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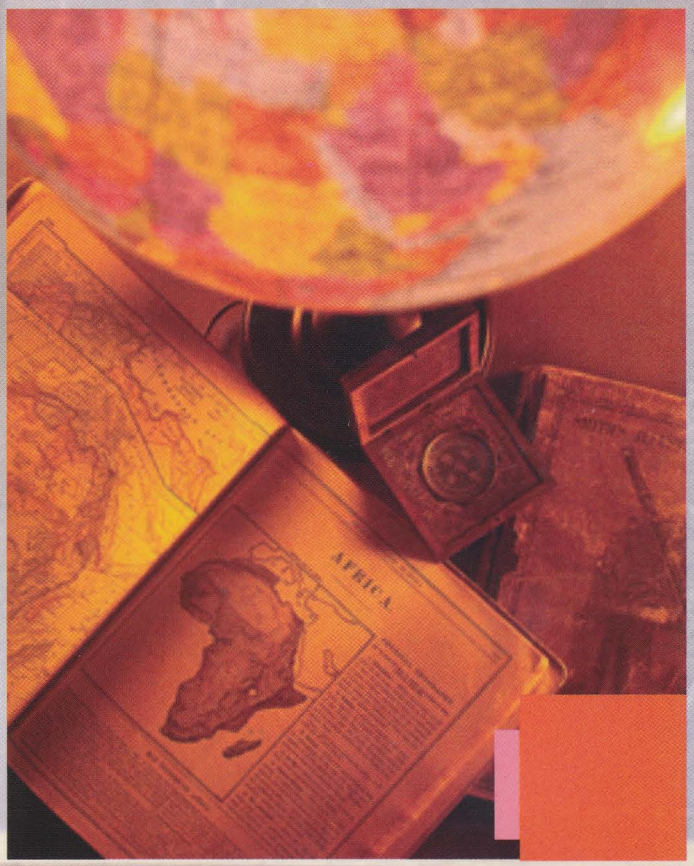

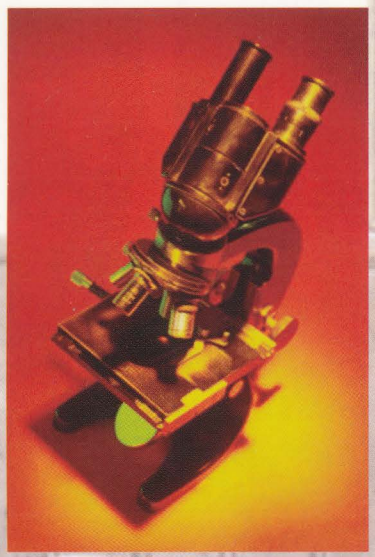

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Design of Supply Chain Management Information System Availability of Tannery Industry Raw Material in Sentra Sukaregang, Garut Regency

Yani Iriani*[1], Anita Juraida[2], Dani Hamdani[3], Esa Fauzi[4]

[1,2]Industrial Engineering Department, Faculty of Engineering Widyatama University
*Corresponding Author: yani.iriani@widyatama.ac.id
anita.juraida@widyatama.ac.id

[3]Information System Department, Faculty of Engineering Widyatama University
dani.hamdani@widyatama.ac.id

[4]Informatics Department, Faculty of Engineering Widyatama University
esa.fauzi@widyatama.ac.id

Abstract *– Distribution management is one of the important aspects in ensuring the smooth distribution of products from producer to consumer in an efficient way. Based on Supply Chain Management (SCM) approach, the weak of the distribution system is one of the causes of price disparity. The availability of raw materials, intermediate materials, and end products of a company is often an important issue in a company. Sukaregang Industrial Center is the main leather center in West Java Province. The development of leather industry in Sentra Sukaregang in the last few years (2010 - 2015) experiencing shortage of supply of cow/sheep leather. The purpose of this research is to make the design of information system of raw material availability with Supply Chain Management (SCM) approach in Sentra Sukaregang Regency of Garut. Through Supply Chain Management approach, it is hoped that the distribution of skin can be more transparent and can be seen stock availability in various areas. In conducting system design, system analysis is first conducted by interviewing stakeholders related to skin distribution. The proposed problem solving will be applied in the form of inventory information system in the form of analysis and design of object inventory information system of object oriented.*

Key Words *– Availability of raw materials; Supply Chain Management (SCM); leather industry.*

1 Introduction

The availability of raw materials, semi-finished materials, and end products of a company often become an important issue in a company. The availability of raw materials determines the productivity of a company. In the absence of raw materials, the company can not perform production activities. Lack of raw material inventory can make the company lose many opportunities. This also applies to SMEs such as leather industry in Sukaregang, Garut, West Java. Leather industry in Sentra Sukaregang Garut regency. Is one of the home industry area, the largest leather handicraft producer in West Java. It is characterized by the rise of leather production from Sukaregang Garut Regency spread in various cities of West Java such as Bandung, Cirebon and Sukabumi with its flagship leather products such as leather jackets, leather shoes, leather belts, leather wallets and even leather bag that is now a new trend among young people of Bandung.

In the fulfillment of the high demand for the skin is often faced with communication gap between the user or the customer with the producer (craftsmen) where the customer considers the raw material supplied does not meet the preferences (quality, quantity, timeliness) and sold the high price while the producer (craftsmen) the sales price they receive does not cover the cost of production, so the business actors are required to make an effort. Forms of effort are done to regulate the amount of skin supply in order to match the amount of consumer demand with the resulting skin.

However, the lack of cooperation among business actors is often exploited by other economic actors (both within communities and outside communities) that place craftsmen in disadvantaged (exploited) situations (Amalia, A., 2012)

Basically, the activity of the leather supply chain in distributing the product from the tanner to the final consumer will create a favorable value. The existence of this added value becomes an attraction in the leather business. According to Brown (Brown, 2003), the supply chain is a network of various interconnected organizations that have the same objective of organizing procurement or distribution of goods, while Champion and Fearne (2001), supply chain is a concept whereby there is a related regulatory system with product flow, information flow as well as financial flows (financial).

Sukaregang skin industry has internal problems such as raw material raw material supply constraints. The development of leather industry Sukaregang in recent years (2010 - 2015) experiencing the shortage of supply of cowhide raw material so that imported from Australia and New Zealand. In this case the lack of raw materials of goat/sheep skin imported from other provinces such as West Nusa Tenggara (NTB), East Nusa Tenggara (NTT), East Java and Sumatra. The lack of raw leather supply interferes with the production process and the low quality and competitiveness of the product. The condition of the lack of supply adds to the burden of production costs, impacting the distribution of late products. (Dzikron Muhamad, 2016)

Based on the problem, it is necessary to consider how to design the information system with supply chain management approach in supporting the development of competitive and sustainable leather industry, thus building coordination process and coordination among leather business actors.

The concept of supply chain is a new way of looking at logistics management, where in the old concept of logistics is seen as an internal company. In this new concept, however, the logistic problem is seen as a wider problem extending from the base material to the finished goods used by the end consumer, which is the supply chain of goods in the right amount, location, and time (David Schimci Levi at al, in Indrajit and Djokopranoto, 2002). Although consumers are the main focus, integration with suppliers is also an important thing to do (Gargeya, 2004). Here integration is associated with a purchasing strategy that is defined as the process of planning, implementation, control, and evaluation. The importance of purchasing in an effort to achieve company goals, where the focus is the consumer

2 Literatur Review

2.1 Supply Chain

The supply chain or supply chain is a system through which a business organization delivers goods or services to customers. This chain is also a network of interrelated organizations that have the same objective of being as effective and efficient as possible in the provision or distribution of such goods or services (Indrajit R.E, 2002).

The concept of the supply chain is a new concept in looking at logistical issues. The old concept of looking at logistics as an internal issue of each company and its solution is focused on solving internally in each

company. In a new concept, logistics problems are seen as a broader problem that extends very long from basic materials to finished materials used by end consumers, which is the supply chain of goods (Indrajit R.E, 2002). Figure 1 shows the flow that occurs in the supply chain:

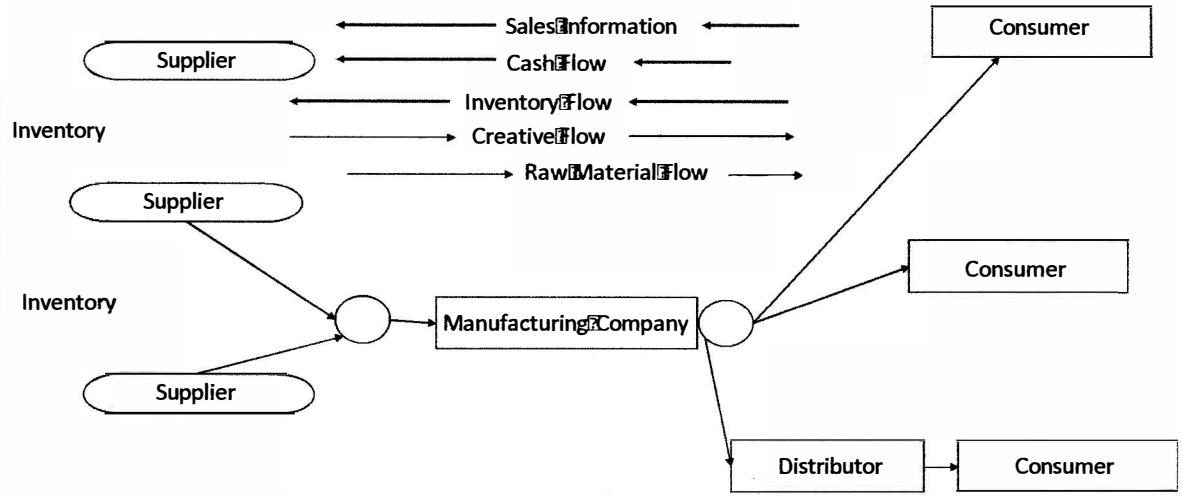


Fig.1: Supply Chain Flow (Heizer, 2010)

According to (Chopra et al. 2001), the goal to be achieved from each supply chain is to maximize the overall value generated. An integrated supply chain will increase the overall value generated by the supply chain. In a supply chain, corporate networks work together to create and deliver a product into the hands of the end user. These companies usually include suppliers, manufacturers, distributors, stores or retailers, as well as support companies such as logistics services companies.

2.2 Supply Chain Management

Supply chain management is a system for making a product and delivering it to consumers from a structural angle (Kalakota, in Irghandi, 2008). According to Irghandi (2008) the emergence of supply chain management background by 2 (two) principal things, namely:

a. The practice of traditional logistics management in this modern era is no longer relevant because it can not create a competitive advantage.
b. The changing business environment is accelerating with an increasingly fierce competition.

The strength of a supply chain depends on the strength of all the elements in it. A healthy and efficient plant will not matter much if the supplier is unable to deliver on time (Pujawan, 2005). According to Jebarus (Jebarus, 2010) supply chain management is a further development of product distribution management to meet consumer demand. This concept emphasizes an integrated pattern involving the flow of products from suppliers, manufacturers, retailers to consumers.

According to Kalakota in Irghandi (2008), supply chain management is the coordination of materials, information and financial flows between participating companies. Supply chain management can also mean all types of basic commodity activities until the end product sale to the consumer to recycle the used product, that is:

- The flow of materials involves the flow of physical products from suppliers to consumers through the chain, as well as the backflow of product returns, services, recycling, and disposal.
- Information flows include demand forecasts, order transmissions and order status reports, these currents run both ways between the end consumer and the raw material provider.
- Financial flows include credit card information, credit terms, payment schedules in ownership and delivery.

According to Turban, Rainer and Porter (Turban, 2004), there are 3 (three) kinds of supply chain components, namely:

1 Upper Section of Supply Chain
The upstream part of the supply chain includes the activities of a time-consuming company with its distributors (it can be either manufacturing, assembler, or both) and their connections to their dealers (second-tier dealers). The relationship to the dealer can be extended to several levels according to the needs and all the paths of material origin. For example directly from mining, plantation, and others. In the upper reaches of the supply chain, procurement is a priority activity.

2 Internal Section Supply Chain
The downstream part of the supply chain covers all activities involving the delivery of the product to the end customer. In the downstream part of the supply chain, attention is directed to distribution, warehousing, transportation, and after-sales service.

3 Downstream Supply Chain Segment / downstream supply chain segment
Downstream (direction of the estuary) supply chain includes all activities involving the delivery of the product to the end customer. In the downstream supply chain, attention is directed to distribution, warehousing, transportation, and after-sales-service.

2.3 Availability

According to Russell and Taylor (Russel, 2000), inventory is the stock of stored goods to meet demand, either within the organization (internal) or outside the organization (external). Inventories include raw material inventories, in-process inventories, maintenance, and finished goods inventory. Inventory has an important function to increase the flexibility of a company's operations. In general, inventory can be divided based on the assumption of dependence on demand on other goods demand. According to Heizer and Render (Heizer, 2010) the inventory model is divided into dependent demand and independent demand.

3 Methodology

This research uses primary and secondary data. Primary data is data obtained from the first source either from individuals or individuals. This research data is obtained directly from the respondents in the form of answers to questions asked in questionnaires and interviews about supply chain management. This secondary data is used to explore supply chain management that will be implemented in SMEs. This data is derived from answers to some semi-closed questions using different research settings per collection. The settings used survey by direct interview through Focus Group Discussion and dissemination

4 Results

4.1 Business Process Analysis on Purchasing Products by consumers

The design of SCM-based integrated information system was created to build a new system that suits the needs of the user. The SCM is used to integrate suppliers, manufacturers, shippers, warehouses, retailers & customers so that the right product or service is distributed at the right amount, to the right location & at the right time online to improve customer satisfaction.

This system will automatically update the data stored in the database based on transactions used by the user. The user interacts with the software by entering the data required by the software. The supply chain management business process begins when the user logs in according to the specifications.

In this research will be discussed about the analysis and design in building supply chain management information system (SCM) for Sukaregang skin industry. The analysis is divided based on the process of purchasing goods/products by consumers from craftsmen which consists of two processes, namely the process of purchasing ready stock and preorder purchasing process (goods ordered according to individual criteria). It will also be analyzed on sales forecasting.

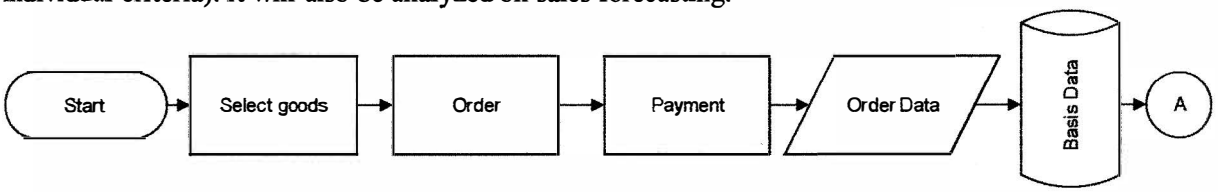


Fig.2: The business process of purchasing ready stock goods

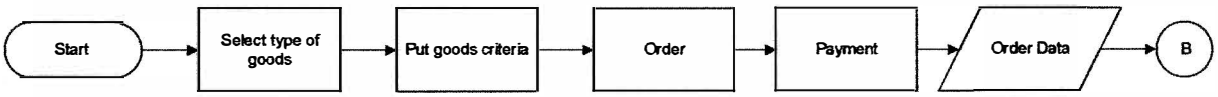


Fig. 3: The business process of purchasing preorder goods

In the business process of purchasing ready stock items, buyers/distributors are only asked to choose which goods to buy then make order and payment of goods. As for purchasing pre order buyers/distributors can order goods based on the criteria itself. From both business processes, the ordering data will then be stored into the database to then be acted upon by the manufacturer

4.2 Business Process Analysis on Production Activities

Once the buyer/distributor orders goods for ready stock or preorder, the manufacturer will then process the order of the goods. In ready stock, the producer only sends the goods order to the customer. While on pre order, the producer must produce the goods first before sending to buyer/distributor. On pre order, the producer must also consider the availability of existing raw materials. Figure 4 and Figure 5 show the business process after the buyer/distributor orders the goods.

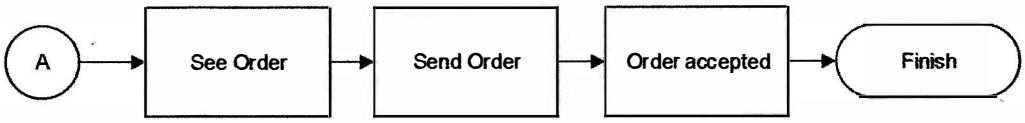


Fig.4: The business process from the producer side for the purchase of ready stock items

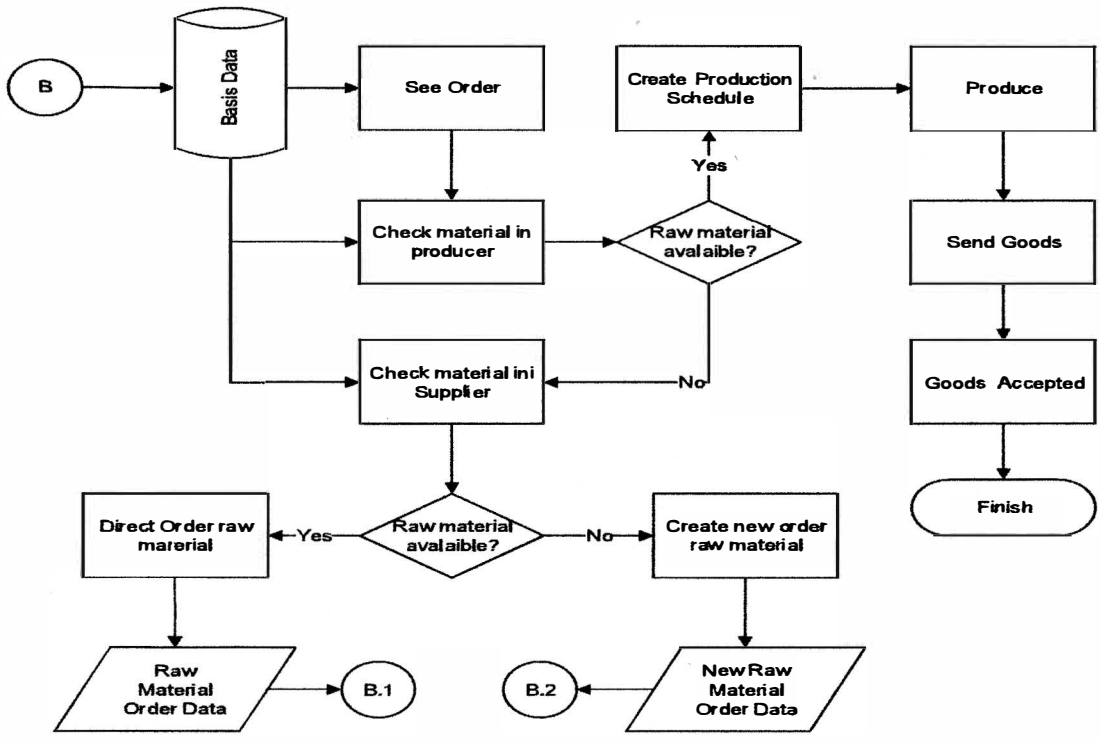


Fig.5: The business process from the manufacturer side for the purchase of preorder goods

In the business process from the manufacturer side for the purchase of preorder goods, producers can pay attention to the availability of raw materials in 2 ways. First by looking at the availability of raw materials on the internal side of the producers themselves. If the raw material is available on the producer side then the producers can directly create a production schedule and produce the goods. However, if the producer of raw materials does not exist then the producers can check the availability of raw materials to the suppliers. If the suppliers of raw materials are available, the producers can order directly the raw materials, but if not available then the producers can also order the new raw materials to be produced by the supplier.

4.3 Business Process Analysis on Supplier Parties

The business process on the supplier side occurs when the producer's lack of raw materials to be produced. The supplier can send raw materials to producers if the raw material is available on the supplier side. However, if the raw material is not available then the supplier will produce the raw material before it is sent to the manufacturer. Figures 5 and 6 show the business processes of the suppliers.

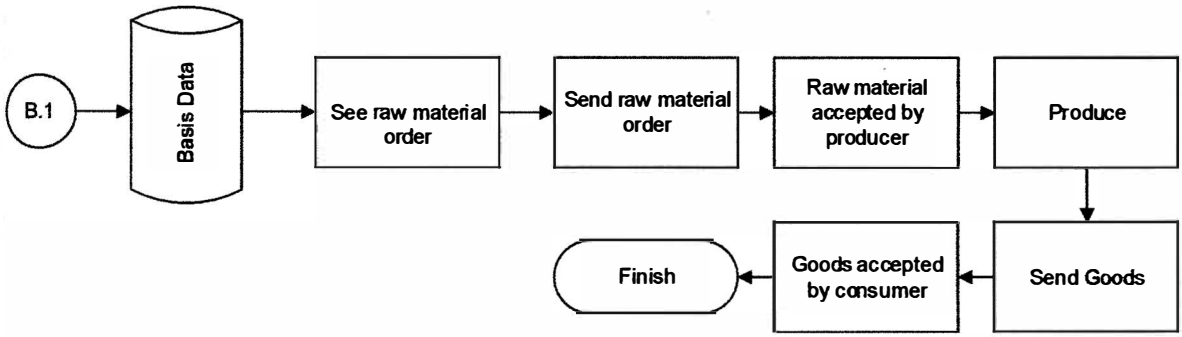


Figure 6. Business process from supplier side if raw material available

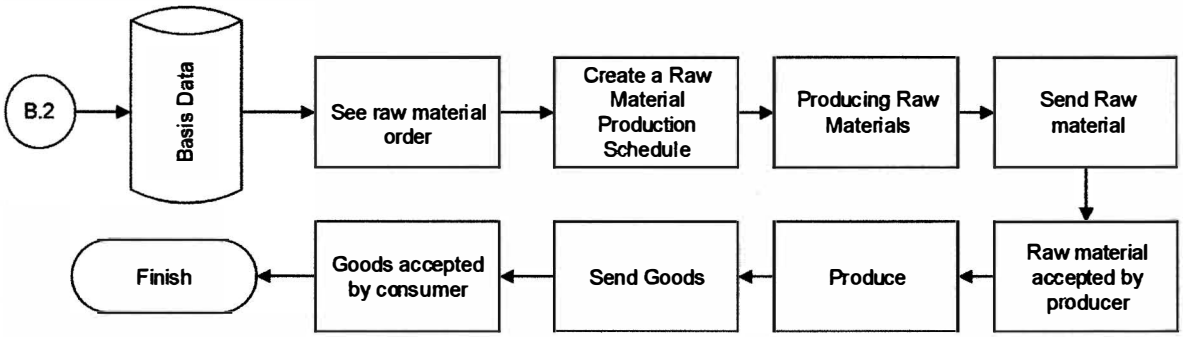


Figure 7. Business process from supplier side if raw material not available

4.4 Sales Forecasting Analysis

Sales forecasting on the system to be built is used to facilitate manufacturers in providing ready stock or supplier in providing raw materials. In general, there are two methods in sales forecasting, namely qualitative or quantitative forecasting. But in this system, the method used is the method of quantitative forecasting because only based on data that can be calculated and contained in the system.
The regression model is one time-series algorithm that can be used in quantitative forecasting. There are several regression models, but this study used regression model from a paper written by Syntesos (Syntetos, 2016) and Villena (Villena, 2017). In the Syntesos regression, model paper is formed from changes in demand/order every week.

$$y_t = \beta_0 + \beta_1 X_{1,t} + \beta_2 X_{2,t} + \beta_3 X_{3,t} + \beta_4 X_{4,t} + \varepsilon_t \quad \ldots (1)$$

Explanation :

X_1 : Holy Day (Idul Adha, Idul Fitri, Natal, dan lain-lain)
X_2 : Day of promotion/sale
X_3 : Days when the product is not sold
X_4 : Outlier sales

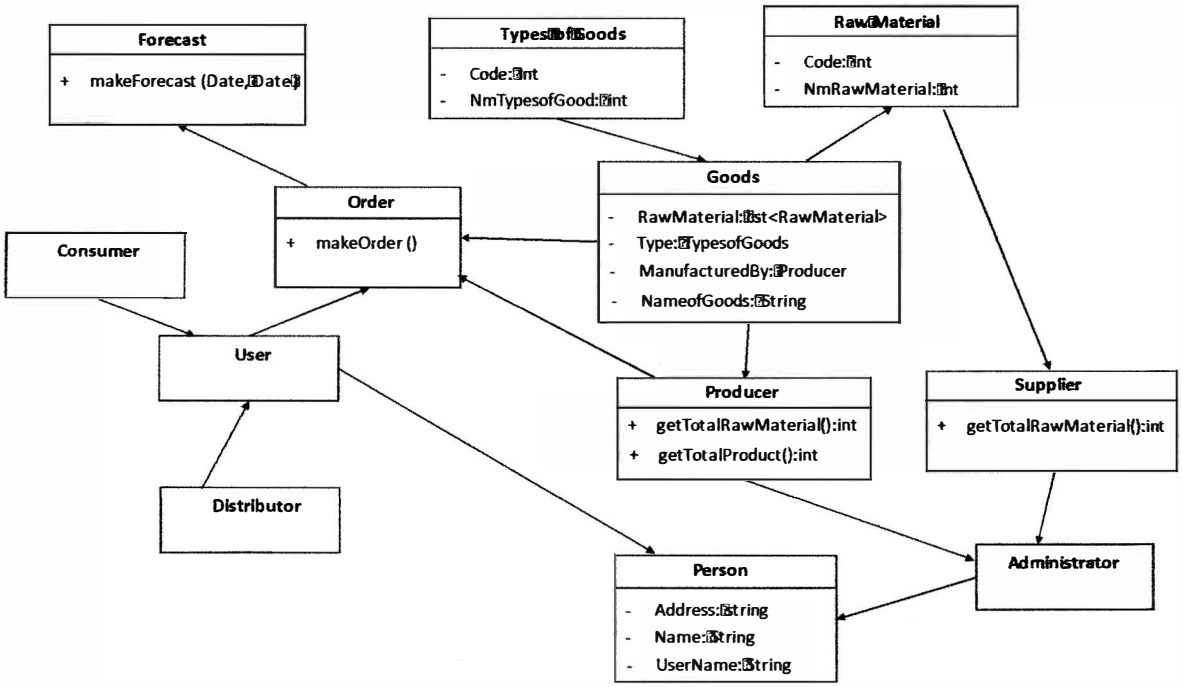
The model then added dummy regression on each month for a period of 1 year and every week for a period of 1 month

$$y_t = \beta_0 + \beta_1 X_{1,t} + \beta_2 X_{2,t} + \beta_3 X_{3,t} + \beta_4 X_{4,t} + \sum_{j=1}^{12} \alpha_j M_{j,t} + \sum_{j=1}^{4} \gamma_j W_{j,t} + \varepsilon_t . \quad \ldots (2)$$

This forecasting method can be used in this system because it is considered effective against certain seasonal products (Bulbul, 2017) (eg jackets and leather shoes that are the main products of the Sukaregang industry will be sold when the wet / cold season arrives)

4.5 Class Diagram Design

The class diagram design is designed to illustrate the inter-class relationships of the Sukaregang SCM system. Figure 7 shows the class diagram design of the SCM Sukaregang system.



The explanation for the usefulness and responsibility of each class from the above class diagram can be seen in Table 1 below:

Tabel 1 Class Diagram Design

Class Name	Description
Person	This class is a class that stores user data involved in the system
User	This class is a derived class of the Person class that has access as a user (who orders and buys goods)
Distributor	This class is a derivative of the user class (distributor)
Consumer	This class is a derivative of the user class (consumer)
Administrator	This class is a derived class of the Person class that has administrator access (which produces goods or raw materials)
Supplier	This class is a derivative of the user class (Supplier)
Producer	This class is a derivative of the user class (Manufacturer)
Type of goods	This class that contains the type of goods sold on the SCM system (Jacket, shoes, etc.)
Goods	This class contains items sold on the SCM system (Leather Jacket A, Leather Jacket B)

Class Name	Description
Raw material	This class consists of raw materials to be used for the production of goods
Order	This class is used when ordering goods
Forecast	This class is used to obtain sales forecasting in the future.

5 Conclusion

Based on research studies conducted in Industrial Centers of Sukaregang, Garut Regency, West Java, it was found that the problems of logistics management is the main problem that makes often the dissatisfaction of price, product quality (raw materials and finished products), availability of raw materials, and timeliness of production between business actors involving suppliers, producers and consumers. The design of the system should look at the functional requirements of the leather industry distribution business process. This study provides an answer how to overcome the problem of weak logistics management with supply chain management approach. The design of information systems on the basis of supply chain management is expected to contribute in supporting the development of competitiveness and sustainable production of leather industry. Furthermore the synergy between leather business actors can be well established. The design of supply chain management is based on the business process of each business actor, following: (1) The business process of purchasing ready stock goods, (2) Preorder business purchasing process, (3) Business process from producer side for purchasing ready stock items, (4) The business process from the producer side for the purchase of preorder items, (5) The business process from the supplier if the raw material is available, (6) The business process from the supplier if the raw material is not available. Sales forecasting methods can be also applied to estimate the needs of finished products for producers and the needs of raw materials that must be prepared by suppliers. By applying the concept of supply chain management, it is expected that logistic problems can be well handled. Thus, the service quality to reach customer satisfaction can always be maintained.

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