Improving Performance through Supplier Integration

By

Bernardo Villarreal and Herlinda Guzman
Departamento de Ingenieria
Universidad de Monterrey

Abstract

The late 1990s can be characterized by change and uncertainty for manufacturing organizations and their respective supply chains. In order to cope with this situation, New organizational structures are being devised to utilize supplier integration relationships as a source of competitive advantage. This work describes a model that has the purpose of achieving integration of the key part suppliers for Home Solutions, a Mexican home appliance manufacturer with headquarters located in Monterrey, Mexico.

1. Introduction

In recent years the growth of world competition and increasingly demanding customers have created a fast moving environment for many manufacturing companies. The late 1990s can therefore be characterized by change and uncertainty for manufacturing organizations and their respective supply chains, Womack, et al [17]. This is the case for the supply chain of a Mexican home appliance manufacturer with headquarters located in Monterrey, Mexico, denominated as Home Solutions hereafter.

In order to cope with this situation, new organizational configurations are concentrating on the management of core expertise and utilizing supplier integration relationships as a source of competitive advantage. This could be achieved when suppliers are focused on their customers’ market requirements and can effectively change their behavior as a result. This suggests that the “lean” internally integrated company has exhausted the competitive advantage to be derived from the enterprise itself and, therefore, attempts to exploit the advantages of integrating suppliers and using the continuous improvement of quality, cost and delivery performance to the focal organization as a means of exploiting market changes.

This paper describes a model that has the purpose of achieving integration of the key part suppliers for Home Solutions. The following section provides a review of the literature that deals with concepts and models related with supply chain integration. The third section offers a brief review of the model structured for integrating suppliers in Home Solutions. Section 4 provides the results of an ongoing application to a sample of key suppliers. Finally, several conclusions about the application of the scheme are given in the last section.
2. Previous Research

The strategic importance of buyer and supplier collaboration to create an integrated approach to the wider supply chain was identified by Carlisle, et al. [4], who contended that the traditional adversarial relationship contained inherent contradictions and served to create competitive advantage only in the short term. Christopher [6] proposes that competitive advantage is an increasing function of supply chain efficiency and effectiveness. The greater the level of collaboration at all levels, between supplier and customer, the greater the likelihood that an advantage will be gained. The impact of customer-supplier partnership on plant's performance has been addressed already. Ring, et al. [15], Ellram [10] and Carr, et al. [5] have highlighted the potential benefits of the relation on financial performance. De Toni, et al. [9] obtained empirical evidence of the impact of the partnership on customer’s plant performance in terms of inventory turnover, average on-time delivery rate, and average defects.

Implementation issues are also growing in importance from a managerial viewpoint, mainly those related to how to implement a partnership. Sako, et al. [16] and Lee, et al. [13] present disappointing results of firms due to implementation issues in all phases; start-up, development and maintenance. Bowersox [3] outlines five factors that are critical to the success of a logistic partnership. These are:

1. Selective matching. Partners have compatible corporate cultures and values.
2. Information sharing. Partners openly share strategic/operational information.
3. Role specification. Each party in the partnership knows specifically what its role is.
4. Ground rules. Procedures and policies are clearly spelled out.
5. Exit provisions. A way for terminating the relationship is defined.

Similarly, Bowersox [3] provides reasons for failure. These are; Lack of management support, lack of trust between partners, lack of control and commitment, and differences in partner’s objectives. Ackerman [1] also spells out several reasons; Misunderstanding about the job to be done, promises that are not satisfied, management resistance to make the relationship, failure to provide the service specified, bad financial results generated from the partnership, and the lack of a procedure for terminating the agreement.

Cooper, et al. [7] describes four general schemes that are used for supply chain integration:

- Dyadic management. Entities belonging to the chain focus on developing ties with those with which have immediate contact.
- Channel integrator. There is a channel leader that set up the overall strategy for integration, having direct contact with all the members of the chain.
- Analytic optimization. The channel leader determines the best chain configuration from the economic viewpoint, and looks for the integration based upon it.
- Keiretsu/Vertical Integration. The channel leader is empowered by partial or total ownership of other members of the chain.

In the same work, Cooper, et al. [7] suggest a four stage process to integrate the chain members’ management processes and product and information flows.
1. Incorporate information sharing and continue managing internal processes separately.
2. Coordinate processes across firms, e.g. forecasting, replenishment, and others.
3. Same as above including the coordination of efforts to improve systems, processes and products.
4. In this advanced stage, the whole chain could be re-engineered looking for different means to deliver value to the customer.

From the 1980s, three approaches to supplier collaboration have emerged. The first relates to the development of long-term partnerships and trust that enables the sharing of benefits and risks of the relationship, Ellram [10]. The second approach focuses in the development of a structured process for information exchange to substitute inventory and increase performance of suppliers throughout the chain, Merli [14]. The last approach emerges from the Japanese exemplar manufacturing organizations and their “lean” supply networks, Hines [11]; Lamming, [12]; and Womack, etal, [17].

Some weaknesses for the first two approaches are; the need for a vast amount of human resources dedicated to the process of creating relationships, and the lack of an implementation method of the required supplier integration structure.

The superior performance and competitive advantage of the Japanese system has been gained by the achievement of a high level of supply-chain integration and a structured approach to managing a smaller number of direct suppliers at each tier in the flow of materials. Two key aspects are fundamental in this system; supplier co-ordination and supplier development, Hines [11]. Supplier co-ordination refers to the activities undertaken by a customer to create a common way of working and the removal of waste between companies in the supply system. Supplier co-ordination then involves common quality standards, shared logistics systems and the development of common information technology with the supply base. Hines [11] proposes that supplier development initiatives are undertaken by the customer to help improve the strategies, tools and techniques employed by suppliers. It therefore involves waste removal inside suppliers.

The focal purchasing organization of the “lean” supply chain (e.g. Toyota in the automotive industry) is supplied by a comparatively small number of direct suppliers that provide entire sub-assemblies rather than component parts. The traditional parts suppliers instead provide parts to the direct sub-assembly suppliers. This chain structure is reinforced by the possibility that the focal organization or the suppliers could partially or totally own each other (Keiretsu). This type of networking lessens the required logistic resources for management and enhances communication and responsiveness of the chain.

The supplier association is the key mechanism of the lean supply chain that enables a high degree of communication and coordination among the members of the chain. This is defined as “a mutually benefiting group of a company’s most important subcontractors, brought together on a regular basis for the purpose of co-ordination and co-operation as well as to assist all the members to benefit from the type of development associated with large Japanese assemblers: such as kaizen, just in time, kanban, U-cell production and the achievement of zero defects”, Hines [11]. As mentioned, the association comprises the key suppliers whose performance impact very significantly the competitiveness of the focal organization. Its structure has the purpose of eliminating the duplication of resources and effort required by projects and initiatives between customer and supplier. The association is divided into two teams; one that is oriented towards the definition of
strategy and direction, and the other that is focused in making performance improvement of the members a reality.

3. Description of Model for Supplier Integration

The structure of the model for integrating suppliers consists of four stages, and it is illustrated in Figure No. 1. These stages are: the communication phase, client-supplier acquaintance, client-supplier integration, and alliance formation. This model follows very closely the four-stage process suggested by Cooper, et al., [7] to enable supplier integration.

![Figure No. 1. Structure of Model for Supplier Integration](image)

During the communication stage, the key aspect that must be carried out is the determination of the mechanism through which both, client and supplier, exchange information that is relevant to their operations’ performance. Product requirements, inventory and demand levels, and quality results are an example. An important consideration that must be taken into account is the infrastructure required to support the mechanism. Communication and information technology must be designed according to specific needs, and the necessary investment should be defined, including the decision about whom is to make it. Finally, there should be an agreement with respect to information confidentiality.

The second stage is crucial in that it is here where client and supplier get to know each others’ strengths and weaknesses. They realize the actual gap that must be reduced in order to obtain the required results. At this stage, both have to alienate their goals and objectives, and identify the projects necessary to make it a reality. Among these could be changes in fabrication processes, standardization of policies and procedures, and others.

Once both know each other, the integration stage takes over. This is designed to make the supplier’s operation an extension of the client’s. This stage includes the execution of a series of practices through which the supplier participates actively in designing products, identifying process improvement opportunities, physically supporting daily operations, sharing best practices, and the like. In this stage, interdisciplinary teams are set up to carry out project management, and a more formal relation between client and supplier is developed. The foundation for a relation based upon trust is established.

The final stage implies the integration at an advanced level geared towards a long range relation. It is at this stage that the term “process partner” takes its real meaning and dimension. Here, the supplier not only participates, but it plays a very active leading role to maintain and improve the business competitiveness. To reach this point the supplier should be seen by the client with confidence.

To carry out the last two stages successfully, it was devised an iterative methodology for supplier performance improvement based upon Deming’s quality circle, Deming [8]. This consists of four steps that must be completed for each improvement cycle. In the initial step, the improvement opportunities for either the supplier and/or the client are
identified and prioritized. Next, the opportunities are established as annual goals, action plans are laid out, and work teams set up. The third step is about evaluating the results of the action plans and insuring periodic feedback to adjust them so that the goals are achieved. Finally, goals are redefined with the supplier for next cycle.

The inter-organizational structure and mechanisms utilized in the last 2 stages are similar to those of the lean supply chain model, Hines [11]. The great difference is that in this case the scheme used for integration is the Channel Integrator instead of the Keiretsu.

4. Implementation and Results

The implementation of the model described previously is briefly presented in this section. The supplier base of Home Solutions consists of 470 members. The initial situation of the relation of the firm with its suppliers can be described as follows:

- The communication level between them was extremely poor.
- The relation stressed quality performance measured through an indicator called Supplier Quality Rating. This indicator consisted of a weighted average of lot acceptance percentage at reception, level of defective parts per million measured at production line, the level of first part acceptance, and the level of service provided by the supplier in terms of attitude and availability to assist in solving problems.
- Only 10% of the suppliers received periodic feedback about their performance, and mainly about quality results.
- The relation was maintained only between the procurement function and the suppliers. The rest of the company did not have any contact with them all.

The above situation describes a very basic and traditional relation that offered great potential opportunities for improvement. For this reason, Home Solutions decided to initiate an effort to develop and integrate its suppliers with the purpose of improving quality, cost and a rapid response from them. This effort started with the development of the model described in the previous section, and has continued with its implementation during the last 2 years. A description of this effort follows in the next sections.

4.1 Communicating with Suppliers Through Internet.

The implementation of the first stage of the model consisted of the development of a portal designed to be the basis for communicating with suppliers. This was called as the Supplier Internet Site (SIS).

The initial structure of the site included a general module addressed to present a history of general results of the main performance indicators, a comparative analysis of them, and a permanent feedback survey. There was also a module that included a description of policies and procedures related with the relation, and another one that was intended for supporting supplier development. This last module included several self-learning courses about quality tools, and the description of those offered by Home Solutions to its suppliers.
To date, all suppliers can access the site and monitor their performance indicator at any time. After a year of operation, this site was fundamental to promote improvement initiatives in the suppliers. The level of overall quality improved 31% and the performance feedback cycle was reduced drastically from an average of a week to almost on real time. However, the main benefit has been the increase of the level of communication with suppliers that has resulted in a new attitude towards improvement.

The experience achieved in this period provided several areas for further improvement of the site. Among these, improving the degree of interaction between key personnel of different functions such as product development and manufacturing, in addition to procurement, proved to be very beneficial since the interaction with the suppliers became more direct and faster. The need to go through the procurement contact became unnecessary.

4.2 Integrating Suppliers.

The second and third stages are being implemented in parallel. In the acquaintance phase, Home Solutions selected a sample of the main suppliers that represented 85% of total annual procurement cost. Among them were the suppliers of the principal parts, components and raw materials.

The basic mechanism used to implement the second stage consisted of a coordination group formed by the managers of the Technology and Product Development, Manufacturing, and Procurement functions. This group is called the “Senior Team”, and it has the responsibility of defining the strategic direction in this project in conjunction with each supplier’s senior administration. The first activity carried out by the team was the definition of the current status for each relation, determining desired performance goals for each supplier, and the action plans required to achieved them. The definition of an operations structure and a “management system” for this new activity was also established.

The implementation of the integration phase is actually the main concern of the operations team. This consists of personnel representative from each administrative function (Manufacturing, Procurement and Product Design) of Home Solutions and every supplier. The main responsibility for these teams is to develop and implement improvement projects oriented towards the elimination of the gaps identified by the Senior Team. Later on, the operations structure was enlarged with the addition of the Plant Resident Engineer. This new entity was designed to insure the correct implementation of the improvement actions and to permanently assist operations in case that abnormal problems arise due to the product’s performance. Additionally, this Engineer supported both, the Senior and the Operations Teams with timely information as requested.

The performance of the mentioned teams was enhanced with the development of modules in the Supplier Integration Site that enabled a full interaction between them on real time. The development and application of a Supplier Certification System has also been fundamental to support a successful implementation of this project. This system has helped to standardize inspection procedures and performance indicators, and to clearly laid out the evaluation scheme for all the suppliers.
4.3 Forming Strategic Alliances.

The final stage is currently initiating with the participation of a selective sample of 9 suppliers. At this stage the objective is to advance the integration to a level in which both, Home Solutions and the supplier, participate in improvement projects through product and process design. The pilot program is supported by an initiative called the Supplier Innovation Challenge. This program emphasizes the generation of cost and quality improvement projects based upon product and process design. To date, a total of 80 suggestions have been proposed and 23 of these accepted with estimated annual savings of 1.7 million dollars in cost.

5. Conclusions

This paper offers a brief description of the model developed by Home Solutions to integrate suppliers, one of the main strategies of the company to improve its level of competitiveness. The structure of the model consists of four general stages, and each of these incorporate the utilization of various tools and schemes that are standard in quality improvement theory and practice. The stages initiate with an effort to increase communication with suppliers and finish with the final step of alliance formation. The model is still being implemented in the final two phases, and in particular, the last stage is at the pilot stage with a very small, though important, sample of suppliers.

The results achieved by both, Home Solutions and its suppliers, have been significant, and these provide a solid basis to justify the continuation of this effort.

6. Bibliography