

Designing e-Commerce Supply Chains

Tri Pujadi, Yosafati Hulu, Tumar

Information Systems Departments - School of Information Systems
Bina Nusantara University
Jakarta, Indonesia
tripujadi@binus.edu

Vikas Kumar

Bristol Business School, University of the West of England,
Bristol, BS16 1QY, UK
vikas.kumar@uwe.ac.uk

Bachtiar H. Simamora

Department of Management Binus Business School
Bina Nusantara University
Jakarta, Indonesia
bsimamora@binus.edu

Abstract

Supply chain management makes the company more competitive. In the Indonesian coffee trade, the bargaining power of coffee farmers and producers improves when the distribution channels for materials are operated effectively. The aim of this study is to develop a supply chain management application based on mobile devices as an intermediary between farmers, producers and consumers. The first step is to identify the issues related to the parties. The methods of analysis using the Business Model Canvas for identifying business process requirements. The results of the analysis used a mapping of the system's design features and finally the design method of an information system based on mobile devices using UML diagrams. Through the Supply Chain, the channel will be organized more effectively and the company will in turn be more competitive

Keywords

Supply Chain Management, application, mobile, UML.

1. Introduction

Information and communications technology continues to evolve, making it easier for companies to improve their performance. The benefits gained through technology are business processes that run in real time. The use of technology will provide benefits for companies facing increasingly fierce business competition, which forces companies to work hard to improve the effectiveness and efficiency of their business. Supply Chain Management is an important process in a company where the flow of raw materials, information and finance between companies is performed to fulfill customer orders. With the use of internet technology, the concept of supply chain management has become E-SCM[Giunipero,2008]. Internet technology provides online, real-time information sharing, so you can integrate the business into customers and suppliers[Golicic,2002]. The implementation of E-SCM, which involves all parties to the delivery process, i.e. customers, suppliers, internal and external parts of the enterprise, all activities in the supply chain process can be performed automatically. and guarantee the sourcing of raw materials from both suppliers and products so that they are available to customers at all times[Widyarto, 2019].

The production of Indonesia-made coffee experienced an increase in production during the period 1980 - 2017 with an average growth rate of 2.15% or an average coffee production of 523.83 thousand tons of coffee[Hari, 2013]. Coffee production based on entrepreneur status is dominated by coffee production that is cultivated on smallholder

estates which reaches 94.53% share or reaches an average production of 495.20 thousand tons, whilst coffee production originates from state-owned estates and privately-owned estates are relatively small, namely contributing less than 5% or reaching a share of 3.19% and 2.28% or an average coffee production of 16.17 thousand tons and 11.93 thousand tons[Noviantari, 2015]. Coffee is a plantation crop that has long been a cultivated crop. Coffee plants become a source of income and also increase the country's foreign exchange through the export of raw or processed beans from coffee beans. Coffee groups that are known to have economic value and are widely traded are the Arabica and Robusta types. Arabica coffee types have high taste quality and lower caffeine content compared[Delima, 2016]

The business development today can be measured by the development of business in the retail industry sector, one of them is an e-commerce business. Based on statistical data released by APJII ("Indonesian Internet Service Providers Association") through a survey conducted in 2016 the number of internet users in Indonesia was 132.7 million users or around 51.1% of the total population of Indonesia. This number increased by 44.6 million users or 50.6% over the last 2 years, because the statistic focused on internet users in Indonesia published in 2015 by APJII showed that in 2014 there were only 88.1 million users of the total population of Indonesia. 11% of internet users in Indonesia in 2014 accessed the internet to conduct the online trading activities which increased to 62% of internet users who made buying and selling online in 2016. This online buying and selling activity is one of the examples of the activity of e-commerce. By the aforementioned data, it can be seen that e-commerce activities in Indonesia continue to grow along with the increasing number of internet users. So it can be seen of the opportunity to develop a business in the form of e-commerce. E-commerce is also currently widely developed and in demand by business people engaged in the agricultural sector. Nowadays, several e-commerce companies in the agriculture sector are starting to emerge, such as *iGrow*, *Limakilo*, *TaniHub*, *Sikumis*, *Crowde*, *Marine Market*, *Inagriasia*[Putra, 2019]. Marketplace is one of the business concepts used by business people engaged in e-commerce. This marketplace concept can be a place for business people to market their products online with a variety of features that can protect the wider market. This can also be applied in the agricultural business in the coffee bean agriculture sector.

The consumers of the coffee agribusiness of a province come from different regions at home and abroad. For example, domestic consumers are from Bali, Lampung, and various parts of Java, while overseas consumers are from China, Taiwan, England, and other countries. There are also coffee consumers who go straight to the coffee farm store for ground coffee at a lower price. Table 1 shows various stakeholder related to the coffee trade in Indonesia.

Table 1. The stakeholder of the coffee trade in Indonesia

The Stakeholder	Community or Organization
Exporter	AEKI (Indonesian Coffee Exporter Association)
	Swiss Coffee Trader Association
	Multinational Coffee Community at Los Angeles
	OLAM International and ECOM Coffee Group Ltd
Coffee Community	Indonesian Coffee Community Cooperative(KOKOPI)
	Community of Roaster Coffee to (Coffee roaster Expert)
	Community of Yahoo Coffee
	Community of Kopi Nusantara
	Coffee Shop Entrepreneur Community
Coffee Producer	Coffee Farmers
	Santri Millennial Center
Coffee Watcher	Coffee Study Club

The actors in the coffee supply chain are coffee farmers as main suppliers of raw materials, coffee collectors, red coffee traders, agribusiness, coffee traders, as well as exporters and consumers [Suchánek, 2011]. The coffee distribution channel in Figure 1, starts from the farmers delivering the products to the collectors and then to the agro-industry. For foreign trade, it is processed by exporters to be shipped to consumers. In the meantime, domestic trade, from agribusiness to wholesalers and retailers, ends up with consumers.

The development of information technology, especially social media, is currently being exploited by various trading parties based on social media. In a coffee trading system involving producers and consumers, the various parties involved, namely farmers, business co-operatives, municipalities, producers and entrepreneurs, need synergies in order to achieve mutual benefit[Lim, 2018]. As shown, there are generally four distribution patterns, but farmers, agribusiness and consumers dominate. Agroindustry has capital with an interest in ensuring a profitable coffee business. Consumers are downstream entrepreneurs in the coffee industry. The use of information technology creates synergies in the coffee trade and can take place via social media.

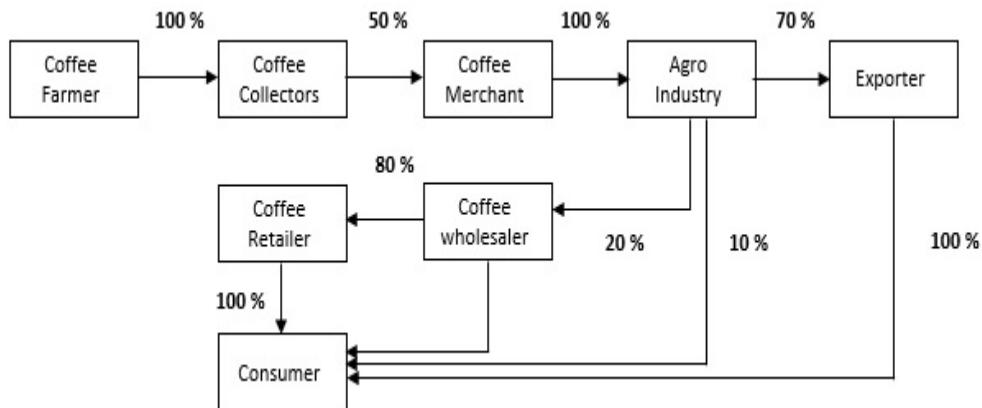


Figure 1. The coffee trade business process

In this section the study of the literature [Pulevska-Ivanovska,2013][Le Tan, 2017][Giménez, 2008][Valverde, 2015], was carried out to determine the contribution and renewal of this research compared to the studies carried out according to Table 2.

Table 2. Previous Literature Study about Supply Chain Management

No	Title	Source	Year	Variable	Content
1	Implementation of e-Supply Chain Management (e-SCM)	TEM Journal – Volume 2 / Number 4 / 2013. www.temjournal.com	2013	strategic possibilities, competitive advantage, information systems and technologies.	The advantages and benefits brought from adopting e-SCM are contribute in creating a competitive advantage.
2	Issues of Implementing Electronic Supply Chain Management (E-SCM) In Enterprise	European Business & Management. Vol 3(5): 86-94. http://www.sciencepublishinggroup.com/j/ebm	2017	Knowledge Management, Customer Loyalty, Market Development	The Implement E-SCM will have a competitive advantages which can be affecting the increase in performance of enterprise also be more sensitive to market environment changes rather than the competitor.
3	E-SCM: Internet's impact on supply chain processes	The International Journal of Logistics Management https://www.researchgate.net/publication/228085786	2008	Internet, e-SCM,	The Internet can enhance SCM by making real time information available and enabling collaboration between trading partners.
4	The Effect of E-SCM Systems in the North American Electronic Manufacturing Services Industry	Journal of Theoretical and Applied Electronic Commerce Research	2015	e-SCM, SCM, Satisfaction, Quality, Performance	The e-SCM had a positive effect in the electronic manufacturing services industry as these showed that the profits of the firm increased and internal communications were improved due to the implementation of e-supply chain management

From previous research literature studies above, it can be seen that several parameters of customer loyalty, market development, internet, knowledge management, satisfaction, quality, performance, and SCM have been commonly used in studies related to e-SCM. In this study, using e-SCM had a positive effect in the manufacturing services industry and contribute in creating a competitive advantage.

The subject of e-SCM is the main concern and has become a topic that has been considered by many contemporary researchers and published in various prestigious journals. The company developed the supply chain, by utilizing information technology and the internet, which is commonly known as an electronic supply chain. The electronic supply chain is a process that involves companies and partners in an integrated manner that allows the sharing of processes, objectives and information relevant to the entire value chain[Abdullah, 2014]. The concept of the supply chain is to manage relationships with parties inside and outside the company by providing customers better value at a lower cost throughout the supply chain. The key value of the SCM philosophy is that the overall performance of the entire supply chain automatically improves by optimizing all links in the chain, and optimizing the results as a whole [Farooq, 2019]. A company must participate in the organizational network; otherwise it will lose the competition. The integration of the company into the network will encourage supply chain management.

2. Methodology

The research method used in this study consisted of data collection methods conducting interviews with relevant parties to obtain information about the problems faced and supported by literature studies in the writing process. The design system using UML (Unified Modeling Language), which consist of Use Case Diagrams, Use Case Descriptions, Domain Class Diagrams, Multilayer Sequence Diagrams, and User Interface Designs

3. Result and Discussion

Application design refers to a business model that is used as a rationale for how an organization creates, delivers and captures value[Brunn, 2002] The business model canvas can be likened to a blueprint as a strategy shaped through organizations, processes and systems. The business model canvas is identified into nine basic building blocks that show the logic of how the company strives to achieve business goals and generate profits, which consists of four main areas in a business, namely customer, supply, infrastructure, and financial sustainability. The results are mapped into the application design, as shown in Table 3 below.

Tabel 3. Business Model Canvas

Factors to be analyzed		The proposed system	
Analysis	Finnding	Result	Feature
Costumer Segments	- Coffee Shop - Internet User - Individual/Cusrtomer	Application mobile that can make it easy traders get seeds coffee	Mobile features as an intermediary among coffee farmers with a coffee shop
Value Proposition	- Create broader market opportunities for coffee farming - Creating convenience for coffee shops in finding quality coffee beans	The application of values can used by consumers in the form easily accessible mobile application	Features purchase coffee online from the farmer who provides recommendation superior coffee
Customer Relationship	- Fitur Chat - Contact us - Blog	Strengthen relationship with consumer	Chat feature, contact-us feature to respond to questions from consumers
Channel	- Event - Sosial media	Marketing strategy for application	Strategy for promotion of application
Key Activities	- Development Application - Establish cooperation - Promotion of Application	Process carried out by the application	Social media based application features
Key Resources	- Physical Resources - Human Resources	Information Systems Resources	na
Key Partners	- Coffee farmers - Bank - Expeditionary Services	Cooperation with producers, banks, and courier delivery	Features payment with many variations
Revenue Streams	- Transaction fee 10%	The commission of 1% of transaction	The system calculates automatically for each transaction
Cost Structure	- Cost Structure Fisik - Cost Structure Intelectual - Cost Structure SDM	Cost of facilities, labor, and office operations	na

The following figure 2 is a Use Case Diagram in the application. there are three actors, namely consumers, sellers, and admins, who perform login functions, register coffee products, validate seller, place orders, payments, and others . Whereas Figure 3 is a Use Case Description which describes consumers placing orders for coffee products

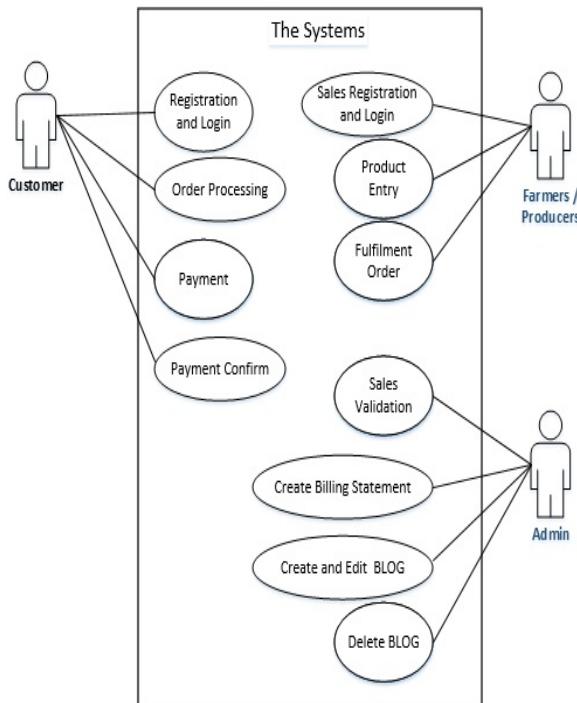


Figure 2. Use Case Diagram

Use Case Name	Place Orders	
Scenario	The customer will place the order	
Trigger	The customer will buy the product	
Brief Description	Consumers who want to buy products are required to place an order	
Actor	Consumers	
Precondition	Consumers make product selection	
Post Condition	Consumers have made product selection	
Flow	Actor	System
	1. Access the Catalog 2. Choose a product 3. Do Checkout 4. Fill in the delivery address 5. Submit orders	1. Show coffee catalog 2. Display the delivery form
Exception	Out of stock	

Figure 3. Use Case Description

The class diagram in Figure 4 illustrates the data in this application, namely consumers, products, orders, payments, and admins

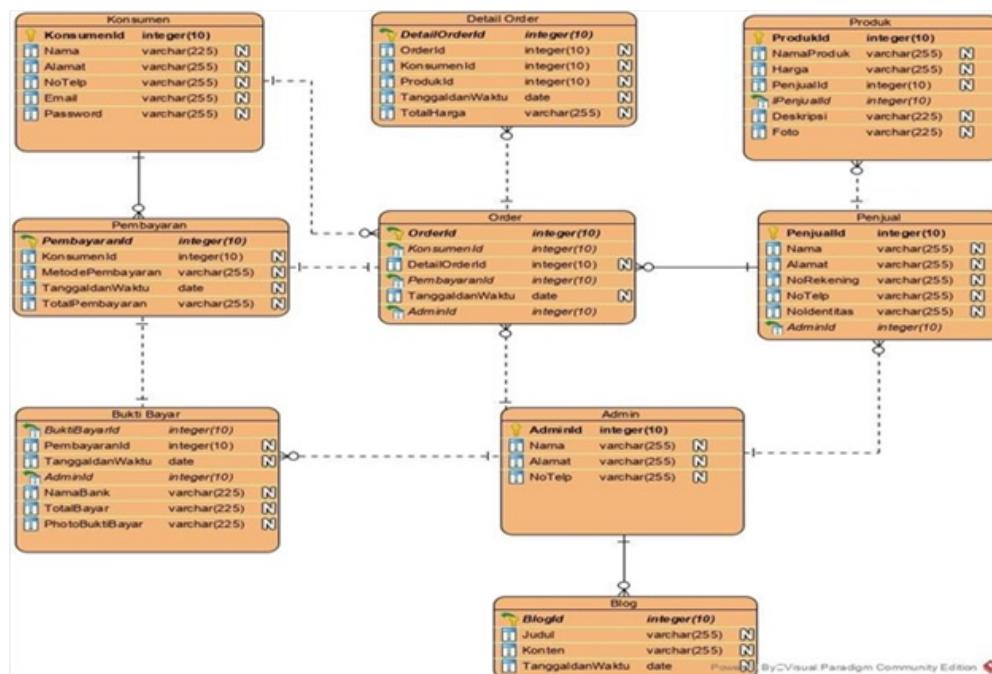


Figure 4 . Domain Class Diagram

User interface design is provided for users to communicate with each other, where users can interact with applications more easily. In the figure3, when the consumer opens the mobile application, it will display the main display, namely home. The home display contains the features available in the Coffee for sale application. On the home menu, consumers can also place an order for products by pressing the "Buy Now" button or the "Shop Now" button which is available on the home screen. Here's the home user interface:

If the consumer already has an account on the Coffee for sale application, in figure 5 the consumer can log in to access the features of the Coffee for sale application and can make transactions in the Coffee for sale application. The following is the user interface for login: In this section consumers can see some of the products displayed on the product menu. In this display, there is a plus (+) icon that can be used by consumers to place orders for products. The figure 5 shows the user interface for the product:

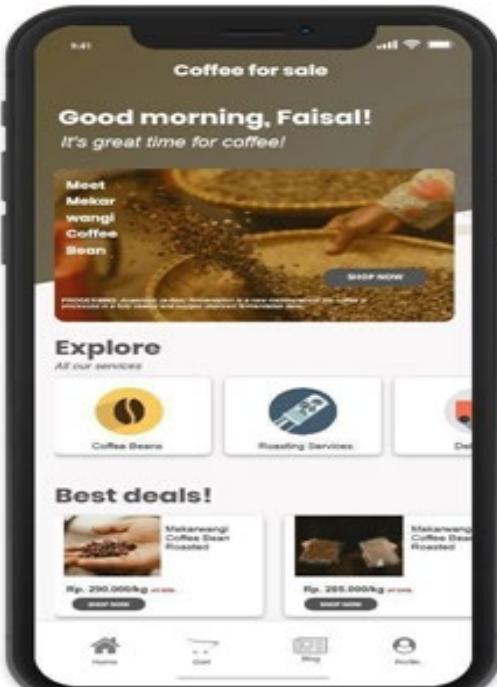


Figure 5. Home User Interface Display

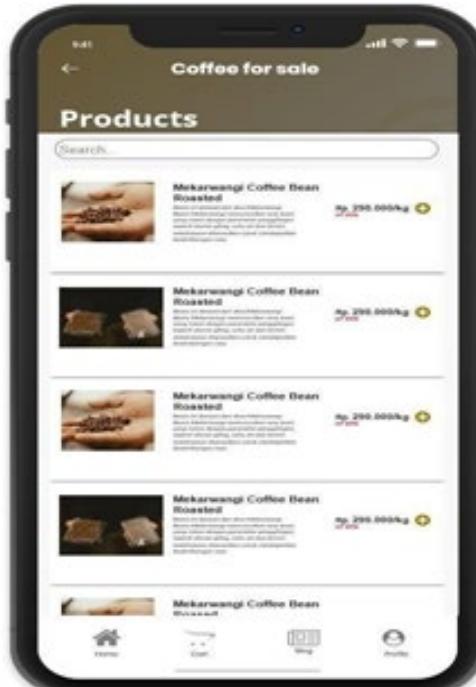


Figure 6. User Interface Product

After the consumer presses the plus icon on the product display, the application will display a product detail pop up so that consumers can carry out order details by pressing the "add" button. Figure 6 is a pop up product detail. As an illustration of how the designed application operates, then Figure 7 illustrates the site map, as the application will be implemented.

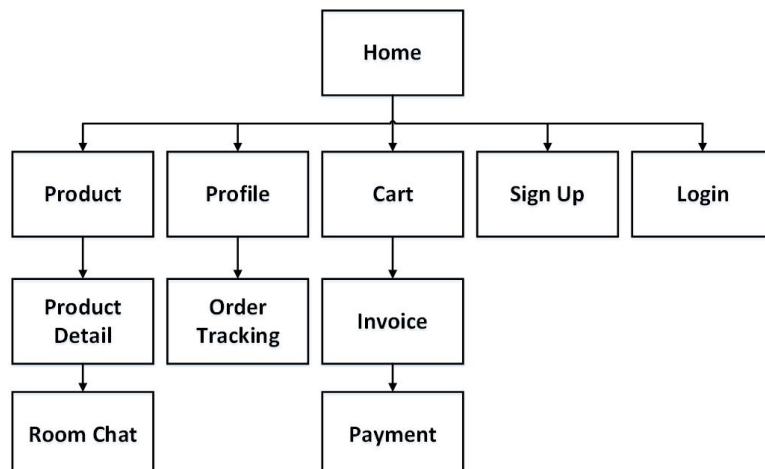


Figure 7. Site map for coffee seller

The product purchase process follows the following sequence:

1. Consumers open the product catalog in the application
2. Consumers choose products in the catalog
3. Customers enter order details
4. Consumers checkout by entering consumer personal data information
5. consumers can register as customers on the application
6. Consumers make payments in a variety of payment methods such as bank transfers and payment gateways
7. After the order is confirmed, the order will be forwarded to the seller
8. The seller sends the order that has been ordered

Effective distribution of products and materials in the supply and demand process among channel partners is at the heart of e-SCM. Integration among partners is a challenge in itself. The Internet and information technology and systems offer such integration, but simply implementing and adopting new software is not the answer and solution to a sustainable competitive advantage. However, the application of Internet-based technology has great potential to reduce costs and increase efficiency

4. Conclusion

Technology and the internet affect the supply chain in companies that exist, easy information exchange, real-time communication with customers or suppliers, quick response, etc. These benefits have an impact on increasing customer satisfaction, efficiency and effectiveness, as well as the company's opportunities for market development. Companies also need to understand how technology does not automatically increase productivity, but needs support from knowledge management. To be a successful knowledge management company, you need to have a close relationship Business, binding perspectives and architecture, leadership knowledge, creation and exchange of a knowledge culture, continuous learning, developed technological infrastructure and systematic organizational knowledge processes.

This application system is designed into two parts, namely the front-end and back-end. The front-end can be used by consumers by accessing it via a smartphone. The back-end section can be accessed by the Coffee for sale admin using a computer. Maintaining the collaboration with institutions related to the agricultural industry, especially coffee farming. Developing the user interface on the Coffee for sale application to increase the ease of interaction between sellers and consumers. Developing a business model so that it can be adapted to the conditions in the future.

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Biography / Biographies

Tri Pujadi is an lecturer, in Information Systems in the School of Information Systems of Bina Nusantara University, Jakarta, Indonesia. He received the B.S. and M.S. degrees in information system management from the Bina Nusantara University, Indonesia, in 1998. From 2012 to 2019, he was a Research Coordinator with the School of Information Systems – BINUS University. Since 2010, he has been an Assistant Professor with expertise in Information Systems Plan and Design. His research interests include database management, e-commerce and e-business, disaster management.

Vikas Kumar is a Professor of Operations and Supply Chain Management at Bristol Business School, University of the West of England (UWE), UK. He holds a PhD degree in Management Studies from Exeter Business School, UK and a Bachelor of Technology (first-class distinction) degree in Metallurgy and Material Science engineering from NIFT, India. He has published more than 150 articles in leading international journals. He serves on the editorial board of a number of international journals including Int. J. of Services, Economics and Management, Int. J. of Manufacturing Systems, and Int. J. of Lean Enterprise Research, and. His current research interests include Sustainability, Food Supply Chains, Blockchain, Operational Excellence, and Digital Supply Chains.