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Development of Digital-Oriented Model on Order Management System for Logistics Operation Improvement: The Problem Identification

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Abstract

Logistics industry is critical to the modern economy. While the delivery practice and activity from orders to customers is exhaustive, it is the inspection and maintenance and approval matters that cause disruption and late deliveries, which leads to an increase in competitiveness difficulties. Transitioning company's operations from semi-manual to a digital-based transformation could enhance efficiency and provide a competitive advantage over competitors, as well as possibly improve employee behaviour and process effectiveness. However, most research indicates that companies are neglecting the significance of technology in business process management due to a lack of employee consciousness or company readiness. Similarly, an absence of a digital culture and understanding creates new challenges. Therefore, the development on digital-oriented model specifically to logistics operation needs is required, to support the IR4.0 and IR4WRD in developing country. Objective of this research is to investigate the details process and activities; and later to determine the digital-oriented criteria, the abilities and readiness of the Malaysia SMEs/LSPs. Finally, this research will develop a digital-oriented model to support logistics operation by considering the business capabilities. The case study methodology using triangulation research method will be used to construct a mode involves data collection using focus group with expert panels including model

development designer and logistics expert in order to understand their business process for order management system (OMS). Data collection obtained using semi-structured interview will be triangulated and analysed using content and thematic analysis. Digital-oriented model will provide a guidance and support for logistics sector which align with National Policy on Industry 4.0 to enhance the industry revolution through digitalization. In future, this research will offer essential guidance on business process management and strengthen support of businesses in handling goods and services that open opportunities to improve skills and participate fully in the digital transformation.

Keywords: Digital, Business Process, Logistics and Transportation, Management, Model Development, Logistics Service Provider.

Introduction

Already at the global front, the logistics sector is reimagining the future of logistics operation where conventional models are making way for greater technology adoption and the key determinants are efficiency, speed and flexibility towards sustaining competitiveness. Like most other industries, logistics is currently confronting immense change [1] from semi-autonomous system management to fully digital-oriented management operation and information processing due to fourth industrial revolution (IR4.0) and forward industrial revolution (IR4WRD). Statistics reported on high demand trends in Malaysia's trade surplus in 2020 by double-digit growth with an expansion of 26.9% to RM184.79 billion compared to 2019) [2]. This statistic also indicate the industry is must to care enough prior to flow of the services and goods for the demand and supply from order to order by prevent the delay in the business process management.

In Malaysia, government encourage the logistics industry to shift their business to higher value-added process, digitisation, advanced technologies and efficient resource utilisation to drive competitiveness going forward. National Policy on Industry 4.0, which would enable the manufacturing sector to move into Industry 4.0 and along the way contribute to fulfilling Malaysia's commitment to the United Nation's Sustainable Development Goals (SDGs) [3]. Thus, like all change, this brings both risks and challenges even it is also may produce the opportunity for the business. New technology, new market entrants, new customer expectations, and new business process models. Handling process from orders to customers is also crucial due to the inspection and approval matters that create the delay and late of the delivery [4], either from driver to customer or form manpower to driver. There are many ways the sector could develop to meet these challenges, some evolutionary, others more revolutionary. The business also need to

recognize and examine their abilities and capabilities in adopting and adapting this vision due to several challenges and constraints, especially for small and medium sized of businesses (SMEs) or logistics service providers (LSPs).

The biggest problem, even though the digitalisation system seems important to business and logistics operation, still only a little research is done on modelled the business process management into digital-oriented system is accomplished. Many research is conducted and patented in United States, Europe and Australia [5]-[8] but not in Malaysia, especially for SMEs/LSPs, uniquely.

Despite several comprehensive research is conducted, existing BPM capability frameworks are being challenged by socio-technical changes and the readiness, such as the manpower behaviour and environment to adopt the technology. By adopting digital-oriented into the BPM, digitalization transforms existing logistics operation and enables new processes due to its impact [4] on individual behaviour and needs, intra and inter business collaboration, and new forms of mechanisation [9]. This development led the authors to presume that digitalization calls for new capability areas and that existing frameworks need to be updated as opportunity-rich environment and rapidly emerging digital disruptions require new BPM capabilities [10]. The rejection for SMEs will probably high due to ambiguous knowledge and skill that directed to more inquiries and difficulties to them in the acceptance of the digital technology. The observation and little research has explored how to extend and help logistics operation for Malaysia SMEs/LSPs to learn the digital applications for their business in handling the flows of goods and services by building a digital-oriented model for business process management such as the knowledge on digital and their assumption.

Therefore, research on development digital-oriented model specifically to logistics operation needs is important to be developed in order to pursue the industrial revolution for IR4.0 and IR4WRD. The abilities, capabilities, skills and readiness is also being investigated throughout this research. The flow of the business process might be investigated in details. With the development of digital-oriented model will provide a guidance and support for logistics sector to enhance the industry revolution through digitalization. In future, this research will offer essential guidance on business process management and strengthen support of businesses in handling goods and services that open opportunities to improve skills and participate fully in the digital transformation.

Literature Review

Logistics can be defined as the management of global supply chains. There are many types of logistics and there are many definitions of logistics, ranging from the organization, planning and management of something complex, such as the logistics of setting up an activities and task whereby

many moving parts, documents and processes are involved. It is in the final sense of moving things, such as goods, assets, materials, data and more around in a business process, supply chain and Industry 4.0 context that we look at logistics here.

Logistics has assumed a very prominent role as it provides the backbone economic growth and to facilitate international trade. As consummated, logistics process is essential as all the things will involving everything from A to Z. The sophisticated business process involves many intermediary steps and the components of the business process management with intelligent and efficient movement across all these different steps in a holistic way. Plus, the inspection and approval process create the delay and late of delivery. As it has one of the mechanisms for the development of industrialization in Malaysia, the performance of this industry will have an impact of the nation's industrialization and its competitiveness in international trade [11]. Logistics is not only consisting the physical movement of goods but it has to be efficient in the facilitation of the movement through documents processing, coordination, monitoring and financing activities. Thus, logistics expansion covers the whole business process in the management systems and the stakeholder development.

This matters urge logistics businesses to shifting their pattern of working environment by looking into future logistics operation trends, such as smart supply chain management and smart logistics technology. There are various shifting pattern around the world such from driverless transportation to intelligent containers [11]-[13], smart warehousing [14]-[16], smart ports, smart shelves to the human and information exchange in all possible logistical chains and contexts. This future-trend been considered as supports in Malaysia National Policy on move forward by adapting the digitalization of the technology by contemplate the fourth industrial revolution (IR4.0) and forward industrial revolution (IR4WRD) into the logistics operational management [2][3].

The shifting pattern of logistics business from semi-autonomous or traditional methods growth rapidly within these 10 years as dominated by United State. In Malaysia this research are still small and not specifically for SMEs and logistics company[17]-[18]. Industries around the world are moving forward and that is the reason that Malaysia need to align with the growth of industrial revolution. Hence, the investigation on the business process management important to derived the fluent process in the logistics operation process and activities to avoid the delay a late delivery. The business process management capabilities and the readiness of staff and company will adjacent the good model development. With the good model development, the business flow and data managing will be better and organisable in the digital transformation [19] [20]. It is, therefore, important to build the understanding of digital transformation as a motivation for introducing beneficial changes to organizational strategies and behaviours. It is a practical view on

diagnosing the current situation and the factors that drive business model changes in relationships to the digital operation, within customers, drivers and partners as well as with the increasing usage of digital elements.

The triangulation method is used according to qualitative research work. The popularity of qualitative research methods popular among the social sciences researchers and still growing [21]-[22]. This tendency also be seen in the sciences on organisation, management and computer science in human interaction [23]. The origins of 'triangulation' in social work and in the wider social sciences are only metaphorically related to the process in the discipline [24]-[25]. The task analysis is use to investigate the knowledge, skill, abilities, capabilities, the readiness of the staff and the digital technology to support the system. The thematic analysis use to categories the theme of the process and activities and all the information as well of this is the most common forms of analysis within qualitative research [26]-[27]. The coding analysis in the thematic analysis may determine the knowledge, skill, abilities, capabilities, the readiness for verification. the process, activities and information will also have done using this analysis as well for the digital-oriented business process management model development.

Research Methodology

Planning & Determine Research Instruments

The planning phase begin with some series of activities that carefully planned comprehensively on their duration's through the common Gantt chart setting up. The ethical issues is also take into account for approval from University's research ethics committee since this study collaborate with another agency and company. Consequently, case study procedures and policy also need to well plan as numerous processes need to aware with the case study research in order to seek consent and ethical considerations. Planning of a massive literature review will be carried out from the earlier stage till the end of the research. This stage involved the method on how to develop the best focus-group for data collection as well as the open-ended-structured interview.

Data Collection (Need Assessments)

Data collection for this research will utilize need assessment process in order to determining and addressing needs between current business process and digital business process. Need assessments will provide the necessary information to develop the digital-oriented business process management model. The ability and readiness of digitalization will understand at this stage, together with all the digital-oriented criteria, the abilities and readiness of the Malaysia SMEs/LSPs.

After the needs (such as difficulties, abilities, knowledge, skills and technology readiness) of logistics business is determine, then researcher and designers will use the information to integrate the needs outcomes

with the model design requirement. Therefore, the crucial part is to understand and organize knowledge about selected digital medium, which in turn helps understand what users expect from technology. This research will embrace the qualitative research method through semi-structured interview. The sample was selected from three logistics company in Malaysia SMEs/LSPs, meanwhile the managers or supervisor were the targeted respondents. However, the interview also look into the important of low level man power, such as officer and the driver in order to gather holistic data collection.

The interviews might be held through online face-to-face (Ms Teams. Google Meets or Zoom) to counteract the issues in this MCO season. Nevertheless, the face-to-face conversation is preferred, which allow us to obtain a clear understanding.

Data Analysis

The integration from output in phase 2 will be gathered and analysed using triangulation research method to determine all the criteria and readiness. This strategy will be increased the validity of the evaluation and research findings. For analysis phase, the qualitative approach will be applied. Then, the thematic analysis is used to produce categories and themes; and later the data will analyse through coding analysis. Within this triangulation, results are reconciled inductively and deductively to form criteria's that could help in later phase to design and develop the digital-oriented business process management model.

The content analysis is use in order to determine the digital-oriented criteria of BPM for Malaysia SMEs. Content analysis suitable to analyze content of communication, facilitates organizing, categorizing, and summarizing the text. Both deductive and inductive coding will be implemented, whereby both theory based and the emerged code that raised from the text were used. The deductive approach is based on the analysis of the theory of research. Another inductive way is to work with the collected database text

Model Design & Development

Results from the analysis in Phase 3 will be used to build the digital-oriented business process management model for logistics operation in Malaysia SMEs. The design of model will be design by guidance from the expert supervision as well. The digital-oriented model will be reviewed and evaluated by panel form the logistics operation to validate the model competence and practicality of the model.

Documentation and Report Writing

In this phase, progress reports are generated periodically and a completing reports prepared upon the due of research.

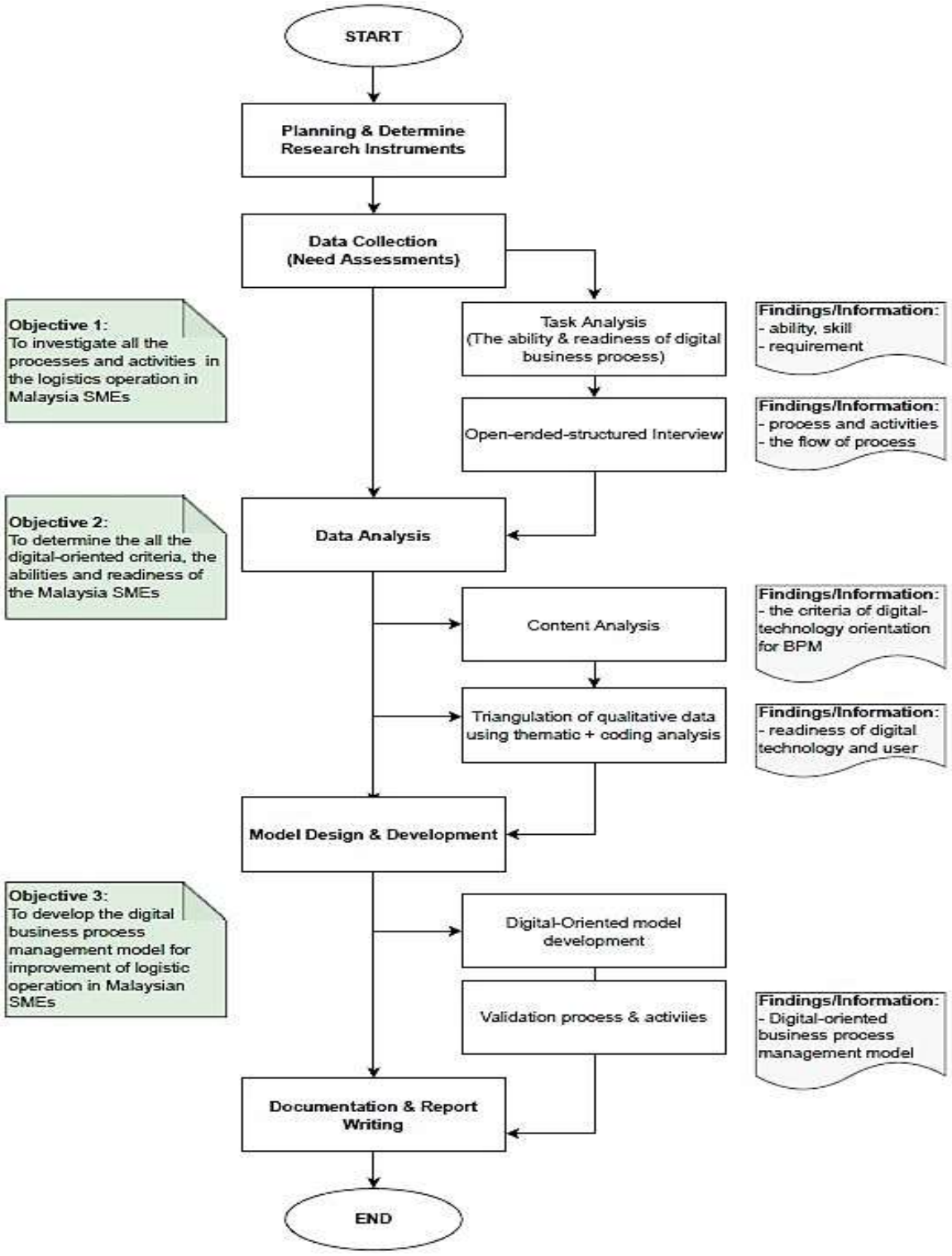
And, once the model is well developed, the application on Intellectual Properties will be appealed for the copyright on the manual & guidelines.

Figure 1 shows the research procedure of this research as the objectives were locating to approximately that the objective will be attained at that position. Also with that, the information and findings are acknowledged to ensure all the need, all the requirements are attainable.

Problem Identification for The Development of Digital-Oriented Model

Main and single objective of this research is to develop the digital model for order management process in logistics service provider. But, somehow, in this research paper, only the requirements definition such as three research objectives, three research questions that occurred from the three objectives, three research goals as an output from three research questions and three research methods use as a guidance for research in gathering their three objectives. The model development is not discussed and not presumed because this project is still in progress and this paper is focusing in the process of determination of the problem identification.

Figure 1. Detail research procedure



The research hypothesis for this research is as below.

H_1: It is hypothesized that digital-oriented model support is required for logistics operation in engaging digital business process management system.

From the hypothesis it is clear that investigation require to be led and the process of gathering the outcome must come from step to another step and they must synchronize and dependable. Thus, three objectives are notorious for this research as follow:

- To investigate all the processes and activities in the logistics operation in order management system.
- To determine the all the digital-oriented criteria, the abilities and readiness of logistics industry.
- To develop the digital business process management model for improvement of logistic services and transportation in order management system.

As to clear identified the requirement definition for this research several criteria also need to be considered such as research questions, research goal, research method and the instruments/tool that contributed in this development. As for that, Table 1 shows the requirement definitions for this research.

Table 1. The determination of the problem identification

Research Question	Research Objective	Research Goal	Research Method
How the logistics company execute and manage their logistics operation.	To investigate all the processes and activities in the logistics operation.	List of all the processes and activities in the logistics operation.	Interview & LR
What are the digital-oriented criteria, the abilities and readiness of the logistics industry.	To determine the all the digital-oriented criteria, the abilities and readiness of the logistics industry	The criteria of digital-technology orientation for BPM and the readiness.	Content Analysis & Need Assessments
How can the digital business process management model will improve the logistic operation.	To develop the digital business process management model for improvement of logistic operation	Digital-oriented business process management model.	Tri-angulation Technique & Interview (for validation)

Conclusion and Future Research

This paper has presented the overview part on the determination of problem identification in order to paradigm a main improvement, which is the development of digital-oriented model on order management system for logistics operation improvement. The targeted intentions for

this research are logistics company either small medium enterprises or logistics service providers. Also, the clear requirement definition and problem identification disclosed and deliberated in this paper. The main outcome of the research is the digital-oriented model for order management system, contributed from three objectives that synchronized into three research questions, research goals and research methods in producing the results at each objectives level.

The understanding of digital-oriented instructional concept can be adapted to gives an impact towards digital trend with the IR 4.0 and IR4WRD as stated in National Policy on Industry 4.0. This digital-oriented model could increase in number of initiatives and strategies to forwarding the digitalization technology for logistics operation especially among Malaysia SMEs/LSPs. With the development of digital-oriented model will provide a guidance and support for logistics sector to enhance the industry revolution through digitalization. In future, this research will offer essential guidance on business process management and strengthen support of businesses in handling goods and services that open opportunities to improve skills and participate fully in the digital transformation.

For future works, the data will be collected in two primary data collection; one if using questionnaire and second is using the interview. The data from questionnaire is use for gathering all information regarding the all the digital-oriented criteria (as IoT), the abilities and readiness of logistics industry. The data will be analysed using content analysis and analysis of variance or any other suitable hypothesis analysis tools. While the data from interview is use to investigate all the processes and activities in the logistics operation in order management system. The data will be processed and analysed via semi-structured interview, transcription and coding. The focus-group technique will be implement to ensure the data and information is more reliable and holistic.

Next, the model will be developed and the process of the development might be discussed in our next research article. The developed model will be validated with the corresponding responding such as industrial expertise and Malaysia SMEs/LSPs.

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