

A Virtual Chain Performance Model for Small Companies

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Abstract Several business companies implement electronic processes to do business online and to exchange with their clients. These electronic businesses affect the ways that small firms exchange goods and services with suppliers and clients. Digital markets are multiplying every day and small companies need to implement a supply chain model to do cost-effective business with their partners. Using models from the literature, this study will highlight that a virtual value chain performance model integrated to open business systems is needed to provide effective services to business partners. In this paper, the author of this research will demonstrate that a virtual value chain performance model is needed to achieve operational effectiveness and efficiency for small businesses.

Keywords Value Chain Model, Small Business, Supply Chain, Performance Management, Performance Metrics

1. Introduction

Small businesses develop and implement more online processes and media to establish a commerce environment with their business partners. These online processes and media facilitate quicker and more efficient linking of both business partners and small business entities as shown in Figure 1 (St-Pierre, 2000).

Bowland (2001) mentions in his paper that organizations adopting e-business approaches may benefit the principles behind the supply chain model: information integration, collaborative planning, stock replenishment, workflow

coordination, etc. Costs of doing business for small firms may be reduced, better flexibility between the end user and the business partner, faster response times, increased efficiency, increased output, are some of the benefits brought up by the supply chain model (Roberts, 2012). Wong, Arlbjorn, and Johansen (2005) describe good management practices in the toy industry while integrating an effective supply chain in their online business processes.

Carbone (2002) argues in his paper that the supply chain model if well implemented can improve profit margin, reduce inventory, and helps an organization to grow. Fawcett & Magnan (2006) propose in their research paper a supply chain integration model to help enterprises to build a customer success infrastructure working in synergy with a supplier success infrastructure. There is a gap between the models just described and the ones presented in this research paper.

The main goal of this paper is to present a virtual value chain performance model to measure the performance of the activities taking place while delivering online services in a small company chain setting. Secondary research questions to be answered in this paper are:

- Why use the supply chain model in an e-business environment for small firms and what are the advantages of using it!
- Why implement a virtual value chain performance model?

The author of this research paper will use a descriptive approach to describe the supply chain model for small companies and propose an integrated model to relate strategic business goals with operational performance metrics to improve effective delivery for online services.

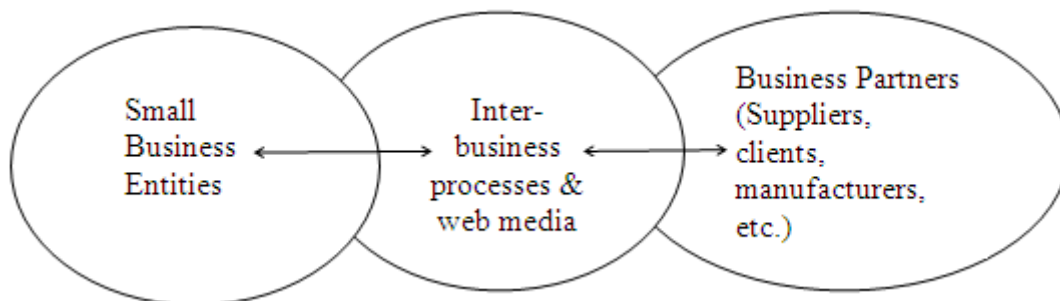


Figure 1. Relationship between small business entities and business partners

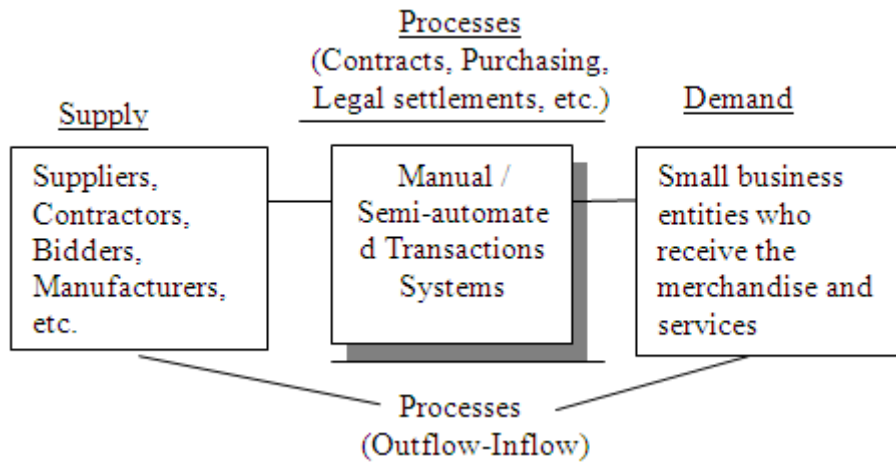


Figure 2. A simplified supply chain model

2. A Supply Chain Model and Operational Performance

Figure 2 shows a simplified supply chain example where an employer's sourcing process (demand side) is initiated through a user-friendly interface when he/she requires a service or product. On the supply side, the products and services are developed and produced, business quotations are prepared, and orders are entered in a warehouse database system.

In some firms, the business flow between the supplier side and the user side is not fully automated using a supply chain model. Inefficiencies take place and purchasing delays occur, sometimes creating frustration among the employees waiting for an effective service or a product. Non monetary metrics exist to measure success and effectiveness of these daily operations.

In other firms, traditional processes are semi-automated as we find various data filing systems. Until these systems and processes are fully integrated, transactions processing systems and operations cannot either link or consolidate the inventories, backlogs, future shipments and commitments. Any attempt to bring this information together means accessing a number of systems and retrieving the information manually in some cases, a long and onerous process. Because a complete picture is not available, the wrong products could be acquired, resulting in inventory backlogs that grow rather than reduce. This list of problems shows that operations efficiency strategy is not met.

Other difficulties could exist in the procurement processes. Long cycle times encountered to obtain goods through the standard purchasing channels result in a high volume of products and services purchased. Various materials come from multiple buyers and several pricing agreements are negotiated by one or more small business agencies. These purchasing difficulties lead to frustration among the users and the purchasing agents. These purchases add a great deal of cost to the organization in that they increase the number of expense forms submitted, diminish the opportunities to capitalize upon the pre-negotiated prices and volume

discounts, and they result in a loss of purchasing leverage with the suppliers.

A supply chain model including several business activities going from upstream ones (business partners) to downstream ones (request by small business entities) should be implemented in small companies as shown in figure 3. Any adoption of effective e-business systems in the extended supply chain between the small firm's entities and business partners has a leveraging effect on the business of the organization. These electronic linkages can tighten the chain by making it quicker, more accurate, and more reliable if well implemented, managed, and assessed properly.

Figure 3 shows the necessary steps needed to define key performance strategic goals and performance metrics in relationship with the activities taking place in the supply chain model. Measurement, reporting, comparison with these key strategic performance goals, assessment, and explanation of the metric variances are important steps to determine the overall business performance of business entities.

The measurement of results from these metrics should be compared to the business goals and unfavorable metrics variance should be explained. The business opportunities being enabled in relationship with the business goals of each business entity in small companies should be presented over a timeline to illustrate when they will be achieved and which of the initiatives have enabled them. During the life of the project, as the opportunities are enabled they must be measured, tracked and reported against this timeline.

3. A Virtual Value Chain Performance Model

In some small companies, systems and processes used are fragmented. We find legacy systems that we cannot integrate. A poor network infrastructures support these legacy systems and problems of integration and interoperability become difficult, almost impossible. We need to standardize these systems and to redesign processes to establish a physical and

virtual chain relationship among the activities of these processes.

The author of this research paper will like to define the *value chain model* presented by Porter (1985). A *value chain*, according to Porter, includes the activities conducted in any organization and can be divided in primary and support activities, as shown in Figure 4. The primary activities are those activities in which goods are purchased and services rendered (upstream), processed through an e-business web site, and delivered to clients (downstream). The support activities are the ones shown in figure 4. As the figure shows, the appropriate metrics could provide a basis upon which managers may evaluate the performance of their processes. They could also give managers the opportunity to follow the affects of developments within their processes.

A *value chain system* for a business setting will include all

upstream and downstream activities going through an e-business web site as shown in figure 4. If the operations efficiency and the cost effectiveness strategies are met throughout these activities in the value chain, then a virtual value chain performance model well implemented will bring a greater added value to the business setting as a whole (Hongze, and Davidrajuh; 2013).

Hausman (2002) argues in his research that supply chain performance metrics are important and he indicates that supply chains need to perform on these dimensions: Service, Assets and Speed. To improve their opportunity for success, the author of this article recommend that the metrics employees and management develop and define should be based on criteria that will, or tries, to address and support all three of the goals.

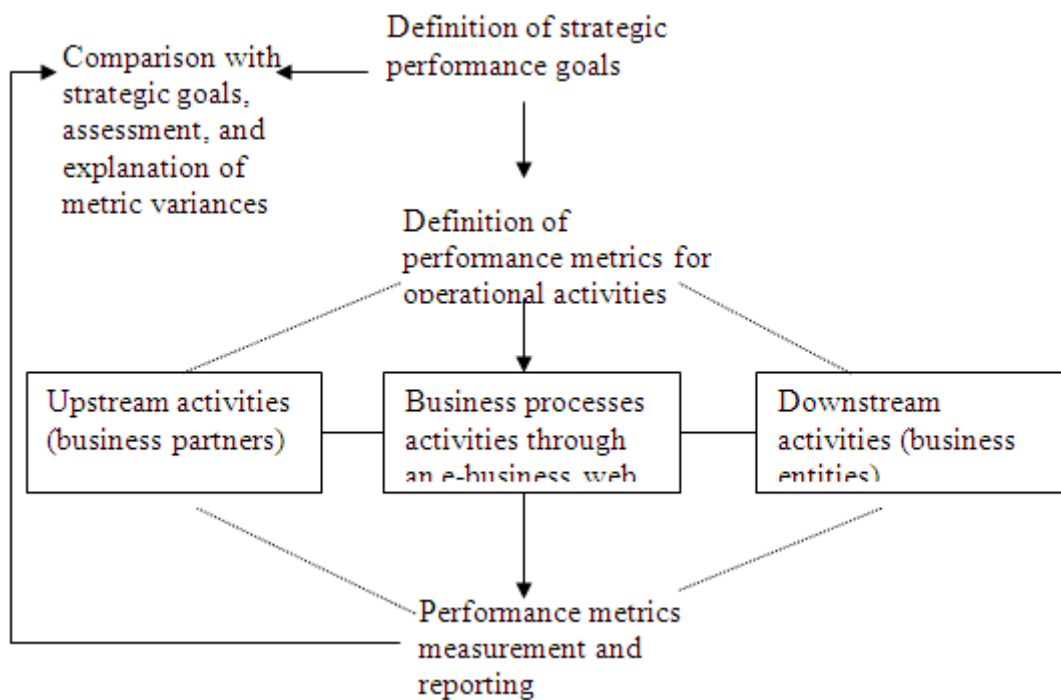


Figure 3. A supply chain model

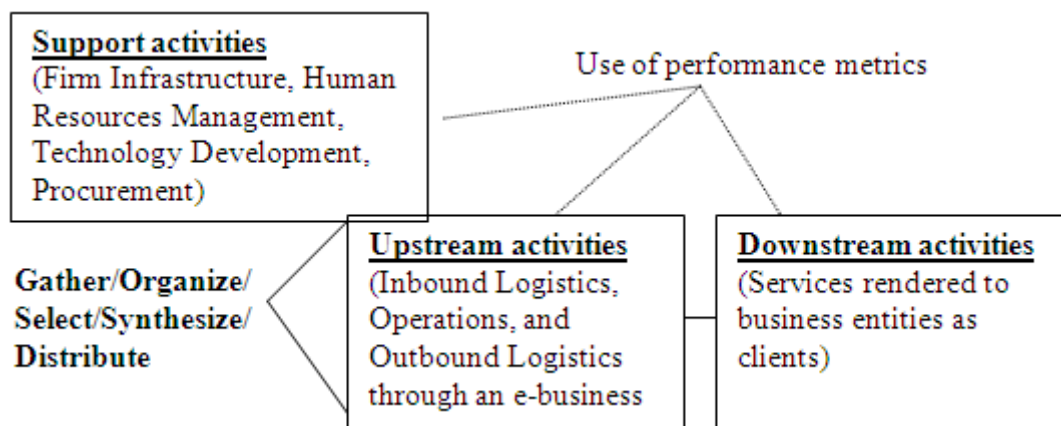


Figure 4. A virtual value chain performance (VVCP) model (Adapted from Porter Model's value chain model, 1985)

Managers should participate in the definition VVCP metrics. Through regular reporting and analysis of these metrics, managers should be able to detect which departments and initiatives are on target, and which are not. Managers should have the ability to identify and measure the performance metrics (Gunasekaran and Kobu; 2007):

- the information to be included in the metrics and measurement process (measure the right things);
- the level of the measurement (e.g., SKU, volume, category, department, etc.);
- the definition of each measure and the method of its calculation;
- the source(s) of the information (where could the agreed to information be obtained);
- the action plan for frequency of the measurement (daily, weekly, monthly, etc.);
- the distribution of the metric information (who gets reports and what they say).

Managers developing these performance metrics could be results oriented (e.g. in-stock %, inventory turnover, etc.) and could be established based on objective targets developed before the business activity is taking place (Akyuz and Erkan; 2010). Metrics could also be process oriented in that they would measure the effectiveness of a given policy or process (e.g. inventory safety stocks, cycle time, etc.). If metrics were developed for each of the business activity, upstream or downstream, it would help senior management to tell the story of their operations (what has happened through current operations) and give them a feel as to what corrective actions (*if any*) may need to be taken to handle these factors.

Real time communication and feedback between site personnel and business partners in VVCP model could improve idea sharing and development of the supply chain network to achieve lower costs and a greater number of options for supply. The number of days a purchase requisition goes unprocessed compared against the number of purchase requisitions processed the same day could possibly be used to monitor communication effectiveness and procurement efficiency.

Employees participating in the implementing of the VVCP model should work with the business entity to help controllers to understand the objectives they should reach (Lohman, Fortuin & Wouters, 2003). They could help identify measures for each of these objectives by answering the question "How would the business opportunity be achieved? To achieve success here, a key function would be the identification of the cost drivers, the factors that cause or drive an activity's costs.

While the reduction of budgetary costs associated with purchasing could be achieved by streamlining administration routines, reducing off contract buying, by consolidating purchases, enabling deeper discounts and obtaining better service from suppliers, the actual costs could be compared with benchmarks within the industry and through this, identification made of the areas where productivity may be increased and costs may be lowered.

In conclusion, the models presented in this paper will bring several benefits for small companies while doing open business with their business partners such as:

- Rendering quicker and more effective services to business partners;
- Eliminating repetitive and inefficient operations while doing business with the clients;
- Using virtual chain processes that will better support business partner interactions;
- Providing electronic billing that will eliminate paper, envelope, and postage costs;
- Improving efficiencies across impacted business process through single process applications;
- Helping small businesses to assess their virtual operations and activities; and
- Reducing inventory and the related operating costs.

4. Conclusion

In this research paper, the author presents a supply chain model for small firms in an e-business environment. Arguments were presented to justify a virtual value chain performance model to assess the operations and activities that takes place in electronic delivery systems for small businesses.

The supply chain model includes performance metrics to determine if business goals have been met throughout the electronic business activities. Unfavorable variances are documented and significant actions are taken to bring the business activity within control.

Turban, E., & Volonino, L. (2011) defines the role of Supply Chain model 2.0 as a mechanism using social media tools to improve the effectiveness of communication and to enhance information acquisition outcomes to make business optimal decisions. Further research could be undertaken to show that small companies using social media networks could identify new suppliers and buyers. Empirical research is needed to show that social media and metrics used will make the supply chain more efficient and productive for small businesses if well implemented in a virtual value chain performance model (Giméneze and Lourenço; 2013).

REFERENCES

- [1] Akyuz, G. A., and Erkan, T (2010). Supply chain performance measurement: a literature review, *International Journal of Production Research*. Volume 48, Issue 17.
- [2] Bowland, J (2001), Demand Chain Enabled Benefits Enabled, pp 1-2.
- [3] Carbone, J. (2002). Lecont's Supply Chain Focus Fattens margins. *Purchasing Journal*, available online: <http://www.stanford.edu/group/scforum/>
- [4] Fawcett, S. E, and Magnan, G. M. (2006). Achieving

World-Class Supply Chain Alignment: Benefits, Barriers, and Bridges, available online: <http://www.capsresearch.org/publications/pdfs-public/fawcett2001es.pdf>

- [5] Gunasekaran, G., and Kobu, B. (2007). Performance measures and metrics in logistics and supply chain management: a review of recent literature for research and applications. *International Journal of Production Research*, Volume 45, Issue 12.
- [6] Giménez, C., and Lourenço, H (2013). Supply Chain Management: review, implications and directions for future research, available online: <http://www.econ.upf.edu/docs/papers/downloads/769.pdf>
- [8] Hausman, Warren H (2002). Supply Chain Performance Metrics. p 6, available online: <http://www.stanford.edu/group/scforum/>
- [9] Lohman, C., Fortuin, L., and Wouters, M. (2003). Designing a Performance Measurement System: A case study, *European Journal of Operational Research*, available online: <http://www.euro-online.org/display.php?page=ejor&>.
- [10] Ma, Hongze, and Davidrajuh, R (2013). An iterative approach for distribution chain design in agile virtual environment, available online: <http://brage.bibsys.no/uis/retrieve/6339/An%20iterative%20approach%20for%20distribution%20chain%20design%20in%20agile%20virtual%20environment.pdf>
- Porter, M. E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: Free Press, 1985
- [11] Roberts, S (2012). The Advantages of the Supply Chain Management for Small Companies. Demand Media. available online: <http://smallbusiness.chron.com/advantages-supply-chain-management-small-companies-20595.html>
- [12] St-Pierre, A (2000). Integration of Electronic Commerce in a Canadian Military Logistic Setting -- A conceptual approach. *ICIS Collector 2000 Proceedings Journal*, Australia, available online: <http://www.rmc.ca/academic/busadm/staff/stpierre/research/icis2000.html>
- [13] Turban, E., & Volonino, L. (2011). *Information technology for management: Improving strategic and operational performance* (8th ed.). New York: John Wiley and Sons, Inc.
- [14] Wong, C. Y., Arlbjørn, J.S., and Johansen, J. (2005). Supply Chain Management practices in toy supply chains. *Supply Chain Management: International Journal* 10, pp.367-378.