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SCRUTINIZING THE WOOD SUPPLY CHAIN – REPORTING FROM WORK IN PROGRESS

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Abstract: *Today, logistics is more than timber trucks and back haulage percentages. The notion of value chain optimization aim to grasp the full width of logistics; material flow, information flow, monetary flow and business and organizational aspects of a supply chain system. In a recently started research project, the industrial wood supply chains in forestry are being scrutinized, using established supply chain analyzing methods from non-forestry contexts. The aim is to discuss a wood value chain as a value chain among others, and evaluate overall effectiveness of the system as well as interesting areas of system improvement. Work includes analyses of production strategies, inventory strategies, information flows, system boundaries and organization effectiveness. A set of KPIs will make it possible to make a real comparison of different strategies, e.g. costs for special assortments and customized production compared to bulk deliveries. The four year project takes part within the EU project FlexWood.*

1. Introduction

The Swedish forestry has during hundreds of years been developing the industrial wood supply to an undoubtedly functioning wood value chain. Major efforts have been invested in R&D on each link in the chain, from growing stands to mill yard. Today common supply chain logistics to measure the effectiveness of the chain as a whole is acknowledged as playing a major role in overall competitiveness and any future productivity development. Leveraging on experiences already made within the common supply chain discipline, adjusting this knowledge to forestry characteristics, the wood supply value chain is being analyzed and measured – being an industrial production system amongst others. This extended abstract is aiming to briefly report from an extensive work in progress where generic supply chain value creation is central – and explored in a forestry context together with researchers from several industrial forestry regions.

1.2 Problem description

In order to actively steer the direction of future development of any production system, a clear and rational business strategy and tactical steering tools to fulfill the strategy is needed as well as reliable performance indicators. Chain of custody, laser scanning, system optimization and outsourcing are all ingredients of the forestry production system of today. Models and thorough understanding of the supply chain of forestry as a complex and mutually interdependent production system is desirable in order to take the right measures in management. The lack of such a common framework in modern Swedish forestry, denotion of processes and system setups, makes the discussion and therefore development and comparison of varying wood supply chain systems (WSCS) complicated. Such a supply chain system model would also be much needed when discussing real productivity improvements and real pay offs on efforts made in the system. These ambitions are the core of supply chain engineering. Major industrial sectors have since long been

working with the challenge of supply chain management and supply chain logistics is considered central. There are common frameworks in use to be able to discuss, compare and measure different supply chain strategies, from strategic to operational level. By considering generic supply chain strategy primarily and engineer it to fit forestry features, aim is to make the best use of non-forestry peak performance supply chain logistic knowledge.

1.3 Aim and deliverables

The aim is to apply common logistics languages on the forestry sector. Common KPIs help benchmarking with other industry branches, and makes learning from them possible. By enabling structural measurement of the processes and sub-processes of the forestry supply chain, the hypothesis is that it is possible to sort out interesting areas to improve and tell about their calculated potential. Final deliverables of the study are tools for system descriptions and useful supply chain models of forestry together with a suggestion of useful KPIs.

1.4 FlexWood

The project is a subpart of the EU project named FlexWood which " aim is to support the design of new innovative supply chains, business models, for the forestry to contribute with a higher level of agility and tailoring to the market". To reach this, answers to the above described questions are an essential contribution. The search for generic role models of wood supply chain set ups are being conducted in FlexWood Work Package 5100 by Quebec University Laval and The Forestry Research Institute of Sweden. As a part of the project, a first case study using the SCOR-model will be performed on a Swedish case, and further enhancement of the model will be made in use cases on other (regionally, nationally or contextually) forestry supply chains.

2. Work in progress

Starting in late 2009, FlexWood is in early stages. However, WP 5100 follows the time plan well and the methodology decided upon.

2.1 Method

The overall background is an identified need to support industrial and comprehensive design of new innovative WSCS for a better integration of the forestry (i.e. the wood supply) within the supply chain of the forest products industry. In WP 5100, to fully be able to study and analyze alternative configurations and logistic concepts that fit different wood supply situations and markets, there are three objectives and corresponding tasks:

1) *Develop a state of the art framework to describe and represent any WSCS.* The task aims to provide a solid and common theory base for further work. Building on existing theory, mostly in the field of supply chain management (SCM), is considered essential. Therefore, the task include a quite extensive literature review on research and applications in the forest product industry as well as in other industry. Identification of the existing theory to represent and describe supply chain as well as the well known key features that apply when measuring and evaluating a supply chain, such as e.g. agility, customization, information transparency. Using identified generic SCM framework and paring it with few existing applications of framework in the forest product industry, adjustments will be made to tailor a framework to describe and represent WSCS. Such work will be done with a first application of the framework (Sweden and eastern Canada (Quebec)) in order to make a pre-test of the framework. The aim is to keep the WSCS mapping on a relatively aggregated level, yet as precise as needed to capture possible important impacts of the key features defined. Also, tools and standards to illustrate results and/or data is developed as well as a version 1.0 of a structural questionnaire (i.e. for internal use) to use when mapping a WSCS with the framework.

2) *Use such framework to study different WSCS (i.e. regional, businesswise, country wise).* To support the selection of the studied region and to stretch the applicability of the framework, a list of relevant criteria will be identified. These criteria must, among other things, identify the different wood supply situations and markets in a WSCS. These criteria will be evaluated on a list of potential studied regions with a significant forest industry.

3) *Analyze and compare each studied WSCS to identify a handful of generic WSCS set ups*. The final result will be used when analyzing optimal supply chain management of different WSCS, focusing on significant competitive features such as e. g. increased agility, mass customization or tailoring.

2.2 Report from status today

Following project time table, a thorough literature review is finalized. Amongst a handful interesting supply chain mapping tools, the survey of literature regarding supply chain research has resulted in a choice of the Supply Chain Operations Reference model (SCOR®-model). Now, in iterations, the SCOR-model is applied and parallel configured on the two test cases decided upon; eastern Canada case and Swedish case.

2.3 The SCOR-model

The SCOR-model was developed by the Supply Chain Council (SCC), an independent non-profit-organization interested in applying and advancing supply chain development. The SCC has today almost 1 000 corporate members world-wide.

SCOR model helps to find a framework to, in and organized way, capture business processes, metrics and best practice. Having a unified framework makes the discussion, communication and comparison easier among supply chain partners.

The model is based upon identifying processes and dividing the processes in sub-processes until reaching an operational level, exploring metric values (KPIs). During the survey describing the detailed processes, reaching a measurable level, the model will help to identify weaknesses such as organizational disadvantages, decoupling point issues etc. The first start is to try to grasp all parts in the chain and then map the overall management processes in the supply chain. Further on a map of all involved process in, or connected to, the production appears. Processes are then subdivided into sub processes in a way defined by the SCOR-model.

SCOR proposes a method where analysis is carried out in four levels with increasing dissolution; level one to three are common for the most types of chains. At level four, which is not in the scope of the work, specific processes connected to a certain production and production processes, are described. At level four, the chain is specific for different chains since production processes are in the most cases unique (Stephens, 2001). SCOR tries to capture the configuration of a supply chain, driven by five generic management processes named plan, source, make, deliver and return (figure one).

Figure 1. (Supply Chain Council, 2008)

All supply chains, and therefore involved companies, consists of the decided processes according to the model. The processes interact using plan for the input and output of the whole chain, steering supply and demand. Make, source and deliver are the processes interacting making products and/or services. Return processes handles the return flows and after sales issues for the delivered products or services.

The definitions according to SCC of the five SCOR processes at level one (Supply-Chain Council, 2008) (Samuel el al., 2004), management level of process types, are:

Plan - Processes that balance aggregate demand and supply to develop a course of action which best meets sourcing, production and delivery requirements

Source - Processes that procure goods and services to meet planned or actual demand

Make - Processes that transform product to a finished state to meet planned or actual demand

Deliver- Processes that provide finished goods and services to meet planned or actual demand, typically including order management, transportation management, and distribution management

Return - Processes associated with returning or receiving returned products for any reason. These processes extend into post-delivery customer support

At level two, the configuration level, the configuration of the SCs the five processes are further divided into more detailed categories, described from planning, execution and enable horizon.

At level three, which is the most detailed level at which this project will reach, the process elements are further decomposed, see figure two (Supply-Chain Council, 2008) below. At this level the SCOR-model aims for describing supply chains competitiveness in the markets they operate in.

Breaking down the five management processes into strategic, tactical and operational level and sub levels enables performance measurement of a supply chain. Performance measurement incorporates in this case *reliability, responsiveness and agility* according to fulfill the demand, i.e. the market as well as *cost* of the supply chain components and *asset,* the value of all involved resources to fulfill the demand of the market. Other standardized metrics describing the above can be *order fulfillment, cash-to-cash cycle time* etc.

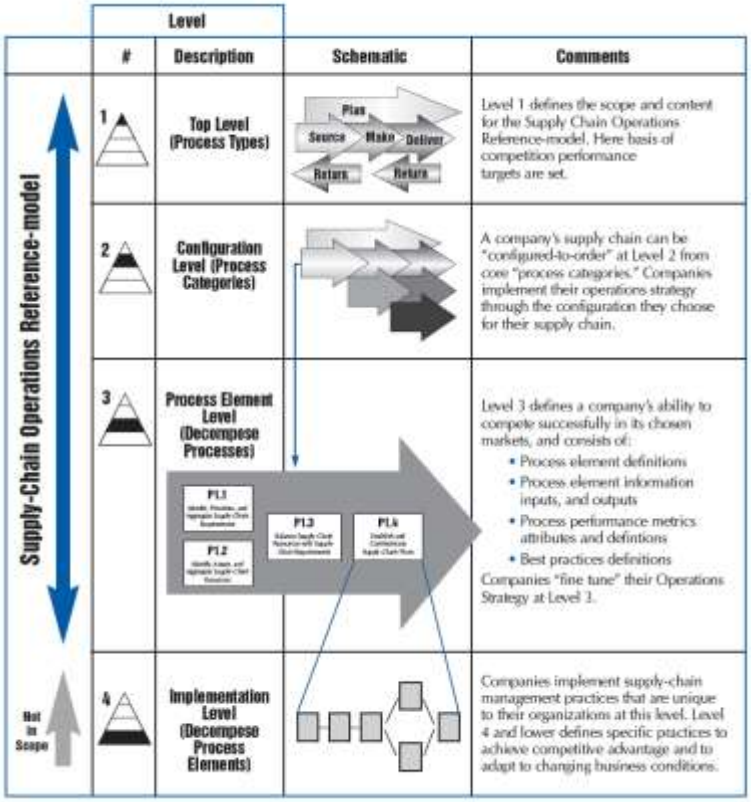

Figure 2. (Supply Chain Council, 2008)

2.4 Pros and cons of the SCOR application in forestry

The SCOR model was picked because of the following benefits;

1. It presents a very well tested methodology for mapping supply chains and therefore a credible suggestion how to develop a common language for supply chain framework for the forestry sector.

2. It makes it possible to single out KPIs capturing the productivity and important features of the whole supply system, and it provides a method on how to do this.

3. It enables comparison with other supply chains and therefore best practice learning.

Possible considerable drawbacks of the model are;

1. Analyses need to be made from a focal company view. This could limit comparisons between set ups if the model suggests different companies as the focal company most relevant in the analyzed set up.

2. The organizational aspects such as inbound incentives or business bottlenecks are not easily captured. Different types of contracting commitments could play a major role, yet not be visible in the analyses.

3. Today used in all contexts, the SCOR-model was developed in manufacturing companies. Using the model in a raw material supply industry could bring unforeseen features.

3. Summary

Here, the core idea of a recently started supply chain research project is presented. At this point, bases of a framework for mapping forestry supply chain process types, is emerging. The ambition is to define a limited number of typical and competitive supply chains in forestry, applicable regardless of country, region or company. The SC types are defined iteratively in use cases. The first use case is the Swedish case and typical SCs in the Swedish forestry, from the supply, stands, to the demand of forest products by industry. Parallel with the Swedish study, a study of the Canadian forestry in the Quebec region will take place. The mapping model is formalized for forestry supply chains, following the ideas and definitions of the core SCOR-model. Questionnaires and interviews together with data collection will make the base for the work on identifying generic type chains. Through applying the model on different supply chain set ups, the model iteratively will be tailored for the application on forestry.

References

Huan, S. H., Sheoran, K. and Wang, G. (2004). A review and analysis of supply chain operations reference (SCOR) model. Supply Chain Management.

Stephens, S., Supply-Chain Council (2001), Supply Chain Operations Reference Model Version 5.0: A New Tool to Improve Supply Chain Efficiency and Achieve Best Practice. Information Systems Frontiers

Supply-Chain Council (2008). Supply-Chain Operations Reference-model, SCOR Overview Version 9.0. www.supply-chain.org