Determination of Success Factors of Logistics Innovation of *Palm Kernel Shell* for Export Market

Abstract

In the export business of palm kernel shell, the businessmen are well aware of the role of logistics in increasing competitive advantage. Nevertheless, the issue of innovation becomes a challenge for companies in the management of logistics system. Therefore, it is necessary to formulate the successful factors of logistics innovation of palm kernel shell for export market. This research traces the success factors of logistics innovation of palm kernel shell for export markets. As a conceptual thought formulated through literature study, thought approaches are based on data and information through news searches, previous research results and other secondary sources. There are four successful factors of logistics innovation of palm kernel shell for export market, namely: competitive priority, 4.0 industry implementation, regulation, and strategic planning.

Keywords: industrial logistics system, :inovation, :conseptual, :success factors, :export of palm kernel shell.

Introduction

Indonesia is the largest palm kernel shells producing country in the world. One of the byproducts of palm kernel shell that has high economic value, namely: palm kernel shell. Palm kernel shell are industrial waste from Palm Oil Factory which can be utilized as a potential alternative energy source. Mangoensoekarjo and Semangun (2005) explained that the palm kernel shell has a high calorific value where the resulting heat value is 4,105 - 4,802 kcal / kg (1 kcal = 4,187 Joule = 1.163 Wh). Nevertheless, the consumption of domestic palm kernel

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shell is limited to boiler fuels, so the export of palm shells becomes a great business opportunity for Indonesia.

The potential demand for palm kernel shells reaches 7 - 8 million tons per year (Indonesian Economic Association, 2017). According to data from the Indonesian Palm Kernel Shell Entrepreneurs Association (Association of Indonesian Palm Shell Entrepreneurs) in 2017, the export of national palm kernel shell currently reaches 1.8 million tons to international markets, of which 800,000 tons to fill the Japanese Market, 50% of total volume shipments to the world are destined to Japan with world market price palm kernel shell is about US $ 80 / ton FOB or equivalent US $ 110 - 120 / ton CIF. The contribution of Indonesia's palm kernel shell to the world's needs is 60%, while the rest is filled by Malaysia (Association of Indonesian Palm Kernel Shell Entrepreneurs, 2017).

Welcoming the business opportunity of the export of palm kernel shell, businessmen (exporters) of palm kernel shells need to understand the role of logistics as one source of significant competitive advantage for the company. The objective of logistics is to provide assurance that the product can be provided appropriately (the right): quantity, quality, place, time, condition, customer, and cost (Rushton et al, 2010). In the context of corporate management, the important role of logistics in achieving competitive advantage is: product cost efficiency (cost leader) and product value increase (service leader). Logistics cost in Indonesia ± 14.7% of product sales price (FEUI Management Institute, 2013) and calculated from cost of product, Indonesia logistic cost is 24% (Zaroni, 2017). In aggregate to Gross Domestic Product (GDP), logistics cost in Indonesia is 24%, bigger than other countries such as: USA, UK, Japan, France, Canada, Italy less than 10%, or Argentina , Spain, Brazil, Mexico, India, and China ranging from 11 to 20% (Rushton et al, 2010). Hence…?

Firms that survive, grow, and compete are those who understand the role of logistics and create logistical innovation. Logistics becomes the determinant factor of the nation's

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competitiveness as has been compiled in the blueprint of the National Logistics System (Sislognas). The challenge for Indonesia now lies in competitiveness, science and technology, and innovation. Indonesia ranks 36 out of 137 in terms of competitiveness (WEF, 2017), ranked 87 out of 127 in terms of innovation competitiveness (WIPO, 2017), and 80th out of 137 in terms of technological readiness (WEF, 2017).

The businessmen (companies/ exporters) of palm kernel shell already understand the role of logistics well. This is seen from the decisions that have been made by the company, whether it is strategic, tactical, or operational. These decisions have been attached to the mechanism/ The businessmen (companies/ exporters) of palm kernel shell already understand the role of logistics well. This is seen from the decisions that have been made by the company, whether it is strategic, tactical, or operational. These decisions have been attached to the mechanism/ business process on the export palm kernel shell in Indonesia in general and West Sumatra in particular.

Understanding the role of logistics alone is not enough to answer today's business challenges. Logistic innovation issues will be an important key in the logistics of palm kernel shell for export markets, so it is necessary to formulate/ determine the success factors in logistics innovation of oil palm shell for export markets. This paper is a conceptual concept formulated through literature studies. Data and information obtained through searching news, research results, and other secondary sources.

Literature Review

The definition of logistics has evolved from the first era to the current era of industrial revolution 4.0. Understanding of logistics evolves from a focused perspective on transport activities to the view that logistics can be one source of competitive advantage for companies with technology use. Porter (2008) mentions that logistics is a basic activity in the formation

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of the value chain. Logistics is one source of significant competitive advantage for the company (Mentzer, 2004). Logistics as an efficient planning, implementation and control process that includes the flow of costs, raw material storage, half-finished goods inventory, finished goods and other related information from the origin to the point of destination with the purpose of customer needs can be achieved (Ballou, 2004). Hadiguna (2017) reveals five keywords as logistic definitions: goods, information, money, processes, and decisions in which the key activities are procurement and transportation interactions. According to Zaroni (2017), logistics serves as an option of cost leadership strategy and service leader strategy.

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Innovation is always associated with some practices that are grounded in value. Innovation is about creating new tools, products or processes, giving birth to something "new" that allows people to achieve something that can not be achieved before (Tidd & Bessant, 2009). Inovation is not about the emergence of new or better products, but about the problem solving that must ariest first (Silverstein, 2009). Innovation is a social and economic success as a result of the introduction or discovery of new ways or new combinations that can create major changes that increase the use value or value of benefits (perceived by consumers/ or users) and monetary value or price (Fontana, 2011. Barringer and Ireland (2013) state that innovation is the process of creating something new. This definition of innovation explains that innovation is a "novelty" that provides value to consumers and added value to producers (firms) where economic and social success is generated. Logistic innovation can be interpreted as a "novelty" process of planning, implementation and control of goods, information, money, and decisions in the business/ company that leads to increased value of use to consumers with care about economic, social and environmental threats and increased efficiency and effectiveness for the Company.

Studies related to logistic innovation have been largely done by previous researchers with different focus. Kamil, Jonrinaldi, and Halim (2015) revealed that financing logistics

infrastructure for the creation of connectivity will trigger innovation. Referring to the World Bank study on Logistics Performance Index (LPI) released every year, the logistics performance of a country is determined by logistics infrastructure. Overall, the logistics performance of a country is determined by six main pillars, namely: (1) Customs efficiency and border management (customs); (2) Quality of trade and infrastructure of transportation (infrastructure); (3) Ease of arranging delivery at competitive prices (Ease of arranging shipments); (4) Competence and quality of logistics services (Quality of logistics services); (5) Ability to track and track submissions (Tracking and tracing); (6) Timely delivery frequency (Timeliness). Amador and Cabral (2014) describe the drivers and measures in the application of Global Value Chain is a reliable logistics system. Hadiguna (2015) sees that information and communication technology is the driving factor of logistics systems both micro (enterprise level) and macro (national level). Hadiguna (2017) unravels conceptually various approaches to solving problems in industrial logistics, such as: Fuzzy logic, that is used to assess risk based on knowledge and experience of decision makers, heuristic and meta heuristic techniques for completion of logistics cost optimization and optimization of delivery routes, and simulation techniques for solving dynamic and stochastic situation problems (such as warehouse location determination). The results of these studies show that innovation in industrial logistics requires a system thinking perspective in formulating success factors because it involves multiple stakeholders. The system thinking perspective is related to the business process of export of palm kernel shell.

Based on a review of the research found that research on logistics innovation with the research object of the palm shell is still relatively minimal. A lot of research in the field of oil palm, but almost nothing to discuss about the success factors of logistics innovation of palm kernel shell. A similar study was conducted in 2014 by Vorst and Hadiguna ini 2015. Vorst (2014) discusses the three factors of successful agro-industry logistics innovation, namely:

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network infrastructure, planning and control, and stimulation of technology. The method used is literature study and it is found that key decision on agro industry logistics, including: transportation (gathering point, route, and loading), production (planning, mixing and scheduling), inventory control (product type, product quantity, place), network design (factories, distribution centers, and retailers), and the integral aspects (supply chain management). Hadiguna (2015) discloses six main drivers of logistics competitiveness, including: key commodities, transport infrastructure, agents and logistics service providers, human resources, information and communication technologies, and regulations and policies.

Some of the points that distinguish this research from Vorst and Hadiguna are: (1) possible changes in conditions affecting the palm kernel shells industry for current export markets, (2) research coverage in the palm kernel shells industry in West Sumatra, (3) it is necessary to re-identify the factors found to be relevant to the characteristics of the logistics system and business process conditions of the palm kernel shells for export markets.

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Methods

This research is a conceptual thinking that uses literature study method related to logistic innovation. Data and information are obtained through searching for news, previous research results and other secondary sources. Based on the literature study, a list of successful factors of logistic innovation was formulated in accordance with the characteristics and business processes of palm kernel shell exports.

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Data Collection

Data collection was conducted to obtain information needed in order to achieve the research objectives, including methods: questionnaires, observations, interviews, and documents (Gulo, 2010: 110). The data collecting is done by researcher with observation and

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document. Through observation, researchers recognize the work processes and business processes of the export of palm kernel shell. Through the document, researchers know the success factors of logistics innovation.

Data Analysis

In this study, researchers adopted qualitative data analysis techniques that are based on the opinions of Miles & Huberman. According to Miles and Huberman (2014), there are three qualitative data analysis techniques, namely: data reduction, data presentation, and conclusion. The researcher performs a form of analysis that sharpens, classifies, directs, discards unnecessary, and organizes the data so that final conclusions can be taken. Furthermore, researchers perform the presentation of data in the form of narrative text and charts, as well as drawing conclusions as a basis for taking action.

Results (or Results and Discussion)

In general, business processes or purchasing mechanisms of palm kernel shell in general in Indonesia and West Sumatra especially started from the Palm Oil Factory which is done by pre order. The company (exporter) orders the palm kernel shell with the specified amount and then made full payment. After that, the palm kernel shell is sent to stockpile or palm kernel shell collecting place. Usually the stockpile is leased by the company (exporter). In stockpile, palm kernel shell are received through weighing, bulk, cleaning, spinning, timing, and loading process. In the business of exporting palm kernel shell, the company prepares supporting documents and follows the procedures, including: sales contracts, trade invoices, Letter of Credit (L/C), Notice of Export of Goods, Bill of Leading (B/L), Insurance Policy, Certificate of Origin, Quality Statement Letter, and export bills. For export procedures, include: correspondence, trade contracting, L/C issuance, preparing export goods, registering Notice of

Export of Goods, ship booking, delivery of goods to port, customs inspection, loading of goods to ship, taking care of Certificate of Origin, L/C , and delivery of goods to importers.

Searching for news, research results, and other secondary sources, a list of successful logistical innovation factors is listed :

Factors of Successful Logistics Innovation

No.	Factor	Definition	Source (Researched by :)
1	Strategic Planning	Strategic decisions that impact on the company's logistics performance with a span of time between 3 s.d. 5 years.	(Aronietis, dkk, 2012) (Cherneva & Voigt, 2015) (Frederick, Lim, & Srai, 2015) (Guohua dan Panpan, 2011) (Hadiguna, 2015) (Hahn & Kuhn, 2012) (Kersten, Blecker, & Ringle, 2015) (Klumpp, Bioly, Zelewski, 2009) (Petit dan Beresford, 2012) (Roumboutsos, Kapros, (Vanelslander, 2014) (Turğut, Banu Tuğba., Gamze Tağ Ahmet Herekoğlu Hakan Tozan Ozalp Vayvay, 2011) (Vorst, 2014) (Yunkai, 2006)
2	Implementation of industrial technology 4.0	Utilization of various types of technologies that are connected digitally, ranging from 3D printing to robotics, new types of materials and production systems. Here is implemented, digitalization, autonomization, transparency, mobility, modularization, product and process socialization.	(Aronietis, dkk, 2012) (Beifert, Prause, & Gerlitz, 2015) (Cherneva & Voigt, 2015) (Esper, dkk, 2007) (Guohua dan Panpan, 2011) (Hadiguna, 2015) (Hahn & Kuhn, 2012) (Kamadjaja Logistics, 2015) (Kamil, 2015) (Klumpp, Bioly, Zelewski, 2009) (Petit dan Beresford, 2012) (Vorst, 2014) (Yunkai, 2006)
3	*Competitive Priority*	Strategic capabilities that can help companies to create, develop, and maintain competitive advantages related to market demands in which firms compete, include elements:	(Allameh et al, 2011) (Banerjee & Siemens, 2015) (Beifert, Prause, & Gerlitz, 2015) (Bidokhti et al, 2011) (Cherneva & Voigt, 2015)

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		Flexibility, Quality, Cost, and Delivery.	(Daneshfard & Zakeri, 2010) (Esper, dkk, 2007) (Flint et al, 2005) (Fuller, Hutler, & Hautz, 2013) (Kunal, 2013) (Guohua dan Panpan, 2011) (Hadiguna, 2017) (Hahn & Kuhn, 2012) (Hjalmarsson, dkk, 2014) (Hugos, 2003) (Kalogerakis & Wagenstetter, 2014) (Kamadjaja Logistics, 2015) (Kamil, 2015) (Kersten, Blecker, & Ringle, 2015) (Kersten, Blecker, Ringle, 2015) (Kersten, Seidel, & Wagenstetter, 2012) (Lin & Ho, 2008) (Pfeifer & Gebauer, 2013) (Roumboutsos, Kapros, (Vanelslander, 2014) (Sedziuviene & Vveinhardt, 2010) (See & Kalogerakis, 2015) (Tabarsa & Ormozdi, 2008) (Turğut, Banu Tuğba., Gamze Tağ Ahmet Herekoğlu Hakan Tozan Ozalp Vayvay, 2011) (Vorst, 2014) (Wagner & Busse, 2008) (Yousefifar et al, 2015)
4	Infrastructure	Physical facilities developed / required by the user in carrying out logistical functions to support social and economic systems.	(Beifert, Prause, & Gerlitz, 2015) (Frederick, Lim, & Srai, 2015) (Guohua dan Panpan, 2011) (Hadiguna, 2015) (Kamadjaja Logistics, 2015) (Kamil, 2015) (Kersten, Blecker, Ringle, 2015) (Klumpp, Bioly, Zelewski, 2009) (Roumboutsos, Kapros, (Vanelslander, 2014) (Turğut, Banu Tuğba., Gamze Tağ Ahmet Herekoğlu Hakan Tozan Ozalp Vayvay, 2011)

			(Wirges et al, 2012)
5	Regulation	Any form of regulation to control business conduct, may be in the form of legal restrictions imposed by governments, industry regulations, trade association rules, and so on.	(Filippetti & Archibugi, 2011) (Frederick, Lim, & Srai, 2015) (Guohua dan Panpan, 2011) (Hadiguna, 2015) (Kersten, Blecker, & Ringle, 2015) (Mehmann, Frehe, & Teuteberg, 2015) (Roumboutsos, Kapros, (Vanelslander, 2014) (Simatupang, 2011)
6	Sustainability	Socio - ecological processes characterized by the achievement of the same ideals, namely: the ability to maintain something by configuring civilization and human activity so as to meet their needs and express their greatest potential in the present, while preserving biodiversity and natural ecosystems, planning and acting to be able to defend the ideals for future generations.	(Beifert, Prause, & Gerlitz, 2015) (Cherneva & Voigt, 2015) (Elkington, 1994) (Green et al, 2012) (Kersten, Blecker, Ringle, 2015) (Klumpp, Bioly, Zelewski, 2009) (Komisi Eropa, 2001) (Seuring, S. and Müller, M., 2008) (Roth & Kaberger, 2002) (Roumboutsos, Kapros, (Vanelslander, 2014) (Taniguchi, Thompson, Yamada, 2014) (Turğut, Banu Tuğba., Gamze Tağ Ahmet Herekoğlu Hakan Tozan Ozalp Vayvay, 2011)
7	Continuous improvement	Ongoing efforts to develop and improve products, services and processes. Creating the best solution from the existing problem, the results will continue to survive and develop even better.	(Cherneva & Voigt, 2015) (Hadiguna, 2015) (Klumpp, Bioly, Zelewski, 2009) (Petit dan Beresford, 2012) (Vorst, 2014)

Discussion (or Results and Discussion)

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In the logistics system of palm kernel shell for export markets, the main functions of industrial logistics include: ordering, purchasing, inventory, and shipping. Aspects of operational and environmental costs are a priority in managing these logistics functions. The

contribution of logistic costs to non-logistic costs on the export business of palm kernel shell reaches 25% (14% tax cost and 11% operational cost). This figure can be suppressed with innovative breakthroughs in its logistics system.

Hay Group Logistics Manpower Study (2015) mentions that technological advances will result in greater productivity and shape the future of logistics. Modern warehouses equipped with key technology solutions will achieve greater productivity, improve volume handling, inventory speed and accuracy at lower costs. Warehouse of the future (modern) can be seen in Figure 1 below.

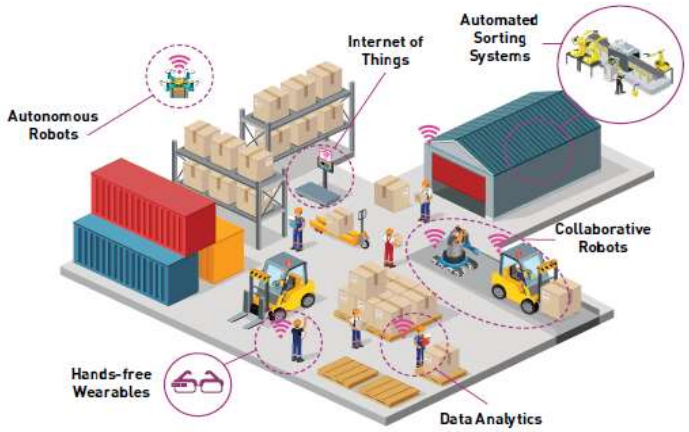

Figure 1: Warehouse of the Future (Modern)
Source: Republic Polytechnic COI SCM (Hay Group Logistics Manpower Study, 2015)

There are four factors to consider in order to succeed in logistics innovation of oil palm shells for export markets. The first is competitive priority which includes elements of flexibility, quality, cost, and delivery. Flexibility refers to the ability to respond effectively to constantly changing environmental conditions and this is necessary in the face of uncertainty. Quality is concerned with the eight dimensions of quality. Cost through the strategy of cost leadership, differentiation, and focus. Delivery referred to the concept of capability related to

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the issue of time: the accuracy of delivery, the speed of delivery, and the development of speed of service.

The characteristics of the 4.0 industry are digitization through the utilization of various technologies. The exporters of palm kernel shell should also prepare the implementation of the 4.0 industry in the company's logistics system. Implementation of the 4.0 industry is a low energy concept, reliable, integrated, transparent, high adaptability, providing technical support and service architecture. The second factor would be to place the role of technology as supporting operations and data management. Some types of technologies such as 3D printing (Additive Layer Manufacturing) to robotics, Enterprise Resources Planning information systems, E-Commerce, Decision Support System application or abbreviated DSS, and others.

The third factor deals with regulation. Technological advances should be accompanied by adequate regulation. This is needed to strengthen the national logistics system, primarily for export activities. Regulations and policies formulated effectively can realize the strength of the logistics system of the palm kernel shell industry for export markets.

The last factor is strategic planning. The decisions compiled in this strategic plan include: customer service management, distribution channel system, supply points, factory location, depot system configuration, depot type and amount, depot location and size, transportation mode choice, strategic alliance, distribution and delivery system, inventory management, and inventory levels. Implementation of this factor is an investment in increasing the competence of human resources logistics and infrastructure sector investment. Technical standardization and processes within the palm kernel shell logistics system for export markets also need to be structured in strategic planning to improve the efficiency and effectiveness of processes as strengthening and enhancing competitiveness.

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Conclusion and Recommendation

There are four factors that need to be considered in achieving successful innovation in palm kernel shell logistics system for export market, namely: competitive priority, 4.0 industry implementation, regulation, and strategic planning. The success of logistics innovation of palm kernel shell for the export market is determined by an appropriate logistical strategy that is strategic, tactical, and operational. These four factors are a recommendation to focus business actors in innovating the logistics system of palm kernel shell industry for export market. Implementation of industry 4.0 through the use of various technologies will further bring the company's business processes more efficiently and effectively and bring positive impacts on sustainability and continuous improvement. Eventhough it has been embodied in the blueprint of the national logistics system, infrastructure financing needs to be prepared for the acceleration of logistics functions to support social and economic systems.

Conflict of interest

The author whose names are listed report the following details of affiliation or involvement in an organization or entity with a financial or non-financial interest in the subject matter or materials discussed in this manuscript.

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Review Report form

Manuscript no: (Yovita Yulia)

Manuscript Title: Determination of Success Factors of Logistics Innovation of *Palm Kernel Shell* for Export Market

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Sr. no.	Criteria	Below average	Average	Good	Very Good	Excellent
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✓ **Your suggestions (If any):**

1. Background of study: Suggest to the justification of "innovation is the most important element in logistic management".
2. Suggest to enhance the discussion/justification on how the 4 factors are selected from Palm Kernell Shell logistic system perspective, and why the other 3 are not?
3. Grammatical errors and awkward sentence. Please get a good proofreader
4. Lack of theoretical foundation

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✓ **Reviewer's Signature:**

Success Factors in *Palm Shell* Logistics Innovation for Export Market: The Case of West Sumatra - Indonesia.

Abstract

In the export business of palm shell, the exporters are well aware of the role of logistics to increase their competitive advantages. Innovation is much required to efficiently manage the logistics system. At the same time, to come up with a successful innovation is also a challenge for the exporters. There are many literature which defined the success factors for innovation in the area of logistics management. However,this paper aims to analyse the success factors of logistics innovation for export markets and determine factors relevant to the business process of exporting palm shell basec on literature published between 2015 and 2018. The publication is from books and two electronic resources, i.e. Science Direct. A total of 1,167 articles are chosen because, owing to the high relevance. After the screening process, only 22 papers, 7 conference articles, and 3 books were included in this study. Through an in-depth discussion with experts, five factors were determined as success factors of logistics innovation in palm shells for the export markets, i.e. (1) strategic planning, (2) application of digitalisation, (3) priority on competition, (4) infrastructure and (5) regulation/ policy. The five factors have the same degree of importance and have the same contribution to the successful achievement of logistics innovation.

Keywords: innovation, *:logistics system*, :export, :Palm Shell.

Introduction

Indonesia is the largest palm shell producing country in the world. Palm shells are industrial waste from palm oil factories which can be utilized as a potential alternative energy

source. (Mangoensoekarjo, S. dan Semangun, 2005) explained that the Palm Shell has a high calorific value where the resulting heat value is 4,105 - 4,802 kcal / kg (1 kcal = 4,187 Joule = 1.163 Wh). Howeever, the consumption of domestic Palm Shell is limited to boiler fuels, so the export of plam kernel shell becomes a great business opportunity for Indonesia.

The potential demand for Palm Shells reaches 7 - 8 million tons per year (Indonesian Economic Association, 2017). According to data from the Indonesian Palm Shell Entrepreneurs Association (Association of Indonesian Palm Shell Entrepreneurs, 2017), the export of national Palm Shell currently reaches 1.8 million tons for the international markets, of which 800,000 tons is for the Japanese market with world market price Palm Shell is about US $ 80 / ton FOB or equivalent to US $ 110 - 120 / ton CIF. The contribution of Indonesia's Palm Shell to the world's needs is 60%, while the rest is filled by Malaysia (Association of Indonesian Palm Shell Entrepreneurs, 2017).

Given the intense industrial competition, logistics play a major role in sustaining competitive advantage of the exporters of Palm Shell. The availability of the right amount of material becomes important in logistics. Overstock material is a waste. Inventory management of both material and storage movement activities can improve the cost efficiency of logistics. Cost efficiency can bring the company into cost leadership. The value of a product can be increased through logistics by ensuring the product will reach the market where it is needed, and available in the market at the right time and amount. Logistics cost in Indonesia + 14.7% of product sales price (Institute, 2013) and if calculated from the cost of the product, Indonesia logistic cost is 24% higger than other countries such as USA, UK, Japan, France, Canada, Italy (Zaroni, 2017) but less than 10% of Argentina, Spain, Brazil, Mexico, India, and China ranging from 11 to 20% (Rushton, Crouhcher, 2010).

Firms that survive, grow, and compete are those which understand the role of logistics and create logistics innovation. Logistic innovation is a "novelty" in the management of

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processes, goods, and information ranging from procurement to the hands of consumers to achieve effectiveness and efficiency. Logistics becomes the determinant factor of the nation's competitiveness as has been compiled in the blueprint of the Indonesia's National Logistics System. The national logistics system was created through the issuance of presidential regulation No. 26 of 2012 on the blueprint for the development of a national logistics system. This blueprint carries the logical vision of 2025 which is "Locally Integrated, Globally Connected for National Competitiveness and Social Welfare". The development of a national logistics system is intended to connect all areas ranging from among villages, between ports, and between countries. The challenge for Indonesia now lies in competitiveness using science, technology and innovation. Indonesia ranks 36 out of 137 in terms of competitiveness (World Economic Forum, 2017) . Ranked 87 out of 127 in terms of innovation competitiveness (WIPO, 2017). And 80 out of 137 in terms of technological readiness (World Economic Forum, 2017). By looking at the vision and position of Indonesia's competitiveness, it is necessary to improve competitiveness, science and technology in the logistics sector.

The exporters of Palm Shell are aware of the role of logistics and will optimize the strategic, tactical or operational decisions to improve the logistic system. Understanding the role of logistics is not enough to answer today's business challenges. Logistic innovation issues will be an important key in the logistics of Palm Shell for export markets, so it is necessary to formulate/ determine the innovation success factors in Palm Shell logistics for export markets.

Literature Review

The definition of logistics has evolved from the first era to the current era of industrial revolution 4.0. Understanding of logistics evolves from a focused perspective on transport activities to the view that logistics can be one source of competitive advantage for companies with technology use. (Porter, 2008) mentions that logistics is a basic activity in the formation of the value chain. Logistics is one source of significant competitive advantage for the company

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(Mentzer, J.T. and Williams, 2004). Logistics as an efficient planning, implementation and control process that includes the flow of costs, raw material storage, half-finished goods inventory, finished goods and other related information from the origin to the point of destination with the purpose of customer needs can be achieved (Ballou, 2004). (Hadiguna, 2017) reveals five keywords as logistic definitions: goods, information, money, processes, and decisions in which the key activities are procurement and transportation interactions. According to (Zaroni, 2017), logistics serves as an option of cost leadership strategy and service leader strategy.

Innovation is always associated with some practices that are grounded in value. Innovation is about creating new tools, products or processes, giving birth to something "new" that allows people to achieve something that can not be achieved before (Tidd, J., and Bessant, 2009). Inovation is not about the emergence of new or better products, but about the problem solving that must ariest first (Silverstein, D., Samuel, P., DeCarlo, 2009). Innovation is a social and economic success as a result of the introduction or discovery of new ways or new combinations that can create major changes that increase the use value or value of benefits (perceived by consumers/ or users) and monetary value or price (Fontana, 2011). (Barringer, B. R, and Ireland, 2013) state that innovation is the process of creating something new. This definition of innovation explains that innovation is a "novelty" that provides value to consumers and added value to producers (firms) where economic and social success is generated. Logistic innovation can be interpreted as a "novelty" process of planning, implementation and control of goods, information, money, and decisions in the business/ company that leads to increased value of use to consumers with care about economic, social and environmental threats and increased efficiency and effectiveness for the company.

Studies related to logistic innovation have been largely done by previous researchers with different focus. (Kamil, Insannul., Jonrinaldi., 2015) revealed that financing logistics

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infrastructure for the creation of connectivity will trigger innovation. Based on the World Bank study on Logistics Performance Index (LPI) released every year, the logistics performance of a country is determined by logistics infrastructure. Overall, the logistics performance of a country is determined by six main pillars, namely: (1) Customs efficiency and border management (customs); (2) Quality of trade and infrastructure of transportation (infrastructure); (3) Ease of arranging delivery at competitive prices (Ease of arranging shipments); (4) Competence and quality of logistics services (Quality of logistics services); (5) Ability to track and track submissions (Tracking and tracing); (6) Timely delivery frequency (Timeliness). (Amador, J., Cabral, 2014) describe the drivers and measures in the application of Global Value Chain is a reliable logistics system. (Hadiguna, 2015) sees that information and communication technology is the driving factor of logistics systems both micro (enterprise level) and macro (national level). (Hadiguna, 2017) unravels conceptually various approaches to solving problems in industrial logistics, such as: Fuzzy logic, that is used to assess risk based on knowledge and experience of decision makers, heuristic and meta heuristic techniques for completion of logistics cost optimization and optimization of delivery routes, and simulation techniques for solving dynamic and stochastic situation problems (such as warehouse location determination). The results of these studies show that innovation in industrial logistics requires a system thinking perspective in formulating success factors because it involves multiple stakeholders. The system thinking perspective is related to the business process of export of Palm Shell.

Based on a review of the research found that research on logistics innovation with the research object of the palm shell is still relatively minimal. There are many researches in the field of oil palm, but almost nothing to discuss about the success factors of logistics innovation of Palm Shell. A similar study was conducted in 2014 by Vorst and Hadiguna in 2015. (Vorst, 2014) discusses the three factors of successful agro-industry logistics innovation, namely:

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network infrastructure, planning and control, and stimulation of technology. The method used is literature study and it is found that key decision on agro industry logistics, including: transportation (gathering point, route, and loading), production (planning, mixing and scheduling), inventory control (product type, product quantity, place), network design (factories, distribution centers, and retailers), and the integral aspects (supply chain management). (Hadiguna, 2015) discloses six main drivers of logistics competitiveness, including: key commodities, transport infrastructure, agents and logistics service providers, human resources, information and communication technologies, and regulations and policies.

Some of the points that distinguish this research from Vorst and Hadiguna are: (1) possible changes in conditions affecting the Palm Shells industry for current export markets, (2) research coverage in the Palm Shells industry in West Sumatra, (3) it is necessary to re-identify the factors found to be relevant to the characteristics of the logistics system and business process conditions of the Palm Shells for export markets.

Methods

This paper take a previous study and in-depth discussion approach. The aim of this previous study is to analyze the success factors of logistics innovation for export markets. In-depth discussion with experts aims to identify and determine factors relevant to the business process of exporting palm shell. Given the focus of this paper, the key words in search are innovation, logistics systems, and exports. Included publication were published in the last three years between 2015 and 2018. The publication are from two electronic resources: Science Direct and Google Scholar, and from books. Articles mainly indexed in minimum scopus indexed journal and for books have ISBNs would be refered. 1.167 articles are chosen because owing to the high relevance. After the screening process, this process resulted in the 22 papers, 7 conference, and 3 books included in this previous study.

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In-depth discussions were conducted with senior managers at the best and leading shell exporters in West Sumatra. This exporter is a company that has a level of fulfillment of export demand and financial stability is very high. The results of the in-depth discussions will be confirmed by previous study.

Data Collection and Analysis

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Data collection was conducted in West Sumatera-Indonesia using primary and secondary data. The business process of export of palm shells as the primary data is used as an initial analytical tool. This data aims to see how business processes related to logistics in the export activities of palm shells. primary data can be seen in the business process following the export of palm shells.

Business process on export of palm shells in West Sumatra especially started from the Palm Oil Factory. The process started done by pre order. The exporter orders the palm shell with the specified amount and then made full payment. After that, the palm shell is sent to stockpile or Palm Shell collecting place. Usually the stockpile is leased by the exporter. In stockpile, palm shell are received through weighing, bulk, cleaning, spinning, timing, and loading process.

In the business of exporting palm shell, the exportir prepares supporting documents and follows the procedures, including: sales contracts, trade invoices, Letter of Credit (L/C), Notice of Export of Goods, Bill of Leading (B/L), Insurance Policy, Certificate of Origin, Quality Statement Letter, and export bills. For export procedures, include: correspondence, trade contracting, L/C issuance, preparing export goods, registering Notice of Export of Goods, ship booking, delivery of goods to port, customs inspection, loading of goods to ship, taking care of Certificate of Origin, L/C , and delivery of goods to importers.

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Secondary data was obtained from mass media and online media related to export, logistics system, and the logistic innovation. A list of successful factors of logistic innovation can be seen in table 1 below:

Table 1. Assesment of Success Factors in Previous Study

S.No.	Success Factors	References
1	Efficiency in business processes	(Cherneva D, 2015a; Egea, Torrente, & Aguilar, 2018)
2	Continous improvement	(Baranowski et al., 2015; Hadiguna, 2015, 2017)
3	Hunting on positive practices	(Özmutaf, Aktekin, Ergani, & Çıta, 2015)
4	Integrated information technology, systems, and management	(Egea et al., 2018; Kersten & Blecker, 2015; Lainez, González, Aguilar, & Vela, 2018; Mehmann, Jens., Volker Frehe., 2015; See, 2015)
5	Technology utilization	(Cherneva D, 2015b; De Araujo, De Oliveira, Marins, & Muniz, 2015; Durán & Córdova, 2015; Erkan & Yildirimci, 2015; García-Olivares, Solé, & Osychenko, 2018; Hadiguna, 2015, 2017; Harris, Wang, & Wang, 2015; Kersten & Blecker, 2015; Mehmann, Jens., Volker Frehe., 2015; Oussous, Benjelloun, Ait Lahcen, & Belfkih, 2017; Park, 2016; See, 2015)
6	Technical support and service architecture	(Cherneva D, 2015b; Frederick, Lim, 2015; Kersten & Blecker, 2015; Limbourg, Giang, & Cools, 2016; Roumboutsos, Kapros, & Vanelslander, 2014)
7	Strategic planning	(Chen, Yin, & Mei, 2018; Frederick, Lim, 2015; Gurel, Acar, Onden, & Gumus, 2015; Hadiguna, 2015; Kersten & Blecker, 2015)
8	Distribution and transportation management	(Acar & Gürol, 2016; Baranowski et al., 2015; Çemberci, Civelek, & Canbolat, 2015; Egea et al., 2018; García-Olivares et al., 2018; Gurel et al., 2015; Lainez et al., 2018)
9	Alliance Strategy	(Kersten & Blecker, 2015; Miyashita, 2015; Zaroni, 2017)
10	Collaboration	(Chen et al., 2018; Cherneva D, 2015b; Hadiguna, 2015; Pateman, Cahoon, & Chen, 2016)
11	Logistic competence	(Çemberci et al., 2015; Cherneva D, 2015b; Fabová & Janáková, 2015)
12	Logistics Cost	(Çemberci et al., 2015; Cherneva D, 2015b; Gurel et al., 2015; Hadiguna, 2015)
13	Regulation/ policy	(Chen et al., 2018; Hadiguna, 2015; Kersten & Blecker, 2015; Mehmann, Jens., Volker Frehe., 2015)
14	Infrastructure	(Acar & Gürol, 2016; Beifert, A., Gerlitz, L., Prause, 2015; Çemberci et al., 2015; Frederick, Lim, 2015; Hadiguna, 2015; Kersten & Blecker, 2015)
15	*Green Logistic*	(Geng, Mansouri, Aktas, & Yen, 2017; Gurel et al., 2015; Hasan & Ali, 2015)
16	Sustainability	(Beifert, A., Gerlitz, L., Prause, 2015; Cherneva D, 2015b; Egea et al., 2018; Gurel et al., 2015; Kersten & Blecker, 2015; Lainez et al., 2018)
17	Attention to economic aspects (eco-efficiency), environment (environmental sustainability), social, and safety	(Egea et al., 2018; Geng et al., 2017; Gurel et al., 2015; Hasan & Ali, 2015; Lainez et al., 2018)

The research performs data analysis by sharpening, classifying, directing, removing unnecessary, and organizing data so that final conclusions can be taken from in-depth discussion with experts. Presentation of data in the form of text and narrative, as well as drawing conclusions as a basis for action. Interviews were conducted with senior managers.

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Results of Discussion With Experts

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In the logistics system of Palm Shell for export markets, the main functions of industrial logistics include: ordering, purchasing, inventory, and shipping. Aspects of operational and environmental costs are a priority in managing these logistics functions. The contribution of logistic costs to non-logistic costs on the export business of Palm Shell reaches 25% (14% tax cost and 11% operational cost). This figure can be suppressed with innovative breakthroughs in its logistics system. There are five factors to consider for success in logistics innovation of oil palm shells for export markets. These factors are: (1) strategic planning, (2) application of digitalisation, (3) priority on competition, (4) infrastructure, (5) regulation/ policy.

Strategic planning is a strategic decision that affects the company's logistics performance with a time span of 3 to 5 years. Exporters of palm shells need to plan well the decisions compiled in this strategic plan include: customer service management, distribution channel system, stockpile location, transportation mode options, strategic alliances, distribution and delivery systems, inventory management, and level stock. Implementation of this factor is an investment in increasing the competence of human resources, logistics and infrastructure sector investment. The technical standardization and processes within the palm oil shell logistics system for export markets should also be structured in strategic planning to improve the efficiency and effectiveness of processes as strengthening and enhancing competitiveness.

The application of digitization will support the successful realization of shell logistics innovation for export markets. Digitalisation is applied through the utilization of various technologies. Exporters of palm shells should place the role of technology as supporting operations and data management. Some types of technologies that can be applied such as: 3D printing (Additive Layer Manufacturing) to robotics, Enterprise Resources Planning information systems, E-Commerce, application Decision Support System or abbreviated DSS, and others. Digitization will help in realizing the efficiency of time and cost in the business of export process of palm shells.

Palm shell exporters need to have competitive priority. Competitive priority includes elements of flexibility, quality, cost, and delivery. Flexibility refers to the exporter's ability to respond effectively to changing environmental conditions and this is necessary in the face of uncertainty. Quality refers to the exporter's attention to the eight dimensions of quality. Cost through the strategy of cost leadership, differentiation, and focus. Delivery referred to the concept of capability related to the issue of time: the accuracy of delivery, the speed of delivery, and the development of speed of service. Competitive priority is a strategic capability because it helps to create, develop, and maintain competitive advantage. In the process, there are continuous improvements. This continuous improvement is intended to develop and improve products, services and processes. Creating the best solution for the existing problem, the results will continue to survive and develop even better. This capability is attributed to market demands in which firms compete.

Infrastructure plays an important role in determining the logistics performance of a company and even the state. Infrastructure is the physical facilities developed / required by the user in carrying out logistical functions as a supporter of social and economic systems. Transportation and warehousing are the main activities of the role of infrastructure. In the export of palm shells, the necessary infrastructure includes: seaports, roads, railways, and

information and communication technologies. Logistics costs in Indonesia are still large because they are not yet supported by quality logistics infrastructure. Procurement of palm shells from various Palm Oil Mill (PKS) and individuals in West Sumatra is still dominant inland trucking. Therefore, it needs to be improved: (1) integration of multimodal transport network through the alignment of various infrastructures to facilitate access to transport shipping/ shipping of oil from land to sea; (2) implement communication and information technology for planning and controlling logistics and warehousing transportation; (3) improve operational performance and service quality, for example by collaborating with strategic alliances (using third party logistics (3 PL) in managing all material management activities from MCC to distribution (export) for efficient solutions and improving overall logistics quality of the company.

Technological advances should be accompanied by adequate regulation and policy. This is needed to strengthen the national logistics system, primarily for export activities. Regulations and policies formulated effectively can realize the strengthening of the logistics system of the palm shell industry for export markets. The regulations and policies made must take into account the following aspects: social, economic, and environment, so as to achieve sustainability. Important points to be reexamined in the export of this palm shell include: the setting of export tax rates and other financing charges, the truck operating hours policy, the policy of shipping palm shells not scattered along the highways, and the policy of exempting illegal levies in the consolidation of loading and unloading in warehouses and transport to seaports.

Conclusion and Recommendation

There are five factors that are determined as successful factors of logistics innovation of the palm shells for the export markets by experts through in-depth discussions. These five

factors, namely: (1) strategic planning, (2) application of digitalisation, (3) priority on competition, (4) infrastructure, (5) regulation/ policy. The five factors have the same degree of importance and have the same contribution to the successful achievement of logistics innovation. Even though the shell of Indonesian origin is highly sought after by the world, exporters should see that the competition in the export market is very tight. Inadequate infrastructure, costly logistics, and tortuous bureaucracy are the main causes of Indonesia's weak export competitiveness. Therefore, exporters give input to innovate logistics by emphasizing the success factors above.

This study recommends that further research undertakes to deepen any successful factors of logistic shell logistics innovation for export markets. The depth includes: observing the relationship between success factors of palm shell logistics innovation for export markets and determining what are the constraining factors or potential obstacles in the implementation of these factors.

Conflict of interest

The authors declares no conflicts of interest.

Acknowledgments

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Success Factors in *Palm Shell* Logistics Innovation for Export Market: The Case of West Sumatra - Indonesia

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This manuscript describes original work and is not under consideration by any other journal. All authors approved the manuscript and this submission for your consideration for publication in Kasetsart Journal of Social Sciences. Please find the enclosed manuscript entitled "Success Factors in *Palm Shell* Logistics Innovation for Export Market: The Case of West Sumatra - Indonesia " by Yovita Yulia M Zai, Rika Ampuh Hadiguna, Feri Afrinaldi The manuscript has 15 pages1 table(s) and 0 figure(s).

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The manuscript highlights the following points

In order to achieve the success of logistics innovation of palm kernel shell for export market it is necessary to determine the success factors. A lot of research in the field of oil palm, but almost nothing to discuss about the success factor of logistics innovation palm kernel shell. In order to achieve the success of logistics innovation of palm kernel shell for export market it is necessary to determine the success factors.

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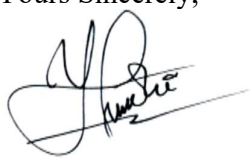

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Determination of Success Factors of Logistics Innovation of *Palm Kernel Shell* for Export Market

Abstract

In the export business of palm kernel shell, the businessmen are well aware of the role of logistics in increasing competitive advantage. Nevertheless, the issue of innovation becomes a challenge for companies in the management of logistics system. Therefore, it is necessary to formulate the successful factors of logistics innovation of palm kernel shell for export market. This research traces the success factors of logistics innovation of palm kernel shell for export markets. As a conceptual thought formulated through literature study, thought approaches are based on data and information through news searches, previous research results and other secondary sources. There are four successful factors of logistics innovation of palm kernel shell for export market, namely: competitive priority, 4.0 industry implementation, regulation, and strategic planning.

Keywords: industrial logistics system, :inovation, :conseptual, :success factors, :export of palm kernel shell.

Introduction

Indonesia is the largest palm kernel shells producing country in the world. One of the byproducts of palm kernel shell that has high economic value, namely: palm kernel shell. Palm kernel shell are industrial waste from Palm Oil Factory which can be utilized as a potential alternative energy source. Mangoensoekarjo and Semangun (2005) explained that the palm kernel shell has a high calorific value where the resulting heat value is 4,105 - 4,802 kcal / kg (1 kcal = 4,187 Joule = 1.163 Wh). Nevertheless, the consumption of domestic

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palm kernel shell is limited to boiler fuels, so the export of palm shells becomes a great business opportunity for Indonesia.

The potential demand for palm kernel shells reaches 7 - 8 million tons per year (Indonesian Economic Association, 2017). According to data from the Indonesian Palm Kernel Shell Entrepreneurs Association (Association of Indonesian Palm Shell Entrepreneurs) in 2017, the export of national palm kernel shell currently reaches 1.8 million tons to international markets, of which 800,000 tons to fill the Japanese Market, 50% of total volume shipments to the world are destined to Japan with world market price palm kernel shell is about US $ 80 / ton FOB or equivalent US $ 110 - 120 / ton CIF. The contribution of Indonesia's palm kernel shell to the world's needs is 60%, while the rest is filled by Malaysia (Association of Indonesian Palm Kernel Shell Entrepreneurs, 2017).

Welcoming the business opportunity of the export of palm kernel shell, businessmen (exporters) of palm kernel shells need to understand the role of logistics as one source of significant competitive advantage for the company. The objective of logistics is to provide assurance that the product can be provided appropriately (the right): quantity, quality, place, time, condition, customer, and cost (Rushton et al, 2010). In the context of corporate management, the important role of logistics in achieving competitive advantage is: product cost efficiency (cost leader) and product value increase (service leader). Logistics cost in Indonesia ± 14.7% of product sales price (FEUI Management Institute, 2013) and calculated from cost of product, Indonesia logistic cost is 24% (Zaroni, 2017). In aggregate to Gross Domestic Product (GDP), logistics cost in Indonesia is 24%, bigger than other countries such as: USA, UK, Japan, France, Canada, Italy less than 10%, or Argentina , Spain, Brazil, Mexico, India, and China ranging from 11 to 20% (Rushton et al, 2010). Hence…?

Firms that survive, grow, and compete are those who understand the role of logistics and create logistical innovation. Logistics becomes the determinant factor of the

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nation's competitiveness as has been compiled in the blueprint of the National Logistics System (Sislognas). The challenge for Indonesia now lies in competitiveness, science and technology, and innovation. Indonesia ranks 36 out of 137 in terms of competitiveness (WEF, 2017), ranked 87 out of 127 in terms of innovation competitiveness (WIPO, 2017), and 80th out of 137 in terms of technological readiness (WEF, 2017).

The businessmen (companies/ exporters) of palm kernel shell already understand the role of logistics well. This is seen from the decisions that have been made by the company, whether it is strategic, tactical, or operational. These decisions have been attached to the mechanism/ The businessmen (companies/ exporters) of palm kernel shell already understand the role of logistics well. This is seen from the decisions that have been made by the company, whether it is strategic, tactical, or operational. These decisions have been attached to the mechanism/ business process on the export palm kernel shell in Indonesia in general and West Sumatra in particular.

Understanding the role of logistics alone is not enough to answer today's business challenges. Logistic innovation issues will be an important key in the logistics of palm kernel shell for export markets, so it is necessary to formulate/ determine the success factors in logistics innovation of oil palm shell for export markets. This paper is a conceptual concept formulated through literature studies. Data and information obtained through searching news, research results, and other secondary sources.

Literature Review

The definition of logistics has evolved from the first era to the current era of industrial revolution 4.0. Understanding of logistics evolves from a focused perspective on transport activities to the view that logistics can be one source of competitive advantage for companies with technology use. Porter (2008) mentions that logistics is a basic activity in the

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formation of the value chain. Logistics is one source of significant competitive advantage for the company (Mentzer, 2004). Logistics as an efficient planning, implementation and control process that includes the flow of costs, raw material storage, half-finished goods inventory, finished goods and other related information from the origin to the point of destination with the purpose of customer needs can be achieved (Ballou, 2004). Hadiguna (2017) reveals five keywords as logistic definitions: goods, information, money, processes, and decisions in which the key activities are procurement and transportation interactions. According to Zaroni (2017), logistics serves as an option of cost leadership strategy and service leader strategy.

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Innovation is always associated with some practices that are grounded in value. Innovation is about creating new tools, products or processes, giving birth to something "new" that allows people to achieve something that can not be achieved before (Tidd & Bessant, 2009). Inovation is not about the emergence of new or better products, but about the problem solving that must ariest first (Silverstein, 2009). Innovation is a social and economic success as a result of the introduction or discovery of new ways or new combinations that can create major changes that increase the use value or value of benefits (perceived by consumers/ or users) and monetary value or price (Fontana, 2011. Barringer and Ireland (2013) state that innovation is the process of creating something new. This definition of innovation explains that innovation is a "novelty" that provides value to consumers and added value to producers (firms) where economic and social success is generated. Logistic innovation can be interpreted as a "novelty" process of planning, implementation and control of goods, information, money, and decisions in the business/ company that leads to increased value of use to consumers with care about economic, social and environmental threats and increased efficiency and effectiveness for the Company.

Studies related to logistic innovation have been largely done by previous researchers with different focus. Kamil, Jonrinaldi, and Halim (2015) revealed that financing

logistics infrastructure for the creation of connectivity will trigger innovation. Referring to the World Bank study on Logistics Performance Index (LPI) released every year, the logistics performance of a country is determined by logistics infrastructure. Overall, the logistics performance of a country is determined by six main pillars, namely: (1) Customs efficiency and border management (customs); (2) Quality of trade and infrastructure of transportation (infrastructure); (3) Ease of arranging delivery at competitive prices (Ease of arranging shipments); (4) Competence and quality of logistics services (Quality of logistics services); (5) Ability to track and track submissions (Tracking and tracing); (6) Timely delivery frequency (Timeliness). Amador and Cabral (2014) describe the drivers and measures in the application of Global Value Chain is a reliable logistics system. Hadiguna (2015) sees that information and communication technology is the driving factor of logistics systems both micro (enterprise level) and macro (national level). Hadiguna (2017) unravels conceptually various approaches to solving problems in industrial logistics, such as: Fuzzy logic, that is used to assess risk based on knowledge and experience of decision makers, heuristic and meta heuristic techniques for completion of logistics cost optimization and optimization of delivery routes, and simulation techniques for solving dynamic and stochastic situation problems (such as warehouse location determination). The results of these studies show that innovation in industrial logistics requires a system thinking perspective in formulating success factors because it involves multiple stakeholders. The system thinking perspective is related to the business process of export of palm kernel shell.

Based on a review of the research found that research on logistics innovation with the research object of the palm shell is still relatively minimal. A lot of research in the field of oil palm, but almost nothing to discuss about the success factors of logistics innovation of palm kernel shell. A similar study was conducted in 2014 by Vorst and Hadiguna ini 2015. Vorst (2014) discusses the three factors of successful agro-industry logistics innovation,

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namely: network infrastructure, planning and control, and stimulation of technology. The method used is literature study and it is found that key decision on agro industry logistics, including: transportation (gathering point, route, and loading), production (planning, mixing and scheduling), inventory control (product type, product quantity, place), network design (factories, distribution centers, and retailers), and the integral aspects (supply chain management). Hadiguna (2015) discloses six main drivers of logistics competitiveness, including: key commodities, transport infrastructure, agents and logistics service providers, human resources, information and communication technologies, and regulations and policies.

Some of the points that distinguish this research from Vorst and Hadiguna are: (1) possible changes in conditions affecting the palm kernel shells industry for current export markets, (2) research coverage in the palm kernel shells industry in West Sumatra, (3) it is necessary to re-identify the factors found to be relevant to the characteristics of the logistics system and business process conditions of the palm kernel shells for export markets.

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Methods

This research is a conceptual thinking that uses literature study method related to logistic innovation. Data and information are obtained through searching for news, previous research results and other secondary sources. Based on the literature study, a list of successful factors of logistic innovation was formulated in accordance with the characteristics and business processes of palm kernel shell exports.

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Data Collection

Data collection was conducted to obtain information needed in order to achieve the research objectives, including methods: questionnaires, observations, interviews, and documents (Gulo, 2010: 110). The data collecting is done by researcher with observation and

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document. Through observation, researchers recognize the work processes and business processes of the export of palm kernel shell. Through the document, researchers know the success factors of logistics innovation.

Data Analysis

In this study, researchers adopted qualitative data analysis techniques that are based on the opinions of Miles & Huberman. According to Miles and Huberman (2014), there are three qualitative data analysis techniques, namely: data reduction, data presentation, and conclusion. The researcher performs a form of analysis that sharpens, classifies, directs, discards unnecessary, and organizes the data so that final conclusions can be taken. Furthermore, researchers perform the presentation of data in the form of narrative text and charts, as well as drawing conclusions as a basis for taking action.

Results (or Results and Discussion)

In general, business processes or purchasing mechanisms of palm kernel shell in general in Indonesia and West Sumatra especially started from the Palm Oil Factory which is done by pre order. The company (exporter) orders the palm kernel shell with the specified amount and then made full payment. After that, the palm kernel shell is sent to stockpile or palm kernel shell collecting place. Usually the stockpile is leased by the company (exporter). In stockpile, palm kernel shell are received through weighing, bulk, cleaning, spinning, timing, and loading process. In the business of exporting palm kernel shell, the company prepares supporting documents and follows the procedures, including: sales contracts, trade invoices, Letter of Credit (L/C), Notice of Export of Goods, Bill of Leading (B/L), Insurance Policy, Certificate of Origin, Quality Statement Letter, and export bills. For export procedures, include: correspondence, trade contracting, L/C issuance, preparing export goods,

registering Notice of Export of Goods, ship booking, delivery of goods to port, customs inspection, loading of goods to ship, taking care of Certificate of Origin, L/C , and delivery of goods to importers.

Searching for news, research results, and other secondary sources, a list of successful logistical innovation factors is listed :

Factors of Successful Logistics Innovation

No.	Factor	Definition	Source (Researched by :)
1	Strategic Planning	Strategic decisions that impact on the company's logistics performance with a span of time between 3 s.d. 5 years.	(Aronietis, dkk, 2012) (Cherneva & Voigt, 2015) (Frederick, Lim, & Srai, 2015) (Guohua dan Panpan, 2011) (Hadiguna, 2015) (Hahn & Kuhn, 2012) (Kersten, Blecker, & Ringle, 2015) (Klumpp, Bioly, Zelewski, 2009) (Petit dan Beresford, 2012) (Roumboutsos, Kapros, (Vanelslander, 2014) (Turğut, Banu Tuğba., Gamze Tağ Ahmet Herekoğlu Hakan Tozan Ozalp Vayvay, 2011) (Vorst, 2014) (Yunkai, 2006)
2	Implementation of industrial technology 4.0	Utilization of various types of technologies that are connected digitally, ranging from 3D printing to robotics, new types of materials and production systems. Here is implemented, digitalization, autonomization, transparency, mobility, modularization, product and process socialization.	(Aronietis, dkk, 2012) (Beifert, Prause, & Gerlitz, 2015) (Cherneva & Voigt, 2015) (Esper, dkk, 2007) (Guohua dan Panpan, 2011) (Hadiguna, 2015) (Hahn & Kuhn, 2012) (Kamadjaja Logistics, 2015) (Kamil, 2015) (Klumpp, Bioly, Zelewski, 2009) (Petit dan Beresford, 2012) (Vorst, 2014) (Yunkai, 2006)
3	*Competitive Priority*	Strategic capabilities that can help companies to create, develop, and maintain competitive advantages related	(Allameh et al, 2011) (Banerjee & Siemens, 2015) (Beifert, Prause, & Gerlitz, 2015)

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		to market demands in which firms compete, include elements: Flexibility, Quality, Cost, and Delivery.	(Bidokhti et al, 2011) (Cherneva & Voigt, 2015) (Daneshfard & Zakeri, 2010) (Esper, dkk, 2007) (Flint et al, 2005) (Fuller, Hutler, & Hautz, 2013) (Kunal, 2013) (Guohua dan Panpan, 2011) (Hadiguna, 2017) (Hahn & Kuhn, 2012) (Hjalmarsson, dkk, 2014) (Hugos, 2003) (Kalogerakis & Wagenstetter, 2014) (Kamadjaja Logistics, 2015) (Kamil, 2015) (Kersten, Blecker, & Ringle, 2015) (Kersten, Blecker, Ringle, 2015) (Kersten, Seidel, & Wagenstetter, 2012) (Lin & Ho, 2008) (Pfeifer & Gebauer, 2013) (Roumboutsos, Kapros, (Vanelslander, 2014) (Sedziuviene & Vveinhardt, 2010) (See & Kalogerakis, 2015) (Tabarsa & Ormozdi, 2008) (Turğut, Banu Tuğba., Gamze Tağ Ahmet Herekoğlu Hakan Tozan Ozalp Vayvay, 2011) (Vorst, 2014) (Wagner & Busse, 2008) (Yousefifar et al, 2015)
4	Infrastructure	Physical facilities developed / required by the user in carrying out logistical functions to support social and economic systems.	(Beifert, Prause, & Gerlitz, 2015) (Frederick, Lim, & Srai, 2015) (Guohua dan Panpan, 2011) (Hadiguna, 2015) (Kamadjaja Logistics, 2015) (Kamil, 2015) (Kersten, Blecker, Ringle, 2015) (Klumpp, Bioly, Zelewski, 2009) (Roumboutsos, Kapros, (Vanelslander, 2014) (Turğut, Banu Tuğba., Gamze

			Tağ Ahmet Herekoğlu Hakan Tozan Ozalp Vayvay, 2011) (Wirges et al, 2012)
5	Regulation	Any form of regulation to control business conduct, may be in the form of legal restrictions imposed by governments, industry regulations, trade association rules, and so on.	(Filippetti & Archibugi, 2011) (Frederick, Lim, & Srai, 2015) (Guohua dan Panpan, 2011) (Hadiguna, 2015) (Kersten, Blecker, & Ringle, 2015) (Mehmann, Frehe, & Teuteberg, 2015) (Roumboutsos, Kapros, (Vanelslander, 2014) (Simatupang, 2011)
6	Sustainability	Socio - ecological processes characterized by the achievement of the same ideals, namely: the ability to maintain something by configuring civilization and human activity so as to meet their needs and express their greatest potential in the present, while preserving biodiversity and natural ecosystems, planning and acting to be able to defend the ideals for future generations.	(Beifert, Prause, & Gerlitz, 2015) (Cherneva & Voigt, 2015) (Elkington, 1994) (Green et al, 2012) (Kersten, Blecker, Ringle, 2015) (Klumpp, Bioly, Zelewski, 2009) (Komisi Eropa, 2001) (Seuring, S. and Müller, M., 2008) (Roth & Kaberger, 2002) (Roumboutsos, Kapros, (Vanelslander, 2014) (Taniguchi, Thompson, Yamada, 2014) (Turğut, Banu Tuğba., Gamze Tağ Ahmet Herekoğlu Hakan Tozan Ozalp Vayvay, 2011)
7	Continuous improvement	Ongoing efforts to develop and improve products, services and processes. Creating the best solution from the existing problem, the results will continue to survive and develop even better.	(Cherneva & Voigt, 2015) (Hadiguna, 2015) (Klumpp, Bioly, Zelewski, 2009) (Petit dan Beresford, 2012) (Vorst, 2014)

Discussion (or Results and Discussion)

In the logistics system of palm kernel shell for export markets, the main functions of industrial logistics include: ordering, purchasing, inventory, and shipping. Aspects of

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operational and environmental costs are a priority in managing these logistics functions. The contribution of logistic costs to non-logistic costs on the export business of palm kernel shell reaches 25% (14% tax cost and 11% operational cost). This figure can be suppressed with innovative breakthroughs in its logistics system.

Hay Group Logistics Manpower Study (2015) mentions that technological advances will result in greater productivity and shape the future of logistics. Modern warehouses equipped with key technology solutions will achieve greater productivity, improve volume handling, inventory speed and accuracy at lower costs. Warehouse of the future (modern) can be seen in Figure 1 below.

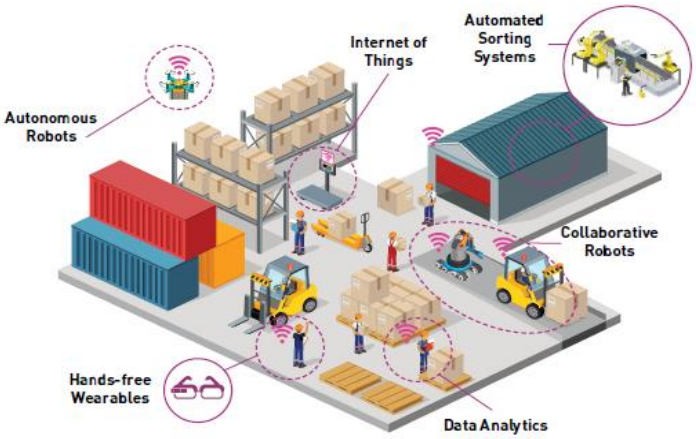

Figure 1: Warehouse of the Future (Modern)
Source: Republic Polytechnic COI SCM (Hay Group Logistics Manpower Study, 2015)

There are four factors to consider in order to succeed in logistics innovation of oil palm shells for export markets. The first is competitive priority which includes elements of flexibility, quality, cost, and delivery. Flexibility refers to the ability to respond effectively to constantly changing environmental conditions and this is necessary in the face of uncertainty. Quality is concerned with the eight dimensions of quality. Cost through the strategy of cost leadership, differentiation, and focus. Delivery referred to the concept of capability related to

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the issue of time: the accuracy of delivery, the speed of delivery, and the development of speed of service.

The characteristics of the 4.0 industry are digitization through the utilization of various technologies. The exporters of palm kernel shell should also prepare the implementation of the 4.0 industry in the company's logistics system. Implementation of the 4.0 industry is a low energy concept, reliable, integrated, transparent, high adaptability, providing technical support and service architecture. The second factor would be to place the role of technology as supporting operations and data management. Some types of technologies such as 3D printing (Additive Layer Manufacturing) to robotics, Enterprise Resources Planning information systems, E-Commerce, Decision Support System application or abbreviated DSS, and others.

The third factor deals with regulation. Technological advances should be accompanied by adequate regulation. This is needed to strengthen the national logistics system, primarily for export activities. Regulations and policies formulated effectively can realize the strength of the logistics system of the palm kernel shell industry for export markets.

The last factor is strategic planning. The decisions compiled in this strategic plan include: customer service management, distribution channel system, supply points, factory location, depot system configuration, depot type and amount, depot location and size, transportation mode choice, strategic alliance, distribution and delivery system, inventory management, and inventory levels. Implementation of this factor is an investment in increasing the competence of human resources logistics and infrastructure sector investment. Technical standardization and processes within the palm kernel shell logistics system for export markets also need to be structured in strategic planning to improve the efficiency and effectiveness of processes as strengthening and enhancing competitiveness.

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XX

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Conclusion and Recommendation

There are four factors that need to be considered in achieving successful innovation in palm kernel shell logistics system for export market, namely: competitive priority, 4.0 industry implementation, regulation, and strategic planning. The success of logistics innovation of palm kernel shell for the export market is determined by an appropriate logistical strategy that is strategic, tactical, and operational. These four factors are a recommendation to focus business actors in innovating the logistics system of palm kernel shell industry for export market. Implementation of industry 4.0 through the use of various technologies will further bring the company's business processes more efficiently and effectively and bring positive impacts on sustainability and continuous improvement. Eventhough it has been embodied in the blueprint of the national logistics system, infrastructure financing needs to be prepared for the acceleration of logistics functions to support social and economic systems.

Conflict of interest

The author whose names are listed report the following details of affiliation or involvement in an organization or entity with a financial or non-financial interest in the subject matter or materials discussed in this manuscript.

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