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Supply Chain Collaboration Management Framework for Small-Medium Enterprise

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Abstract

Even though it has an important role for the economy, SMEs are facing various obstacles that can potentially weaken its competitiveness. The use of information technology in supply chain management has become an opportunity for SMEs to develop their business and increasing their competitiveness. In order to improve productivity, collaboration is one of opportunities that can be carried out by SMEs.

This research is carried out in Katapang Sub-district in Bandung Regency. The data relating supply chain in practices is obtained through observation and in-depth interview with small enterprises. The method of Hevner information systems is applied to construct the framework.

Based on the study on the supply chain practices in Katapang Sub-district, the Supply Chain Collaboration Management (SC2M)-SME is proposed as a framework for technology planning and management information systems of SMEs' supply chain collaboration. The framework consists of entities, collaboration components, SRM | CRM building blocks, and level of maturity. It provides a guide to the implementation of technology in boosting the competitiveness of SMEs and overcome its limitations.

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Keywords: collaboration; Framework; SME; supply chain;

1. Introduction

Small and Medium Scale Enterprises (SMEs) have a major contribution to the Indonesian economy nowadays. Based on data from the Central Bureau of Statistics from 1997 to 2012, the growth rate of SMEs is increasing both in number of SMEs and labor employment, an average of about 97.25% of the entire labor force [1]. However, in association with other indicators, such as share and total exports, the level of education of workers and employers and spending on R & D, SMEs in Indonesia have lower competitiveness than those of South East Asia countries [2].

The development of information technology has become an opportunity for SMEs to develop the business and increase its competitiveness through increasing productivity and speed up to respond on demand and expanding market [3]. The information technology can be applied in supply chain management. The competitiveness that has been tested on the contribution to GDP can be strengthened with the relationships model in the supply chain. However, comparing to large companies, they have some limitations like the access to financial resources, the less capability to improve supply chain relationships, the difficulties on reducing material costs and increasing production. SMEs' competitiveness can be improved by supporting them to access to markets, sources of raw materials, technology and information, and management easily. Competitive SME means that they have chance to be a reliable and competitive business [4]. To improve productivity, collaboration is an opportunity that can be carried out by SMEs. Collaboration allows each SME works together and at the same time competing in the market to attract the attention of customers and market share [5].

The objective of this paper is to propose the framework of supply chain management to be implemented in SMEs. The use of information technology is the main issue in developing the framework. It is generally acknowledged that information technology is critical in improving the competitiveness and overcoming the limitations of SMEs. (comment 2) Adopting Hevner's information system methods, the framework is developed based on the data obtained through observation and in-depth interview with small enterprises in Katapang Sub-district in Bandung Regency.

The stages of framework development are [6]:

- Construction stage. The framework is constructed based on the theoretical concepts proposed by the National Network for Collaboration. The construction involves the concept of supply chain management and the characters of the observed SMEs. The findings at this stage were to identify the elements that will be used as the basis of supply chain collaboration management framework of SMEs.
- Framework development stage. In this stage, the map of supply chain is developed referring to the National Network for Collaboration. The framework is mapped based on the elements and characters of SMEs that are found in the construction stage. The result of this stage is the ultimate supply chain collaboration management framework of SMEs that can be used for planning the use of information technology within an SME.
- Justify stages. The implementation of collaborative supply chain management framework of SME is evaluated in this stage in order to justify the fitness of the framework.

2. Small and Medium Enterprises

Katapang is a Sub-district in Bandung Regency that has a business center for SMEs. There are 86 business units, consisting of SMEs in services for a total of 28 units and SMEs manufacturing/craft for a total of 58 units. There are two main small businesses; garment and birdhouse. There are two types of manufacturing in the garment industry, job-order and full manufacturing. In the garment industry, SMEs have variety of roles in the supply chain system. They have conducted processes of innovation, collaboration, coordination, and efficiency efforts even though in a very limited and non-standard patterns.

The knowledge of the SMEs has become an important factor for improving innovation in competitive products. There are three areas of SME strategy in managing knowledge, i.e. [7]: 1) Interpreting organization information concerning the environment to get the sense of what happened and what the company are; 2) Creating new knowledge by converting and combining expertise and knowledge (know-how) of its members in order to learn and to innovate; 3) Processing and analyzing information to choose and to commit perform activities in accordance with his actions.

3. Entities and Collaboration on SRM and CRM SMEs

Due to the limitations of SMEs in knowledge, education, capital, and information, local government and the association should foster the creation of collaboration of SMEs. Knowledge is critical in the collaboration. Knowledge collaboration is the substance of collaboration. The position of knowledge in supply chain collaboration is figured in the following picture [12] (See Fig. 1): (comment 3)

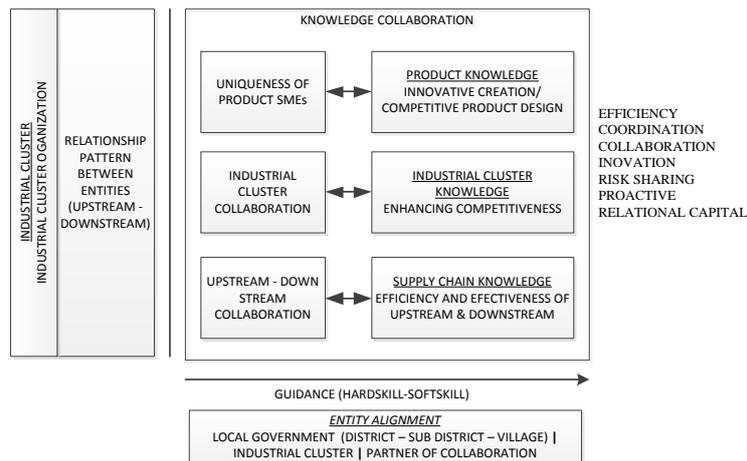


Fig. 1. Components of Collaboration SMEs [12]

- Collaboration in industrial clusters: the collaboration exists to create value in obtaining key raw material in industrial cluster.
- Upstream-downstream collaboration: Collaboration for both ease of access to key raw materials related to the management of the industrial clusters and collaboration of key raw materials and to support to the creation of value for product excellence.
- Collaborative knowledge: this collaboration exists to create value-added for every SME in improving both hard skills and soft skills abilities.

4. Typology of Information Systems and Collaboration Maturity Level

SMEs as a business organization have limited funds and access to better resources. So that, in the application of technology and information systems to the SME's supply chain collaboration, should be adapted the maturity level of collaboration which is owned by the industry cluster facilitators that embodies the collaboration between the entities associated with the SME supply chain collaboration.

Technology and information systems in the third collaboration adapted to the level of maturity (maturity level) for every industrial clusters in using information technology, so that the typology of information systems can be implemented by adopting typology inter-organizational Information Systems (Kumar and van Dissel,1996) [9], so then SME's supply chain management collaboration typology can be divided into three types, i.e.: (comment 3)

- The first type, resource sharing general information system/information technology, including database, network communications and general applications as well as application of standard transaction in an industrial cluster to communicate indirectly with upstream and downstream. The exchange of knowledge between SME owners in the industrial cluster forum.
- The second type, the relationship between industrial clusters with upstream and downstream along the value chain in the supply chain. The exchange of information and knowledge among owners of SMEs in industrial clusters and entities in the upstream and downstream are already computerized, so as to reduce the level of uncertainty.
- The third type, operating system network between industrial cluster and upstream and downstream, reciprocal interdependence, including communication technology, the repository of knowledge and technologies that support collaborative work.

Based on enterprise collaboration maturity model (Enterprises Collaboration Maturity Model/ECMM) proposed by Alonso *et. al.*, maturity level is defined in four levels, i.e. [10]: Performed, Managed, Standardized and Innovating Based on the mapping of typology and information systems maturity model as mentioned above, then the maturity level typology performed using a type of unity; maturity levels are managed using the second type; and to standardized level and Innovating using a third type.

5. Collaboration in terms of SRM and CRM

CRM and SRM which is running by SME is different from ones comparing to established companies on implementing and managing information technology. Mostly SMEs are having limited access to funding agencies, tools, technology and products distribution. Therefore, they need the government to facilitate them on providing technology and information system.

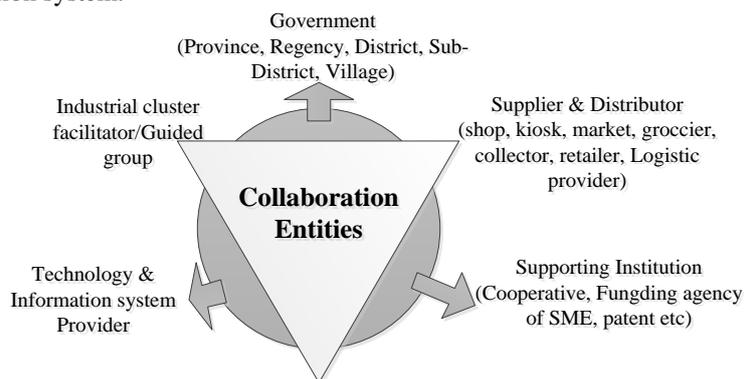


Fig. 2. Collaboration Entities [12]

Supporting entities (government, supporting institutions, technology and information system providers) becoming the fundamentals on collaboration among entities which supporting SCM copetitiveness growth. Meanwhile, the facilitators of industrial clusters/guided groups, raw material suppliers as well as product distibrutors, and information system and SME are the major entities (comment 4) (See Fig. 2).

The CRM process integrates the internal fuctions and external network focusing on creating costumer's experiance value. Based on Zablah's process model [13] considering knowledge management is one of key success factor in implementing CRM. Information infrastructures, i.e.: *Data warehousing*, *data mining* and *data mart* may help for giving information about constumer and processing on decision making process as well as data analyzing (Fig. 3).

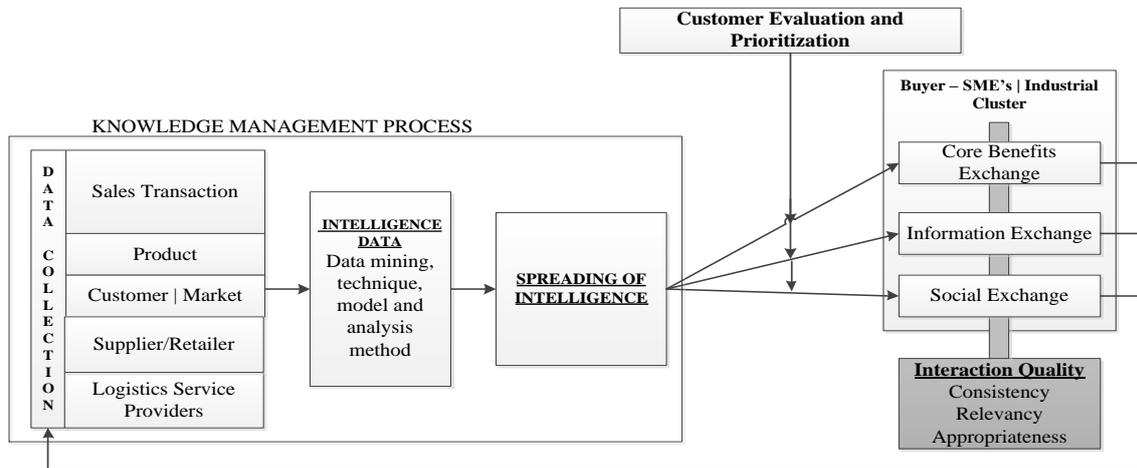


Fig 3. SME's CRM Process

CRM ultimately intended for market intelligence is done through the execution of knowledge management process. Its results are used to maximize the portfolio of relationships with customers through the company's ability to sort, prioritization, and productive interaction with profitable customers.

SRM business processes associated with all tasks and activities of the supply of goods such as ordering, procurement, payment processing, knowledge management and quality management of supplier relationships supplier. SRM business success becomes important things, like reducing material costs, shorten time-to-market, reduce inventory costs, shorten lead times and its impact on overall cost reduction, risk reduction and performance improvement company's business. Integration is happening makes SRM process requires trust and commitment among companies and suppliers. (comment 5)

In this study, SRM adopted three approaches of Mettler and Rohner (2009) and the process Ruegg-Sturm (48) in Mettler & Rohner (2009), i.e. [14]:

- Cooperation (level business relationship): to prepare, build, engage and control of supplier relations of cooperation.
 - Coordination (*process level*): business processes, supporting processes and management processes. At this level there are things that are needed i.e.: *Business processes, support processes, and Management Processes*.
- Communication (level information system): between companies and suppliers to improve the efficiency and effectiveness of the cooperation and improvement of the quality, safety, and innovation (both analytic, collaboration and operational).
 - Analytical SRM leads to store, analyze and apply knowledge of the supplier and personnel to manage supplier relationships.
 - Collaborative SRM aims to improve the quality of supplier collaboration to result in improved performance supplier and trustworthy supplier.
 - Operational SRM (*dark gray rounded squares*), usually refers to the E-Procurement, which includes all the necessary tools for ordering and conclusion of contracts as payment.

In addition to the involvement of entities in the upstream and downstream as well as facilitators and supporters were related to management of Supplier Relationship Management (SRM) and Customer Relationship Management (CRM) collaboration in SMEs. Other things to consider are the components that exist in the SRM and CRM, which is represented in the form of building blocks of SRM and CRM (See Fig. 4).

Vision of SRM CRM
Value of SRM CRM Service
Business Process Engineering
SRM CRM Information (Data, Operational, Collaboration, Analytic, Knowledge management)
SRM CRM Technology (Application, Architecture, Infrastructure)

Fig. 4. Building Block of SRM and CRM

- Vision of SRM | CRM: Successful SRM and CRM are on the clarity of vision, is the cornerstone to motivate entities, generating customer loyalty and gain a greater market share as well as working with the suppliers of key raw materials and auxiliary equally beneficial.

- Value of SRM | CRM Services: define the added value of every SRM and CRM services that can be tailored to the needs and maturity level of collaboration SRM and CRM.
- Business Process Engineering: define every process in the SME CRM and SRM itself or related to collaboration with other entities.
- SRM | CRM information: Having the right information at the right time is fundamental to the success of SRM and CRM strategy. Information may include operational information, collaboration, analytical as well as those in the form of knowledge management.
- SRM | CRM technology: SRM and CRM technology is an important enabler for modern business strategy. In this phase defines the application SRM and CRM collaboration tailored to the needs of SMEs in the industrial cluster, its architecture up to the necessary infrastructure.

Based on the discussion above, in facilitating and developing SMEs, the collaboration involving all entities that can support the SMEs to run and to compete (collaboration entities). Collaboration becomes a basic component of the role of each entity in the supply chain collaboration SMEs. In building technology and information systems, it needs to consider the building blocks of SRM and CRM. In the application of technology and information systems in supply chain collaboration SMEs need to consider the maturity level of collaboration. Based on these four points, then the model of collaboration SRM and CRM SMEs are as follows (See Fig. 5):

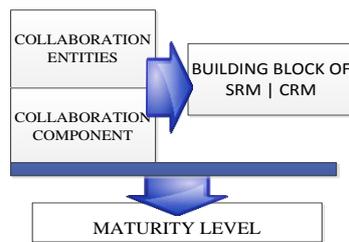


Fig. 5. Collaboration Model SRM and CRM SMEs

Collaboration entities and components will be able to form the building blocks of SRM | CRM to become the basis of the application of technology and information systems in accordance with the SME collaboration maturity level.

6. Development Collaborative Supply Chain Management Framework SMEs (SC2M-SME)

Concerning National Network for Collaboration that collaboration is a process of participation strategies among individuals, groups and organizations to work together, in order to obtain results/improvements quickly [11]. Framework collaboration include:

- *Grounding*, basis of collaboration is the diversity of the human form, groups, organizations and communities who share a desire for collaboration.
- *Core Foundation*, focus on the creation of a common goal to bring people together.
- *Outcomes*, the expected conditions of the community.
- *Contextual and process factors*, focus on the "how" collaboration and coverage skills and specific components that are essential to create an effective working relationship.

SME's Collaborative Supply Chain Management (Supply Chain Collaboration Management of Small Medium Enterprise/SC2M-SME) that will be formed is the adoption of a framework collaboration of the National Network for Collaboration. Thus, based on a collaboration framework NNC, then all elements and components of the SME's supply chain collaboration were mapped. The artifacts forming the framework of collaboration: Grounding; Core Foundation; Contextual factors and outcome.

Instructions for use (See Fig. 6):

- Identify the organization and the container cluster collaboration with determining the entities involved in the management of the SME's supply chain collaboration both main and supporting entity and the type of collaboration.
- Define the vision and mission of collaboration and the values obtained in the presence of such collaboration.
- Define outcomes to be achieved in the collaboration.
- Identify the maturity level with ECMM (If collaboration is already running in a container organization), if the collaboration has not been established, the maturity level is considered the level performed.

- Implement building block SRM | CRM adjust to the systems and technologies that will be built as well as stacking rules and policies to support the collaboration.

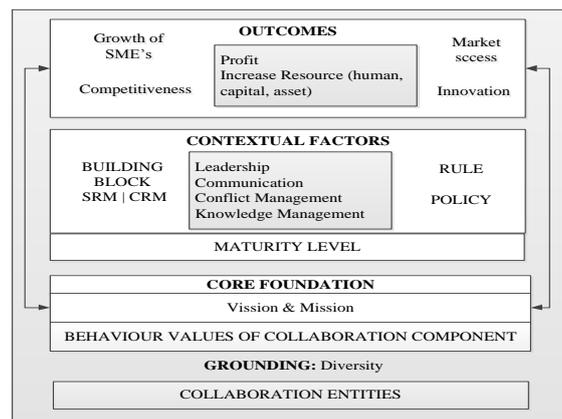


Fig. 6. Management Framework Collaborative supply chain SMEs

7. Framework Evaluation

Framework evaluation needs to be performed to assure that the framework is proper and runs well for the benefits of SMEs. In order to get the best results of the framework implementation, the planner of the supply chain collaboration management system for SMEs must have good knowledge in planning the development of the system, both in terms of technology including the social impacts and risks that may occur. (comment 6) They also must have good understanding of governance rules that may affect the passage of collaborative supply chain management system. In addition, the translation of the framework becomes more detail and can be described more easily by the system developer.

8. Conclusion

The framework of SC2M SME consists of entities collaboration, collaboration components, the building blocks of SRM | CRM and level of maturity. The framework is proposed as a guide to the implementation of technology in the area of supply chain management in boosting the competitiveness of SME. The evaluation needs to be performed to assure the fitness of the framework. Meanwhile, mastering the knowledge of planning the development and governance rules is a must for the planner in getting the best result of the framework.

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