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SME and Planning in Supply Chains: a Socio-technical View *

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Abstract

The co-existence of large and small companies in nowadays supply chains may led to misunderstandings which are prejudicial to the supply chain performance. Based on several studies in aeronautical supply chains, we list some of typical problems linked to the relationship between large and small companies, and show how the solutions promoted by large companies may in some cases be inadequate. We suggest to use different frameworks suggested in social sciences for better understanding the origins of these problems and provide some guidelines for defining a framework of cooperation between large and small companies, oriented on a better mutual understanding.

Key words: Supply Chain Management, Flexible manufacturing systems, Human aspects.

1 Introduction

Supply Chain Management motivates a great interest both on industrial and academics sides, but this ever growing area is most of the time considered according to specific points of view (information technologies, management, social aspects) which can hardly address its multiple interrelated facets. The present study, focusing on the relationships between large and small companies in aeronautical Supply Chains, suggests to consider the SCM problem with the double perspective of production management and social science. Aeronautic supply chains have indeed specificities which make them especially interesting, for instance regarding the complexity of their planning process but also the co-existence in these macro-organizations of very large and rather small companies. After listing these specificities, some daily problems linked to the cooperation between large and small companies will be explored through case studies. The interpretation of these problems according to the dominant partners of the supply chains (OEM - assemblers of aircrafts or of large sub-systems) will be given, together with the solutions they try to implement. The main characteristics of SMEs as they have been identified in social science research programs will then be emphasized and the implications of such characteristics concerning the planning of supply chains which combine large firms and

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SMEs (Small and Medium Enterprises) will be explored, by referring to the case studies. It will be shown how the solutions suggested by the large companies may be in contradiction with these characteristics.

2 Supply chains in the aeronautic sector: specificity, problems and actions in progress

2.1 Specificity

In the food, pharmaceutical, automotive or electronic sectors, complexity mainly comes from the necessity to manage high volumes: the increasing need in diversification, typical from the automotive sector for instance, is addressed through mass customization, thanks to modularization and component standardization [1]. Mass production allows using a large set of proven methods aiming at simplifying material flow management. Dedicated or flexible manufacturing lines within the companies, or physical proximity of the OEM and its main suppliers are for instance layout changes which have made possible management techniques such as Just-in-time, then lean manufacturing [2]. In this case, mass production has allowed changing the problem from "managing complex flows" to "designing a complex supply chain allowing to manage a simpler flow". This mass production context is far from the reality of the aeronautic sector: even in flexible lines are often implemented in large companies, the context in the area is still to manage a very large number of discrete lots, each composed of few parts, in widely spread supply chains. In a distributed management context, where each company manages its customers and suppliers, this is the perfect context for apparition of chaotic phenomena like the Bullwhip effect [3] which induces uncontrolled flow variations which may destabilize the supply chain.

2.2 Problems in aeronautics supply chains

During many years, the progressive increase of demand and relatively low level of competition in the sector has allowed to focus the efforts on quality of parts and products, and on technical innovation. The context is now very different: competition is fierce and other aspects than technological ones have now to be better addressed, the cycle time and cost of a product being the main ones. In times when the value added by the OEM was around 60-70% of the total value of the product, efforts have been made internally by these large companies, resulting for instance in layout reorganisations making possible internal just-in-time and lean manufacturing, implementation of ERP (Enterprise Resource Planning) systems for a better control of activity and cost, or implementation of CRM (Customer Relationship Management) tools for better understanding and managing the customer's demand. In parallel, the large companies began large programs aiming at motivating their suppliers on management and organisational issues. Today, only 40% of the value is added by the final assembler, and this level will still decrease. One of the reasons of this transfer is that in the past, only "operations" were subcontracted to SMEs which were receiving the semi-manufactured parts, performed their operation and sent the parts back. The effort on flow management was on the large companies, and many unnecessary movements of parts were drastically increasing the cycle times. In order to simplify the global flows, elementary parts were then subcontracted to SMEs, the assembly being performed by the large companies and SMEs were to manage the raw material or component suppliers. Today, still for flow simplification purposes, large companies ask their suppliers to deliver assembled components, or at least "kits", i.e. sets of parts to be assembled in the same component. This requires the SMEs to manage a real bill of materials, and to synchronise several suppliers. In this new context, large companies set a high pressure on the SMEs, considered as having high technical skills but poor motivation and competence on the flow management field which is now critical.

2.3 Solutions promoted by large companies

Generating a Supply Planning on the base of orders (firm or forecasted) is usually done using the MRPII method (Manufacturing Resource Planning, see for instance [4]. Using this method, a Sales and Operation Planning (SOP) is firstly built at long term (for instance 1-3 years in the aeronautical sector) on the base of firm orders and forecasts, describing requirements for family of products. A Master Production Schedule (MPS) is then deduced by product at lower term. On the base of these requirements, the bills of materials are used for generating on one side a Supply Planning, and on the other a Production Planning (Material Requirement Planning (MRP) step). The adequacy between the load deduced from the Production plan and the capacity of the company is checked (Load Planning), then the production is scheduled (Scheduling). Release and work in progress management can eventually be done using a Kanban technique.

This method allows dealing with complex bills of materials when the demand is known through programs, which is the case in the aeronautical industry. Therefore, Supply Chain management is usually considered in this sector as performable through a cascade of MRPII systems, one in each company (see Figure 1), the information flow being created by the final demand on the OEM.

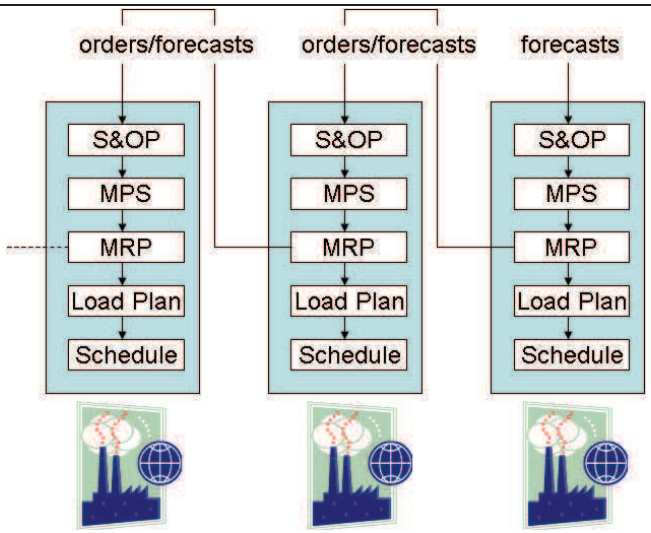

Fig. 1. Cascade of MRPII systems for Supply Chain Management

Controlling the global performance factors of the Supply Chain, like the cycle time, using a sequence of local decision makings is of course a challenge, and a centralized approach (i.e. the main partner performing a planning for the whole Supply Chain using an APS (Advanced Planning System) [5] could be considered as more consistent. Nevertheless, the goal is here to co-ordinate autonomous companies, each partner being responsible for the quality and delay of the product it delivers, including what is provided by its own suppliers. This prevents from the use of centralized techniques which set into question autonomy and responsibility of each partner. As a consequence of this context, most OEM have launched programs aiming at promoting the use of MRPII by their suppliers, including the use of Production Management software, together with Lean Manufacturing techniques aiming at simplifying the material flow management. We shall see in next sections that the success of these programs is questionable.

3 Lessons learnt by case studies

Various problems in the application of the solutions listed in previous sections are visible in the SMEs. In different contexts (consulting, audits, interviews and participation to projects launched by large companies in order to improve the competences of their suppliers), the authors have had access to a large panel of real situations showing new practical problems induced by these various solutions (six Original Equipment Manufacturers (OEM) or large companies manufacturing complex sub-systems, around 20 SMEs). Precise descriptions of the analyzed real situations can be found in [6] or [7]; we shall here focus on a synthesis of these situations, addressing the efforts done by the large companies for improving the performance of their smallest partners. These efforts - the "bright side" of cooperation are summarised in the white boxes of Figure 2. At long term, large companies promote the idea of privileged partnership, the SMEs accepting to progress according to the suggested rules benefiting from long term contracts. It is indeed necessary to situate such relationship, requiring an important investment for both partners, at middle long term. Large companies may be subject to unexpected variation in their customer's demand, and are conscious that such variations could set in danger their smallest partners. Therefore, they often include by contract in their forecasts the definition of "firm periods" longer than their own visibility. As explained above, production and management systems have to be simplified first for being more efficient. Improvement methods like Lean Manufacturing are usually promoted in the aeronautic sector in that purpose. For instance, a simplification of the management of the priorities between orders is usually considered as a necessary improvement: if the material flow becomes more regular, simple

management techniques like FIFO (First In First Out) considerably increase the predictability of the cycle times at each step of the supply chain, therefore increasing global visibility.

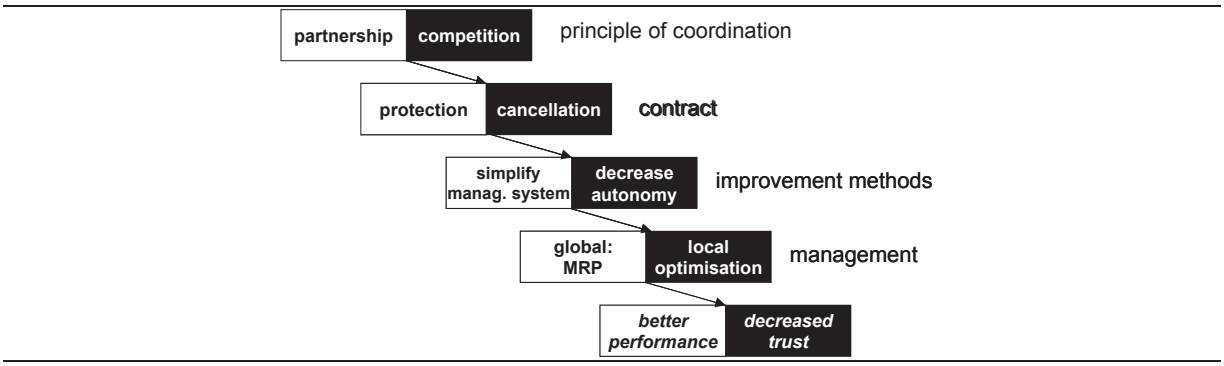

Fig. 2. The Bright and Dark sides of OEM/SMEs cooperation

Once the production and management systems have been simplified, the MRP technique should allow to implement control loops at various time horizons (long term, using S&OP; middle term, using Material Requirement Planning; short term, using the Load Planning). The expected result of this consistent program of cooperation should be a better performance, beneficial to all partners. Reality seems to be often different, for two main reasons: on one hand, large companies often have a "double discourse" which may set into question their credibility, while on the other hand some of their initiatives are interpreted by SMEs in a totally counter-productive manner. These points - the "Dark side" - are represented by the black boxes of Figure 2. Large companies promote partnerships, but at the same time, they try to decrease their costs by choosing new suppliers in low cost countries. In many cases, we noticed that even SMEs having accepted to follow improvement programs saw some of "their" parts sent in eastern Europe of China. The protection provided by the large companies concerning the final customer's demand is often not noticed by SMEs. On the opposite, many of them draw our attention on a paragraph of their contracts specifying that the contract could be immediately cancelled if parts at lower costs could be found from other suppliers. For large companies, such paragraph only aims at pushing the suppliers to constantly decrease their costs, choosing a new supplier being a time and money consuming activity. Correlated with the arrival of new low cost suppliers, it was clearly not interpreted that way by the SMEs.

In a supply chain, the parts should processed by each supplier according to their criticity regarding the global objectives of the Supply Chain. For instance, parts which manufacturing is on the critical path for obtaining the final product should have high priority. Unfortunately, it is not yet possible to provide such information to all the partners of the chain. Improvement methods such as lean manufacturing are in our opinion prescribed as a substitute with the idea that, if the parts cannot be prioritized according to the global objectives of the Supply Chain, a material steady flow would nevertheless be beneficial. Indeed, one important message of Lean Manufacturing transmitted by large companies to the SMEs was to process the parts according to a FIFO logic (First In First Out), allowing to preserve the sequence of processing built by the OEM. This is clearly against the autonomy of the SMEs: in one case for instance, an SME performing thermal treatment shown us that 60% of its production was for the same customer (a large SME). It was so important to give him satisfaction, which was obtained by giving high priority to its urgent parts. Such attitude would not anymore be possible if using the FIFO principle promoted by the OEM. Nevertheless, it is interesting to notice that this important customer was also working for the same OEM... This means that the Supply Chain can locally be in competition with itself...

At a more operational level, MRP is suggested by large companies as the only way to efficiently control manufacturing. Nevertheless, SMEs have to address technological constraints, which they usually handle through ad-hoc information processing, often based on Excel® or Access® tools. In that case, it can be seen that the forecasts are introduced in the production management tool present in the SME, that a long term load/capacity balance is sometimes checked... then orders are derived to a specific application allowing for instance to group components in order to decrease set-up times, or optimize the use of raw materials... Since the sequencing performed by these tools is never re-introduced in the MRP systems, it is afterwards not anymore possible to define the control loops allowing to give middle term and short term visibility. The question is of

course not to say who is right and who is wrong, but such local optimization is absolutely necessary for being able to meet the drastic decrease of costs through time imposed by the customers. Asking at the same time to process parts in FIFO in small lots and to decrease costs is considered as inconsistent by the SMEs, who privilege the costs, which is the most visible of their performance criteria.

As a conclusion, it can be seen that instead of an increased performance, the result of such cascade of misunderstandings is usually a decreased trust, which can be easily noticed in the SMEs. In next section, we suggest to apply various concepts suggested by social science to the problem of cooperation between large and small companies. These concepts could help us to better understand the origins of the problems, allowing to suggest some research directions for better addressing them.

4 Another view on the relationship between large and small companies in the supply chain context

4.1 A specific entrepreneurship Project: independence as a core value

The projects promoted by large companies in order to improve the relationship with their small suppliers implicitly consider that the methods which have been successfully applied in large companies should be applied in small ones. Research programs in social sciences concerning SMEs have demonstrated that small and medium firms should not be considered as big firms at a smaller scale [8, 9, 10, 11]. In particular, it has been shown that a majority of SMEs do not grow beyond a certain size because their managers do not want them to develop and lose their SME characteristics [12]. This is a definite, if implicit, strategic decision. These managers place great emphasis on being able to decide the way their firm will develop, and on keeping a relative freedom regarding their environment. In such a context, the control of the planning process appears to go much further than questions regarding either technical issues or human capabilities. As we will see further on, evolutions such as lean manufacturing, with a process organized according to a FIFO rule, imply that no more pilot should be needed at the subcontractor level; such principles seems to be deeply contradictory with SME manager s search for independence.

Organizational independence is officially highly valued. In many respects, the issue of keeping companies relatively independent meets the customer's goals very well: the large companies, in their pursuit of flexibility, ask their suppliers to be economically sustainable under widely varying demand, even to the extent that they may lose their contract. This places pressure on the SME to diversify by being involved in different supply chains, as a risk reduction strategy. This diversification strategy is coherent with the desire of SME to keep independent of particular clients. But it introduces also a contradictory constraint when the main company tries optimizing its supply chain without taking into account the supplier s involvement in different supply chains, or his type of relationship with different partners of the same supply chain, creating a planning disconnect.

4.2 Proximity Logic and 'Magnifying Effect'

The relationship between large and small companies is a good example of "proximity logic" and of its consequence, the "magnifying effect" [13]. The proximity logic is related to the propensity of each person or organization to see herself or himself in the centre of her or his world. In such a centric view of the world, the nearer are the persons, the things or the events, the more important they appear. Only adequate information on the external context can balance this phenomenon, under condition that this information is available, understood, trusted and leads to decisions at least partially consistent with local interests. None of these conditions are in our opinion verified in the context describe din previous sections.

Indeed, both large and small companies seem to consider that their own problems are the most important, e.g. local optimization for SMEs vs. global visibility for large companies, etc. It would be an error to consider that large companies would be right and SMEs wrong, the first ones being aware of the real objectives of the supply chain, while the SMEs are myopic. As a matter of fact, the global objectives of the chain (decrease of costs and cycle times, better customer service, etc.) are the own local objectives of the OEM, and large companies do not really see that these objectives have to be balanced with those of the SMEs for allowing better global satisfaction... Research programs have also analyzed the 'proximity logic' that characterizes the way SMEs are

dealing with relationships [13]. Proximity according to geographical or social criteria is often mobilized to choose the partners and suppliers. Therefore, the way production planning is designed and carried out has to be consistent with such a way of setting up relationships. The proximity logic deals also with the choice regarding priorities (the nearer the most important) and related decision process. It is clear that the introduction of far partners like those based on low cost countries sets problems for SMEs used to this "proximity logic" even when they do not feel really menaced by those partners. Another important notion is the 'wall' that tends to separate the inner view and its related priorities and constraints, and the outside. Since SMEs only have a limited number of decision makers, the wall effect is mainly at stake between firms but also between different functions in a large firm. In spite of the process view promoted by large companies, the "horizontal" logic present in various departments of a large company, and the "vertical" logic can be in opposition, phenomenon which can hardly be accepted by Small Companies which do not suffer from this. Therefore, any inconsistence in the behaviour of employees of a large company due to the wall effect is easily considered as planned by SMEs. Promoting at the same time partnership and removing parts from partners for sending them in low cost countries is an example of consequence of such "vertical" wall. Concerning the "horizontal" wall, let us relate the case of a supplier receiving its raw materials from its customer: the raw materials were not yet delivered by the customer, but the orders were already late, and requested... In that case, the "wall" effect separates the two concerned departments of the customer, the magnifying effect preventing each of them to set into question its own behaviour even if it sis inconsistent with an efficient work of the other.

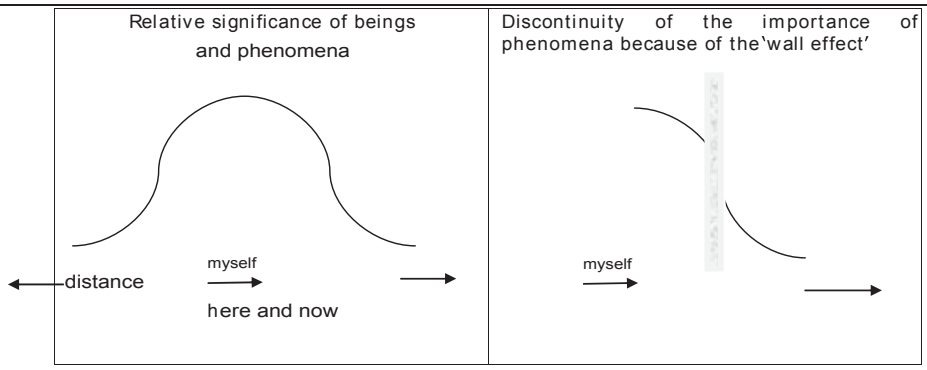

Fig. 3. Magnifying effect and wall

Such an organizational difference between SME and large firms can have a strong impact on their mutual understanding, therefore on their cooperation capabilities, and at the front line on the relationships between their planners and schedulers. The SME planner will possibly search for combining the constraints and priorities of the commercial and the production components of his enterprise, because of the function proximity that helps him being concerned with such issues. Meanwhile, the large firm planner will probably focus on optimizing its own planning, because the walls are fairly high with the other functions in his firm, preventing for instance to assess the consequences on planning of other policies of the company. He may consider that the SME planner is fairly inconsistent in regards to planning methods and criteria.

4.3 Personal trust vs. trust in expert systems

Mutual trust is clearly a key point for a successful cooperation, especially in such a disturbed environment than manufacturing. In his theory concerning The Consequence of Modernity (1990-1994), Anthony Giddens has discussed the role of trust in social relationships. He differentiates two main types of trust. The most traditional one is trust based on personal relations, often initiated through face-to-face communication. Turn-over and constant reorganizations makes large companies quite reluctant to base their performance on personal relationship. As a consequence, contemporary modernity impulses the development of what A. Giddens calls "expert systems" of "technical accomplishment or professional expertise that organizes large areas of the material and social environment in which we live today . These are impersonal, complex, abstract systems, and methods, like lean manufacturing, MRPII or tools like ERP can be considered as "expert systems" in Gidden's sense. In the process of modernity, people have to count on the reliability of these systems, whose inner-working they usually do not know or conceptually understand.

Let us go back to SMEs. Studies have shown that SME managers were relying strongly on inter-personal trust that fits well with proximity logic and magnifying effect [14, 15]. Planning, with its logics, methods and tools, forms an expert system; another expert system is the set of information and communication technologies that usually support the treatment required and information exchange. SME managers usually have an in-depth knowledge of their firm activity domain, but the planning "expert system" is often far away from their own expertise. When the large companies ask SMEs to implement MRPII or the like, they are in fact very demanding, looking for a deep cultural change. From the SME managers and employees, it means switching from inter-personal trust, based on commonly practiced social judgment, to trust in abstract systems, that has to be set up from nowhere. As noticed in [16], in SMEs, formalism and standardization is often seen as a lack of trust, whereas for big companies they are means to work efficiently . The change at stake is a very important one, and information or training is not sufficient to cope with it. The main values and worldviews are fundamentally different, each of the participants, and moreover the main firms, being absolutely sure that there is a one best way , and that it is the one they have chosen.

4.4 Components of trust

An additional dimension comes from L. Karpik research program regarding trust in service relationships [17]. According to Karpik, trust relies on a combination of knowledge and believes. Changing from interpersonal trust to trust in expert system possibly means evolving from knowledge based on personal relationships, including previous experience and the related decisions, to new beliefs in the supposed-to-be reliable abstract system. The fact that main firm planners can be very aware of the interest of planning methods and tools does not by itself produce the same believe in SMEs.

Anthony Giddens underlines the role of gatekeepers for expert systems. These gatekeepers are mainly persons who play an important part in the mediation between an expert system and its users. The personal trust in gatekeepers can play its part in the development of trust in this expert system. This dimension raises the question of the individual relationships between main clients and suppliers. Supply chain managers employed in large companies could play this role of gate-keepers, acting as interfaces between the ERP and the suppliers. They do not seem in position to fulfil it, because they only have for mission to transmit and make operational the message from the expert system, and not to adapt it to the reality of the SMEs. Moreover, they do not always manage to create personal relationships with the suppliers, since the contemporary process of rationalization and optimization tends to sustain the principle according to which the substitutability of employees should be possible as soon as standardized procedures are followed. Such logic, giving priority to standardized exchanges rather than to personal contacts, takes aside the personal dimension in relationships that appears to play an important part in trust production.

4.5 Plans and Actions: complementary or contradictory?

The relationship between large companies and their subcontractors could also be analyzed according to Suchman's plan and action theory [18] (citation à mettre): indeed, SME planner gives priority to action (supposed to provide reactivity) compared with main firm planner, who tries to keep the planning relevant (in order to increase efficiency). Table 1 aims at pointing some of the misunderstandings between large companies and small ones by summarizing what are the knowledge's and beliefs on which each kind of structure bases its truth.

Table 1
Bases of trust on large companies and SMEs.

Large companies trust in:	Small companies trust in:

- institutionalized/standardized relationships
- planning systems:
  - strong belief in their efficiency
  - have specific knowledge in planning methods and tools
	- personal/informal relationships
	- action
	  - strong belief in their capacity to efficiently react to unexpected events
	  - know-how and know-whom to solve problems in action

For small companies, performance is linked to people whereas a large company want to have the insurance of a good process quality whatever the people involved. As a consequence, small companies mainly trust in personal, often informal, relationships whereas large companies trust in standardized processes supposed to provide quality insurance. Similarly, they will prefer the "guaranteed" quality provided by a validated planning built by their information systems in comparison with actions improvised by people. The consequence is often that SMEs consider their large partners are poorly reactive, whereas the large companies consider their small suppliers are poorly organized, leading to a poor trust in the other's attitude.

4.6 Power as a Disturber of the Trust-based Relationship

As emphasized in Table 1, large companies and small ones do not trust in the same behaviours. Therefore, only discussion/negotiation could allow the two types of organization to agree on common behaviours, based on knowledge and beliefs acceptable by both partners. Such discussions allowing to define the bases of cooperation require in our opinion to be open to the partner's expectations, which is not always the case. Figure 45 shows for instance a simple taxonomy of collaborative situations, suggested in [6]. The first axis of this taxonomy expresses the power of the partner on the Supply Chain, while the other shows the power of the partner on the Supply Chain. For simplification purpose, only two degrees are considered here (high or low) defining four main situations:

1rst situation: this is an ideal collaboration situation. The company is important for the SN and the SN is important for the company. There is a mutual interest in collaborating. In that case, the company is a strategic partner in the SN and discussion is a natural thing between partners.

2nd situation: this is a constraining situation for the SN since the company is important for the SN, but the SN cannot really influence the local decisions towards the SN requirements. The company is a constraining partner for the SN, which does not suggest that it will be ready to make efforts for the Supply Chain, represented here by the large company.

3rd situation: this is a situation of dependency of the company regarding the SN. The SN requirements will then have priority in the local coordination process. The company is a dependent partner. A non specialized sub-contractor in a competitive market will be in this situation.

4th situation: it is a situation of mutual indifference regarding coordination between the SN and the company. Without constraints, strategic issues, or mutual interest, there are very few reasons to collaborate or to put energy in coordination. The company is a non strategic partner regarding the SN.

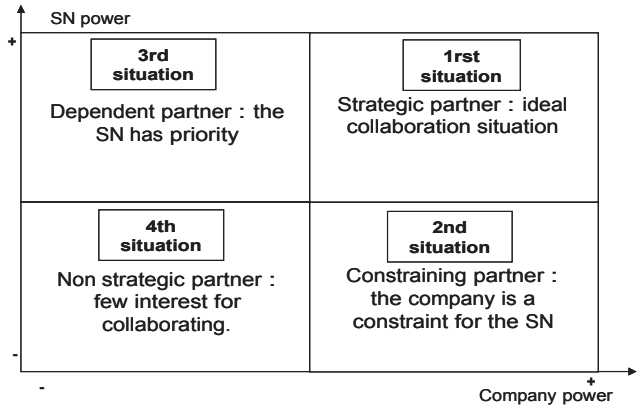

Fig. 4. The situations of collaboration

In situation 1, cooperation is in our opinion "natural", whereas it is questionable in the 4th one. In the second situation, the Supply Chain will have to cope with the constraints induced by its partner. All the SMEs that we have met during this study were in the 3rd situation. As dependent partners, they know what is expected from them even if they do not share these values. Since they can hardly influence their large customers, who in turn want to change their way of working, these companies make a clear difference between an apparent behaviour, conform to what is expected by the large company, but not really applied, and a "parallel" one more conform to their own knowledge and belief. A part of the problem lies in our opinion in the disjunction between these two spaces, coming from an absence of real comparison of the expectations (justified or not) of each partner. In next section, we try to exhibit some technical research directions aiming at coping with some of these problems.

5 Directions of improvement

Technical tools only cannot solve complex relationship problems as those depicted in previous sections. Therefore, the first condition of improvement is of course that each partner understands the reality of the problems, which is made easier by an ad-hoc interpretation framework. A second condition is certainly to avoid to set the problem in a "who is right - who is wrong" perspective. In our opinion, the following steps could be a first step for setting the relationship between large companies and their small suppliers on another base.

Show the links between local (suppliers) problems and global ones, and conversely. It is often considered that in a Supply Chain, the partner's objectives may be in conflict with the global objectives of the Supply Chain. Reality is in our opinion a little bit more complex, but also more favourable: the links between the local objectives of the suppliers and the global objectives of the supply chain (often represented by the large companies/OEM) is unclear. Indeed, most of the behaviours of the small companies which are condemned by large ones aim at addressing locally global problems, like decrease of the costs by local optimization. Therefore, it is important to analyze the consistence between local and global objectives. In that purpose, a solution could be, like in the GRAI method [19] to compare the decompositions of the global objectives into local ones obtained from a top-down approach (performed by large companies) and from a bottom-up approach (performed by the suppliers). Inconsistencies could then be identified and formalized.

Show how each partner's behaviour is consistent with its decision level (local or global). Each partner could then position its behaviour and actions according to the structure of objectives he identifies, so that the large companies can see the consistence of the SME's behaviours with their objectives, and conversely. The aim is here to gain respect from the other by showing the consistence of its attitude, which is a basic condition for trust. Of course, inconsistencies can be identified during these two steps, on both sides. These inconsistencies, once formalized, have to be discussed.

Allow each partner to show how the other's decision have set difficulties from him. After the two first steps, it is possible to show how the decisions and actions performed by its partners may induce difficulties for him. In that purpose, the negative impact of the partner's actions on its own objectives should be identified and assessed.

Have a common agreement of what can be improved and what should be respected. Once the situation is more clear on both sides, it is important to discuss the mutual adjustments which are required for making the relationship more effective. This difficult step should allow:

1) to fix obvious problems, i.e. to identify and modify inappropriate behaviours
2) to compare the benefits and drawbacks of other behaviours, and to try to find other solutions providing a better balance.
3) to identify unsolved problems, i.e. local (resp. global) objectives which are not addressed by global (resp. local) actions.

Find how the necessity for mutual adjustments can be made consistent with existing planning tools (on both sides). On both sides (local and global), actions are organized through planning tools often used according to a top-down logic. In consistence with the previous steps, it must be decided how top-down and bottom-up planning can be made consistent, by defining areas of negotiation within the information systems.

This sequence of actions have only one goal: explain its own behaviour to its partners so that communication lead to recognition, then to trust, authorizing acceptation of mutual adjustment.

6 Conclusion

In nowadays Supply Chains, and especially Aeronautic Supply Chains, the leading partners, often large companies, usually consider that their efficient internal way to manage production has to be generalized to all their partners. This is especially true when their partners are SMEs, often considered as poorly organized. In that purpose, large companies promote the standardization of methods and processes in the chain, supported by nowadays IT tools providing communication and planning facilities.

We have tried to emphasize that this evolution sets several problems, mainly linked to the different of nature between large and small companies:

- new management methods, like lean manufacturing, are promising for better meeting the global Supply Chain objectives (cycle time, better reaction...), which are also the objectives of the leading partner. Nevertheless, SMEs do not find in these methods their usual means to lead their own policy (e.g. by choosing the priority of the orders) or to optimize their own local objectives (e.g. through order sequencing according to technological constraints).
- since the relationship between supplier and customer is more and more based on numerical exchange of forecasts and planning, their suspicion for these methods is poorly balanced by their trust on persons, based on a stable relationship. Moreover, problems inherent to large companies (separation between departments, conflicting projects...) or to the tools used (complexity of ERP systems) make that this personal trust can hardly be replaced by a trust on the methods and tools allowing to move from personal relationship to IT-based relationship.

We have suggested to use various concepts (wall effect, magnifying effect, trust in expert systems...) for better understanding these problems. The first conclusion is that instead of standardized communication protocols, SMEs need "negotiation spaces" with their customers [20] which would allow them to better express their problems and try to find solutions addressing both local and global constraints of the Supply Chain. Even if some ideas have been suggested in that purpose, how these negotiation spaces can be set-up in the context of present IT tools, like ERP systems, is a complex problem which will be further investigated in future studies.

7 References

[1] Khota, S. Mass customization: implementing the emerging paradigm for competitive advantage, Strategic Management Journal, 16:21-42, Summer, 1995.
[2] Shah R., Ward P.T. Lean manufacturing: context, practice bundles, and performance. Journal of Operations Management, 21(2):129-149, 2003.
[3] Lee H.L., Padmanabhan, V., Whang, S. The bullwhip effect in Supply Chains. Sloan Management review, Spring:93-102, 1997.
[4] Orlicky, J., Plossl, G. Orlicky's Material Requirement Planning, McGraw Hill Text, 2nd Edition, 1994.
[5] Stadtler, H., Kilger, C., (Eds.), Supply Chain Management and Advanced Planning, Springer: Berlin, 3rd Edition, 2005.
[6] Marcotte, F., Grabot, B., Affonso, R. Cooperation models for Supply Chain Management. International Journal of Logistics Systems and Management, 5(1), 2009.
[7] B. Grabot, S. Marsina, A. Mayere, R. Riedel, P. Williams, A socio-technical view on Supply-Chain management problems, 11th International Conference on Human Aspects of Advanced Manufacturing Agility and Hybrid Automation - Haamaha'2007, Poznan, Poland, July 9-12, 2007.
[8] Julien, P.A. Les PME, bilan et perspectives, Economica, Paris, 1994.
[9] Julien, P.A. The state of the art in small business and entrepreneurship, Ashgate, Aldershot, 1998.
[10] Fourcade C., Marchesnay M., (Eds). Gestion de la PME/PMI, Paris, Nathan, 1997.
[11] Torrès O., Les PME, Flammarion, coll. Dominos, 1999.
[12] Girard B., Pourquoi les PME restent-elles PME ?, Gérer et Comprendre, Annales des Mines, 1997.
[13] Torrès O., Petitesse des entreprises et grossissement des effets de proximité. Revue Française de Gestion, 144:119-132, 2003.
[14] Boutary M. et al., TIC et PME : des usages aux stratégies, Editions L Harmattan, 2003.
[15] Boutary M., Mayère A., PME, TIC et prestataires de service dans le développement de communications distantes : questions de proximité et de confiance, TIC et relations de services dans une économie globalisée, XIVth International Conference of RESER, Castres, 245-261, 2004
[16] Grabot, B., Marsina, S., Mayere, A., Riedel, R., Williams, P. A socio-technical view of Supply Chain Planning: towards an understanding of the interactions between large and small businesses - the case of Aeronautical and Automotive Supply Chains. In " Human and Organisational Factors in Planning and Scheduling Conference", Wäfler T., Fransoo J. (Eds) (to appear), 2009.
[17] Karpik L. L économie des singularités, Editions Gallimard, 2007.
[18] Suchman L., Plans and situated actions; the problem of human-machine communication. Cambridge University Press, 1987.
[19] Doumeingts, G., Ducq, Y., Vallespir, B., Kleinhans, S. Production Management and Enterprise Modelling. Computers in Industry, 42:245-263, 2000.
[20] Groleau, C. Integrative Technologies in the Workplace - Using distributed cognition to frame the challenges associated with their implementation, in "ERP systems and organisational changes", Grabot B., Mayère A., Bazet I. (Eds), Springer, 27-45, 2008.