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### INTEGRATION TECHNOLOGY SYSTEMS VARIOUS PARTIES FOR SUPPLY CHAIN SUPPORT

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#### **ABSTRACT:**

Supply Chain Management is the most important component in a company because it greatly determines the level of success of a company in carrying out its business processes. Therefore, every business entity must have in-depth knowledge of supply chain management, so that it can carry out all plans and strategies that are deemed suitable to meet the expected expectations of the business it runs. This case study relates to a paving block manufacturing company where the supply chain management process of this business has 3 entities to carry out its business processes, the three entities including producers as sellers of paving block products, suppliers as suppliers of raw materials needed by producers, and customers as end-users (RP Kampstra, J. Ashayeri, JL Gattorna, 2013). Problem-solving solutions are directed at the use of information technology systems for business processes that are run based on needs and conformity to the problems or constraints faced in carrying out supply chain activities. In carrying out their business activities, the three entities involved in the supply chain that were built still experience various obstacles, so that these constraints have a continuous impact that can cause unexpected losses of course. Constraints between these entities that often occur, such as 1) for the producer: ordering raw materials that takes a long time, which can cause lead time (Bernardo Villarreal and Lucy Salido, 2016); promotion and customer service are still manual, so market coverage is limited; the production of various reports is still traditional, so it is prone to errors; monitoring of material delivery activities is also still constrained because the monitoring process is limited to using the telephone. 2) for suppliers: delivery of raw materials to producers which takes a long time; Promotion and provision of product information have difficulty, due to the absence of special media from suppliers that can make it easier for producers to obtain this information. 3) for the consumer:

orders can only be made by visiting the producer directly; monitoring of goods delivery can only be limited to using telephone media; it is difficult to obtain product information and producer company data. In overcoming these problems, it is necessary to use information technology as an integrated system that will integrate the needs of the three entities (T. N. Varma, D. A. Khan, 2014) which in this case is called the electronic supply chain (eSCM).

## INTRODUCTION

This case study that we create illustrates how the implementation of supply chain management is following the business processes being carried out. The steps that we do include studying what problems occur, what factors are the causes, the consequences of these problems, and how to deal with these problems. In this case study, we will design a supply chain management system that utilizes information technology that involves 3 parties (entities) involved, namely: producers, suppliers, and customers. The first entity here is a producer who acts as a seller of paving block products to the consumer entity directly. The scope of the producers includes direct customer service activities, ordering raw materials to suppliers, manufacturing, product promotion, and product delivery to consumers. Furthermore, the supplier acts as a supplier of raw materials to the producer following the specifications and quantities ordered by the producer. After that, there is the consumer, which is the last entity as the customer who can order the products offered by the producer. The main problem that occurs is where each entity experiences problems in carrying out various kinds of activities such as time of delivery, ordering of goods, searching and providing product information, making reports, media promotions, and so on. This is of course very time consuming and increases costs for each related entity, the result is inefficient and ineffective in conducting business processes based on the supply chain. The solution by building a supply chain based on integrated information technology is expected to facilitate things such as: ordering products online without requiring consumers to come directly to the point of sale, be able to manage product / raw material inventory, be able to provide product and company information more quickly and accurately, ordering raw materials can be faster to reduce the lead time for paving block companies. Lead Time is a vulnerable time needed in business processes. Lead time can be seen from two sides, namely from the consumer side and the supplier. From the consumer's point of view, the lead time is the waiting time required from the order process to the delivery process. Meanwhile, from the supplier's point of view, it is vulnerable to the time it takes to process the order into revenue. Of course, the optimization of the lead time will provide added value (Arawati Agus, 2015) which is an activity of adding value to the product, of course, it will be different if the system will provide added costs (Assey Mbang Janvier-James, 2012) which affects activities that do not generate added value. on the product, but causes increased expenditure at the time of manufacture of the product. Added value and added cost will be closely related, where companies can manage the added value and added cost by optimizing lead time, to reduce expenditure and add as much value as possible in their business activities. With an integrated system, it will make it easier for each entity to carry out various kinds of activities from the supply chain that is being carried out, as well as an

effort to optimize the supply chain that has been built. Currently, the use of information technology has been very rapid and very effective/efficient as a means of supporting business processes (Ming-Lang Tseng, Kuo-Jui Wu, Thi Thoa Nguyen, 2011), due to the existence of an information system for each activity process of each entity in the supply network. chain (eSCM), it will become more practical in terms of providing information, service to consumers, and product marketing, goods management, and reporting. This of course will also provide positive benefits to increase sales and marketing of the company's products. eSCM in its application is to help companies interact with suppliers and consumers, wherein this interaction the use of information technology, which is to carry out the entire process from monitoring stocks to ordering raw materials needed for the production process at companies and providing information services to consumers regarding products and delivery. eSCM is implemented by creating a system that can manage the availability of raw materials in the company so that it can make orders and manage all ongoing transactions between the company and suppliers and consumers (Raul Valverde and Raafat George Saadé, 2015).

### ***Problem Formulation***

One of the focuses in this supply chain is related to Lead Time, which can be seen from two perspectives, namely from a consumer point of view and a supplier's point of view. From a consumer's point of view, the lead time is the time it takes from the order process to the delivery process. Meanwhile, if viewed from the supplier's point of view, the lead time required in the order process becomes cash income. From the supplier's point of view, lead time can be used as business capital from the results of consumer payments. Added value is an activity that produces added value, while the added cost is an activity that does not generate added value, and even tends to increase expenditure. This will generate added value in their activities and reduce or eliminate activities that require additional expenses (Samuel Darko, Vincent Doh Terkper, Jewel Dela Novixoxo, and Lucy Anning, 2018). In this case study, various problems that exist from the three entities can be formulated, namely producers, suppliers, and consumers. The following are important points that have been formulated for each role performed as an entity in supply chain management. As for the formulation of the problem between the three parties, namely:

Relationships between parties between producers and customers, as follows:

- a. There are no media that can support the product marketing process to customer service, so when customers need more detailed product & company information, they will experience difficulties which of course have an impact on customer confidence in the product and the producer company.
- b. The process of making an order report that still uses manual errors often occurs, so it is considered less accurate and efficient.
- c. There are no media that can provide detailed information such as order status and delivery.

- d. The company does the shipping itself has not cooperated with the shipping company, so it is often overwhelmed in the process.
- e. There are no manufacturers who want to accept custom orders by providing consultants to help with the product design process.

Relationships between suppliers and producers:

- a. The process of recording orders at the supplier that is still manual and not neatly stored (manually) is considered inaccurate and inefficient.
- b. Ordering raw materials via telephone or meeting in person made the producers difficult and needed more time to carry out these activities.
- c. Cannot confirm the time needed to make and send raw material to producers, and it hinders the process of making the final product to producers.
- d. The not yet implemented system of contract cooperation between suppliers and producers has made one party change policies at will or harm the other party.
- e. By using a system manually, producers could not monitor the progress of orders placed at the supplier.

The thing that is formulated from the problem is the occurrence of a prolonged lead time, causing losses, so to overcome this, of course it is necessary to take actions that emphasize planning lead time and added costs which will have an effect in increasing added value. This can be achieved by optimizing each party involved in the integrated supply chain (Yasemin Kocaoğlu, Alev Taşkin Gümüş, Batuhan Kocaoğlu, 2018). In supply chain management, of course, the lead time is something that must be minimized, because it will have a negative impact on the business being run, and of course with a minimized lead time, both producers and suppliers will get the expected profit more quickly. Therefore, various optimizations are carried out, one of which is by implementing an information technology system that is able to carry out tasks according to company needs.

The following is an overview of the lead time analysis from the producer, namely:

- a. Providing a bid and survey proposal: This stage takes 1 day, on the first day of submitting a proposal and after an agreement is made with the customer, on the second day a team is invited to conduct a field survey.
- b. Consultation and design coordination: This stage takes 2 days, on the first day for discussions with customers about raw materials for paving blocks and the latest types, and on the second day, a revision of the consultation results will be submitted on the first day.
- c. Ordering materials to suppliers: This stage takes only 1 day because previously there was cooperation with the supplier.
- d. Preparation and checking: Conducted for 1 day to prepare the raw materials that have been selected by the producer until they are ready to be shipped.
- e. Delivery of goods: It takes 1 day for delivery to the address of the manufacturer who has ordered the material.

Following are the results of planning for the producer regarding e-SCM that will be applied to paving block companies:

- a. Online marketing by storing detailed information such as creating catalogs, photos of previous production orders, and models that are trending at that time.
- b. Manufacturers are more active in marketing their products directly by sending promotional information via email.
- c. Ordering products can be made in various ways, either by coming directly or by accessing the available website.
- d. Provide complaint services and other communication services via email or telephone
- e. By accessing the website, customers can directly monitor the current status of the goods ordered or can call directly to the company information department.
- f. During the consultation, the customer can choose the appropriate medium. Whether by email, telephone, or by video call available on the company's website.
- g. The last is a payment, the amount of payment can be seen directly on the website or you can also search for information via telephone service to the company's customer service.

Meanwhile, planning on the supplier side regarding eSCM that will be implemented includes:

- a. Provision of information regarding the type and quantity of raw materials in the warehouse can be accessed directly by the producer
- b. Ordering raw materials can be ordered immediately according to the amount and type of information available on the supplier's website.
- c. When the order is approved, the contract can be automatically agreed upon by both parties
- d. The goods to be ordered will be able to be monitored by the delivery time at any time (order status)
- e. Goods that have arrived at the manufacturer's warehouse will be checked for compliance with the order for the payment process.

### ***System Design***

As for providing solutions to problems that occur, we designed a system where the system we are proposing is a web-based system where the system can later be accessed by manufacturers, suppliers, and customers. This system consists of various functions according to the needs of each entity, where these needs include being able to serve product orders from customers to manufacturers without having to meet directly, can input product data, can manage product inventory and raw materials, print reports consisting of from inventory reports, purchases, sales can be done automatically from the output generated by the system, and this website can also be integrated with suppliers. Through this system design, of course, the various obstacles that existed before can be overcome and the business processes that are carried out become more efficient and effective. The following is the eSCM design that was developed by relating the database of each party. It appears that the

business processes that are built will first be made suitable applications for each party so that they can store the database according to the needs of each party. Furthermore, the database that is on each side will be selected regarding what information can be related to the other party, because not all information on a particular party can be seen by the other party. The infrastructure on the three parties may be different, but the main key is that certain parts of the database, which are needed by each party and agreed by the other to be shared will be a priority in interacting.

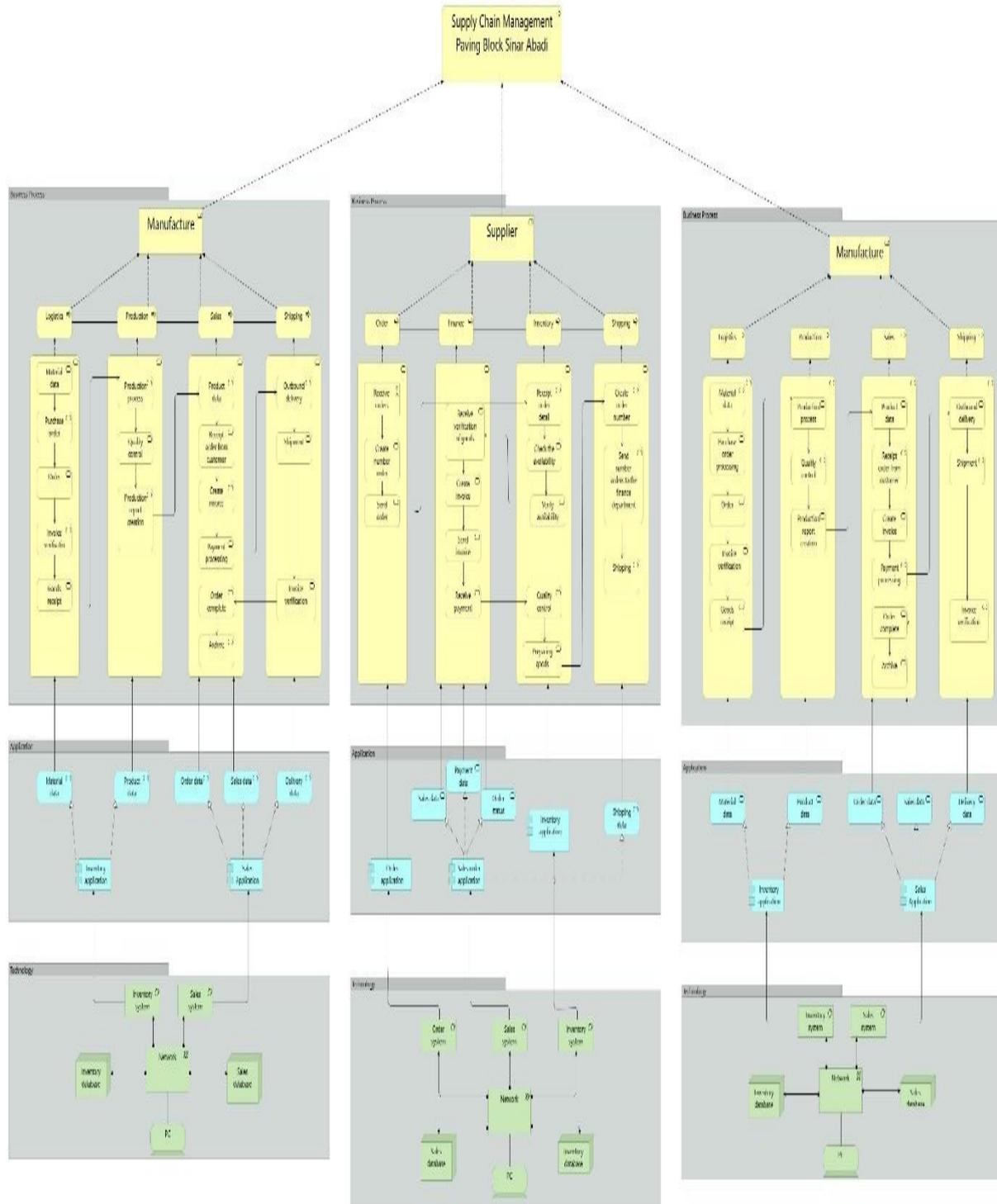


Figure 1. System Integration Design

***Implementation Results***

There are three points of view resulting from information technology-based systems. First, producers, of course, this new system has several advantages that can simplify and provide more efficiency to every running business process, such as the following:

- a. By using information technology, producers can store planning data as well as all kinds of transaction reports in the company database, so that it can be easier and more efficient and avoid human errors.
- b. By using information technology, it will be easier to communicate with suppliers only by using the internet, this can save more time for placing orders or providing information.
- c. Makes it easy for producers to provide product catalogs only via the web or by sending promo information via email to customers.
- d. Orders made by customers can be made anywhere, anytime without having to visit the office to place an order or just ask about products.
- e. Facilitates monitoring of orders, both those ordered from suppliers and orders placed by customers to producers. A transparent system like this, it can make it easier to monitor and can always foster customer confidence in the continuation of their orders.

Second, the supplier sees the results of using this information technology, namely:

- a. Supplier can easily communicate with producers through the internal web without any time limit.
- b. Order orders from producers can be monitored and recorded sequentially according to the queue.
- c. Notification and dissemination of information can be conveyed properly to all supplier branches closest to the producer so that they are faster in their business processes.
- d. Data storage stored in the database prevents losses due to data discrepancies.

Third, consumers see the results of using this information technology, namely:

- a. It is easy to view the product catalog and details from the manufacturer at any time.
- b. Become more confident in orders that have been placed because they can be monitored directly on the existence of the ordered product (status update).
- c. Consultation with the producer can be done anytime and anywhere.
- d. The order process and payment are confirmed and scheduled properly after the transaction is completed by both parties.

**CONCLUSION**

Planning and implementation of information technology in a company are now very easy to do. However, there are still few companies that can integrate with other parties, such as suppliers and end-users. This means that the supply chain does not only manage the optimization of business processes within the company but also greatly influences other (external) parties. The unification of various databases by utilizing the role of technology among parties (producers, suppliers, customers) will strengthen the flow of information which will certainly have an impact on increasing added value and will also reduce the costs that arise as a result of faster information obtained. Effective and efficient transactions in eSCM that occur through the interaction of three parties, greatly provide an opportunity for the emergence of the latest information that makes an impact to provide better support and benefits to each party.

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