LogDynamics
International Graduate School

Supply Chain Modeling & Improvement of Manufacturing Industry in Developing Countries

Developing countries are becoming more and more integrated in the global manufacturing market due to the international nature of retailers and manufacturing. A consumer who visits a market in Berlin, Rome, Paris or Amsterdam, can find fashion clothes from Bangladesh and Pakistan, special coffees from Tanzania, or rice from Thailand, among many other imported items from a diverse number of developing countries. Therefore, the manufacturing industry in developing countries (MIDC) has been a part of global supply chains for long time as raw material supplier and manufacturer of the final product (see figure 1).

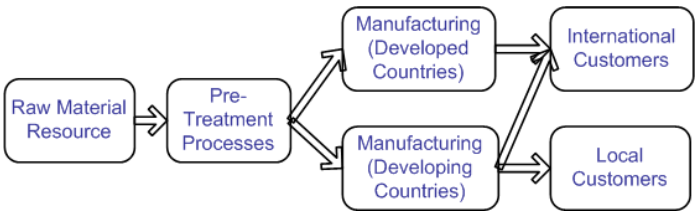

Figure 1: Typical manufacturing industry supply chain

Research Problem

Managing the supply chain within a country may be complicated by various types of uncertainties in demand, supply and process. In countries with the most developed economies, there are limited uncertainties in availability of the basic necessities. Infrastructure in developing countries is weaker, and as a result they may face many new challenges that developed countries have never experienced. It may even cause failure of strategies and models that are tested successful in countries with developed economies.

A classical example is the attempt to operational Wal-Mart in South America (Brazil) and Korea. In US, Wal-Mart has an efficient network of cross docking facilities with a minimal necessity for store inventory and increased opportunities for suppliers to access retailer stores. South America (Brazil) and Korea, however, ensuring an efficient cross docking facilities and logistics system was very difficult. It was necessary to adapt the approach to meet the specific context there. The biggest challenge that Wal-Mart faced in Brazil was shipping products and getting them on the shelf on time. Timely delivery of merchandise is an ideal concept in the bumper-to-bumper traffic in Sao Paulo like Seoul in Korea, where Wal-Mart depends on suppliers or contract truckers to deliver most of its goods directly to stores. Therefore, operating supply chains in developing nations often require firms to enable to tailor their existing supply chain strategies and models or develop new ones appropriate for that specific environment.

In recent years, the lack of process models, key performance indicators (KPIs) and best practices have been recognized as one of the major problems in process evaluation and improvements of a supply chain in the MIDC. Varieties of performance measurement system (PMS) that have been developed and traditionally used for measuring supply chain performance. In addition to a wildly popularized Balanced Scorecard, there are other measurement approaches like Supply Chain Council's SCOR Model, the Logistics Scoreboard, Activity-Based Costing (ABC) and Economic Value Analysis (EVA).

SCOR model is designed and maintained to support supply chains of various complexity levels and across multiple industries. The Supply-Chain Operations Reference (SCOR) model was developed by the Supply-Chain Council to provide a process-based approach of supply chain management and assist firms in evaluating the effectiveness of their supply chains. The SCOR Model is based on five distinct management processes; Plan, Source, Make, Deliver, and Return.

Performance measurement system can be regarded as one of those theories whose validity needs to be tested in a developing country's context, as this context can be more dynamic and be completely different from a developed countries'. The state-of-the-art techniques and practices currently in operation in developed countries

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companies can undoubtedly be of great benefit to organizations in developing countries. However, these techniques and practices have evolved in the context of Western environment should not be transplanted as they are onto the socio-cultural environment of developing countries.

From a technical perspective, supply chain operations have been manipulated on a manual or semi-automated basis with the support of basic or legacy applications. Lack of connectivity, limited resources, and skilled labor are still challenge for direct application of the model. There is often system of shortage of qualified and experienced professional employees, weak and lack of ICT and little or no experience in the using of such technologies. The implementation ICT base advanced manufacturing technologies entangles also with several cultural and organizational challenges. Other considerable obstacles are related to poor supporting infrastructure of the developing countries. This infrastructure leads delivery and material shortage uncertainty. Lack of a well-developed infrastructure, which is a pre-condition for successful supply chain improvement, imposes additional pressure on implement-tation of SCOR model.

Approach and Methodology

The study will be carried out by review the available literature on SCM concepts, PMS, SCOR model. This helps to encapsulate various research outcomes in a structured manner. An industrial analysis will be carried out to assess how supply chain operations are operated, managed, measured, evaluated and improved in the manufacturing industry and detail investigation studies will be carried out in different organizations (see figure 3).

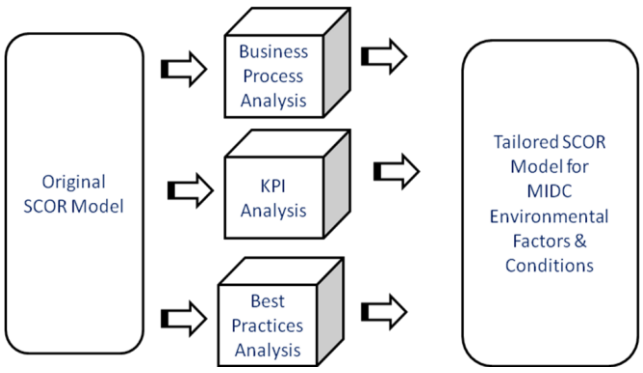

Figure 3: Approach for Adaptation

The industrial analysis results will then compared against the SCOR model process elements. Corresponding process elements will be chosen to regenerate manufacturing industry supply chain process elements, which will be based on SCOR model concept. Then, there will be also a corresponding selection of suitable KPI and best practices that suit each process element to adapt the existing metrics or add new ones.

Research Objective and Question

The objective of research is adapting of the SCOR model and applying it for evaluating and improving manufacturing industry supply chain operations in developing countries. In fulfilling this objective, answers will be sought to the following questions:

- What are the differences between supply chains characteristics in developing countries and developed countries with an effect on supply chain performance measurement systems?
- What type of metrics and best practices are applicable in DCMI supply chain in future according to different market maturity conditions and scenarios (see figure 2)?

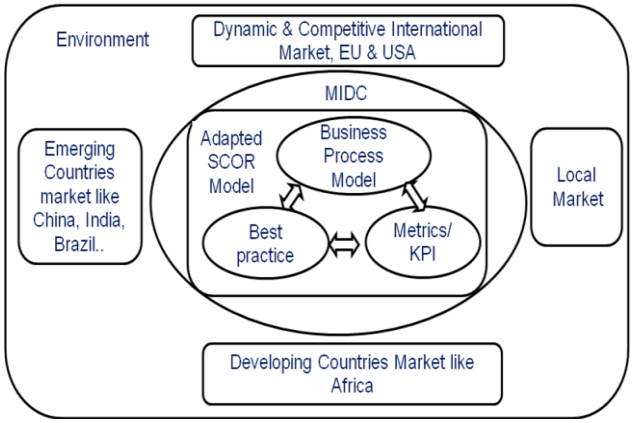

Figure 4: Adapted SCOR Model and Different Market Segments

Expected Results

Anticipated contributions to the common body of supply chain knowledge will be an adapted SCOR model specific to the DCMI, This model enabling them to adapt a scalable, enterprise integration based standard. The result of adaptation will be the establishment of business process model and best practices for the DCMI. Finally, each process element included suitable KPI to evaluate supply chain performance.

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