Chapter 11
A Blockchain Model for Less Container Load Operations in China

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ABSTRACT

In recent years, with the growth of international trade and development of economies, the volume of container throughput at China's ports has grown rapidly. Yet, the business process for the Less Container Load (LCL) transport industry in most ports of China still remain complicated and inefficient. In this article, the authors see numerous opportunities for process improvement by integrating the information among the various actors using the blockchain concept. In this paper, the authors propose to build a LCL Export Platform (LEP) using the blockchain concept to optimize the LCL operations for international trading, by integrating and sharing information among forwarder agencies and their clients.

INTRODUCTION

Today, the supply chain network is well integrated with information technologies such as Enterprise Resource Planning, RFID, GPS, sensor technology, video technology and barcode technology. However, these technologies work in silos and are not interconnected externally in most cases. For instance, if we need Inventory visibility, we will need to implement some form of warehouse management system, whereas if we need Inventory tracking, we will need to implement some form of Track and Trace application.

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In the area of artificial intelligence of information platform, Porterfield, Bailey and Evers (2010) analyzed the relationship between electronic data interchange and company performance by applying econometric theory, in which sharing sales order information not only enhanced the cooperation relationship, but it also resulted in an improved business performance. Meanwhile, Cheong and Song (2013) studied the supply risk of information value under uncertain conditions and found that some of the supply risks were determined by the volume of sales order. But when it came to improving company profitability, they realized that the most important task was to incorporate as much key information as possible.

In the area of e-commerce platform development for the logistics industry, there has been some research conducted in several countries (see Lau, 2008). Wang (2015) built a software service platform with cloud computing technology to effectively solve the limitations of visual merchants and logistics enterprises through data analysis and processing. Some scholars proposed to develop an international freight forwarder information system with paperless transactions, so as to fulfill customer requirements and provide clients with reduced cost and risk (Kouvelis and Li, 2013). However, there have only been a few references to the information platform framework designed for the LCL operations (Wang, 2014).

The authors believe that the application of Blockchain technology has the potential to visualize and make LCL transactions more transparent in the same way the Internet changed the way we made information available. It is a good opportunity for China to be at the forefront of adopting this transformative technology as government agencies and businesses are supportive of the need to have a shared secured ledger that establishes accountability and transparency while streamlining their exports processes with the view of increasing their trade with other countries.

LITERATURE REVIEW

The LCL business can hardly be considered as a technological innovation but, at the same time, it does involve several aspects related to clustering processes. The advancement of LCL business will require involving upgrading current infrastructure, by using advanced carrier or cargo handling technologies, and automating the business processes (Xu, 2015). Therefore, in the deployment of LCL business, multiple skills and approaches are pre-requites for the success of such large-scale implementations. This will result in building a logistics cluster where the different actors will interact directly. It is common that consortiums are established for such projects or development initiatives, which later may turn into an industry cluster where organizations from associated industries and the surrounding communities are represented (Yossi, 2012).

Rapid developments in international trade in China have driven many managers to focus on the role of logistics and specifically on the use of IT to streamline its supply chain. One popular notion as suggested by the following stream of research argues that IT supports logistical integration through free flow of critical information, and thus increases operational efficiency and customer responsiveness (Xu, 2015; Navin Lee et al., 2013).

Blockchain Technology

Blockchain Technology is the decentralized transaction and distributed database solution that powers bitcoin cryptocurrency as its first application of the innovation (McLean, 2016). Blockchain itself is a distributed ledger in the peer-to-peer network where all network members store up-to-date copy and