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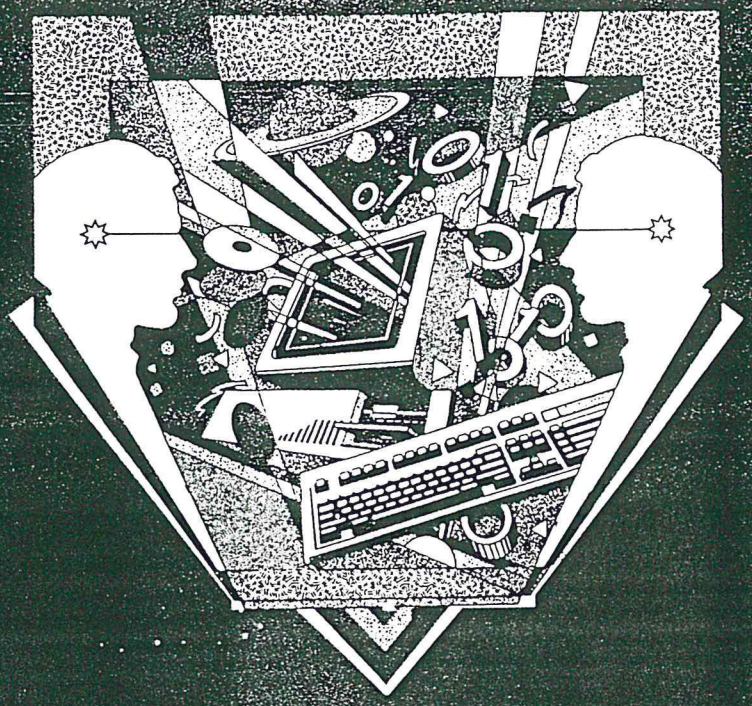

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THE ROLE OF INFORMATION AND SERVICE IN THE SUPPLY CHAIN

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Abstract
The aim of this paper is to analyse the importance of information (with the consequent EDI applications of Information Technology) in the service oriented customer-supplier relationship. On the basis of the empirical evidence emerging from a case-study - the Zanussi-Electrolux Company, a firm with plants both in Europe and in the U.S.A. - the authors explore some of the main evolutionary aspects of supply management and the role of Information for the improvement of service performances in the supply transaction.

THE INCREASING IMPORTANCE OF SERVICE IN THE SUPPLYING ACTIVITIES

Present day competition has brought about a marked evolution in the management of the supplying activities, imposing on the firms an increasingly close interaction with the suppliers. The achievement of high level performances in terms of cost, quality and time to market appears ever more dependent on the quality and efficiency of the supply network (Pearson and Gritzmacher, 1990).
In current models of buyer-supplier relationships it is generally possible to identify different stages along the route which leads to a buyer-supplier partnership. In correspondence to the most advanced and cooperative relationship (supplier partner - figure 1) the buyer requires the support of interlocutors capable of sharing in the innovative, planning and productive effort; the supplier, in turn, is looking for buyers with whom he can collaborate on a more stable and long lasting basis (De Toni, Nassimbeni and Tonchia, 1993).

The results are:

- the supply transaction is enriched in content: the control of the so-called *intangible processes* has become one of the requisites for the consolidation and development of supply relations. In fact the exchange between customer and supplier regards not only an object, but rather the complex of services that lead to the completion of that object.

- the suppliers exchange with the purchaser not simply productive capacity, but rather the ability to plan and innovate as well as the opportunity to plan over a medium to long-term period. The purchaser offers the supply unit stability in providing supplies, circulating information and expertise. In addition the complex of information and technical and planning collaboration consolidates a continuous and interactive dialogue between the upper and lower ends of the productive chain.

- it is becoming always less possible to entirely decentralise the manufacturing of the components or sets of components that make up the final product, especially in the case where they incorporate a high added value. Vice versa it is becoming ever more necessary to share and synchronise the expertise possessed by each side involved, that is to organise the synergies (internal and external) to optimise the potentials of each unit in the supply chain. The traditional distinction between supplier and buyer of a service loses its sharpness.

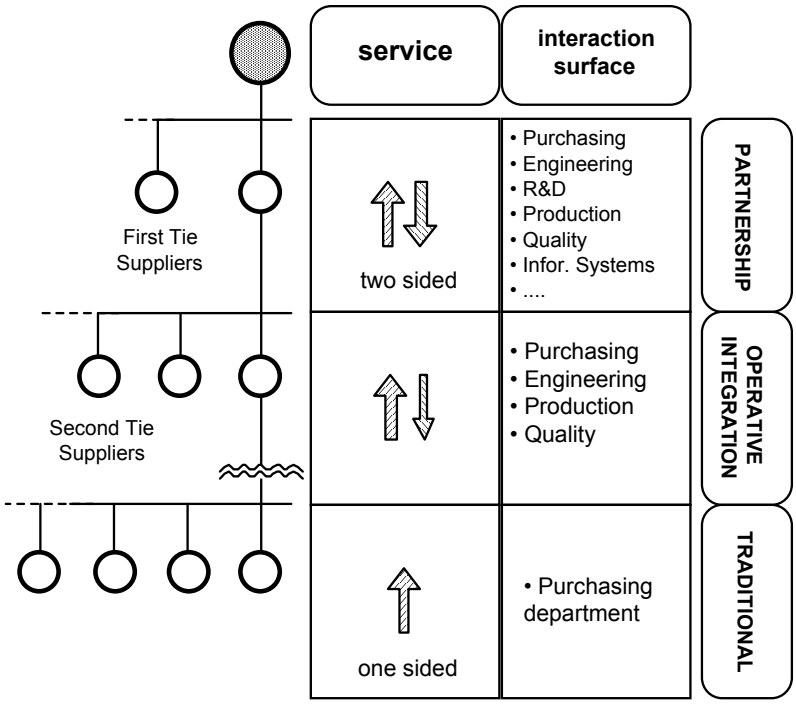

Fig. 1. Service, interaction surface and patterns of buyer-supplier relationship

In conclusion, present day models of customer-supplier relation lose the clear-cut traditional distinction between the server and the receiver of a service: service is, in fact a responsibility which is due to both sides.

traditional approach		new approach
supplier = server buyer = customer supply chain	h	supplier = server & customer buyer = customer & server supply service chain

MATERIAL, INFORMATION AND SERVICE FLOW IN THE SUPPLY TRANSACTION

In a wide range of sectors, the need for informative and logistic integration between activities at the upper and lower ends of the productive chain, for buyer-supplier involvement in the development of the product, for coherence between the respective operative systems, for cooperation in the creation of value and the reduction in overall costs of the transaction, promote the formation of "strong linked" buyer/supplier system, in particular in recent years. The Japanese car industry is a good example of this (Cusumano,Takeishi, 1991).
In other words, in contrast to the antagonism and the individualistic competition of approaches in the past, and encouraged by more advanced production and management practices (TQM, JIT), modern operating models foster a higher level of interaction (in production, design, engineering, technological development) between client and suppliers (Schonberger, 1986).
Thus the buyer/supplier relationship changes from prevalently commercial transactions based on price, to cooperative relations and even to a strategic congruency. The suppliers shape the capacity for continuous joint improvement and the productive and logistical congruence of the respective operating systems so as to eventually reach the point of reciprocal involvement in strategic planning. The term "partner" describes the last step in a process marked by various typical events: from substantially independent production and management systems to the congruence between these systems, the informative and logistic integration and the mutual involvement in all stages of product development (fig. 2).

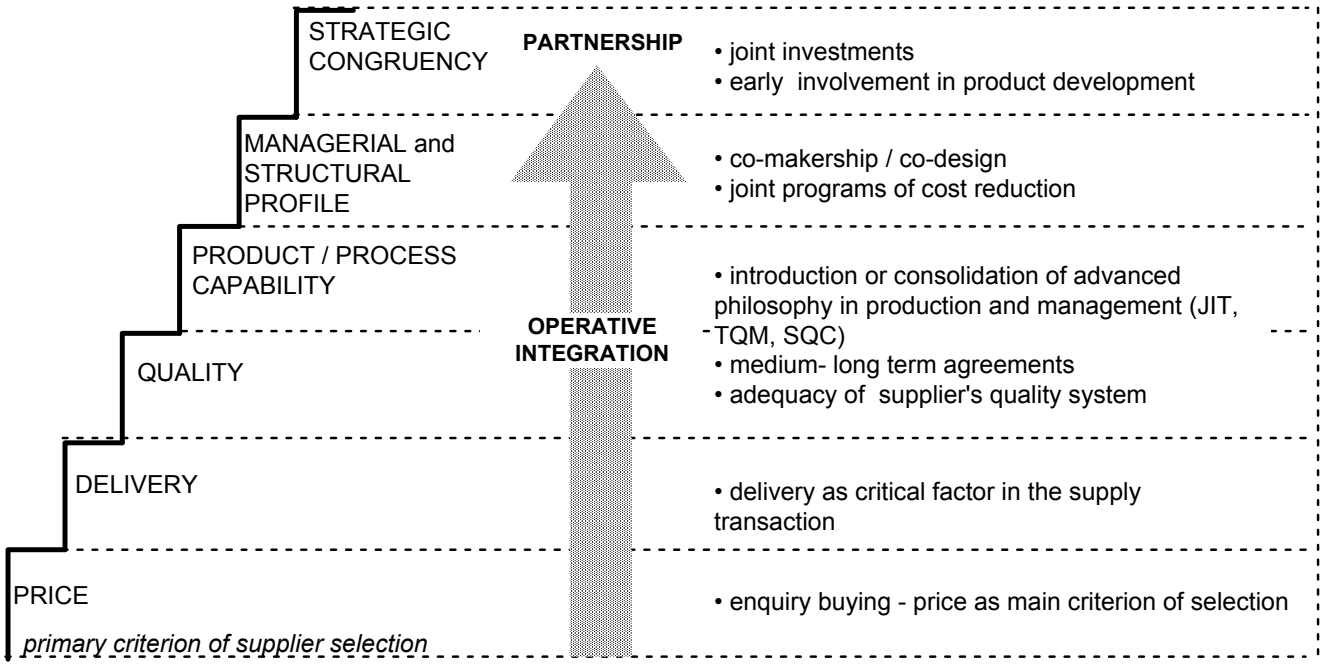

fig. 2. Stages in the evolution toward partnership relations

In this way, an integrated production systems is composed which encompasses the units (buyer and main suppliers) that belong to the same supply chain.

Towill, Naim and Wilkner (1992) define the "supply chain" as «a system, the constituent part of which includes material suppliers, production facilities, distribution services and customer linked together via the feedward flow of materials and the feedback flow of information».
Thus the evolution in the buyer-supplier relationship (from the traditional "enquiry buying" to an operative and strategic partnership between buyer and suppliers) has modified the structure and the architecture of the supply chain both concerning the flow of materials (supplies of "black-box" materials are becoming more widespread) particularly in regard to the flow of information.

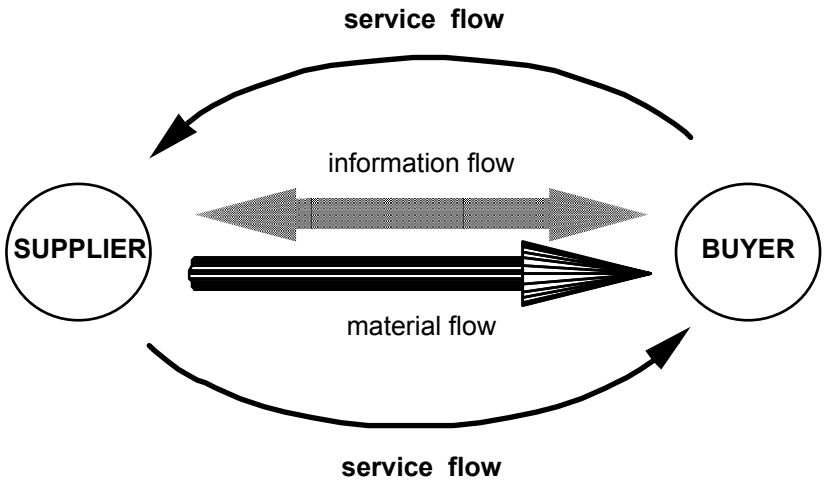

Fig. 3: Material, information and service flow between buyer and supplier

However the most important transformation concerns the entity and nature of the services (planning, production, logistics,..) demanded by the modern supply transaction. Competitive management of the supplies activity involves not only the management of the flow of material and information, but also the planning and organisation of a third type of flow: the service flow (fig. 3).

SERVICE PACKAGE AND INFORMATIVE INTEGRATION SURFACES: THE ZANUSSI ELECTROLUX S.P.A. CASE

Zanussi Elettrodomestici s.p.a., the most important firm in the Zanussi group of industries (which in its turn belongs to the Electrolux group) is the biggest producer in Europe of domestic appliances. Its turnover is around 3000 billion lire and the productive structure is articulated in monoproductive plants (fridges, freezers, cookers, ovens, dish-washers washing machines, etc.) and in component plants to make a total of 12 units. The purchases, almost exclusively purchases of parts-components, at present account for two thirds of the turnover.
In the past the buyer-supplier relationship, in general, foresaw a simple collaboration of a commercial character. Today Zanussi is developing an integrated productive structure in which the supplier, in particular the supplier that has specific know-how as well as specific and specialistic abilities, plays a decisive role. A reciprocal exchange of informations and an advanced technological dialogue in then promoted.

The main aspects of service as met with in the context of the Zanussi Company are illustrated below. The investigation was carried out using specially compiled questionnaires and interviewing the managers of the buyer company and the managers of a significant sample of the supplier firms.
The supply transaction in the Zanussi context actuates a series of services (in R&D, Design, Logistics, ...) characterized by tangible and intangible elements: the supplier must have the ability to innovate, plan, make deliveries respecting the times, quantities and conditions specified. In other words the supplier of Zanussi must be able to handle the *service package* which increasingly characterizes the present day supply transactions. The activities and services required by the buyer fan out symmetrically: from supply market monitoring to management and control of the supply chain; from simple procurement of materials to training and technical assistance for the suppliers.

❑ *Services on the suppliers side*. In general the supplier-partner of Zanussi must be able to suitably look after the R&D and Design, Procurement, Production and Distribution steps, that is, all the phases that link him to the operation chain of the customer (De Toni, Filippini, Forza, 1992):

- *R&D and Design*. Competitive dynamics push Zanussi towards the formation of a pool of suppliers capable of immediately going along with its product strategies: the sources must be able to incorporate innovations in the supply object and offer design capability on complete functional sub-assemblies (black box).

- *Procurement*. An element which often characterizes the privileged supplier of Zanussi is the ability to carry out the role of intermediary collector for those supply channels whose connection with the final assembler was eliminated by the same assembler. Usually these are channels of added value and of technological content which do not require the direct control of Zanussi. Thus the supplier assumes the responsibility of procurement which otherwise would be the concern of the buyer. The supplier must possess the ability to manage and coordinate the intermediate supplies network, and so develop the capacity to select, train, control and evaluate his own suppliers.

- *Production*. A quality and technological answer to the supply object constitutes the best qualification parameter for privileged suppliers. A sufficiently well-developed productive asset and the use of advanced managerial practices (JIT, TQM) often represent the necessary premise for the development and consolidation of the relationships with Zanussi.

- *Distribution*. JIT deliveries and precise packaging rules (re-usable containers, in specific configuration for robotic handling, automatically identifiable) are becoming more frequent requirements made by Zanussi to the suppliers.

❑ *Services on the part of the customer*. In like manner Zanussi sustains the effort made by the direct supplier to qualify, aiding in particular in the following areas:

- *training and technical assistance* (in Design, Production, Quality, Statistical Process Control, Maintenance), and in some cases even financial aid (low interest rate loans to the supplier to enable him to meet the required specifications).

- *integrated production planning* through a vendor scheduling system extended to the activity at the upper end of the chain. Bad performance on the part of the suppliers is sometimes justified by the absence or inadequacy of an integrated planning system: changes in the specifics of production and in the quantity are the easier to face the more time is available to the supplier. More generally the customer, especially if situated at the top of a complex production chain, is nowadays required to possess the capacity to plan, together with the integrated suppliers, the coordination of the supply flows which cross the units of the chain (Scott and Westbrook, 1991).

- *evaluation and control* of the networks composed by the supply units (that is monitoring the performance of the supply units). The more cooperative interaction with suppliers requires of Zanussi more sophisticated instruments for the coordination and the control of the activities.

In addition, Zanussi offers the preferred-suppliers opportunities projected over a medium to long term period so as to justify their more intense efforts in design, production and logistics. Finally the new formulae of relationships with the suppliers lead Zanussi to an appropriate reconfiguration of his own operative structure so as to permit an effective interaction/integration with the supplier.

The need of a computerized link: the EDI Project

All the areas listed above, corresponding to the main service activities encountered in the context of the Zanussi Company, promote a more intense exchange of information between the actors involved. At this stage Zanussi Electrolux felt the need to set up a computerised link allowing the effective integration of the main supply units. Thus the EDI project for the computerised management of supplies was set in motion. The main objectives of the project can be summed up as follows;
• guarantee greater reliability and timeliness to the data and documents issued;
• punctually learn the state of progress of the order and immediately identify any problems;
• promote an effective integration with the operations chains (De Toni, Filippini and Forza, 1992) of the main suppliers;
• permit an integrated view and management of the supply chain, so delineating a complete description of the productive phases, the cost and value connected with them, the network of suppliers and the times regarding the progress of the productive flow;
• foster a process of "enrichment" of the supplier, that is, allow an outflow of information such as to encourage the qualitative growth of the supplier;
• permit Zanussi to have punctual control over the performance of the supplier pool, thus imposing on the supplier unit a constant pressure to improve.

Possibilities and advantages of the EDI link

The EDI (Electronic Data Interchange) project thus aims at establishing a computerised interface with the suppliers. This data communication link differs according to the profile of the supplier and is preferentially addressed to high volume (in both quantity and value) suppliers who have sufficiently powerful EDP systems
Thus the electronic transfer of business documents such as purchase orders, requests for

quotes, invoices and remittance information to these suppliers becomes possible. In addition File Transfer using a standard method known to the agents. In other words it is possible to transfer, by electronic means, designs elaborated by the CAD-CAM system of the supplier or, vice versa to receive, from the supplier, the quality control data of a workday.
The use of this advanced technology brings benefits both to the suppliers and to Zanussi, at the same time improving internal productivity and the customer service. The capital tied up in stocks of raw material and components is reduced thanks to the increased frequency and better quality of the information transmitted, with a consequent reduction in the supply times. Productive flexibility and response to the market are also improved. Administrative costs are reduced and communication between supplier and transporter becomes more efficient.

Organisational aspects of the EDI project

The EDI project is run on a world-wide scale by the Electrolux group, and they have established objectives and resources to obtain them. The organisation is structured (Figure 3) in units, both at a central level for the global management of the project, and at a peripheral level to regulate the project at a national level down to the responsibility of the firm.
At both the central and peripheral level each working unit is composed of a functional section and a software section. At the national or peripheral level the EDI Country Officer is responsible for running the project. He must keep himself up to date on the standard ODETTE and their applications, request EDI links, assist and train the suppliers in the use of new layouts, look after legal aspects and carry out the role of interface with the head office, transferring the experience accrued in the single factories.
Still at the peripheral level, in the software section, the Application System Development is in schedule, to control software use, install or test new releases, manage the communication lines, agree on plans for intervention and support from the technical point of view. This link will be set up subject to an agreement to communicate with the EDI Plant Officer, and depending on the Communication Centres of the Electrolux Company.

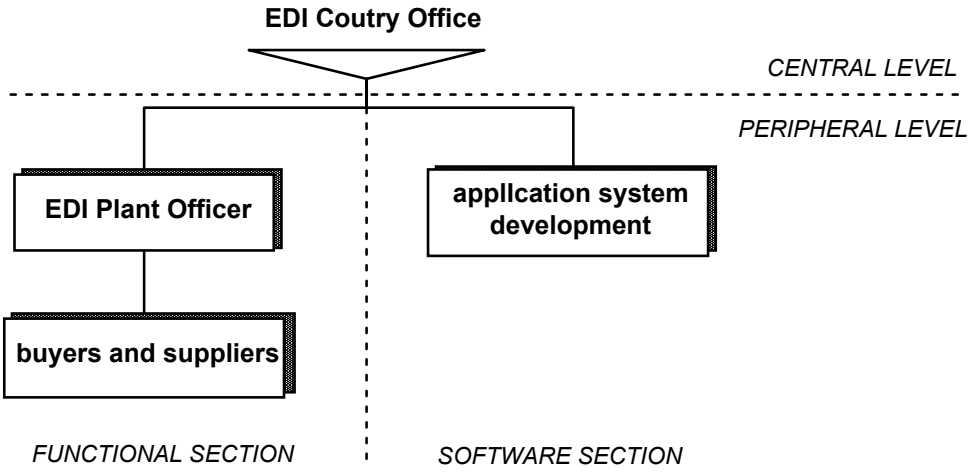

fig. 3. EDI Project: organisational aspects

CONCLUSIONS

The achievement of high level performances in terms of cost, quality and time to market appears ever more dependent on the quality and efficiency of the supply network: the area of supplier-customer interaction tends to spread and the type of relationship to become modified. Information Technology, in particular the EDI technology, has probably the main role in this evolution because it permits a drastic reduction in paper bureaucracy and postal delays and eliminates typing in documents received, speeds up ordering procedures, helps to cut down on stocks, integrates the operations chains of buyer and supplier and manages in an integrated way the logistic flow which crosses the supply units. Information technology thus aids in the organisation and planning of the service network which is ever more connected with the supply transaction.

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