

## Government Initiative to Propose E-commerce Logistics Companies to Improve Parcel Accessibility and Scanning in Fulfillment Centers

Muhammad Younus<sup>1</sup>, Achmad Nurmandi<sup>2</sup>, Suswanta<sup>3</sup>

<sup>1</sup> Department of Government Affairs and Administration,  
University of Muhammadiyah Yogyakarta, Yogyakarta, Indonesia; [mohammedyounusghazni@gmail.com](mailto:mohammedyounusghazni@gmail.com)

<sup>2</sup> Department of Product Research and Software Development,  
TPL Logistics Pvt Ltd, Karachi, Pakistan; [nurmandi\\_achmad@umy.ac.id](mailto:nurmandi_achmad@umy.ac.id)

<sup>3</sup> University of Muhammadiyah Yogyakarta; [suswanta@umy.ac.id](mailto:suswanta@umy.ac.id)

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### ABSTRACT

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In the recent era, the rise of the Internet has brought about a significant disruption in the global economy regarding the new height of innovative businesses, which created different employment opportunities. But still, people are struggling to cope with this recent phenomenon and cannot fully utilize these solutions for their benefit. One of the most critical ways of business emerged through the Internet as E-commerce. So, people are getting so many benefits from it, but in some areas, they are still struggling to get effective results; that is why to deal with these issues and suggest a proper way forward. Therefore, this Paper's objective will be to pick and choose one of the challenges and then will provide the solutions that will fill in the gaps, and most importantly, how the government will play a vital role in the successful running and implementing of this initiative to boost the E-Commerce sector productivity.

*Keywords:* Conveyer Belt, RFID, Barcode, OTG Cable, Logistics, E-commerce.

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### INTRODUCTION

The "E-Commerce" service is one of the fundamental services users access online. E-commerce, sometimes known as "Electronic Commerce" (Li, M., & Wang, R. 2023), is ordering or buying anything online, including electronics, clothing, books, and even prescription medications. Finally, depending on the provider, the products you ordered will arrive to you within a specific window of time, which relates to the other phase, which relates to the Logistics operation on which the Order that got ready to deliver Rider or courier will read the Address of the Customer who has ordered online and then Rider takes out the Order en Route and finally Customer receives the Order from Rider when he reaches to his location and then pays the amount against the Order, and that's it the cycle of online shopping is completed from ordering online to receiving Order physically.

But there is also a necessary process that happens after when Customer places an Order and happens before when Rider or Courier takes the Order en Route for delivery to the Customer, which is the process done at the Fulfillment center (Pichka, K., Alwan, L. C., & Yue, X. 2022) and warehouse to prepare the Order according to the customer requirement. Then, pack the Order and place Barcode on the Order through which the Order is processed quickly. And, Finally, orders will be sorted on the shelves from which Rider or Courier can easily pick up orders and take them en route for delivery. That is why this process is essential for making the delivery of the Order to the Customer possible. However, still, there are so many things that are irregular and are done in the most inefficient or ineffective which causes the problem of a decrease in productivity of an overall operation. This is why we have analyzed the problems in this Paper regarding what are problems in quickly identifying any specific parcel from shelves and what are solutions to cope with this

problem, and also what issues cause delays in the parcel processing right now and through which ways we can be able to resolve the very easily. This is the whole concept behind the research in this Paper.

## LITERATURE REVIEW

In this section, we explain the key terms we will be using in this article so readers can understand better.

### 2.1 Logistics

The process of organizing and carrying out the practical storage and movement of commodities from the point of origin to the end of consumption is known as logistics. Logistics aims to provide timely and cost-effective client service (Nagpal, G., Bishnoi, G. K., Dhama, H. S., & Vijayvargia, A. 2020). Moving military troops, supplies, and equipment was a crucial function originally performed by logistics. Despite its continued importance in the military, logistics is now more frequently used to refer to the movement of commercial items along the supply chain (Srivastav, P., & Nagpal, G. 2021).

### 2.2 Fulfillment Center

Part of the supply chain, a fulfillment center is a focal point for all logistics procedures required to move a product from the supplier to the Customer. It manages every step of the order fulfillment process, from picking and processing orders to packing and sending them (Ho, G. T. S., Choy, S. K., Tong, P. H., & Tang, V. 2022). For e-commerce businesses wishing to optimize their operations, a third-party logistics (3PL) provider like ShipBob uses the fulfillment center to receive, process, and complete customer orders. A fulfillment center exists to expedite the delivery of online purchases to clients and free e-commerce businesses from handling this essential but complex procedure (Pichka, K., Alwan, L. C., & Yue, X. 2022).

### 2.3 Warehousing

When we discuss a warehouse solution, we're referring to a business that keeps goods on hand for a long time. A warehouse is a sizable storage facility or industrial building intended to contain enormous quantities of inventory (de Jesus Pacheco, D. A., Møller Clausen, D., & Baumann, J. 2023). You'll see forklifts, containers, and shelves stacked high and filled with much merchandise. Some companies specialize in B2B e-commerce or wholesale orders, and warehousing providers focus on wholesale fulfillment. While some large merchants rent space in a warehouse in cooperation with other e-commerce companies, others own warehouses or warehouses to keep excess inventory (Onal, S., Zhu, W., & Das, S. 2023).

### 2.4 E-Commerce

"e-commerce" refers to businesses and individuals that purchase and resell goods and services online. E-commerce can be done on computers, tablets, cellphones, and other intelligent devices and operates in various market categories. E-commerce transactions make almost every good or service accessible, including books, music, airline tickets, and financial services like stock trading and online banking (Xie, H., Chang, S., Wang, Y., & Afzal, A. 2023). It is seen as a very disruptive technology as a result. E-commerce, as mentioned above, is the practice of purchasing and selling actual goods and services through the Internet. More than one party is involved in completing a transaction and transferring money or data. It is a component of the larger field of electronic business (e-business), which includes all of the procedures needed to run a business online (Li, M., & Wang, R. 2023).



## **2. Red Highlight Parcel with Marker**

Another technique is if people find issues in managing the above way of identifying parcels, instead of dividing the parcels on the shelves with regular category parcels placed in one part of the shelf, particular category parcels are placed in other parts the frames. So, people can hold the different markers' colors and understand which color means what, like, red means Special or Critical Parcel. Similarly, green indicates a regular parcel with no priority for it. Therefore, with this color marker, fulfillment center staff will mark parcels which special request that needs to be prioritized, then they will highlight the red color on that parcel, and in that way, after some time, they quickly identify the parcels on shelves with color marking and pick parcels first which is Red highlighted mean these are critical.

## **3. Fill Shelves with one day Delay**

In some cases, the segregation of parcels within shelves or the color marking of parcels technique we discussed above can be challenging because fulfillment centers might need extra resources to do it correctly, which they can't afford. In that case, the other technique is filling the new parcels on shelves with one day delay, which means everyday people order new items online, and the fulfillment center has to pack make ready the parcels that the Customer wants, so simple boxes will go out from shelves and then new properties will be filled in the stands. In that way, newly booked and old booked parcels are mixed on the shelves, making it difficult for staff to differentiate the orders; the same is valid with regular and special request parcels. They all look the same physically. Therefore, the other way to achieve the working is to fill the shelves with a one-day delay with new properties, and staff should wait for the maximum number of old boots to be mixed.

## **4. Rider Chief of Area**

Also, another way to solve the resources lacking and still make parcels identifiable is to use the Riders or couriers and give them the additional responsibility of the parcel identifying with any of the abovementioned techniques. So, on each shelf, the Rider or courier working fulfillment team should pick one Rider from different shelves where they are working and then assign them their particular frame, and in return, a fixed stipend or incentive should be given to that selected Rider or courier. Then it will be the responsibility of the Rider to adjust their assigned shelve parcels after work is done and then highlight boxes that belong to a particular category either through placing a special sub-area within the shelve or a red marking color on the parcel, they will do it, and they will get the extra earning in return of doing that. In this way, Riders will get some benefits. Also, the fulfillment team will get their work done with a minimum amount spent from their side because if they hired the dedicated resource for doing it, then it would cost them more, so to use current staff with some additional tasks and with additional earning they able to achieve the work they want.

## **5. Make Sack Bag of Parcel (Date and Reason Mentioned)**

Another way to achieve the task of successfully identifying the new and old booked parcels or regular and special request parcels is, at day end, the boxes are getting left on the shelves or before loading newly booked packages on the shelves, the fulfillment staff will take each parcel out from shelve and fill in some Sack or box or trolley and then will be sealed with Date of sealing, and reason of sealing will be mentioned on it like old booked parcels or particular request parcels. So, the next day, the Sealed seal bag will be opened before taking new orders from the shelves. All packages will be picked from it, and if any space or capacity to handle more parcels remains, then new parcels will

be selected from the shelves. This activity will continue everyday end before filling new boxes on the shelves. In that way, a clear identification between fields can be made quickly.

**6. Orders Bagging Process**

Lastly, to remove any chances of mixed parcels and boxes getting missed due to it, another strategy to counter it is to remove the picking choice from the Rider or couriers, and what parcels the Rider or courier will take should be decided by the fulfillment team itself. Because when a courier or Rider comes to his shelf, if there is no way to identify the new and old parcels or regular and special request parcels, then the Rider will randomly pick the Order of his choice which belongs to its route. In that way, the risk of the package getting missed will always remain. So, in that scenario, the best way is for fulfillment staff should pick and choose parcels that are on high priority and then fill in the bag and pack the bag by the day's end, the next day in the morning, when the Rider or courier comes, he has to pick the bag and take it for delivery no pick or choosing which will minimize the chances of parcel missing completely but the bagging process should be done correctly.

**1) Risks Order Bagging Process**

There is some risk involved in the bagging process, which creates a problem in successfully implementing this technique, so before implementing it, the following risk needs to be analyzed, and its solution should be made. Below risks are mentioned;

- a) In case of Parcel is Missing from Bag, who will be the Responsible Bagger or Rider?
- b) Balance the load capacity in the Bag; Less Load Means Less Incentive.
- c) Allow Rider to Open Bag at Warehouse for Parcel Checking?
- d) Allow Rider to Open Bag at Warehouse for Route Sorting?
- e) If Rider Objects that the following parcel in the bag is not in his route, then?

**Understanding Challenges for Making Parcels Scannable**

In this section, we will highlight the possible challenges and issues the fulfillment team usually faces when they have to scan the parcels for processing; as mentioned below, the following points can come with the Barcode, which is used to make parcel processing easy when it is scanned with a scanner;

**1. Damaged Barcode**

If Barcode placed on the parcel has been damaged or torn, which is caused due to if the package being mishandled and dropped or thrown at the time of processing, and even the parcel gets wet. Water is dropped on the Barcode, which also causes the Barcode to get damaged and makes it unscannable.



Figure 2. Example of a Damaged Barcode

**2. Barcode Scanner Adjusting Takes Time**

Sometimes if the barcode scanner being used is of low quality, it takes time for the laser to adjust and scan the parcels successfully. So, the staff must constantly move it up and down or turn it on and off the barcode scanner to make it adjustable.

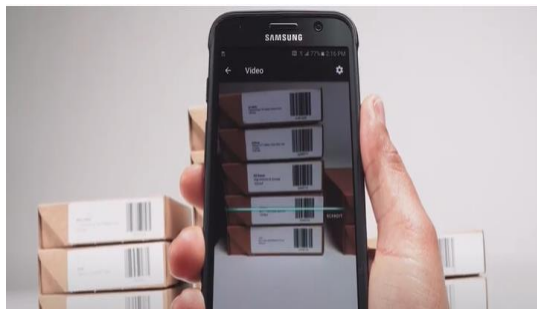


Figure 3. Example of Barcode Scanner Adjusting Takes Time

**3. Glare on Barcode (Lighting Reflection)**

The glare and light reflection on the Barcode also caused the issue of making the Barcode unscannable many times, the Barcode of parcels was under the plastic layer of the Barcode to save it from getting wet. When any light reflection comes on that plastic, it makes it difficult to scan Barcode. The staff has to block light, adjust the plastic, or even tear the plastic to scan Barcode without the plastic layer.



Figure 4. Example of Glare on Barcode (Lighting Reflection)

**4. Marking on Barcode**

When some marking was done on the top of the Barcode of parcels through some color marker, this marking messes up the Barcode alignment of packages and causes the problem in scanning parcels successfully.



Figure 5. Example of Marking on Barcode

**5. Too-Small Barcode**

The Barcode generated, printed, and then pasted on the parcel should be a standard scannable size that any traditional scanner can easily recognize without any problem. Still, if the size of pasted Barcode is minimal, then it makes it difficult to scan the Order or even be scanned, then it takes more time than usual.



Figure 6. Example of a Too-Small Barcode

**6. Curved Pasted Barcode**

The Barcode pasted on the parcel must be aligned in a straight line and not be pasted in a curved shape or any other shape; it should always be pasted straight from left to suitable static.



Figure 7. Example of Curved Pasted Barcode

**7. Light-Printed Barcode**

The printer through which the Barcode is printed should be prefilled with ink properly. Every published Barcode should be clear and visible because a light-printed Barcode makes it so difficult to scan the Barcode and even, in some cases, unscannable. You have to print and paste Barcode again.



Figure 8. Example of Light-Printed Barcode

**8. Angle of Barcode**

This issue is related to the expertise and skill of the staff scanning the parcel. Staff must scan the Barcode from the direction where a barcode is shown correctly; preferably should be done from the front with the scanner on the straight top of the Barcode. If done at an unusual angle, it will cause an issue, and staff will start to check the Barcode for the issue, but in reality, the issue will be with how a team is scanning.



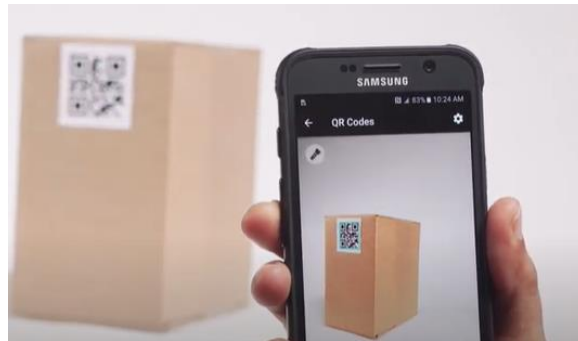


Figure 9. Example of Angle of Barcode

### 9. Distant Range Barcode

The direction from which the parcel has been scanned is also important as the distance from which the parcel barcode is reviewed by staff. The barcode scanning should be done by a team from a moderate distance from which the Barcode should not be far from the scanner. Also, it should not be placed near the Barcode because, in either case, the parcel barcode will become unscannable, and this issue is also not related to the Barcode being set but to the skill of the staff who is scanning.

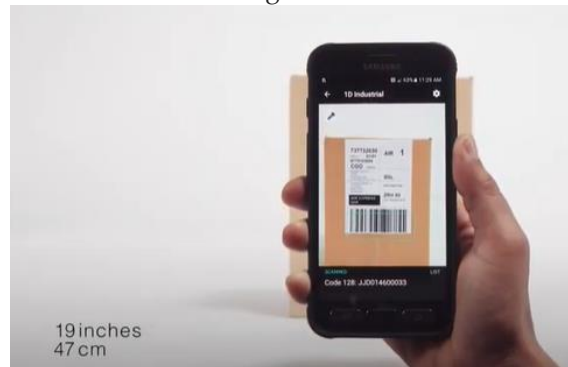


Figure 10. Example of Distant Range Barcode

### 10. Low Light Barcode

Similarly, too much lightning and too much darkness due to the absence of a moderate amount of lightning causes the same issue of making parcel barcodes challenging to be scanned. That is why the parcel barcode should be checked from the location where the required amount of light should be present to review the parcel. So, this issue relates to the fulfillment center facility, not staff expertise or a barcode pasted.

### 11. How Quickly Can Staff Scan

This issue purely deals with the expertise of the staff who is scanning the parcel, with proper facility and Barcode being pasted with precautions; then it all comes down to the team on how quickly he can check the boxes and process it for the next step. So, only experience and proper training are given to staff are matter.

### Different Solutions for Enhancing Orders Scannability

Below we are going to discuss some innovative solutions that enhance the Scannability of parcels barcode and minimize the manual intervention of the staff in the process and automate the process, which are;

#### 1. Usage of RFID

RFID is a radio frequency-based technology that automatically identifies various things. An RFID tag connected inside the radio wave's range transmits feedback to the RFID reader. When personnel approaches a parcel that has been RFID-tagged, the status of the property will immediately be changed, and the fulfillment center system will be notified. The same thing happens when a parcel is in the range of an RFID device. By doing so, the entire barcode scanning process



can be bypassed, the issues listed above associated with barcode scanning can be eliminated, and the whole process can be automated.

**2. Usage of Auto Scan Machine**

To make scanning fast and efficient, another solution is the usage of an Automated Weight and Scan Machine. Through it, the staff will start the machine and place the parcel near the camera so the package can be scanned with a scanning status update. This machine additionally determines the dimensions and weight of the box and sends it automatically to the warehousing fulfillment system. In this way, the whole process will be automated, manual staff work will be minimized, and weight and dimension calculation additional advantages can be taken from it.

**3. Connect Scanner with Mobile App**

Another solution is to connect the barcode scanner with the application installed in the mobile phone through OTG USB Cable. In that way, staff can utilize mobile phones and successfully perform the work through a barcode scanner. Also, the parcel processing gets updates simultaneously in the warehouse system automatically through its connectivity with a mobile application, a mobile version of the warehouse system. This solution is beneficial and becomes an alternative where laptops are unavailable for staff working. Still, every team has a mobile phone, so they can use this technique and start working without waiting. The proposed design for it is as follows;

- a) Mobile Phone is easily attached to a Scanner and placed on top of it, so instead of holding One Hand Barcode Scanner on the other hand, we can handle Mobile and Scanner both through this design on a single hand.



Figure 11. Example of Connect Scanner with Mobile App

- b) When reading 1D barcodes, smartphone cameras can be slow and cumbersome but help read Q.R. codes. Therefore, using a Bluetooth barcode scanner that is wirelessly connected to your smartphone is advised to read 1D barcodes.



Figure 12. Another Example of Connect Scanner with a Mobile App

1) Possible Problem in Proposed Solution

- a) Mobile Batteries are our primary concern now that battery consumption is very high. So, phone model dependency is there in terms of battery Consumption. But we have to see how to optimize the consumption of batteries.
- b) Mobile Heat Up, Mobile overheating is also one of the issues found, but external factors are more involved in it, like sunlight, Mobile phone model, etc. So, phone model dependency is also there in terms of Mobile heat-up. Infinix phones are not getting heated up, but Samsung phones are. So, we must see how to stop our phones from getting heated.

4. Usage of Conveyor Belt

It is also a widespread solution that very fastly started to get used in different fulfillment and warehouse centers for the quick processing of the parcels and benefits in many ways, like making quick and easy the transfer and movement of properties from one place to another without the need and involvement of staff. But for this solution, the investment finance is very high, and also it is helpful in the place where the warehouse and fulfillment area space are huge. This conveyor belt solution will play a significant role in increasing the efficiency of the fulfillment center working.

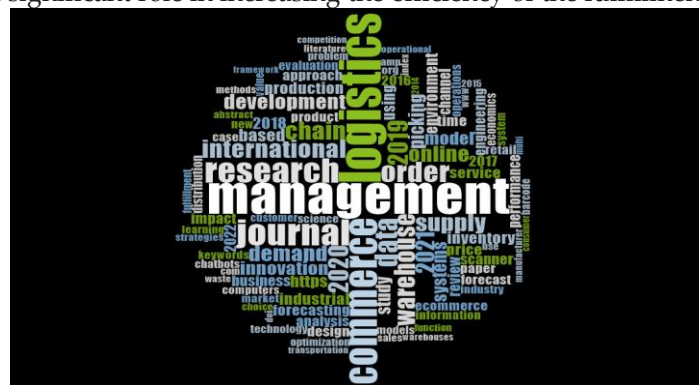


Figure 13. Main Themes in Research

CONCLUSION

On this basis, we conclude that by following the mentioned strategies above, we can not only save from lots of issues faced internally in the fulfillment centers. With it, we can also increase the fulfillment center's efficiency, effectiveness, and productivity. So, different logistics companies should try to implement the solutions mentioned in their respective fulfillment center or warehouse. Still, we know there will be some constraints for them, like unavailability of financial resources or lack of expertise to implement or even some solutions that may not fit their current way of working, etc. Therefore, it is not essential which solutions or strategies you want to pick and choose; it is about the step the logistics companies want to take to bring betterment in their working environment and increase their competence so they can grow and, eventually, can produce more output in the growth of the country economy.

Whereas government will play the catalyst role in the whole process, they will suggest the technique. They will continue with the private sector to research and development in this regard, and also provide training, guidance, and arrange awareness sessions to help in any capacity they can. Even they can help ease the imports if required because much of the machinery related to the solution is manufactured abroad, so this will be a short-term plan, and in the long term, the government can ask either company to set up their manufacturing factories in the country, so with

it, the imports will be decreased and also employment opportunities will be created. This is the whole idea behind creating this program on the government's end and its implications in the future.

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