

# Virtual Warehouse for Merchandise Inventory, Small and Medium Entrepreneurs (SMEs) in the E-Commerce Sector

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## ABSTRACT

*The advancement of e-commerce marketplace applications has made small and medium entrepreneurs (SMEs) in the e-commerce sector, grow rapidly in the current Era Industrial Revolution 4.0 Era. With limited capital, SMEs businesses must compete by increasing the inventory of various merchandise and large stocks, thus requiring an increase in warehouse capacity to become larger. There is a phenomenon related to the need for large warehouses and inventory for merchandise products of SMEs in the e-commerce sector, to e-commerce marketplace applications that have a virtual warehouse concept.*

*The purpose of this study was to determine the concept of virtual warehouses, inventory management in virtual warehouses and the advantages of virtual warehouses, for SMEs in the E-commerce sector in the Industrial Revolution Era 4.0. This research method is descriptive qualitative. Informants in this study were determined purposively.*

*The Virtual Warehouse is a virtual storage place to accommodate and store inventory data, it's a product of a digital application system program that functions to accommodate, storage, and record inventory data stock. In the e-commerce marketplace application, the warehouse facility feature is provided virtually by the application system. It's implementation greatly reduces costs and is very efficient compared to conventional physical warehouses. With mobile device or computer that can operating online and within internet signal range, operating of virtual warehouse can be carried out anytime and anywhere.*

## 1. INTRODUCTION

E-commerce has grown very fast. According to Herman et. Al. (2015). The Industrial Revolution 4.0 is an era of digital industry where all parts in it collaborate and communicate in real time anywhere at any time with the use of IT (information technology) in the form of the internet and CPS, IoT and IoS to produce new innovations or other optimizations that are more effective and efficient.

Small and Medium Enterprises (SMEs) in their competition must also adapt and utilize e-commerce, especially facing the challenges of the Industrial Revolution 4.0 and the current COVID-19 pandemic situation. The definition of SMEs according to Republic of Indonesia Act No. 20 of 2008. is a trading business managed by individuals which refers to a productive economic business with the criteria set out in the act. The SMEs' constraint of limited capital (Vikaliana et al., 2017) and storage space can be helped through alternative uses of Virtual Warehouse by opening an online shop (Online Shop) on the e-commerce market place application (Hei, 2006).

The urgency of this research is to be able to assist and provide solutions for Small and Medium Enterprises in the e-commerce sector, in helping to minimize business capital by implementing Virtual Warehouse for inventory management of selling products. So that they can survive, adapt,

compete and develop their business with the limited capital they have, during the COVID-19 Pandemic, even after this pandemic can be overcome and in the era of the industrial revolution 4.0.

The research question to objective of this study are includes:

1. What is the Virtual Warehouse Application Concept for Small and Medium Enterprises (SMEs) in the E-Commerce sector in the Industrial Revolution Era 4.0?
2. How is the concept of inventory management in the Virtual Warehouse Application for products selling Small and Medium Enterprises (SMEs) in the E-Commerce sector in the Industrial Revolution Era 4.0?
3. What are the perceived advantages of Virtual Warehouse for Small and Medium Enterprises (SMEs) in the E-Commerce sector in the Industrial Revolution Era 4.0?

By implementing a Virtual Warehouse for inventory management of their selling products, SMEs in the e-commerce sector can remain resilient, adapt, compete and develop their business with the limited capital they have, in the midst of the COVID-19 Pandemic, even after this pandemic can be overcome and in the midst of the era of This industrial revolution 4.0.

## 2. LITERATURE REVIEW

### Virtual Warehouse.

Jung, H.; Jeong, S. (2018). A Virtual Warehouse where only inventory information on all the material provided by the suppliers can be stored and shared can replace a physical joint warehouse or a supplier park without a large investment. Fung, S.H.; Cheung, C.F.; Lee, W.B.; Kwok, S.K. (2005). Virtual Warehouse is a business model that aims to reduce costs, optimize production and provide high-quality customer service among supply chain channels. The VW is dependent on information technologies and real-time decision algorithms to provide operating efficiencies and global inventory visibility comparable to those achieved in a single-location, world-class warehouse .

Thomas L Landers, Michael H Cole, Bryan Walker, Randall W Kirk. (2020). The virtual warehouse is a state of global resource visibility, based on real-time acquisition and processing of operational data. Information available in the virtual warehouse has the potential to reduce cost and improve customer service. The infrastructure is now available to capture real-time data, and the cost of data acquisition will continue to reduce. The challenge for logistics researchers is to develop fast algorithms and interactive decision-support systems to fully exploit the potential of real-time global visibility.

### E-commerce.

Huang et al. (2015). Future technologies for supporting E-commerce include three future perspectives: Internet of Things (IoT), Big Data Analytics, and Cloud Computing. These technologies may be able to upgrade and transform the Ecommerce logistics into a wider implementation not only for giant corporations, but also for small and medium-sized enterprises (SMEs) to get the benefits from E-commerce era. IoT is a smart network of physical objects, devices, vehicles, architectures, and other items that are embedded with sensors so that these objects could communicate and exchange data within an intelligent environment

The similarity with the previous research is discussing the virtual warehouse and the inventory management. The previous research, virtual warehouse and inventory management were studied in the manufacturing sector, with a large business scale. While, this research studies the virtual warehouse and inventory management for SMEs entrepreneur in e-commerce sector.

## 3. METHOD

The research method was carried out with a descriptive qualitative approach (Creswell, 2014). Resource persons were determined by purposive sampling to SMEs entrepreneur who carry out transactions through online stores (e-commerce). Data collection is done by triangulation, observation, documentation and interviews, data has analyzed continuously to find the concept of using virtual warehouse applications for supplies used by SMEs. To maintain the credibility of the validity of the data and the quality of the research results, extended observations during the research

process, test results by conducting business process transactions as verification and also focus group discussions internally by the research team and with external colleagues. In the end, conclusions can be drawn that deserve to be used as research results to be published as research outputs.

#### 4. RESULT AND DISCUSSION

##### Result

The informants of this research were selected by purposive sampling to SMEs in the sector of e-commerce with the following provisions and criteria:

1. SMEs entrepreneurs as informants are included in the criteria for small and medium business actors in accordance with Republic of Indonesia Act No. 20 of 2008.
2. SMEs entrepreneurs have been running e-commerce businesses for at least 2 years.
3. SMEs entrepreneurs apply the concept of a virtual warehouse in their business.

This research was conducted to several informants who have been determined according to the provisions previously described. The research informants are:

1. Mr. Astana Ashadi
2. Mr. Ade Firmansyah
3. Mrs. Komala

The initial stage carried out on the informants in this study was to conduct interviews related to the purpose of this research, then all answers would be analyzed to find the specifics, characteristics and similarities of the answers to the main ideas. This is done to find the main answer and to get one of the input materials for drawing conclusions. From the interview questions that were asked to all the informants, all the answers had the same meaning. The results and summary of interview answers are as follows:

##### Question-1:

What is the suitable concept of virtual warehouse for SMEs?

##### Answer:

- a. The feature of marketplace platform. A place to store and record the stock of merchandise which can be regarded as a virtual warehouse.
- b. The warehouse does not exist, but only as the form of an application system.
- c. A marketplace platform installation and create an online shop business account in order to be able to do transaction and utilize the facilities available.

##### Question-2:

What is the inventory management concept in the virtual warehouse?

##### Answer:

- a. Recording the flow of product transactions in the marketplace platform system, such as goods receive; stock availability; and goods outbound. Products that are recorded to be advertised and sell, are not only that are owned, but also from many online partners who sharing data product with each other.
- b. Data sharing aims to help each other to advertise and sell products. When there is a sale, we can buy the product first and send it to our consumers. Or it can be sent directly from supplier partners, directly to our consumers.

##### Question-3:

What are the perceived advantages of virtual warehouse for SMEs?

##### Answer:

- a. The transaction recording feature that is easy to learn and use, transactions are recorded and stored for a long time. It's can be use anywhere and anytime, as long as your computer or mobile device is within the range of internet access.
- b. Compared to conventional or physical warehouses, warehouse application costs are very low.

## Discussion

All of the informants' answers, it is an appropriate and mutually reinforcing implementation of the literature review presented in this research method. So that it can be concluded between the results of previous studies, expert theory and entrepreneurs SMEs ecommerce sector practices in this study, are implementation is appropriate and mutually reinforcing.

The results studies of observation and trial transactions by applying the virtual warehouse concept, can produce a concept pattern that describes the role and position of the virtual warehouse in the marketplace application in the e-commerce business world (Forte et al., 2012; Hei, 2006).

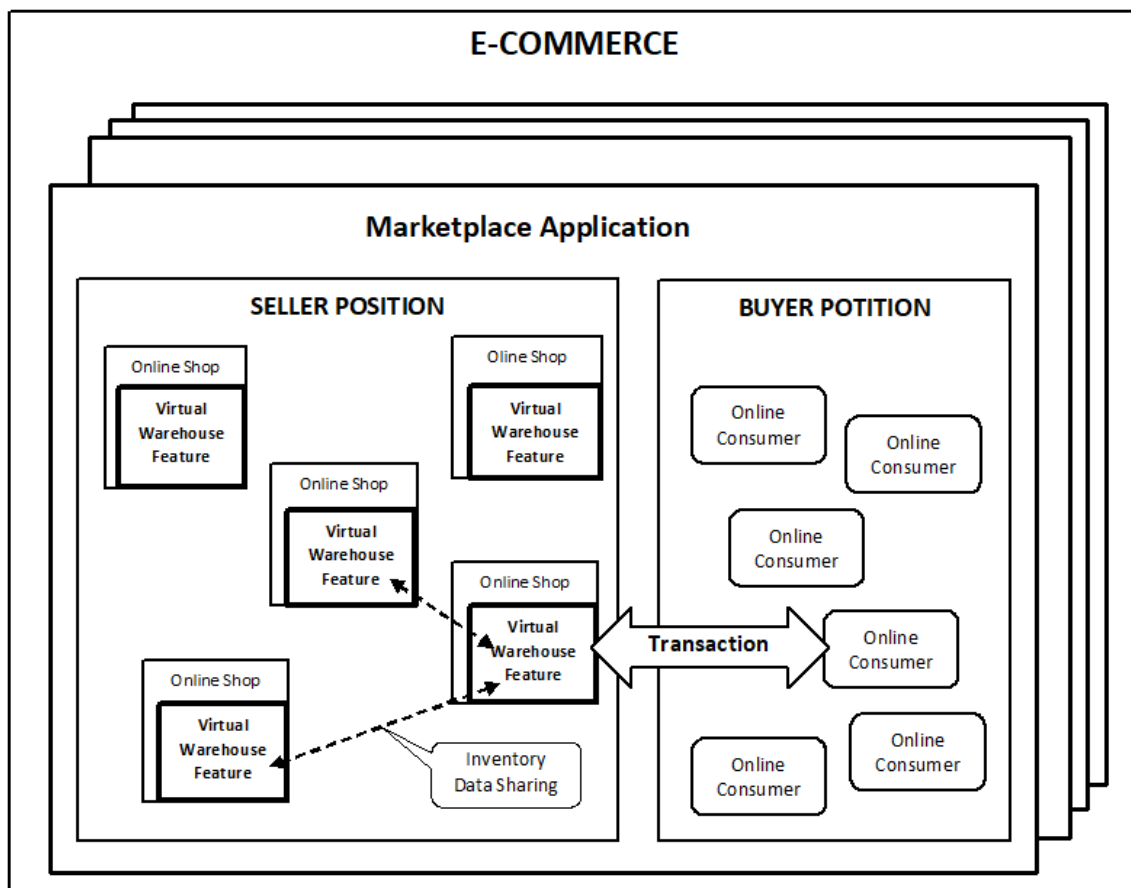


Figure 1.: Illustration Concept Virtual Warehouse Merchandise Inventory, in the Online Shop marketplace application in E-commerce

In the world of trading ecommerce, there are many marketplace applications as a one of which is a place to bring together sellers who want to sell goods with buyers who need goods or services, so the marketplace application is a tool for buying and selling transactions.

Between one application marketplace and another, each has advantages and various service features and facilities, among the various features available, of course there is a facility to record the products and quantities they sell, this feature is a virtual warehouse. The Virtual warehouse feature itself is a facility to place selling items that not only they already have, but also those owned by their business partners to helping to sell each other.

In generally, Virtual Warehouse is a virtual storage place , which is used to accommodate and store inventory data, it's as one of the features in the ecommerce marketplace application to conduct trade transactions between sellers and buyers in e-commerce.

In terms of the physical existence of a virtual warehouse, a virtual warehouse is not actually a physical building that exists in the real world. The virtual warehouse is a product of a digital

application system program that functions to accommodate, storage, and record inventory data stock. Inventory isn't also physically stored, but in the form of data from inventory stock that exists in the real world. If in the real world a storage warehouse is a physical building, then a virtual warehouse is a storage warehouse in cyberspace in the form of a digital application system program to store and record inventory stock data.

In terms of storage capacity, virtual warehouses have a very large capacity that can even be said to be countless. This is because the virtual warehouse capacity is based on digital application system data storage space, in contrast to conventional physical warehouses that capacity can be calculated based on the physical area space and volume of the building space (Banfalvi et al., 1996; Hei, 2006).

In terms of inventory procurement and maintenance costs, virtual warehouses reduce costs significantly and are much more efficient than conventional physical warehouses. In the procurement virtual warehouse, SMEs entrepreneurs just simply to create an account business seller on a marketplace application, so they can immediately use various service facility features, one of which is a provided is virtual warehouse. Opening a business account on a marketplace application is an important and main thing for SMEs entrepreneur in e-commerce sector to carry out trade transactions online. There are various methods that are charged to users, including purchasing a member account consisting of several levels; or from every trade transaction that occurs will be subject to a transaction fee discount. The maintenance costs are almost non-existent because virtual warehouse maintenance is carried out by the owner of the marketplace application, and SMEs entrepreneurs only take advantage of the facilities without having to worry about maintaining the virtual warehouse.

In terms of easy to use and operation, it can be said so user friendly, because as long as you have a mobile device or computer that can operating online internet and within internet signal range, operating of virtual warehouse can be carried out anytime and anywhere.

## 5. CONCLUSION AND SUGESSTIONS

The conclusion results of this studies are as below:

1. Virtual Warehouse Application Concept for Small and Medium Enterprises (SMEs) in the E-Commerce sector in the Industrial Revolution Era 4.0. Virtual Warehouse is a virtual storage place to accommodate and store inventory data, as one of the marketplace application feature facilities to conduct trade transactions between sellers and buyers. To take advantage of it, SMEs entrepreneurs need to create an online store account in the marketplace application.
2. Inventory management concept in virtual warehouse for SMEs, is recording the flow of product transactions. It's not only come from the owner, but also from many suppliers who have collaborated to help each other to advertise and sell partner's merchandise.
3. The advantages of virtual warehouse for SMEs are:
  - a. In terms of the operation. Provides transaction recording features, which easy use and transactions are recorded and stored for a long time. It's can be use anywhere and anytime, as long as internet accessing.
  - b. In terms of costs. Compared to conventional or physical warehouses, which at least have to pay the cost of buy or rent a warehouses and other supporting facilities. The virtual warehouse makes a greatly cost reduction and very efficient

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