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The Accuracy of Datria System in Improving Order Picking Process

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Abstract*: Order picking is an essential part of the supply chain operation. It forms as much as 55% of the operating cost at any distribution centre, as opposed to shipping, receiving, storage and has a direct impact on the level of customer contentment [1]. The ability to process customer orders quickly and accurately is now an essential part of doing business. In order to improve order picking processes within warehouse, the company must choose an order picking method that is suitable for their business. Therefore, XYZ Combined Distribution Centre (CDC) was implemented DATRIA system to dramatically increase productivity in their order picking process Based on this practices, researcher want to investigate the accuracy of DATRIA system in improving the order picking process at XYZ CDC. There are three factors that have been discussed in this study which are order picker, equipment, and interference. In this study, researcher have used questionnaire and observation as a method of data collection. The questionnaire has been distributed to order pickers at XYZ Distribution Centre and researcher also has looked at the data from order fulfilment report. At the end of this study, recommendations for efficient practicing of this system have been provided. By identifying the factors that could affect the accuracy of DATRIA system, it is easier to come up with various ideas and suggestions in improving the operations that will eventually improve the company's overall performance besides maintaining a positive image among the customers throughout the nation.

Keywords: Combined Distribution Centre, DATRIA, Order Picking

I. INTRODUCTION

The retail industry is an economic sector comprising individuals and companies involved in the sale of finished products to end-users. Retailing is essential because it let the manufacturers concentrate on producing goods without being disturbed by large numbers of effort required to engage with the purchasing end-user consumer [1].

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The normal process of retailing consists of products exhibition, processing payments, describing the key features and advantages of products, stocking products, and take all necessary measures to secure the right products at the right fee to the right clients at the right time [2].

The retail sector encompasses all stores selling goods to major customers, who buy them for personal and non-business use. 'It covers all kinds of shops, from diminutive groceries and kiosks to the supermarket chain and immense convenience store. In addition to traditional and mortar brick shops, the retail sector includes online businesses and mail-order. There are several examples of physical retail outlets where users can buy the product for direct consumption such as grocery stores and supermarkets, department stores, convenience retailer and warehouse retailers [3].

Therefore, order picking is an essential aspect of any warehouse because of the right supply have come from the accurate order picking. However, in large part due to the fact that order picking often still needs the involvement of human operators, as automating order picking systems requires an immense investment. Because of this, [4] has mentioned that over the years, order picking has become a rising area of interest among warehouse professionals to increase productivity in warehouses. Therefore, this study objective is to evaluate the accuracy of DATRIA system in improving the order picking process by finding the most critical factor that contributed to the accuracy of the selected system.

II. ISSUES AND PROBLEM STATEMENT

Company XYZ is one of convenience store that have many braches around Malaysia, therefore they need to make arrangement for the majority of store deliveries. To cater the increasing number of stores and need to range the products, XYZ Company has opened their Combined Distribution Centre (CDC). This XYZ Combined Distribution Centre, currently serves almost 70% of merchandise that is sold in peninsular stores. The main objective of the CDC operation is to keep its store shelves will be filled by making daily delivery to every store by using a complex but very effective supply chain, to allow products from different suppliers to be loaded on the same truck for delivery to stores, and delivers the right ordered quantity at the right time. CDC operations consist of many activities and processes. An excellence performance of CDC activities is very crucial to ensure they are on track. Achieving targeted lead time is one important thing to be fulfilled.

The CDC have a good performance in optimizes logistics costs and improves efficiency by providing just in time delivery of dry goods to all Company XYZ stores. But, behind that, there are always obstacles occur during CDC operation then lead to poor performance. Throughout the observation, researchers have found that the CDC face some issues regarding the shortage of order fulfilment to the store. This is due to the accuracy of DATRIA system that affects them during the order picking process that lead to time consume and operation performance.

This study would cover on the accuracy of DATRIA system in improving the order picking process since this system is the order picking method that is used at the CDC for now. Researchers also have observed the connection problem that occurs during the order picking process where the calls drop suddenly or not being able to dial back in after a call drops. When this happened, the order pickers have to run the process manually by using paper-based picking method. This is an inefficient process that wastes valuable time and resources. It also makes the order fulfilment longer leading to dissatisfied customers.

According to [5], complicating matters is the fact that turnover for warehouse staff tends to be high, resulting in greater levels of inexperience among employees. Besides that, some pickers may be struggling with language differences. They can also often be distracted from their work by fellow workers, managers, and the need to repeatedly traverse the warehouse searching for products [6]. As a result, there is no coordinated system to assure order accuracy, and additional time is spent double-checking each pallet. Manufacturers require a flexible, powerful solution that provides the precision, ease-of-use, and ability to scale within the warehouse and throughout the extended logistical chain [7]. They also need to improve cost-effectiveness by controlling operational expenses and lowering training costs, as well as improving worker retention.

DATRIA system is supposed to help to reduce the order operational costs. There are many activities which have been carried out in the warehouses that affect a very large number of units for example a full pallet. However, in order picking process warehouses often handle single units to satisfy customer need or request. According to [8], order picking is typically one of the most time-consuming activities and a large contributor to the operational costs in a warehouse but by improving order picking is an essential way of saving costs. But if the problem keeps occurring, this will lead to increase the cost [9]. As a general rule, an increase in any kind of business expenses will be lowered the profits.

However, there is no such thing as a perfect process. In the other words, order fulfilment process cannot always be perfect even the system used is perfect. From the order fulfilment report that has be obtained from DATRIA departments at Company XYZ CDC, it had showed that there was a shortage in the order fulfilment since it is not fulfilled 100% for every month. Those reports have proved that there is a problem either within the process or the system. According to [10], the system will only be as good as the people running it. The wrong people working the right system will produce the wrong results. Nevertheless, the system does have advantages. But, it has to be just the right situation, the right hardware/software, and the right user dialogue.

Fig. 1. Statistics of Order Fulfilment to Store 2016

Fig. 1 above has shown that the percentage of order fulfilment to the stores did not even reach 100% for any month at year 2016. This has proven that there are few factors that can affect the accuracy of DATRIA system since there was shortage for every month.

III. DISCUSSION ON PREVIOUS STUDIES

Precise order fulfilment is vital if companies are to compete efficaciously in today's challenging retail environment and keep their customers jubilant. The Perfect order fulfilment as a discrete measurement defined as the percentage of orders delivered to the right place, with the right product, at the right time, in the right condition, in the right package, in the right quantity, with the right documentation, to the right customer, with the correct invoice described by The Supply Chain Council. According to [11], failure to meet any of these conditions results in a less than perfect order. The concept seems straight forward in practice, but it is often very difficult to accomplish.

In the present case, picking processes are recognized as the most high-cost and high-labour intensive operation that turns out to be a significant part of the impeccable order fulfilment process. The estimation of order picking cost is nearly to 55% of the whole operation expense for warehousing activity. With thousands of picks need to be performed in every hour per day, the accuracy of the picking processes performed by the warehouse labour need to be as highest possible. The efficiency of warehousing can be caused by imprecise picking which can lead to mistaken deliveries and will affect the overall client satisfaction [12]. As the order fulfilment process involves paramount expenses and can affect client contentment levels, several purchasable technology solutions can enhance the accuracy and the speed of order pickers in operating their tasks. One of the solutions which has become the choice in Company XYZ CDC is DATRIA system or in the other words is "pick to voice".

The voice directed picking system can make the warehouse become more efficient and this means the warehouse workers can picks more items per hour accurately. Order pickers can confirm their picks with the system before it is completed, so they know that they have the correct parts and operate efficiently. Thus, the overall accuracy of the picking process may increase effectively.

Voice directed picking system offers a tremendous advantage over the completion of traditional solutions in the warehouses. By using the voice instructed headsets, order pickers do not required to review paperwork as they can fully focus on the picking which they will make and the area they need to go inside the storage area. Besides, order picker can have both hands free and fully commit on the picking fulfilment because they are not required to manage handheld devices such as barcode scanner in voice picking scenario. Furthermore, [12]'s study has suggested that picking errors can be reduced by 80 percent to 90 percent when CDC implementing a voice-directed picking system compare to the paper-based system.

IV. METHODOLOGY

For this study, the researcher collects the data by using primary and secondary data. Primary data comes from the original source and are primarily collected to answer research questions. Therefore, under these technique researchers was using structured questionnaire and observation methods. Questionnaires refer to a set of printed or written questions with a choice of answers, designed for statistical or research purposes [13]. Questionnaires are designed to be as simple and clear as possible regarding the research objectives and research questions. For this study, the questionnaires have been distributed amongst the workers that been using DATRIA system at the CDC. Every question that stated in the questionnaire is related with every variable that have been stated in the framework. This is to avoid any unreliable questions to the study. There are 50 respondents that have been selected by the researchers. The second method that researchers was utilized for data collection is observation. Observation is made by predicated on the working environment, how the workers commit to their jobs and additionally on the warehouse daily operations [14]. The observation is during working days (Monday until Saturday) from 0900 to 1745.

Secondary data was collected and recorded by monitoring and evaluating the order fulfilment report that contained of order displays, put/pick date, ordered quantity, received quantity, name of product(s) ordered, and the percentage of fulfilment. This report provides an analysis of the total percentage of order fulfilment. It enables the company to compare the ordered quantity with the received quantity. The report data can be broken down to each order schedule line. This report also highlights exceptions such as shortage and surplus of the received quantity.

V. RESULT AND DISCUSSION

This section represents the result of investigation towards the accuracy of DATRIA system in improving order picking process. In this section, researchers also concludes the data findings from the questionnaire which has been distributed to the respondents, all the data have been gathered together. Data analysis is done routinely with statistical analysis by using IBM SPSS software. The researchers analysed the data in term of respondent's profile, reliability test and multiple regressions which consists of correlation and model summary table. This also helps to ascertain that the data is really good as well as the quality guaranteed for further analysis.

Before actual data was collected through the questionnaire, researchers tended to be randomly distributed to 30 respondents to explain the understanding of questionnaires to the respondents. The reason of this pilot test is to make sure that the questionnaire is suitable and can be clearly understand and accepted by the respondents later.

A. Validation

Realibility analysis is the outcome of the pilot test. Analysis of reliability is analysed to find out how reliable the question is and how the question is related to each other. This research used the common consistency reliability test which is the Cronbach's Alpha [15]. It also shows how well the items are in a set that relates to other questions. Table-I demonstrate the reliability of test results. All the independent variables which are equipment, interference and order picker have been used to measure the dependent variable which is the accuracy of DATRIA system.

Table-I : Cronbach's Alpha of Variable

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.803	.788	28

The table above has shown that the Cronbach's Alpha for the overall variables is 0.803 with 28 number of Likerts-scale questions. The dependent variable and independent variables which are the accuracy of DATRIA system, equipment, interference, and order picker can considered to be acceptable, reliable and very good because of the value is 0.803. Thereby, researchers had drawn a conclusion which is all the items for each variable are reliable since the value is more than the recommended 0.6 and this value was proved by the study that have been conducted by [16] and; [17], if the coefficients yield below 0.8 are considered acceptable and a minimum alpha of 0.6 will suffice in the pilot survey, and coefficients yield above 0.8, are considered very good. This means the items are positively correlated to each other and are appropriate for subsequent analysis. (Refer Table I)

B. Respondents' Profile

In the features of social science study, respondents' characteristics have a very important role to play in expressing and responding to the problem, therefore a set of personal characteristics which is age, gender, education level and working years of fifty respondents have been examined and presented in this study. The frequency from multiple subcategories represents a computable and analyzed percentage of data. The researchers also visually displayed the data as bar charts and a pie chart in order to help researchers better understand the data that has been collected.

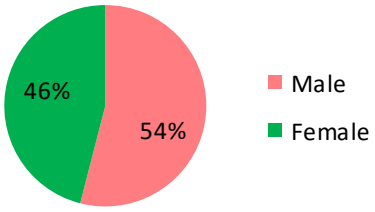

Fig. 2. Gender

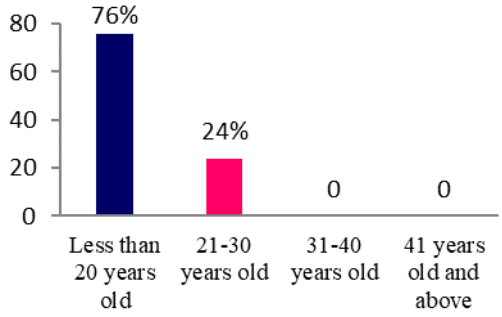

Fig. 3. Age

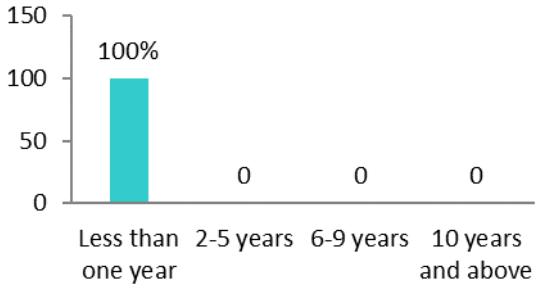

Fig. 4. Working Years

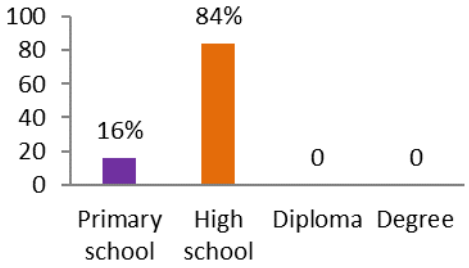

Fig. 5. Education Level

Based on the Fig. 2, the majority of the respondents are male with the number of 27 respondents, 54% and the rest of them are female with the percentage of 46%. Next, Fig. 3 shows that 76% of them are range of age less than 20 years old whereas 24% of the remaining respondents are below than 30 years old. Apart from that, Fig. 4 illustrates that all respondents also had been working not more than one year and most of them have the education background from primary school and high school which are 16% and 84% respectively (refer Fig. 5). From these results, it is clear that the majority of Company XYZ's respondents was male, age ranges below 20 years, work experience is less than one year and the highest education level hold by them is high school level. Therefore, this can be concluded that the order pickers have less experiences and skills in this workforce.

C. Critical Factor towards the Accuracy

Regression is a technique of measuring linear equations between dependent and independent variables. The aim of regression is to predict the value of one variable at another variable. Analysis of regression was used to test the effects of three variables which are equipment, interference, and order picker towards the accuracy of DATRIA system.

Table-II: Coefficient of Interference

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.983	.826		3.613	.001
	mean_ Equipment	.093	.142	.122	.655	.516
	mean_ Orderpicker	.323	.207	.291	1.562	.125

a. Dependent Variable: mean_Interference

Table-II above has shown that the coefficient of independent variables which are order picker and equipment towards the interference. Based on the result, both variables which is equipment and order picker are being interrupted by interference because the significant value is above than 0.05 which are 0.516 and 0.125. Just like the real scenario, we as the human, the interruption come from the surrounding. For example, in this study, another people were talking while another picker receiving their order. Same goes to the equipment; there might be interference in term of the networking and connection.

Table-III: Coefficient of the Accuracy of DATRIA System

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.648	.742		3.568	.001
	mean_ Equipment	-.018	.127	-.026	-.145	.885
	mean_ Order picker	.529	.186	.502	2.847	.007

a. Dependent Variable: mean_AccurancyofDATRIA

Based on Table-III, it shows the relationship for each variable. In this table, it shows the coefficient of independent variables which are order picker and equipment towards the accuracy of DATRIA system. Based on this table, it shows that order picker needs the improvement to make the DATRIA system more accurate in improving order picking process.

This is because the significant value of order picker gets below than 0.05 which is 0.007, means that this element need to be concentrate more to contribute towards the accuracy of DATRIA system.

The outcome of this study was matching the objective of the study in which to identify the most important factor that affect the accuracy of DATRIA system. The analysis used was obtained based on coefficient table which is from the multiple regressions. The most important factor that can affect accuracy of DATRIA system is order picker. The result is supported due to the significance value (Sig=0.007, $p<0.05$). This finding shows that order picker contributing to the most critical factor that affect the accuracy of DATRIA system in improving order picking process. This finding also shows that there is a relationship between order picker with education level and working years. This is because from the respondent's profile, it shows that most of the order pickers are working at CDC less than one year and none of them are a diploma or a degree holder. All of the finding has proven that as someone who has high level of education and has many working experience may easily to understand and evaluate the incorrect working context.

VI. CONCLUSION

As a conclusion, it shows that order picker, equipment and interference can be related to the accuracy of DATRIA system. Therefore, XYZ CDC need to be concern about this issue due to the shortage of order fulfilment for every month from year to year. As mentioned earlier, the objectives of this study is to seek factor that most critical which could contribute to the accuracy of DATRIA system. Thereby, from the coefficient analysis, the researcher found that the most critical factor that can influence the accuracy of DATRIA system in improving order picking process is order picker because the significant value is higher than others factor.

In order to improve the productivity of order picker, the best way to ensure there is no more shortage in the order fulfilment, the CDC need to have each picker sign their name or number for each item they pick for accountability. This is great train opportunity. Then keep up to train as long as the picker is tending to give a try. If the picker does not care and CDC has endeavoured to work with them an abundance of times, the CDC may determine that they require letting the picker go.

Besides that, in their operation, CDC should make sure each order been double check. If there any pick issue arises, it will not go out for delivery. The CDC does not have to worry about the upcoming speed. They should more worry about the precision and build a quality pallet so that customers only receive the best quality. In addition, it was essential for the picker to check the product against the picking slip and if it is correct to get them to tick and if more than one, check every product code to ascertain that it is identical product and tick the quantity for the amount requested and also tick the picking slip of the location their picking from. It takes time but once the picker gets the hang of it, this can assure that the picking error will getting better. With this way, the CDC will aware with who making the mistake and took them through the process with the documentation.

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