This paper deals with the new role that firms at the second and third tier of the automotive supply chain are called to play in the ongoing process of globalisation of the automotive industry. It argues that the new demands in product quality, service, and cost reduction these firms have to meet imply a rationalisation of the lower tiers of the supply chain, which entails both a selection among these firms and the upgrading of survivors’ competencies and performances. Most of survivors will be however incapable of implementing by themselves the training actions, and the long learning processes, that are needed to achieve this aim. Therefore the question of who should take care of such improvements (as regards their objectives, organisation, and costs) appears as a critical one, and in need for original solutions.

In the first three sections a tentative diagnosis of this rationalisation problem will be developed, drawing much upon the evaluations expressed by members of the CLEPA Training Network in occasion of the 1996 Brussels seminar on “Training for new Work Structures”

1 CLEPA is the European association among suppliers of automotive parts and components. It directly associates all the practical example of how to address its solution, the following two sections will describe and comment on the program which Fiat Auto and about 100 of its direct suppliers have recently promoted to improve product quality at the second tier of this supply chain.

THE NEED FOR RATIONALISING THE LOWER TIERS OF THE AUTOMOTIVE SUPPLY CHAIN

Three main factors can be identified as driving forces of this rationalisation.

The increasing number and functional importance of parts allotted to second tier suppliers, and therefore the increasing impact of these parts on quality, as well as on prices of the components first tier companies supply to car manufacturers. Two different processes foster this trend:

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1 CLEPA is the European association among suppliers of automotive parts and components. It directly associates all the major European firms in the sector, such as Valeo, Bosch, Lucas Varity, Magneti Marelli, besides sister associations operating at a national level, such as ANFIA in Italy and FIEV in France.
the drastic reduction of the number of suppliers with whom final assemblers want to deal, by which the former are called to supply more and more complex components, that incorporate many parts that they have never previously produced;

- the need of direct suppliers to carefully select the technologies and products on which to concentrate their own resources, in order to cope with the increasing demands final assemblers put on them, and therefore their choice to allot to sub suppliers many of the parts they have previously produced themselves.

As a consequence of these trends, direct suppliers now buy an increasing share of the parts they assemble from their own suppliers, notwithstanding many of these inputs are crucial for the functioning of the components they supply, and therefore affect both the image of final products and their customers’ satisfaction. According to Fiat Auto’s experience based on diagnostic reports of its repair shops, 75% of the defects that entailed repairing or substituting a component, concerned parts that had been produced by second tier suppliers. Similar figures are supplied by occasional observation of specific streams of supply to other car manufacturers. The unsatisfactory quality of parts produced by sub suppliers really stands as a major problem of the automotive industry.

As for prices, a common recent feature of contracts between car manufacturers and direct suppliers is the clause of a yearly reduction of the price on which they have agreed for a given product, against the assurance that this stream of supply will last until the relative car model will be produced. First tier suppliers are therefore more or less bound to put in their turn the same request to their own suppliers.

The request of first tier suppliers that their own suppliers have an increasing share in developing, designing, and engineering the components they produce. Until recently what mattered at the second tier of the supply chain was the capability to conform in the most precise way to the designs and technical specifications quoted by first tier companies, which required essentially a good practical know-how of manufacturing processes. Now this is no more sufficient. Inasmuch as first tier suppliers are being charged by final assemblers of the, often complete, responsibility of designing, developing and innovating increasingly complex components, they are compelled to reproduce the same process, and to assign to their own suppliers the responsibility to engineer and design most of the parts they assemble, while keeping the overall control over the product development process. Therefore firms at the second tier level of the supply chain are called to develop new activities, that require sophisticated competencies.

The need of car manufacturers to curtail warranty costs. Warranties on new vehicle efficiency are an increasingly critical asset in competition between automotive companies. In recent years the scope as well as the time period of these warranties have been continuously enlarged, even for low price models. However this service entails very heavy costs for automobile producers. Therefore it is quite understandable that car manufacturers are striving to reduce these costs. The obvious solution is to involve direct suppliers in the after sale service, both by imposing contractual clauses which bind them to pay for failures of their products (which however, as we have just seen, depend mainly on the poor quality of sub supplies), and by asking them to produce adequate technical information about the components they supply, in order to allow personnel in the repair chain to avoid unnecessary substitutions of costly complex components, that could be otherwise repaired substituting one of their parts. Inasmuch as these requests are going to involve in turn second tier suppliers, they put a further pressure on their quality performances and on the capability to broaden the scope of their operations beyond manufacturing.

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1 Some examples of price reductions might be useful: Renault, -18% between 1997 and 2000; PSA, -25% from 1997 to 2000; Ford, -5% per annum between 1996 and 2000; Honda UK, -1.5% per annum and Fiat 3% per annum (EIU, Components Business Europe, several numbers).

2 Chrysler seems to value in $1,000 the average cost per car of the warranty it supplies.
RATIONALISATION AS SELECTION OF SUITABLE COMPANIES

The new, strategic bearing operations at the lower tiers of the supply chain have effects on the overall performances of the automotive industry, but entails in the first place a selection among these firms. Two main reasons stand for this selection.

The recent development of the automotive supply industry has brought each direct supplier to deal with too many own suppliers. In the middle nineties, some 14,000 firms have been estimated to operate in Italy below the first tier of the Fiat Auto supply chain\(^1\), against some 300 direct suppliers. However, insofar as firms operating at the second tier of the chain often supply several direct suppliers, the “effective” ratio of second to first tier suppliers is much greater than the previous figures would lead to reveal. According to the estimate of a large component manufacturer, every direct supplier in Europe presently deals with an average of 100 sub suppliers. The availability of many firms among which direct suppliers could choose, allowed them to sustain the pressures final assemblers were putting on them, relative to price reduction and just-in-time deliveries. But presently this advantage is overridden by the need that own suppliers ensure a high inputs quality, being at the same time capable of playing an increasing autonomous role in product design and engineering. Given these constraints, purchase fragmentation entails too high transaction costs.

In any case several firms presently operating at the second level of the supply chain are unable to meet these new requirements. Although the structure of this segment of the automotive industry is poorly known, one can be rather safely distinguish between three clusters of firms:

- Those which are already capable to yield adequate performances such as cost reduction, quality standards, and design capability, or have in any case the resources to undertake the innovative actions needed to achieve these results. This group is mainly made of firms with more than 100 employees, which are at large specialised in the automotive industry. They include companies owned by the same first tier supplier to which they supply some critical sub components (as balls for bearings in the case of SKF group), and many former first tier suppliers, that continue to supply the same products to direct suppliers, to which car manufacturers have entrusted more complex components.

- Firms, usually of smaller dimensions, which in one or more aspects do not meet the standards presently required of second tier suppliers, but have the prerequisites for improving.

- Firms of even smaller size, which, besides yielding insufficient performances, lack one or more prerequisite for improving.

It is quite probable that the relative weight of the three clusters varies considerably, depending on the structural features of national and local industrial systems. However it is safe to say that almost everywhere only a minority of second tier suppliers belong to the first cluster, so that a selection process will inevitably affect the ones in the last two clusters: in a drastic way those belonging to the third cluster, according to much more chequered pattern those in the second one.

The evidence that the process of rationalisation at the second tier of the supply chain concerns mainly small firms has several implications.

In the first place not every sub supplier may be interested in affording the costs required to continue operating in the automotive sector. Two main structural features account for this choice: the degree of a firm’s specialisation in the automotive industry, and the “strength” of its relationship with first tier suppliers. Consequently:

- the larger is a sub suppliers’ turnover in products that require inferior quality and service relative to the automotive ones, the less their convenience to afford the costly improvements needed to remain in the automotive industry;

- the more stable is the relationship this firm has with each first tier supplier, so to reduce uncertainty about future orders, the greater is, ceteris paribus, its incentive to undertake the improvement actions required.

Secondly, the large majority of these firms seem unable to take effective actions to improve their own capabilities, because of lack of material resources, know-how, and often of an adequate cultural attitude. For instance, it is still common among sub suppliers to accept one defective part every 100 delivered - which amounts to 10,000

\(^1\) Fiat Auto, Suppliers Convention, 1994
defective parts per million - a fair quality standard, while several direct suppliers are already close to meet the request of a max of 30-25 defective units p.m.

RATIONALISATION AS DIFFUSION OF COMPETENCIES DOWNWARD THE SUPPLY CHAIN

As a consequence, rationalisation of the second tier of the supply chain cannot be achieved only by selecting suitable firms, but calls in any case for specific actions to help these firms (and first of all their management) to acquire the competencies needed to improve their capabilities and performances. Training has indeed to be seen as the strategic lever of this rationalisation process. Product quality standards make again a good case in point. As it is now well known, in order to improve quality performances without incurring in prohibitive costs (or even curtailing production costs, as sub suppliers are presently required), it is not sufficient to hire or train an expert in quality, who at his best can implement an adequate quality control system. Instead the entire organisation of work has to be changed, which requires that all workers substantially enlarge their competencies, and undertake to this end a long process in training and learning. This entails the further issue of who should provide such training. One obvious solution would be their first tier client firms. First tiers suppliers are well acquainted with the procedures and the competencies required to achieve good performances in product quality, cost effectiveness and design capability. Moreover, since they have themselves achieved these results by means of training and learning actions, are well aware of the difficulties such actions imply and of the errors to be avoided. Thus they should be quite suited of taking care of their own suppliers development, until they become able to establish a virtuous circle of continuous improvement. The term “mother-hen” captures effectively the rationale of the experience transferring process that is needed.

It is not clear however who should bear the costs of these training actions. In fact, first tier suppliers’ willingness to act as “mother-hens” can be hampered by the risk of not being able to recover the costs this role entails. Inasmuch as a sub supplier deals with several direct suppliers at the same time – as it often happens – any one of the latter might comprehensibly contend that other firms (and eventually even its own competitors) could take advantage of its expenditures for improving this supplier’s performances. Indeed, the knowledge (and the training) needed to improve second tier suppliers’ performances must be conceived as a “public good”, for which no private concern in the supply chain is rationally interested in spending money, even if the envisaged improvement should increase the efficiency of the whole system.

At the same time, sub suppliers’ willingness to be the chicks of some mother-hen cannot be taken for granted. We can suppose that small enterprises are at large contrary to a top-down approach to their improvement, since this would inevitably imply that larger client companies “filter” small firms needs through the distorting lenses of their own organisational criteria and procedures. Therefore, the latter would strongly prefer to take care by themselves of their own improvement, or rather to associate with similarly small firms to undertake suitable initiatives; furthermore, we think that such an attitude often corresponds to an effective intention to innovate, while the compliance with a top-down scheme may imply a passive attitude towards improvement. However the quite scant evidence of concrete initiatives following a bottom-up approach leads to conclude that this alternative solution to sub suppliers’ development requires conditions, that are in any case difficult to meet.

THE MAIN FEATURES OF THE “GUIDED IMPROVEMENT” PROGRAM FOR SECOND TIER SUPPLIERS OF FIAT AUTO

A significant attempt to solve the problem at issue from a top-down approach is the initiative Fiat Auto and several of its first tier suppliers have recently undertaken. Even though this initiative focuses on the specific (albeit strategic) topic of product quality, it deserves attention on account of its organisational features. In what follows we will therefore try to give a brief account of its salient characteristics and subsequently discuss the more general lesson that can be learnt from it.

Until quite recently Fiat Auto disregarded the problem of sub suppliers’ output quality, or more
precisely addressed it in pure contractual terms, leaving to direct suppliers the entire responsibility over it, eventually imposing penalties on them for detected defects of inputs coming from sub suppliers. This position was coherent with the selection policy this automobile manufacturer had been following from the early nineties, since giving a supplier the responsibility of its input quality amounted to putting on him a strong incentive to select in its turn its own suppliers, and/or to establish better agreements with them. However, this incentive proved ultimately to be insufficient. At the same time a further selection of direct suppliers was unfeasible for Fiat Auto by 1998\(^1\). Therefore it had to change policy, deciding to play an active role, even if an indirect one, in improving the quality of the products supplied by firms at the second tier of the supply chain.

Fiat Auto resorted to the integrated training and follow-up program, named “crescita guidata” (guided/monitored improvement), it had already successfully experienced with several first tier suppliers between 1988 and 1992\(^2\). The basic idea was to have first tier companies to play with their suppliers the same “mother-hen” role Fiat Auto had previously played with them. But to induce these companies to invest time and resources to this aim, a specific organisational scheme had of course to be designed. The original solution has been to entrust the executive authority over the program to a consortium between first tier suppliers and their main customers: these being the three largest Italian automotive companies of Fiat Group (Fiat Auto, Iveco, New Holland). The consortium, labelled CONSAF, was founded in 1998. Its tasks were mainly to facilitate access to national and local funds for training, establish the program priorities, and control it’s results. The practical implementation of the program had been instead jointly entrusted to ISVOR\(^3\), that was already in charge of the former program for first tier suppliers, and the first tier supplier firms involved in each improvement action. Some 100-150 first tier suppliers were expected to join the consortium (excluding suppliers of raw materials, firms without any establishment in Italy, or which had already taken by their own initiative similar actions with their suppliers) and each was supposed to bring into the program from 2 to 4 sub suppliers. Up to date the consortium has been joined by 102 first tier suppliers, that have involved 4 sub suppliers on average each, for a total amount of about 430 second tier firms, which evidences that so far the program succeeded more at the intensive margin than at the extensive one.

The program allows quite flexible procedures for selecting partners, and usually the choice about which sub suppliers to involve is completely left to the Fiat direct suppliers. The former are in any case small enterprises (between 30 and 50 employees approximately), that belong to the second and third clusters we mentioned above. Inasmuch as these enterprises have almost only competencies in manufacturing (and usually in a single process technology), even though possibly of superior level, they lend themselves well to rapid improvements of their outputs by means of training actions, addressed to few strategic roles.

The main features of the program can be summarised as follows. Each selected sub supplier is called to undertake three subsequent modules, aimed at improving process quality relative to a definite production technology, for a total six month period, each module\(^8\) consisting of:

- 10 day training course about a definite topic in quality improvement. These courses are addressed to the concerned firms’ owners and/or to their top managers, and are supplied by ISVOR. Their cost is rather low - about 100 Euro per person per day – so to allow most sub supplier firms to afford it, and to have more than one person attending a course. However, a wide array of mixed solutions, providing for contributions from first tier client companies, have been experienced.
- one month exercise by which sub supplier firms are called to practically implement the methodologies and procedures that have been taught to their managers, with the advice and under the supervision of client company professionals. The much larger costs of such

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1 The number of suppliers rose was 1200 in 1987 with Fiat’s take over of Alfa Romeo. The number of suppliers starts to fall in 1987 very rapidly; so much so that today, it is less than one third of the 1987 figure, that is about 360.


3 ISVOR is one of Europe’s most important full-line training companies in terms of turnover, size, quantity and quality of staff. ISVOR was founded in the 1970s through the merger of all Fiat’s training bodies.

4 The first module concerns the regulation of the production process; the second one the quality in production and the third one the methodologies to improve the quality.
activities are met by client companies, such as
time spent by their professionals, and by sub
supplier firms, and for the time spent by their
own human resources.

The three modules are conceived so to cover all
together a definite area in quality improvement for
a given production process. At the end of the six
months period the results each sub supplier has
achieved are assessed by experts of the client
company that has taken care of the improvement
process. Up to July 2000 109 second tier suppliers
had achieved a positive evaluation, while 56 audits
were still under way. It is however expected that
success in a single product line be extended to the
whole range of supplier company’s products.

In order to ensure coherence, this evaluation has
to follow specific criteria, that are being specified
for each process technology by ANFIA, the Italian
association between companies in the automotive
industry, to which - besides Fiat Group companies -
all the principal first tier supplier companies
belong. It is the simplified version of a previous
instrument for assessing quality by means of
process audits, named VSQ94, that had been
jointly defined by Fiat Auto and several of its
suppliers.

A TENTATIVE ANALYSIS OF THE
RATIONALE OF THE PROGRAM

According to the information we have been able
to collect (but only from its sponsors) this initiative
seems to provide an effective solution to some
major obstacles that ensue from a top-down
approach to sub suppliers’ improvement. These
solutions point to the advantage of the specific
organisational features of the initiative.

First of all, the idea to have a consortium
between final assemblers and many of their direct
suppliers to lead this program, amounts to creating
a common ground, where the latter, on account of
their collective presence, are encouraged to put
forward their own interest and to call for a
rationalisation of all the joints in the supply chain,
as a precondition for taking the role of “mother-
hens” towards their small supplier firms. It should
be noted that the initial meetings of the consortium
have been in fact the occasion for first tier
suppliers to raise many complaints about the
inefficiencies of their client firms. At the same time
this organisational structure, and particularly the
presence of Fiat Auto, allows participants to solve
the implicit conflict of interests, that normally
prevents first tier companies in investing in
improvement of their own supplier performances,
when these also produce for other fist tier
companies. The existence of such multiple ties
across the two tiers of the supply chain has been a
recurring problem for the implementation of the
program. But their paralysing effect has been
avoided because of the arbitrage position held by
Fiat Auto as regards first tier suppliers, by which
the former has been able to induce them to
experience innovative solutions, such as sharing
the expenses undertaken by one first tier company
also to the advantage of others; or equally
distributing the care of a given set of sub suppliers
among the enterprises they supply, eventually
according to a rotation scheme, etc.

On account of this organisational structure, it
has been also possible to overcome the diffuse
mistrust of sub suppliers in first tier companies,
and their resistance to undergo costly initiatives to
improve own performances, on account of the
uncertain perspective in recovering such expenses.
Sub suppliers are, of course, attracted by the
perspective opportunity of high volume orders as
the ones allowed by the market for automotive
components, but they also have a long time
experience of first tier firms’ common practice of
fragmenting their supplies, and abruptlly switching
suppliers.

Once again, the collective ground on which sub
suppliers have been involved in the initiative has
given them the strength to raise this complaint, and
to ask as a condition in undertaking the
improvement program a more stable relationship
with the client companies that have brought them
in. At the same time the perspective opportunity of
improving own inputs quality and of constantly
monitoring suppliers’ performances has given first
tier suppliers a strong incentive to comply. While
Fiat Auto, because of its partnership in the
initiative, has been put in the position to arbitrate
between the demands that firms at the two tiers of
the supply chain address each other, encouraging
sub suppliers to take some risk, and their clients to
take a more collaborative attitude towards them, in
particular as a more stable flow of orders is
concerned.
A last interesting feature is the tight (although implicit), multifaceted link this initiative establishes between to support the second tier suppliers and their selection. As we have seen, the decision about which second tier suppliers to invite to participate in the development program, is normally up to their customer firms: the understanding is however that every sub supplier (except those lacking basic prerequisites) should be given sooner or later the chance to take part in it, and that, according to their reply, customers should apply two different policies as for price cutting requirements:

- refusal or mere perfunctory compliance lead to the inflexible request of an yearly 3% reduction in price, in order to continue to receive orders;
- acceptance, instead, implies a bargained solution, that eventually allows for a temporary delay of the request - which practically amounts to a further contribution by first tier suppliers to their suppliers’ improvement. But one must also consider that, inasmuch as acceptance entails the transfer of critical information from sub supplier to client firm, on the one hand it severely hampers the bargaining capability of the former, and, on the other hand, it gives the latter the opportunity to better assess whether the sub supplier is fit to survive in the automotive industry, and therefore how much it is worth to be helped.

These considerations lead to the conclusion that the initiative should have a twofold, strong rationalisation effect on the second tier of the supply chain. On the one hand it should get rid of the worst performing firms, that will be progressively induced to let themselves drop out of the automotive supply chain.

By its same sequential logic this self-selection process should avoid the biases otherwise implied by any selection - provided that the criteria by which sub suppliers are invited to participate in the program (their prerequisites for improving) be properly assessed. At the same time it should upgrade quality performances of promising firms, giving a joint responsibility for this endeavour to their clients and to them. Much further inquiry is requested to verify this hypothesis. In particular the implementation of the program has to be observed also from the second tier firms point of view, and a significant sample of sub suppliers that have taken part in it must be carefully studied. A specific topic that should be addressed by this analysis are the instruments on which rests the assessment of suppliers’ performances, also in a view of the transferability of this initiative. Inasmuch as a top-down approach to second tier suppliers improvement is preferred, or is considered the only viable solution, the availability of effective instruments for identifying which firms it is worthwhile to help and subsequently assessing the results they have achieved is indeed an essential precondition for this kind of initiatives. These instruments concern mainly the efficient running of the various production processes in the automotive industry. As we have seen, ANFIA has already taken an important step in this direction, by starting to produce a simplified tool for assessing process quality. It is plausible that also other national industrial associations have produced or are producing similar instruments. A comparison among these tools, in view of their integration at the European level, would therefore facilitate the rationalisation process at the second tier of the supply chain, and CLEPA could rightfully take care of this important task.

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