

E-Government Regulation for the Rider's Delivery Attempt Verification to Remove Issues in Logistic Operation and Protect Customer Rights

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Abstract

The objective of this paper is to share the details related to the standard Delivery Attempt Verification Techniques for accurately determining if the Delivery Attempt made by the Delivery Rider is valid or not against the Order or Parcel ordered Online by the Customer through Shipper E-commerce Site. The Researchers who are working on this research area are using 'Qualitative Research.' The Data for the research was taken from the Delivery Mobile Applications, Blogs, social media, and E-commerce Sites, and then it was presented descriptively. The study in this paper tells us that the formation of the Standard Regulation will improve the visibility of Delivery Attempts made on the logistics operations. In Order to achieve it, several steps need to be taken for the successful implementation of the Regulation. This paper will only be limited to the extent to which the challenge currently facing is clearly described, then suggest possible solutions like Live Tracking, Lat-long Capture, Delivery Code, Verification Calls or SMS, etc., for resolving it and how it will work, and finally, what positive impact the solution will have on the Customer and the logistics sector.

Keywords: First Mile; Mid Mile; Last Mile; Logistics; E-Commerce; COD (Cash on Delivery)

Introduction

The Logistics Operation has many aspects and can be categorized into many parts. Like First Mile (Picking the Order from a Shipper or Merchant who owns the e-commerce Website or social media Page, Mobile Application, etc., the Channel from which the Customer can make an Order item of his need), then comes the Mid Mile (On which Transit movement is done, means moving of the shipments from One Warehouse to Another Warehouse or One City to Another City), and also the Last Mile (When the Customer or Consignee will be Receiving the Parcel or Order or Shipment that he has Or-

dered Online) and many others. But if we have to choose which part or aspect of the logistic operation is more crucial, then the Answer will be the 'Last Mile. Because all the efforts in different steps of Logistics, some of which we have mentioned at the top, are done, the successful delivery of the Order to the customer can be made possible. If we cannot achieve this target successfully, no matter how hard we have worked on other flows, if you fail on the 'Last Mile,' all will be wasted for nothing. You can't do much about it. So, in the Last Mile, the Ideal Scenario is that When Delivery Rider reaches the Customer's Location, The Customer is Available and has the Required COD Amount Available at the time. If that is the case, then the work becomes straightforward for the Delivery Rider, and he has to Deliver the Order and Receive the COD Amount, and Order Journey Will Successfully End there. But it is not valid in all cases. The Order Journey is not always successful, and what happens in other cases, the Delivery Order Attempt gets Failed or is unsuccessful. There are many reasons for it to happen like Customer is not Available, Delivery Location is Closed, Refused/Rejected the Order, Reschedule Order on Consignee Request, COD Amount is not available, the Customer already purchased the Item, Order Arrived Late, Non-Service Area, etc., and many more can be the possible reason of Failure. But in either case, if the order gets Delivered Successfully or Order Delivery Attempt gets Failed, the Proof of the Delivery Order Received or Attempt was made for Delivery is very important because in case of any complaint is received from the Customer or Shipper (Like Customer not Received Order, Rider Taken Extra Amount, Delivered Parcel is Damaged, etc.). Then the only way Logistics Operation has to find out what happens is the proof they have from Delivery Rider for its Valid Working. If the acceptance amount of evidence is there, then the issue gets resolved quickly, and the responsible person gets punished. But on the other hand, if the acceptance amount of proof is not there and the logistics operation can't satisfy the Customer or Shipper. In that case, it creates Conflict, which wastes lots of time for the concerned person whose complaint is genuine, and just because there is no standard way and method of Verifying or proving the Delivery Attempt. The real culprits, who can be the Warehouse Staff, Delivery riders, or the Customer themselves, can't be made accountable. In most cases, the real victim is not always compensated, and the responsible person gets away. Like the Customer has Ordered a Prepaid Order from the Shipper, and what the Rider does he instead of delivering the Order to the customer, he took the Order by himself because it is Prepaid, so don't have to pay a cash amount for the Order. Lastly, he marked the Order as Delivered after the Customer Received the Order. After some time, when the Customer doesn't get any update on his Order, then he will call Logistics or Shipper Customer Service to say that he hasn't received his Order yet. After the complaint, Logistics Operation calls Rider and asks him about it; surely, he will deny the accusation Rider will say yes, I have delivered the Order. Then without having a proper Standard of Delivery Attempt Verification of How Logistics Operation or Shipper decides who is telling a lie, there is no way of finding it out. So, they usually believe their guts about who is telling the truth, and it will always be a Dicey situation. You sometimes make the correct decision, and sometimes you make the wrong decision. Either way, the consequences of the decision taken against the accused person are very intense, which means either he will be fired, Penalty on it, or hurt his job profile. Also, to be note This case happens in reverse also means that sometimes the Customer can also make the Fake Complaint that he received the Order but still complaints he hasn't received it because he knows the weakness of the system, so he will exploit it and takes another order in free if his complaint been accepted. Now we understand how easily an innocent person can be accused of forgery because of the lackness of the system. When we go in-depth, then we know that it is not limited to the above problem, it also has an impact on Time, Effort, and Resources consumed by the Logistics Operation and Shipper on it for handling these complaints, Investigation the complaint, Compensating for the complaint and many others. It creates an extra load of work which can be removed if the proper system for it is given to them.

That is why it's essential to regulate the Logistics Operation to have proper and standard Techniques for Recording and verifying Rider Delivery attempts. Because right now, there is no acceptable format and standardized method for it, each Logistics Operation has created its own way and technique for handling the Complaints regarding Delivery attempts. Most of the methods are traditional and ineffective. They are made as a Defensive way to handle customers or merchants, so, in case of a complaint, it ensures that they can get away from it. So, it's not about resolving the complaint. It's just about dodging the criticism. So, in a current way, proper case understanding is not done. In many cases, to save himself, the Logistics Operation makes the Customer or Delivery Rider a Scapegoat and keeps himself safe. Therefore, instead of planning for it, this becomes only face-saving activity. This makes it essential for the government to make that there should be Standard Regulation for Verifying the Delivery Attempt, which every Logistics Operation must follow and through which the complaint will be analyzed. It will protect the Customer, Merchant, and Delivery Riders' rights. So, no

injustice will be done to anyone. For that purpose, the government will suggest different techniques which will use Modern Technologies, and from which Logistics Operations must select Techniques and implement them for the running of Delivery Operations so once for all conflicts can be resolved through the proper standard way, which guarantees adequate justice and serving the Victim of Fraud. So, the government will suggest these Techniques and share them with the logistics operations, also help them and train them to use them against the standard service charges.

Literature Review

E-Commerce

E-commerce refers to the buying, selling, and trading of goods and services over the Internet. It's frequently referred to as electronic commerce or Internet trade (Xu, J., Yang, Z., Wang, Z., Li, J., & Zhang, X. (2023)). The words "e-commerce" can also be spelled as follows: e-commerce, e-commerce, E-commerce, eCommerce, etc. While some firms use their websites to sell products, many use them as a means of distribution as part of a more effective company strategy that includes physical storefronts and other revenue streams. E-commerce allows new businesses, established ones, and international corporations to sell their products worldwide in either scenario (Yin, L., Zhong, R. R., & Wang, J. (2023)).

The following are examples of the most prevalent e-commerce model types and what they mean (Peng, Y., & Yi, J. (2023)):

1. **Business to Consumer (B2C):** This is the most popular e-commerce model (B2C). Business to consumer refers to any transaction that involves both a business and a customer, such as when you make an online purchase.
2. **Business to Business (B2B):** B2B e-commerce refers to exchanging goods or services between businesses, such as manufacturers, wholesalers, and retailers. Consumers are not the primary objective of business-to-business e-commerce, which often involves products like raw materials, software, or combination items. Manufacturers can also sell directly to retailers through B2B e-commerce.
3. **Direct-to-Consumer (D2C):** Direct-to-consumer is the newest kind of e-commerce, and trends in this area are continually changing. Direct-to-consumer (D2C) marketing is when a brand sells directly to the customer instead of going through a retailer, distributor, or wholesaler. Subscriptions are commonly used in direct-to-consumer sales, and social selling on platforms like Facebook, Instagram, Pinterest, TikTok, and Snap joints is also common (Raj, N. V., & Saini, J. R. (2023)).
4. **Consumer to Consumer (C2C):** C2C e-commerce refers to selling a good or service to another consumer. Consumer-to-consumer transactions occur on websites like eBay, Etsy, Fivver, etc.
5. **Consumer to Business (C2B):** A consumer-to-business relationship is one in which a person provides goods or services to a company. C2B includes exposure-delivering influencers (Datta, S., Naruka, K. S., Sajidha, S. A., Nisha, V. M., & Ragala, R. (2023)).

These are only a few examples of the various delivery models used in e-commerce (Pérez-Morón, J. M. (2023)).

1. **Retail:** Sales to customers directly, without the involvement of a middleman.
2. **Dropshipping:** The sale of products made and delivered to clients by a separate entity.
3. **Digital products:** Downloadable goods, such as templates, courses, e-books, software, or media, that must be purchased to be used. A substantial share of e-commerce transactions involves purchasing software, tools, cloud-based products, or digital assets (Bighrissen, B. (2023)).
4. **Wholesale:** Selling products in Wholesale bulk products are often sold to a retailer, who sells them to customers.
5. **Services:** These are occupations that may be hired online, such as writing, influencer marketing, and counseling.
6. **Services with frequent, recurring purchases** are known as "subscription services" and are a popular D2C business model.
7. **Crowdfunding:** Business owners can raise start-up capital for their products through crowdfunding. Once there are enough buyers, the product is manufactured and shipped (Almtiri, Z., Miah, S. J., & Noman, N. (2023)).

Merchant/Shipper

Any person or company transacting in products or services is referred to as a merchant. An eCommerce merchant is a company that only conducts online sales of goods or services (Etumnu, C. E. (2022)). A merchant has a legal obligation to treat the customer with care since he knows the things he offers and will sell them to the consumer for a profit. The commodities may be spread among different sources, and the merchant may be a wholesaler or a retailer. The only requirement for someone to be considered a merchant is to sell something to gain money (Hasan, F., Mondal, S. K., Kabir, M. R., Al Mamun, M. A., Rahman, N. S., & Hossen, M. S. (2022)).

Customer/Consignee

A consignee or client in shipping is listed on the bill of lading (BOL) (Ashrafpour, N., Niky Esfahlan, H., Aali, S., & Taghizadeh, H. (2022)). This person or organization is the intended recipient of the package and, in most situations, the owner of the goods being conveyed. Unless otherwise specified, the consignee is the business or individual who must physically accept the package under the contract terms (Stefko, R., Bacik, R., Fedorko, R., & Olearova, M. (2022)).

Rider/Courier

A delivery driver also referred to as a carrier, is responsible for delivering packages and other products from a mail facility to a residential or commercial address (Oviedo-Trespalacios, O., Rubie, E., & Haworth, N. (2022)). They are in charge of loading freight, traveling to the designated place using navigational aids, and delivering packages (McKinlay, A., Mitchell, G., & Bertenshaw, C. (2022)).

Logistics

Logistics in e-commerce refers to the processes used to store and send goods to an online store or marketplace. Logistics for e-commerce starts with the transportation of inventory from the manufacturer and continues until it reaches the end customer (Li, Y., Shi, J., Cao, F., & Cui, A. (2021)). Inventory management, warehousing, packaging, labeling, invoicing, shipping, payment collecting, return, and exchange processes are all coordinated to form a supply chain. Together, they produce a complex task that demands a reliable strategy to complete (Wu, G. (2021)). Furthermore, eCommerce logistics necessitates a thorough understanding of geographical regions, highways, conditions, and transportation laws. Establishing a logistics unit is primarily done to transport packages much faster, safer, and more precisely. An eCommerce logistics company's operations are bidirectional. Commodity distribution and delivery to clients move in a forward manner. Incorrect, harmed, or defective shipments are exchanged or replaced in the Reverse Direction. There are several logistics of which you must be aware. There are five main categories of logistics:

Firstly, inbound logistics. The use of inbound logistics enables strategic organizational tasks for upstream activity. Different information and goods from the suppliers are moved, transported, and kept in the warehouse as part of this inbound logistics process before being sent to the production facilities for further processing & manufacture. The transportation of goods between companies and their suppliers is the main emphasis of inbound logistics (Dasgupta, S., Kanchan, S., & Kundu, T. (2019)).

Outbound Logistics: Outbound logistics transport goods from manufacturing facilities to the following supply chain link. These products are delivered to the customers or the consumption location from the warehouse. Outbound logistics is another term for order fulfillment (Muñoz-Villamizar, A., Velázquez-Martínez, J. C., Haro, P., Ferrer, A., & Mariño, R. (2021)).

Reverse Logistics: As the name suggests, reverse logistics involves moving products or goods from end users to the supply chain. Reverse logistics is necessary when products need to be swapped out or returned for refurbishing, repairing, exchanging, discarding, or recycling (Das, D., Kumar, R., & Rajak, M. K. (2020)).

Third-Party Logistics (3PL Logistics): Third-party logistics, also referred to as 3PL logistics, refers to contracting out operational or eCommerce logistics to a third-party logistics company, which then handles everything from inventory control to product delivery. A 3PL provider frees business owners to focus on their core skills by taking the order fulfillment procedures effectively.

4PL: Fourth-Party Logistics To assign all their logistics-related responsibilities to a single logistics partner, businesses use 4PL or fourth-party logistics. Every part of the supply chain for each client, including assessment, design, building, operation, and tracking, is under the provider's supervision. A 4PL logistics partner, therefore, denotes to the client a higher level of supply chain management (Cosmi, M., Nicosia, G., & Pacifici, A. (2019)).

Last Mile Delivery

The last-mile delivery establishes a connection between consumers and companies in the e-commerce supply chain by delivering the customer's order (Bopage, G., Nanayakkara, J., & Vidanagamachchi, K. (2019)). Products are delivered to a customer's home, place of work, or parcel locker from a warehouse or distribution center. The final mile of a product's journey is the most complex and expensive for the shipper. Excellent last-mile delivery attempts guarantee that every delivery arrives at its destination consistently, on time, precisely, efficiently, and sustainably (Wang, M., Zhang, C., Bell, M. G. H., & Miao, L. (2022)).

Cash on Delivery / Pre-paid

A cash-on-delivery (COD) transaction requires the recipient to pay in cash for the goods rather than using credit when it is delivered (Ha, X. S., Le, T. H., Phan, T. T., Nguyen, H. H. D., Vo, H. K., & Duong-Trung, N. (2021)). Different terms and acceptable payment methods apply depending on the purchase agreement's payment provisions. Cash on delivery is also called collect on delivery because deliveries can accept cash, checks, or electronic payments. A customer puts an order on the internet and specifies a delivery address. Instead of paying for the goods at the time of purchase, the buyer opts to do so when they are delivered. The verified order will come with an invoice from the seller (Alfarizi, M., & Sari, R. K. (2021)).

Application Programming Interface (API)

A software interface known as an application programming interface, or API, permits communication between two applications. Every time you use a mobile app, such as Facebook, send an instant message or look up the weather, you use an API (Verma, R., Dhanda, N., & Nagar, V. (2023)). A mobile application connects to the Internet and sends data to a server when you use it. The server retrieves, analyzes, utilizes, and sends the data back to your phone. Following data analysis, the program provides the information you requested. It is an API that allows all of this to happen. There are four primary categories of web APIs; you can connect to open APIs and open-source application programming interfaces using the HTTP protocol (González-Mora, C., Barros, C., Garrigós, I., Zubcoff, J., Lloret, E., & Mazón, J.-N. (2023)). They have defined public API endpoints, request forms, and response formats. Programming interfaces (APIs) are a type of API that key business partners can access or provide. Typically, developers can self-serve access to APIs using a public API developer site. However, they must undergo onboarding and login credentials to use partner APIs. Internal application programming interfaces (APIs) are hidden from users outside the organization. The effectiveness and communication of these internal development teams can be improved by utilizing these private APIs, which are inaccessible to those outside the company. Composite APIs integrate many data or service APIs. These services allow programmers to call several endpoints with a single call when designing microservices, where a single job may require information from numerous sources (Luo, X., Sun, Q., Yang, T., He, K., & Tang, X. (2023)).

Mobile-Based Applications

A computer program or software application made specifically to run on a mobile device, such as a phone, tablet, or watch, is known as a mobile application or app (Law, C.-Y., Seek, Y.-W., Tay, C.-C., & Goh, W.-W. (2023)). In contrast to desktop applications, which are created to operate on desktop computers, and web applications, which run in web browsers rather than directly on the mobile device, mobile applications are frequently intended to run on mobile devices. Following are the famous platforms of mobile OS systems. Apple's iOS operating system was initially created for the iPhone. The Open Handset Alliance, which Google heads, developed the Linux-based mobile operating system known as Android (Handhayani, T., & Hendryli, J. (2023)).

Results and Discussion

Based on the analysis done on the problem and research regarding the possible solution of it, below mentioned points are highlighted as potential checklist points that can be made a part of government regulation as a standard practice to do Delivery attempt verification which will help in solving the current issue and also protects customer and logistics operation from unnecessary challenges, which will make them focus towards an increase of the efficiency of the logistics sector, especially the last mile delivery.

Standardize Rider Mobile Application

To get correct and accurate information from the ground level, it is now necessary to equip the delivery rider firstly with the standard mobile application for delivery order updates and, secondly, to give them training for the practical usage of the mobile application. Because still many logistics companies are updating delivery order status through the manual data entry process, which creates a vacuum for the problems of incorrect updates of delivery order status. also, the customer doesn't get real-time updates which keeps them in the dark. Therefore, it should be mandatory for each logistics company to have at least a standard mobile application with fundamental functionalities like a status update of delivery riders, etc.; so logistics companies can either develop it in-house, or government can develop the standard rider mobile application with all the essentials features mainly for those companies who can't create it in-house by themselves. The government will provide the common rider mobile application for logistics companies. This Application will support any Mobile Operating System like Android, iOS, etc. The API Call will also be given if any logistics company has the app but cannot successfully develop the solution. Therefore, with the help of API calls, they can easily integrate it with their Mobile Application. In return for these services to logistics companies, the government can take service charges from them, creating a win-win situation for both. The government will ensure that the developed Application has all critical basic features. To an extent, the government can also develop some advanced functionality for continuing research and innovation and put them in a premium category.

Equip Riders with Smartphones

One of the reasons to mention here, which in some cases creates hurdles in the implementation of Standard Mobile Application, is that Delivery Riders don't have Smartphones and they can't afford to buy them; they only have keypad phones, and even in some cases they have the smartphones, but it has very old Mobile Operating System version which doesn't support the Application. In Order to Remove this hurdle, logistics companies can arrange a scheme of providing smartphones to Riders with some discount and on easy installment so it will not put any financial burden on riders and also at the same time will equip them with the latest Technology devices. This scheme of Easy Mobile Installment can be implemented In-house by themselves. It can also be made possible by partnerships with Mobile Retailers; this way, Logistics companies will have less load. They have to provide potential buyers with Mobile Retailers Directly, and Mobile Retailers will negotiate with Riders and equip Riders will smartphones in easy installments. Even the government plays a role here if logistics companies don't have the capacity to do it. So, they initiate this as Government Scheme to digitize Delivery Riders by equipping them with the latest Mobile devices in easy installments. It will be the best approach because with this Scheme, problems like:

- Rider left the Job without paying the entire installment; in that case, it will become a problem for Logistics companies because they can't do recovery operations, and they will get lost because of it. In that case with Government's involvement as a guarantor in the scheme will not create any issues, and the Rider will pay the installment. The government can recover the amount with multiple resources if he doesn't pay without proper justification.
- The rider Lost the phone, or the Mobile is snatched/Stolen from the Rider; if the case is genuine means the rider has no mistake in it. Then, in that case, Logistics Operation has to bear the loss and give a new smartphone to Rider for work. In That Case, Insurance of Mobile devices against loss and stealing will be the best solution, so it will help to recover lost with it. The government can also make it a part of the Scheme to Insured Devices.

Government can either handle the whole scheme by itself or involve the private sector of Mobile and Insurance in it and play the role of mediator between Logistics Companies, Riders, Mobile retailers, and Insurance companies to make sure things are smooth and

transparency is maintained. So, this solution is needed in any way. Logistics companies can either do it by themselves or add a third party from the Mobile and Insurance Sectors, or They can ask Government for the Scheme. The government can also do it entirely by itself or add a third party from the Mobile and Insurance Sectors to the scheme.

Capture Delivery Attempt Location

The location where a rider will update the delivery Order status through a mobile application is always important and will become the primary source for verifying the delivery order attempt. In this way, soon rider will update the status against any delivery order, either it will be 'Delivered' (Customer Received Order) or 'Failed' (Delivery Attempt Unsuccessful); in both cases, the location where the rider updates the delivery attempt its Latitude and Longitude will be captured and save it against the Order in the Database of the server. With the help of Delivery Attempt Location, we can quickly identify whether the rider went to the customer location or not by checking the customer location and comparing it with the Rider Delivery Attempt location; if the distance between both of them is minimum means the rider visited the customer location and it is a valid delivery attempt. But if the distance between both places is more significant, it means the rider hasn't made a valid delivery attempt, so the rider is responsible for the complaint. This location data will be captured Online and Offline in both cases, which means no matter rider has an active internet connection or not, it will capture its location at any cost. Therefore, logistics companies can either develop this feature in-house on their existing rider application, use the government-developed standard rider mobile application, or integrate it with their Application through the API Call feature.

Maintain Log of Rider Call to Customer

Before making a delivery attempt, one of the basic operations done by the rider is to call the customer either to get clarity on the customer's address or to inform the customer regarding the delivery attempt and also to know about their availability. In so many cases, the fate of the delivery order attempt is decided on this call whether the delivery attempt will be successful or not. Because often Customer either updates the rider that he is unavailable, so the rider does not have to make a delivery attempt or even update regarding its availability and waits for him to receive his order to make it a successful delivery attempt. In either case, when and what is discussed between Rider and the customer is critical for the validity of the Delivery Order Attempt; that is why maintaining a log of the Rider Call to the customer when the rider called, how many times he called, what is the duration of the call. Most importantly, the Audio Call Recording of the conversation will benefit the logistics operation to conclude any complaint by listening to the exact call conversation, quickly making things black and white. If the Customer didn't pick up the call, then the attempt to a call from Rider also becomes evident that the rider not only reached the customer's location but also called him to inform. Also, it can help in so many cases like:

- Customer's address is not precise, then Rider has to call the customer for clarity so that he can reach the location; if the customer has picked up the call, then Rider will quickly get it, but if the Customer did not pick up the call, then the Call attempts customer for address verification will be considered as an attempt.
- Customer sometimes Rejects or Reschedule the Order on the call to Rider before coming to the customer's location because the Customer doesn't want the Order or is unavailable Today. In That case, there is no point in visiting the Customer's Location or going near the Customer's location when Rider knows that Delivery Order will be unsuccessful. That is why Rider Delivery Attempt Location Data will not be beneficial in that case because the rider hasn't visited after confirmation with the Customer on Call. So, the Call Log of the conversation between the Rider and the customer will be the primary source of confirming the validity of the Order Attempt.
- Sometimes, instead of adequately calling, Rider clicks to call and cuts it, so he can justify that he had made the call and the customer's phone was switched off or not picked up. In that case, only calling a customer will not be enough, but we have to have a check on call duration that it should be dialed for enough time that the customer can answer it, and it will not be a Missed Call. So standard dialing time will be given to check valid call dial attempts in case the customer not picked the call.

Therefore, logistics companies can either develop this functionality in-house on their existing rider application, use the government-developed standard rider mobile application, or integrate it with their Application through the API Call feature. One thing to

be noted for Customer Privacy is that the Recorded Calls should be maintained and saved in a secure environment. Access to it also should be limited to the concerned people only. So, in case Logistics companies develop this feature by Themselves, then Government will regulate them to check if this information is stored according to the standard or not. And if Logistics Companies use Government developed solutions, the Government will make sure the data security standard themselves.

Providing Riders with Call Package

Delivery riders can also face issues if they have to do the calling with their own Mobile SIM; in that case there, too much expense will be spent on Mobile Billing, and Delivery Rider, at some stage, will compromise in the way of adequately calling the Customer to save its Mobile Bill. That is why Mobile Calling Basic Cost needs to be a part of the Delivery Rider Salary, and Delivery Rider have to make sure this Given amount is only used for Customer Calling purpose or Either providing Delivery Rider SIMS with Calling Package Enabled in it by adding Private SIM provider Companies in it. So, Delivery Rider will now have a Call packaged SIM, and they can no longer compromise Customer Calling standards. So, this solution is also needed. Logistics companies can either do it by themselves entirely by adding a third party from the Mobile SIM provider Sector; or They can ask Government for the Scheme and the Government with the third party from Mobile SIM providers to implement it.

Providing Riders with Internet Package

Sometimes the location where Rider is calling have a weak Internet connection, and the call doesn't go through, or even in some case Customer is not active on Mobile Call on Provided Mobile Number. Still, he is available Online on different Mobile applications like WhatsApp, Signal, etc. So, with the help of these Online features, Delivery Riders can Contact customers effectively by using a different mode of communication. Also, internet connectivity can use other Apps, Like Google Maps, etc., to get guidance on customer Addresses. To make communication smooth through other Apps, there are also so many features to Integrate Apps like WhatsApp with mobile; with its help, you don't have to save or find customer numbers on your Mobile. You can click it, and it automatically sees if the number exists in WhatsApp or not. That is why Mobile Internet Basic Cost needs to be a part of the Delivery Rider Salary or Either on provided Delivery Rider SIMS, making the Internet Package part of it by adding Private SIM provider Companies. So, this solution is also needed. Logistics companies can either do it by themselves entirely by adding a third party from the Mobile SIM provider Sector; or They can ask Government for the Scheme and the Government with the third party from Mobile SIM providers to implement it.

Pre-Alert Customers with SMS

When Delivery Rider Updates the Delivery Order status from Mobile Application, the Backend Automatically initiates SMS on the Customer's Registered phone number. That SMS should have a standard text format with all necessary details regarding the Delivery Order's success or failure reasons and delivery Riders' details. The Customer Service support number should be mentioned in it, with the help of its customer can quickly Contact Customer Support of logistics company by himself. Through SMS, customers can able get notified immediately regarding their Order; and they can acknowledge or complaints accordingly. So, logistics companies can either develop this feature in-house on their existing rider application through many Different SMS provider Companies or use the government-developed standard rider mobile application or integrate it with their Application through the API Call feature.

Sharing Delivery Verification Code with Customer

When Delivery Rider scans the Delivery Order successfully to take with him en route from Mobile Application, the Backend Automatically initiates an SMS on the Customer Registered phone number. That SMS should have a standard text format with all necessary details regarding the Delivery Order and, most importantly, a randomly generated 4-Digit Delivery Verification Code. That Delivery Verification Code Input option will be present in Delivery Rider Mobile Application. So, whenever Delivery Rider Delivers or Failed Status updates the Order, he has to ask the customer to tell him the 4 Digit Code he received on the SMS. Then Rider that shared Delivery Code will input it in the Application. Therefore, if the Delivery Code entered by the Rider is matched precisely with the Delivery Code Sent to the customer, then it will be a Valid Delivery Attempt; otherwise, it will be considered a Fake delivery attempt if Delivery Rider

enters the wrong Delivery code. Some corner cases also can happen on it like:

- Customer misplaced SMS or mistakenly Deleted the SMS or did not Receive SMS due to technical issues; in that case, Rider can't be able to put the Correct Delivery Code. To cater to these issues, a 'Resend SMS' option will be added in the Backend of the System, which automatically gets triggered on all failed SMS, and also a Button with the same function will be added in Delivery Rider Mobile Application, clicking on it again Customer will receive SMS at that time.
- Customer not available and not picking up Call or even picked Call not shared Delivery Code due to any personal reason which relates to customer nothing to do with Delivery Rider in that case, Rider can't be able to put Correct Delivery Code. No way to cater to this situation.

So, logistics companies can either develop this functionality in-house on their existing rider application, use the government-developed standard rider mobile application, or integrate it with their Application through the API Call feature.

Stopping Fake Delivery Orders

Sometimes online fraud happens with customers somehow, and customer delivery order information is leaked either from an e-commerce site or from Logistics Operations, which is done through the In-house staff that has access to the customer information. So, what they do next is make a Fake Delivery Order with a Fake Flyer on it, deliver it to a customer, and receive cash in return. At the time of delivery, a customer can't be able to open the delivery order due to the policy of the e-commerce site that until the Cash Amount is given Customer is not allowed to open the Delivery Order after payment. When the customer opens the Fake delivery Order Flyer, he finds out that it has Fake items with no value, and the Fake Delivery Rider would have left with Cash for the Actual Order. To cater to these two actions need to be taken:

Sharing Flyer or Box Code with Customer

Ecommerce Sites Shipper or Merchant should make sure that each Flyer or Box on which Delivery Order is packed should have a random, uniquely generated Code, and the Code should be present on Flyer or Box behind a scratchable Bar like the Code in SIM Card to know the code you have to scratch the Code in SIM Card. Similarly, a Flyer or Box Code will be present on Order Like This, and that Code will be shared only with the Customer through Email or SMS at the time of Order Booking. Finally, when Delivery Rider brings the Order to the Customer, the Customer will already have the Flyer or Box Code in the SMS. Then the Customer will scratch the Code on Flyer or Box and will compare it with Code in the SMS and the code on the Actual Order. If the same, then we will accept the Order. If different, they will know that it may be a Fake Order and will not pay the Cash. So, logistics companies can either develop this option in-house on their existing rider application, use the government-developed standard rider mobile application, or integrate it with their Application through the API Call feature.

Identifying Delivery Rider

When Delivery Rider scans the Delivery Order successfully to take with him en route from Mobile Application, then an SMS initiated from the Backend Automatically on the Customer Registered phone number should have all the necessary details regarding Delivery Rider Like his Name, Phone Number, Employee Code, etc., and also Logistics Company Name. Then at the Time of Delivery Order Receiving Customer, make sure the Delivery Rider Name, Employee Code on Employee Card Rider is wearing, and Company Uniform Rider is wearing should match all Details shared in the SMS. It will be the responsibility of the Logistics Company to make sure Delivery Rider has the proper company Uniform and Employee Card for verification.

Auto Delivery Verification Call to Customer

When Delivery Rider Updated the Delivery Order status to either Delivered or Failed from Mobile Application, then from the Backend, an Automatically Robotic Call with pre-recorded audio will be initiated on the Customer's Registered phone number, and that Robo Call will give an Update to the Customer with all necessary details regarding Delivery Order success or failure reasons. At the End

of the Call, the Customer will get the option to give feedback on Order Delivery Attempt Validity Like. Press '1' for Valid Attempt and Press '2' for Fake Attempt, etc., If Valid Attempt Digit is pressed, then a fine and Call will end. But if Fake Attempt Digit is Pressed Then, it will Connect the Customer immediately with Customer Service support; with this help, the customer can easily share the complaint with the Customer Support of the logistics company and wait for their response of them. So, with this feature, logistics companies can either develop it in-house on their existing rider application through many Different Call Service Providers Companies or use the government-developed standard rider mobile application or integrate it with their Application through API Call feature.

Delivery Verification by QR Code Send to Customer

When Delivery Rider scans the Delivery Order successfully to take with him en route from Mobile Application, the Backend Automatically generates a Unique QR Code link. It then sends the QR Code Link to the Customer's Registered phone number. That Delivery Verification QR Code scan option will be present in Delivery Rider Mobile Application. So, whenever Delivery Rider Delivered or Failed Status updates Order, he has to ask the customer to show him the QR Code he received. Then the Rider scans Delivery QR Code from the Application. Therefore, if the Delivery QR Code scanned by the Rider is matched precisely with the Delivery QR Code Sent to the customer, then it will be a Valid Delivery Attempt; otherwise, it will be considered a Fake delivery attempt if Delivery Rider scans the wrong Delivery QR code. Some corner cases also can happen on it like:

- Customer misplaced QR Code Link or did not Receive SMS due to a technical issue; in that case, Rider can't be able to scan the Correct Delivery QR Code. To cater to these issues, a 'Resend QR code' option will be added in the Backend of the System, which automatically gets triggered on all failed QR Code also, a Button with the same function will be added in the Delivery Rider Mobile Application, clicking on it again Customer will receive QR code link at that time.
- Customer not available and not picking up Call or even picked Call not sharing Delivery QR Code due to any personal reason which relates to customer nothing to do with Delivery Rider in that case, Rider can't be able to Scan the Correct Delivery QR Code. No way to cater to this situation.

So, this option also logistics companies can either develop it in-house on their existing rider application, use the government-developed standard rider mobile application, or integrate it with their Application through the API Call feature.

Delivery Verification by Feedback Form Send to Customer

When Delivery Rider Updated the Delivery Order status with Delivered or Failed status from Mobile Application, then from the Backend, Automatically Feedback Form link will be sent by SMS to the Customer's Registered phone number, and that Feedback Form will give an Update to the Customer with all necessary details regarding Delivery Order success or failure reasons. In the end, the Customer will have the option to provide feedback on Order Delivery Attempt Validity By selecting 'Yes' for Valid Attempt and Selecting 'No' for Fake Attempt, etc.; if the Valid Attempt option is selected, then the fine and form will complete. But suppose the Fake Attempt option is selected. In that case, it will share information regarding the fake attempt with Customer Service support. With the help, its customer will be contacted by Customer Support of the logistics company and will resolve its query. So, logistics companies can either develop this feature in-house on their existing rider application, use the government-developed standard rider mobile application, or integrate it with their Application through the API Call feature.

Customer Sign Verification through Finger Prints Check

Most of the Delivery Update Applications for successful attempts usually take the customer's Digital signature on the mobile Application screen. We can use that digital signature to verify the Delivery Attempt Verification by checking if it is the customer's Signature or a fake signature. To do it, we will take the fingerprint data of all enrolled delivery riders and save it in the system. We know the customer's signature is mainly done on the Mobile Application screen through fingers. So, we will also capture the fingerprint data with the signature itself during the signature. Finally, then compare the Fingerprints captured from the signature and the Fingerprints of the Delivery Rider stored in the System, if matched this means a Fake Attempt' because the Rider himself did the signature and not taken

the customer's signature, and if not matched, then it 'Valid Attempt.' Some corner cases also can happen on it like:

- Delivery Rider took any random person's signature on the mobile application screen. In that case, it will always show as a 'Valid Attempt' because fingerprints are not matched with Delivery Rider. To cater to it, no solution right now exists.
- Objection of Rider or Customer regarding their Fingerprints being stored in the system can be made, significantly if logistics companies develop it in-house.

Customer Sign Verification with Saved Signature Link

Instead of the Finger, the customer used a digital pen for the signature. To cater to these issues, a 'Send Signature Link' option will be added in the Backend of the System, which automatically gets triggered on all Orders at the time of Booking, and on that link, the Customer will do his signature and submit the link. That signature will be stored on the system with Order. So, at the time of delivery Customer will do a signature, and that signature on the delivery receiving time will be matched with the customer's signature saved on the system received from the link. If not matched, this means a 'Fake Attempt' because Rider himself did the signature and not taken the customer's signature. If matched, then 'Valid Attempt.' Therefore, logistics companies can either develop this innovative feature in-house on their existing rider application, use the government-developed standard rider mobile application, or integrate it with their Application through the API Call feature. One thing to be noted regarding the sensitivity of Rider or Customer Fingerprints Data is that it should be maintained and saved in a secure environment, and access to it should only be limited to the concerned people. So, in case Logistics companies develop this feature by Themselves, then Government will regulate them to check if this information is stored according to the standard or not. And if Logistics Companies use Government developed solutions, the Government will make sure the data security standard themselves.

Delivery Verification through Customer Thumb Impression

To do it, we will be taking the thumb impression data of all enrolled delivery riders and saving it in the internal system. So, during the Delivery receiving process thumb impression of the customer will be taken on the Delivery Updating screen of the Mobile Application. Then a comparison of the thumb impression captured at the time of Delivery and the thumb impression of the Delivery Rider stored in the System will be made, if matched this means a 'Fake Attempt' because Rider himself made a thumb impression on the delivery screen and not taken customer thumb impression and if not checked then 'Valid Attempt.' Some corner cases also can happen on it like:

- Delivery Rider has taken any random person's thumb impression on the mobile application screen. In that case, it will always show as a 'Valid Attempt' because the thumb impression is not matched with Delivery Rider. To cater to it, no solution right now exists.
- Objection of Rider or Customer regarding the thumb impression of them being stored in the system can be made, especially if logistics companies develop it in-house.

Therefore, with this innovative functionality, logistics companies can either develop it in-house on their existing rider application, use the government-developed standard rider mobile application, or integrate it with their Application through the API Call feature. One thing to be noted regarding the sensitivity of Rider or Customer thumb impression Data is that it should be maintained and saved in a secure environment, and access to it should be limited to the concerned people only. So, in case Logistics companies develop this feature by Themselves, then Government will regulate them to check if this information is stored according to the standard or not. And if Logistics Companies use Government developed solutions, the Government will make sure the data security standard themselves.

Delivery Verification through Customer Face Verification

To make it possible, we will take pictures of all enrolled delivery riders and save them in our system. So, during the Delivery receiving process picture of the customer will be taken on the Delivery Updating screen of the Mobile Application when the customer is doing a signature on it. Then compare the photo taken at the time of Delivery and the image of the Delivery Rider stored in the System, if matched this means a 'Fake Attempt' because the Rider himself made a signature on the delivery screen and not taken the customer's

signature and if not matched then 'Valid Attempt.' Some corner cases also can happen on it like:

- Delivery Rider is taking any random person sign on the mobile application screen. In that case, it will always show it as a 'Valid Attempt' because the captured picture is not matched with Delivery Rider. To cater to it, no solution right now exists.

Therefore, with this innovative functionality, logistics companies can either develop it in-house on their existing rider application, use the government-developed standard rider mobile application, or integrate it with their Application through the API Call feature.

Delivery Verification through Customer Voice Verification

To create this solution, we will be recording the voices of all enrolled delivery riders by saying the same word or sentence like 'Order is Delivered,' etc. It will save it in our internal system. So, during the Delivery receiving process, the customer will have to say the same sentence on the Delivery Updating screen of the Mobile Application. After done, then the comparison of the voice recorded at the time of Delivery and the voice of the Delivery Rider stored in the System will be done, if matched this means a 'Fake Attempt' because Rider himself recorded his voice on the delivery screen and not recorded customer's voice and if not matched then 'Valid Attempt.' Some corner cases also can happen on it like:

- Delivery Rider recorded any random person's voice on the mobile application screen. In that case, it will always show as a 'Valid Attempt' because the recorded voice is not matched with Delivery Rider. To cater to it, no solution right now exists.

Therefore, with this innovative functionality, logistics companies can either develop it in-house on their existing rider application, use the government-developed standard rider mobile application, or integrate it with their Application through the API Call feature.

Providing Live Tracking of Delivery Rider to Customers

In different technology-based companies which are providing solutions for online food ordering or online ride taking etc., one of the prominent features they give is the availability of the option to track delivery rider location in real-time on the application. This solution provides a great user experience and makes the process more transparent by giving visibility into where the delivery rider is and when he will reach the customer's location. Different logistics companies are starting to adopt this solution, but it is still not very common; that is why we should implement this solution to give the customer more clarity regarding the delivery process flow and also make things more transparent so that no longer logistics companies and Delivery rider can have any way of making false claims because now with live Tracking every move of rider will be monitored and checked by the customer. Also, Logistics companies with this solution can better control delivery riders and track their work enroute through it, which will really help them to judge the riders' performance better. Therefore, with this live tracking feature, logistics companies can either develop it in-house on their existing rider application, use the government-developed standard rider mobile application, or integrate it with their Application through the API Call feature.

Conclusion

Based on this research study, standard Delivery Verification techniques will play a prominent role in the future of Last mile logistics operations. However, it will depend on the outcome when implemented in a natural practical environment. Through this paper study, we have built an understanding of the concept behind the formation of standard Delivery verification regulation. Then we have taken into view the situations in which it badly impacts the efficiency of the logistics sector, in that case was the discomfort regarding the current process of Delivery verification done between customers and logistics companies. These cases made it necessary to think beyond the practices we are currently following and generate new innovative ideas according to the problem nature, one of them being the Standard regulations from the government, which will lead towards problem resolution. We agreed that it is needed to be implemented quickly, so it can give directions to the current logistics expert to align operations according to it because so many issues are being faced on the ground without it. But by learning from our mistakes and recent experience, we can now get critical points we must follow or fulfill before successfully implementing them in any country. These points are discussed in detail so we can get a complete

understanding of it and also why it is necessary to do it or the logic behind it. We have confidence that the mentioned findings points will be beneficial for solving current issues. Finally, this regulation is the answer to the change in behaviors of online e-commerce customers. However, it's still in a testing phase, so we must constantly keep up with every change and prepare a plan to deal with it through different solutions. But as of now, it is more than enough to regulate the logistics sector based on it and parallelly keep learning and continue further research work that should be the first step toward the inception of a new Digital era of logistics.

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Conflicts of Interest

The authors declare no conflict of interest.

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