Original Article

THE PRODUCTION CYCLE IN THE PHARMACEUTICAL SUB SECTOR : TRADITIONAL VS DIGITAL ACCOUNTING INFORMATION SYSTEMS ERA AND IMPLEMENTATION OF INTERNAL CONTROL PROCEDURES THAT ENABLE COST SAVINGS IN DEALING WITH THREATS IN THE CYCLE

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Abstract

Digitalization of the industrial revolution forced companies to adapt to these changes. The era of digitalization makes companies compete more with each other and requires sophisticated technology. So far, the enterprise resource planning (ERP) system can assist companies in controlling their digitalization needs in AIS cycles, including the production cycle. However, the differences must be reviewed thoroughly in terms of strengths and weaknesses in the implementation of product cycle digitalization so that enterprises understand the importance of changing their ways of functioning. Production cycle is interconnected with other cycles, so companies must be able to maintain internal controls in that cycle. Descriptive analyzation is used in this research by using prior literature and documentation studies. Research questions are further described and analyzed in the discussion section regarding the comparison of traditional and digital ways of production cycle and implementation procedures of internal control in a way to deal with threats concerning the production cycle.

Keywords: Production Cycle, Internal Control, Cost Savings, Threats.

Introduction

An accounting information system is a mechanism for a firm to keep track of all financial and operational activity. Internal controls, data, software, procedures and instructions, people, and technology infrastructure make up the six main parts of an accounting information system (Franklin M., et al., 2019). SIA is also used to ensure that the transaction cycle within the company runs smoothly between one subsystem and another. Because of this, there are cycles that are commonly known in SIA, namely the financing cycle, expenditure cycle, human resources payroll cycle, general ledger and reporting system, revenue cycle, and production cycle. The manufacturing process is coupled with a series of recurrent business activities and associated information processing procedures known as the production cycle (Romney & Steinbart, 2016).

An enterprise's production cycle is made up of a number of business processes and associated information processing procedures that are constantly in communication with one another. Customer orders and sales projections are provided through a revenue cycle information system, which is utilized to determine production and readiness levels (Pratama, et al., 2022). The production information system responds by sending information to cycles that have been discontinued and are still for sale. In the form of a purchase request, information on the need for raw materials is transmitted to an information exchange information system. In contrast, the cycle system sends data on raw materials and linked materials to plant overhead. The human resources cycle receives information about labor needs and relays it to the information system of the organization, which in turn offers information about costs and labor support (Afzalia,et al., 2022). Information regarding finished items will be available through the money flow information system. Last but not least, data on the cost of manufacturing will be transmitted to the information reporting system and general ledger (Pratama, et al., 2022).

The change in the era of the industrial revolution from 3.0 to 4.0 forced companies to adapt to these changes. The era of digitalization makes pharmaceutical companies compete more with each other and requires sophisticated technology for daily business processes. So far, the enterprise resource planning (ERP) system can assist companies in controlling their digitalization needs in AIS cycles, including the production cycle. However, the differences must be reviewed thoroughly in terms of strengths and weaknesses in the implementation of product cycle digitalization so that enterprises understand the importance of changing their ways of functioning. Another significance of the production cycle is that it is interconnected with other cycles, so companies must be able to maintain internal control in that cycle. There is a close relationship in this cycle between the implementation of internal controls that allow companies to save its cost budget when dealing with threats (Lubis et al., 2022). With this information, the problems and objectives of this research can be identified, namely: 1) what is the comparison of production cycles in the traditional and digital eras; and 2) what are the procedures for implementing internal controls that enable cost savings in dealing with threats to the production cycle?

Literature review

Accounting Information System

Accounting information system is a collection of sub-systems that are interrelated and cooperate harmoniously with each other to process transactions or data related to financial problems into structured financial information (Azhar, 2008). Meanwhile, according to Bodnar and Hopwood (2004), the accounting information system is a combination of information data that is processed in accordance with procedures so as to create the information needed by its users. Then according to Bagranoff et al (2007) Accounting information systems are integrated structures that use physical resources and components to convert economic data into financial data in the form of financial information for external and internal users. Accounting information systems are subsystems that process financial and financial transactions that will affect the processing of financial transactions (Hal, 2008). So it can be concluded that the accounting information system is a structured system to process economic data into financial data that provides financial information that can be used by internal and external users.

The accounting information system can be measured by looking at the effectiveness of the information it produces (Janrosl, 2021). The accounting information system will be effective if it produces the right information so that it can encourage improvements in the daily operational business and can improve the quality of decision making. The effectiveness of accounting information systems is achieved when producing financial information that can help company management in decision-making (Sajad et al, 2008). Meanwhile, according to Thong and Yap (1996), Gelderman (1998) user negligence is the benchmark for the success of accounting information systems. The success of accounting information systems is related to the efficiency of information systems to meet the needs (Brabander and Theirs, 1984).

Production Cycle

The production cycle is a series of repetitive business activities and information processing operations related to the manufacture of a product at the enterprise (Romney and Steinbart, 2015). The production cycle in the accounting information system aims to provide information about the revenue cycle of finished goods that have been produced and are ready for sale. This information will complement the information needs to the revenue cycle that has provided customer order information used to plan production and inventory levels (Maksum et al., 2021). Information data on raw material needs is obtained in the expenditure cycle information system in the form of purchase requests. Then the production system system provides information about raw materials and expenses related to factory overhead. Labor information is obtained from accounting information systems sourced from the human resource cycle. The human resource cycle will provide data related to labor costs and availability. In the end information about the cost of goods produced will be reported in the ledger and reporting information systems.

Activities in Production Cycle

There are four basic activities in the production cycle (Romney and Steinbart, 2015) as follows:

1) Product Design
2) Planning and Scheduling
3) Production Operations
4) Cost Accounting

Product Design

Product design is the first step of the production cycle that aims to produce quality, durability, and functional products to meet customer needs by minimizing production costs. The use of information systems can bind the efficiency and effectiveness of product design. Product design is tasked with developing each product produced and structuring the equipment and time needed in the production process of the product (Romney and Steinbart, 2015). Product design can use tools such as product life cycle management (PLM) software that will help improve the efficiency and effectiveness of the product design process. There are three components in PLM, namely computer-aided design software (CAD) to design new products, digital manufacturing software that stimulates the product to be produced, product data management software that stores all data related to the product being produced.

Planning and Scheduling

Planning and Scheduling is the second step in the production cycle that aims to develop production plans that are efficient in meeting existing orders and anticipate short-term demand and minimize the inventory of raw materials and finished goods. There are two methods in production planning, namely manufacturing resource planning and lean manufacturing. Manufacturing resource planning is a plan that balances existing production capacity and raw material needs to meet the expected sales demand. Lean manufacturing extends the principles of just-in-time inventory to the entire production process aimed at minimizing the inventory of raw materials, in-process goods, and finished goods. Lean manufacturing develops short-term production planning.

Production Operations

Product manufacturing is the third in the production cycle that aims to provide cross-cycle information in helping companies to be more efficient by managing purchase times in meeting actual demand. This activity is adapted to

the variations of the entire enterprise and according to the type of products manufactured and the automatic rate used in the production process. Product manufacturing can use humans, robots, and computer-controlled machines. It can use integrated manufacturing computers (CIM).

Cost Accounting

Cost accounting is the last rare in the production cycle which aims as follows (Romney and Steinbart, 2015):

1) To provide information for planning, controlling, and evaluating the performance of production operations

2) To provide accurate data related to product costs that can be used in pricing decisions and product quantity.

3) Untuk mengumpulkan dan memproses informasi yang digunakan untuk menghitung nilai persediaan dan harga pokok penjualan yang akan dilaporkan di dalam laporan keuangan perusahaan.

The first goal can be achieved when the cost accounting system must be planned and collect real-time data on the performance of production activities so that management can make timely decisions. While the second goal can be achieved when the cost accounting system must classify costs according to categories and assign those costs to specific products and units of the enterprise. In data collection should use proper cost data coding because often the same costs are allocated in different ways.

Method

Types of research

Through further topical analysis, this study employs a qualitative descriptive methodology. (Sugiyono, 2005:21)

Research Instruments and Data Collection Techniques

Literature books and scholarly publications were used as research resources for this investigation. Additionally, official websites that might serve as sources are used by research tools. To accomplish the goals of this research, data collection methods employed literature and documentary studies.

Results and discussion

The comparison of traditional vs. digital eras in Production Cycle

It is essential to understand the value of the production cycle for a company's long-term viability and how to compete with other businesses, preferably of the same kind. All industrial sectors had to adapt to the Industrial Revolution 4.0's changes, which included the conversion of the accounting information system's traditional to digital components. However, it is undeniable that many businesses are still hesitant to undergo digital transformation for a variety of reasons, including inadequate data, lack of an effective strategy, gap in communication between the interns, inability to experiment quickly, complex tools and technologies, lack of proper planning and training, lack of skills and talent, security concerns, insufficient budge and ignorance of the need for digital transformation (Schwertner, 2017).

Some of the comparison on traditional and digital AIS is (Gelinas, et al., 2017):

1) While conventional AIS is an accounting system that employs actual registers and accounting records for preserving financial records, digitized AIS is software-based activities carried out by particular AIS software that utilizes an automated framework.

2) The digital AIS streamlines, accelerates, and simplifies the accounting process in terms of time spent. The program is used to keep all data in an organized and precise manner. Records are manually kept utilizing paper-based account books in traditional AIS, which is a time-consuming operation and occasionally erroneous.

3) Digital allows for accurate transaction recording, automatic accounting, and minimal room for error. However in traditional, since the reporting is done by hand, there is a risk of human error in the correctness of the figures.

4) In digital AIS, technical problems such software stalling, the system not functioning, data dumps, and so on, can occasionally happen if adequate maintenance is not carried out because a system is a machine. Due to the lack of computer usage in this procedure and the fact that all records are made physically and carefully preserved, it is free from such maintenance.

5) Tracking reports or recognizing transactions in this accounting is easy and entirely automatic in digital AIS. The laborious process of manually identifying a specific transaction might necessitate some time to report.

6) Since everything in digital AIS is saved digitally, no physical space is needed to keep the papers; instead, just enough room for a computer is needed. In contrast, traditional AIS necessitate a significant amount of physical space or specific racks or shelves to maintain the records, registers, etc. for the accounting books.

As for the objectives of the production cycle, all production and acquisition of fixed assets are properly authorized, work-in-progress inventories and fixed assets are kept safe, and all valid and valid production cycle transactions will be recorded. All production cycle transactions are recorded accurately, accurate records are maintained and protected from loss, and production cycle activities are carried out efficiently and effectively. The Data Flow Diagram Level 0 of its activities also shows a comparison of traditional and digital eras in the production cycle. There are four activities in the production cycle: product design, planning and scheduling, production operations, and cost accounting. These activities require more detailed information about costs than the data needed to prepare financial statements in conformity with generally accepted accounting principles. Thus, the design of a company's production cycle AIS must include much more information than just meeting external financial reporting requirements.

Figure below shows the traditional and digital production cycle:

Figure 1. Traditional Production Cycle Data Flow Diagram Level 0

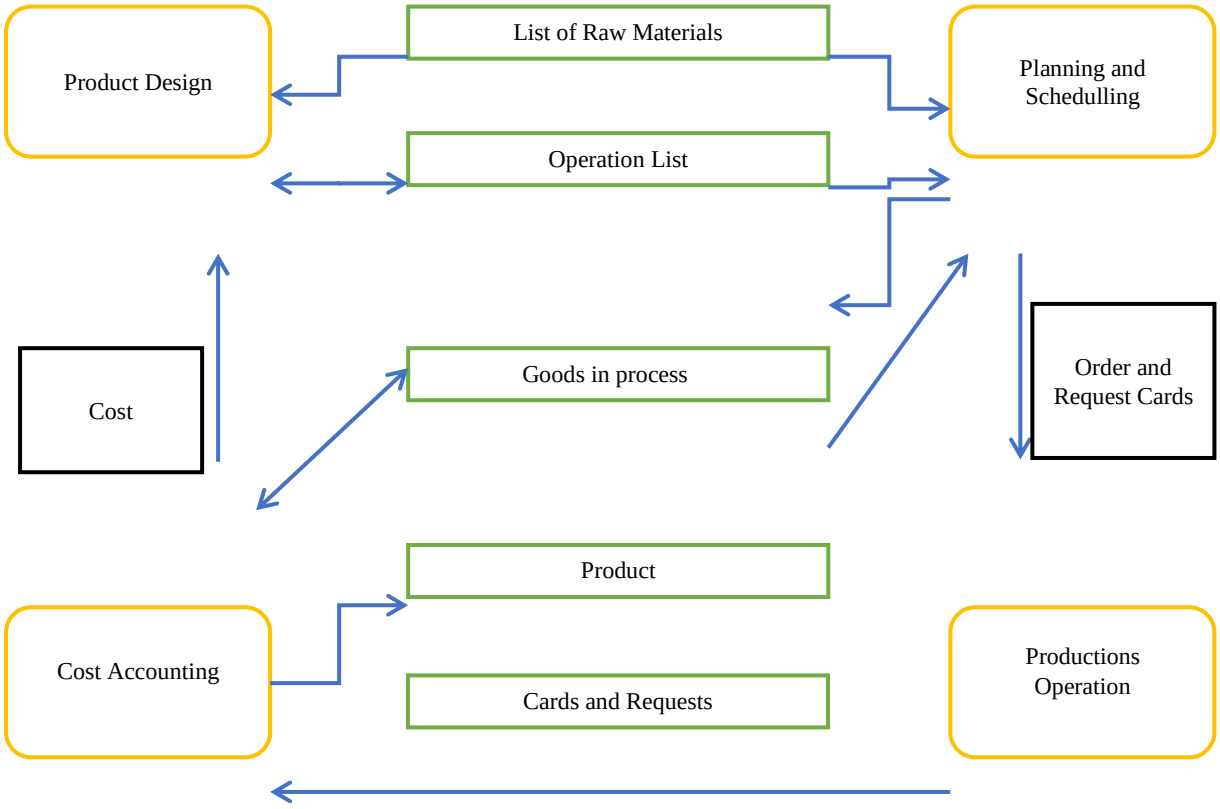
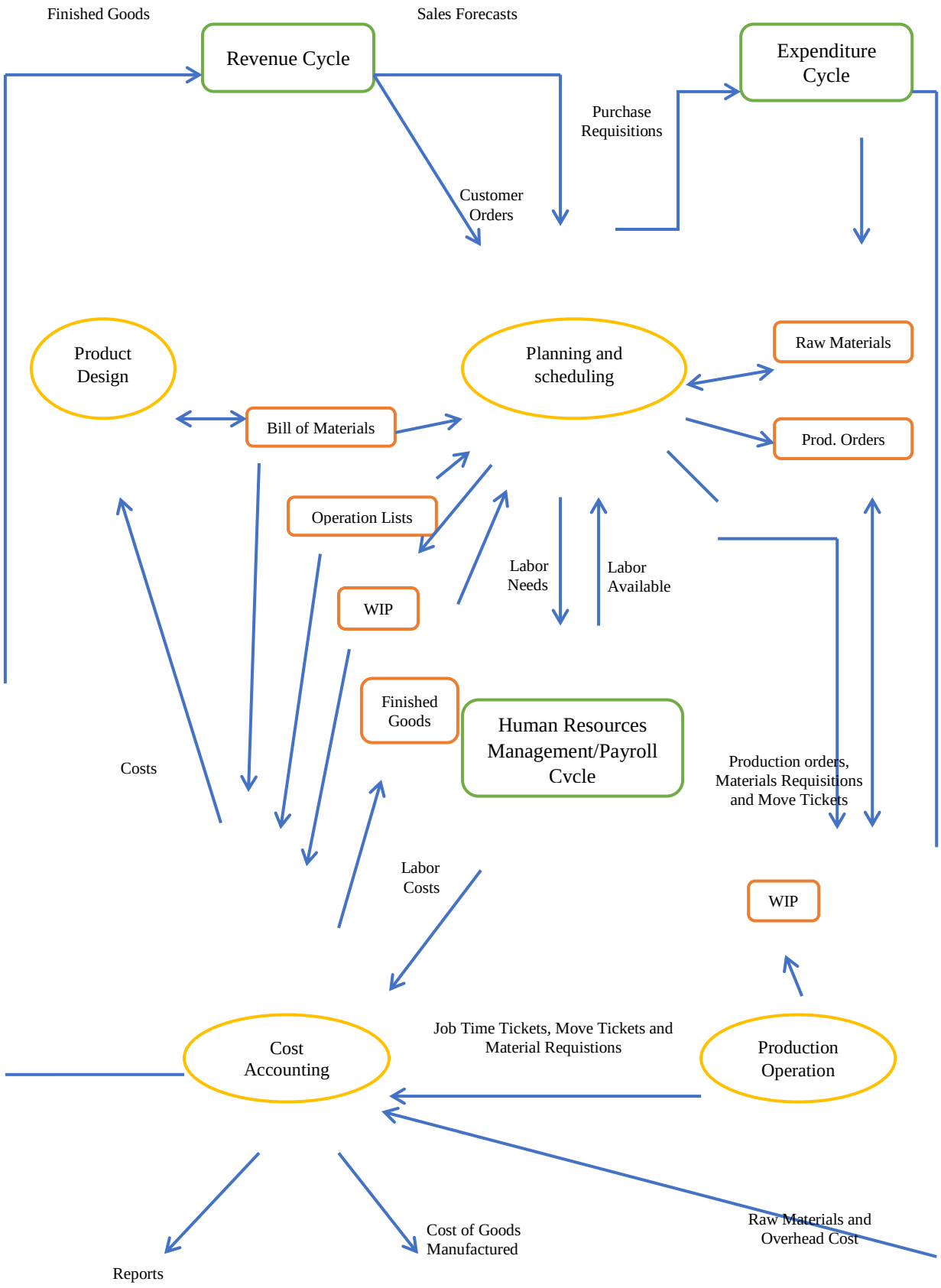


Figure 2. Digital Production Cycle Data Flow Diagram Level 0



It can be seen from Figures 1 and 2 that there are differences in traditional and digital DFD production cycles. In summary, when viewed, the traditional DFD production cycle is simpler and more concise and only describes its needs in carrying out the four main activities. However, if seen from the digital production cycle, a lot of data and output information is provided. The revenue cycle information system provides information (sales orders and sales forecasts) that is used to plan production and inventory levels. In contrast, a production cycle information system sends information to the revenue cycle about finished goods that have been manufactured and are available for sale. information about finished goods that have been manufactured and are available for sale. Information regarding raw material requirements is sent to the expenditure cycle information system in the form of a purchase requisition. Instead, the expenditure cycle system provides information about the acquisition of raw materials as well as about other expenses that are included in factory overhead. Information regarding the workforce needed will be sent to the human resource cycle, which will then provide data regarding the cost and availability of labor. Finally, information regarding the cost of sales will be sent to the general ledger and reporting system. As a result of having more information about specific cycles and parts, system integration in the production cycle will be more integrated and clear.

Traditional and digital comparisons can also be seen in the cost accounting system, which is the last and most important activity in the production cycle. The purpose of the cost accounting system in the production cycle is produce data for planning, controlling, and assessing production performance; produce precise cost data to serve as a foundation for pricing and judgments on the product composition (mix); and produce data to compute the value of inventories and the cost of goods sold. The types of cost accounting systems commonly used by a company are job order costing systems and process costing systems, and the reports produced by the cost accounting system are generally in the form of control report and production cost report. Accounting records maintained in the cost accounting system are divided into two categories: If a company processes cost data manually (a non-computerized record), service and manufacturing companies use a production cost ledger, which functions as a subsidiary card for product inventory accounts in processes; if the company uses an order costing system, this record is created on one page for each order. If the company employs a process costing system, this record is created on a separate page for each cost center. To record the information in these records, archives of production orders are used. If the company processes cost data using digital, then the report included master file and transaction file. Overall, the production cycle process is digitally better than traditional, due to additional data and output information as well as processing that is faster and more integrated with other cycle subsystems in the accounting information system.

Procedures for Implementing Internal Controls that Enable Cost Savings in Dealing with Threats in the cycle

A well designed AIS should offer sufficient controls during the production cycle (or any cycle) to ensure that each of the following goals is achieved: assets are protected from loss or theft; business activities are carried out successfully and efficiently; the organization complies with all applicable laws. The risk of inaccurate master data is the main problem with the production cycle. Businesses need to manage their master data changes, restrict access, and manage their data processing integrity controls in order to deal with this. Another problem is that confidential information is frequently disclosed without authorization. In order to combat it, businesses should manage access controls and encrypt data. One of the common problems in the manufacturing cycle is the loss or deletion of data. By performing a backup and disaster recovery strategy, this can be managed internally.

Different internal control solutions are used for each activity in the production cycle to give a way for the business to save expenses on the hazards that exist in this cycle. The steps for putting in place regulations that could lowering the price of addressing threats are as follows:

1) Product Design

Threat: Poor Design

In response to this concern, internal controls are being put in place to list more precise component data and analyze warranty and repair costs. Companies can also enter accurate information about how product design affects expenses as well as comprehensive information about warranty and service costs.

2) Planning and Scheduling

a) Threat: Over- or Under-Production.

For this threat, control needed for proper authorisation of production orders, access to production scheduling programs, investment in production planning, gathering of production performance data, accurate sales projections and inventory data, and validity checks on production orders are all necessary.

b) Threat: Investments that are not optimal in Fixed Assets.

As for this issue, firms have to carefully analyzed investments that are not optimal in Fixed Assets and see more into the bidding that is competitive and safe for fixed asset deals.

3) Production Operation

a) Threat: Inventory and Fixed Assets Theft

In order to lessen this issue, companies have to make physical access restrictions, records of internal inventory movements, appropriately authorized material requests, RFID tags, and bar codes, as well as segregation of duties, logical and physical access controls, independent inventory counts, identification and recording of fixed assets, management responsibility, physical security, disposal authorization, fixed asset reports, and adequate insurance, are all examples of controls that must be in place.

b) Threat: Operational Disruption

Firms can managed their resource reserved and proceed with suppliers who are prepared for emergencies.

4) Cost Accounting

Threat: Inaccurate recording data and production activities

For this threat, firms can do internal control such as make a Bar code, RFID, and badge readers for data recording automation, set an online data entry terminals, set up a logical access restrictions, input validation procedures, do a periodic physical inventory counts, inspections and counts of fixed assets.

Apart from these threats accordingly to it's activites, production cycle also get another general issues such unauthorized loss, alteration or disclosure of data. But companies can alter this with a good internal control such as making logical access controls, adjusting the default ERP settings, backup files, external and internal file labeling, encryption, and message acknowledgment methods. Another issue is that there can be a poor company's performance, but this can be managed with making a performance report.

Discussion of internal control and cost reduction is equally relevant to the industrial sector. Total quality management must be the main priority in a manufacturing environment. Managers require data on the degree of damage, the frequency of breakdowns, the proportion of finished goods that must be reworked, and the proportion of customer-reported defects. Overhead costs are inappropriately allocated to products, and reports do not accurately reflect the impact of factory automation because the analysis of production performance is less thorough and ignores non-financial aspects. These are the two main criticisms leveled at traditional cost accounting systems for their inability to provide accurate cost information for the benefit of production management. Some of these objections are addressed by Activity-Based Costing (ABC). The ABC technique and the conventional approach have three key distinctions in common. First, tracing of overhead expenses: ABC more directly and comprehensively links the costs of overhead to the products. ABC is able to deliver more precise Cost of Goods Manufactured data because to this tracing. Second, number of cost pools: ABC employs cost pools to tally overhead expenses, separating them into batch-related, product-related, and corporate overhead expenditures.

From this second approach, ABC can be diffirentiate into three ways i.e. a) Batch related: Examples of expenditures associated with batch handling, inspection, and material preparation. The ABC System gathers these expenses into a single batch and then distributes them across the units created in that batch. Large-scale production hence results in cheaper batch-related overhead costs per unit than small-scale production; b) Product related: The variety of the company's product line is related to these costs, examples include forwarding, shipping and receiving, environmental laws, and purchasing and when possible, the ABC system tries to assign some costs to particular products; and c) Companywide Overhead: Costs like rent or property taxes fall under the heading of general overhead for the entire company. All products are subject to this price. As a result, an ABC system usually distributes them based on factory or departmental rates. Third, Identification of cost drivers. Cost drives generally fall into one of three categories. Volume: cost factors are dependent on work units (eg, number of orders.) As more units are processed, the activity's cost rises. Time: The cost driver for an activity is determined by how long it takes to execute it. Depending on how much time is required to perform the activity, the cost will rise. The quantity of products produced is irrelevant (eg, during machine re-equipment, the cost driver is the length of time it takes to complete machine re-equipment). Charge: The cost for each activity is immediately assigned to the product cost (for example, all costs associated with retooling a machine for a product are assigned directly to the final product).

Conclusion

Traditional AIS is still done manually, while digitization-based AIS is done using software and can run automatically. Digital AIS really helps companies in carrying out their production cycle, by using a digital system the company's production activities can run easily and quickly. Traditional AIS stores data using paper or book media which can take a long time, requires physical space in data storage and can cause recording errors, while digital AIS stores data in an organized manner so as to minimize errors in recording and does not require physical space for recording data storage. However, digital AIS has weaknesses. When technical problems such as software crashes or systems that don't work, this can still be minimized by carrying out regular maintenance of this digital AIS system. Digital AIS can quickly present the information needed by the company related to the company's production cycle.

AIS is designed to offer an internal control system related to the production cycle with the aim of protecting assets from loss and theft as well as managing data processing integrity controls and limiting system users to prevent leakage of company confidential information. In the production cycle there are common problems that often occur such as loss, alteration and unauthorized disclosure of data, with internal control the company can control logical access by making ERP default settings, backup files, labeling internal and external files.

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