Implementation of supply chain business application through business model canvas and waterfall framework collaborations for fish farmers SMEs in ulekan market bandung

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Abstract. This research resulted in the development of e-SCM application, in small-scale group of fish farmers based on Open Source technology in Ulekan Market Bandung, by collaborating the implementation of e-SCM and Data Management. Then proceed with the application of supply chain business through collaboration Business Model Canvas and Waterfall Framework. For the design of business process reengineering in this activity, it produces a context diagram called e-SCM SME Fish consisting of five entities directly involved with the system, namely: fish shop supervisor, fish shop retailer, employees, fish farmers, and customers. Referring to the Context Diagram, decomposition process of Level 0 e-SCM SMEs Fish. The decomposition results in Data Flow Diagram Level 1 for four sub processes, namely: business partners, transactions, retailer stock, and documentation. Result of nine blocks on Business Model Canvas on e-SCM activity, its category consist of Priority 1, Priority 2, Direct, Indirect, Purchase / e-SCM, Transactional, Community, Asset Sale, Physical Asset, Human, Production, Strategic Alliance -competitors, Coopetition, Buyer supplier relationship, Fixed Cost, Variable Cost. For integration of data management on Localhost Server media on e-SCM using http://whyphi:8080 address, as prototype which will soon be adopted by farmer fish farmer.

1. Introduction
There are 42 million data on the implementers of Small and Medium Enterprises (hereinafter referred to as SMEs), spread over 23 government agencies. Referring to the Law of the Republic of Indonesia Number 20 Year 2008, concerning small and medium enterprises in business development activities, to be able to carry out improvement is done through several ways, namely: improving network marketing, distribution, technical skills, quality control, cooperation and transfer of technology. The basic reference of Supply Chain Management (hereinafter referred to as SCM) is the cycle of activities in the business processes of an organization, in coordinating the flow management for raw materials, finance, and information that adds value to the achievement of the organization's objectives. To achieve its goals, the information technology is very important role in improving the performance of SCM. There are four driving factors for the performance, namely: information, transportation, inventory, and facilities. [3].

An activity that can be collaborated to handle SME business processes is Open Source technology and Electronic Supply Chain Management (hereinafter referred to as e-SCM). In doing business process adjustment and implementation of such activities, a business model design strategy is required. Business Model Canvas (hereinafter referred to as BMC), is a strategic mapping tool for
business development that can describe, design, and focus on strategic aspects, thus becoming a unified business strategy. Referring to the BMC device then the results of a business activity, can be analyzed and designed as a solution to business processes that have a problem.

In the tabulation data of Spatial Planning (RTRW) Bandung 2011-2013, Ulekan Market including the location that became the development of Sub Service Center City. This market stagnated in increasing revenue, due to difficulties in adopting supply chain technology.

2. Discussion
All these activities, is a continuation of research that has been done in the previous year. This section is an implementation, which aims to improve the current system.

2.1. Stages Waterfall Framework
Referring to the specific objectives of the study, the following describes the stages of developing BMC collaboration with Open Source e-SCM that adopt the waterfall framework as its development cycle. Stages performed for this second year of research, including the flow that can be observed in Figure 1.

Figure 1. Adoption of Waterfall Stages for Second Year Research

Through this step approach, a series of process activities are described and presented in separate processes, such as BMC and e-SCM requirements specifications, design and implementation for design collaboration, and piloting. After each step is defined, the step is signed off and development resumes in the next step. This model has been obtained from the reengineering process. [18].

2.2. 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 2, 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 2. CD of E-SCM UKM Ikan [15]
Based on Figure 3, there is a breakdown DFD results for level 1. [9]. In the diagram, there are four sub-processes, namely: business partner, transaksi (transaction), stoknya retailer (the stock of retailers), and dokumentasi (documentation).

![DFD Diagram]

**Figure 3. DFD of E-SCM UKM Ikan [15]**

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. [9],[14].

![Data Dictionary Diagram]

**Figure 4. Data Dictionary in the E-R Diagram [15]**

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 4, which presents the use of the data dictionary to E-R Diagram.
2.3. Business Model Canvas e-SCM

Referring to survey results from fish farmers in Ulekan Market, the mapping of the business model in the environment is culminated with nine blocks from BMC, namely: Customers Segment, Value Proposition, Customer Relationship, Channel, Revenue Stream, Key Resource, Key Activities, Key Partnership, and Cost Structure. [13]. For details of the explanation of the nine blocks, are as follows:

- **Customer Segment.** (Priority 1: An ornamental fish hobbyist, Priority 2: Reseller)

- **Value Propositions.** (e-SCM SME Fish Farmers is an application used by smallholders of ornamental fish farmers. This activity can be implemented, because the application has been through the adjustment of system requirements. Its development aims to improve the supply chain business processes that have been adapted to the conditions in the market Ulekan)

- **Channels.** (Direct: Breeder Place, Indirect: Reseller, Purchase / e-SCM: http://whyphi:8080)

- **Customer Relationships.** (Transactional: purchase broken / restricted for customer segments. Community: social media group)

- **Revenue streams.** (Asset Sale: Sale of fish, medicine / vitamins, and aquascape supplies)

- **Key Resources.** (Physical Asset: Fish breeder, breeder room, aquarium, water, pump. Human: e-SCM operational staff, distribution personnel and asset sale maintainers)

- **Key Activities.** (Production: Fish supply chain activities from fish farmers to Customer segments)

- **Key Partnerships.** (Strategic Alliance between non-competitors: Provider of fish feed, Provider of medicines and vitamins, Aquascape equipment dealer. Coopetition: Reseller, Buyer supplier relationship: Ornamental fish hobbyist)

- **Cost Structure.** (Fixed Cost: purchase of feed, electricity payment, purchase of fish farming equipment, worker's wage. Variable Cost: Delivery fee via courier or COD)

Summary mapping of nine blocks and all its categories, can be observed in Figure 5. In the business model seen some linkages and slices of all categories in the Ulekan Market.

2.4. Results of Prototype Engineering Applications e-SCM

The following are some of the results of open source e-SCM application engineering, adapted to business processes in the Fish Market of Ulekan, among others, as follows:

- Localhost address. For testing this application engineering, used server that is local with address http://whyphi:8080
• Database used in this application using PostgreSQL which is open source, so it is suitable with e-SCM application. Referring to the database, there are several core tables that are modified according to system requirements.

![Figure 6. Relation on Physical Table [15]](image)

• Login form for e-SCM, using an input view of the application tailored to the needs of the fish supply system.

![Figure 7. Prototype for e-SCM Login Form](image)

• Business partner transactions for Fish Farmers, tailored to the needs of users.

![Figure 8. Business partner transactions](image)

3. Conclusions
This research, in general, resulted in the development of e-SCM application in small-scale fish farmers based on Open Source technology in Ulekan Market Bandung, by collaborating the implementation of e-SCM and Data Management. Then proceed with application of supply chain business through collaboration Business Model Canvas and Waterfall Method. In addition, specifically this research has achieved the following results:
In the existing system model design, for Context Diagram Level 0 there are four entities directly involved, ie fish farmers, fish shop, courier, and buyer. Referring to the Context Diagram of the Fish Supply System, the decomposition process of Level 0. The decomposition results in Data Flow Diagram Level 1 for 3 sub processes, namely: stock transactions, courier transactions, and consumer transactions.

In existing system modeling for data management, there is the use of a single data store named "simpan". The role of data store on the existing system, just as a medium to record transactions and buy only fish, often not even documented for transactions. Based on these facts, then the use of ERD concept for existing system can not be used.

To design business process reengineering in this activity, generate a context diagram called e-SCM SME Fish consisting of five entities directly involved with the system, namely: fish shop supervisor, fish shop retailer, employees, fish farmers, and customers. Referring to the Context Diagram, decomposition process of Level 0 e-SCM SME Fish. The decomposition results in Data Flow Diagram Level 1 for four sub processes, namely: business partners, transactions, retailer stock, and documentation. In addition, for data storage activities in Data Flow Diagram Level 1, the seven data store results modified from the e-SCM process, as follows: consists of B_BUYER, AD_USER, B_SELLER, C_CASH, C_PAYMENT, C_BANK, and MWAREHOUSE.

The results of nine blocks on Business Model Canvas on e-SCM activities, the categories consist of Priority 1, Priority 2, Direct, Indirect, Purchase / e-SCM, Transactional, Community, Asset Sale, Physical Asset, Human, Production, Strategic Alliance between non-competitors, Coopetition, Buyer supplier relationship, Fixed Cost, Variable Cost

For integration of data management on Localhost Server media on e-SCM using http://whyphi:8080 address, as a prototype that will soon be adopted by small scale fish farmers in the second year of this study.

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