Francesco Garibaldo

03 NETWORKS BETWEEN COMPANYS AND SMEs

THE DETERMINANTS, FORMS AND RATIONALE

THE DETERMINANTS

The diffusion of networks among companies derives from multifarious causes and gives rise to forms of co-operation that differ greatly from one another and that respond to economic and social rationale that are alternative one to the other. The aim of this paper is to carry out a preliminary reconnaissance of the causes, the forms and the rationales of the inter-company networks with a view to illustrating the Tetrapak - Tetrabrik case, i.e. a nodal company in a network and, conversely, the really remarkable case of some companies in a network.

The various and differing causes, the determinants of the inception of networks between the enterprises can be classified according to the disciplines that have studied them, for example, the organisation economics or industrial economics, or by means of classifications that are more oriented towards the historical and structural dynamics of the social and economic systems understood as the true subject of the analysis. The latter is the approach chosen in this paper.

Our starting point is the dynamic relationship between the process of globalisation of the economy and the new production systems. We shall adopt the distinction introduced by Petrella (1989, 191) between internationalisation, multinationalisation / transnationalisation and globalisation of the economy; a distinction that allows us to grasp the phenomenon of globalisation as something different from the preceding experiences of an international and global dimension of the economy. Following such a distinction: "Multinational and transnational enterprises encounter severe structural limits in a world of intensified oligopolistic competition. First, transnationalisation involves a reinforcement of hierarchy as the dominant organisational principle of world economic activity in a period in which the new rationale of innovation invalidates the strategy of ever more comprehensive vertical integration for even the largest, wealthiest and most capable corporations." (Gordon, 1995)[1]. Second, there is the subsumption of space within hierarchical strategy: "The spatial dynamics of transnationalisation tend towards a differentiated homogenisation of space" (Gordon, 1995)[2] which translates into the substitution of locations for products and processes, with the consequent devaluation of the idiosyncratic features of regional productive systems (Belussi, F., Garibaldo, F., 1996)[3], excepting needs that are internal to the enterprise. In contrast, globalisation is propelled by a new social organisational *logic of innovation*: "Fundamental changes in the material logic of modern production - the appearance of new core technologies, the widespread diffusion of advanced technological capabilities and dramatic convulsions in long-standing patterns of international competition, the complexity and pace of technological change, technological convergence, massive

(1) Gordon, R. - *Globalization and New Production System* - in Littek, W.E. Charles, T. (eds) - Emerging Forms of Work Organisation in International Perspective - Walter de Gruyter, Berlin, New York, 1995, p. 177.

(2) ibidem, p.178

(3) see Belussi, F. and Garibaldo, F. - *Variety of Pattern of the Post-Fordist Economy: Why are the 'old times' still with us and* the ' new times' yet to come? - Futures, vol. 28, no. 2 pp. 153 - 171. 1996.

increases in development costs, ubiquitous organisational, technological and market uncertainty - have prompted both theoretical and practical re-assessment of the innovation process in advanced industrial societies." (Gordon, 1995)[4]. The consequences of this new material logic are multifarious and well-known; what we are intent on underlining is:

a) the growing need for collaborative relations between producers and clients, from the standpoint of the product innovation process, given that the aspects of product specificity and differentiation are integrated in the process of innovation from the beginning;

b) the growing need to have some suppliers who are able to act as independent sources of creativity in a process of joint technological creation between producers and supplier, this depends upon the producers' difficulties in directly managing such a broad set of interdependent technologies.

c) what has been described in a) and b) involves a reduction in economic efficiency both in the classic scheme of sub-provision, based on the exchange of goods, and based in a classic market transaction, precludes schemes of long-term collaborative relations, both of the model of vertical integration, with the internal availability of all the necessary basic technologies, which reduces diversity and hence creativity. In this regard the point of view of Professor Pietro Gros, chairman of IRI and researcher in industrial economics, is interesting. This is how he replied to a journalist of the Italian financial newspaper *Il Sole 24 Ore* when commenting upon the international crisis: "The industrial systems with which we are in direct competition seem to be much more vertically integrated. They have an optimisation of the productive process from start to finish, all designed as a function of the end-product. Instead the district from this point of view presents weaknesses, precisely because it is less integrated. This element in a moment of transition can become an advantage. In the districts every stage a the productive process is by nature flexible because it supplies different clients, and thus can produce for enterprises with different specifications. That is why, at a time when the outcomes change very rapidly - and so the products are substituted - the fact of having a flexible chain of production upstream becomes a formidable opportunity" (from *Il Sole 24 ore*, Tuesday 15th September 1998).

The whole of these new situations linked to the process of globalisation, in the specific sense mentioned earlier, involves a series of important consequences:

a) The superseding of the Williamson's (1985) traditional organisational alternatives between 'market' and 'hierarchy', with the consequence that "innovation for any firm in these circumstances is necessarily dependent upon external transactions, yet structural change negates the efficiency and adequacy of market provision. Firms, both large and small, are coping with this contradiction by elaborating new non-market forms of inter-firm co-ordination. That is, both large and small firms increasingly focus their own enterprise on core capabilities and delegate interdependent functions (formerly provided in-house or purchased on the market) to the complementary specialisation of autonomous firms organised in a collaborative and inter-dependent chain of production." (Gordon, 1995)[5].

b) The multinational network increasingly operates as a *heterarchy* rather than as a hierarchy (Bartlett et al. 1990), that is "as a set of globally interdependent, spatially dispersed innovation centres" (Gordon, 1995)[6].

Hence, this is very briefly the mix of macroeconomic and industrial causes that underpins the expansionary trend in collaboration between enterprises beyond the *make or buy* alternative. In terms of Organisation Economics and Industrial Economics the concept of transaction costs is crucial. It allows us to identify collaboration opportunities between

(4) Gordon, R. - *globalization and New Production System*; op. cit., p. 178
(5) ibidem p. 180.
(6) ibidem p. 181.

companies that are less bound by the globalisation process, this is typically the case of the industrial districts.

The economic concept of *externalities* or, to be more exact, *external economies* (Marshall, 1920) introduced the idea that there exist some interdependencies between the participants to an economic system, that do not operate through the market mechanism or that are not completely mediated by process; there can be negative externalities - a third party, external to the economic transaction, is affected by the consequences of a transaction between seller and buyer, as is the case of pollution - just as there are positive externalities - for example, when there is a direct interdependency between producers who use some factors generated by a third party free of charge, each one in their function of production, such as a certain publicly-available know-how in that territorial area or in that industrial sector. Typically, the positive externalities are external to the market and are related to co-operation and co-ordination. A very special example of externalities is that of transaction costs. There is no doubt that the very concept of network is from the very beginning linked to the role of the externalities in the explanation of growth and economic change. What is specific to this phase is the organic transformation of information and knowledge, into a particularly precious datum such that its value consists in giving, to whosoever possesses it, a strategic advantage in the production of all other goods not only from the distributive point of view but also from the point of view of the organisation of the economic cycle and the production of those goods. Information and knowledge have become an important part of the 'productive' base of wealth. As has already been mentioned, there is no linear process, guided by technology, by development; there are contradictory trends: "The long-term impact of networking technologies on the economy will depend to a large degree on how businesses employ them to reduce rising transaction costs (*partly dependent upon the technologies themselves - my note*). To optimise their benefits, new ways of doing business are required, co-operation will be likely to prove more rewarding than competition and information-sharing more fruitful than information-control. The businesses that succeed in this radically changed environment will be those that - like the railroad owners in their day - seize the opportunity to re-structure their organisations and goals to take the best advantage of their situations." (Mansell, R., 1992)[7]

(7) Mansell, R., 1992.

THE FORMS

It is beyond the scope of this paper to develop an exhaustive taxonomy of the possible forms of co-operation between enterprises, something that can in any case be found in the copious literature; for Italy a review can be found in a recent book by Soda. We are interested in some schemes of classification that highlight the determinants which we have singled out as being crucial.

The first scheme we borrow from Soda is that of Pilati who relates the frequency of the transactions and the specificity of the investments identifying the networks that are closest to the market and those that are closest to the organisation. What emerges is that faced with a specificity of the average investments and a low frequency of transactions, there is a bureaucratised quasi-market with trilateral bargaining, that is a situation in which the relations between enterprises, due to the risk of opportunistic behaviours, require the intervention of third parties as mediators or the use of formalised and defined contracts. When, instead, there is an average specificity of the investments and a high frequency of transactions there tends to emerge as convenient for all the companies a quasi-clan-like market with bilateral bargaining, i.e. situations based on trust and on non-formalised social mechanisms. Lastly, as we move towards high-specificity investments and frequent transactions a strategy of internalisation becomes preferable.

A second scheme is that of Ring and Van de Ven (cited by Soda) from 1994 which relates the transnational risks, i.e. reduced availability of time, information and control levers, and the degree of trust among the parties:

Transnational risks →	low	high
Trust among the parties Low	MARKET	HIERARCHY
High	RECURRENT BARGAINING	RELATIONAL BARGAINING

It is clear that the case of relational bargaining is an extreme case where the internationalisation option is always possible. In all of the schemes the orientation to vertical collaboration between enterprises is prevalent. In these cases the fundamental determinant to be considered is the globalisation dynamics.

Lastly, of interest is the contribution provided by Cagliano and Smiraglia (1998) who classify the collaborations in a network of enterprises according to three modalities:

1) *Horizontal collaboration* between enterprises of the same kind; that is "an agreement focused on only one stage of the chain of the value with the aim of exploiting economies of scale or reaching the critical mass of resources needed to perform a given function";

2) *Horizontal collaboration* between enterprises of a different kind; i.e. that "between suppliers, for the same group of clients, complementary and interdependent products that constitute a subset of the finished product, and that come to an agreement with a view to making in a co-ordinated and collaborative way the parts required by the client"

3) *Vertical collaboration*; i.e. "the one that exists between companies belonging to different stages of the value chain. The objectives pursued in this case by the companies consist in the improvement in quality and flexibility, or in the overcoming of the barriers for the development of new products or for the access to new markets, through a greater integration of internal and external competencies".

Clearly, in this scheme, cases 1) and 2) can be interpreted more from the point of view of the transaction costs as traditionally understood - namely, the logic of the districts, - while case 3) corresponds more to Gordon's interpretative model. In the work by Cagliano and Smiraglia, which is oriented to the study of the horizontal collaborations, the model proposed by Wiendahl and Helms (1997) is recalled:

VARIABLES → ↓		Asset specificity	
		High	Low
Duration/ stability relation	High	Strategic Networks	Operative Networks
	Low	Virtual enterprises	Black Box relations

The *strategic networks* regard actors specialised in specific technical competencies, engaged in forms of long-term collaboration, with an elevated interdependence an intense exchange. "The relation is often sustained by guarantee mechanisms that preserve stability. Relational investments are also elevated, and are aimed at formalising and planning the exchange of information and materials between the network components ."[(8)]

The *operative networks* regard actors specialised in a phase of the creation of the product, engaged in stable collaboration, but "the lower interdependence between the parties requires the presence of a unit with a strong co-ordination role and some sounder guarantee mechanisms. The formalisation of the agreements and the support mechanism is elevated depending upon the duration of the relation"[(9)].

The *virtual enterprises* are born in the cases of unstable collaborations or those oriented to the short-term and in the presence of complementarity of resources. "The guarantee mechanisms are limited to the preservation of autonomy by the parties and the formalisation of the agreements is generally limited. The intensity of the exchanges is determined by the level of innovation of the product that is realised and, as a consequence, by the need to define the interfaces between the parties realised by the single units "[(10)].

The black box relations regard partners with similar competencies and unstable relations with "rather rare shared moments of problem-solving and decision-making, and the information exchange is limited to input and output information for each activity. (...).

(8) Mansell, R., 1992, pag. 25
(9) Mansell, R., 1992, pag. 25
(10) Mansell, R., 1992, pag. 25

However, these networks are strongly centred upon the unit that is in direct contact with the market that performs the role of chief assistant, co-ordinating the activities of the partners and generally keeps a large share of the surplus generated by the network ."[11]

Another possible classification is the one by Storper and Harrison (1992)[12]:

1. *Only the peripheral ring without centre*, i.e. a system of non-hierarchical enterprises in which one company in turn performs the leader function;

2. *'Periphery-centre' systems characterised by a co-ordinating enterprise*; a hierarchical system in which, however, the enterprise cannot function without the aid of the others.

We thus have a set of classificatory systems of the forms of co-operation between enterprises enabling us to analyse both the relationship between nodal enterprise and the others, as well as the horizontal relations between companies.

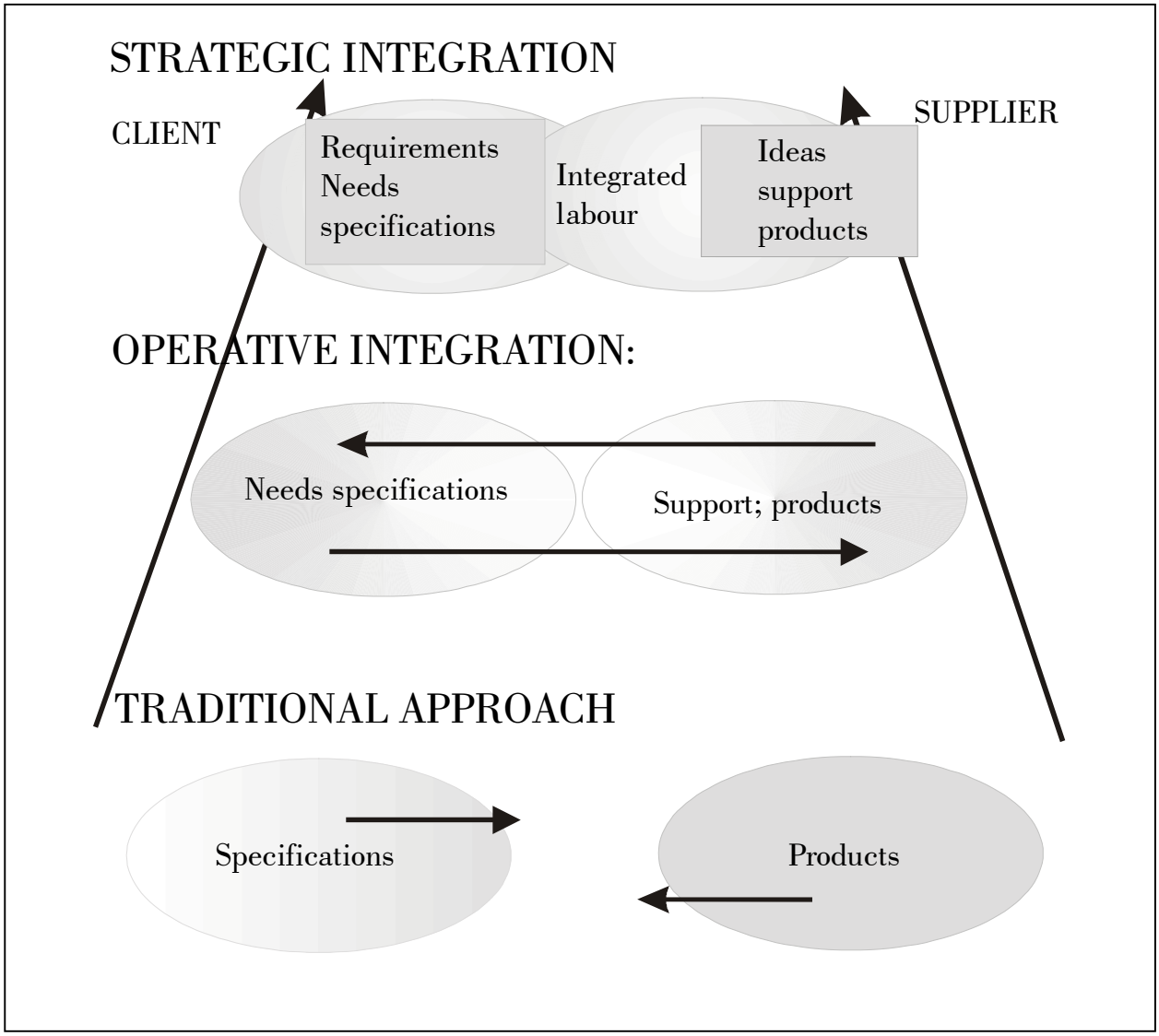
(11) Mansell, R., 1992, pag. 25

(12) M. Storper, B. Harrison - *Flexibility, hierarchy and regional development: the organisational restructuring of the productive systems and the new forms of governance* - in F. Belussi (edited by) - *New enterprise models, organisational hierarchies and network enterprises* - Angeli, Milan, 1992.

THE RATIONALE

The macro-micro relation and the reciprocal determination between the organisation of the physical flow of the production and the network architecture.

It is essential to find a gap-bridging concept between macro and micro analysis. The analysis of the company networks can actually become a useful instrument of organisational development only if it is capable of defining the levels of congruence between network architecture and organisation of production and labour. Indeed, the shift of the old models to the new ones means an overlap, even if partial, of the two previously separate worlds, as is clearly illustrated by this diagram of Tetrabrik:



At a time when an area of integrated work is being developed among the enterprises, the set-ups of the two organisations come to progressively develop compatible organisational systems and a continuing exchange of data and information. This is a long and extremely

difficult process, since when it is realised it engenders a situation in which both parties put, for better or for worse, into the hands of the other partner, a considerable part of the company's future. Such an organisational permeability involves the processing of new management techniques, but first of all the identification of new organisational models capable of maximising the strategic advantages of strategic integration, this shift already becomes a critical element in the transition phase from operative integration to strategic integration. The new productive systems can be connoted starting from two gap-bridging concepts: 1) client orientation and 2) the reduction in lead-times.

The first gap-bridging concept is that of *customer in focus* (for example, the T50 project by ABB). Indeed, if we take client orientation seriously as a value of reference for the organisation then the organisational model must allow for the orientation of one specific flow of production towards the client's specifications, and conversely, be able to channel towards design and marketing customer responses and expectations.

The second concept is that of reducing lead times. According to Tetrabrik, the supplier that enters into a strategic integration with them must possess the following capabilities:

1) Efficacy and speed in the development of the design solutions for the launch of new products on the market;
2) Optimisation of the product design in relation to the process technologies;
3) Capacity to react flexibly to any product changes and variations in production volumes,
4) Short lead times with an elevated reactivity to deliveries;
5) Reduction in Works in Progress (WiPs) and zeroing of warehouse stocks;
6) Quality understood as reciprocal satisfaction as regards relationships, product, services and overall costs.

Points 1) and 2) are an illustration of Gordon's theory on globalisation and are definitely requirements linked to the shift from operative integration to strategic integration; point 3) is a more traditional requisite in subcontracting; points 4) and 5) are the modality needed for the shift to the operative integration and then to the strategic one; point 6) is already specific to the strategic integration.

How do the two gap-bridging concepts identified determine the organisational structure of the nodal enterprise and what requisites do they exact from the network architecture between the nodal enterprise and the suppliers? The answer lies in the shift from functional organisational forms to flow organisational forms. Tetrabrik draws inspiration from that specific form of flow organisation called *Boundaryless Flow*[13]. This consists in the organisation of all the business functions throughout the flow of the production activities, whether it is a manufacturing process or the development of a product or the supply of a services. "Within the flow there are not just the competencies and the resources linked to the production, but also those that are needed to manage the other things correlated to it: programming, quality, maintenance and the technologies. What must be integrated into the flow wholly depends upon the kind of activity and must be decided from case to case. The organisational model is no longer strictly hierarchical/pyramidal, but looks like a set of concentric circles, whose inner nucleus is made up of the productive flow group, but in the second ring there are the support functions (programming, administration,

(13) Helmrich, K., Janbrink, S. and Edeback, B. - *Boundaryless Flow Organisations for satisfied customers and motivated colleagues - BFO* - The Swedish Productivity Centre amd Klaus Helmrich - 1994.

etc.) that depend directly upon the flow group, and lastly, in the third outermost ring, the functions common to several groups (sales, personnel, etc.)."[14] Moreover, Tetrabrik's orientation is entirely consistent with a formal standpoint vis-à-vis organisational planning. This orientation singles out two basic options for the reorganisation of enterprises that have to cope with highly uncertain and complex environments: increasing the internal complexity (complex organisations with simple jobs) or reducing the need for checks and internal co-ordination (fewer indirect jobs, less bureaucracy) realising simple organisations with complex jobs[15]. What is significant in these cases, from the standpoint of organisational planning, is the reduction in the variances, both external (demand) as well as internal (the number of interfaces between the operative functions) which is obtained using two design techniques:

1) *parallelisation* of the productive flows, i.e. the creation of parallel and independent flows, preferably matching product/market combinations, which is like saying that every flow can correspond to a client or to a specific target;

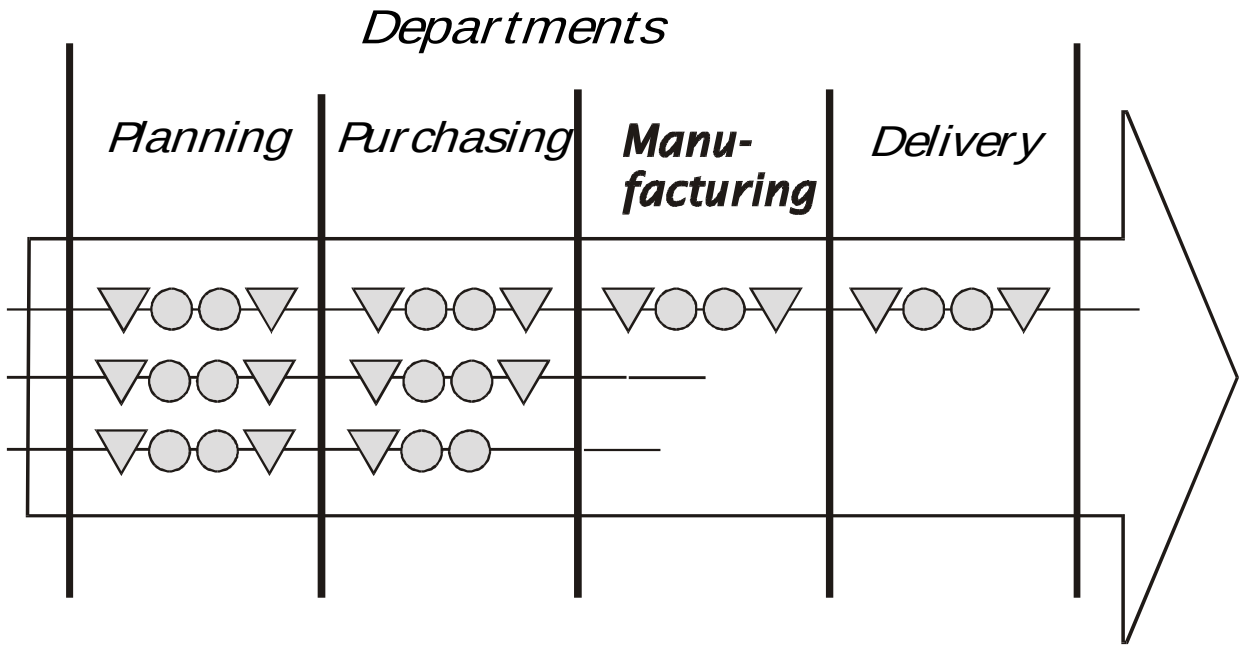
2) *segmentation*, i.e. the shift from functional structures in which the company functions of the same kind are grouped by department, increasing the number of interfaces with the individual productive flows, to situations in which the functions are distributed as directly as possible in the productive flow. From this point of view, the *Boundaryless Flow Organisation* is particularly efficient. As a matter of fact it divides all the traditional support functions, such as scheduling, dispatch, administration, quality and maintenance, into two separate set-ups: the *generalist* functions and the *specialist* ones; the former actually do the work, the latter ensure that the work is properly done and that the prerequisites most suited to the purpose are available. This division enables the utmost distribution of the flow resources and the minimal reduction of the strategic resources, concomitantly reducing the risk of purely bureaucratic stances. In short, there is a dual movement: towards centralisation, on the flow, and towards decentralisation, from the specialist functions to the generalist ones; this dual movement involves the risk of possible tensions and a poor balancing of the two movements. This depends upon the planning and the organisational development.

It cannot be overlooked that the choice of a *Boundaryless Flow Organisation* represents a prerequisite for a form of co-operation, between the nodal enterprise and first level suppliers, that aims towards strategic integration: as a matter of fact, such an integration indeed requires a reciprocal visibility of the processes, which implies a controlled permeability of the organisational boundaries, and common forms of language whose realisation presupposes that the flexibility demanded from others is in a *feedback loop* with the nodal enterprise, barrier and obstacle-free. It is a long and complex path, as shown by the Tetrabrik experience, a company that is currently introducing joint forms of planning with enterprises classified as 'system suppliers'.

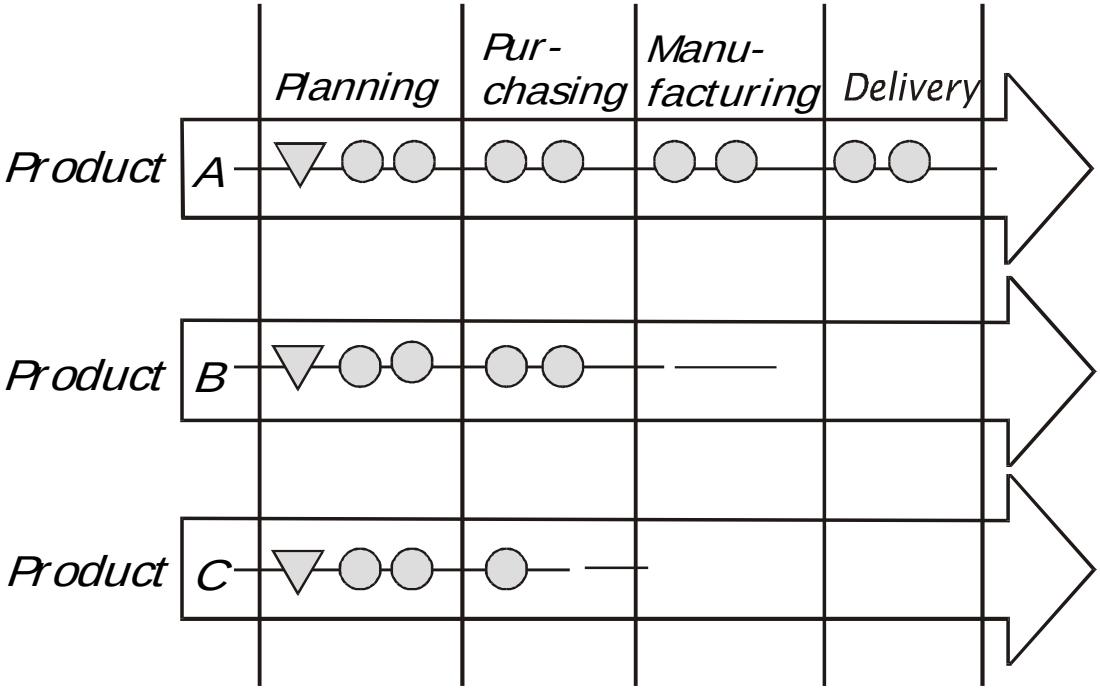
(14) regional ADAPT project; Regione Emilia-Romagna - *Get it* - presented by Tetra Brik Packaging Systems, April 1997.

(15) Ulbo de Sitter, L., Friso den Hertog J., Dankbaar, B- - *From Complex Organisations with Simple Jobs to Simple Organisations with Complex Jobs* - Human Relations, Vol. 50, no. 5, 1997.

Traditional
Flow oriented production in a functional organisation



Boundaryless Flow Organisation



The choice of the flow organisation involves a significant shift towards the control system, as well as of the forms and the management method, the individual behaviours and the elementary organisational models; according to Tetrabrik, the cultural shift can be summarised thus:

organisation:	*form of control*	*management method*	*Human factor*	*Organisation*
flow	Vision, objectives, dialogue	Culture, global approach	responsibility	work groups
Functional	rules, instructions	hierarchical	passive	bureaucratic

All this is particularly significant for a company like Tetrabrik because it is a part of the packaging sector, a sector that has a specific industrial history.

THE PROBLEM OF SUBCONTRACTING: THE NEW CRITICAL FACTORS ARE QUALITY AND LEAD TIMES.

In this sector there is a massive use of subcontracting for a combination of reasons given the nature of the productive process - up to 10,000 pieces per drawing - and the market. This is a traditional datum and has always amounted to a problem of co-ordination and quality control. What has been new in the last few years is the nature of the subcontracting. At the end of the 1960s and the beginning of the 1970s it was a question of the decentralisation of production volumes that 'was seen as an economic measure, to be employed as an alternative to investments'(16) and that kept the cycle under the complete and direct control of the contractor with the exception of generic workshop jobs and even then some specialised activities that earned economies of scale only at the level of the local system. Since the mid 1970s the subcontracting system has undergone a structural evolution based on the diffusion of economies of scale by the small and very small enterprises, a phenomenon due to the growing capacity of those companies, which had previously only been capable of totally pre-determined, timed performances, to specialise in complex jobs.

A dynamic equilibrium was thus determined based upon a diffuse capacity for specialised mechanical production that largely depended upon the decisions of the contractor companies. This situation has never completely ceased and has coexisted with other subcontracting models, arising since the 1980s up to the present day. Indeed, since the 1980s we have, along with the traditional model, the growth of subcontracting that not only maintains the know-how of precision mechanics for production but also for the creation of intermediate goods - semi-finished products or groups of components - of the packaging cycle, apart from some design specialisations and engineering of these products; this is the indispensable background for the leading enterprises in order to have a less elevated level of fixed costs(17) along with a higher level of flexibility. The latter movement introduces a break in continuity away from the preceding experience, if indeed the subcontracting becomes an integral part of the cycle, substituting or substantially integrating the internal activities, then the leading enterprise's overall performance is the product of the performances of all the parts that make up the productive cycle; in short, a diseconomy or a serious loss of quality standards in one point of the cycle is distributed over all the others 'devouring', so to speak, the positive standards of the other parts. It thus becomes critical to guarantee quality standards in the whole cycle. It is no coincidence that in all the leading companies interviewed there has been, over the last few years, a process of rationalisation in subcontracting with a reduction in the number of companies involved, though still high, around several hundred for the larger ones. In the meantime, competitive pressure has hugely increased, thereby reducing the fat margins that have always characterised this sector thanks to the extraordinary capacity for product personalisation. How can this reduction in margins be managed? Besides investing heavily in the internal process also by intervening in the subcontracting. At this point the answer branches out along a range of highly

(16) regional ADAPT project ; Emilia - Romagna region – *Get it* – presentated by Tetra Brik Packaging Systems April 1997

(17) see P. Bianchi - *Pathways of industrialisation and regional development in the 1990s: political strategies for public intervention in the new post-Fordist competitive phase* - in F. Belussi (edited by) - *New enterprise modesl, organisational hierarchies and netoroks enterprises* - Angeli, Milan,1992

differentiated responses but which, basically, can be traced back to two extreme models: 1) off-loading downstream, along the value chain, thanks to the symmetry of power in the relations with the contractor-supplier, the cost pressure, thus giving rise to a Darwinian selection and creaming off in one's own favour the efficiency advantages thus obtained in the overall cycle; 2) associating a network of subcontracting enterprises to the leading enterprise in such a way as to cut costs by acting upon the lead times of the whole cycle. This means reducing the need for intermediate 'lags' - i.e. eliminating the inefficiencies between the phases rather than only looking to the efficiency of the phases - redistributing the advantages of efficiency amongst everyone. This can only happen by raising the average managerial capacity of all the subjects involved in the cycle - enterprises, intermediate management and workers - which implies an organisational transformation of the leading enterprise, of the sub-contracting enterprises and their functional relations with the leading company and amongst themselves. An exemplary case in point of this second way is that of Tetra Brick. The actual situation of the companies in the sector is situated in intermediate positions but if one should indicate a median point - being wholly aware of the artfulness of the exercise - one should say that the model hitherto prevalent is more shifted towards case 1 than towards that of Tetra Brick. Other concomitant phenomena partially explain this drift along the line of least resistance.

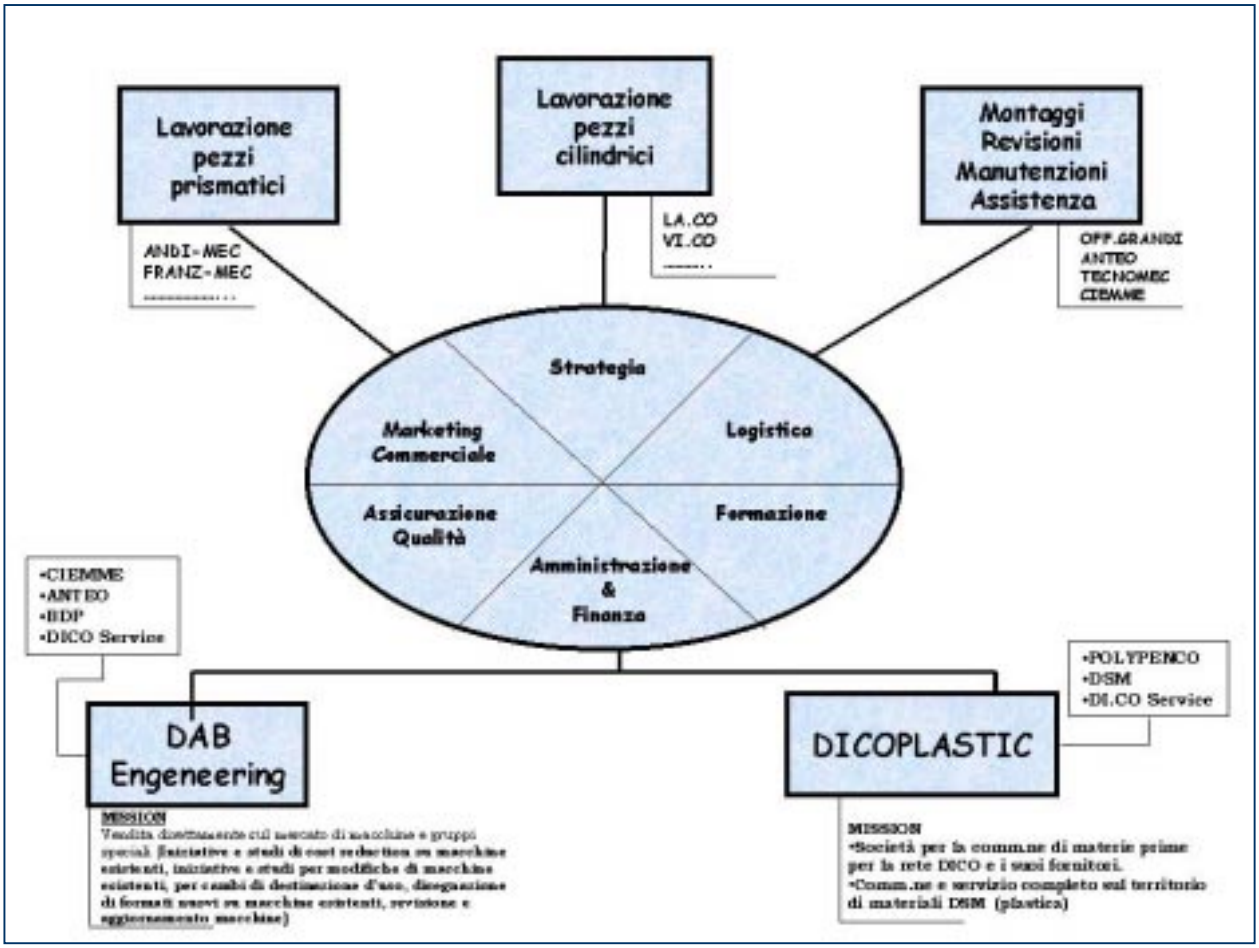
THE BIRTH OF VIRTUAL COMPANIES

INTRODUCTION

It is by now part of Italian industrial history that the so-called packaging valley, and the industrial and economic wealth that characterises it, has been engendered by a cascade of spin-offs due to a variety of economic, social and political factors that have succeeded one another in the course of time, beginning from the 1950s[18]. In some interviews a completely different recent picture was portrayed for us - something that can be confirmed in the reports of the specialised journalism. As is well-known, many foreign enterprises, generally multinationals, have come to do some 'shopping' in packaging valley. The economists have variously explained this strategy which substantially is linked to the pattern of market globalisation and the correlated need to control a wide range of activities - the growing importance of economies of scope. What is now salient in our discussion is the fact that these acquisitions often occur in a climate of hostility and coincide with the removal, not always well-mannered, of the previous ownership from every role. There is therefore a spin-off that leads to a new enterprise that will try to come to terms with the old one, triggering off in the same market segment a battle fought essentially on costs. We think there is a genuine risk of there being a situation in which the old mechanism that has presided over the success and the wealth of the fabric of packaging valley, i.e. the differentiation and the deepening of the productive capacities through the birth of new entrepreneurial subjects has reached, in this phase, its upper limit and that the new phase of 'enrichment' of the territory and its industrial capital moves along the road of co-operation between companies via the development of enterprise networks that correspond to the previously defined typologies. As concerns the vertical relationship, i.e. the one between the nodal enterprise and the others, we have already mentioned the predominance of the traditional approach model while as regards the horizontal relations between the network enterprise, the conclusion of Cagliano and Smiraglia's research, utilising Wiendhal and Helms' model, is that in the network started up by Tetrabrik all four quadrants are represented. Amongst these we feel the case of the company DI.CO Service, S.r.l. is especially significant, as it represents a true and proper virtual company that gravitates around a System Integrator, precisely DI.CO Service, S.r.l..

(18) A. Lipparini - *Enterprises, relations between companies and competitive positioning* - ETASLIBRI, Milan.1995

DI.CO. SERVICE



The company was established in 1988 and was set up by Mr Grandi, an ex-IMA employee. He started working for IMA in 1960 until 1974 as an assembler. Between 1974 and 1980 he carried out assembly jobs for IMA. From 1987 he also started some production activity with some collaborators. In 1987 he also started a diversification of the client portfolio with other factories in the sector and other sectors as well. More recently he has been producing complete machines for companies.

The current clients are: IMA. TETRAPAK , CEVOLANI, SASIB. ARCOTRONICS.

Currently the activity is organised around 10 companies linked in a network with each one specialised in its own "core business" with a total of 100 workers.

An important transformation process started about four years ago.

Driven forward by a market that wanted ever-shorter product delivery times together with specialisation, the entrepreneur decided to experiment with the possibility of managing small companies in a network. “Small companies in a network in that if we had chosen to grow internally we would have been faced with the problems of ‘size’ that underlie their choices of becoming ‘slimmer’.”

The objectives have been defined in the following way:

reinforcing the procurement function;

slimming down production;

getting equipped with a quality system to obtain internal benefits subsequently to have the certification.

In the three or four years that have gone by since that decision, with the support of external consultants this currently existing structure has been defined:

The DI.CO. SERVICE supplies services to the other local units: administration and finance, planning (by means of logistics). DI.CO only receives and deals with the orders that require the production of a complete machine, while the individual production, design etc. go directly to the other enterprises that are wholly autonomous in regard to business statute, market, and come into contact with DI.CO. only when necessary. Mr. Grandi holds 51% of the stock of DI.CO and 50% of all the others. Inside each company there is a partner who is also a technician/expert in the firm's specialisation. DI.CO has a functional hierarchical structure while the other companies are organised according to a flow model, with traces of a matrix model. In any case, the aim is to have flat structures.

These companies (10) are all specialised: mechanical production, assembly, design.

The current set-up and its growth has come about naturally in time and gradually on the basis of the idea that it was better to grow by proliferating in terms of productive units rather than by increasing in terms of size. Each time that the company's market expanded and the opportunity occurred to develop a single specialised activity, a collaborator/employee, previously working inside an existing production unit, would be projected towards a legally as well as economically autonomous task.

This drive is reinforced by the tendency of the contractors to no longer demand straightforward production but complex products. The existence of a purchasing office, for example, has amounted to an advantage over competitors who perhaps had more workers but were unable to directly devise procurement policies as required by the recent market evolution. The same advantage has been recorded with the presence of assembly capacity that has been a vantage point for the supply of 'assembled units.

The supply of units and complete machines has completed changed the scenario. As a matter of fact, work has been started towards obtaining certification.

The first step has been the identification of three roles: operative unit managers,; definition of logistics, contracts manager.

Each micro-company undertakes rapport with the outside as well as with the DI.CO system, and has its own planning and design capabilities.

Other fundamental factors in the development of DI.CO have been, on the one hand, the encounter with TETRAPAK: in particular the support policies that it provides to the subcontractors in terms of training and management culture, on the other the consultancy of a professional studio.

Thanks to the help of the consultants today DI.CO can be certified and the network homologated "even if it isn't the certification of the group, it isn't its non-recognition, either": this result has been achieved with the consultant; subsequently relations with CERMET have also improved.

The training cost is estimated at around 300 million for the development of the current quality system: the group's turnover in 1996 has been in excess of 19 billion lire and for 1997 the figure is expected to be over 23 billion lire.