SUPPLY CHAIN INTEGRATION IN SMALL MEDIUM ENTERPRISES: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT
Nowadays, Supply Chain Integration is getting known as an element in supply chain management that can achieve the intentions of supply chain. Supply chain management application in Small Medium Enterprises is rarely understood or even never used as an important aspect in running a business. There are only a few researchers who did a research on Supply Chain Integration in SMEs, therefore initiating a research on this aspect has its own challenges. This was caused by many gaps that appear within the research as the dimensions of the research are not suitable with the business criterias. For this article researchers realized the need to perform literature reviews to perceive the development and new discoveries that appeared in earlier researches. Systematic literature review is used as the method of this research so that the review can be explained systematically. Based on the discoveries from this literature review, there are methods or framework that can be used by researchers as well as practitioner to understand the application of Supply Chain Integration. Moreover, the existence of Supply Chain Integration within a business may increase performance, efficiency, customer value added, or even competitive advantages.

KEY WORDS
Supply chain, integration, SMEs, systematic literature review, business.

Small Medium Enterprise (SMEs) practitioners often have to encounter the impact of uncertainty that emerge from their business environment. Existence of the uncertainty within the business environment may cause accumulation in inventory or even loss (Xu et al., 2010). This certainly will lead to bad consequences when the business fail to manage the accumulated inventory and unable to distribute it to perform production process. This may even lead to degression of the business’ competitive advantage.

SMEs may overcome this phenomenon in a better way if they are able to get resolutions for the occurring environmental uncertainty issue. Performing integration for stakeholders may help the business. By doing integration, SMEs may get informations on high quality materials at lower price, or even able to predict number of sales for every month with information on customer database. This is the matter that often looked by SMEs in order to sustain from the uncertainty of the business environment and the high rate of competition.

Furthermore, a business’ operating cost also act as an affecting aspect in setting the final price. This can be done by applying supply chain within a business. Supply chain may help increase efficiency by intensifying the connection between the business and stakeholders (Ballou, 2004).

This can be done by performing integration within supply chain which can increase stakeholder’s collaboration to the business starting from suppliers to consumers. Leuschner et al. (2013) explained that supply chain integration’s ranges which can be integrated are consumers, suppliers, internal and external. Presence of integration within supply chain will certainly help SMEs to increase their competitive advantages, not only from the quality aspect, but the connection with the stakeholders can also increase sustainable loyalty and decrease environmental uncertainty which often encountered by SMEs.

In this case, Supply Chain Integration (SCI) is the fundamental aspect for completing supply chain management (SCM) (Forker et al., 2004). SCM in a business is certainly has a role in connecting the flow from upstream to downstream. The connection started from suppliers, consumers, human resources, and all the informations inside the business.
However, this concept mostly applied on larger scale businesses. In SMEs scale, the small scope of business becomes its own challenges for applying this concept. Most SMEs practitioners don’t comprehend this concept; therefore utilizing SCM is rarely done in SMEs, including maintaining connections with suppliers or consumers.

In the explanation by Committee on Supply Chain Integration by The National Research Council (Commision on Engineering and Technical System, 2000) which published a book titled Surviving Chain Integration: Strategies for Small Manufacturers, mentioned that SMEs need to be aware of their own circumstances to find if there is any gap that occurred in achieving supply chain integration with their own capability, so that SMEs can systematically know what they have to do. In this statement, SMEs need to comprehend that SCI is an important aspect in running their business. This caused by nothing else but the business’ objectives which are cost efficiency, quality, and loyalty.

Many researchers have conducted some researches about Supply Chain Integration to deepened the aspects that may affect the course of a business in order to integrate all supply chain. Researches on Supply Chain Integration has been quite challenging for the researchers because most SMEs practitioners have no insight on the concept of supply chain. SCI research focusing on larger corporation is more common than SMEs (Sastry, 1999).

In this research, researchers will use analytical approach to discover researches which have been done on SCI in SMEs. This analysis is done to figure out how to apply the theory that been used on SCI. Fundamentally, the purpose of this research is to identify SCI in SMEs with systematic literature review, and offer some suggestion or referrals for the future related researches. Systematic literature review method will provide informations which obtained from earlier researches, therefore researchers may give suggestions based on theory and empirical research.

Further, this entire article will discuss on the concept of Supply Chain Integration itself, the explanation on research methodology, and the result of systematic literature review, identifying obtained information and usage suggestions based on theory perspective.

**LITERATURE REVIEW**

Basically, supply chain management has a concept wherein supply chain process, production and information flow need to be integrated. This also discussed in the part about the objectives of supply chain management to coordinate every network in supply chain. Narasimhan & Jarayan (1998) explained that supply chain integration is defined as an expansion from every activity of supply chain member, supplier and customer to be simultaneously integrated.

Commission on Engineering and Technical System (2000) defined supply chain integration as a consumers and suppliers associations which use management techniques as well as optimizing performance. This shows that supply chain integration is done to increase performance and in executing it cooperation between all of the network within supply chain is needed.

The explanation on the dimensions of supply chain integration previously divided in two dimensions, internal and external integration, this explained by Narasimhan & Kim (2002) and Zailani & Rajagopal (2005). Based on newest research, there are three dimensions on supply chain integration explained by Flynn et al. (2010) and Wong et al. (2011) which are internal integration, supplier integration, and customer integration. This research will analyze three dimensions of supply chain integration.

Internal integration, as explained by Cespedes (1996), is a collaborative system of functions inside manufacture to achieve customer satisfaction. Therefore, in internal integration, an effort to collaborate in production process will achieve customer satisfaction. Kahn & Mentzer (1996) and Wong et al. (2007) explained that internal integration is a collaboration of all the organizational function by breaking all the boundaries. The presence of internal integration may cause the whole organization work together without having to
categorizing each and every task of the business function. Therefore, the information flow may spread faster without any boundaries between each function.

Customer integration explained by Bowersox et al. (2000) and Stank et al. (2001) which mentioned that by passing external integration, interorganization coordination in supply chain activities for developing main competence may appear. Fisher et al. (1994) added that to achieve customer integration, collaboration and information sharing between the company and customer will be needed in order for supply chain visibility to be better. This explanation defines that the presence of customer integration may allow company to discover customer’s demand and needs. Therefore, it will be easier for the company to specify the strategy for the next target market. Swing et al. (2007) explained that applying customer integration is done to understand market expectation and the company will be able to react quickly and accurately. If the company is able to implement customer integration better, the business will develop more because it already has the ability to adapt to market’s demand.

Supplier integration explained by Lai et al. (2010 and Ragatz et al. (2002). They mentioned that by passing external integration, collaboration between manufacturer and supplier within all the production activity is needed. This is required in order to perform its production; the company will not be obstructed by the lack of materials or by the incompatibility of the materials or even can be more efficient to perform production. External integration as well as customer and supplier integration is focusing in building good connection toward customers and suppliers.

METHODS OF RESEARCH

This research will performed using systematic literature review. This method will help to identify literature reviews. Systematic literature review was adopted from Transfield et al. (2003) which in the determination on inclusion and exclusion criteria in this research will not match with the recommendation. This methodology will help, researcher to find a comprehensive coverage literature. There are five phases in this approach by Trandfield et al. (2003), which is planning, searching, screening, extraction and synthesis, including reporting.

Planning. In this phase, the authors tried to define the review question. The Review question within this research is “How is the application of supply chain integration in SMEs?”. The answer of this question will facilitate content and range of related theory and practice. The next step is to perform identification of database research and search string.

Searching. The search for articles related to the research question is performed through Scopus. Articles selection was based on the article that gives good presentation on supply chain integration, empirical research, and all research was done on SMEs. Keywords that are used in searching are “supply chain integration” and “SMEs”. Researcher using those keywords to answer the review question.

Screening. The result of the search strings of this research were showed 43 articles listed with abstract. Researchers reviewed this search results using the research question i.e. supply chain integration in SMEs, of course towards inclusion as well as exclusion criteria which have been determined to simplify the article reviews from the search results. Inclusions criteria within this research are:

- Articles in english language;
- No duplication;
- Abstract contained explanation that matched the research question;
- Articles show empirical research method.

Whereas, exclusion criteria within this research are:
- Articles not in english language;
- Not in accordance to research question;
- Have duplications.
Extraction. Based on mentioned criteria, researchers found 7 relevant articles. This shows that research on this aspect is still rarely done. Subsequently, structural dissection are done to these 7 articles to get deeper reviews by using Excel as database of inclusion articles. Excel database is beneficial for structural dissection and reviews towards the articles using column section in Excel database (Trandfield et al., 2003). On this database, there are covering aspects which in each articles will be performed grouping based on public informations in a publication. These public informations are titles, writers, publishers, and year of publication. On this information, researchers may discover in what year research in this topic started to be done and in what year this research becomes substantial. Further,
main elements in this research such as purpose of the research, definition of the research, keywords, theory used within the research, aspects, and analyzed unit will be performed. The analysis unit act as focal point of this research, therefore the focus of this research is no other than SMEs.

RESULTS OF STUDY

In this section, the discoveries from systematic literature review will be explained following the performed identification based on group criteria within Excel database.

Classification based on Year and Publication. In this section, researchers will discover the amount of research has been done each year and which publication that published researches which are suitable to the research question.

![Figure 2 – Years of Articles Publication](image)

Based on the existence of research in every year, researchers discovered that research on supply chain integration and the SMEs has performed since 2001. This shows that there are a lot of researchers who has realized the need to apply supply chain integration in SMEs. From the discovered 7 articles, researchers found that there is 1 published article in each year of 2001, 2005, 2007, 2011 and 2016. While in 2014 there are 3 published articles. This indicates that 2014 has the most published articles. Moreover, the publishers of these articles are known as Production Planning Control, International Journal of Production Research, International Journal of Supply Chain Management, International Journal of Business Science and Applied Management, The 11th World Multi Conference on Systematics, Cybernetics and Informatics, Jointly with the 13th International Conference on Information Systems Analysis and Synthesis, ISAS 2017, Integrated Supply Chain Management, dan Springer Science Business-Media Dordrecht. On the published articles from Production Planning Control, researchers discovered that there are 2 articles that suit the research question.

Classification Based on Theme. Based on performed systematic literature review, researchers discovered 2 themes in the research. First, is the application of SCI in SMEs. Second, is the influence of SCI application in SMEs. The articles using the first theme explained how SCI can be applied on field, while the articles using the second theme are explaining to discover the application of SCI in SMEs.

The application of SCI in SMEs. There are 3 discovered articles included in this first theme. The article from Palomero & Chalmeta (2012) by title A guide for Supply Chain Integration in SMEs explained that within the application of SCI, mainly in SMEs, there are a substantial amount of methods that are incompatible to be performed. This may lead researchers in the research to discover which methods can be the most compatible with the application of SCI in SMEs. Palomero & Chalmeta (2012) performed the research by using case study method toward 30 SMEs. The use of case study method may help researchers to
surpass challenges and gaps that exist within the attempt to discover the proper methods in the achievement of applying SCI in SMEs. For the researchers of this article, this research needed to be done since one of the issues on SCI application is when the adopted methodologies are incompatible with the characteristic of SMEs which can provide some guides for SCI application to decrease complexity levels in it (Humphreys et al., 2001).

Based on known theories, there are some methodologies that can be used in SCM such as Supply Chain Operation Refference (SCOR) model, Analytic Hierarchy Process (AHP), and Key Performance Indicators (KPIs). However, to the researchers, these methodologies are incompatible with the characteristic of SMEs themselves. In this research, researchers are using SCI-IRIS methodology. SCI-IRIS or Integration and Re-engineering is a methodology formulated by IRIS group in order to perform research towards SCI in SMEs in 2005 (Palomero & Chalmeta, 2012). SCI-IRIS method performed 9 phases in the research which are: SCI planning, analysis of the business, analysis of the supply chain, designing the balance scorecard of the supply chain, process design, organization and management of human resources, construction of the information system, implementation and continuous improvement (Palomero & Chalmeta, 2012).

The research performed by Palomero & Chalmeta (2012) discovered that using SCI-IRIS method; the discoveries that can be useful for SMEs management are occurring. This gives solution for the organization’s classified issues during integrarion process. Moreover, one of the research findings shows that KPI can be used since it might be useful to define the responsibility areas that have to be done by SMEs. In this article, researchers could find out that there are very compatible methodologies to discover SCI application in SMEs. According to Palomero & Chalmeta (2012), these applied methodologies can be developed with more focus towards the procedures on solving the emerging and complicating issues faced by SMEs to gain access towards SCI application.

The existence of research result which opens the insight that there are approaches that may simplify the SMEs application of SCI will be very helpful to increase the relationship with the stakeholder. Various methods that have been used earlier can only effective if applied in large scale corporations. With these new findings, SMEs can also use these methods by eliminating gaps. These gaps are commonly occurring when the method used is incompatible with the business criteria.

Different from the research performed by Palomero & Chalmeta (2012), Campbell & Sankaran (2007) tend to explain the inductive framework to achieve SCI since there are participations from suppliers or resellers in SMEs that also involved in supply chain. The title of Campbell & Sankaran (2007) research is An Inductive Framework for Enhancing Supply Chain Integration. The existence of this framework intends for SMEs supplier or reseller to be able to applied SCI. Moreover, SMEs may also adapt to fit their business partners according to their business situation. This research done by Campbell & Sankaran (2007) was performed with in-depth case study. This method performed to understand current situation, one of the procedure is by doing in-depth interview to gain more detail comprehension from current situation. In this research, Campbell & Sankaran (2007) saw that development of the framework can be done by using a framework known as SCIEF (SCI Enhance Framework). Utilization of SCIEF in this research is performed because the framework deals with every integration’ aspects in more enhanced way without having to use liker type or empirical questionnaire that usually used in preceding frameworks. In this article, researchers are able to announce that comprehending SCI application in SMEs can be done by using SCIEF in order to gain further informations.

The Influence of SCI application in SMEs. This theme explained that the existence of particular variable may increase integration on supply chain. SCI application may even increase a variable on a business. One of the researches performed under this theme is performed by Caskey et al. (2001) by title Enabling SMEs to take full advantage of e-business. In this research, Caske et al. (2001) discovered that e-business has developed enough to influence the relationship with business partners on supply chain. This research is also explain in details regarding the challenges faced by SMEs when going to deal with e-business current development to achieve supply chain integration. One of the examples can
be seen in the rapid growth of e-commerce and the support of internet that will be examined on its influence.

Caskey et al. (2001) performed this research by case study method using LOGSME as model for the analysis which will be done. The use of LOGSME in this research itself is intended to give solutions regarding the development of technology which lead to the existence of e-business in SMEs. The result of this research shows that the existence of e-business may increase supply chain integration which caused by cost reduction and the increase of reliability. However, this needs intense coordination between the partners and SMEs. For example, intense coordination can be done by doing periodic information exchange with the business partners i.e. manufacturers, distributors, and retailers (Caskey et al., 2001). Moreover, this research discovered that the food industry currently has the biggest challenges caused by the development of e-business. This research also discovered that currently retailers have begun to comprehend the power of the combination of e-business and supply chain. Furthermore, this research claimed that SMEs are unable to run their own e-business; therefore SMEs will need collaboration from every stakeholder in supply chain.

Other researchers that performed similar research are investigating the influence of supply chain integration on operational performance of a business. This research is performed by Annan et al. (2016) by title Antecedents and Consequences of Supply Chain Integration: Empirical Evidence from a Developing Economy. This research performed by using survey method and analyzed using Confirmatory Factor Analysis (CFA). Result of this research referred that the influence of SCI application will shows in the increasing on customer value and the operational efficiency of the business. Through the result of this research, Annan et al. (2016) pointed that better application of SCI within a business, particularly SMEs, will minimized operational cost and maximizing the formed value towards the customers. This discovery is relevant with the explanation from Danese & Romano (2011) who claimed that efficiency may occur when the company is able to performed inbound and outbound integration on its own supply chain.

There is other research which also analyzed the influence of SCI towards business performance of SMEs. This research is performed by Ozdemir et al. (2014), by title Determining Critical Success Factors Related to the Effect of Supply Chain Integration and Competition Capabilities on Business Performance. This research not only considering SCI on one side, the researchers are also considering competition capabilities (CC) aspect in order to figure out the influence towards business performance. This research is performed using survey method and analyzed using Structural Equation Model (SEM). Research from Ozdemir et al. (2014) is inspired by the competition occurring not only between businesses but also between supply chains. The enhancement of competition capabilities and integration of every supply chain member becoming more important aspects in achieving business excellence (Ozdemir & Aslan, 2011). This research discovered that the application of SCI and CC in a business may enhance business performance. This finding indicates that application of SCI within a business may increase business performance. This research even discovered two critical factors that may influenced business performance, which are reliability and lowest price.

Furthermore, other research which discussed the influence of SCI towards performance is Vivek et al. (2011) by title Supplier partnerships, information quality, supply chain flexibility, supply chain integration dan operational performance: the Indian story. This research performed with survey method and analyzed using Confirmatory Factor Analysis (CFA). Research performed by Vivek et al. (2011) is inspired by the substantial numbers of researchers who needed deep understanding regarding the critical issues of supply chain. Deep comprehension towards supply chain enables the company to achieve efficiency. Result of the research itself, which involving several elements of supply chain, shows on the supply chain flexibility element that in order to enhance the quality of informations within the supply chain, strong partnership between the company and suppliers need to be built. This shows that the strength of partnership can be built when supply chain integration applied on the business. This also mentioned in the result of a research performed by Zailani and Rajagopal (2005) which shows that a company’s competitive advantage can be achieved
When the company is able to strengthen the relationship with the suppliers within its internal process, this occurs because SCI is holding the most important role in the business. The application of SCI within a business will gives its own advantages as the internal and external aspects of the business can be integrated well.

Based on overall research under this theme, the influence of SCI towards business performance can be comprehended. The application of SCI may even disclose the insight for SMEs as they can discover the advantages of applying SCI. For example, some advantages are cost efficiency, adding value towards customer, or even competitive advantage. Even though the performed researches have their own limitations, they can help build new perspectives for future research as well as SMEs practitioners.

Classification based on Research Methods. Based on mentioned researches, the first theme may conclude as using qualitative method. This method performed by the researchers to gain deep comprehension towards SMEs criterias on applying SCI. Moreover, researches under the first theme are using case study method towards SMEs. Contrasting with the first theme, the majority of researches under the second theme are done using quantitative methods by performing surveys. Surveys are performed to collect a substantial amount of data which allows researchers to be aware of SMEs current behavior while applying SCI which may influence other variable of the business scope. The overall researches are performed with empirical approaches.

CONCLUSION

This research is performed using systematic literature review with the intention of answering the research question “How is the application of supply chain integration in SMEs?”. Corresponding articles that matched the inclusion criterias are collected and assured as compatible to answer the research question. There are 7 articles collected after initiating search on Scopus. This research discovers that there are a substantial amount of researchers that already performed some research to comprehend the application of SCI in SMEs since 2001, and nowadays the researches are continue to grow. Various aspects of supply chain had also been researched.

There are two types of research methods that found during the review on this articles, which are case study and survey. This shows that the overall researches are empirical research, therefore researchers may directly comprehend the current situation of SMEs. In this research there are discoveries that may facilitate future researchers and practitioners.

First, for futur empirical researches, the application of SCI in SMEs may conduct by using SCI-IRIS method. SCI IRIS method gives detail phases that are need to be done. Palomero & Chalmeta (2012) discovered that the usage of SCI-IRIS method can solve deepest internal issues of SMEs. Future researchers may use this method in order to solve emerging issues of SMEs in the relation towards the stakeholders of their supply chain. For practitioners, the usage of SCI-IRIS method may provide guidance for SMEs.

Moreover, the inductive framework mentioned by Campbell & Sankaran (2007) gas given a framework which compatible with the criteria of SMEs. This will facilitate future researchers in performing researches to comprehend more on the application of SCI. Furthermore, earlier research discoveries may be updated to adjust with current situation of SMEs as the framework may be more suitable to new issues and situation faced by SMEs.

Second, based on the discoveries, there are researchers who already performed researches on the influence of SCI towards SMEs performance. There are several elements in supply chain and other variables that are used to comprehend the influence of SCI application towards SMEs performance. Overall, researchers have assumed the application of SCI may increase SMEs performance. However, those researches still having some limitations which are the range of researches that only reach certain countries or the researches are not specifying towards SMEs or their types of businesses. For future researchers, performing researches on the influence of SCI towards business performance may be done with more specific business criteria or expanded to wider range of research.
REFERENCES