



FURNITURE INDUSTRY IN RESTRUCTURING : SYSTEMS & TOOLS

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Guidelines

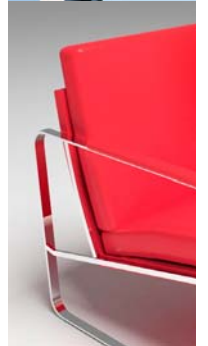
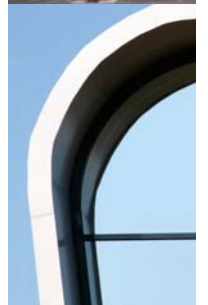
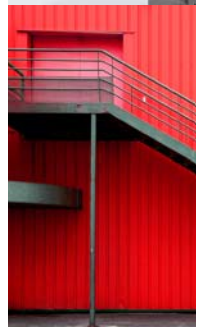
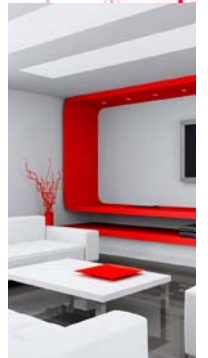
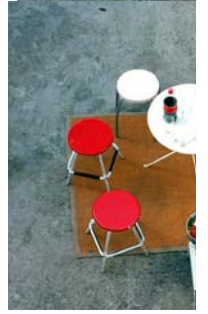
Supply chain management



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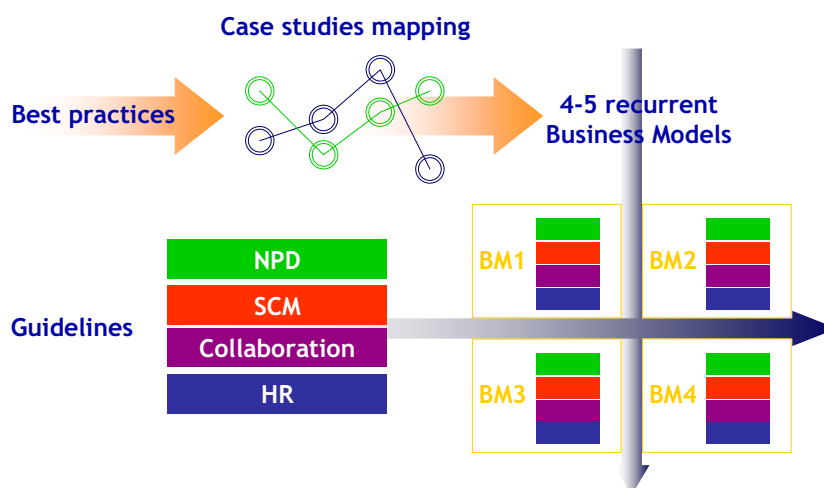
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The globalization is changing the structure of labor intensive industries such as the furniture industry. Increased imports at lower prices force the European manufacturers to look for competitive edges and if necessary to restructure their operations. Some looked at their business model, other at the product, the production, productivity or the relation with the final consumer or a combination of some or all of these different aspects. The solutions, some more successful than others they come up with are multiple.

The FIRST project has the ambition to look into this subject with the aim to formulate recommendations to serve as inspiration to manufacturers. The methodology used was to analyze 30 companies that either went to a restructuring or that had particular characteristics in one or more aspects of their business that allows them to (better) cope with the problems arising from the globalization. This analysis should lead to business models from which guidelines on specific strategies could be distilled.



During the work it rapidly became clear that there are almost as many business models as there are companies, and on suggestion of the advisory board of the project, it was decided to concentrate on guidelines for practical strategies in specific fields rather than develop entire business models. The advisory board also suggested to formulate these guidelines in short separate formats easily usable by interested manufacturers.

This way the work resulted in the formulation of six guidelines around specific activities: product development and innovation, supply chain management, industrial co-operation, outsourcing, human resource management and electronic communications. In parallel the partners developed a sub contracting database for manufactures interested in co-operation as an instrument of increasing such co-operation between manufacturers in the EU and especially with manufacturers in the most recent EU Member States. Information on the project and on the database can be found on the UEA web site www.ueanet.com.

The analytical work has been done by the partners under the leadership and guidance of the MIP, the Polytechnic University of Milan and of AIDIMA, the Spanish technical furniture center. BFM, MEDIFA and the UEA and some of its other members contributed in the best practices and the redaction of the guidelines. Ifabrick, the information department of MEDIFA was responsible for the Web site and database.

The current booklet formulates guidelines for the optimization of the furniture supply chain. It is not meant to suggest that European furniture manufacturers should follow the strategies described, but the booklet wants to contribute to the reflection on this subject by those manufacturers who feel that it might fit into their business model. We hope it serves them well.

Bart De Turck
UEA secretary general
FIRST project manager

I. What is meant by SC

I.I. Source/Make/Deliver

The ever-evolving context brings forward the level of competition: the firm success does not only depend onto the management of core activities, but also on supply relations and management. So, upwards and downwards the supply chain, a company need to manage relationships with clients and suppliers. Naturally, the developing outsourcing tendency fosters this necessity.

Despite the term "supply chain management" (SCM) first appeared in literature during the 80s it has its roots in the 60s, when the Council of Supply Chain Management Professionals (CSCMP) gave a definition of physical distribution. In the 80s SCM started to address the integration of information and material flows, from raw materials suppliers to end customers. During the 90s a variety of terms flourished, very similar indeed: network sourcing, supply pipeline management, network supply chain, supply base management, value chain management, value stream management. Today, a consolidated and comprehensive definition of SCM is provided by Metz: SCM is a process-oriented approach to managing product, information and funds flow across the overall supply network, from the initial suppliers to the final end consumers.

The key elements of this definition are the following:

- **Process management.** It implies the coordination of activities even outside firm's boundaries. Such processes are shown in Figure 1.
- **Physical, information and fund flows.** Production and transport of raw material, components and end products is in place. Moreover, each activities is associated with information indispensable for the firms involved. Physical flows mainly go downwards, information flow, on the contrary, mainly go upwards (e.g. demand forecasting data are shared in order to plan production and, in turn, purchasing). At the end, financial flows go upwards from buyer firms to suppliers. According to a cooperative perspective it is fundamental to correctly split the value throughout the chain, in order to implement transaction that satisfies all the partners.
- **Supply and distribution network.** From the outside, the supply chain appears as a sequential series of companies, even if each phase of the sequence is almost never made of one single firm, both because firms have many clients and suppliers and complex products requires materials, parts and sub-assemblies. As a consequence, from the inside (i.e. from the perspective of a single firm) a supply chain is made of two distinct networks: one upstream and one downstream (see Figure 2).

More and more SCM research field has been connected to strategy and organization rather than to logistics and physical distribution, as testified by the recent attention to services.





Figure 1. SCM processes

Horizontal: supplier per level

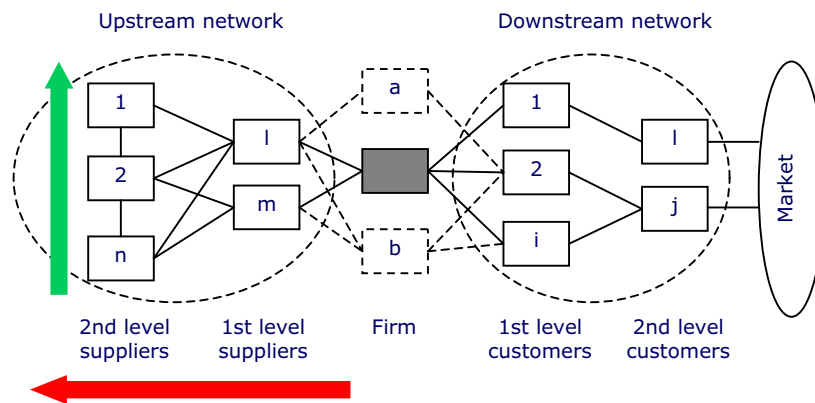


Figure 2. Supply and distribution networks

The Supply Chain Council (SCC) has developed and endorsed the Supply Chain Operations Reference model (SCOR) as the cross-industry standard for supply chain management. Process reference models integrate the well-known concepts of business process reengineering, benchmarking, and process measurement into a cross-functional framework.

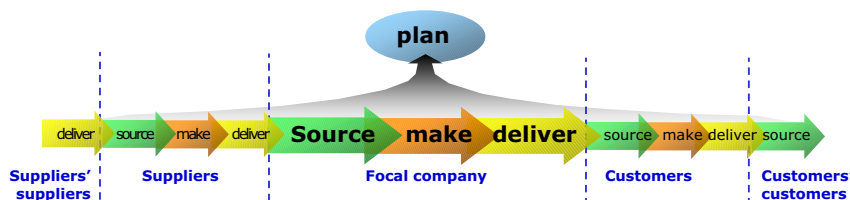


Figure 3. SCOR model

2. Performance and trade-off

Several actors determine the overall supply chain performances. The two most widely acknowledged performance measures are:

- **Total logistic cost** of the network;
- **Service level** delivered to the final customer.

Both of them are multi-dimensional concept (see Figure 4) and are determined by the action of several organizational units (for instance logistic cost comes from purchasing, warehousing, materials management, marketing and sales and so on). A classical trade-off relation occurs between these two indicators: actions aimed at containing total logistic cost risk to decrease service level. The question is: how to improve logistic cost either improving or at least keeping constant the service level? Through innovation, information technology (IT) and cooperation along the supply chain.

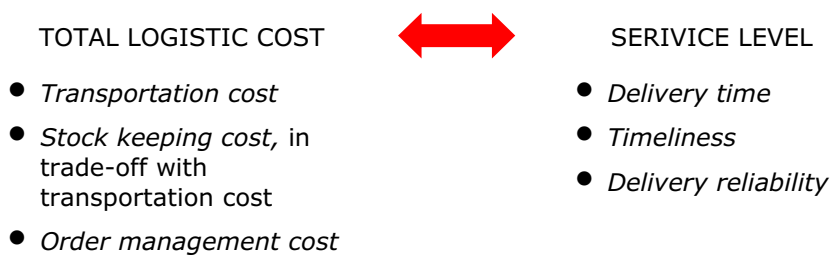


Figure 4. Supply chain trade-off

This trade-off is of great importance since the consequences of a poor service level could be very dangerous for the supply chain. This is the reason why customer and supplier within the chain should mutually agree in order to maintain a high service level, not to loose end customers.

Every supply chain has to define its competitive priorities and evaluate the best positioning in terms of logistic cost and service level. There are three different approaches (see Figure 5):

- **Marketing approach.** The priority is given to service level, which depends by competitors and customers expectations.
- **Budget approach.** The priority is given to the cost, trying to satisfy ad much as possible customers' requirements.
- **Analytic approach.** The objective is to optimize the trade-off. So the cost and income functions have to be calculated depending on service level. In theory, this approach assures the maximum profit. In practice, it is hard to estimate the two mathematical functions. This approach is widely used within the sector of consumer goods, where logistic cost and service level are constantly monitored. It states however a conceptual principle: the best service level is not necessarily the highest one. In fact, beyond a certain threshold, costs starts to grow faster than benefits and the margin decreases.

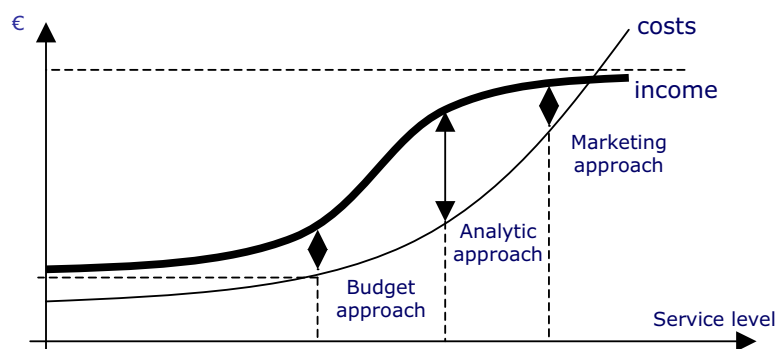


Figure 5. Management of cost-service trade-off



3. SC main strategies

The supply chain can be managed differently, according to different key performances addressed by firms in order to build their competitive advantage and to the characteristics of the market.

In recent years, new supply chain strategies tried to move further the cost-service trade-off described in the previous section, working both on speed and efficiency. The emerging strategies depend on two dimensions (Product and Process typology, see Figure 6), which lead to different supply chain strategies (see Figure 7).

Product typology		Process typology	
Standard	Innovative	Stable	Unstable
Mass distribution	Unspecific	Mature processes and technologies	Technology and production processes evolution
Stable demand	Variable demand	Wide and clear supply system	Narrow and unstable supply system
Long life cycle	Short life cycle	Automation	Continuous operations fine-tuning, variable productivity
Stability generates competition, that limits profit margins	High margins, due to product differentiation	Medium-long term supply contracts	Spot supply contracts or frequent specifications changes
Turbulence induced by <i>speculative purchasing and sales promotion</i>	Short time window (Time To Market role)	High quality	Quality problems and process reliability

Figure 6. Product and Process classification

	Standard	Innovative
Stable	Lean Supply Chain	Responsive Supply Chain
Unstable	Risk hedging Supply Chain	Agile Supply Chain

Figure 7. Supply chain management strategies

3.1. Lean

This strategy is applicable when demand forecasting accuracy and production process stability are high. In such cases you can pursue logistic cost minimization, i.e. a pure efficiency strategy. In particular, companies try to eliminate or outsource every non value-adding activity, looking for economies of scale in production. This often implies the centralization of production planning and stock management for the whole supply chain and the application of optimization techniques for operational costs reduction. In order to coordinate a complex system and reduce lead times, it is of great importance to automate the information exchange with suppliers.

3.2. Responsive

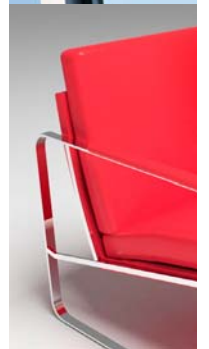
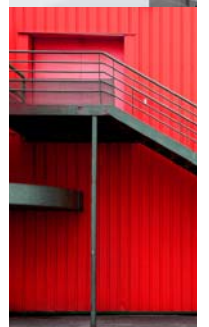
In some cases market demand is variable and products range is high, while operational processes are settled. As a consequence, it is hard to plan requirements in order to keep stocks low. On the other side, stable technologies allow a flexible and reactive supply chain management. Procurement, production and distribution lead-time reduction is fundamental, in order to answer to customer needs.

3.3. Risk hedging

In other cases market demand can be forecasted but processes of procurement, production and distribution are subjected to frequent changes. The attention is then directed to minimize risks, which can be structural (production capacity, quality, strikes, etc.) or anomalous (fires, floods, earthquakes, etc.). Backup stocks are required in such cases. Otherwise, a firm can adopt backup suppliers, in case traditional one would be no more able to meet requirements. Like the other strategies, information systems help in coordinating the different actors and having timely and accurate information on stocks and demand along the chain.

3.4. Agile

The most difficult supply chains to manage are those where demand is highly variable and processes are unstable. In such cases responsive and risk hedging approaches should be combined. Some companies adopt different supply chain strategies according to different products of different parts of the chain.



4. Levers for SC configuration

4.1. Deliver

A critical aspect for the definition of supply chain configuration is represented by the physical flows management techniques. There are two different alternatives: push and pull systems.

- **Push systems** require activating some stages of the chain in advance, on the basis of forecasts of next stage requirements. This implies the use of tools such as MRP (Material Requirement Planning) on production side or DRP (Distribution Requirement Planning) on distribution side. Because of the likelihood of forecasting errors push systems often count on safety stocks on various supply chain stages.
- **Pull systems** allow starting the activities only after the next stage manifests a need (explicit, such as a client order, or implicit, such as the decrease of warehouse stocks). Pull systems require short lead times, in order to quickly satisfy the requirement. Set-up times and machines queue times are the most frequent causes of too long lead times: for this reason pull systems often call either for technological investments or non-saturated productive capacity aimed at reducing unproductive times. The JIT logic is a typical example pull system adoption. However, when downstream demand is highly variable, pull systems are not applicable.
- **Postponement** (see Figure 8). Recent supply strategies developments allowed firms improving the cost-service trade-off, by moving upwards the decoupling point, that is to say the point where the chain passes from one system to the other. In other words, before the decoupling point components are standardized and broken into modules as much as possible, so that production can follow forecasts and, at the same time, the obsolescence risk is low. On the other side, the reduction of production, assembly and distribution times allow to reduce stock and postpone customization as much as possible, according to pull systems.

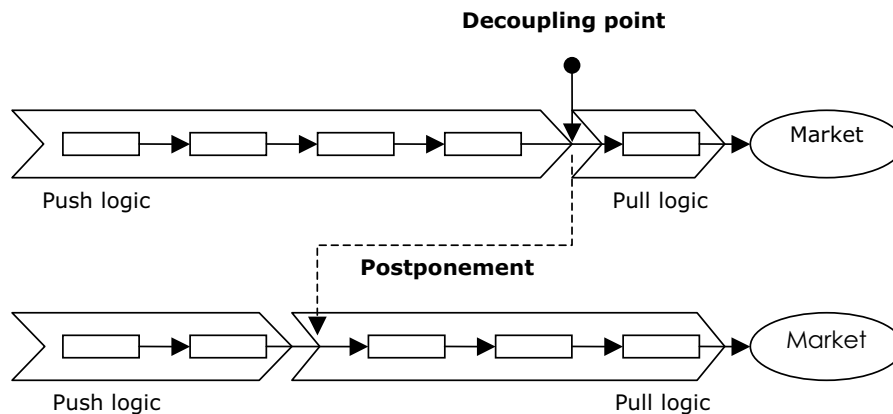


Figure 8. Postponement

In particular, in term of delivery, the passage from one stage of the supply chain to the other can be direct or intermediated, according to different types of products and contexts. The two different solutions (direct delivery and multi-level networks) are described in Figure 9.

Direct deliveries	Multi-level network
<ul style="list-style-type: none"> ▪ Direct deliveries ▪ Few deliveries, high volumes ▪ Minimizing stocks, operational costs and fixed assets (scale) ▪ Minimize transportation costs: <ul style="list-style-type: none"> ○ Full-truckload (FTL) ▪ If delivery frequency increases and volumes decreases, than: <ul style="list-style-type: none"> ○ Less-than-truckload (LTL) ○ Smaller vehicles ○ Costs increase ○ Outsourcing transportation 	<ul style="list-style-type: none"> ▪ Multi-stage distribution process with inventory accumulation in intermediate warehouses ▪ Many deliveries, low volumes to final customers ▪ Minimising transportation costs <ul style="list-style-type: none"> ○ FTL trunking (upstream) ○ LTL local distribution (downstream) ▪ Higher service to the final customers

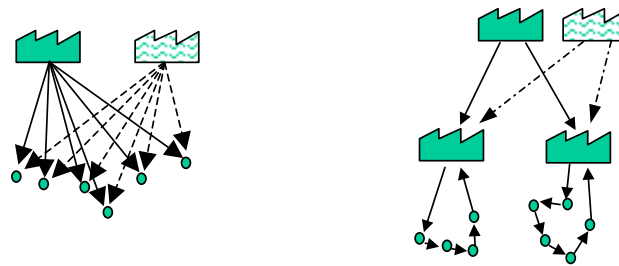


Figure 9. Direct delivery vs Multi-level network

4.2. Source

In order to understand key concepts in supply chain configurations from the point of view of supply it is useful to introduce a reference model of purchasing activities emerged from case studies.

Such activities can be classified into three different clusters (see Figure 10). Some of them have a strategic relevance, like make or buy decisions, partnership management and so on. As a consequence these are long term, and therefore low-frequency, decisions. Some others are, on the contrary, more operational and repetitive in nature: you can think to order management, quality control, payment, etc. These activities follow the strategic ones and take place by far more frequently. We can therefore represent the purchasing process as a total of three processes: strategic purchasing, sourcing and supply, where the second two represent the operational (or tactic) flow.

4.2.1. Strategic Purchasing

The Purchasing Department is responsible of coordinating strategic activities with high impact on business as make or buy decisions, reverse marketing leading to suppliers scouting and qualification, managing the supply base and the suppliers' portfolio over time and evaluating suppliers in order to improve purchasing relationships. These strategic tasks are performed together with other key departments within the organization providing useful competences (e.g. Information Technology, Engineering), sometimes involving also the top management. In particular, strategic purchasing is composed by 4 key activities.

- **Make or buy.** This is the fundamental decision that origins the supply need. It is a stand-alone decision and consist in: analysing the market conditions in order to understand whether outsourcing is applicable or vertical integration is preferred, looking at the drivers that leads towards outsourcing (such as competences, costs and capital management) and, eventually, considering which is the most advisable contract agreement for the good or service considered.



4.2.3. Supply

Once the agreement between customer and supplier has been reached, the supply process might start, meaning the customer places order/orders to the supplier according to the agreement, goods or services are then delivered by the supplier and controlled by the customer, invoicing and payment takes place and finally the customer usually evaluates supplier's performance. The supply process might be repeated several times within the contract agreement (e.g. blanket orders) or might be performed only once (e.g. capital investments) according to the specific purchase.

While the sourcing process is similar for any purchase category, supply process activities and related tools differ according to two completely different purchase categories:

- **Production-driven purchasing:** the supply process is triggered by requirements of the core business operations planning satisfying customer's market demand (e.g. raw materials, product components);
- **Non production-driven purchasing:** the supply process is triggered by requirements of internal users within the customer organization not necessarily driven by operations planning (e.g. office supplies, information technology).

Given the distinction between blanket and una-tantum agreements and production-driven and non production-driver purchases, the recurring activities during the supply process are the following.

- **Order and expediting.** The purchase order is the official document that commits the customer to buy and gives the input for production or expediting (in case of make-to-stock production plan). In case of single transactions (e.g. capital assets purchase) contract and order are the same thing. On the contrary, when supply relationships are solid and repetitive, the Requests for Purchase can be directly uploaded to the supplier's information system, overcoming low value added activities. Expediting consists in tracking the order and stress the supplier, if needed.
- **Shipping and receiving.** Delivered goods have to be downloaded and recorded. Then the quality control (usually on a sample) takes place. Delivery time, quantity and conformity are registered. More and more this activity is performed by Production or Planning and Control department, even if the responsibility can remain in charge of Purchasing.
- **Payment.** Once the delivery is ended, the supplier releases the invoice and the payment cycle starts, according to contractual terms.
- **Operations evaluation.** Any data regarding the supply is used to assess the supplier evaluation and feed the vendor rating system at the strategic level.

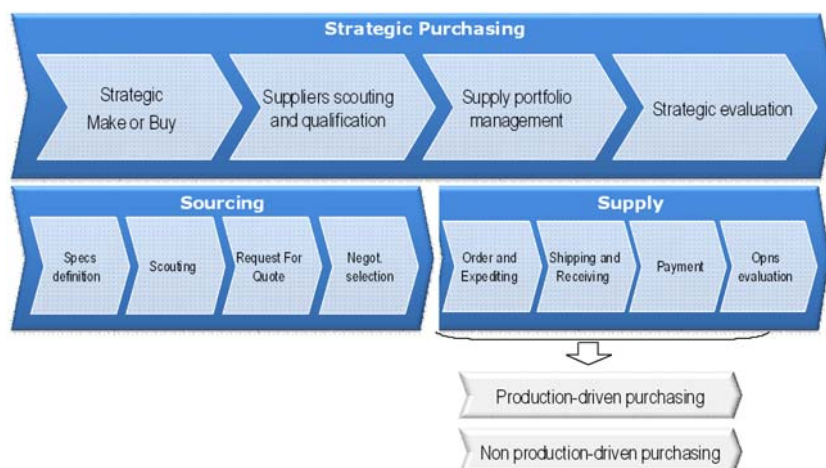


Figure 10. The purchasing process

4.3. Outsourcing

How to decide whether or not is the case to outsource any activity is not the scope of this document (see FIRST guidelines: Outsourcing). However, since outsourcing decisions are the logical antecedents of supply network configuration decisions, Figure 11 summarizes the critical aspects a firm should take into consideration when the outsourcing decision takes place.

- **Descriptive complexity** (external) of the components / parts limits the outsourcing convenience by the potential customer.
- **The component specificity** limits the real availability of a supply market as the potential suppliers are not in favour of "ad hoc" investments to design and produce specific components.
- **Uncertainty** of processes and components reduce the convenience for the potential supplier.

The reader has to note that the three previous drivers are useful to determine which kind of market exists for a specific component. So, no choice is up to the firm. It is only later on, when you established that a collaborative market could be the case, that a company could decide if it is the case to outsource, considering competence, cost and capital drivers. Figure 12 in turn, summarizes pros and cons of each existing market condition.

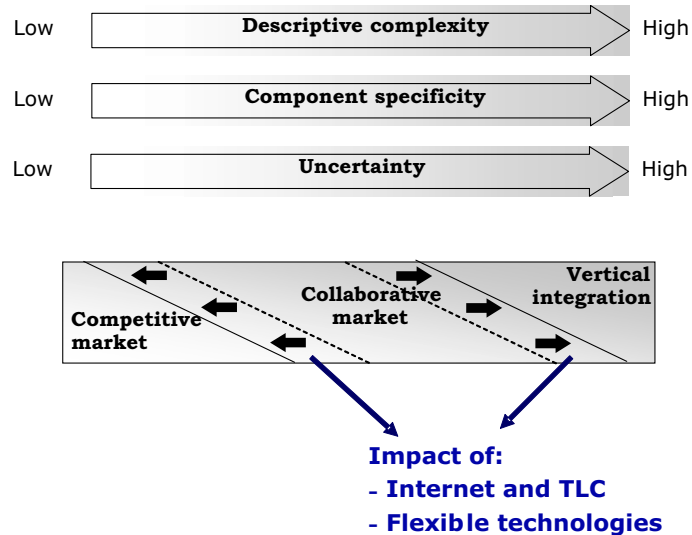


Figure II. Existing market

Competitive market		Collaborative market		Vertical integration	
Pros	Cons	Pros	Cons	Pros	Cons
Low switching costs	Low differentiation	Benefits/risks sharing	High switching costs	High control	Low flexibility
High flexibility	Low control	Better performances	Spill-over risk	High differentiation	High investments
Access to innovation	Loss of competence	Medium-high control	Risk of choosing the wrong supplier	Economies of scope	Defocalization
Low costs		Supply base reduction			
Focus on core-competence		Secure market for the supplier (and low uncertainty)			

Figure I2. Pros and Cons

4.4. Collaborative SCM

In the previous section we introduced the notion of collaborative market. In this field firms establish the so called partnership between customer and supplier. This kind of relationships require the interaction among several organizational functions or department, according to Figure 13. Within a partnership the relation with supplier is no more conflicting and does not only require negotiation skills. Coherently, the purchasing department gains new relevance and the buyer changes his role as well, becoming a "process owner" rather than a commercial employee. Nevertheless partnerships do not eliminate negotiations: the scope is the fair risk and benefit sharing, constantly looking for synergies and win-win situations.

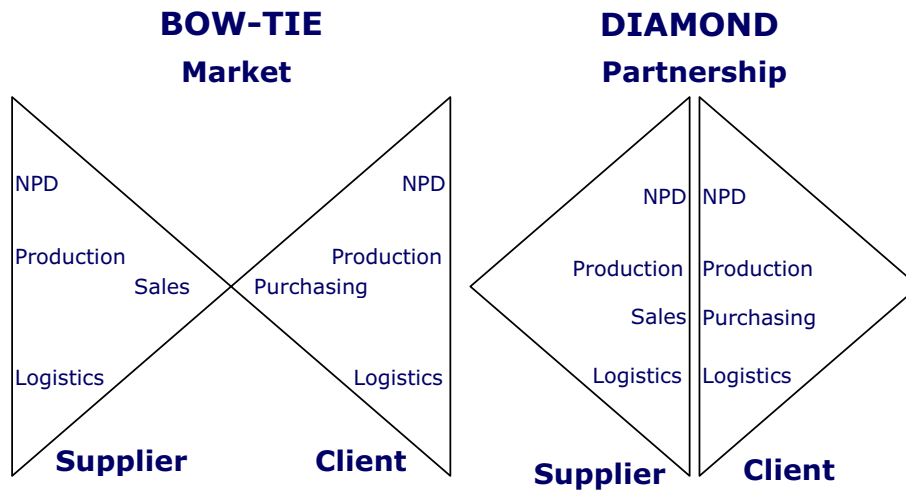


Figure 13. Partnership management

Since partnerships can generate benefit for firms but carry on even some risks, there are tools and solutions aimed at keeping the risk low:

- **Framework agreement:** medium-long term contract for a durable supply relationship. The customer reserves a certain amount of production capacity and the supplier is covered for specific investments.
- **Performance monitoring:** in order to anticipate any problem. This activity should be aimed at the actual improvement rather than at taking advantage of fines or contractual clauses. Moreover, performance measures have to be clearly stated, in order to align supplier efforts to customer objectives.
- **Dedicated investments:** if one or both companies invest on a specific relation this represent a warranty of commitment.
- **Knowledge sharing:** this is a particular form of dedicated investment. Actually, knowledge sharing is the true element that differentiates the partnership from a pure market relation.
- **Transparency:** this is one of the most effective levers. If the supplier reveals its cost structure, the client is protected by too high prices. The supplier can in turn ask for the repayment of his dedicated investments.
- **Reputation:** an opportunistic behaviour of a partner can be profitable in the short term, but can also exclude future collaborations.



If a firm establishes that it is the case to collaborate with suppliers there are still some alternatives. As Figure 14 represents, there are two type of integration:

- **Technological collaboration (Co-design).** Customer and supplier collaborate in designing and developing new products or processes. There are different types of co-design according to different aims (e.g. time, cost, quality) and there are some pre-requisites too. First of all, project management skills are needed, in order to be able to interact. Secondly, firms capabilities should be complementary, in order to reach results otherwise difficult to obtain. At the end, a certain degree of trust is needed, since contractual protection mechanisms are not always sufficient.
- **Operational collaboration.** Customer and supplier jointly coordinate demand forecasting, material requirement planning, order management, production, expediting, delivery, quality control, invoicing, payment or a part of these activities. There are different types of operational collaboration, according to different levels of information sharing (e.g. visibility or integration). There are also different tools to put in place in order to activate information flows, such as: telephone and fax, proprietary ERP, EDI, web EDI, extranet and so on.

Note: synergies deriving from the simultaneous application of technological and operational collaboration are not excluded. For instance, JIT very often requires the development of specific production platforms before the actual integration of the production and logistic cycle starts.

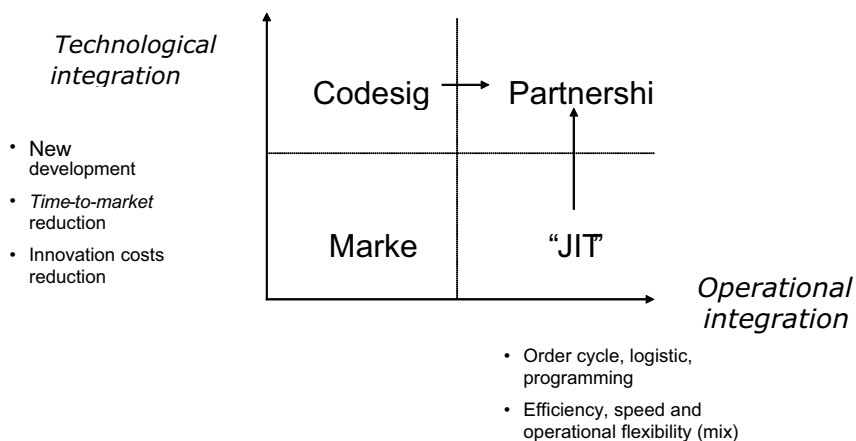


Figure 14. Operational and Technological integration

According to the type of product that is the object of the transaction, different sourcing strategies can be chosen. In particular, two drivers lead to decide which strategy is most appropriate (see Figure 15):

- **Supply market complexity.** It consider whether or not there are obstacles for purchasing a specific product or component. This dimension is obviously linked to those listed previously: descriptive complexity, specificity and uncertainty. Indeed, for certain categories a competitive market is not the case: still, difficulties in supply could be in place. Possible indicators of the supply market complexity for a given good are: market concentration (number and dimension of suppliers), bargaining power of suppliers, constraints in production capacity.
- **Strategic importance.** It measures the contribution of a purchased good to the firm competitive performances and allows to distinguish between purchases that are strategic and others that, despite necessary, do not add competitive advantage. Possible indicators of the strategic importance of a good are: cost impact on the firm product, contribution to the overall product quality, capability to offer competitive advantage (for instance, in terms of differentiation from competitors).

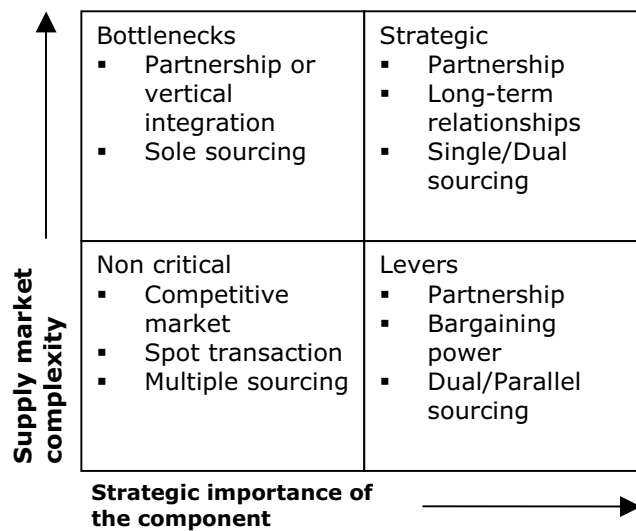


Figure 15. Kraljic matrix

As Kraljic’s matrix suggests, there are different sourcing policies available to manage the supply network, which are characterized as follows.

- **Multiple sourcing.** The customer constantly refers to a competitive market and uses spot transactions, not to depend on a single supplier. Suppliers are generally selected on price basis and switching costs are low (i.e. different suppliers produce more or less the same product). This kind of supply network adapts to standard products that are easy to find on the market. In general, it is also easier to access innovation. The main weakness is the impossibility to obtain a high level of customization or benefit for economies of scale, since the material requirement is divided among several suppliers.
- **Single sourcing.** The customer buys a certain product or component from a unique supplier. This is sometime a mandatory choice: the supplier could own a proprietary technology or be a monopolist or, again, the customer could ask for dedicated investments. In other cases the customer is interested in customization, flexibility, high exchanged volumes, specific skills and so on. There is however a danger of “lateral monopoly”, since the customer can become hostage of his supplier.
- **Dual sourcing.** It is a variant of single sourcing: the customer maintains a single supplier for the majority of supply of a certain good and a backup supplier for the remaining part. In this way, there is a certain degree of competition between the two suppliers and the customer is protected by accidents and opportunistic behaviours.
- **Parallel sourcing.** It is characterized by a series of single-sourcing relationships in order to satisfy the requirement of a component for a family of end products. In other words, the customer renounces to aggregate the need across different product families, keeping several suppliers that realize more or less the same product. In order to activate parallel sourcing, a firm should have a sufficiently wide product range (where product families share similar products or activities). Moreover, a single family requirement for a component has to be as high as to justify the activation of a dedicated supplier. The objective of parallel sourcing is to improve the trade-off between risk and efficiency of the supply: like in single sourcing, the customer has the possibility to build long term and collaborative relationship; while, like in multiple sourcing, he maintain the possibility to substitute a supplier with another.





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