Online Parcel Management System (PMS) for Small and Medium Company

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Abstract

The rising trend of e-commerce has caused the traditional shopping slowly being replaced by online shopping. Nowadays, online shopping has been very popular and slowly being accepted by. Due to the demand of the people in the field of online shopping increasing, which lead to the growing of the number of parcel day by day. The proposed system is to solve all the limitation of the current parcel management system and to improve the performance of the current system which will reduce the workload of the staff and to let the recipient of the parcel using the lesser time to collect their parcels. This research is going to gather more information of the recipient viewpoint on how Parcel Management System can help current system to reduce the workload and manpower to handle all these parcels, increase efficiency and save time and effort which make the staff of the reception counter easier to work and no need to use back the old method to record the details of the parcel.

Keywords: Parcel management system, Online shopping, E-commerce, Courier services.

1. Introduction

In this new era, delivery services are assuming a significant duty in community because of the rising trend of the E-commerce. The increasing trend of E-commerce prompt to a changing consumer purchasing behavior to online shopping stores instead of physical outlets thus increase the income of goods and products delivery by courier companies. As e-commerce division is growing faster in Malaysia, the last mile delivery is an important aspect to provide online shoppers in Malaysia a very good online shopping experience. The importance of last mile deliveries to customers has increased. The last mile issues occur during the arrangement of distribution service from a transportation hub to the final delivery destination of the consumer's house or workplace [1][2]. However, there are issues occurring in this service, and

these issues significantly result in customer dissatisfaction and low efficiency. Convenience and time saving were among the most complained by online shoppers. This has been highlighted in recent study by Morganosky and Cude [5] that online shoppers cannot achieve convenience and time saving advantages of online shopping. Furthermore, due to delays in delivery or the issues of failed delivery, some online shoppers even feel online shopping takes longer than traditional shopping. An average of 38% of home customers were required to collect missed delivered things from a post office or other warehouse in the year 2016 [3][4][5]. Added by Charlton (2018), 63% concerned on delivery speed when shopping online. According to statistics by Statista on year 2017, customers demand delivery flexibility the most from their last mile delivery services, which occupies 65%. Following by speed of delivery (61%), real time visibility (51%), delivery options (45%), and specific delivery slot selection (41%). With 67% of Malaysians online, making Malaysia the most astounding penetration of online shoppers followed by 57% contributed by Thailand and 52% by Singapore. It is also stated that by looking at the development rate of our region in general, Malaysia are one of the speediest developing markets, keeping pace with China at 25% development rate [6][7].

In line with rapid growth in e-commerce, delivery services are currently encountering a fast development to satisfy the expanding demand. With the aims of being quick, safety, controllable and traceable. Several courier companies have built up a very extraordinary logistics network and system in their logistics process. The courier companies are playing an increasingly significant role in the supply chain of manufacturing companies. This is because of the amount of deliveries is getting larger and larger than before because of E-commerce. Innovation is required to deal with the amount of the delivery services markets. Most of the supplier in the retail area aims to create a maintainable supply chain, the job of courier companies is becoming more significant than before due to E-commerce. The effect of E-commerce in the supply chain is significant, not only in shipping fee aspect with their future way to conveyance and impacts on delivery [8][9][10].

The proposed system that the researcher proposed to small and medium company is Parcel Management System (PMS) for a small and medium company. Parcel Management System (PMS) is a computerized system for reception counter to handle all the parcels that have send to reception counter. The staff of the reception counter can use it to insert the details information of the parcel in the system, search and allocate where is location of the parcel they put, update the status of the parcel which allow the staff to know which parcel haven't collect by the recipient of the parcel, and also can delete the information of the parcel if they key in the wrong information. After the staff have enter the information of the parcel to the system and put the parcel to the locker that specially to put all the parcels, and the system will allocate the empty locker for the parcel based on the date, type of parcel and the courier company. If the recipient of the parcel wants to collect the parcel, they just must show the QR code to the staff, and the staff will scan for it. The system will verify the QR code information, if the QR code is valid so the system will tell where the location of the parcel locates at. After the recipient of the parcel have collect the parcel, the system will auto update the status of the parcel from to "Haven't Collect" to "Collected" and the empty locker will be used for the next parcel. The aim of this system is to reduce the workload and manpower to handle all these parcels, increase efficiency and save time and effort which make the staff of the reception counter easier to work and no need to use back the old method to record the details of the parcel [3][4][5][6][7].

2. Previous work

In bringing changing in customer purchasing behaviour, innovation in technology is one of the important reasons that must be considered too. Although an outstanding technology has been achieved through the introduction of Internet, consumer convenience can also be affected by the innovation in Information Technology (IT). The sign of improvement can be seen by the products being sold on the web managed to attract many customers. Other than that, the analytics of the web shops and the guidance on web shops on which the supplier is becoming more acquainted and familiar with the consumer purchasing behaviour of its consumers had also successfully induce improvement in technology. By having this innovation, the suppliers are now getting to know the frequent possible terms which are always used by the consumers to search for at the online shops, nevertheless the suppliers can get to perceive those histories which

consumer already have with through online purchase. That information gathered from the consumer tells quite lots regarding the consumer purchasing behaviour thus this can be utilized to promote some of the products particularly for the consumer. With all the data they have successfully collected, every kind of advertising technique can be utilized. Moreover, the data are also used to promote a specific sort of item for selling to the consumer. Through emphasizing the advertisement on those items which more popular and gained more interest from consumers, this will have a big impact on consumer [6][7][8][9][10].

Another technique like loyalty programmers are used to acquire and keep up the consumers that are purchasing items on the web shops. Although many different kinds of factors are impacting the conductivity of the web shoppers as well as their repeated purchasing behaviour, however the utilitarian value are still caused by the most critical ones in repeated purchasing behaviour, that is the convenience factor. This value is made for consumer thanks to the good quality and high service level and consumer convenience that consumer get at the web stores. Customer loyalty is built when a better offering of prices, high service levels as well as more information are provided as what is in the physical shops. When customer loyalty is established, this will subsequently lead to repeated purchasing from these group of customers. Due to having a larger amount of consumer convenience, web shop is said to have more utilitarian value when compared to those physical shops and this bring a positive effect, which guarantees a more often online purchasing by the loyal customers [6][7][8][9][10].

In creating consumer convenience, service and fast delivery are the significant components that must be considered. Nowadays it is very usual and possible for the most common to order something on the web shop and the items are delivered straight to the consumer's place on the following day or even the same day if the delivery service is fast enough. The network of distribution must be proficient and systematically organised in order to have an express delivery of the items, leads additional consumer convenience. The increasing of demand on web shopping will cause the rising of deliveries which would largely influence the freight traffic as well as the road network. When there is changing caused, which is the shifting of bulk quantities of the physical stores into a delivery system, this may cause the changing in the distribution by warehouse too because all the orders are being packed and distributed piece by piece. Delivery to home becomes a service that is highly appreciated and applied by the consumers, but a great deal of logistical problems is arisen due to the engagement of different parties in the logistic process.

Courier company is becoming more significant because courier company can help the seller or the manufactory to deliver the goods and services to consumer. Courier companies have few methods to deliver the parcel to the consumer which is standard delivery services or express delivery services. If the consumer really needs to use that parcel emergency, then they will choose express delivery services, because they can receive the parcel in shorter time than the standard delivery services, but they must pay extra for that services. The courier company will emphasize the parcel with express delivery services first than standard delivery services. Consumer only need to pay for some delivery fee then they will get their parcel in a few days, so they will no need to go to the physical store to buy something, which is suitable and bring convenience to those busy and lazy people. Courier companies also provide a track and trace services for consumer to track down where is the location of their parcel. When the sender passes the parcel to courier company, the courier company will give the sender a tracking number. The recipient can use the track and trace services to track down the parcel anytime and anywhere, and also estimate what is the time they can receive the parcel so that they can be ready to stay at home to receive the parcel and to prevent the in charge person from courier company need to come twice to deliver the parcel if the recipient cannot receive the parcel at that time [6][7][8][9][10].

In this era, Malaysia's E-commerce transactions are charting a new height and growing at a healthy pace. As the statistic chart in Table 1 shows that the number of domestic parcels handled by courier service companies has grew by 42% to 16 million in year 2017 from 18.6% in year 2016, which supports the view that e-commerce in Malaysia is growing rapidly. In this research, we found that most bookkeeping applications are not tailored to individual needs. Therefore, designing a suitable personal application will be a good suggestion.

Table 1: Statistic chart of parcels and documents handled by courier in Malaysia (Mun, 2018)

	2015	2016	2017
Document			
Domestic	16,947,745	21,235,000	25,162,000
Growth (year over year)		25.3%	18.5%
International	1,275,254	1,301,000	1,388,000
Growth (year over year)		2.0%	6.7%
Parcels			
Domestic	9,537,074	11,313,000	16,070,000
Growth (year over year)		18.6%	42.0%

The courier company is the one who is benefit from online shopping which they involved in the back-end work of delivering the parcels from the seller of e-commerce to the consumer. The rise of e-commerce is the motive force of the burgeoning express delivery services. E-commerce contribute a lot revenue to the courier company, and it is still growing rapidly as deliver the parcel to consumer is also one of the reasons of successful of e-commerce [6][7][8][9][10].

3. Methodology

The system development approach that the researcher used for this system is Rapid Application Development (RAD) Model. The reason that the researcher selects this methodology is because there is lack of time and money to do this project because of the researcher is still a student so can't spend much money to buy the scanner to make the system more perfect but the researcher still able to use laptop's built-in webcam as QR Code scanner to scan the QR code that send to the recipient of the parcel. Since the objective of Rapid Application Development (RAD) methodologies is high quality systems, fast development and delivery and low costs. (P Beynon-Davies, 1999) Since the researcher don't have much time for this project, so the researcher needs to develop a system in a short time and without spending a lot of money. Because of the requirement analysis during planning stage is reduced, so there will have more time to be spared as the time to develop a system can be reduced. Rapid Application Development (RAD) methodologies is good for small project like Parcel Management System (PMS) since this project is an independent project, so there will be easier during decision making and required less resources when develop the project. One of the benefits that use Rapid Application Development (RAD) methodologies is prototyping, the system can be tested by using prototyping to find out where is the limitation of the system and will try to solve the limitation and improve it.

There is four of the stages in Rapid Application Development (RAD) methodology life cycle, which is requirement planning phase, user design phase, construction phase and transition (cutover) phase [11][12][13][14].

The first stage of Rapid Application Development (RAD) methodology is requirement planning stage. The stage is the most important stage in this methodology because this stage will define the objective of the system which is what the system will do and achieve when developing the system. During this stage researching the current problem also is an important activity, through doing the research the researcher will have the opportunity to take other research as reference and this helps to compare and learn something new from other people's works. Thus, other than doing researching also need to be defining the requirement of the project which is the aim, objective and the scope of the system. when all the requirement is met, the researcher will start to be finalizing the requirements by writing the proposal to be send to the stakeholders for approval. Once the proposal is being accepted, it can be avoiding miscommunications between stakeholder and developer and all the works can be started and may proceed to the other stage [15][16][17][18].

The second stage of the Rapid Application Development (RAD) methodology is user design stage. Prototype of the system will be developed in this stage. Firstly, a survey will be created based on the feature of the system, the survey will be included all the question about what the user thinks about the limitation of the current system and their review about the current system and the recommendation how to improve it in the proposed system. Secondly, the survey will be distributed to the user which is the staff of the small and medium company. Thirdly, design the diagram such as use case diagram, activity diagram, class diagram to represent the function and feature of the system. After this, can start to design the prototype interface design, then finalized the system design. At last, demonstrate the prototype interface design. After that can proceed to the next stage which is rapid construction stage.

The third stage of the Rapid Application Development (RAD) methodology is rapid construction stage. In this stage, it will be starting to develop the system and start coding based on the design at the previous stage. Preparing the data that needed to develop the system, coding, testing and implementation of the system will be conducted in this stage. In this stage will based on the interface design that created at last stage and start to coding to it and make it functionable. Testing is important and will keep take place to make sure the requirement of the system is met and find out what is the bug and try to solve it.

The last stage of the Rapid Application Development (RAD) methodology is cutover (transition) phase. In this stage, every function of the system can be used and ready to be used by the user. The system developed in this stage become operational, the system is considering a success when all the requirement of the system is met and with zero bug which is no error when using it [19][20].

4. Results

Figure 1 shows the login page of PMS which require the staff to enter the correct staff ID and Password before entering to the homepage. If the staff key in the invalid Staff ID and Password, then the system will show an error message.

Fig. 1 Login page of PMS

Figure 2 is the PMS's homepage after the staff login to the system, the staff can choose to add the parcel information by using add parcel button or empty locker button, search parcel, update parcel and delete parcel.

Fig. 2 Homepage of PMS

Figure 3 shows the "Add Parcel Page" after the staff press the "Add Parcel" button from homepage.

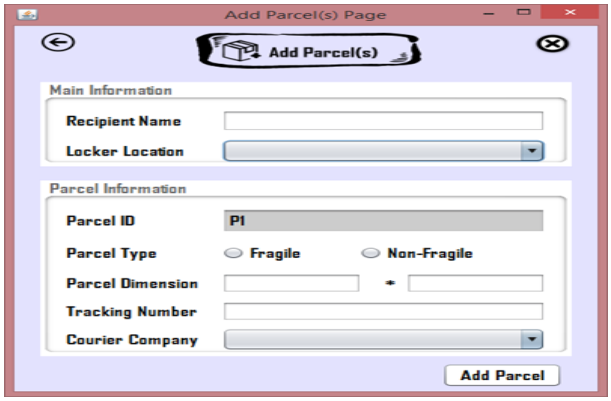

Fig. 3 Add parcel (1)

Figure 4 shows the option of locker location, the combo box will only show the empty locker, if the locker number is not empty then the combo box will not have the locker number.

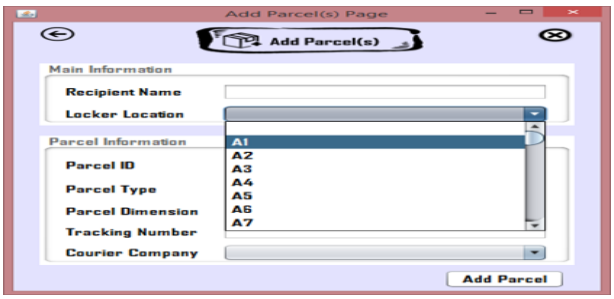

Fig. 4 Add parcel (2)

Figure 5 is "Add Parcel Page (Empty Locker Button)" after the staff press the "Empty Locker" button which is blue colour button from homepage. The locker location will show the locker number that the staff just choose, and the system will lock the textbox to prevent changes.

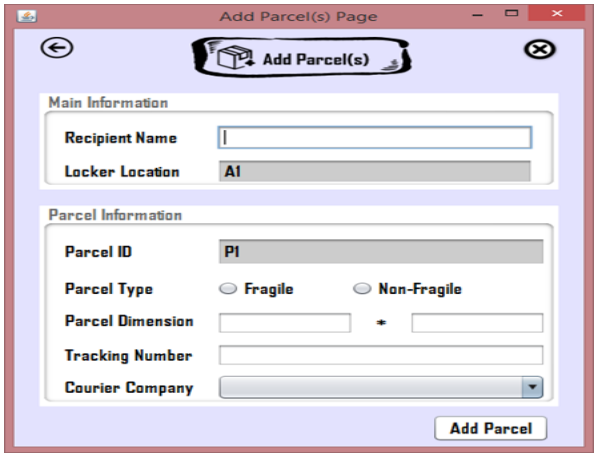

Fig. 5 Add Parcel Page (Empty Locker Button)

Figure 6 is "Search Parcel Page" after the staff press the "Search Parcel" button from homepage. In this page, the staff can search the location of the parcel by using QR code, Recipient ID, combo box which need the staff to select the parcel information. The staff only can check the uncollected parcel and check today's parcel.

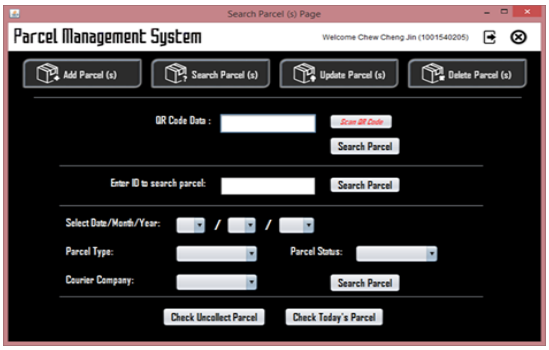

Fig. 6 Search Parcel Page

Figure 7 is "Webcam QR Code Scanner" after the staff press the "Scan QR Code" button from Search Parcel Page. In this page, the staff require to take the QR Code from recipient of the parcel and show the QR Code in front of the scanner and have to make sure that the environment and the phone brightness is bright enough, if not the scanner was not able to get the QR Code data.

Fig. 7 Webcam QR code scanner

Figure 8 is "Search Parcel Button". After the staff scan the QR Code, must select the "Select Parcel Button" to start to search the location of the parcel and it will redirect to "Search Result Page" if the QR Code is valid. The error message will show up if the text field is empty or the QR Code data is invalid.

Fig. 8 QR Code Searching

5. Conclusion

In conclusion, the research project is studied and go through again and again to see whether the aim and objective that have write during proposal stage it is met

or not. After the development and all the testing of the system have done, it can be said that all the requirement and goals that were proposed in the proposal during the proposal stage have been achieved. The output of this research project is the development of the Parcel Management System (PMS). The Parcel Management System (PMS) is programmed by using java programming language and use the Oracle Database. This system can help the staff of company reception counter which is responsible to manages the parcels that send to the reception counter. This system also can send the email with QR Code to the recipient of the parcel. This system only allows staff of the company to use it, any outsider's parcel will not be accepted. This system has improved the current parcel management system which is still using the traditional method to record the parcel information. With the help of the new system, the staff able to increase and speed up the overall parcel management process. Most importantly, the new system can increase the efficiency and productivity of the parcel managing and save a lot of time and effort of staff when they are trying to search and allocate the parcel.

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