Designing a Customer-focused Supply Chain Strategy: A Case of Thailand's National Postal Company

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Abstract

With rising competitiveness in the express delivery industry in Thailand, the national postal service company encounters heightened rivalry from its immediate competing companies in the market. This paper proposes the conceptual supply chain digitization strategy with the aim to increase operational efficiency and enhance customer serviceability. The operational gaps of the case study company are identified and analyzed. We undertake the customer survey to obtain the level of satisfaction and ways forward for the industry, which is factored into the determination of company-specific digitization strategy. The survey indicates that a substantial number of customers have had previous encounters with reliability issues from the provided service of the case study company. It is discovered that the market demands for three vital aspects of delivery excellence - timeliness, accuracy, and acceptable parcel condition. Furthermore, three of the market-winning elements identified by the Thai market include pre-delivery SMS reminders, real-time traceability, and clear or flexible delivery timing, which are incorporated into the conceptual framework. The proposed digitization conceptual framework for the case company integrates four main methods - RFID with smart labels, AIBA telematics, cloud computing, and last-mile delivery vehicle routing to enable the achievement of improved operational efficiency and serviceability. Eventually, we derive the lessons learnt for the industrial peers to realise the importance of process integration, automation, cloud computing integration, last-mile delivery process, and customer comprehension – which has increasingly become vital for logistics companies going forward.

Keywords

Customer-centric Supply Chain, Postal Company, Serviceability, Optimization, Digitization

1. Introduction

As of the rise of e-commerce and technological shifts, the postal and courier industry is experiencing a remarkable change – reduced volume of documents and letter deliveries with marked increase in parcel deliveries (Morganti et al. 2014). In addition, the industry is expected to prosper from the Thai government's initiative of the 20-year strategic roadmap to enhance improvements in digital platforms and logistics connections domestically. As a result of the mentioned coupled with the industrial denationalization, rivalries have built up between incumbents and new-coming businesses with strong competition based on price and quicker delivery duration. In addition, the industry is further pressured by target customers to offer the lowest price yet lightning-speed delivery. This is in concert with the findings of Dragendorf et al. (2018) as the expectation is on the shortest duration at the lowest possible delivery

costs, which can also imply "free of charge". Chanliem and Pisitkhasem (2018) find that added humanized factors can create further appeal for customers, including acceptable parcel condition and staff professionalism in service.

Table 1: Operating income of the case study company in comparison to its main rival (Prachachart Business 2019)

Operating Income	**2016**	**YOY%**	**2017**	**YOY%**	**2018**	**YOY%**
Case company	R 13,170.30	16.01%	R 14,344.38	8.93%	***R 15,071.60***	***5.07%***
Main rival	R 1,636.88	112.45%	R 3,383.14	106.70%	***R 6,929.23***	***104.82%***

Operating Profit	**2016**	**YOY%**	**2017**	**YOY%**	**2018**	**YOY%**
Case company	R 1,774.07	36.16%	R 2,135.61	20.37%	***R 1,940.48***	***-9.14%***
Main rival	R 156.11	128.57%	R 371.62	138.04%	***R 600.82***	***61.68%***

Unit: Million South African Rand (Recorded Rate: 1 SA Rand = 1.97 Thai Baht)

The study of Dragendorf et al. (2018) displays nationalized couriers and postal companies in an uncompetitive light in comparison to privately-owned providers due to average higher staff salary of up to 20% - 40%, the reliance on ageing ICT systems and labor-intensive work units as limiting capabilities. Indeed, slow adaptation to changes in the industry and low digitization efforts are also relevant contributing factors. Regarding the case study company, customer complaint reports indicate reliability problems from its operations in the areas of delivery accuracy (delivery to the correct address), delivery timeliness (on-time performance), and parcels condition (parcels in acceptable conditions upon receiving) which are believed to further reduced its advantageous position. This is predicted to be a consequence of sluggish innovation realization and costly operating expenses due to its tall structure, and the lack of brand presence on digital platforms, enabling competing firms to fill in the gap to provide quicker and more value-adding services. The reflection of such sluggish performance is illustrated in table 1 with the diminishing operating profit as compared to the rising star in the industry. This can be deemed as an opportunity loss given the level of resources and large presence in the country; thus, requiring investigation into the hindering factors and establishing a digitization strategy to ensure operational outcome improvements. In addition, changes in societal patterns during the COVID-19 pandemic and stay-at-home orders imposed by the Thai government since March 2020 until the end of the year (Pothiwan 2021) can further constricts the efficiency in operations and serviceability.

The objective of the research aims to construct a conceptual strategic digitization framework to address operational and serviceability issues based on Industry 4.0 technologies and improved asset utilization. This study considers consumer demands due to the shifting roles of logistics as a service entity (Daugherty et al. 2019), current operational issues, and the investment patterns of the case study company as primary in deriving the strategic framework. Firstly, we conduct the literature review with emphasis on the shift towards servitization of logistics operations and changes to the industry in Thailand as a result of the pandemic. Thai market customer demand is studied alongside the descriptive analytics of the case study company to obtain customer needs and wants; let alone, issues encountered by the case study company as a consequence of its operations. Afterwards, the conceptual supply chain digitization strategy is presented and proposed, along with important lessons for other industrial peers.

2. Literature Review

Postal and courier companies encounter a number of complex issues of incoming loads on a daily basis through the nature of less-than-truckload logistics operation to consolidate the loads for further delivery to similar geographical destinations (Chu 2005). Further problematic encounters are defined by Sanchez-Rodrigues et al. (2008) to include delivery methods, transportation types, and vehicle conditions, contributing to systematic inefficiency and delays; let alone, the lack of ICT integration with fellow supply chain members. This prohibits the achievement of process integration, which would put companies in a better position to be flexible and agile in face of occurring changes. According to Irfan et al. (2020), IT-based process integration enables data and knowledge sharing across the entire supply chain to result in participants in the upper stream to control the lead time of processing; let alone, the downstream parties being able to evolve to respond better to customer demand to reduce operational risks. This results in positive impacts operationally and financially to companies in the supply chain.

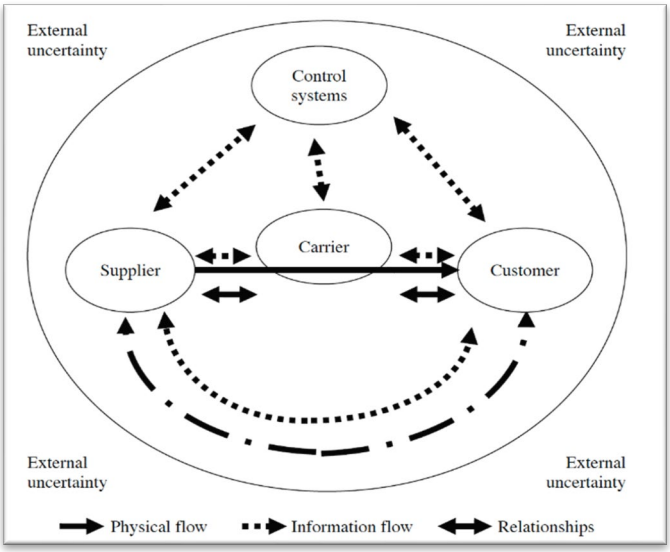

Figure 1: Logistics operations' uncertainty model (Sanchez-Rodrigues et al. 2008)

It can be witnessed that the eventual objective is to optimize the operational performance in order to enhance customer service at the other end of the supply chain. Daugherty et al. (2019) mentions the need for logistics companies to shift towards customer service more extensively as a market-wining strategy. This study classifies customer demand into two forms: market-qualifying and market-winning factors. Market-qualifying factors are operation-based; hence, must firstly be performed with exceptionality – "getting things right the first time" to satisfy customers on a basic level. This usually includes delivery reliability factors: accuracy, parcel handling, and timeliness (Mentzer et al. 1999; Banomyong and Supatn 2011). Market-winning factors must separately be taken into consideration as a method to create 'special feelings' - enriching customer experiences based on what customers visualise as 'value-adding' in a defined market space. This can include (but not limited to) brand omni-presence via offline and online channels, item traceability and reverse logistics (Daugherty et al. 2019), one-stop service points (Banomyong and Supatn 2011), and some forms of on-going dialogues with customers (Daugherty et al. 2019). This enables logistics providers to provide further services to enrich customer experience to inspire trust, honesty, and reliability to clients (Rajesh et al. 2011).

Additionally, it can be witnessed that logistics operations have been shifted to become more "forefront" as a customer facing role in comparison to its past role as a mere 'delivery' entity, which is presently expediated from the implementation of stay-at-home regulations by the Thai government causing the e-commerce market to exponentially grow owing to "the lipstick phenomenon". Thus, ever-growing number of postage items are expected to be delivered through couriers and postal service. Indeed, only through courier and postal service agents can customers receive service-like experience; thus, creating the need to develop service orientation to elevate customer experience (Pothiwan 2021). OC&C (2017) observes that a large number of customers liken delivery service experience to that as per received from a particular company. It is also discovered that up to 75% of customers would expect the provision of free return policies to encourage their purchases. Consequently, this results in companies, brands, and vendors pursuing logistics more strategically – extending its roles beyond a delivery entity (PwC 2020).

It is interpreted that customer demand and operational efficiency must, in concert, be optimal in order to sustain long-term optimization. The theory of lean manufacturing can be utilized to minimize non-value-adding activities in the work system to enhance systematic efficiencies; let alone, deriving better focus for value-adding activities. The concept encourages companies to identify systematic inefficiencies to scientifically guide strategies in diminish such flaws through consistent reviews (Jaffar et al. 2015) to increase flexibility, reliability, and productivity from the within in order to maintain competitiveness and customer-centrism (Gupta et al. 2015). Differing emphases of lean can be visualised across different authors, such as the application JIT to manage informational flow in the work process (Green, Jr. et al. 2014), wastage in transportation identification and reduction (Villarreal et al. 2016), and resource optimization methods in regard to lorry arrival time at sorting centers (Boysen et al. 2017), and sorting center lay-out optimization (Werners and Wülfing 2010). Revere (2004) discusses vehicle routing and zoning to optimize vehicle and driver utilization to improve courier services for the Texian healthcare system. With the reliance on the

travelling salesman vehicle routing problem (VRP), the most efficient routes with optimized travel time can be derived to enhance service reliability.

In addition, the studied literatures also emphasize the integration of novel innovation and Industry 4.0 technologies to optimize operational performance. Mangiaracina et al. (2019) suggests automated collection points to reduce delivery failures from customers' absence and travel distance for last-mile deliveries; let alone, the use of drones and robots in performing last-mile deliveries to avoid traffic congestions, reduce vehicle travelling distance, and serve areas which are difficult to reach via vehicles. Selma et al. (2019) emphasizes on the integration of Industry 4.0 technologies to result in work system enhancements, including the integration of 'auto-ID technologies' to enhance object tracking and traceability, cloud computing to enable information storage and sharing across the supply chain, and cyber-physical production system (CPPS) to enhance machinery automation which can increase work system efficiency and flexibility in response to changes and to reduce labor-intensive work units and associated human errors.

It can be witnessed that the reviewed literatures directly and indirectly lead to satisfying customer demands and requirements as the common theme, reinforcing the importance of customers at the core operation of couriers and logistics companies. Nonetheless, the research outputs in the area of logistics customer service have become scarce in recent years with researchers and logistics companies largely focusing on operational enhancement methods (Daugherty et al. 2019). In the age of customer impatience, delivery accuracy and swiftness must be promoted to inspire customer satisfaction; let alone, the reinvention of market-winning factors to create further appeals (Wang et al. 2019). In addressing the contemporary issue, there must be a framework which can aid couriers to strike a balance between addressing customer demand and operational efficiency.

3. Methodology

This paper aims to derive a digitization strategy for the case study company in order to uplift the current operational performance and enhance customer service. The case study format is selected to explore the nature of the case study company with focus and flexibility based on case complexity to garner fuller comprehension of the context. A survey of 400 participants was executed based on purposive sampling basis to recruit frequent users of postal and courier service providers for the course of one month with the goal to obtain objective perspectives on the current satisfaction level, areas required attention for future improvements, and expected technological integration with the realization that customers play an active and vital role in shaping corporate strategies in the industry (Simon and Gomez 2005). Having performed statistical analysis, key areas are selected for further consideration in establishing a digitization strategy. In establishing the digitization strategy, the current operational issues and the investment patterns of the case study company are considered alongside the outcomes of the mentioned survey in order to derive a feasible strategy for digitizing the current work system to achieve the betterment of customer service and operations. Descriptive analytics is performed to achieve comprehension of the current operational processes and procedures, of which associated issues are obtained through root cause analysis. This is also used in conjunction with the customer survey in the consideration of the digitization for the case study company with the aims to derive an appropriate strategy suited to the operational context of the case study company.

4. Data Collection

Based on the customer survey effort, it is discovered that 89% of the 400 respondents tend to utilize couriers and postal companies for private matters rather than for business engagements. Indeed, the utilization of parcel deliveries (registered and express categories) are significantly higher compared to other categories – letters/documents and overseas deliveries, as the mean values fall between "moderate" for parcel deliveries whereas "low" and "very low" in letters/documents and overseas deliveries respectively. In regard with the satisfaction level, respondents tend to be satisfied with the current service level provided by their couriers of choice, regarding delivery speed, convenience, staff professionalism, and affordability. However, a noticeable number of users (n = 186) have previously encountered reliability issues upon receiving their parcels, including delivery accuracy (21%), delivery timing (21%), and parcel condition (19%) – which are considered as market-qualifying factors (Mentzer et al. 1999). In terms of technology and innovation, respondents expect enhancements to be provided for delivery timing and accuracy. For the Thailand market, it can be noticed that respondents (n = 256) perceive the following to be the market-winning factors (Daugherty et al. 2019): delivery time flexibility or clear timing of delivery, delivery status reporting through SMS, and real-time traceability as displayed in Table 2 and Figure 2.

Table 2: Customer-perceived market-qualifying factors to address (left) and market-winning elements (right)

Category	Mean
Affordability	4.00
Service Excellence	***4.33***
Delivery timeliness	***4.59***
Delivery accuracy	***4.59***
Convenience & Location	***4.29***
Brach atmosphere	3.91
Supporting amenities	4.19

Category	Mean
Click and drop service	4.03
SMS Delivery status reporting	***4.20***
Integration on e-commerce sites	4.04
Delivery timing flexibility OR clear timing	***4.20***

Based on the descriptive analytics performed on the case study company, postage items are received at the branch and from designated containers, which are then pre-sorted based on destinations and delivery duration – express items in the polyester bag and registered items in cage containers for further process. Items are then transported to the nearest regional hubs for further sortation, where intra-regional items are separated for further conveyance and cross-regional items are sorted to larger trucks to be further processed at the Bangkok center. At sorting centers, polyester bags and/or cage containers are firstly registered and inspected through physical counting, which is then followed by preliminary sortation based on size and regions. Afterwards, items pass through automated sortation via machine to be classified based on destinations and packed for further delivery. Unlike intra-regional items which are conveyed to provincial branches, cross-regional items are then delivered to regional hubs to be further sorted based on provincial destinations. Branches then perform last-mile delivery via motorcycles and light-duty trucks. A large number of transportations is carried out with the utilization of heavy-duty and light-duty trucks. Only a small number of occasions are postage items transported via railway and air due to additional costly handling procedures.

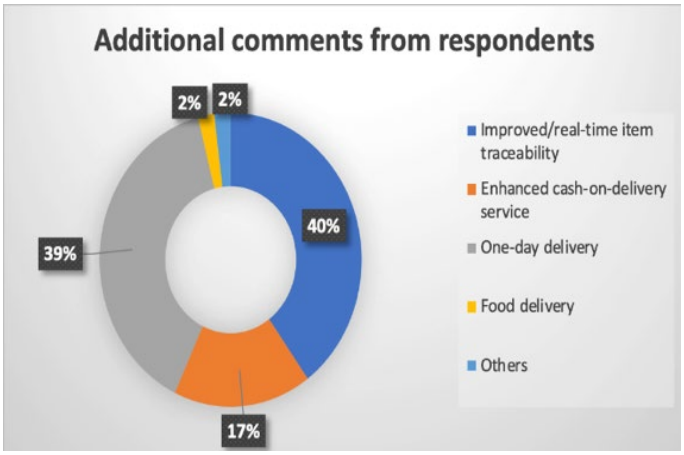

Figure 2: Additional customer-perceived value-adding elements expected from couriers and postal service

5. Results and Discussion

5.1 Operational Optimization Issues

From the collected data, it can be visualised that the complexity of the handling procedures by the case study company would likely contribute to operational sub-optimality, which causes issues in last-mile delivery: accuracy, timeliness, and parcel condition as displayed in Figure 3. This is the likely cause preventing the case company in achieving operational optimality in response to market-qualifying factors; let alone, efficiently integrating market-winning services based on customer wants and needs. Regarding issues surrounding the utilized equipment, the unavailability of sufficient equipment negatively affects the sorting procedures and transportation to cause tardiness and sorting inefficiencies through over-processing, long waiting time, defects, and item loss. It is likely that such issues would be heightened owing to the rise in e-commerce during the societal spread of COVID-19 (PwC 2020).

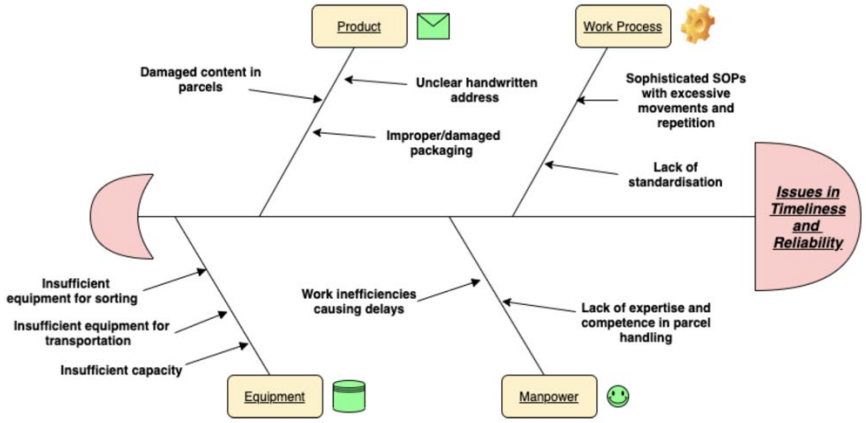

Figure 3: Ishikawa diagram for the root cause analysis of the case study company

The groundwork is at times lackluster due to manpower incompetence stemmed from the lack of knowledge and effectiveness in item handling and sortation processes, causing time loss, excessive movements, and damaged items because of mishandling. Using humans to preliminarily sort items, this can potentially lead to inaccurate processing of items based on provincial codes and sizes. Indeed, when staff do not conform to the standard operating procedures, work inefficiencies can also be realized, which then causes delays for the subsequent processes. Due to the complicatedness and systematic redundancy, excessive movements add up to delays and item mishandling to cause time loss, reprocessing, and defects. Technology gaps between branches can most likely cause inefficient information sharing throughout the system – affecting the planning of last-mile delivery and manpower planning. As for products, handwritten addresses can be cumbersome in the occasion of incomprehensibility and damaged written addresses to cause extra handling and time loss. Issues from damaged items from improper packaging from customers also triggers additional reprocessing; thus, the loss of time.

5.2 Supply Chain Digitization Strategy

Considering the procedural issues and interpreting customer demand in Thailand, a digitization strategy for the case study company is proposed with the goals to enhance operations and serviceability with the reliance on the concepts of novel technologies and resource optimization as displayed in Figure 3.

5.2.1. Full Integration of RFID and Smart Label

With the current superficial internal RFID implementation at the case study company (Forbes Thailand 2016), the consideration must be placed to achieve higher RFID use to improve process integration in the supply chain to enhance information inputs and item traceability. This leads to reduced reliance on paper-based documentations and labor-intensive work units to physically register and count items. Nevertheless, the cost of investment for full integration of RFID can be high due to the set-up and maintenance. In hindsight, RFID can be integrated with cloud computing to reduce the investment costs whilst enabling the expected benefits (Jamal et al. 2013).

Integrating with cloud computing, RFID registers items as inputs from transponders (barcodes) via RFID scanners or tunnel readers. The information is then collected and stored in the centralized data management system via the enterprise subsystem. Information sharing can be enabled through the inter-enterprise subsystem to achieve process integration amongst the supply chain members and enhanced internal track-and-trace (Jamal et al. 2013). Indeed, the adoption of smart labels as transponders would result in systematic facilitation, minimizing the possible flaws of customer handwritten addresses to expedite postage item management (UPS 2014).

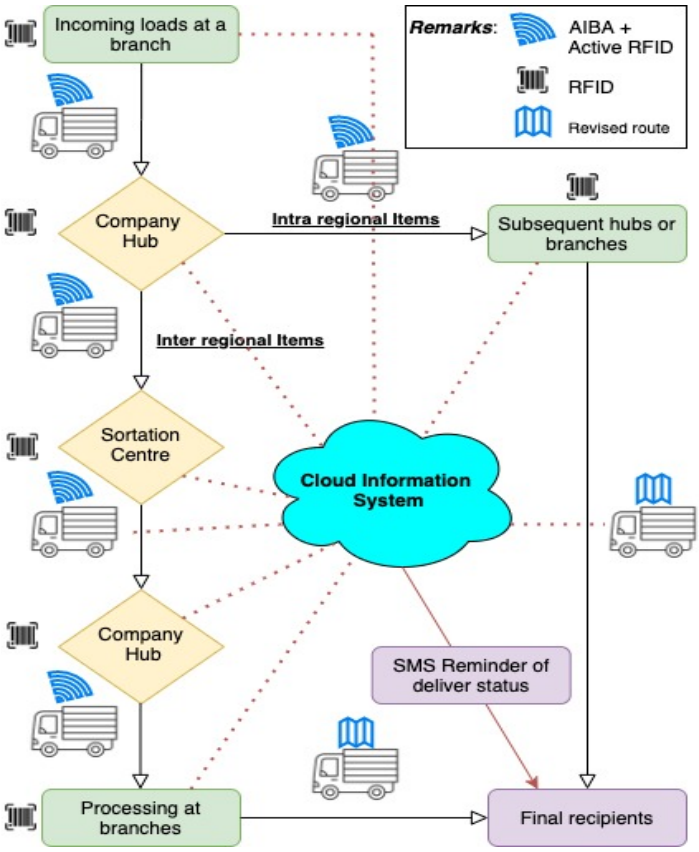

Figure 4: Proposed strategy for supply chain digitization for the case study company

5.2.2. AIBA Telematics for Managing Vehicle Utilization

Optimizing vehicle capacity, dynamic fleet management must be integrated to render delivery timeliness and optimal vehicle usage. Automated information-based allocation system (AIBA) can be integrated due to its two corresponding modules – FORECAST and ALLOCATE. The FORECAST module is to provision near-future demand forecast, including item delivery, estimated vehicle travel time, and real-time vehicle conditions to the ALLOCATE module in order to assign tasks to vehicles and perform route reassignment in unforeseeable circumstances based on traffic condition, route optimality, and timeliness. Task assignment can be additional tasks whilst the trucks are tasked to pick up loads from certain branches or company hubs as well as assigning work to idle vehicles to optimize vehicle usage (Attanasio et al. 2007).

It can be witnessed that through the deployment of AIBA, a more efficient fleet utilization can be observed compared to the current work model – route planners seating at the control centers manually corresponding with drivers which can likely cause inefficient route management and slow response due to network complexity (Attanasio et al. 2007). The deployment of AIBA for the case study company can be integrated with active RFID tags for vehicle traceability, which can then be paired with the on-board communication system to relay live information to route planners, instead of the originally proposed GPS integration in order to extend its RFID investments (Mane 2013). This is forecasted to potentially result in optimized vehicle usage through gaining better vehicle visibility, which enables the staff to respond to problematic encounters more effectively.

5.2.3. Last-mile Delivery Routing for Vehicles

Further enhancing vehicle utilization and serviceability, traditional model of last-mile delivery - vehicles are assigned to designated routes for the entire day - must be altered to cope with the dynamics of delivery volume on a daily basis. It is proposed that time-dependent vehicle routing problem (VRP) be consulted based on the adaptation of Falsini et al (2009). The constraints are set as follows:

1. The tours begin and terminate at a postal branch within the time windows: (1) 9.00am – 12noon, (2) 1.00pm – 3.00pm, and (3) 4.00pm – 6.00pm
2. The tours only serve the determined responsible area of the branch only.
3. Vehicles carry out deliveries in the designated routes only so that recipients are visited exactly once.
4. The carried quantity cannot exceed the capacity of vehicles.
5. Vehicles are not to pick up any items unless bringing undelivered loads back.

The service time at the premises of recipients can take 4-10 minutes depending on the item quantity and time to obtain customer acknowledgement. Time on the road can vary in daily hours of traffic conditions, weather conditions, and road conditions. The departure time (DT) from nodes a to b can be defined as follows:

$$DT \leq (\text{Latest Delivery Time})_b - (\text{Travel Time})_{a \to b} \text{ of time slot } X - (\text{Service Time})_b$$

The formula enables the calculation of the total time for the routes via the summation of DT from all the nodes, which are defined here as villages, housing complexes, and/or work complexes. The critical nodes, defined as nodes to be attended to first and foremost in a route, can be realized from:

$$(\text{Latest Delivery Time})_b - (\text{Service Time})_b \leq \text{End of time slot } X$$

The critical nodes are defined based on the discretion of load volume and travel distance to the nodes. Nodes with the closest duration to the end of the designated time slots are considered as critical nodes. Less prioritized nodes are then added to the routes, having assigned vehicles to serve all critical nodes. To realize the departure time from the branch for vehicles, the following must be calculated:

$$DT_{Branch} + (\text{Travel Time})_{Branch \to b} \text{ of time slot } X \leq \text{End of time slot } X$$

In addition, the buffer time can be added to the travel time from nodes a to b based on the discretion of route planners in unexpected events and adverse weather conditions affecting the delivery. In planning out the service routes, simplified graphs must be drawn with the arcs connecting the nodes to be the shortest travel path to assure time limit and vehicle capacity compliances. Aiding the calculation, a computer program can be written to quicken the calculation and route selection. Also, it can be connected with cloud computing for information storage for future usage.

5.2.4. Cloud Computing for Data Sharing

Enhancing process integration, cloud computing must be incorporated in the strategy given its data storage capability and instant informational sharing to bring about improved supply chain visibility and elasticity (An and Lee 2015), reducing the reliance on paper-based documentations and enabling enhanced internal process integration with vital information to facilitate operational planning. Integrated with RFID modules, operational data can be saved in the back-end layer classified to the respective servers, which are connected with working modules to enable access to pertinent services to carry out operations effectively. Item registration and counting can be performed through the integration with Electronic Product Code Information System (EPCIS) to quicken the process with reduced potential sortation-related human errors (Jamal et al. 2013).

The pairing with AIBA telematics can relay live information of vehicles and item whereabouts, which can be used to enhance internal traceability (Jamal et al. 2013); Indeed, it can be aimed to satisfy the Thai market with real-time item traceability. Moreover, the system can be paired with SMS reminder module for delivery status in last-mile delivery which caters towards customer satisfaction whilst reducing unsuccessful deliveries due to customers' absence. Cloud computing is considered a more affordable alternative given its pay-as-you-go subscription nature, of which companies can opt to spend more or less based on the required data storage space, in addition to the inclusion

of software updates and issue resolution as a functional package to minimize operational disruption should unforeseeable circumstances occur (Lal and Bharadwaj 2016).

5.3 Validation

Having consulted a manager of the case study company, it is obtained that the interviewed manager appreciates the full integration of RFID and the deployment of AIBA telematics to enhance operational performance in regard to improved item traceability internally and for customers. The manager also appreciates the capability of AIBA telematics to optimize travelled miles and vehicle utilization. In the interview, it is recognized that through the suggested methodologies, operational inefficiency and human errors as a result of mismanagement to cause damages to items and/or systematic delays can be reduced.

Nevertheless, the manager is not convinced that the use of Industry 4.0 technology would lead to the operational improvements, as the reliability of cloud computing is firstly questioned regarding its safety from cybersecurity issues and malicious attacks: let alone, its usability should internet connection failures occur. The last-mile vehicle routing was criticized by the manager as the efforts must be executed on a daily basis, adding on to the responsibilities of route planners. Indeed, the framework needs to further consider the current corporate culture and routines of the case study company, in addition to customer demand, investment patterns, and studied efficiency issues. However, it is mentioned that the framework would highly contribute as a conceptual framework for alternative investment consideration.

5.4 Insights for the Thai Couriers Service Industry

The proposed framework addresses the encountered issues regarding operational efficiency and effectiveness to quicken the sortation procedures through RFID and automation coupled with the utilization of cloud computing to bring about systematic process integration across the supply chain with improved visibility. This enables the involved parties in the supply chain to achieve optimality in demand forecasts – leading improved resource utilization and planning in response to changing demand level efficiently (Green, Jr. et al. 2014). As a recommendation for the industrial peers, the achievement of systematic process integration would provision an advantage in the operations to enable the plausibility of operational optimalization, leading to improve supply chain visibility and enhanced demand forecasts to respond more robustly to changes in parcel volumes (Irfan et al. 2020). This can potentially create improvements in manpower and resource utilization planning, which can imply the reduction of associated operational costs in a long run. Also, using automation in the sortation process, lessened item mishandling and time savings can be realized in the process (Selma et al. 2018). The proposed heuristics emphasizes majorly on RFID utilization, as the consideration is based on the current investment patterns of the case study company. As for its industrial peers, it is suggested that object identifying technologies be employed to achieve similar outcomes.

Through cloud computing, it can be realized that process integration can be achieved optimally with affordability in comparison to full investments in ICT system altogether (An and Lee 2015); hence, is highly suggested for the industrial peers as a solution to enhance process integration in the supply chain to enable agility and flexibility in unprecedented circumstances. Cloud computing can also be connected to service providing modules to provide additional services to customers (Jamal et al. 2013), such as SMS delivery report to customers and real-time track-and-trace. Nevertheless, it must be noted that the degree of cloud computing integration must depend on the operational context of the industrial peers. Last-mile deliveries must be explored given the high associated cost in the logistics process (Mangiaracina et al. 2019) through careful planning of daily routes to achieve vehicle utilization optimality; let alone, reducing transportation cost for last-mile delivery and optimizing vehicle fuel usage. Lastly, it can be understood that in order to achieve success in the marketplace, couriers and postal companies must assure the excellence in market-qualifying factors to provide a good first impression. However, the contribution of reinventing market-winning strategy can propel the company to success in this changing time. Customer needs must be sensed and understood in order to establish appropriate market-winning services which can cater to their needs accordingly with the realization of "the importance of human touch" in this era of change (Pothiwan 2021).

6. Conclusion

This paper proposes a digitization strategy for the case study postal service provider in Thailand with the aim to enhance operational efficiency and serviceability. The strategy is proposed as a conceptual framework, constructed based on four pertinent methodologies including the full integration of RFID with smart label implementation, AIBA telematics, cloud computing, and last-mile delivery vehicle routing. The framework aims at improving work process efficiency - reducing wastes, repetitive activities and inefficiencies. Moreover, it reduces travel time on the road and improves vehicle utilization. This will be projected through the reduction of operational costs. Customers is set to benefit from improved serviceability of quicker and less-error prone deliveries as market-qualifying factors, real-time traceability and delivery status SMS reminder as market-winning factors. This study contributes to the development of the Thai express delivery industry by advocating the systematic process integration as the enabler of supply chain visibility, object identifying technologies for sortation and traceability, cloud computing integration, and last-mile delivery enhancements. For its industrial peers, process integration and automation can be learnt and applied based on the operational contexts. It is expected that cloud computing becomes useful for fellow couriers due to its scalability and integrative capabilities to contribute to the improvements of operational enhancements and customer satisfaction. Customer needs and wants are beyond achieving excellence in market-qualifying factors, but also excellence in market-winning services to ultimately "win the hearts of customers" in the age of logistics servitization. This study also paves ways forward for the industry through the investigation of customer needs and wants which can be exploited for future strategic adaptations. This contribution is to shape our future research into the express delivery industry of Thailand to emphasize flexibility in delivery timing, click-and-drop service integration, and digital integration on e-commerce webpages to further in supply chain digitization. Moving forward, the plausibility of same-day delivery in Thailand must be developed given the level of customer demand.

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