

CONCEPTUAL MODEL OF SUPPLY CHAIN MANAGEMENT FOR HIGHER EDUCATION

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ABSTRACT

The study investigates implementation of supply chain management into the higher education system. This study depicts of value chain in the higher education comprising inputs, process and outputs of the higher educational chain. Higher education system involves information and value sharing for all chain process that can be designed into strategic and operational objectives of the institution in every level. The performance of supply chain depends on value sharing coordination between stakeholders which start from secondary school as the input of higher education system. Main goals of the supply chain management model is to improve the output of higher education. The output are the benefit implemented research for industries and qualified graduates.

Key words: supply chain management, higher education, model.

1. INTRODUCTION

The objective of supply chain management (SCM) is to integrate the different function of procurement, transformation and distribution for improving the performance of organizations to achieve efficient fulfillment and customer satisfaction. Supply chain management mostly implemented for tangible products firms, along with the growth of service sector this system can be used for intangible products such as finance, insurance, and education.

Higher education is a part of service firm that has different character from manufacturing industries based on its products. Supply chain management for higher education will separate agents into four basic linear supply chain models, such as supplier, service providers, and customer. Universities will be the service provider that accept input from secondary school as the supplier. Society, and universities itself will be the Customers of supply chain models. Outcome of the supply chain network are qualified graduates and applied research for the society. Those model of supply chain framework is a complex system that can be simulate through

System Dynamics to study change in model and verify analytical solution and come out with optimal policies and decision rules that can give benefit for each agents.

1.1. Background

All the problems that arise in relation to the performance of education system, originated from three complex supply chain networks such as supplier, service provider, and customer. There are several problems faced by universities in Indonesia. Supplier of the supply chain network is secondary school. Secondary graduates will be the input of the supply chain network, which has 2 complex problems, such as:

- National Committee for Selection of Entrance into State University (2015) released number the of student graduates from secondary in 2015 is 2,7 million graduates. Successful students that can continue to state University is 245.000 or 8.8 % and those who enrolled in private universities reached 1,1 million or 39 %. Means of all graduate students who can manage to get into the Universities is only 48 percent, while 52 percent will not continue to college. 42% of the students who took the national exam, the results did not meet the standards of National National Education Standards Board or below 55. According to those data, an interest of students to continue their study to University still, need to improve.
- Most of the international literature written in English. The ability of secondary

graduates in using English need to develop. They have difficulty in absorbing many kinds of literature in English, which affect the quality deterioration and idea of doing research. According to Indonesian Statistic Board (2015), the number of secondary schools that reaches high National Examination Integrity Index only 503 schools (only 2% from 24.135 schools). These 503 schools have more English content in their curriculum, but many of other school have less number in using English as their language instruction in school.

Universities as a service provider have to face the threat of competition among universities. from local and overseas. Competition will bring effect on the admission number of student and become stronger after Asean Economy Community (AEC) in 2015. Skilled manpower can compete in AEC, and most of them are university degrees. Indonesian Government have prepared for the AEC and technically good enough shown in the implementation ratios of AEC pillars reaching 89,91% from 107 points of ASEAN assessment. The problem arise from human resources was rated in minimum preparation (Farida Rohmah, 2014). Indonesia became the target market both for Asian universities and other countries outside Asia, such as New Zealand, Australia, Middle East and the United States. That challenge is the basic goals of many University in Indonesia to Compete in the global market.

The universities responsible to produce scholars and develop students who are educated to be accepted by society as a customer. Problem arise after the students finish the process of education, such as:

- The number of unemployed graduates reached 7,56 million or 6,18 % of total 122,4 million workforces (Indonesian Statistics Board, 2015). This situation indicates that the waiting time for graduates to get a job was considered quite a long time. Asian Economy Society started 1 January 2016 will increase the level of competition and Indonesia will become a destination for foreign skilled labor. Most of the skilled

labor are graduates degree. Compared with other ASEAN country, Indonesia only has 4,3% skilled labor from 1000 workforce. ASEAN Productivity Organization released that Philippine reaches 8,3% from 1000 workforce, Malaysia 32,6% and Singapore 34,7% of skilled labor (Gajah Mada University, 2015). Universities in Indonesia must prepare all graduates to compete with skilled labor from other countries.

- The outcome of the higher education process is applicable research. Most of the research held by University for undergraduate degrees just to complete the requirements of undergraduate studies. Only a few research can be applied by institutions or industries. Less performance of research in Indonesia is the limited allocation of funding is only 0.09% of Gross Domestic Product, is very low compared to other middle-income countries such as Malaysia with an investment of 0.6%, Thailand 0.26%, and China 1.47% (Ministry of Research and Higher Education Republic of Indonesia, 2016). Collaboration research between industry and university need to be developed.

Based on those problems faced by all stakeholders, supply chain management simulation is needed for improving performance in each operation, and generate new policies and decision rules for enhancing customer satisfaction. Students as output would have to meet good quality of graduates and their research can be accepted and implement in the society.

All the problems that arise in relation to the performance of education system in Indonesia, originated from insufficient performance of the supply chain network activities. Higher education problems in Indonesia is a complex system. Simulation can be used to describe complex system and System Dynamic can describe causes and effect of the performances system. Collaboration of those tools will be the problem solving of education system in Indonesia.

1.2. Objectives of the Research

The followings are the perceived objectives of the Research:

- To obtain perspective of present condition of higher education system and design the framework of supply chain model for higher education in Indonesia.
- Provide most important variable for integrating supply chain management for higher education in order to create value and achieve benefit for all stakeholders in the value chain model
- Produce conceptual model to implement supply chain management system for higher institution;
- Designing model for higher education system by implementing System approach for increasing optimal strategy that can minimize potential loss of revenue caused by the mentioned low performance system.
- Improving performance of students as customers themselves, in the supply chain network based on the desirable quality of graduates and resulting benefits of their research for society
- Supporting service provider in the supply chain with decision support system software for assessment the performance of the university in strategic, tactical and operational level.

2. METHODOLOGY

In order to provide supporting data of the study and examine the main questions raised, the following methodology will be employed. Participant observation with a group of universities will be carried out. The aim is to collect more qualitative information about the perceived impact, critical point and the cause of delay due to supply chain agent point of view as the users of higher education system in daily activity. There will be an attempt to interview stake holders and experts connected to higher education in Indonesia. Individual interviews by a way of structured questionnaire will also be used to collect information about the alternative solution for developing policy in order to develop improvements in quality graduates

and research application in Indonesia. The solution will be based on the perception of the environment.

Participant in the individual interviews based on Purposive Sampling Methods. In order to gain full picture of recent higher education condition in Indonesia and fulfill compliance data in system Dynamics, a comprehensive analysis of the official statistics will also be undertaken aside from the official data, other sources of statistical data produced by agencies such as Indonesian Statistic Board, Ministry of Research and Higher Education Republic of Indonesia, Ministry of Basic and Middle Education Republic of Indonesia, National Accreditation Board, National Education Standardized Board and Central of Education Assessment. Special attention to information about all variables that have correlation with the performance of higher education in Indonesia will be given due consideration. Quantitative data will largely be gathered through existing database and datasets in the field of higher education system. Datasets publicly available in official Indonesian Statistics Board as well as number of graduates and qualification level in each supply chain networks. The quantitative data would be analyzed using simulation to provide wider picture of the structural characteristics of the higher education system in Indonesia. To complement the analysis, the qualitative investigation derived from interview, observation and case study would offer deeper understanding of the case.

3. SUPPLY CHAIN MANAGEMENT MODEL FOR HIGHER EDUCATION

A supply chain is a network of facilities and distribution options that performs the following functions; the procurement of materials, transformation of these materials into intermediate and finished products; distribution of these finished products to customers. Supply chain management is a strategy through of these different functions can be achieved (Shapiro, 2000).

There an easily identifiable flow of inputs that helps sustain a service provider's capabilities. Some of these inputs are

directly tied to a particular service; others provide the necessary overhead infrastructure. Whatever the purpose, there is clearly an upstream chain that moves supplies toward the service provider. This means supply chain management techniques can be applied to that chain of supply (John M Mc- Keller, 2014). Higher Education is service firms offer “intangible products,” which can adopt supply chain management into their chain network system.

The following proposal is expected to present the model for supply chain management in higher education, which will rely on the ideas and methods developed by O’Brien and Deans (1996), Lau (2007), K.M Sharath Kumar and S.R Shankapal (2010), and Mamun Habib and Chamnong Jungtiranpanich (2008):

- O’Brien and Deans (1996) from La Rochelle Business School France examined the concept of adapting industry models to higher education with specific reference to the idea of educational supply chain. The study was empirical research conducted by University of Strathclyde. A university works in collaboration with schools, further education colleges, its current students, University staff, and employers of its graduates were integrated into decision making process in designing curricula to ensure that the needs of all stakeholders are satisfied.
 - Lau (2007) designed the integrated educational supply chain management, case study City University of Hong Kong. Research suggested the development of two separate supply chains namely “student” supply chain and “research” supply chain.
- Modelling Commodity Supply Chain in Higher Educational Institute showed significant savings in supply chain cost. Research focused on supporting facility for higher education activity. Study will help the procurement managers of Higher Education Institute to manage multi-commodity procurement scientifically and optimally (K.M Sharath Kumar and S.R Shankapal, 2010).
- Research conducted by Mamun Habib and Chamnong Jungtiranpanich (2008)

from Assumption University of Thailand, explored framework of Integrated Educational Supply Chain Management (IESCM) for the Universities which provides two main contribution to the society, including human resource and research contribution. The empirical study depicts a holistic view comprising inputs, the process, and outputs of the educational supply chain. Educational management represent the process component which may be accomplished in level of strategic, planning and operation. The research I believe that neither of the above research work implemented simulation process into the supply chain management model. In addition, the researches continued to focused only on the the framework and identification of possible variables in the complex supply chain network.

The intention of this research is designing supply chain model for higher education and simulate mentioned framework in order to validate the related supply chain and to be able to test different decision alternatives. Supply chain management for higher education is a complex system, and each subsystem variable related to each other. All of the characteristic complexity can be solve by implementing System dynamics simulation. It is hoped that this model design can improve the performance of outcome in higher education in Indonesia.

Outcome of supply chain management in higher education are qualified students and implementation of the research. Students are the products of the supply chain, will start from secondary school as supplier, universities as a process agent and enterprise as the end user of the student considered part of the logistics function.

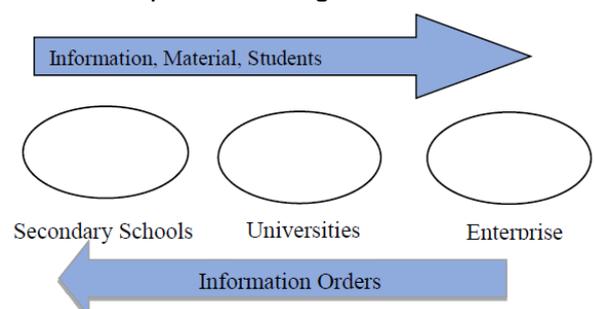


Figure 1. Basic Supply Chain Model

The purpose of chain of supply is to transform and transport whatever is required to meet enterprise needs as a customers. It can be illustrated as a chain along which materials, students, information, and financial resources are moved in a system that creates and delivers a product or service; however, movement along the chain is not all downstream (John M. McKeller. 2014).

Information about customer preferences and firm orders drive the planning activities and the whole process by covering costs

and generating benefits for the upstream providers. A basic linear supply chain diagram in figure 1 represents just the major members included in a larger system.

In addition to having multiple upstream suppliers, each member of the chain also has many customers. This creates a network of interdependent organization and processes in a larger system. Supply chains are often much more complex than a linear diagram implies. Complex supply chain shown in figure 2.

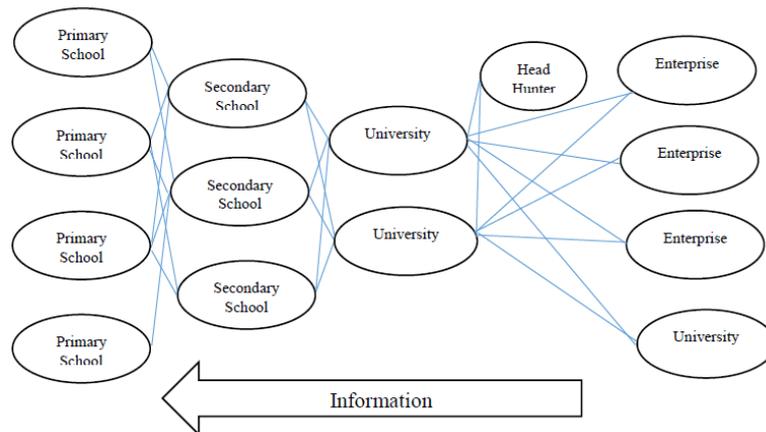


Figure 2. Complex Supply Chain Model

Supply chain management model is an integrated model involves coordination and information sharing for all entire chain process. This research identifies variables of suppliers, service provider and customer.

End of the chain or chain result are qualified graduates and research implementation. Variable that involve in supply chain process shown in figure 3.

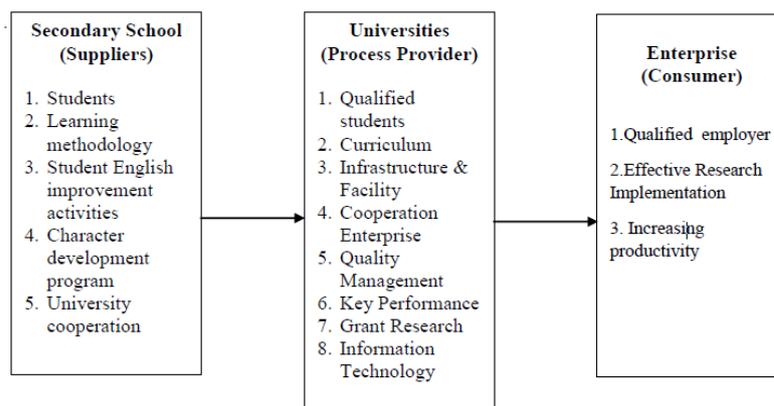


Figure 3. Supply Chain Management Variables

Simulation will use in this research, because there may be a need to determine the priority level of optimization and robustness of strategy without interrupting the real supply chain. Kleijnen (2005)

distinguishes four types of simulation problems for supply chains: validation and verification; sensitivity or the what-if analysis, which provides a list, or screening, of the most important factors in simulation

models of supply chains; optimizing the critical control factor; and robustness, risk, or the uncertainty analysis. Simulation can act as a support for supply chain decision making (strategic, tactical and operational): rapid responses, collaborative planning, forecasting demand, and subcontracting third parties (Campuzano, F. Mula, F. 2011).

4. CONCLUSION

Higher Education must have Quality Assurance System to guide the universities for fulfilling the customer needs. Quality assurance will be the Role of the 'external examiner' and universal and structured means of assessing processes and outcomes of the expanding higher education jurisdictions. QA in response to the fast changing modes of education and new types of providers; working to reduce the burden of QA of institutions, while assuring stakeholders; strengthening global systems of recognition and mobility; and ensuring that QA system develop to match the changing world in which they operate. The influential variable that cause the problem in higher education system in Indonesia is the implementation of rules and regulation without any effective supervision system. Integration of cooperation between secondary school and university.

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