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Research paper

Information Real-Time Delivery (IRTD) System through the Internet of Things (IoT): An Improvement in Truck Management Environment

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Abstract

Today, logistics sector, particularly in container haulage industry, is dealing with million shipments of cargo every day, origin and destination, size, weight, content, and location are all tracked across the global delivery network. in and out containers at the port can cause the port congestion and additionally are going to affect driver to deliver the cargo to the customer at the right time. Due to that matter, container haulage invariably received lots of complaint by the customer concerning the delay of the cargo without customer grasp precisely situation that faced by a driver in order to deliver the customer's goods. The delay of this cargo may occur as a result of waiting time at the port terminal, customs clearance, road congestion, bad weather, and the breakdown of truck and shortage of driver. All this information is late received by the customer and it will affect the level of customer satisfaction. This study proposed to conduct a research about the Information Real-Time Delivery Systems IRTD through the Internet of Things (IoT) that can give the information of real-time monitoring and updated delivery systems to related parties. Thus, these papers focuses on the current process of the information notification delivery model to the related parties and resolve the uncertainties delays by redesign model of information real-time delivery system at haulage industry. Furthermore, this research will determine the utilization benefit of IRTD system at haulage industry. Business Process Redesign model will be adopted in this study as a holistic guidance about a development model of IRTD integrated IoT technology as an improvement in haulage industry environment.

Keywords: *Cloud Computing; Visualized; Organization Support; VLE*

1. Introduction

With the rapid growth of industrialization in Malaysia, it contributes to increasing volume of international trade using containerization for the import and export purpose. Container haulage industry is vitally important due to that role as the backbone of industry growth economy that can give the value added to service to the country. According to Zaid & Shah, (2007), the haulage industry is one of the key parts in crucial the efficiency and effectiveness of their customer, which general meaning the whole supply chain of Malaysian industry. Dealing with million shipments of cargo every day, origin and destination, size, weight, content, and location are all tracked across the global delivery network will cause to congestion at the port and delays delivery of the container to the destination. Late to notify information to the customer regarding the delay of their shipment show the inefficiency of the hauler in meeting the demand and requirements of the customer.

The delay of the shipment may occur due to the waiting time, customs clearance, road congestion, bad weather, maintenance of truck and shortage of driver that affect the capabilities of haulage industry to sustain their performance. According to the Islam, S., and Osle, T (2014) said that the customer always complaint about the delay of the shipment without exactly know the real situation faced by the driver in order to deliver their shipment. These need an immediate solution and improve the bottleneck of the haulage industry in order to ensure their operation can be run smoothly.

The implementation new technology innovation named Information Real-Time Delivery Systems (IRTDS) one of the Internet of Things (IoT) application may improve the current problem faced by the haulage industry. Internet of Things (IoT) called as Industrial 4.0 that already changing the world also give the idea of the digital connection of object via the internet, creating a network which enables this object to gather and exchange data. IoT will enable users to share information in real time and to storage massive quantity of data in order to have access anywhere and anytime is wanted, although it is essentially good security software in order to protect all this information. Information Real-Time Delivery System will support the haulage industry to give the real-time notification status activities of delivery to the customer. Customer will be updated every second of movement of their shipment regarding the condition, location, and situation that faced by a driver in order to deliver their goods. Furthermore, the customer will receive an emergency alert in real time if the driver has a problem to send customer's goods such accident, waiting time at port, road congestion, and other else constraint.

Using this kind of system will increase visibility for carrier, shipper, and driver. It will result in better inventory and vehicle management and improved customer service due to a lot proactive approach to managing deliveries because the delay is known earlier. Other than that, it will improve information accuracy between shipper, carrier and as well customer (2). In brief, this study aims to investigate the current process of delivery notification status to the customer at Haulage Company. This study also targets to rede-

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sign model of Information Real-Time Delivery Systems at haulage industry. Afterward, the benefits of the implementation of Information Real-Time Delivery Systems would be identified.

2. Literature Review

2.1 Internet of Things (IoT) in Logistic Industry

Internet of Things can overcome shortcomings of some areas of logistics, for example, monitoring, production management, the efficiency of logistics operations, information, exchange, and communication, modeling supply chains, intelligent information collection and security (3). Internet of things refers to the system that connecting things to the internet and using the connection to produce some kind of the helpful remote monitoring or control of all the things (4). Adoption of IoT in logistic operation promises a substantial impact in a way it can monitor the status of assets, parcel and people in real time throughout the worth chain (5). Applying the IoT in the logistics will make the smooth information can be transformed. It starts from IoT will monitor the real-time status of assets, parcel, and people and as well it will measure how these assets are acting and result in a modification in what they are presently doing. Through IoT, we can automatically eliminate manual intervention, improve quality and predictability. On top of that, we can optimize how people, systems, and assets can work along, and coordinate their activities. And eventually, we can apply analytics to the whole value chain to identify extensive improvement opportunities and best practices (5,6).
The IoT allows tracking of the product until that product delivered to the customer (7,8). Real-time weather and traffic data are obtainable to the logistic carrier to work out optimum routes for delivery and changes during a truck's delivery plans will be communicated directly to the carrier and if appropriate to the customer. IoT-enabled assets tracking can provide business with a centralized view of all assets, whether in transit or not and this allows customers to monitor the status of goods during transit, providing them with peace of mind that their good will arrive at the right place and right condition (9). Figure 1 shows the Real-Time Product Tracking from order to the delivery real-time location and if the truck stuck in traffic or breakdown, the system will update immediately to the customer. Real-time information gathered via traffic sensing element will facilitate guide the vehicle to an optimal route (8).In the previous study, show the specified application of IoT include the real-time tracking of cargo, warehouse-capacity improvement, prophetic assets maintenance, route improvement and improved last mile delivery (10,11). This real-time visibility can enable transport and logistics providers to explore much more of effectively and intelligent their rich and complex database, resulting in a lot of efficient use of resources, better engagement with the customer and more informed decision making (10). (

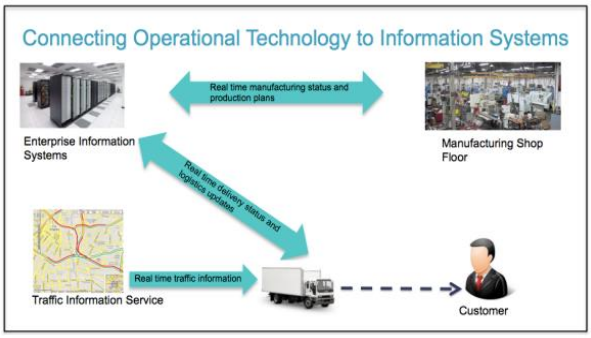
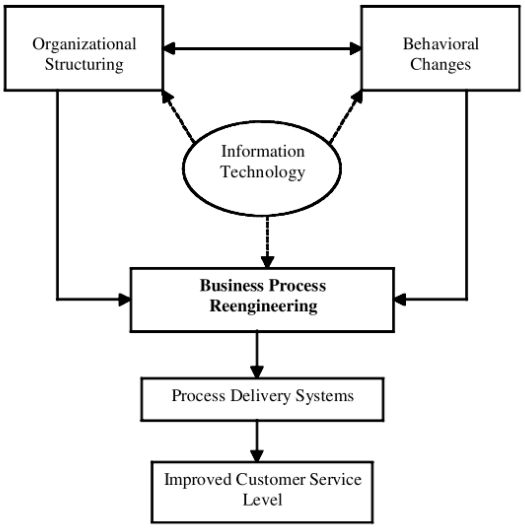


Figure 1: Real-Time Product Tracking from Order to Delivery (8)

2.2 Business Process Re-design frameworks

Business process redesign is introduced in early 1990's by Michael Hammer and this technique is one of the many management concepts adopted by the organization to improve the efficiency of their business operation (12). BPR is concerned with the fundamental rethinking and radical redesign of business process to achieve dramatic improvement in the current activity (12–14). Several studies have revealed that BPR process increases the operational error in term of technology innovation. Cakmak, (2016), in the study, found that BPR is a successful process in improving the Electronic Resources Planning (ERP) in the organization. BPR is that the most extreme illustration of process thinking because it seeks to exchange the whole organizational structure with core business processes (16). The examination of IT will reveal the utilization of IT tools inside the BPR process which usually ends up in faster, better and cheaper solutions at every part of the BPR process (17). In addition, as studies by Iqbal N, Nadeem W, Zaheer in (18), BPR provides empirical proof to look at impacts of dynamic environments, dynamic capabilities and information technology adoption on business process re-engineering. The scope for requests in manufacturing and service organizations and that IT is an important part of BPR (18). The figure below shows the conceptual model explaining the major components of BPR.
BPR model needs structure restructuring include the facility location, capacity, varieties of products, technology, people and BPR additionally changes in employees' behavior in term of training, education, job enrichment, job enlargement, and worker management with a view to accommodating and facilitating radical changes for achieving dramatic improvements in business performance. Information technology, such as the Internet, E-Commerce, CAD/CAM, CIM, MRP, Multimedia, ERP and World Wide Web, EDI and EFT, would facilitate to restructure a company and promote changes with acceptance from workers on any radical changes within the company. The re-engineering of a business process will result in improved process delivery systems and



hence an improved customer service level (19,20). Figure 2 showed the BPR basic model.

Figure 2: BPR basis process

3. Methodology

This research will apply a case study in Qualitative methodology for data collection and analysis. Main data collection method is an interview. It involves a semi-structured interview with 14 personnel that are expert in the related field. The case example is chosen from the FMCG industry and is formed by Southern Forward Trans manufacturers as a sample study. The 7 respondents in Table have been interviewed for initial validation for new development of the business process. The interview process will be repeated together with the others respondents to confirm the proposed model. Thus, this paper is only involved until the basic new process/business model developed with the guides of BPR model.

Table 1: Respondents

Position	Specialist	Total
Haulage Industry	Managers	5
Port	Operation Manager	2
Customers Company	Operation Manager	5
Technology vendor	Software development	2

4 Finding

4.1 Current Process of Delivery Notification Status To the customer at Haulage Industry

There is the basis of current process delivery notification status to the customer once the goods are shifted by the carrier are using the e-mail, phone, and fax as stated in research by Yi, (2010). The most serious problem with this kind of medium is possibilities to miss some details and there is no any system to control it. Sometimes customer needs to call the freight forwarder to know about their goods and the freight forwarder needs to call the haulage to know the current status of the goods to update to the customer. Lack of person-to-person communication among related parties always invariable during this method.

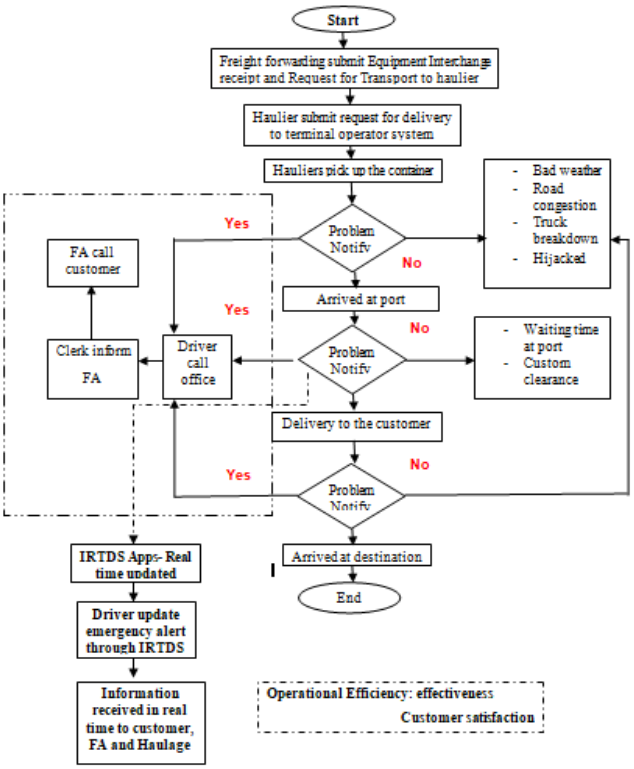


Figure 3: Current process

The problem notifies in the current process delivery shipment occur due to the waiting time at port, customs clearance, road congestion, bad weather, maintenance of the truck. Figure 3 illustrated the basic current business model process of truck management in haulage firms. This operation conventionnaly implemented and subsequentlly enhance for improvement. Figure 4 illustrate the proposed process model of real time information notification. However this is for first logical design and this basic process model will be revised and validated by same experts from related industry and technology vendor.

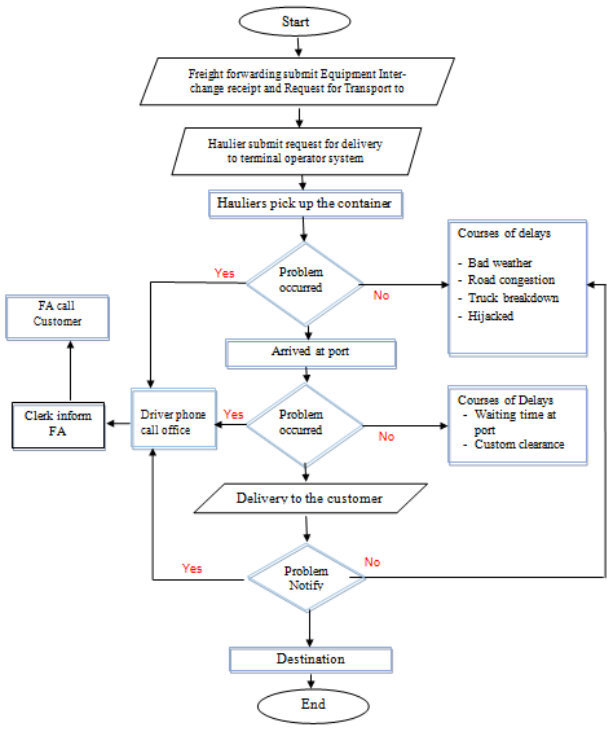


Figure 4: Proposed New Process of Delivery Information notification

5. Conclusion

This writing made a review of the literature a few determinants of implementation of Internet of things at the various organization and business level. The interview conducted to analyze the and redesign the current process delivery information in haulage industry by using the strategic model of BPR as a guideline to develop a new model of Information Real-Time Delivery System (IRTD). Validation of the new process will be the next activity in this research and the benefits of proposed model will be produced with the deference perspective of respondents. This is believed to lead increased use in industry in the future. Although technical barriers are less important, we need to be aware that the use of real-time tracking systems requires careful cost and benefit examination, and the arrangement of tactical collaboration between senders and carriers for successful execution and subsequent diffusion.

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