allocated evenly to all units produced.

According to Mulyadi (2015), a process costing system is a method of determining production costs in which costs are accumulated for each production process or department during a specific period and then averaged and charged to the units produced in that period. This approach emphasizes the importance of grouping costs based on stages of the production process rather than on specific orders or jobs, making it suitable for industries with continuous production.

In line with this view, Hansen and Mowen (2013) state that process costing is used when products pass through the same production stages in a sequential manner. In this system, raw material costs, direct labor costs, and manufacturing overhead are assigned to each process and averaged using the concept of equivalent units. Therefore, the process costing system requires careful calculation of equivalent units, whether using the weighted average or FIFO method, to ensure that the cost per unit is determined accurately.

Characteristics of Companies with Process Production

Companies that apply a process costing system have production characteristics that differ from those using a job order costing system. Generally, these companies produce goods in large quantities with high volume and operate continuously. Examples of industries that frequently use this system include food and beverage, chemical, cement, textile, and paper industries, where the production process runs continuously over long periods.

In addition, the products produced are homogeneous or identical, making it difficult to distinguish one unit from another. This condition allows companies to use average cost calculations as the basis for determining the cost of production. Uniform products also make cost accumulation per unit more efficient compared to methods that trace costs individually.

Another prominent characteristic is the division of the production process into several departments or specific stages. Each department has different production functions and consumes varying levels of costs. At the end of the period, companies typically have work in process inventories that are not fully completed, requiring the calculation of equivalent units. These characteristics

indicate that the process costing system is highly suitable for companies with continuous and standardized production lines.

Concept of Enterprise Resource Planning (ERP)

Enterprise Resource Planning (ERP) is an integrated information system designed to manage and coordinate all company resources in a unified manner. ERP connects various business functions within a single platform based on a centralized database, allowing information to be accessed and processed in real time. The implementation of ERP serves as a strategic solution for companies to improve operational efficiency and the quality of managerial information.

O'Brien and Marakas (2011) explain that ERP integrates various core company modules, such as accounting, production, inventory, purchasing, sales, and human resources. This integration enables consistent data flow across departments, reduces duplication of records, and minimizes data input errors. Thus, ERP functions not only as a recording tool but also as a decision-support system.

In the context of cost accounting, ERP plays an important role in automatically recording and processing production cost data. Information on raw material usage, labor hours, and overhead costs can be directly linked to ongoing operational activities. This makes cost information more accurate, timely, and relevant for management in conducting cost planning and control.

Integration of Cost Accounting and ERP

The integration of cost accounting and ERP systems is an important part of the development of modern accounting information systems. Through this integration, the process of recording production costs is no longer carried out separately but is directly linked to the company's operational activities. According to Mulyadi as well as Hansen and Mowen, such integration is able to improve the accuracy and efficiency of cost calculation systems.

Within an ERP system, production data such as raw material usage, labor hours, and machine activities are automatically recorded through production and inventory modules. This information is then transferred to the cost accounting module for the calculation of process costs, including the computation of equivalent units. With this mechanism, cost calculations can be performed in real time without having to wait for manual reconciliation processes at the end of the period.

The integration of ERP modules, such as Production Planning (PP), Materials Management (MM), Controlling (CO), and Financial Accounting (FI), enables companies to generate cost reports automatically and in a structured manner. Reports such as cost center reports, variance analysis, and cost of goods manufactured can be presented quickly and accurately. The main benefits of this integration include the reduction of manual input errors, increased transparency of cost flows, and stronger support for cost control and efficiency analysis in production activities.

Previous Studies on ERP Implementation in Cost Accounting

Various previous studies indicate that ERP implementation has a positive impact on the effectiveness of cost accounting systems in manufacturing companies. Research conducted by Putra (2020) and Wibowo (2019) found that the use of ERP improves the accuracy of production cost data because all

transactions are recorded automatically and in an integrated manner. This also facilitates the audit process due to the availability of a clear audit trail.

In addition to improving accuracy, ERP has also been proven to accelerate the process of preparing cost reports. A study by Sari and Nugroho (2021) shows that ERP implementation can reduce the time required to prepare production cost reports by 40–60 percent compared to manual systems. The speed of report generation provides significant advantages for management in conducting cost evaluations and making timely decisions.

Nevertheless, several studies also reveal challenges in ERP implementation. Rahmadani (2018) notes that the main obstacles include high investment costs, the need for human resource training, and resistance to changes in work systems. However, overall, previous studies conclude that the benefits of ERP implementation in supporting cost accounting systems, particularly process costing systems, outweigh the challenges encountered.

METHODOLOGY

This study adopts a qualitative descriptive approach aimed at systematically, factually, and accurately describing the implementation of a process costing system integrated with an Enterprise Resource Planning (ERP) system in a manufacturing company. The study does not employ statistical analysis or quantitative numerical data but instead focuses on understanding processes, system flows, and the relationships among ERP components and cost accounting. The approach combines a literature review and a case study to obtain both conceptual and practical insights into the integration of process costing systems with ERP.

The object of the study focuses on the implementation of an ERP-based process costing system within a manufacturing company, with a case study of PT Indofood Sukses Makmur Tbk as a company that has implemented SAP ERP. The research examines how ERP modules such as Production Planning (PP), Materials Management (MM), Controlling (CO), and Financial Accounting (FI) are integrated to support automatic and real-time production cost calculations. The data sources consist of primary and secondary data, where primary data are obtained through observation, interviews, or internal documentation if field research is conducted, while secondary data are obtained from academic journals, cost accounting and accounting information systems textbooks, previous research reports, company annual reports, and official documents related to ERP implementation.

Data collection techniques are carried out through literature review and case study based on documentation and secondary observation. The literature review is used to build the theoretical and conceptual foundation regarding process costing systems, ERP, and the integration of cost accounting systems, while the case study is conducted by analyzing financial statements, annual reports, company publications, and official information related to the implementation of SAP ERP at PT Indofood Sukses Makmur Tbk. Data analysis is conducted descriptively through stages of identifying manual cost calculation systems prior to ERP implementation, analyzing the integration process of the

process costing system into ERP, and comparing the efficiency and effectiveness of manual systems with ERP-based systems. The results of the analysis indicate that ERP implementation is able to improve reporting speed, accuracy of cost calculations, interdepartmental integration, transparency in cost control, and support more timely managerial decision-making compared to manual systems.

RESEARCH RESULTS AND DISCUSSION

Overview of the Traditional Process Costing System

The traditional process costing system is used in manufacturing companies with mass and continuous production. In this system, production costs are accumulated by department or process stage and then allocated evenly to all units produced. This method is suitable for industries with homogeneous products such as food and beverage, chemical, and textile industries.

However, the implementation of the traditional system relies heavily on manual recordkeeping and interdepartmental coordination. Human resource accuracy becomes the key success factor, resulting in relatively high risks of reporting delays, data inconsistencies, and recording errors.

Manual Production Cost Recording Flow

Under the manual system, raw material costs are recorded through material requisition documents from the production department to the warehouse, followed by the recording of material issuance and the charging of costs to the relevant departments. Labor costs are recorded using time cards that are summarized by supervisors before being calculated by the accounting department based on wage rates.

Meanwhile, manufacturing overhead costs are applied using predetermined rates established at the beginning of the period, based on allocation bases such as labor hours or machine hours. All cost components are manually summarized into process cost reports, causing the reporting process to take a relatively long time.

Problems of the Manual System

The analysis shows that the manual system often causes delays in production cost reporting due to step-by-step recording processes and the need to collect physical documents from various departments. In the case of PT Indofood prior to ERP implementation, the reporting of cost per batch could be delayed by up to 2-3 days.

In addition to delays, the manual system is also prone to recording errors and data duplication. Repeated data entry across departments increases the risk of human error, data inconsistencies between departments, and difficulties in reconciliation, which ultimately affect the quality of managerial decision-making.

Integration of the Process Costing System within ERP

ERP implementation integrates financial, production, procurement, and inventory modules into a single unified database. This integration enables all process cost data to be collected consistently and in real time, replacing separate records maintained by individual departments.

Through Financial Accounting, Production Management, and Inventory Management modules, ERP ensures that data on raw material usage, labor hours,

and overhead costs are directly linked to the cost accounting system. This significantly improves the accuracy of process cost calculations and facilitates better control over production costs.

Automation of Cost Allocation and Reporting

ERP systems automate the allocation of raw material, labor, and overhead costs to Work in Process (WIP) accounts based on actual production data. The calculation of equivalent units and cost per unit is performed automatically without the use of separate spreadsheets.

This automation enables accounting journal entries and production cost reports to be generated immediately after the production process is completed. As a result, companies obtain faster, more accurate, and more reliable cost information to support decision-making.

Examples of ERP Implementation in Process Costing

The discussion indicates that various ERP systems such as SAP, Odoo, Oracle, and Zahir ERP are capable of supporting integrated process costing. SAP and Oracle are widely used by large enterprises through complex and real-time controlling and production planning modules.

Meanwhile, Odoo and Zahir ERP serve as alternatives for small and medium-sized enterprises with simpler manufacturing and accounting features. The core feature of all these systems is the integration of production, inventory, and accounting data flows within a single unified platform.

Comparison between Manual and ERP Systems

In terms of time efficiency, ERP systems are far superior because recording and reporting processes are automated and performed in real time. Unlike manual systems that require several days, ERP can generate production cost reports within minutes.

From the perspectives of accuracy and transparency, ERP systems are superior because they minimize input errors and provide a clear audit trail. Cost information can be monitored directly by management, thereby enhancing data transparency and reliability.

Impact on Cost Control and Managerial Reporting

ERP implementation has been proven to improve cost control efficiency by enabling rapid and continuous monitoring of cost variances. The integration of production and accounting modules ensures that cost data reflect actual operational conditions.

In addition, managerial reporting becomes faster and more informative through dashboards and automated reports. Management gains access to accurate and real-time cost data to support strategic decision-making and enhance corporate accountability.

Company Case Studies

At PT Semen Indonesia, the implementation of ERP (SAP) resulted in improved efficiency in financial reporting and production cost control across multiple plants. Cost data became more accurate and could be monitored in real time by central management.

Similarly, at PT Indofood, ERP implementation helped address the complexity of high-volume production and distribution transactions. The costing

system became more automated and consistent, significantly reducing managerial reporting lead time.

CONCLUSIONS AND RECOMMENDATIONS

The implementation of an Enterprise Resource Planning (ERP) system integrated with a process costing system has been proven to enhance the efficiency and accuracy of production cost management. The automation of cost allocation and inventory tracking enables real-time data flows without excessive reliance on manual intervention. This condition accelerates the period-end closing process and the preparation of cost reports, thereby supporting improved operational efficiency. In addition, ERP functions as a single source of truth that consistently integrates information on raw material usage, labor, and overhead costs across departments. As a result, the risks of input errors and data inconsistencies can be minimized, reporting transparency is improved, and profitability analysis can be conducted based on accurate and reliable data to support managerial decision-making.

Based on the findings of this study, companies are recommended to ensure the readiness of human resources through structured and continuous training programs to enable optimal operation of ERP systems. The utilization of real-time cost data should be integrated into decision-making processes, particularly in pricing decisions and resource allocation, to enhance responsiveness to operational conditions. Furthermore, companies are advised to quantitatively measure the impact of ERP implementation by establishing clear production cost metrics and comparing performance before and after system adoption. Regular reviews of master data should also be conducted to maintain input accuracy and ensure the sustainability of high-quality cost information generated by the ERP system.

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