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Garment Inventory Management Systems

Irfan Luthfi Makarim [1], Reflia Yusramdaleni [2], Alif Fathir [3], Tanty Oktavia [4], Ford Lumban Gaol [5] Takaaki Hosoda [6]

[1,2,3,4]*Information Systems Department, School of Information Systems Bina Nusantara University* Jakarta, Indonesia, 11480

[5]*Computer Science Department,Binus Graduate Program -Doctor of Computer Science Bina Nusantara University Jakarta, Indonesia, 11480*

[6]*Decision Science Department Advanced Institute of Industrial Technology Tokyo, Japan*

Irvan @binus.ac.id, reflia@binus.ac.id, alif@binus.ac.id, toktavia@binus.edu, *fgaol@binus.edu*, t-hosoda@aiit.ac.jp

Abstract

One of the difficulties to create stock control is the way to deal with the stockroom and organize stock to satisfy both on the web and offline (retailer) orders. Mostly, the current improvement of stock administration by the garment industry is yet running physically utilizing paper and notes. It causes miscalculation and loss of stock by the piece of clothing industry happened when recording the stock information. Additionally, it influences shrinkage and quality fall flat reduces which prompts the inconsistency between the recorded stock and the actual stock. The fundamental motivation behind this theory is to assemble an answer for stock administration for Garment Industry and encourages the piece of clothing industry with the Buka Gudang – Inventory Management System. Advantage from Buka Gudang – Inventory Management System for an article of the clothing industry is to improve for eliminating bottlenecks and disposal of repetitive advances can without much of a stretch be accomplished, encourage Garment Industry for a mechanized report of stock by checking stock rundown that will be refreshed electronically each time a deal is made and print out the report featuring the stock to be restocked, and Help business for keeping up the stock rundown naturally and give an exactness to each refreshed information, for example, a precise numerical estimation on Buka Gudang – Inventory Management System. Investigation measure for this postulation is finished by Data Gathering through Interview with a few dealers around Tanah Abang Jakarta who possessed a centerpiece of the clothing industry, at that point doing some perception on the stock framework and current piece of clothing industry circumstance that requirements stock administration to have the option to control the stockroom of an article of the clothing industry. Inventory, Control, Garment, Stock, Online

Keywords— Inventory, Control, Garment, Stock, Online

1 Introduction

The most emerging technology allows technological devices to be connected easily through the internet (Anggraini et al., 2019). Along with developments in mobile technology, more and more technologies are being created to help human activities, such as wearable smartwatch technology. Terms of smart wearable technologies of wearable technology are defined to figure out seamlessly embedded portable computers and advanced technology that can be used on the part of the body and can interact between users and the smart environment anywhere and anytime they need. The successful wearable technology allows the embedded this device into a new generation of products.

This phenomenon changes the pattern of humans using watches in general. By using a smartwatch humans can communicate, interact with other people, and get various information. A smartwatch is a device that can be connected to a smartphone and can receive various information, such as time, text messages, schedules, and GPS data. Smartwatch technology is the latest development in wearable type technology. Smartphones and smartwatches have become a daily need for many people. Many people use this technology to accommodate the monitoring of health, especially as sports tools.

Smartwatch technologies innovate with many wireless sensors that can support people who intense to take exercises, such as athletes. With this smartwatch, the sensor can record sports activity, oxygen, heart rate, sleep quality. Moreover, it can synchronize the data from various platforms, thus leads to a database and network (Ha et al., 2017). Data from smartwatches can be support for sport science analysis because the human activity can become a part of an intelligent system (Ardiyanto et al., 2020) to recognize every pattern in daily sports activity, so the sports organization can monitor the athlete's performance periodically. Before sports organization adopts this technology, we need to do the evaluation review to check the behavior of people to use a smartwatch, what factors that influence people to decide to wear the smartwatch.

In this study, the factor he anthology, hedonic, habit, expectation confirmation models are explored to determine their influence on the smartwatch adoption. The result shows heathology and habit factors also have a significant effect on continuance intention variables. This proves that most smartwatch users feel that wearable technology can motivate them to exercise to maintain healthy health. Users also feel that using a smartwatch can help with certain tasks such as maintaining sleep patterns so that this can increase the user's continued intention to use the smartwatch. Therefore, overall in this study, it is evident that including `healthology and habit variables into the Expectation Confirmation (ECM) model framework will add predictive power in the user's continuing intention.

2 Literature Review

This session describes the theories from relevant previous research related to wearable technology and variable of research, as a background of this research:

2.1. Information Systems. The role of information systems in modern times can be found in everyday life. The application of information systems covers many fields such as education, banking, business, and health. Information systems in the health sector aim to make it easier to find patient data, drugs, and doctor's schedules. This is done to improve services at the hospital. Information systems serve as tools for gathering information and can monitor in an emergency (Holla & Moricova, 2019) and information systems are an important form of knowledge representation (Liu et al., 2020).

2.2. Internet of Things (IoT). Discussing the Internet of Things (IoT) is very broad because the Internet of Things (IoT) does not have a fixed definition. When discussing the Internet of Things (IoT), there is usually a new discussion, starting from everyday life to objects that are used as a device to help with daily activities, such as using a smartwatch that can record user activity to find out the distance the user has traveled and then smartwatch data. connected to a smartphone to be used as a reference for users in carrying out activities. The Internet of Things (IoT) reshapes the world into smart cities, smart networks, smart agriculture, smart transportation, smart health care systems, and smart homes (Kamran et al., 2020) Internet of Things (IoT) applications can enable device-to-device and human-device interactions strongly and reliably (Nord et al., 2019).

2.3. Smartwatch. Wearable technological developments and advancements that are increasingly widespread today are supported by a variety of technological sophistication to give rise to the latest discoveries. One of them is the invention of wearable devices, which are objects in the form of accessories that have technology such as the small computer. Wearable devices can take the form of bracelets, clothes, glasses, and watches. In general, wearable device users are fans of the latest technological developments, sports players, and elderly people who are advised by medical personnel to maintain their activities and health. Wearable smartwatch technology is a modification of an ordinary watch into a communication tool. Today, most smartwatches have a variety of useful functions that turn them into mini-computers that can be used to run applications, answer calls, read messages, and receive notifications without having to look at the phone. Some smartwatches have complete fitness tracker functionality by monitoring important metrics such as running speed, several steps, and heart rate (Casselman et al., 2017) With the various features in the smartwatch, of course, it will be very useful for both individuals and health institutions. More and more testimonies prove that smartwatches can save people's lives in cases of medical emergencies. The use of smartwatches in health institutions, for example, monitors patients who have been in intensive care but have been allowed to return home. This helps medical personnel monitor the health of their patients so that medical personnel becomes more responsive, and for patients using smartwatches, they are more concerned about health. The use of smartwatches can improve the quality of health services by using data accuracy and easy monitoring and can encourage lifestyle changes to be healthy. According to (Ogbanufe & Gerhart, 2018) said that a smartwatch equipped with a pedometer function can be used to monitor health conditions such as heart rate and blood pressure. The more benefits that users get from the smartwatch, the result is that user satisfaction is met and allows users to continue using it (Nascimento et al., 2018).

2.4. Health and Healthology Variables. The application of the Internet of Things (IoT) in health products can change the focus of the health care industry into a preventive program, this allows a person to be active and take responsibility for their health. Therefore, the emergence of smart devices that can be used creates a new dimension to measure health and technology is considered appropriate, the term healthology is defined as the interaction of health, informatics, and technology problems (Dehghani et al., 2018).

2.5. Hedonism and Hedonic Variables. The life of hedonism in modern times is increasingly widespread starting from clothing styles, modern entertainment, modern technology, and consumptive lifestyles. Hedonism will continue to develop as long as humans are still alive and technology creators continue to develop their innovations. The development of technological innovations, for example in the use of watches, which currently have various functions. Given that smartwatches are multipurpose and convergent devices that are expected to meet the utilitarian and hedonic needs of users (Kim, 2016).

2.6. Habits and Habits Variables. Each individual certainly has the behavior to get pleasure or the goals to be achieved. The behavior that a person does repeatedly creates a habit of his actions. Habits are human actions that are repeated in the same way. The habit of using watches has changed, due to the creation of smartwatch technology or what is known as a smartwatch. The use of a smartwatch creates a new habit of using a watch. A smartwatch is not only useful as a smartphone companion, but

has many functions such as adjusting sleep patterns, getting notifications, becoming a fitness tracker, and others. (Nascimento et al., 2018) observed that the effect of habit moderation in the relationship between satisfaction and the continuing intention was statistically significant in the context of wearable technology.

2.7. Expectation Confirmation Model (ECM). The Expectation Confirmation Model (ECM) introduced by (Bhattacherjee & Barfar, 2011) is a well-known research model for explaining the sustainability of information systems. In the Expectation Confirmation Model (ECM) an individual's decision to continue using the information system depends on three variables, namely, confirmation, satisfaction, and perceived usefulness. (Bhattacherjee & Barfar, 2011) show that user continuity intention is determined by satisfaction in the use of information systems and perceived usefulness of the continuous use of information systems, then user satisfaction is influenced by the confirmation that users expect in using the information system, then perceived usefulness after acceptance in using the system. the information is affected by the user's confirmation level. Previous research using the Expectation Confirmation Model (ECM) such as mobile application journals written by (Hsu & Lin, 2015). e-learning system journals are written by (Daɬhan & Akkoyunlu, 2016), social commerce journals written by (Hew et al., 2016), a digital textbook journal is written by (Joo et al., 2017), continuation intention journal to use smartwatch (Hong et al., 2017), and journal of advanced features of smartwatch use (Ogbanufe & Gerhart, 2018).

3 Method

- BUKA GUDANG Inventory Management is an electronic entryway that gives stock administration framework to the clothing stores to screen and to keep up stock accessibility to adapt to the interest of stock administration framework and can be gotten to through the program from mobile phones, PC, even PC tablet. The idea of the administration is to bring straightforwardness during observing and keeping up stock accessibility measures. By utilizing BUKA GUDANG, Partners can check the summary and statistics of their stock on a month-to-month premise. All the functionalities of Buka Gudang can be seen in the Fig. 1 Use Case Diagram and Fig. 2 User Interface Diagram of Buka Gudang. A partner can create, change, erase, archive, and check items by clicking the stock menu to record their stock information. Notice menu is utilized for Partner to make, adjust, erase, document, download, and check their stock exercises for which things that should be continued or transported. A partner can add, alter, erase, document, and check which things are put away in one distribution center and which things are put away in different stockrooms by clicking the stockroom menu. To follow things that have been dispatched, clients can check it on the Trace menu if just Partner as of now has set up reconciliation with BUKA GUDANG delivering Partner. Last, by clicking the organization menu, Partner can set up joining with BUKA GUDANG transportation and commercial center Partner to follow their requests and to associate their stock information to the commercial center.

- Partners don't need to record stock information physically utilizing paper or notes, by utilizing BUKA GUDANG stock information and stock exercises will be recorded naturally to dodge any erroneous conclusion concerning stock data. On the opposite side, Partner doesn't need to settle on decisions to ensure whether one thing is put away in one stockroom or different distribution centers, by utilizing BUKA GUDANG thing or thing gatherings can be recorded which things or thing bunches that put away in one distribution center and consequently BUKA GUDANG will ascertain between the bookkeeping and actual stocks to evade lost and shrinkage which incorporates deterioration and harm. Partner doesn't need to stress if their stock stocks are now being sent because BUKA GUDANG has incorporated with delivery Partner to follow stock transportation to stay away from a stock robbery. Alongside this site, not just encourage Partner to keep up their stock control yet additionally rearrange the delivery cycle and help piece of clothing businesses to interface stock information to the commercial center Partner of BUKA GUDANG. Spared in one information base, all of the stock

information from everything Partner can be controlled and checked by BUKA GUDANG. BUKA GUDANG additionally keeps up all stock information from all Partners which is spared in one data set. Created as a cloud-based, article of clothing businesses can get to this application more adaptable through their PC or cell phone. Last, by making this framework, it can decrease the blunders which happen because of the human mistake. These are a few advantages that are picked up from BUKA GUDANG. BUKA GUDANG homepage which incorporates four taskbars menu, for example, highlights, evaluating, about, and sign in. Partners need to enlist themselves by clicking Sign Up catch on point of arrival or clicked free preliminary thirty days to attempt the preliminary. If Partner clicked free preliminary thirty days, at that point Partner need to enter organization name, email, telephone number, and necessities to continue the preliminary at that point if succeed, Partner needs to browse their email to discover the preliminary connection that BUKA GUDANG has sent. On the opposite side, if the Partner clicked Sign Up to enroll themselves, the Partner needs to include organization name, email, secret key, telephone number, organization address, about the organization at that point Partner clicked close to continue the following stage. In the following stage, the Partner will be requested their installment plan possibly they need to be charged naturally or physically every month and there is extra help that Partner can decide for the individuals who needed extra 50 requests and delivery marks and clicked close to continue to the last advance. Moreover, the framework will show the outline of Partner request at that point Partner can check if their information is as of now right. If not, they can click back to adjust the past information and if the information is as of now right, they can click Sign Up to continue the last advance in enlisting themselves to BUKA GUDANG.

Moreover, Partner clicked sign-in on the taskbar menu, the framework will guide them to the sign-in page. At that point, the Partner needs to include their email and secret phrase and clicked Sign In catch to enter the BUKA GUDANG dashboard. OTP code will be sent naturally to the Partner telephone number after Partner clicked sign in the catch, at that point Partner need to enter the OTP code and clicked submit to continue the sign in the cycle. On one condition where Partner didn't get any OTP code, Partner can click resend code to get another code on their telephone. This code will just keep going for thirty minutes. On the off chance that the login is an achievement, the Partner will be coordinated to BUKA GUDANG Dashboard. On other condition, if Partner overlooked their secret key, they can click failed to remember secret key and info enlisted email and captcha then clicked sign to get the connection which will guide them to the profile page and change their secret phrase. For a Partner who cannot peruse the captcha appropriately, click attempt another captcha to get another captcha.

After successfully signing in to BUKA GUDANG, the system will show the dashboard of BUKA GUDANG which comprise of BUKA GUDANG navigation bar menu, for example, stock, warning, announcing, distribution center, follow, and association and BUKA GUDANG Dashboard are isolated into two classifications which are outline and measurement. Outline comprises of deals movement, item rundown, deals request synopsis, stock rundown, and top-selling things. This information is taken from the detailing page. Then Statistics page comprises data about thing rate, deals request illustrations, receivables, and reorder designs, this information is produced naturally by Buka Gudang.

Then again, if stock is being clicked, the Partner can see arrangements of things. Subtleties comprise of thing subtleties data. A partner can add another thing or thing gathering, adjust the information, erase the information, and file the information which will be moved to the announcing page. The information can be arranged per section and the Partner can download the softcopy or straightforwardly print the information.

A partner can see arrangements of stock exercises when they click the warning menu. Notice isolated into two exercises, for example, to be pressed and to be delivered. To be stuffed comprises of new request records that should be continued while to be transported incorporates data about the request that has been pressed yet should be sent from stockroom to the store or the other way around. A partner can add another thing or thing gathering, change the information, erase the information, download, and chronicle the information which will be moved to the revealing page. The information

can be arranged per segment and the Partner can download the softcopy or straightforwardly print the information.

A partner can see arrangements of distribution centers that put away things or thing bunches on the stockroom page. A partner can make another distribution center information, alter, erase, and archive the stockroom which will be moved to the detailing page. The information can be arranged per section and the Partner can download the softcopy or straightforwardly print the information.

Then again, when Partner clicked follow, Partner can follow their request from stockroom to the store or the other way around by contributing receipt number from BUKA GUDANG delivering Partner yet on this condition, Partner needs to set up reconciliation with delivery Partner of BUKA GUDANG first or, more than likely they can't follow their request. In an association page, the Partner can set up the mix with BUKA GUDANG dispatching Partner to assist their business with conveying their stock stocks from the distribution center to the store or the other way around. Likewise, Partner can propel their business with BUKA GUDANG Marketplace Partner by doing coordination through BUKA GUDANG which will set up their stock stocks level to the commercial center itself.

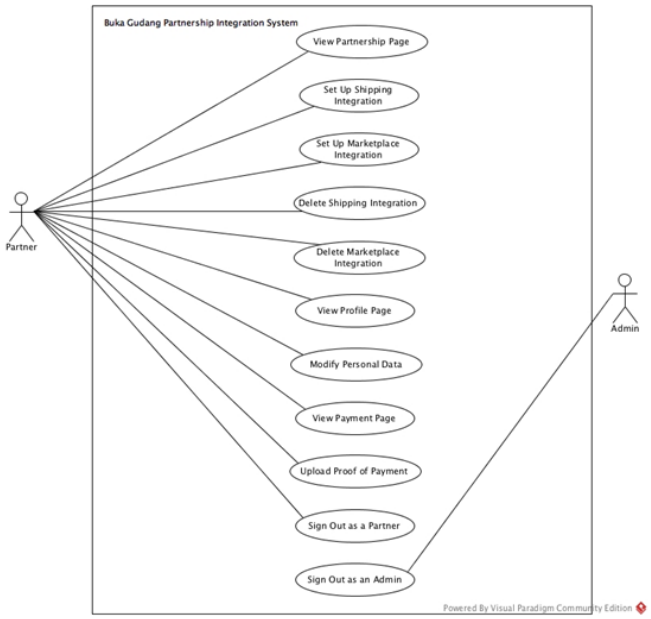

Figure 1 Use Case Buka Gudang

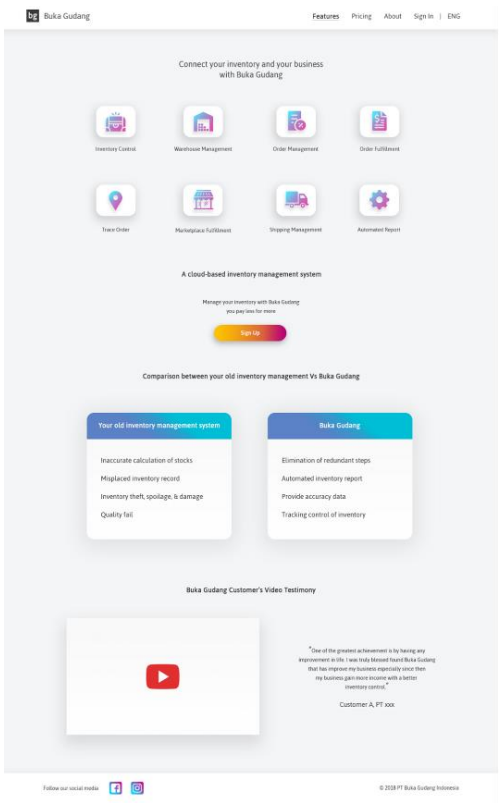

Figure 2 User Interface Buka Gudang

In the client symbol, there are three alternatives, for example, profile, installment, and sign out. If the profile is being clicked, Partners can see and adjust the subtleties of their information. At the point when Partner clicked installment, they can see their installment history and their next installment plan, likewise on this page Partner can transfer confirmation of installment. Also, to wrap things up if Partner needs to exit from BUKA GUDANG, they can click sign out then discourse box will seem to find out if they are certain or not to close BUKA GUDANG and if they clicked truly, they will be coordinated to the BUKA GUDANG greeting page once more.

On the presentation page, there is four taskbar menu, for example, highlights, estimating, about, and sign in. At the point when Partner clicked highlights, they can see some data concerning highlights of BUKA GUDANG, likewise, they can click pose an inquiry catch to pose any inquiry in regards to BUKA GUDANG highlights. Then again, if Partner clicked estimating, Partner can see evaluating of BUKA GUDANG and the advantage of its cost, likewise there are some oftentimes posed inquiries content that can be seen to see more about BUKA GUDANG valuing. Next, when Partner clicked about, they can perceive what BUKA GUDANG is and who are the organizers of BUKA GUDANG. Likewise, there are some much of the time posed inquiries substance about BUKA GUDANG to see profoundly of what is the issue here.

4 Conclusion

Based on the result of system modeling of Buka Gudang a Cloud-Based Inventory Management Service to help the stock control for the article of clothing industry can be finished up as follows:

1. Some distribution center issue that happens underway from the upstream cycle might be wrong that can be a consequence of miscalculating stock. With the presence of Buka Gudang, it will consequently spare the stock information, handling the information, and leave the information in one data set. This can diminish mistakes that happen when the Buka Gudang framework recorded the stock information for the accomplice to get stock information consequently from one source.

2. Warehouse in Production from the upstream cycle might be lost and not accessible for this activity, but rather it isn't reflected in the stock record. Through Buka Gudang, all stock information will be recorded per each stockroom creation remembering the stocks for some distribution center stockroom and naturally will reflect the stock record. Thus, it assists with dodging lost while controlling the stock.

3. Shrinkage additionally turning into a difficult issue. Shrinkage incorporates stock robbery, waste, and harm. Waste is more normal in the creation of transient merchandise. Additionally, the Quality bomb reduces the accessible Warehouse in Production, which prompts the inconsistency between the recorded stock and the actual stock. In Buka Gudang, the accomplice can see the level of stock per stockroom and creation, and everything comprises of point by point things which permits the accomplice to channel their stock information and oversee stock information. At that point, by this component, the level of occasion to get shrinkage or deterioration will be abatement.

4. Companies need inventory management as adequate planning and administration of the inventories to integrate coordination with the production, maintenance, and distribution of the products to meet partner demand and not lose market share concerning other firms. Buka Gudang facilitates partner to integrate coordination with the inventory data, warehouse data, even partner can trace their shipping from one warehouse to the production. Moreover, partners can integrate coordination with shipping partners and marketplace partners to expand their inventory data to the next level and increasing their market share.

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References

Direktorat Industri Tekstil dan Aneka, Direktorat Jenderal Basis Industri Manufaktur; Kementerian Perindustrian. (2013). Info Komoditi Pakaian Jadi. p. 14.

Direktorat Jenderal Basis Industri Manufaktur Kementerian Perindustrian; Badan Pusat Statistik. (2014). Info Komoditi Pakaian Jadi. p.11.

Li, M., & Wang, Z. (2017). An integrated replenishment and production control policy under. (pp. 137 - 149.)

Nagle, M., Fisher, S., Frazier, S., & McComb, S. (2018). Streamlining a Simulation Center's Inventory Management.p.2.

Several internet users in Indonesia from 2015 to 2022 (in millions). (2018). Retrieved from statista.com.

Soylu, B., & Akyol, B. (2013). Multi-criteria inventory classification with reference items.

Satzinger, J. W., Jackson, R. B., & Burd, S. D. (2012). In Systems Analysis and Design in A Changing World, Sixth Edition (pp. 46-132). Boston, MA 02210: Joe Sabatino.