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The Trigger Factors and Constraints on e-Supply Chain Processes : A Systematic Literature Review

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Abstract— **The development of information technology will certainly have a major influence on all aspects of life, not least for companies engaged in the supply chain. The role of information technology and electronic networks in running a supply chain is called the Electronic Supply Chain (e-Supply Chain). The main point of this research is to conduct a literature review to find the trigger factors and constraints in the e-supply chain. This research uses the Systematic Literature Review methodology to collect selected research articles. The steps in defining the selected article use PRISMA. Keywords used for article search are ("Trigger" OR "Driving") AND "Factors" AND "Constraints" AND ("Supply Chain" OR "SC") AND ("electronics supply chain" OR "e-supply chain") AND "Processes". Source of data used includes: Elsevier, ACM Digital Library, Emerald Insight, IEEE Explore, Inder science publisher, and Springer. Based on the literature review that was carried out, the resulting trigger factors in the e-supply chain, including: Integrated supply chain system, IT Support, Service quality; while the constraints include: A supply chain network cyber attack, Manufacturing, storage or distribution problems, Operational, economic, environmental and social factors, Restrictive government regulations, Costs and logistics performance, cost of raw materials, Post-harvest waste, Global / digital markets, product life cycles, consumer demand, Logistics strategy, Global competitiveness, Internationalization of markets and climate change.**

Keywords — e-supply chain, trigger factors, constraints, systematic literature review

I. INTRODUCTION

The evolution of e-supply chain [1] began in the 1970s, beginning with the development of an ERP (Enterprise Resources Planning) system such as SAP, Baan, JD Edwards. Then continued in the next decade of the 1990s with the advent of SCM Module (Supply Chain Management) which introduced a decision-making system to deal with lead time demand problems. The next decade was developed by SCP (Supply Chain Planning) and SCE (Supply Chain Execution). In this paper [1], there are several constraints contained in the production planning system, such as: operating time, stacking and production capacity.

It has long been talked about in terms of supply chain technology, namely Electronics Data Interchanges (EDI), which is a technology to connect data communication between different applications, making it easier for supply chain players to exchange data [2].

In the current era of technology, almost all users of products from the company want the products that use it in good condition and according to his wishes. Many factors influence it to ensure that the product condition remains good until the customer's hand. Among these factors is the process of delivering products by the company until the customers.

The company is a supplier of products that play the role of e-supply chain processes from the planning, purchasing, inventory, production to transportation process. Electronics supply chain process is very important to be noticed by the actors involved in it. The purpose of supply chain process is to reduce challenges and make integration of all supply chain components [3]. Problems that often arise in the supply chain are annual strategy planning, and weekly operational planning; [4]. In addition, economic pressures and new technological developments today are also a challenge for the supply chain [5]. Evaluation of the impact of risk in supply chains is also an important thing that decision makers should pay attention to. Several sources of risk on supply chain, namely: supply, demand, external and internal [6]. In addition

to these limitations, there are many trigger factors also found in e-supply chain process.

One of the trigger factors is Remanufacturing methods. Remanufacturing is a reverse logistic movement strategy from the consumer to the producer, with the aim to perform reproduction that will impact on customer satisfaction [7]. A supply chain design is designed to provide customer satisfaction and improve overall performance [8]. To ensure sustainability in supply chain process, it is important to conduct research on literature review which will answer a research question: "What are the trigger factors and constraints on e-supply chains processes". The contribution of our research is to provide information for supply chain business actors on the trigger factors and constraints that may arise throughout the e-supply chain process.

II. METHODOLOGY

Through the literature review methodology, as it is also used by [9], this research outlines the trigger factors and constraints on e-supply chain processes with the steps of: determine the topic of research, build database, set keywords, select the relevant articles and last dissect the data with inclusion and exclusion criteria.

Research Objective, this research aims to identify the trigger factors and constraints that exist on e-supply chain processes. *The database*, to define articles relevant to this research, the authors specify the source of the article taken from the database: (1) ACM digital library (https://dl.acm.org), (2) Springer (https://link.springer.com), (3) Emerald Insight (http://www.emeraldinsight.com), (4) IEEE Explore (https://ieeexplore.ieee.org), (5) Science Direct (https://www.sciencedirect.com). *Keyword identification*, defining a keyword uses a combination of strings (AND, OR). So the keyword is obtained: ("Trigger" OR "Driving") AND "Factors" AND "Constraints" AND ("electronics supply chain" OR "e-supply chain") AND "Processes".

The next step is to select articles that are relevant to the given keyword. Search results by keyword there are 246 relevant articles (search for articles of 2015 - 2018). Then selected with title and abstract conformity generate 41 articles. Finally selected again with the suitability of full text and focus on the question as much as 29 articles.

The criteria used to find relevant articles above are: which comes from the *Elsevier* source (# 71), select by years 2016 to present. From the source of *ACM Digital Library* (# 57), refine by publication year (published since 2016). From the Emerald Insight source (# 28), order result by relevance (keyword: journal). From the *IEEE Explore* source (# 28), filters applied: journal & magazines conferences and published 2015 to present. From *Inder science publisher* sources (# 62), for criteria Science, Engineering and Technology / Materials and Manufacturing / Int. J. of Supply Chain and Operation Resilience / Topics: Supply Chain performance / optimization / risk / decision making / support systems, year 2016 to present. Lastly, from the *Springer* source (# 1), published

2016 to present, document type: article, access type: open access. So the total article comes from the searched source of # 247 articles.

The next step is to select the article by looking at the suitability of the article title and abstract. At this stage there are as many as # 46 articles that are considered relevant to the purpose of the study.

Based on the final results of 29 articles on the topic of the trigger factors and constraints on e-supply chain processes, further detailed analysis is done in order to provide answers to the research question (see Figure 1).
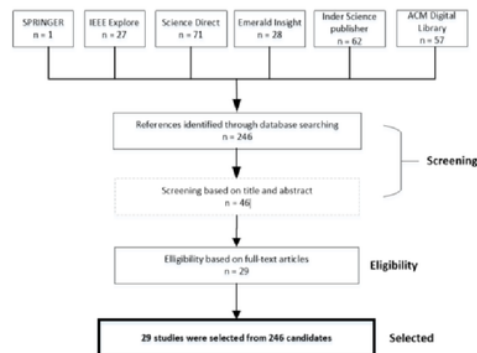

Fig. 1. PRISMA Data Flow: Process Extraction Data [10]

III. RESULT AND DISCUSSIONS

Based on search results that match the keywords about trigger factors and constraints on e-supply chain processes in this research, researchers conducted a data grouping based on demographics.

A. Trend Publishing

The following are the results of demographics and trend publishing outlets based on year, publication type, # of papers [11]. Summary of # papers by years: 2015 (#4), 2016 (#7), 2017 (#17), 2018 (#1). Publishing outlets are shown in full in table 2 below.

TABLE I.   TREND PUBLISHING

Year – Publication Type	# of Paper
2015	**4**
48th Hawaii International Conference on System Sciences	1
FedCSIS	3
2016	**7**
Biochemical Engineering Journal	1
Int. J. Supply Chain and Operations Resilience	4
the 2016 Winter Simulation	2
2017	**17**
ACM Transactions on Design Automation of Electronic Systems	1

Year – Publication Type	# of Paper
Benchmarking : An International Journal	2
Computer and Industrial Engineering	1
Food Policy	1
Int. J. Production Economics	1
ICE/ITMC	1
ICIMSA	1
International Journal of Logistics Management	1
Journal of Cleaner Production	3
SummerSim-SCSC	1
Supply Chain Management : An International Journal	1
International Conference on E-Business and Internet	1
ICICM	1
The genetic and Evolutionary Computation Conference	1
2018	**1**
Benchmarking : An International Journal	1
Total papers	**29**

This research identifies the paper produced by institutions from 2015 to 2018 that are linked to the trigger factors and constraints on e-supply chain processes, total country names as much as 24, total number of institutions as many as 44 and total number of authors as many as 77, as shown in table 3 below:

TABLE II.   DEMOGRAPHICS THE INDUSTRY OR RESEARCH LOCATION

Country Names	# of Institutions	# of Authors
Germany	4	9
USA	7	11
Australia	1	1
Taiwan	2	3
India	5	8
Thailand	1	1
Florida	1	4
Virginia	1	1
Midland, United States	1	1
Russia	3	3
Italy	1	4
UK	2	4
Chatham United Kingdom	1	4
Rumania	3	7
Mexico	2	2
France	1	1
Colombia	1	1
Thessaloniki, Greece	1	2

Country Names	# of Institutions	# of Authors
United Kingdom	1	1
United States	1	1
Netherlands	1	5
Denmark	1	1
California	1	1
Urbana-Champaign	1	1
Total country names : 24	**44**	**77**

B. Trigger Factors and Constraints on e-Supply Chain Processes

Trigger factors are the driving factors that arise in any supply chain activity.. Based on the above article selection results, several posts related to the trigger factors on e-Supply Chain Processes, e.g.: (i) Various problems in supply chain management is also mentioned about transportation costs, delivery timetables and service quality [4], (ii) The driving factor developed by [12] is an integrated supply chain system between supplier and customer, (iii) The role of computerization is very influential to increase the added value of a business [13].

While some constraints exist on e-supply chain processes like: The constraints comes from cost and logistics performance [14]. Barricade in the supply chain are quite influential, among others: market competition and uncertainty, resource constraints, government policies, knowledge and training, financial issues, management concerns [15]. Constraints faced by supply chain due to dynamic changes in global market, technology, consumer demand and product life cycle [16]. Mentioned also, one of the major constraints for supply chain is limited government regulation, besides bad infrastructure [8].. Global competitiveness would be dangerous if managers did not learn about supply chain risk management [6]. Often risks arise in various aspects of the supply chain network [17]. As expressed by [18], about the advances in recycling technology is a challenge in the supply chain. [19], in his writing said that the globalization of markets and environmental challenges is a challenge for the modern supply chain.

Based on previous research, [20] stated that there were 13 articles relevant to the search for "CSF to implement SCM", published in 2000 to 2012. In 2015, in his research, [21] creating new technology to help supply chain security systems. For more details the above factors can be classified as shown in table 4 below.

TABLE III.   TRIGGER FACTORS AND CONSTRAINTS FROM THE IMPLEMENTATION OF "SC"

Trigger Factors on e-Supply Chain Processes	Articles Related
Integrated system supply chain	[12]

Securing the supply chain	[21]
Service quality	[4]
IT Support	[13]
Decision Support System	[22]
Critical Success Factors	[20]
Constraints on e-Supply Chain Processes	*Articles Related*
Transportation	[4],[13]
Scheduled delivery time	[4]
A cyber attack on the supply chain network	[23]
The production planning system	[1]
Manufacturing, storage or distribution problems	[8],[24],[25]
Operational, economic, environmental and social factors	[25],[26],[27],[28]
Restrictive government regulations	[8],[15]
cost of raw materials	[5]
Logistics strategy	[29]
Global competitiveness	[6]
Internationalization of markets and climate change	[19]
Post-harvest waste	[30]
Costs and logistics performance	[14]
Global/digital markets, product life cycles, consumer demand	[16],[25],[31],[32]

Based on the trigger factors and constraints for the e-supply chain as in table 4 above, we can specify in more detail that there are 6 trigger factors in the e-supply chain strategy, namely: (1) Laws & Regulations, (2) Human Resource & Management, (3) Information Communication Technology, (4) Logistics Service Provider, (5) What & Where Infrastructure, (6) Key Commodity Focus [33], as shown in Figure 2 below. In the current digital economy era, these 6 components will also be a challenge in running e-supply chain processes, including for Indonesia.

Fig. 2. Driver Strategy e-Supply Chain

IV. Conclusion and Implication

This study conducted literature review on selected databases namely *ACM Digital Library, Emerald Insight, IEEE Explore, Inder Science Publisher, Elsevier, Springer.*

By doing the selection in accordance with the given keyword, then obtained as many as 24 relevant articles. From the articles it was found that, (i) trigger factors: Integrated system supply chain, Securing the supply chain, IT Support, Decision Support System, Service quality, Critical Success Factors; (ii) constraints : A cyber attack on the supply chain network, Manufacturing, storage or distribution problems, Operational, economic, environmental and social factors, Restrictive government regulations, Costs and logistics performance, cost of raw materials, Post-harvest waste, Global/digital markets, product life cycles, consumer demand, Logistics strategy, Global competitiveness, Internationalization of markets and climate change.

The results of this research provide implications on theoretical implication and practical implications. For theoretical implication, it can be a theory in research as a reference for implementing e-scm in industrial businesses. For practical implications, can provide recommendations for decision makers to make improvements in the e-supply chain processes.

V. Limitation and Future Research

The results of this research are still far from perfect, because the trigger factors and constraints on supply chain processes is still very limited. This limitation is caused because the data source used is still very limited. So it is deemed necessary to conduct further research after this research. The results of this study will serve as input for the next research plan. The research related to supply chain process is interesting is the digital supply chain, while how the supply chain process can be described with the concept of gamification approach. So the author will plan the next research is how to do the process of e-SCM based on Gamification.

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