



# Adaptation Strategies to Increase Business Competitiveness in the Digital Era: an Empirical Study of Local Freight Firms in Thailand

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## ABSTRACT

Digitization plays a significant role in shaping modern business operations. The notion of digitalization is also included in Thailand's recent national economic development policy, known as Thailand 4.0. Under the policy, rooted in the industry 4.0 concept, the country promotes economic growth with innovation and creativity and tries to move towards the digital economy. This paper presents an empirical study examining the business adaptation of local family firms facing opportunities and business challenges caused by the Thailand 4.0 policy and the digitalization motivation. It delivers empirical evidence on entrepreneurship development in local Thai cross-border freight family businesses trying to change to innovative firms. The researchers employed a qualitative research approach to investigate five purposively selected firms from Nakhon Phanom province of the North-East region of Thailand. The research data was collected using documentary analysis and semi-structured interviews with the owner-managers of the selected firms. Study results are delivered under two themes: developing innovative family entrepreneurship and digitalization in local cross-border freight firms. The results show that digitalization is adopted to improve three primary areas for strategic improvement in the transportation industry, including inventory, transport, and location strategies. Family power and control are founded to positively support the family business transformation towards industry 4.0 via business digitalization. Trained employees to gain sufficient knowledge related to digital transformation is also essential. The paper also identifies areas requiring further improvements, including systematic support from public authorities and reliable technology to help widen and sustain domestic and international business partnership networks.

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## CCS CONCEPTS

• **Social and professional topics** → **Economic impact.**

## KEYWORDS

Business Adaptation, Digitalization, Family Business, Freight Transportation, Industry 4.0

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## 1 INTRODUCTION

Since 2017, Thailand has adopted the industry 4.0 notion to underpin its economic development concept, known as the Thailand 4.0 [21]. This policy focuses on increasing the national economic value with innovation. Digitalization is one of the economic driving tools for developing the Thailand 4.0 policy [18] [13]. Given the influence of the Thailand 4.0 policy on shaping innovative business adaptation of businesses in the country, this paper presents a case study of family firms in the cross-border freight industry from Nakhon Phanom. The province is located at the rim of the North-East region of Thailand. Transportation is one of the key economic activities of the province, considering its competitive geography lies in the proximity of two international economic development areas of South-East Asia, namely the Greater Mekong Subregion (GMS) and the East-West Economic Corridor (EWEC) [20] [14]. Additionally, the province is home to one of the cross-border bridges crossing the Mekong River named the Third Friendship Bridge. Since the bridge's official opening in Nakhon Phanom in 2011, it has become a primary mode of cross-border transportation. This new land transportation infrastructure fosters a business opportunity and challenges local freight firms to perform business adaptation to survive the increasingly competitive environment.

As a result, considering the influence of Thailand 4.0 and the increasing competition in the region, local family freight firms, having been operating in the region since before the bright, inevitably face challenges to business adaptation. This paper presents an empirical study of business digitalization and the development of innovative entrepreneurship in these local family firms.

## 2 DIGITALIZATION IN TRANSPORTATION

Studies relating to logistics and transportation recommend various strategies for business in the industry under the Thailand 4.0 policy. Worrakitcharoen [23] studies the competitive behavior of a logistics company in Thailand and discovers that using computer software for inventory management significantly helps the business increase its service efficiency. He asserts that efficient inventory management is an essential factor for the business as it affects the punctuation of services required by customers.

Similarly, Chaisinson [3] studies factors influencing customer decisions on choosing parcel logistics service providers in Bangkok and finds that reliable inventory management and punctuation of services are important factors. Other factors for customer decisions are recommended by Pansang [15], who states that IT services have increased importance as customers choose transportation providers. The efficient system helps with service tracking and reliable services. Competitors in transportation businesses need to have an inventory strategy to provide up-to-date and reliable services to the customers. Pansang [15] also discovers that an efficient inventory strategy helps increase business efficiency and competitiveness.

For small transportation businesses to transform towards innovative development, previous studies identify various organizational resources required to promote the effective transition, including employees with required IT skills [5]. Puriwat and Tripopsakul [18] study employment in Thailand, evaluating the readiness of the youth labor force and their readiness for the preparation for Thailand moving towards the industry 4.0 era. They recommend education reform using the following actions: the development of English language skills, the promotion of the teaching and learning of mathematics and science, the development of analytical skills, the adjustment of the teaching and learning curriculum, the development and improvement of textbooks to meet global standards [18].

The literature reviewed above agrees with Ballou [1] that the development of business strategies in logistics and transportation lies in three areas, namely inventory, transport, and location. Therefore, the focus of this study will look into these three identified areas.

## 3 INNOVATIVE ENTREPRENEURSHIP OF FAMILY FIRMS

Small and local enterprise development in logistics and transportation in Thailand faces various challenges specific to its context, especially commercialization capability and supportive systems to promote research and development (R&D) and technology transfer [21]. In the North-East region of Thailand, these challenges are seen as motivation to local cross-border transportation firms concerning their business residing in the center of the Greater Mekong Subregion and the East-West Economic Corridor [2]. Local cross-border firms in the region benefit from national and international economic development agencies as they provide support systems that promote the economic integrity in the area with supportive cross-border infrastructure and public services [2] [9]. According to Kanellos [12], supportive systems motivate development and business transformation towards innovative entrepreneurship.

Pitchayadol et al. [16] study innovativeness in Thai family SMEs to investigate whether family-like business management enhances

or decelerates innovativeness in family SMEs. They discover that the family's power in business operation positively influences innovativeness in Thai family SMEs. The domestic relationship, the experience, persuades the power and the culture exerts on the family. They conclude that the family's influence can encourage and support the management of innovation of the family business in the long term. Unlike Pitchayadol et al. [16], Cucculelli et al. [7] find that family ownership can positively or negatively influence a firm's business model development towards the industry 4.0 paradigm. By studying 3,000 firms in Italy, they discover that family ownership affects the probability of innovating the family business more than external influences such as public policies and support. Furthermore, they find that family leadership tends not to adopt industry 4.0 business models unless they match the standard terms of family ownership.

Another empirical study on innovation development in family business firms is delivered by Kammerlander and Ganter [11], who finds that family power and control can shape managerial attention-response patterns in family firms. These factors can manipulate the attention of the family firm's leader, known as the CEOs, to discontinue technological shifts and the interpretation and decision-making processes associated with the changes.

As introduced earlier, this paper delivers a case study of business development of local freight family firms in Nakhon Phanom province of Thailand. Its objective is to examine the innovative development of these firms in response to the challenges of increased competition raised by the motivation of the Thailand 4.0 concept and this new digital era. The following section will explain the methodological conduct of this study.

## 4 RESEARCH METHODOLOGY

### 4.1 Designing the Case Study

This study is a continuing work of an empirical study by Polhong and Puangpronpitag [17], which investigate the business adaptation in the digital era of five selected local freight firms in Nakhon Phanom province, see Table 1 below. While scrutinizing these local firms, they discovered the importance of family entrepreneurship significantly shaping the business adaptation in the increasing regional competition of the industry. Therefore, the researcher revisited the case site in Nakhon Phanom to collect additional research data using the investigative boundary as presented in Figure 1. This boundary helped outline the critical scope of the investigation [19].

Polhong and Puangpronpitag [17] identified investigative facets as three essential strategies for transportation business, including inventory, transport and location strategies. The researchers outlined this boundary to clarify the examining directions of the studied firms in the given contextual conditions.

### 4.2 The Qualitative Data Collection

There were three sources of research data. First, the documentary analysis of the interview transcripts of semi-structured interviews from Polhong and Puangpronpitag [17]'s study. The interviews with the owner-managers of the five selected firms, as seen in Table 1, took place from November 2018 to February 2019.

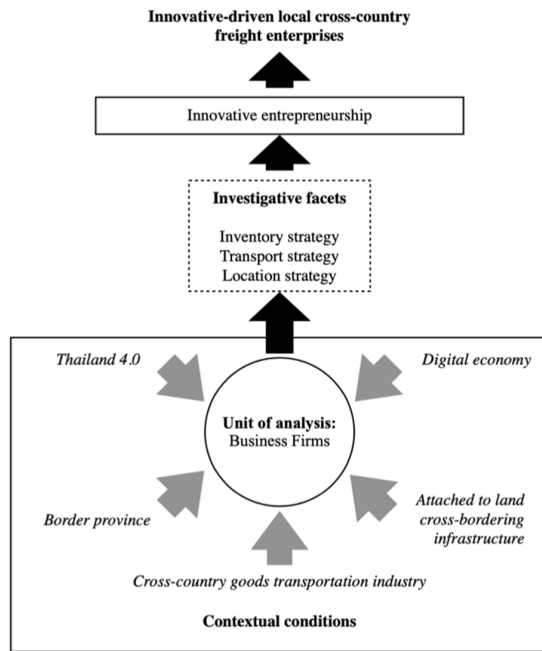


Figure 1: Boundary of the Case Study (adapted from Polhong and Puangpronpitag [17], p.472).

Table 1: The Five Selected Firms

| Firm | Founded | Number of Employee | Number of Branches | Number of Trucks |
|------|---------|--------------------|--------------------|------------------|
| A    | 1970    | 100                | 3                  | 21               |
| B    | 1992    | 36                 | 3                  | 12               |
| C    | 1991    | 24                 | 2                  | 5                |
| D    | 2010    | 22                 | 1                  | 4                |
| E    | 2010    | 30                 | 2                  | 5                |

Second, documentary analysis of related government reports and publications relating to agricultural extension policy in Thailand. Finally, the primary data was collected using semi-structured interviews with the owner-managers of the five selected firms, which the researcher revisited in the site in Nakhon Phanom in August 2019. Additionally, in September 2019 the researcher interviewed two participants who were managers of the Bangkok branches of two firms reporting to have family members acting as the managers in this capital city of Thailand.

### 4.3 The Qualitative Content Analysis

The unit of analysis of this research is business firms. The researchers used the qualitative content analysis technique, which led to the code construction involving three crucial actions: coding, constantly comparing codes with related literature and documents, and revisiting the interview transcripts [4]. As a result, the researchers developed the coding structure outlined in Figure 2.

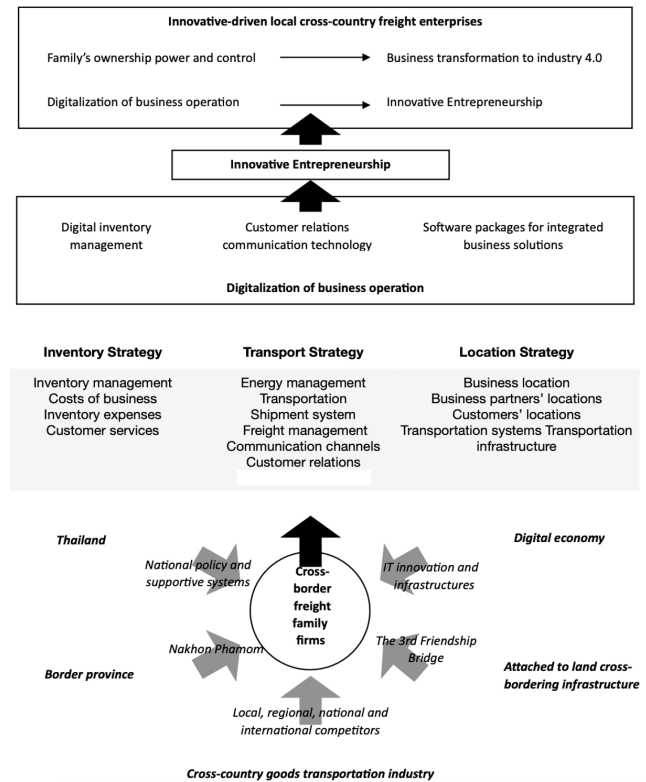


Figure 2: Structure of the Codes and the Substantive Theory (developed by the authors).

The researchers examined the innovative development of the selected firms in response to the challenges of increased competition; codes at the theoretical coding level were eventually constructed as a substantive theory to explain the case study [6]. As seen at the top of Figure 2, the emerging substantive theory explaining the research inquiry comprised two components: the development of innovative family entrepreneurship and digitalization in local cross-border freight firms. The research findings are presented and discussed in the following section.

## 5 RESEARCH FINDINGS

The outcome of this research explained the business adaptation strategies of local family freight firms in Nakhon Phanom province of Thailand. According to Tight et al.[22], the eventual outcome of the qualitative content analysis employed for a case study is a substantive theory emerging from the case context. Therefore, given the case's investigative boundary outlined in Figure 1 leading to the construction of codes illustrated in Figure 2, the research findings presented in this section are grouped into two themes: the digitalization of local cross-border freight firms and the development of innovative family entrepreneurship. Discussions of the findings are also provided in this section.

## 5.1 Digitalization in Local Cross-Border Freight Firms

Local Thai family businesses adopt digitalization and develop towards becoming innovative entrepreneurs. This evidence agrees with Pitchayadol et al. [16] that sufficient capacity for business digitalization is essential for fostering innovativeness in Thai Family SMEs. Three success factors lead to business digitalization: digital inventory management, customer relations communication technology, and software packages for integrated business solutions. These factors are recognized as the digital advancement adopted by the family firms with long-time conventional family ownership; they significantly help adapt the business management development towards industry 4.0, which is the foundation for the Thailand 4.0 policy [10].

In addition to having sufficient digital capabilities, most of the studied firms included in this case study also provide training for implemented technologies for their employees. The pieces of training help promote their digital intellects required for the new adaptation of the business to use new technologies for logistics and transportation. Also, employees working for the regional family firms presented in this paper received training and sufficient skills to serve the digitalized business operation. As a manager from firm B stated:

"We buy software packages to aid the business. They normally come with training offered by the service provider. We are now familiar with using them."

Therefore, this evidence does not agree with [18], whose study in a general context of Thailand points out that the readiness for the preparation for Thailand moving towards the industry 4.0 era is relatively low for the national expectations.

The empirical evidence also showed two crucial challenges for improvement. The first challenge is a requirement for enhanced digital linkages with regional and national transportation authorities. Four out of five interviewed owner-managers pointed this out. As one gave an example of a struggling business operation:

"An example to confirm that we need the [public] systems to improve is that sometimes our trucks will have to wait for a long time at the customs. I understand that because the processes are the matters of two countries, not just one. However, it would be helpful if we had some real-time services from the authorities to check the status of the freights."

The second challenge is innovative communication networks with domestic and international business partners. Four out of five interviewed owner-managers pointed this out. As one stated:

"Now that we have all the infrastructures and opportunities, transportation seems borderless. So, we need a broader network of partners. Online communication alone is not enough; I think we need more systematic and reliable networks to ensure that the services are through and meet the customers' expectations."

This research concerning the competitive conditions for freight businesses in Nakhon Phanom involved five components, as seen

earlier in Figure 1. These components were the Thailand 4.0 concept, the national focus on digital economy development, the border province location of the selected research site, the cross-border bridge international infrastructure, and the increasing competition in freight transport in this region.

The increasingly competitive business environment caused by the new land cross-border transportation of the region was not considered an obstacle; rather, it was seen as a motivation for these local firms to widen and sustain domestic and international business partnership networks. However, further developments were required, including systematic support from public authorities and reliable technology and systems for business communication.

## 5.2 Development of Innovative Family Entrepreneurship

All the five studied firms had provided freight services in the region for more than a decade. They were founded before the opening of the 3rd Friendship Bridge in 2011 that land linking Thailand and its neighboring country named Laos [2]. Also, they started the business before the enactment of the Thailand 4.0 policy, which initially came up as the 20-year national economic development in 2017 for the period of enactment from 2017 to 2036 [21]. As an interview respondent from firm C remarked:

"My parents found the company over 30 years ago. They started the business as a land transportation service provider. The most popular route was Bangkok-Nakhon Phanom. There was a water cross-border transportation service before the opening of the [3rd Friendship] Bridge. Our company only served the land part and helped with the transfer of goods onto the water freight."

The finding agrees with Cucculelli et al. [7] and that family power and control are founded to support the family business transformation towards industry 4.0. In this era of industry 4.0 and the digital economy, most studied family cross-border freight firms have the family's younger generation lead the firms. This result agrees with Pansang [15]. It also agree with Pitchayadol et al. [16] who discover that family power and control can be a positive factor for innovativeness in Thai Family SMEs when the family sees no contradiction between the family's traditional business norm and the new technology adoption. The interviewed manager-owners have sufficient capacity to implement new digital innovations to improve, in a supporting way, the family's business operation as they had learned from their family. As the manager of firm A pointed out:

"I grew up learning the family business. At first, we did not have much technology to use; the services were based on trucks and telephones. Nowadays, I step in to lead the company; many good things are employed, such as the GPS locator, accounting software, and online social media. In addition, we hire a software house to develop an application to integrate all the departments for providing accurate and reliable services to the customers. My folks are happy with these changes. They see the business improve with their own eyes."

The business operation of cross-border freight comprises a range of activities. The interviewed owner-managers pointed out that

they tried to adopt available technology suitable for the activities and the involved employees working for the tasks. Agreeing with Chinoracký and Čorejová [5], increased digital capability of the trained labor-force helped smoothen the digital transformation. As a result, related technology employed to promote the inventory strategy founded by the studied firms were inventory management, software packages for controlling and managing business costs, inventory expenses, and customer services. For the transport strategy, the technology employed was related to the energy management of the freights, the transportation route management, the shipment system, freight management and communication channels and customer relations via real-time responsive services. For the location strategy, the studied firms perceived the lowered costs of related technology such as GPS locators and social communication platforms helped promote the accuracy of the services, which met the customers' expectations. The technology also supported the convenience of identifying the locations of both existing customers of the family and the potential new customers, existing and potential business partners, and national and international transportation infrastructures.

## 6 CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

This paper has presented an empirical study of the development of innovative family entrepreneurship in the new digital era of industry 4.0. Five family businesses in the cross-border freight industry from the North-East region of Thailand were purposively selected for the investigation. The researchers employed a qualitative research approach and collected the data using documentary analysis and semi-structured interviews with owner-managers of the selected family firms and their branches in Bangkok, the capital of Thailand. This paper has presented and discussed the empirical evidence of the business digitalization and family power and control being identified as significant support factors for family business adaptation towards industry 4.0 in the digital era.

The study limitations relate to two attributes of the case study design: one is the specific locational profiles of the selected research site, namely Nakhon Phanom and Bangkok Provinces of Thailand; the other is the profiling of those five selected firms included in the study. However, Tight et al. [22] assert that the implementation of results of case study research is not limited to the selected case. The employment of the qualitative content analysis approach allowed the researchers to consistently compared the theoretical explanations that emerged from the empirical data with the related literature [4] [8]. Therefore, the identified success factors and challenges for development identified as the research results may be utilized to construct a conceptual framework for future studies. By conducting further studies in other areas with cross-border infrastructures. Comparisons are recommended to include as investigative facets. The comparative studies may help enhance the understanding of innovative entrepreneurship development for local cross-border enterprises in the broader extent of Thailand's national context and contribute to practical knowledge for promoting the country's economic growth.

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## REFERENCES

- [1] R H Ballou. 2004. *Business Logistics/supply Chain Management: Planning, Organizing, and Controlling the Supply Chain*. Pearson/Prentice Hall.
- [2] Ruth Banomyong. 2010. Benchmarking Economic Corridors logistics performance: A GMS border crossing observation. *World Customs Journal* (2010).
- [3] S Chaisinson. 2021. The development of behavioral decision model for choosing the parcel transportation service provider in Bangkok. *Journal of the Association of Researchers* 26, 1 (2021), 145–160.
- [4] Kathy Charmaz. 2006. *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis (Introducing Qualitative Methods series)*. arXiv:arXiv:1011.1669v3
- [5] Roman Chinoracký and Tatiana Čorejová. 2019. Impact of digital technologies on labor market and the transport sector. *Transportation Research Procedia* 40 (2019), 994–1001. <https://doi.org/10.1016/J.TRPRO.2019.07.139>
- [6] Juliet Corbin and Anselm Strauss. 2012. *Basics of Qualitative Research (3rd ed.): Techniques and Procedures for Developing Grounded Theory* (3rd ed. ed.). Sage, London. <https://doi.org/10.4135/9781452230153>
- [7] Marco Cucculelli, Ivano Dileo, and Marco Pini. 2022. Filling the void of family leadership: institutional support to business model changes in the Italian Industry 4.0 experience. *The Journal of Technology Transfer* 47, 1 (2022), 213–241. <https://doi.org/10.1007/s10961-021-09847-4>
- [8] Barney G. Glaser. 2002. Conceptualization: On Theory and Theorizing Using Grounded Theory. *International Journal of Qualitative Methods* (2002). <https://doi.org/10.1177/160940690200100203>
- [9] Masami Ishida. 2019. GMS Economic Corridors Under the Belt and Road Initiative. *Journal of Asian Economic Integration* (2019). <https://doi.org/10.1177/2631684619894102>
- [10] Charlie C Jones and Paitoon Pimdee. 2017. Innovative ideas: Thailand 4.0 and the fourth industrial revolution. *Asian International Journal of Social Sciences* 17, 1 (2017), 4–32.
- [11] N. Kammerlander and M. Ganter. 2015. An attention-based view of family firm adaptation to discontinuous technological change: Exploring the role of family CEOs' noneconomic goals. *Journal of Product Innovation Management* 32, 3 (2015), 361–383.
- [12] Nikos S. Kanellos. 2013. Exploring the Characteristics of Knowledge-based Entrepreneurs in Greece. *Procedia - Social and Behavioral Sciences* (2013). <https://doi.org/10.1016/j.sbspro.2013.02.060>
- [13] Office of the National Digital Economy and Society Commission. 2020. Outcome of Preliminary Study of Digital Economy Indicators. (2020).
- [14] Office of Transport and Traffic Policy and Planning. 2015. *The potential Assessment and Readiness of Transport Infrastructure and Services in Thailand for ASEAN Economic Community (AEC)*. Technical Report. Office of Transport and Traffic Policy and Planning, Bangkok. [https://www.otp.go.th/uploads/tiny\\_uploads/Education\\_Report/2555/Project2-AEC/ExecutiveENG.pdf](https://www.otp.go.th/uploads/tiny_uploads/Education_Report/2555/Project2-AEC/ExecutiveENG.pdf)
- [15] W Pansang. 2011. *The development of a transportation planning system for reducing empty trucks*. Technical Report. Ministry of Science and Technology, Bangkok.
- [16] Pongsakorn Pitchayadol, Danupol Hoonsonopon, Achara Chandrachai, and Sipat Triukose. 2018. Innovativeness in Thai Family SMEs: An Exploratory Case Study. *Journal of Small Business Strategy* 28 (2018), 38–48. <https://libjournals.mtsu.edu/index.php/jsbs/article/view/1081/897>
- [17] Teeraphorn Polhong and Suteera Puangpronpitag. 2020. Innovative entrepreneurship in local cross-country freight enterprises in thailand. In *Proceedings of the European Conference on Innovation and Entrepreneurship, ECIE*. 468–475. <https://doi.org/10.34190/EIE.20.159>
- [18] Wilert Puriwat and Suchart Tripopsakul. 2020. Preparing for Industry 4.0 – Will youths have enough essential skills?: An Evidence from Thailand. *International Journal of Instruction* 13, 3 (2020), 89–104. <https://doi.org/10.29333/iji.2020.1337a>
- [19] R. E. Stake. 2000. *Case studies*, in: (2nd ed.). Sage, London.
- [20] Thailand Board of Investment. 2015. *A Guide to Investment in the Special Economic Development Zones (SEZ)*. Technical Report. Thailand Board of Investment, Bangkok. [https://www.nesdc.go.th/ewt\\_dl\\_link.php?nid=5197](https://www.nesdc.go.th/ewt_dl_link.php?nid=5197)
- [21] Thailand Board of Investment. 2016. Thailand's Logistics Market Set to Flourish. *Thailand Investment Review* (sep 2016), 5–6. [https://www.boi.go.th/upload/content/BOI\\_TIR\\_SEP2016\\_22669.pdf](https://www.boi.go.th/upload/content/BOI_TIR_SEP2016_22669.pdf)
- [22] Malcolm Tight, Kathleen Eisenhardt, and Kathleen M. Eisenhardt. 2016. Building Theories from Case Study Research. In *Case Studies*. <https://doi.org/10.4135/9781473915480.n52>
- [23] J Worrakitcharoen. 2016. Warehouse Management System (WMS): a case study of J.S. pack and marketing. *Journal Of Logistics And Supply Chain Management Ramhkamhaeng* 3, 1 (2016).