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Development of e-SCM Open Source as Integration of Data Management For Fish Farmers SMEs in Pasar Ulekan Bandung

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Abstract

In general, e-SCM-based Open Source is a framework that conduct collaborative use of information technology for the flow of information, materials, finance, services from producers to consumers to achieve the efficiency of activities and costs on all entities involved in the system. Business potential is still very large ornamental fish to thrive. It can be observed from the data of Agricultural Census 2013-2014, that the income from this business ranks first on fishing effort. Small and Medium Enterprises (hereinafter referred to as SMEs) is a transformative companies that are committed to continue the development and growth. These relationships involve the key stakeholders such as customers, employees, suppliers, and competitors. The use of modeling notation DFD is part of a context diagram, which is one modeling notation in information systems. DFD contained in the draft Notation Data Store that will be implemented into a table in the database. In information systems modeling, a Data Store in a DFD will be modeled by E-R diagram be Notation Entity. To design a business process reengineering in this activity, generate context diagram called “E-SCM UKM Ikan”, which consists of five entities involved directly with the system, namely: supervisor fish shop, fish shop retailers, employees, fish farmers, and customers. Referring to the Context Diagram, there is decomposition process “E-SCM UKM Ikan” Level 0. Decomposition produces Data Flow Diagram Level 1 consists of four sub processes, namely: business partner, transaction, the stock of retailers, and documentation. For the integration of data management, there is a Localhost Server e-SCM, using <http://whyphi:8080>, as the address for the prototype.

Keywords: *e-SCM, Open Source, Data Management, Context Diagram, DFD, E-R Diagram.*

1. Introduction

Through the description of the Government Work Plan (GWP) Sector Empowerment of Cooperatives and SMEs in 2014, that there are 42 million data regarding the perpetrators of Small and Medium Enterprises (hereinafter referred to as SMEs), which are scattered in 23 government agencies. Referring to the Law of the Republic of Indonesia Number 20 of 2008, concerning micro, small and medium business development activities. In Article 17 through Article 20, there is a description of the business development for the increase in production, processing, marketing, human resources, design, and technology. An activity that can be collaborated to handle the business processes of SMEs mentioned above is Open Source technology and the Electronic Supply Chain Management (hereinafter referred to as e-SCM). Business potential is still very large ornamental fish to thrive. It can be

observed from the data of Agricultural Census 2013-2014, that the income from this business ranks first on fishing effort. In the tabulation of data Spatial Plan in Bandung from 2011 to 2013, Pasar Ulekan including the location being the center of the development of Sub City Services and the Center for the Environment by indications of commercial activity program trading and Sub-scale entertainment City Territory, Even this stagnant market to increase revenues, due to difficulties in adopting the technology supply chain.

2. Methods and Design

2.1. The combination of Fishbone Diagrams and Charts Research

There are four categories for the stagnation of SME business processes fish farmers, namely Man Power, Machine, Methods, and Materials. Of these categories, some problems can be grouped its implementation in the first year and second year. For the four categories that performed in the first year (Phase 1), the cause is as follows:

1. Not understanding the Electronic Data Interchange for production transaction (Tidak memahami Electronic Data Interchange untuk transaksi produksi)
2. Not to understand the accounting of financial data (Belum memahami pembukuan data keuangan)
3. Not understanding the Supply Chain (Tidak memahami Supply Chain)
4. Data on the supply of fish is not available (Data pasokan ikan tidak tersedia)
5. Hardware/Software for business process improvement is not owned by SMEs (Hardware/Software untuk peningkatan proses bisnis tidak dimiliki oleh UKM)
6. Promotion inconsistent (Promosi tidak konsisten)
7. Fish stocks are not monitored (Stok ikan tidak dimonitor)
8. Distribution of goods do not flow (Distribusi barang tidak mengalir)
9. Do not perform data management (Tidak melakukan manajemen data)
10. The concept of supply chain is not used (Konsep supply chain tidak digunakan)
11. Material for the standard prices do not (Material untuk standar harga tidak dilakukan)
12. Less cultivation of fish seeds (Kurang budi daya bibit ikan)
13. Raw material of fish feed is not available (Bahan baku pembuatan pakan ikan tidak tersedia)
14. Delay of fish stocks and feeding areas (Keterlambatan stok ikan dan pakannya)
15. Not available data/information supply of fish (Tidak tersedia data/informasi pasokan ikan)

Figure 1. Adoption Fishbone for Research

2.2 Stages of Application Development

Referring to the specific purpose of the research, the following is an explanation of the stages of development of Open Source e-SCM adopted the framework as waterfall development cycle. Steps being taken for this study in the first year, includes grooves that can be observed in Figure 2.

Figure 2 Adoption Stages Waterfall for Research [14]

After each step is defined, the steps in signing off and continued development in the next step. This model has been obtained from other engineering process, which offers a way of making software more tangible. Description of the stages are as follows [14]:

1. Analysis and Requirements Definition (Analisis dan Definisi Kebutuhan)
2. Software and system design (Perancangan sistem dan Perangkat Lunak)
3. Implementation and testing unit (Implementasi dan pengujian unit)
4. Integration and Testing System (Integrasi dan Pengujian Sistem)
5. Operations and Maintenance (Operasi dan Pemeliharaan)

3. Discussion

3.1. Context Diagram of Existing System

Referring to Figure 3, it can be observed that the existing system is composed of four entities that are directly involved, namely: petani ikan (fish farmers), toko ikan (fish shop), kurir (courier) and pembeli (buyers).

Figure 3. CD of Existing Systems

3.2. DFD and Data Store of Existing Systems

DFD are used to determine the details of the process, which is contained in a Context Diagram. Therefore, the details of the process can be observed in Figure 6 which presents the results of a data flow diagram breakdown at level 1. In the diagram, we can know the details of the process that consists of three sub-processes, namely: transaksi stok (stock transaction), transaksi kurir (courier transaction), and transaksi konsumen (consumer transactions). In addition, there is also the use of one data store, the name is simpan (save).

Figure 4. DFD of Existing Systems

Referring to Figure 6 of the DFD of the existing system, it can be observed that the existence of data storage on the system is not very support business processes for fish supply system. In the picture, the role of notation data store only as a medium for recording transactions of buying and selling of fish, even many transactions were never documented. However, this media can be used as the basis for the development of BPR in e-SCM, so that the fundamental issue in this system, namely the SME business processes stagnation fish farmers, can find a solution. Table 1 contains the explanation of connectivity between entities, sub processes and data store occurred in context diagram Level 1.

Table 1 Relationship of Entities, Sub-Process and Data Store

ENTITY	SUB PROCESS	DATA STORE
Pembeli	TransaksiKonsumen	Simpan
TokolkanUlekan	TransaksiStok	Simpan
TokolkanUlekan	TransaksiKurir	
TokolkanUlekan	TransaksiKonsumen	Simpan
PetaniIkan	TransaksiStok	Simpan
PetaniIkan	TransaksiKurir	
Kurir	TransaksiKurir	

3.3. Business Process Reengineering for CD/DFD and E-R Diagram

The next activity is to create Business Process Reengineering (BPR) based on the existing system that has been described previously, by adopting the scheme Open Source e-SCM. Referring to Figure 7, there is a change in the flow of data and the entities involved. This happens from Context Diagram engineering with e-SCM scheme. In this figure, there are five entities involved directly with the system, namely: supervisor toko ikan (supervisor fish shop), retailer toko ikan (fish shop retailers), employees, petani ikan (fish farmers), and customers.

Figure 5. CD of E-SCM UKM Ikan

Based on Figure 6, there is a breakdown DFD results for level 1. In the diagram, there are four sub-processes, namely: business partner, transaksi (transaction), stoknya retailer (the stock of retailers), and dokumentasi (documentation).

Figure 6. DFD of E-SCM UKM Ikan

Designing models for data management, data storage is engineered to the process of e-SCM. This design, built based on the existence of the data store on the DFD for all levels.

Figure 9. Data Dictionary in the E-R Diagram

When referring to the design of DFD modified, then all data store contained in the DFD will be the entity on the E-R Diagram. The entity comprised of B_BUYER, AD_USER, B_SELLER, C_CASH, C_PAYMENT, C_BANK, and M_WAREHOUSE. Use of the data dictionary at E-R Diagram, aims to show the relationships between entities without being disturbed by the presence of key attributes and descriptive attributes. This can be observed in Figure 9, which presents the use of the data dictionary to E-R Diagram.

1.4. The Result of Engineering Prototype e-SCM Applications

Here is some footage of the experimental results to the adjustment of business processes in Pasar Ulekan with open source e-SCM, as follows:

1. Address localhost. To test engineering this application, used a server that is local to the address <http://whyphi:8080>
2. The database used in this application uses PostgreSQL that is open source, so it is suitable to the application of e-SCM. Referring to the database, there are several core tables are modified according to the needs of the system.

Figure 8. Relations on the Physical Table

3. Login form e-SCM, using the display input from applications that are tailored to the needs of the fish supply chain system

Figure 9. The prototype for Form Login e-SCM (iDempiere)

4. Conclusions

In general, the research develops SCM applications for SMEs fish farmers based Open Source, through the implementation of E-SCM collaboration and Data Management. Additionally, in particular the research has reached the following results:

1. In designing the model of existing system, for Context Diagram Level 0 there are four entities involved, namely: fish farmers, fish shop, courier and buyers. Referring to the Fish Supply System Diagram Context, there is decomposition process Level 0, which produces Data Flow Diagram Level 1 with three sub-processes, namely: the stock transaction, the transaction courier, and consumer transactions.
2. In the existing modeling system for data management, there is the use of one data store, named "simpan". The role of the existing data store of this system, just as the media to record the sale and purchase transactions of fish, often not even been documented for the transaction. Based on these facts, the use of the concept of ER-Diagram for the existing system cannot be used.
3. To design a business process reengineering in this activity, generate context diagram called E-SCM UKM Ikan, which consists of five entities involved directly with the system, namely: supervisor fish shop, fish shop retailers, employees, fish farmers, and customers. Referring to the Context Diagram, there is decomposition process E-SCM UKM Ikan Level 0. Decomposition produces Data Flow Diagram Level 1 consists of four sub processes, namely: business partner, transaction, the stock of retailers, and documentation. In addition, for the activities of data storage

on the Data Flow Diagram Level 1, which produced seven data store of e-SCM process, as follows: B_BUYER, AD_USER, B_SELLER, C_CASH, C_PAYMENT, C_BANK, and M_WAREHOUSE.

4. For the integration of data management, there is a Localhost Server e-SCM, using <http://whyphi:8080>, as the address for the prototype, which can be adopted by SMEs fish farmers in the research for the second year.

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