Benefits of Computerized Accounting Information Systems on the JIT Production Systems

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Abstract

Advancements in information technology (IT) have enabled companies to use computers to carry out their activities that were previously performed manually. Accounting systems that were previously performed manually can now be performed with the help of computers. Therefore, improvements in the information technology have facilitated the use of cost and management accounting procedures. On the other hand, most of the companies have started to apply just-in-time (JIT) production system as a tool to become competitive. Companies applying JIT production system aim at minimizing all inventory levels and delivering the goods and services to customers on time. In this sense, use of IT has also helped companies apply JIT production system more effectively. The aim of this paper is to identify how improvements in IT have influenced accounting systems. More importantly, this paper will also focus on examining the benefits of information technology for companies applying JIT production system.

KeyWords: Information technology, Just in Time, Computerized Accounting.

Özet

Bilişim teknolojilerindeki ilerlemeler, işletmeleri daha önce elle yaptıkları faaliyetleri bilgisayarlar yardımıyla yapmalarını sağlamıştır. Daha önce elle tutulan muhasebe kayıtları da artık bilgisayarlar yardımıyla tutulmaktadır. Bu sayede, bilişim teknolojilerindeki gelişmeler maliyet ve yönetim muhasebesi süreçlerini kolaylaştırmışlardır. Diğer taraftan, işletmeler sıfır stokla üretim (JIT) felsefesini uygulamaya çalışarak rekabet güçlerini artırmak istemektedirler. JIT felsefesini uygulayan işletmeler temel olarak her türlü stok seviyelerini ve müşteriye ürün teslim sürelerini azaltmaya çalışmaktadırlar. Bu anlamda bilişim teknolojileri işletmelere JIT felsefesini daha verimli bir şekilde uygulamakta yardımcı olmaktadır. Bu çalışmanın temel amacı bilişim teknolojilerinde ortaya çıkan gelişmelerin muhasebe sistemlerini nasıl etkilediğini açıklamaktır. Daha da önemlisi bu çalışma JIT felsefesini uygulayan işletmeler için bilişim teknolojilerinin yararlarını ortaya koymaya çalışacaktır.

Anahtar Kelimeler: Bilişim Teknolojileri, Sıfır Stokla Üretim (JIT), Bilgisayarlı Muhasebe.

1. Introduction

The ongoing revolution in information technology (IT) has had a significant influence on accounting information system (AIS). Improvements in the IT have brought improvements in computers. Today, almost all organizations are using computers in

their daily businesses. As computers become smaller, faster, easier to use, and less expensive, the computerization of accounting work will continue. Accounting activities that were previously performed manually can now be performed with the use of computers. That is, accountants are now able to perform their activities more effectively and efficiently than before.

On the other hand, many companies are now applying JIT production system in order to be able to provide their customers with goods and services on time, and minimize all kinds of inventories in order to minimize the inventory-related costs. Use of computers by cost/management accountants will help them facilitate the use of JIT production system. The aim of this paper is to analyze the effects of improvements in IT on accounting information system. Also the use of computers by management accountants as an effective tool to apply JIT production system will be examined.

In the first section of this paper, information system will be explained. In the second, effect of advancement in IT accounting information system will be identified. In the third part, JIT production system will be explained. The last part, effect of computerized AIS on JIT production system will be examined.

2. Information Systems in General

An information system is an organized means of collecting, entering, and processing data and storing, managing, controlling, and reporting information so that an organization can achieve its objectives and goals (Romney et al., 1997:18). This definition of information system shows that an information system has following components.

Goals and objectives. Every information system is designed to accomplish one or more goals or objectives. For example, an information system may be designed to collect and process data about employees to help managers prepare payroll reports.

Inputs. Data must be entered into the information system to be processed. Data are the facts that are collected and processed by the information system. Data are meaningless and useless, which, therefore, should be processed and transformed to meaningful, organized, and useful form that is called information.

Output. Output is the meaningful and useful information produced by the information system. For example, weekly payroll report produced by the information system is an output.

Data storage. In addition to the external data entered into the information system, there should be internally stored data used for processing.

Processors. In order to produce useful and meaningful information, data must be processed. Most companies process data by using computers.

Instructions and Procedures. An information system produces data by the following instructions and procedures. In computerized information systems, software includes procedures and instructions that direct computers to process the data.

Users. Users are people who use the information produced by the system and who interacts with the system. For example, managers who use financial statements that are produced by an accounting information system are the users of the information system.

Control Measures. To make the system produce correct and error free information, necessary measures should be taken to protect and control the information system.

Any system that includes the above components is known as an information system. The following section will show how accounting systems are established using these components.

3. Accounting information system (AIS)

Accounting is the service function that seeks to provide the users with quantitative information. On the other hand, AIS is an information system that is designed to make the accomplishment of accounting function possible. AIS processes data and transactions to provide users with the information they need to plan, control, and operate their businesses (Romney et al., 1997:2).

An accounting information system can be a manual system, or a computerized system using computers. Regardless of the type, AIS is designed to collect, enter, process, store, and report data and information. The following paragraphs explain AIS in detail.

3.1. Computerized Accounting Information Systems

Along with the improvements in the technology, information systems have been computerized. Improvements in this technology have replaced manual bookkeeping systems with computerized ones. The revolution in the information systems, which started in the early 1950s when the first business computers became available, is still in progress (Nash, 1989: 5). Large mainframe computers have been replaced by small and fast personal computers at lower costs. As a result, accounting information systems that were previously performed manually are now performed by computers in most companies.

Companies can now capture, process, store, and transmit data with the help of computers. Whereas data collections and processing were performed manually in historical systems, on-line collection and processing of data are performed by computerized systems (Grabski and Marsh, 1994: 63).

In manual accounting information systems, processing of data is slow and subject to error. Fortunately, improvements in the technology have enabled companies to collect, process, and retrieve data quickly. In addition, there is less likelihood for error when data are processed with computers. In this case, functions of manual AIS that were explained in the preceding section, can be explained for computerized AIS as follows:

Data input function: In manual AIS, the data are captured with the source documents and directly processed in journals and transferred to ledger accounts. On the other hand, in computerized AIS, after data are captured, they should be converted into machine-readable form. In most computerized AIS, source data automation devices that capture data at the time and place of their origins are used. For example, bar code scanners used in retail stores can record the sale transaction just as scanning devices read the codes located on the products.

In addition to the data scanned into the computer, there are existing data bases that contain the stored data for future processing. A database includes information about entities. An entity is something about which information is stored. For example, information about existing customers is stored in databases. In this case, customers represent entities. Information about customers such as account number, credit limit, and current balance of the customer can be stored in the database.

Master files are used to store data about entities in databases in an computerized AIS. Master files have replaced the subsidiary ledgers that are used in manual systems. For example, records in accounts receivable master file include customer name, customer account number, address, and balance due. Master files are frequently updated as transactions are taking place. For example, as sales are made or receivables are collected, accounts receivable master files are changed.

In addition to the accounts receivable master file, master files are kept for all other balance sheet and income statement items such as accounts payable, fixed assets and expenses. In computerized AIS, relational tables can be used to establish master files (Murthy and Wiggins, 1993:98). Another concept in accounting is relational tables which are the tables that include detailed information for every entity. For example, following table represents a relational table for sales:
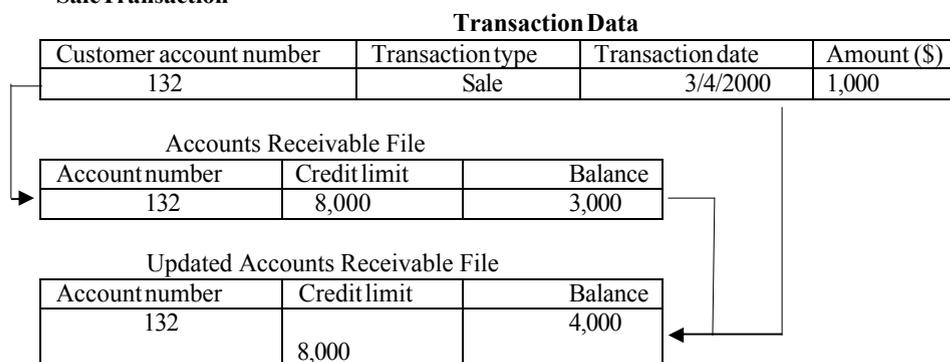
Table 1: Relational Table For Sales

SALES				
Sales invoice #	Date	Salesperson	Customer number	Invoice total ($)
101	2/8/2000	James Boby	156	2,000
102	3/8/2000	John Tony	157	1,000
103	9/8/2000	B. Toy	158	1,500

As seen from the above table, the relational tables show details for every entity. For example, sales file shows customer (account) numbers, invoice total, and date of sale.

Data processing: After the data are collected and entered into computers, they are processed. The most common data processing activity is data maintenance. Data maintenance is the processing of transactions to update stored data. For example, when sales transaction takes place, data are entered into the computer. In turn, computer immediately updates sales and accounts receivable files.

In computerized systems, records are updated by using primary keys that uniquely identifies each record. For example, when a sales transaction takes place, related customer file should be updated. In order to find related customer master file, customer account number can be used as the primary key because every customer has unique customer account number. In other words, it is not possible that two or more customers have common customer account number. Following example shows how a customer file is updated as a result of a credit sale transaction:

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Exhibit 1: Process By Which AIS Updates Customer File As a Result Of SaleTransaction

Transaction Data

Customer account number	Transaction type	Transaction date	Amount ($)
132	Sale	3/4/2000	1,000

Accounts Receivable File

Account number	Credit limit	Balance
132	8,000	3,000

Updated Accounts Receivable File

Account number	Credit limit	Balance
132	8,000	4,000

As seen above, when a credit sale is made to a customer, computer searches for the related customer in the accounts receivable file via customer account number. In this case, there is no chance to go to wrong customer because every customer has unique customer account number. When the desired customer is found, amount in the current balance column is updated.

Information output: After the data are entered into the computer and processed, information output is produced to meet the needs of the users. Information is presented in three forms: a document, a report, or a response to a query. Documents are records of transactions or company data such as invoices. These documents can be printed out using printers. In addition, they can be stored as electronic images in the computer databases.

Reports are prepared for internal and external users. For example, to meet the needs of external users such as creditors, financial statements should be prepared. In addition, computers can be programmed to display financial information automatically in a required form such as spreadsheets. Today, electronic communication systems enable companies to transmit financial reports to the users electronically. This, of course, eliminates paper work and reduces costs. In addition to the reports produced for the needs of external users, reports can also be produced to meet the needs of the internal users such as managers.

Sometimes, documents and periodic reports may not be enough to meet the needs of the users. If unexpected problems arise, managers can enter the system and query the information they need. A user enters a request into the computer to get the information, and the computer performs necessary tasks to solicit the required information. Once found, the information is retrieved and analyzed by the user.

In a manual AIS, transactions are first recorded in journals and then they are posted to ledger accounts. At the end of each accounting period, financial statements are prepared by using the ending balances of ledger accounts. On the other hand, in a computerized AIS, all the information is gathered in relational tables. In this case, financial statements can be prepared at any time by entering necessary commands into the computer.

3.2. Software Tools in the Accounting Process

This section includes the most-frequently used software tools and their most appropriate use. Accountants must be familiar with the software tools because they help the users perform the accounting functions more effectively and efficiently.

Accounting software. This software contains the basic accounting functions such as input, processing and output. There are two classifications of accounting software as low-end and high-end. Low-end is all-in-one software, which means all of the functions of accounting system are performed within one software. Therefore, low-end software is used for small companies. On the other hand, in high-end software, each accounting function comes in a separate module. Each module checks data for correctness, processes it, and updates all relevant accounts, and finally, produces outputs such as documents and reports.

Personal computer (PC)-based accounting software allows companies to computerize their manual systems and to provide better and timely information. In addition, PCs have been connected to another PCs via networks. This allows companies to process indefinite number of transactions occurring at different locations simultaneously within several minutes.

Income tax. Because tax laws are frequently changing, it is becoming exceedingly difficult to deal with them. Therefore, manual tax preparation is becoming more and more difficult and time consuming. Fortunately, tax preparation software is currently available for companies. Therefore, instead of processing tax manually, companies can use computer software to perform the same functions. As a result, even complex calculations can be performed via computers in a short period of time.

Audit. Information technology has also computerized the auditing profession. If auditors perform auditing functions manually, it takes time. However, audit software packages are currently available for auditors. For example, trial balance software enables auditors to input the working trial balance, handle all types of adjusting entries, and automatically compute the adjusted trial balance. In addition, software package can access customer's files, select a statistical sample of the accounts, and print a working paper sheet. Auditors have used personal computers to reduce their costs significantly.

Word processing. Word processing is computer-assisted creation, editing, correcting, manipulation, storage, and printing of textual data (Romney et al., 1997: 246). Accountants use word processing software to prepare reports, billings, memos, and financial statements.

Graphics software. Graphics can be prepared using graphics software. Graphics can be printed on paper or displayed on slides, transparencies, and photos. Many auditors and managerial accountants use the graphics software to graph the data in financial statements and reports.

Image processing. Creating, storing, and updating paper forms of documents take time. In addition, it is very costly to process and store documents. Fortunately, these costs can be eliminated with the help of document imaging systems. Image processing captures electronic image of data so that it can be stored and shared. With the help of document imaging, accountants can scan paper documents into the computer and process all of the files electronically. Companies that use document imaging are moving toward paperless offices.

Electronic data interchange (EDI). Electronic data interchange enables companies to communicate with each other electronically. Therefore, EDI enables companies to exchange documents electronically with each other. For example, computerized network enables purchaser and the supplier to exchange purchase orders and invoices electronically in the form of images.

Electronic funds transfer (EFT). Companies can now connect to banks through EFT. This system enables companies to make payment and collection electronically. In this case, when company wants to pay for accounts payable to a supplier, it can do it via EFT. Furthermore, whenever company makes sales, transactions are immediately charged to consumer's bank account and simultaneously credited to company's account. In addition, all relevant accounts such as accounts receivable and cash are updated immediately by the computerized system.

The use of the computerized systems mentioned above has led to the automation of accounting information system. Accounting information systems equipped with these kinds of technologically advanced tools can now perform accounting functions more effectively and reduce costs.

4. Just-in-Time Production System

In recent years, some manufacturing businesses have tried to eliminate the need to hold stocks by adopting JIT. This method was first used in the US defense industry during Word War II and, in more recent times, it has been widely used by Japanese businesses (Atrill and McLaney, 2002:242). The essence of JIT philosophy is to eliminate waste. Managers try to (1) reduce the time that products spend in the production process and (2) eliminate the time that products spend on activities that do not add value (Horngren et al., 2002:23). Just in time (JIT) refers to a system in which materials arrive at the right place (i.e., factory floor) exactly as they are needed. Demand drives the procurement of materials and production of the product. A key element of JIT is the production. JIT production is a system in which each component on a production line is produced immediately as needed by the next step in the production line (Horngren et.al., 2002:706). In other words, in a JIT setting, demand triggers each step of the production process, starting with customer demand for a finished product at the end of the process and working all the way back to the demand for direct material at the beginning of the process (Horngren et.al., 2000: 726).

4.1. Necessary Tools for JIT Implementation

A JIT production system, as explained above, aims at minimizing work-in-process and finished-goods inventories, reducing lead-time, and increasing product quality. In order to achieve these by implementing a JIT manufacturing system, the

following aspects should be put into consideration and then operation (Hilton, 2001: 207; Horngren et.al., 1999:735; Hilton, 2000:462, Horngren et al., 2002:706).

a. Pull Method

JIT production system is based on pull method. As final products are produced only when they are demanded, operators will not put materials and components into production unless they are required. Therefore, parts and components that are produced by any operator should not be produced until the next operator demands them.

When customer demands the product, production centers begin to produce the parts required by the following divisions in sequence. Under the pull method, goods are produced in each manufacturing stage only as they are needed. When additional materials and parts are needed for final assembly, a message is sent to the preceding work center immediately to send the amount of materials that will be needed over the next few hours. Often, this message is in the form of withdrawal kanban, a card that describes a part number, a quantity of parts, where parts are from, where the parts are to be delivered.

b. Establishing Reliable Relationships With Few Suppliers

If any company wants to establish JIT production system, supplier must be able to provide raw materials on time because in JIT setting, there is no allowance for the stoppage resulting from the lack of raw materials (Atkinson et.al, 2001:242). If any stoppage occurs, company will not be able to offer the product to customers on time. In other words, lead-time will be longer. Furthermore, waste will increase because of shutdown of the production line. Therefore, successful JIT production depends largely on working with cooperative and reliable suppliers.

c. Standard Work Concepts

Standard work is one of the most comprehensive and powerful tools found in JIT (DeLuzio,1993:15). Standardization is achieved when all the tasks necessary to perform the production process are made uniform. Once the procedure is standardized, there will be no variation in the process. Therefore, a work procedure must define every detail as clearly as possible. Otherwise, if the procedure is not made clear, each operator will perform the task in a way he likes.

If the work procedure is made clear, the worker will make high-quality parts with less variation (DeLuzio, 1993:16). Then the workers are able to finish products in shorter time because work is done in a standard sequential way. Also, if the procedure is standardized, the worker does not face any confusion because there is a known and fixed way of performing the job. Thus, any worker can carry out the task. This helps managers substitute the absent operator with the existing one to perform the task in case of employee absence. Therefore, possibility of delay caused by the absence of the operators is eliminated and products can be produced in the planned way.

d. Creating a Clean, Orderly Work Environment

In a JIT work environment, production flow must be smooth. In other words, production should be done in standardized way without variation. Also, work-in-process

inventory should be moved smoothly in the production area because it is desired that production process be completed on time.

In JIT environment, tools used in production should be put in order, and machinery and the work place should be clean (Hayes, 1981:59). In a JIT environment, materials move through the factory very quickly in response to signals from the pull control system. Therefore, the work environment should be organized in a way that allows the movement of materials without any difficulty. In addition, the workers should be able to reach the tools and other materials easily without spending too much time. If work place is clean and tidy, and everything is in order, there will be no chance for the occurrence of delay because tasks can be performed without any waste of time.

e. High-quality finished products
In a JIT production system, finished-goods inventory is kept at minimum level. To achieve this, products that are produced in the system must be of uniform quality. Thus, a total quality control program should be applied in the JIT setting. In this case, everybody should be responsible for the quality of the final product. So, everybody in the organization should seek ways to continuously improve the production system.

In a JIT environment, everybody focuses on continuous improvement in order to prevent problems from taking place, and shutting down the production line that may then cause delay in offering the product on time. One division should provide the coming division with defect-free work-in-process so that there will be no rework and wasted time through the production process. Effective quality-control programs also help minimize work-in-process inventories because there is no need to establish huge buffer inventories to prevent the plant from disruptions that would be caused by poor quality. In other words, if company guarantees that all raw materials and work-in-process are of high quality, then it can ensure that there will be no problem caused by poor quality. Automation of AIS is facilitating the application of JIT production system. In the following section, it is explained how improvements in IT can help managers in implementing a JIT production system.

5. Computerized AIS and JIT Production System
As explained in the preceding section, JIT production system aims at producing the products just in time so that the inventory levels can be minimized. Thus, raw materials should be purchased without a delay. In other words, when a need arises for production, merchandise or raw materials should be ordered and received immediately.

In addition, when goods are finished, they should be sent to the customers as soon as possible because under a JIT production system, finished-goods inventory should not wait in the inventory. When JIT process is applied, organizations can maintain less storeroom inventory and thereby reduce storage costs (McBride et.al., 2000:34). Accounting systems are undergoing change to suit the needs of new manufacturing environments (O'Brien and Sivaramakrishnan, 1996: 152). Therefore, AIS should be modified to facilitate the application of a JIT production system. Transformation of manual AIS into computerized AIS can facilitate the application of JIT production system. In the following sections, it is identified how the use of computerized AIS facilitates JIT production system and brings about cost and time savings:

a. Use of electronic purchase systems helps the company set up effective connection and communication with suppliers: In a JIT production system, purchasing is critical to the success of the business operations. For JIT to be effective, there should be a cooperative relationships with suppliers (Miller and Kelle, 1998:25). To make JIT work, all players need to communicate their needs better (Milligan, 1999:41). Using the electronic communications network with suppliers, companies can order raw materials or merchandise. For example, companies may employ on-line databases with catalogs connected to the suppliers' computers. In this case, the only thing an officer has to do is a click on the related icons to select the requested merchandise or materials; then select the quantity; and finally send the order to the manager for approval with another click of the mouse. Approved orders are sent to vendors via network. All a manager has to do is to go on suppliers' Web sites and place an order (Trunk, 2000: 57).

The purchase of the merchandise or raw materials is initiated by a purchase requisition. Fortunately, electronic documentation reduces the cost and time required to process the purchase requisitions. The use of on-line processing systems linking purchasing and production gives accurate and timely perpetual inventory records. In this case, computer can be programmed to keep track of the inventory levels and automatically generate purchase requisitions when quantity on hand falls below the reorder point. When the purchase requisitions are approved, purchase orders should be transmitted to vendors via electronic data interchange (EDI).

The use of EDI reduces the time between recognizing the need for the item and receiving it. Transmitting the purchase orders via EDI reduces the costs by eliminating printing and mailing paper documents. In addition, the risk of running out of stock is lessened. Therefore, the use of electronic commerce supports the application of JIT production system (Borthick, 1996: 102).

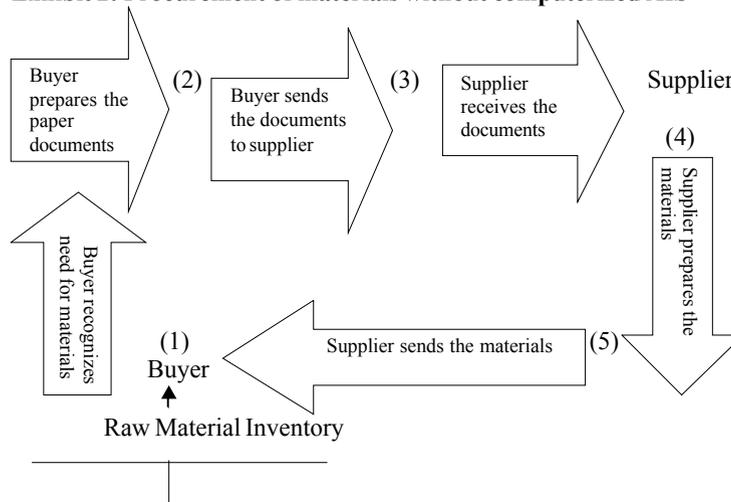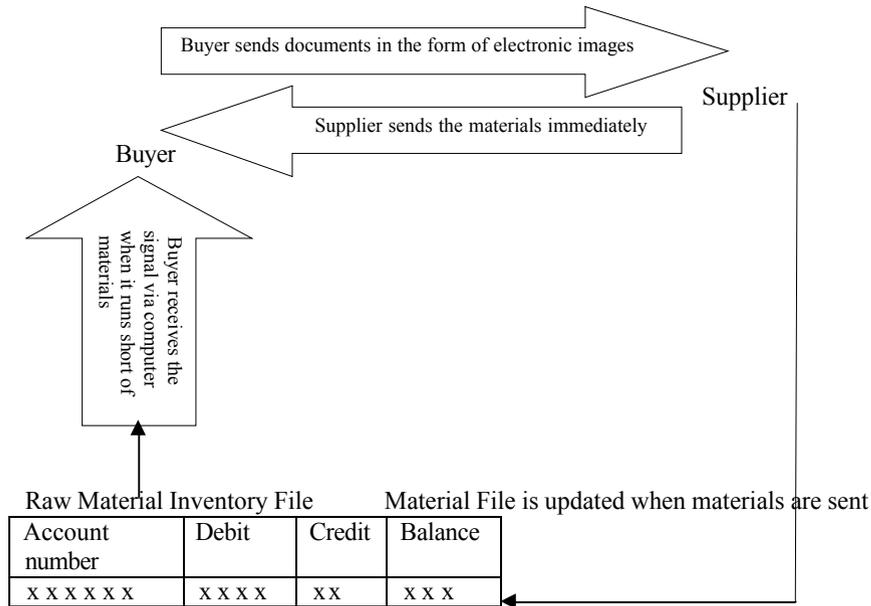**Exhibit 2: Procurement of materials without computerized AIS**

Exhibit 3: Procurement of materials with computerized AIS

Buyer sends documents in the form of electronic images

Supplier

Supplier sends the materials immediately

Buyer

Buyer receives the signal via computer when it runs short of materials

Raw Material Inventory File   Material File is updated when materials are sent

Account number	Debit	Credit	Balance
x x x x x x	x x x x	x x	x x x

As can be seen in the above schedule, procurement of materials requires considerable time without computerized AIS. On the other hand, buyer can receive the materials within a very short period of time with the help of computerized AIS because all of the documents are sent and received in the form of electronic images. In addition, all of the costs associated with processing, signing and mailing documents are eliminated. Therefore, significant time and cost savings can be achieved.

b. The computerized AIS that use electronic selling systems help companies offer the products to customers within the shortest time available, as well as, the computerized AIS helps companies reduce the amount of time finished-goods inventory waited in stock: When customer orders a product, inventory should be checked in order to determine whether there is an adequate amount of inventory on hand to meet the demand. If there is no sufficient amount of inventory on hand, a signal to produce required amount of inventory is sent to the production department. Also, customer's credit status is checked to find out whether the customer's credit limit permits the sale. In manual accounting systems in which all activities related to sales are performed manually on paper documents, processing of sales transactions requires considerable time. Not only does this cause significant costs, it also causes late distribution of finished-products to the customers. Therefore, switching to on-line processing of sales orders via computers will lead to significant time and cost savings for companies.

If sales staff is equipped with portable computers, they can immediately perform the transactions related to sales. When an order is received, they can immediately let the customers know whether there is a sufficient amount of inventory to meet the demand. In addition, network connections can be established with customers so that customer's inventory can be replenished immediately when customer runs out of stock.

While replenishing the stocks, the computer system performs all accounting records immediately. In this case, when customer is about to run out of stock, network system sends a signal to company's production department to make the production of the required products. Then, production is made and finished products are sent to the customer. Also, the computerized accounting system makes the necessary accounting entries in the inventory and accounts payable records.

Furthermore, IT can be used to facilitate shipping and warehousing procedures. An automated warehouse systems consisting of computers and bar-code scanners can reduce the time and cost of moving inventory out of the warehouse. For example, forklifts may be equipped with radio frequency data communication (RFDC) terminals to provide drivers with information about which items to pick next and where they are located. Once picked, items are run through a bar-code scanner. This procedure provides real-time and accurate recording of movements of the inventory, which is essential for the perpetual inventory systems. Data communication terminals keep track of the inventory records as well. Thus, time-consuming manual work is eliminated.

Levi Strauss & Company's advanced warehousing system uses bar-code scanners on conveyor belts to route jeans and shirts so that they can be packed and shipped to customers in matched sets. Customers are also sent an electronic packing slip indicating the size, style, and colors of clothing in the pending shipments. The cartons are then bar-coded so that retailers' bar-code readers read the bar-code and inflow of inventory is recorded immediately. Therefore, manual accounting process for recording inflow of inventory is eliminated because computers perform the same tasks now.

Some companies may prefer not to send the finished goods to customers until they receive cash from them. Therefore, they prepare invoices, send them to customers, and receive the cash. It takes time when companies perform these processes manually. The problem is that the finished-goods wait in the inventory until company receives the cash. If companies switch to on-line invoice processing, they can be print as soon as a notification is received from the shipping department that the order has been shipped. Once the invoices are prepared, they are sent to customers using electronic data interchange equipments. The use of EDI leads to quicker billing. In addition, costs are reduced because paper processing is eliminated. When electronic images of bills are sent to customers, system immediately makes necessary changes in related customer accounts. In addition, digital images of customer bills are stored in the computers. Thus, accountants can easily enter the computer and retrieve necessary information when needed. In manual systems, customer payment may be subject to a delay because of the mail system, and time between when the checks are deposited and when the bank makes those funds available to the company. EFT provides an opportunity for customers to send their payments electronically to the company's bank account. Therefore, the use of EFT eliminates the delay associated with the time when a remittance is in the mail
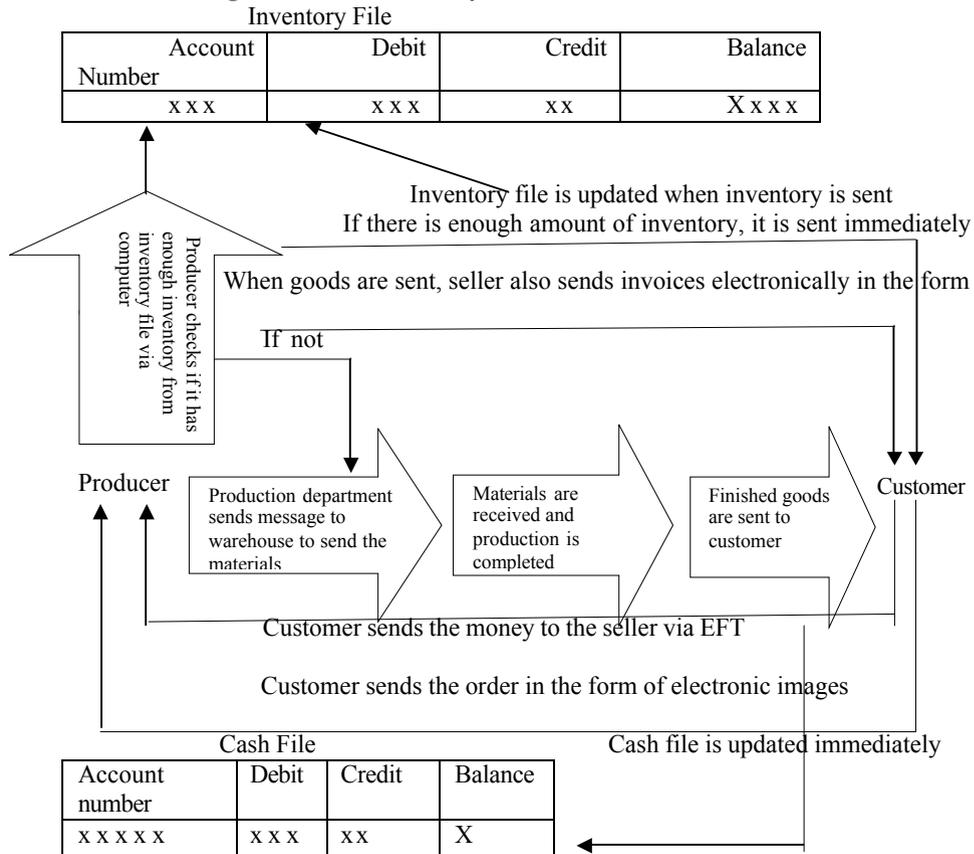
system. It also reduces the time lag before the bank makes the deposited funds available to the company in case of checks are cleared in the banking system.

Many retail merchants are tied into the banking network thorough point-of-sale terminals and personal computers. In this system, all sales transactions are immediately charged to consumer's account and credited to the merchants account. Therefore, cash receipts are handled electronically rather than by check.

As a result, computerized systems confirms the availability of inventory, approves customer credit, enters the order into the system, updates the finished goods inventory file, and posts the invoice to an on-line accounts receivable ledger. The system initiates the delivery by transmitting the shipping order to the closest warehouse electronically. In addition, a sales file is updated as orders are placed. When cash is deposited, cash, accounts receivable, and inventory files are updated. In this case, data are entered once, and all accounting records affected by the data and all documents necessary for processing the transaction are updated.

All of these applications enable to move the finished-goods out of the warehouse to customers as soon as possible. In this case, all the costs related with storage of inventory are minimized. Therefore, the use of information technology makes it easier to apply JIT production system. All of these explanations can be clarified with the help of following schedule:

Exhibit 4: Process By Which Computerized AIS Handles Transactions Related With Ordering and Sale Of Inventory

Inventory File

Account Number	Debit	Credit	Balance
x x x	x x x	x x	X x x x

Producer checks if it has enough inventory from inventory file via computer

Inventory file is updated when inventory is sent

If there is enough amount of inventory, it is sent immediately

When goods are sent, seller also sends invoices electronically in the form

If not

Producer

Production department sends message to warehouse to send the materials	Materials are received and production is completed	Finished goods are sent to customer	Customer

Customer sends the money to the seller via EFT

Customer sends the order in the form of electronic images

Cash File

Cash file is updated immediately

Account number	Debit	Credit	Balance
x x x x x	x x x	x x	X

d. The computerized AIS facilitates the application of pull method: Automating production procedures facilitate the application of a JIT production system. Sequential processes in the production system can be connected via electronic data interchange systems to exchange information on a timely basis. Assembly department can be connected with the warehouse electronically. The computerized AIS can keep track of raw materials on hand in the manufacturing area and automatically sends an order to the warehouse when these materials are needed. In addition, the computerized AIS can update related accounts quickly. For example, when raw materials are sent from a warehouse to a production department, the computer immediately updates raw-material inventory and work-in-process accounts. When a production department runs out of materials a signal is sent instantly to the preceding department. In this case, the preceding department can supply the needed materials at once. This means that automation of accounting system eliminates the causes of delays in the production

process. Thus, the risk of running out of raw materials even if sufficient quantities are available in the warehouse is minimized. As a result, the risk of late deliveries of products to customers is eliminated.

e. The computerized AIS help companies create clean, orderly work environment: As explained in the preceding sections, the use of a computerized AIS can help companies to reduce the amount of paperwork and lead to the use of paperless offices. Use of EDI and EFT, as seen in the above schedules, has enabled companies to exchange documents in the form of images. Furthermore, image processing reduces the space and costs associated with storing paper documents. The savings in this area can be substantial; one optical disk can store up to 20,000 documents, in a fraction of the space (Romney et al., 1997: 594). This movement toward paperless offices creates a clean and orderly work environment that requires less number of employees than before.

f. The computerized AIS help companies apply Total Quality Management (TQM) and increase quality: As explained in the preceding sections, in a JIT environment, everything must be of high quality because there is no allowance for the stoppage caused by the poor quality raw materials and work-in-processes. Application of TQM should be applied in JIT environment in order to assure quality. Clean and orderly work environment is one of the most important aspects of TQM. Since the computerized AIS leads to clean, and orderly work environment, it facilitates the application of TQM.

If some materials are proved to be defective, companies must ship a replacement as soon as possible. If the product is not on time, scheduling goes wrong and the cost is huge (Schwartz et al., 1998:34). In case of finding some materials to be defective, a message can easily be sent to the suppliers and transportation firms instantly via EDI. Therefore, materials can be received within a very short period of time and operations can be continued without much delay, and this keeps factory running.

All of the above explanations contribute to the fact that the use of computerized AIS facilitates the application of JIT production system. This means that the use of computerized AIS enables companies to attain significant time and cost savings.

6. Summary and Conclusion

Advancements in the information technology have enabled companies to computerize their information systems. Accounting information systems (AIS) have also been computerized as a result of significant improvements in the technology. As AIS are being computerized, accountants must gain the skills to use computerized systems. The use of computerized AIS has brought opportunities for companies to perform the accounting functions more effectively and efficiently because the use of computerized AIS has brought significant time and cost savings. Use of information technology to perform accounting functions has brought a chance for companies to progress toward paperless offices. Companies applying a JIT production system may as well apply it more effectively if they use computerized systems. Such tools as electronic

data interchange and electronic funds transfer can provide companies with opportunities to apply JIT production system more effectively and save money.

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