

The Italian Economy at the Dawn of the 21st Century

To Patrizia and Flora

Edited by
MASSIMO DI MATTEO
Università di Siena

PAOLO PIACENTINI
Università La Sapienza, Roma

ASHGATE

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission of the publisher.

The editors have asserted their moral right under the Copyright, Designs and Patents Act, 1988, to be identified as the editors of this work.

Published by
Ashgate Publishing Limited
Gower House
Suite 420
101 Cherry Street
Burlington, VT 05401-4405
USA
England

Ashgate website: <http://www.ashgate.com>

British Library Cataloguing in Publication Data

The Italian economy at the dawn of the 21st century
1. Italy - Economic conditions - 1994- - Congresses 2. Italy
- Economic policy - 20th century - Congresses 3. Italy -
Social conditions - 1994- - Congresses
I. Di Matteo, Massimo II. Piacentini, Paolo III. Enterprises,
Labour Markets, and the Institutions in Italy facing the
Challenges of the XXI Century (2001 : University of Tokyo,
Japan)
330.9'45/093

Library of Congress Cataloging-in-Publication Data

The Italian economy at the dawn of the 21st century / edited by Massimo Di Matteo and
Paolo Piacentini.
p. cm.

Chiefly papers based on presentations at the Conference on Enterprises, Labour Markets,
and Institutions in Italy Facing the Challenges of the XXI Century held at the University of
Tokyo, October 23-24, 2001.
Includes bibliographical references.
ISBN 0-7546-3392-6 (alk. paper)

1. Italy--Economic conditions--1945--Congresses. 2. Italy--Economic policy--20th
century--Congresses. 3. Regional development--Italy--History--20th century--Congresses.
4. Labor market--Italy--History--20th century--Congresses. 5. Industrial
organization--Italy--History--20th century--Congresses. 6. Italy--Social conditions--20th
century--Congresses. 7. Italy--Social policy--20th century--Congresses. I. Di Matteo,
Massimo. II. Piacentini, Paolo, 1948- III. Conference on Enterprises, Labour Markets, and
Institutions in Italy Facing the Challenges of the XXI Century (2001 : University of
Tokyo)

HC305.I716 2003
330.945--dc21

ISBN 0 7546 3392 6

Printed and bound by Athenaeum Press, Ltd.,
Gateshead, Tyne & Wear.

2002043967

Contents

List of Contributors *Preface*

viii
x

PART I: GROWTH PATTERNS AND STRUCTURAL FEATURES

- 1 Italy's First Phase of Postwar Development: The Role of
Aggregate Demand
Massimo Di Matteo 3
Comment
Hiroshi Yoshikawa 11
- 2 The Italian Economy after the Bretton Woods Era (1971-2001)
Alessandro Vercelli and Luciano Fiordoni 13
- 3 The Italian Labour Market and Production System:
Structural Features and Main Developments
*Carlo De Gregorio, Andrea de Panizza, Roberto Monducci
and Leonello Tronti* 38
Comment
Kenichi Sakai 76

PART II: ASPECTS OF A DUAL ECONOMY

- 4 Old and New Dualisms in the Italian Labour Market
Roberto Schiattarella and Paolo Piacentini 81
Comment
Sumi Iwamoto 100
- 5 Development Policies in the Italian Mezzogiorno:
Lessons from the Past
Maurizio Franzini 104
- 6 Rethinking Development Policies in Italy
Fabrizio Barca 129

	<i>The Italian Economy at the Dawn of the 21st Century</i>	<i>Contents</i>	
vi			vii
7	Evolution of Production Structure in the Italian Regions <i>Carlo Andrea Bollino and Marcello Signorelli</i> Comment <i>Micaela Notarangelo and Giovanni Russo</i>	150 172	14 The Family and Social Networks in the Socio-Economic Development of Italy <i>Andrea Toma</i> Comment <i>Masao Kotani</i>
	PART III: CORPORATE GOVERNANCE AND INDUSTRIAL ORGANIZATION		
8	Continuity and Change in Italian Corporate Governance: The Institutional Stability of One Variety of Capitalism <i>Ugo Pagano and Sandro Trento</i>	177	15 The Italian Welfare System Between the European Unification and the Globalization Processes: A Suggested Interpretation <i>Paolo Calza Bini</i> Comment <i>Nobuhiro Hiwatari</i>
9	Production Outsourcing in Italian Manufacturing Industry <i>Alessandro Innocenti</i> Comment <i>Katsuhito Iwai</i>	212 233	<i>Index</i> 355
10	Italian Districts in the International Economy <i>Rodolfo Helg</i> Comment <i>Yoshiyuki Okamoto</i>	236 246	
11	Banking System and the Dualistic Development of the Italian Economy <i>Cesare Imbriani</i> Comment <i>Osamu Ito</i>	248 256	
	PART IV: SOCIAL INSTITUTIONS AND NETWORKS		
12	The Fiscal Decentralization and the Autonomy of the Local Government <i>Carlo Filippini and Giampaolo Arachi</i> Comment <i>Hiroko Kudo</i>	261 287	
13	The Italian Third Sector: An Overview at the Beginning of the Century <i>Marco Demarie and Stefano Cima</i> Comment <i>Yousuke Mamiya</i>	292 311	

Production Outsourcing in Italian Manufacturing Industry¹

Alessandro Innocenti

Introduction

The debate on the role of dualism in the Italian manufacturing industry goes back to the 1970s. Since then it has been a key issue not only for industrial economics but also for economic policy. Only recently the Italian Parliament has recognised the autonomous role played by the local systems of small firms in economic development by introducing specific legislation to support industrial districts. At the same time, theoretical approaches interpreting the relationships between small and large firms solely as subordinate ones have been disputed on both empirical and theoretical grounds. Some arguments were suggested by the evolutionary theories of innovation. Innovation has been viewed as a localized process where progress can be obtained only gradually and within the path followed by each firm, independently of its size. Other insights were given by information economics. Firms have been described as information processors and repositories of explicit and tacit knowledge, that are made complementary to each other by the decentralised action of the network. By means of cooperative relationships with other small firms and of growing specialisation, small firms can remain small and become autonomous decision-makers. At the same time, vertical integration of large firm has been generally abandoned in favour of a refocusing on core activities joined with outsourcing through the subcontracting of the production of parts or of the provision of services to small and medium firms. Generally speaking, subcontracting can be defined as a pattern of co-ordination of production activities based on vertical relationships between separately owned and managed enterprises with distinct economic objectives.² The buyer decides not to internalise the development and production of a component, nor to directly procure it from a spot market. Instead, a sustained relationship is created, which includes the exchange of proprietary information and knowledge between the buyer and the supplier. The efficiency of this relationship depends on the fact that all the firms involved, whatever their size, share the knowledge necessary to solve problems of complementarities among different production phases but at the same time are protected from being expropriated of their own specific knowledge and their profits.

This paper analyses how these conditions for efficiency in networks of firms

have been satisfied in the Italian manufacturing industry and proposes a theoretical interpretation to explain them. Section 2 surveys some evidence showing that since the 1970s production outsourcing was increasingly used in Italian manufacturing industry despite the high employment share of small firms. Section 3 argues that such a growth was characterised by the convergence between organizational patterns of vertical networks promoted by large firms and those characterising industrial districts. Both large and small firms increasingly externalised production phases by evolving from their past dependence on sourcing cheaper labour towards speciality subcontracting. Section 4 proposes a theoretical framework to interpret this process. It is argued that an explanation of the growth of outsourcing is given by the informational advantages of decentralised networks of firms over the vertically integrated firm. Section 5 sets out some concluding remarks.

The extent of outsourcing

The high employment share of small firms is considered a distinctive characteristic of Italian industrial organisation since the 1970s.³ All the same, economic activity in Italian manufacturing moved away from large firms to small firms in the 1980s and 1990s. As Table 1 shows, the rate of downsizing grew constantly during the 1971–1996 period. In particular, the employment share of firms with less than 50 employees increased from 38.8 per cent to 56.6 per cent. In the same period the share of firms with 500 or more employees dropped from 32.2 per cent to 17.2 per cent.

Table 1 – Manufacturing employment by firms size class (percentage shares)

	1-9	10-19	20-49	50-99	100-199	200-499	≥500	<50	≥50
1971	19.1	7.9	11.8	9.5	9.2	10.3	32.2	38.8	61.2
1981	21.6	11.9	12.7	9.1	9.0	9.6	26.2	46.2	53.8
1991	24.4	14.7	15.3	8.9	8.1	8.8	19.8	54.5	45.5
1996	24.9	15.3	16.4	9.2	8.4	8.6	17.2	56.6	43.4

Source: Author's elaborations of Istat census database

This process has been attributed to a number of features of the Italian economy. First, small firms would have benefited from less rigidity in the labour market and more favourable fiscal treatment. A specific legislation approved in the 1970s affected primarily large-scale firms, by imposing them restrictive norms for dismissing workers. Moreover, it is well known that the practice of avoiding taxation was relatively more diffuse among small firms. Second, the prevalence of small size firms was fostered by the rapid growth of industrial districts. These local systems of production had gradually become the most innovative and profitable part of the Italian industrial system. In addition to these causes, firm downsizing showed in Table 1 cannot be explained without the spreading of outsourcing.

An indirect way to assess the extent of outsourcing is given by the degree of vertical integration. As Arrighetti (1999) shows, the index of vertical integration – namely, the ratio of value added over output – for the Italian manufacturing industry was stable on 0.35 – 0.39 from 1968 until the 1973. Then, it constantly decreased until 1997, when it was about 0.27. This trend is confirmed by disaggregated data. All the macro-sectors of manufacturing share the same tendency with the only exception of the food sector. Arrighetti also calculates the same index by firm size classes showing that the decrease was common to all the classes considered (20-199, 200-999, more than 999) but it was greater for large firms and more variable for medium and small firms. Not surprisingly, the comparison with a number of European countries confirms that although the rise in outsourcing was a very diffuse process, the Italian case was characterised by greater intensity and rapidity of change. Finally, it is interesting to note that according to some econometric tests performed by Arrighetti, the determinants of outsourcing were mainly connected to structural and organizational specificities of the countries under analysis rather than to uncertainty or variability of the demand in the final markets. Another indirect source of evidence for outsourcing is given by the sample measurements of the extent of subcontracting relationships. The main problem with this evidence is that it appears fragmented and piecemeal. In particular its evaluation is made difficult by the variety of definitions employed. However, available data confirm the widespread and growing use of outsourcing.

Sample data was collected by Mediocredito Centrale with the *Indagine sulle imprese manifatturiere*, that provides information both on the size and the evolution of subcontracting. So far the Observatory of Mediocredito Centrale has produced three surveys. The first was conducted in 1989-1991 and published in 1994; the second was conducted in 1992-1994 and published in 1997. In the second half of 1999 Mediocredito completed the third survey for the 1995-1997 period. All the surveys targeted manufacturing firms with more than 10 employees. The sample of 4,497 firms was stratified by census region and employment size.

Table 2 – Firms by intensity of subcontracting (percentage shares)

Intensity of subcontracting	1994		1997	
0		66.8		62.5
0-10		15.6		3.9
10-25		8.0		2.8
25-50		6.1		4.0
50-100		3.5		26.8

Source: Author's elaborations of Mediocredito Centrale data

The dataset included information from balance sheets and subcontracting relationships. Only 1994 data are comparable with 1997 data because previous surveys considered different samples of firms. Table 2 gives data for the intensity

of subcontracting, that is measured by the ratio between subcontracting activity and turnover.

In the 1994-1997 period, the share of subcontracting firms in the total of manufacturing firms rose by more than 4 percentage points (from 33.2 to 37.5 per cent). In just three years, the share of firms that subcontracted more than 50 per cent of their turnover grew from 3.5 to 26.8 per cent.

Table 3 – Subcontracting intensity by firm size class and Pavitt sectors, 1997 (all firms)

	Traditional	Scale	Specialized	High technology	Total
Number of employees					
11-20	27.9	27.3	30.1	18.3	27.9
21-50	28.7	34.4	30.0	23.5	30.3
51-100	28.1	28.0	26.0	35.2	27.8
101-250	25.8	27.6	20.2	23.9	24.7
251-500	22.4	23.3	33.1	25.9	26.1
> 500	9.9	22.2	22.9	40.1	22.4
Total	27.4	29.3	28.3	26.2	28.1

Table 4 – Subcontracting intensity by firms size class and Pavitt sectors, 1997 (only subcontracting firms)

	Traditional	Scale	Specialized	High technology	Total
Firms size					
11-20	78.4	73.9	77.1	71.6	76.8
21-50	72.1	81.1	78.1	76	76.3
51-100	76.3	74.5	72.5	79.2	75
101-250	70.1	68.8	60.7	75.8	67.5
251-500	73.4	76.9	67.9	67.4	71.9
> 500	40.6	68.1	74.6	77.5	67.3
Total	74	76	74.4	75.5	74.7

Source (table3-table4): Author's elaborations of Mediocredito Centrale data

In 1997, subcontracting intensity (Tables 3 and 4) was on average about 28 per cent for the entire sample and 75 per cent for subcontracting firms and it was virtually constant across Pavitt sectors and firm size classes. In particular, no major difference emerges between scale and specialized sectors and across size classes with less than 500 employees. This suggests that similar patterns of relationships are shared to the same extent by different production techniques and various

organisational structures.

The search for variables correlated with subcontracting is troublesome because there are a number of factors that are likely to increase the level of outsourcing. A possible correlate of subcontracting intensity may be export intensity. On the contrary Mediocredito data (Table 5) shows that non-export firms outsourced more than export firms. The source of this relation could suggest that relationships among small firms belonging to local systems account for a considerable part of subcontracting activity. However different evidence exists concerning the distribution of subcontracting activity according to geographical distribution (Table 6). The total share of sales in subcontracting to foreign firms (belonging or not to the same group) was 23.7 per cent in total, the total share of sales to national firms was 33.6 per cent and 33 per cent to firms located in the same area. Finally, the percentage of sales in subcontracting among firms belonging to the same group was about 40 per cent. This data could be evidence of the fact that, although the existence of widespread intra-group links was supported, subcontracting relationships among independent and distant firms were also significant.

Table 5 – Subcontracting intensity by export activity, 1997 (all firms)

	Share of subcontracting activity in turnover
Export Firms	23.8
Non-export Firms	38.9
Total	28.1

Source: Author's elaborations of Mediocredito Centrale data

Table 6 – Subcontracting activity by geographical distribution 1997

	Shares of sales in subcontracting
Foreign firms belonging to the same group	7.6
Domestic firms belonging to the same group	17.5
Local firms belonging to the same group	15.0
Foreign firms	16.1
National firms	46.2
Local firms	28.0

Source: Author's elaborations of Mediocredito Centrale data

Not surprisingly, the share of the main contractor (Table 7) shows a U-shape distribution that matches firm size distribution of Italian manufacturers. Largest and smallest firms established subcontracting relationships characterized by a

higher share of the first contractor compared to the intermediate size firms. However, the share of the main contractor was, on average, 21 per cent, that is a value too low to substantiate the dominance of strictly hierarchical relationships between contractors and subcontractors.

Table 7 – Shares of the main contractor by firm size class

	Number of employees						Total
	11-20	21-50	51-100	101-250	251-500	> 500	
First contractor	21.5	20.7	20.3	19.7	21.2	22.1	20.9
First three contractors	36.6	36.0	34.3	33.8	34.1	37.2	35.6

Source: Author's elaborations of Mediocredito Centrale data

Mediocredito data also allow for a positive evaluation of the subcontractors' performance (Table 8). The values of Return on Equity (ROE) and of Return on Investment (ROI) and investment/turnover ratio for subcontracting firms were indeed higher than for non-subcontracting firms.

Table 8 – Indicators of performance

	ROE ^a	ROI	Investment/turnover
Subcontracting firms	-8.2	30.1	6.3
Non-subcontracting firms	-27.5	22.9	6.2
Total	-20.4	25.5	6.2

Source: Author's elaborations of Mediocredito Centrale data

Finally, another piece of information is given by the Bank of Italy that has recently promoted a statistically significant sample survey of industrial districts (Omiccioli 2000). This survey gives an assessment of the average intensity of subcontracting of about 25 per cent of the turnover in industrial districts. This value, that matches exactly the results of Mediocredito surveys for the whole manufacturing industry, confirms the share of subcontracting in the local system of small firms and is similar to that of vertical networks co-ordinated by large firms. More interestingly, the analysis of the specific patterns of outsourcing shows that local systems increase the degree of specialization by outsourcing not only immaterial activities (design, marketing, advertising) but also productive phases. The prevalent pattern adopted by these subcontracting relationships among small firms is to create balanced contractual arrangements, where suppliers and users are protected from exploitation or replacement by the increase of their specialization.

To conclude, the spreading of outsourcing increasingly characterises the Italian manufacturing industry. Since the average size of Italian manufacturing

firms has been steadily decreasing, the distance between the employment share of small Italian firms and that of other industrialized countries has been growing. These quantitative changes have been triggered off by qualitative transformations that are discussed in the following section, first the case of outsourcing of large vs. small firms is discussed followed by that of small vs. small firms within local systems of production.

Changing patterns in production outsourcing

The outsourcing of large firms

The downsizing or segmentation of large firms is conventionally viewed as the main cause of outsourcing. Such a process could depend on the maintenance of hierarchical arrangements between the supplier (usually small) and the user (usually large) and could ask for arm's length relationships safeguarding the retaliation power of the large firm.⁵ Although the traditional patterns of exploitation of subcontractors through one-way communication channels and demands for cost reductions remains diffuse in traditional scale sectors and low-skilled activities, outsourcing between independent or partner firms has become the main source of downsizing even for large firms. Following the diffusion of the flexible production systems, which combine economies of scale and scope by pushing product differentiation to the last stages of the production process, large firms have progressively disintegrated vertically and established specific relationships with their suppliers. This expanding reliance on subcontractors, both for parts and for complete subassemblies, means that the way in which subcontracting relationships are organised becomes central to the efficiency of the whole production process and to the quality of products. The aim of large firms becomes the implementation of these relationships in cooperation with their small subcontractors by creating relational contracts, operating on a long-term basis and requiring active responses in terms of innovation and flexibility. To obtain this result, most large firms have outsourced by adjusting to subcontractor characteristics and by radically changing their internal organization. For instance, Camuffo and Volpato (2001) describe the case of the car industry, while Crestanello (1999) discusses the textile and clothing industry case. In these cases, outsourcing follows different channels, starting with spin-off within the same group and moving on to the start of new activities that is combined with large-scale specialisation strategies. The first level of the supply chain is progressively reduced and takes responsibility not only for the production of specific parts but also for technological innovation and components design. Finally, services have been fully outsourced, from those having lower added value and more labour-intensive (security, cleaning and catering) to more complex services such as logistics, computer maintenance, or transportation.

Generally, the process of outsourcing of large firms involves two main types of suppliers according to the degree of autonomy of the supplier. The first type is the dependent supplier, which just executes orders from the client firm. This kind

of relationship is hierarchical, and information flows are typically one-way from the user to the supplier. The second type is more autonomous and is involved in the co-design of products. The subcontractor in this case faces more competitive pressure, from other potential suppliers, but has more bargaining power regarding the price of the product.

Insights into the characteristics of these relationships are given by the example of the carmaker Fiat. Recent work (Enrietti 2000, Volpato and Stocchetti 2000, Camuffo and Volpato 2001) shows that outsourcing is rapidly increasing, in both production and services. While in the 1970s and 1980s, Fiat outsourced mainly low value added production phases, since the late 1980s the same process involved important production phases such as the mounting of suspension units and crucial services like plant maintenance and logistics. An evident measure of the extent of this process is given by the reduction in employment level by 38 per cent from 133,431 units in 1990 to 82,450 units in 1999 despite the maintenance of the same production level.

The downsizing of Fiat has been accompanied by the restructuring of the suppliers relationships. Subcontractors are divided into three groups. The first-level subcontractors are those producing more complex components that are designed in close collaboration with Fiat and that are usually modules to be assembled internally by Fiat. The other two groups produce more standardized components and their activity is relatively more independent from Fiat.

The rationale for outsourcing appears to be the increase in the specialisation of activities. Subcontractors are chosen on the basis of their specialised technical knowledge and not in order to lower labour costs.⁶ First-tier suppliers carry out specific tasks that correspond to a module. In order to make the different parts complementary, Fiat has organised car production by arranging the different phases in such a way that the information necessary to produce each of them can be processed autonomously. Generally, when a task is decomposed, the resulting units cannot only be arranged in different ways, they can also interact with each other in various ways. The amount and nature of interaction between the different modules can be described in terms of different kinds of modularity (Fodor 1983). The representational modularity, also known as information encapsulation, means that each module has its own exclusive representation of a kind of knowledge that is not accessible to any other module. Differently from functional modularity, where each module can interact with the other modules, in presence of encapsulated information a module is an exclusive source of knowledge and is independent on general architecture.⁷ This implies that contrary to the past, when car components were designed and engineered by the car manufacturer leading the whole project and suppliers simply manufactured them, now the supply chain is fully decentralized among firms of equal importance:

"The fundamental aspect of coordination based upon ex ante planning is that any individual operator does not need information on the whole chain of operations. Any chain operator must know only start and end date for a given activity, and must be concerned about precisely meeting its specific deadline. This implies a hierarchical management of information. But forms of simultaneous coordination on the whole of operations, aimed at compressing chain slacks require

on line access to the whole sequence of operations, in order to carry out adaptations any time in which downwards demand triggers a wave of change which involves the whole upward operation chain. In other words, this implies forms of network connections among operators. The decision-making processes related to product development involve both the car manufacturer and first tier suppliers. According to the continuous improvement both in product and process technology, nowadays the competencies that are necessary in order to manufacture a competitive car encompass a wide range of fields of expertise. As a result, critical decisions might often take place in an inter-firm process and thus an agreement among peers could be required" (Volpato and Stocchetti 2000, p. 9).

This arrangement requires that relationships between large firms and suppliers become contractually more balanced and long-term in such a way that their duration is determined by the product life cycles. Each time a new product is launched, the large firm makes a sort of call for the best offer from suppliers and suppliers are put into competition. After this initial phase, large firms continue subcontracting relationships with the same suppliers, so that product change is in fact an occasion to renegotiate the contract. The long duration of relationships allows deriving some of the benefit of vertical integration, while simultaneously avoiding its drawbacks, such as the lack of incentive for performance for the component maker.

Moreover, the flows of information in the suppliers network become more intense and complex. Technological and market information are shared depending on the necessity of co-ordinating the whole production process and a common language is established. On the other hand, the supplier specialises in an autonomous way and therefore can develop proper ideas and innovate. The advantages of this network can be characterized as the result of specialisation, namely to deal with a particular subset of the overall information set related to the development of the product, and of the sharing of generic knowledge, which brings both co-ordination and innovation, while the encapsulation of information safeguards incentives to introduce innovation because the residual claimant to the rents from innovation is protected from being expropriated.

One interesting point that is worth noting is that such partnership relationships are supported by technological progress (Mariotti ed. 1996). The co-ordination across firm boundaries is indeed helped by the use of information technology, and CAD (Computer Aided Design) systems in particular. Electronic data interchange was first used for structured tasks, such as scheduling, logistics and just in time. The increase of involvement of some suppliers in product development is associated with the use of information technology for complex and creative tasks, such as joint design and engineering. In addition, information technology helps to increase the efficiency of network relationships with suppliers since electronic data interchange and industry-wide platforms have been shown to help buyers to reduce the costs of finding an appropriate supplier, monitoring subcontractors and co-ordinating ordering, scheduling and payment systems (Bensaou, 1999). Such co-design requires close collaboration and intense communication between the engineers of the buyer firm and the supplier.

The outsourcing of small firms

If the disintegration of large firms had a decisive influence on the further increase of the occupational share of small firms, the processes of outsourcing among small firms have reinforced the same trend. Carnazza, Innocenti and Vercelli (2000) study the processes of outsourcing among small firms of Italian industrial districts. Their discussion is based on the distinction between specialised and capacity-based subcontracting. Specialised subcontracting means a relationship between a contractor and a subcontractor where the former continuously relies on the latter for the supply of an input for which there is no in-house supply. In contrast, capacity-based subcontracting indicates a relationship where the contractor hands over supply to the subcontractor only in the case of temporarily high levels of demand. In many industrial districts, small firms have increasingly allocated part of the production process to other small firms, either by providing the financial resources needed to acquire machinery (since owners of the suppliers are often own previous workers), or by moving the isolated phases out of the district. Other contributions (Conti and Menghinello, 1998, Innocenti 1998, Corò and Grandinetti 1999, Gargiulo and Mariotti 1999) provide some evidence that local systems of small firms are characterised by processes of delocalisation, whereby production characterised by low knowledge specificity and intensive use of labour is shifted to low labour cost countries. The latter type of subcontracting is however considered valuable only if close co-operation between the contractor and the subcontractor is not crucial. On the other hand, subcontracting relationships characterised by high levels of knowledge specificity and product quality involve firms belonging to the same local system, among which vertical cooperation is arranged on the basis of long term duration, explicit ex-ante agreements and implicit renewal over time.

The difference between these two types of subcontracting can be shown better by describing what changes have concerned subcontracting relationships in industrial districts since the 1970s. These patterns of evolution are very similar to those characterising outsourcing of large vs. small firms. A significant part of these relationships among small firms turned from one-way to two-way communication channels. Two major factors explain this change. First, the increased technological level of production induces small firms to increase their specialisation. This implies the creation of more stable agreements, the multiplication of the tiers of subcontractors and more balanced contractual powers between suppliers and buyers. At the same time, capacity-based subcontracting, which was largely used in the past as excess capacity to be exploited during temporary phases of demand expansion, become less attractive. Secondly, the final markets in which Italian industrial districts are specialised become increasingly fragmented. The production of these local systems is largely concentrated on the high quality segments of three macro-sectors: the so-called "fashion system" (textiles, leather, clothes, shoes, glasses); goods for the house (wood, furniture, ceramics, accessories); the machinery produced for the previous two macro-sectors. These production systems have acquired the characteristics of niche markets, where customer needs are deeply diversified and the product life cycle has shortened. Rather than on price factors, firm market strategies are increasingly dependent on design innovation,

product differentiation, customisation and after-sales services, and brand loyalty. These requirements can be satisfied only by intensifying the process of outsourcing and asking suppliers to co-develop products or parts.

To summarize, these examples point out how outsourcing of both large vs. small firms and among small firms is associated with the intensification of competition mainly based on non-price factors. Large firms have developed vertical networks with their suppliers, first tier suppliers being involved not only in cost reduction and time saving in production but also co-design and innovation. They have implemented a two phase outsourcing strategy. First, outsourcing aimed at cost reduction was limited to second tier suppliers involved in structured tasks such as scheduling and logistics. Second, first tier suppliers have been involved in product development, and thus have started to share strategic knowledge with their buyers. This process has shifted information flows from one-way flows, whereby the buyer gives orders to the supplier and the latter executes, to two-way communication. The extension of two-way communication to the processes of outsourcing has also concerned relationships among small firms giving them advantages relating to specialization and incentives. First, specialization provides small firms with the incentive to both actively participate in the production process and innovate. Although coordination costs may be higher in decentralised networks of small firms than in hierarchically managed organisations, horizontal competition contributes to increasing the efficiency of the system. Indeed small firms tend to base their competitiveness on the dominance of a narrow niche market, where the maintenance of monopolistic position is essential for making adequate profits. Therefore, small firms are particularly keen on keeping their strategic information and not leaking it out to potential competitors. The rise in both these two typologies of outsourcing can be interpreted on the basis of a unifying factor, the decentralisation of information in firm networks, this is the topic of the next section.

The decentralisation of information in firm networks

A recent approach to the theory of the firm considers organisations as structures which aim at efficiently collecting and processing information (Radner, 1992, 1993; Bolton and Dewatripont, 1994; Marschak and Reichelstein, 1998). In this literature the key trade-off is between delay in decision-making (if there are more layers or more units within the firm, hence more intense communication is required) and the efficiency of decision-making (information processing is more efficient if the amount of information to be processed by each agent is smaller). For example, Radner focuses on the trade-off between reducing the delay in information aggregation by parallel processing and the rise in communication costs, while Bolton and Dewatripont emphasise the trade-off between specialisation and costs of communication and co-ordination. Hence the latter authors define the notion of specialisation: specialising on particular tasks allows the amount of information to process to be limited hence avoiding information overload and achieving more efficient processing.

A possible criticism to these contributions is that they do not distinguish between the various types of information to be processed and transmitted. In reality, information can be more or less complex, and some individuals in the firm cannot process any kind of information. Due to these differences in complexity, information is not always easily communicable. Different kinds of information therefore may carry different communication costs. Furthermore information has to be clearly differentiated from knowledge and knowledge can assume different meanings as well. More recent literature discusses the distinction between tacit and explicit knowledge (Grant 1996, Liebeskind 1996, Garicano 2000). Tacit knowledge is largely embodied in individuals and possessed without complete conscience of it. Hence tacit knowledge is typically acquired through experience and transmitted with difficulty, through metaphorical language or observation.

In this paper knowledge is considered, to some extent, always tacit, while information is the only part of knowledge that can be transferred. Knowledge can be considered as an infinite set – mainly because it is the outcome of a mental process – that includes information as a closed set.⁸ While information can be communicated, knowledge cannot always be communicated perfectly. In other words, information is knowledge made explicit that can be communicated to others. The process of knowledge creation can be described as a sequence where the subject collects information, that is explicit knowledge communicated by others, and combines it with the knowledge stock, which is both explicit and tacit. The outcome is new knowledge that is only partially communicated to others.

To explain how the information is processed within the network it is useful to give a definition of hierarchy as well. Aoki (1986) defines the hierarchy as “the layering of specialised decision making in order to cope with emergent events for which detailed specification of appropriate actions cannot be formulated *ex ante*”. According to this definition, the decision maker typically performs the activity of management by exception. Subordinates are assumed as not being able to cope with exceptional events. Any problem that is not solvable by ordinary skills of the subordinates is reported to the upper layer which is responsible for finding the solution. Consequently, the larger the range of activities assigned to each level of the hierarchy, the higher the number of unexpected problems to be reported to the upper levels will probably be.

Hierarchy can also be viewed as a system where “only a few individuals (or only one individual) can undertake projects, while others provide support in decision making”, as opposed to a polyarchy, i.e. a system in which “there are several decision makers who can undertake projects (or ideas) independently of one another” (Sah and Stiglitz, 1986, p. 716). In this way the integrated firm, i.e. a self-contained hierarchical system, can be compared with the decentralised network, that is a polyarchy where several independent decision makers autonomously undertake productive projects. By the same token, if the integrated firm is the place where all residual rights of control accrue to the owner, then the decentralised network can be seen as a system in which multiple owners possess rights of control on separate competencies. The choice of an organisational pattern could thus be represented as the selection of a point on the line joining the extreme cases of the fully vertically integrated firm, which includes all the productive units,

and of the "monadic" network that is a network where each producer is an autonomous decision-maker. In this way outsourcing, i.e. the decentralization of decision-making, would correspond to a movement along the direction going from the fully integrated firm to the totally decentralised network.

This representation points out how vertically integrated firms must solve informative problems similar to those of firm networks. Both kinds of organisation must indeed co-ordinate in the presence of specialisation. More specifically, the information necessary to make the specialist knowledge possessed by their components complementary has to be diffused and shared in order to improve the performance of both systems. But coordination has to be obtained while minimising knowledge transfers mainly, because "Communication, like decision making, is always imperfect. No individual ever fully communicates perfectly what he knows to another." (Sah and Stiglitz, 1986, p. 717). The informative efficiency of both organisations is the result of the equilibrium between these two opposed requirements and depends more on the patterns of information processing and knowledge creation rather than on the property assets of the firms. According to the first definition of hierarchy given above, the degree of decentralization is given by the assignment of the rights to decide on unexpected events. But this task cannot be accomplished if the subject in charge of the decision isn't able to manage the relevant information. Thus, it becomes important to analyse the information flows both in the firm and in the network, in order to compare their performance in terms of information processing capacity (static efficiency) and problem-solving capacity, hence also innovative capacity (dynamic efficiency).

What indeed makes a hierarchical firm or network different from a decentralised one beyond and for the very reason of the multiplicity of decision makers? A possible answer hinges on two issues. The first concerns the managing of information, that is, the process through which productive units collect, process and transmit information with the purpose of creating knowledge. The second involves making the different pieces of knowledge created through the managing of information complementary.

The managing of information can be viewed as being made up of three phases, each defined by problems, decisions to be taken and sources of costs (Figure 1). The first phase is information collection. The subject who collects information has to choose the senders to receive and the criteria for receiving information. Both decisions imply costs – selection and collection costs, respectively – that can be lowered through specialisation, mainly because this activity requires a prior investment in a receiving channel (Arrow, 1975; Demsetz, 1991). By contrast, the focus of information collection is too narrow a scope can prevent the organisation from taking advantage of the variety of information sources, in particular because absorptive capacity, and consequently the ability to create knowledge, can be weakened (Cohen and Levinthal, 1990).

Figure 1 – The managing of information

Phases	Main problems	Decisions	Costs
1. Collection of information	Information overload; ability to collect information	Choice of Senders Criteria for receiving information	Selection costs Collection costs
2. Processing of information	Matching problem with problem-solver; delay between the collection and the processing of information	Capacity of the processors Communication among processors	Matching costs Communication costs
3. Transmission of information	Tacit knowledge and difficulty of communication; information appropriability	Modalities of transmission Capacity of the Receiver	Transmission costs Appropriability costs

Source: elaboration by the author

The second phase is information processing. The information collected in the first phase is complemented with the knowledge previously possessed by the decision maker. Costs are given by matching the problem with the problem solver (matching costs) and by the elapsing time between the collection of information and its communication to the decision maker (communication costs). Both costs are influenced by specialisation. In particular, the efficiency of this phase depends on the net effect of the reduction of matching costs due to the narrowing of the range of specialisation of the subjects and of the increase in communication costs necessary for connecting the higher number of processors (Bolton and Dewatripont, 1994). De Canio and Watkins (1998) prove that an increase in the capabilities of processing allows a flattening of the organisations mainly by decreasing matching costs. The third phase is information transmission. In this phase modalities of transmission are chosen and channels for communicating with the receivers are created. (if knowledge is to some extent always tacit, only explicit knowledge is communicated and becomes information). Thus transmission costs depend on the ability of the sender to transform knowledge into information and by the absorptive capacity of the receiver to understand the collected information (Cohen and Levinthal, 1990). Information transmission may raise a problem of appropriability, whereby the receiver may exploit information to create knowledge that can be used to increase its own benefits at the expense of the sender.

By applying this classification, we define the decentralisation of information as an increase in the share of information processed by the same subject who collects it. In the firm the decentralisation of information increases when the task of coping with emergent events of a specified activity is transferred hierarchically

downwards. This implies that the upper layers don't need to process information related to that specific activity and all the information collected by the lower layer is processed directly by the collector. Similarly, in the network the decentralisation of information is given by the increase of the share of the information processed by the same firm which collects it. We can define a network (or a firm) as fully hierarchical if it comprises a firm (or a subject) processing all the information, including that collected by other firms. By contrast, in a fully decentralised network, each piece of information is processed by the same firm who collects it. In any intermediate case, information will be partially transmitted by the collecting firm to another firm for processing. In as far as independent decision-making is the outcome of decentralised information processing, the difference to be emphasised is not the one between the firm and the network, but the one between the decentralised network (that is a polyarchy where autonomous suppliers undertake projects independently of one another) and hierarchical organisations, where decisions are taken on by a manager (in the case of the vertically integrated firm) or by the firm "overseeing" the production process (in the case of a network directed by a leading firm).

Thus, the relevant problem becomes fixing the optimal degree of decentralisation of information which corresponds to the optimal degree of decentralisation of the network that can be discussed by applying the division in phases defined above to the case of network.

Phase 1. Collection of information. The receiver chooses the senders and the criteria for receiving information. In a hierarchical network, these decision are usually taken by the same firm which collects the information and not by the firm which processes it. This splitting between collection and processing criteria causes a loss of efficiency. The decentralisation of information reduces these inefficiencies by increasing the quantity of information processed by the firm which collects it. If the collector and the processor are the same subjects selection and observation costs are minimised. Moreover, selection costs decrease if relationships between supplier and user are long term. As senders are the same and the same criteria are used and improved over time, scale economies in the collection of information can be fully exploited.

Phase 2. Processing of information. The processing of information consists principally in making collected information complementary to previously possessed knowledge. This process takes place within a network in two sub-periods: the first is the source of matching costs, namely to match the information collected to the firm possessing the knowledge appropriate to solving the problem, the second is the source of communication costs, that are necessary for diffusing the different pieces of knowledge created within the network. The decentralisation of information has two effects. In the decentralised network the matching of the problem with the problem-solver becomes the outcome of competition. Firms belonging to the network co-operate vertically but compete horizontally in order to better perform this matching. The second effect is related to communication costs that are minimised by transmitting knowledge incorporated in the inputs produced by others.⁹ Real communication is indeed limited to the vertical communication between supplier and user. The proximity of their productive phases enhances their

ability to communicate in comparison with the case of a hierarchical network, where order rather than inputs are exchanged between supplier and user.¹⁰ In this way, matching costs are decreased by reducing the number of problems delegated within the fully hierarchical network, and communication costs are decreased by restricting communication to adjacent productive phases, that are able to better extract tacit knowledge incorporated in the inputs.

Phase 3. Transmission of information. If the decentralisation of information allows for the substitution of direct communication with exchange of inputs, transmission can include elements of tacit knowledge because it concerns adjacent productive units which adopt similar codes of communication. Modalities of communication are consequently enhanced. At the same time appropriability costs are higher only if information is generic. The decentralisation of information increase the number of firms that process autonomously the collected information and take decisions that are incorporated in the product. The process of innovation is therefore based on inputs developed sequentially from the firms making up the productive chain. The selection of the productive paradigm is the result of a decentralised process in which local improvements are not distinguishable from the point of view of the whole productive process. Suppliers perform a specific task corresponding to a module based on exclusive knowledge which prevents other productive units from appropriating the specific knowledge of the specialized unit.

This specific pattern of information managing also regards the other issue to discuss, that is how the decentralised information and knowledge is made complementary in the network. Hierarchical and decentralised networks are differentiated by the way this activity is performed. The main problem to be solved in decentralised networks is indeed how to guarantee complementarities among the knowledge created by the various firms without hierarchy and at the same time to minimise imperfect communication of tacit knowledge. This task is accomplished by means of the shared body of knowledge.

The existence of the shared body of knowledge within the network is the consequence of the fact that improvement in tacit communication reduces the dependence on the hierarchy. The individuals who share common knowledge can directly communicate tacit knowledge because they rely on common cognitive frameworks determined by various factors, including the awareness of "reciprocal" or "group" interdependence, which necessitates co-ordination by mutual adjustment (Grant 1996). This outcome is obtained by limiting co-project to productive adjacent phases, that establish communications which becomes progressively free from error. By establishing stable relationships characterised by a continuous and frequent exchange of information not only is information but also tacit knowledge is shared allowing efficient complementarities between the two productive phases.

This exchange of information between supplier and user can be seen as a process involving three phases that differ according to the state of the prominent information:

- a) The information is disseminated. The user decides to outsource the production of a new input and addresses a population of potential suppliers with a general idea of the new input. Some suppliers study the feasibility of the product specifying the range of possible investments.

b) The information is shared. The user accepts some proposals on the basis of an outline of the general characteristics of the product. The user and supplier co-project the prototype of the input and make the investments.

c) The information is encapsulated. The supplier produces the input and autonomously decides any change to the process that can derive from local shocks and unforeseen contingencies (errors, imperfections, adaptations to its own productive process). The user inserts the input in its product, autonomously introducing only the adaptations that come from unforeseen contingencies relative to its production process. Signals of problems can be derived from the market and are solved in the decentralised mode by means of the relevant information.

The shared body of knowledge is created and made common to supplier and user in the information sharing phase. The efficiency of subcontracting relationships depends indeed on the capacity of sharing not only information but also tacit knowledge necessary for solving the problem of complementarities between two adjacent stages. After solving this problem in the co-project phase, the process of information encapsulation allows the firms' contractual power to be balanced since it prevents weakening the incentives for introducing innovations. If the firm collects, processes and transmits information and is also the residual claimant to the rents from innovation because it is protected from being expropriated of its specific knowledge, it will have strong incentives for improving its performance by introducing innovations. It is specifically the increase in the amount of information processed by the collecting firm (i.e. the decentralisation of information) which creates better incentives for knowledge creation.

To summarize, the decentralisation of information, by delegating the processing of information to autonomous suppliers rather than keeping propriety or maintaining control over the whole production chain of the network through the exercise of leadership, made the production process complementary not through hierarchical arrangements but through the shared body of knowledge. Furthermore suppliers are provided with higher incentives for developing specialised knowledge related to the particular stage of the production process they are dealing with because their contractual power is protected and enhanced by the encapsulation of information.

This theoretical framework can explain why in the Italian manufacturing industry the process of large firm downsizing has changed from the traditional pattern searching low labour costs to a different pattern characterized by the weakening of leadership in a way that makes the network created by large firms more and more similar to local systems of small firms. Both for large and small firms, the decentralization of information is the means whereby the capability of subcontractors to create knowledge is enhanced. But it is also the way through which incentives are enforced because users cannot easily replace suppliers and contractual power is more equally distributed. The balance of contractual powers between suppliers and users has a number of implications for local economic policies as well. In particular, the creation of medium and large firms in local systems may not be that advantageous in as far as they establish or maintain control over the network and take measures to monitor the activities of the suppliers, thereby reducing their innovative potential. Likewise the provision of

business services or the public support to consortiums and associations of firms are bound to fail if they are perceived as harmful for such a contractual equilibrium. This problem is particularly relevant for industrial districts where public policies promoting cooperation have been often unsuccessful because they could have undermined the historically determined equilibrium and prompted the emergence of leaderships in a way that would have weakened incentives. Policies aimed at establishing new local systems of production should take this point into consideration.

Conclusive remarks

This paper has examined production outsourcing in the Italian manufacturing industry from the perspective of information advantages, relying on some empirical evidence on vertical disintegration of both large and small firms. Aggregate data and case studies show that since the 1980s Italian manufacturers made widespread and increasing use of outsourcing. This process was triggered off by qualitative transformations. Supply chains were re-arranged in such a way that the number of first tier subcontractors decreased, functions previously considered as strategic were decentralised and the inter-firm relations were modularised. This evolution, that was common to the outsourcing of large vs. small firms and of creation, coupled with higher incentives to innovate for the suppliers since they increased their specialisation.

In order to explain this process, decentralised networks have been contrasted with vertically integrated firms. A network has been defined more decentralised if the amount of information processed by the same subject who collects it is higher. The increase of the ratio between this quantity of information and all the information processed by the firm has been defined as the process of decentralisation of information, the consequences of which have been analysed for the managing of information. It has been argued that the informative advantages of a decentralised network are given by two factors: first, the existence of a shared body of knowledge that allows complementary information to be disseminated without hierarchy and, second, by vertical communication between suppliers and users that is based on the encapsulation of information. This status of information makes each module in which production is divided independent from general architecture and based on exclusive source of knowledge. In this way, specialisation gives better incentives for innovating because contractual powers of the firms are more balanced. If the same firm collects, processes and transmits information and is also the residual claimant to the rents from innovation because it is protected from being expropriated, it will have strong incentives to create knowledge and to introduce innovation. Furthermore, this interpretation implies that economic policies should consider the balance of contractual powers between suppliers and users as powerful means for creating and developing local systems of production.

Notes

- ¹ The author would like to thank Sandrine Labory for many valuable comments. This paper is a by-product of a joint research with her.
- ² Outsourcing is used to describe many different activities, included the hiring of workers in non-traditional jobs such as temporary and part-time workers, but this paper focuses on the processes of outsourcing among firms that usually assume the form of subcontracting relationships. In this perspective, outsourcing involves turning over the functions that fall outside firm's core competencies to another firm whose core competencies are the functions being outsourced.
- ³ For comparative analyses, see Loveman and Sengenberger (1991), Acs and Audretsch (1993), Arrighetti (1999), Traù (1999).
- ⁴ ROE's values below zero are due to a restricted numbers of big firms with negative returns.
- ⁵ This interpretation may be defined orthodox in so far as it assumes that the only aim of entrepreneurs is to cut costs and increase managerial control over the labour process. Thus, it may be justified on the basis of the neoclassical production function.
- ⁶ This change of perspective has important consequences for collective bargaining. Trade unions are indeed successful in extending their bargaining power to the subcontractors. For example, an agreement signed in 1998, which externalises logistics from Fiat Mirafiori's establishment to a Dutch multinational, applies all the rights provided by the old agreement (the kind of employment contract, the benefits available in Fiat, the guarantee of job security and insurance for accident) to the new relationship.
- ⁷ This discussion of the role of information encapsulation in industrial organizations relies on Aoki (2001).
- ⁸ This distinction between *knowledge* and *information* is made by assuming that knowledge is open-ended because it is a process, while information is "closed" because it can be derived on the basis of specific data (see Loasby 1986 and Fransman 1998).
- ⁹ According to Demsetz (1991, pp. 28-29): "The boundary of firms is shaped by the relative costs and advantages of putting specialised knowledge to use by means of orders or by means of selling goods accompanied by instruction on uses. The latter is advantageous when the best use of an asset does not strongly depend on it being used at a particular time and place. Giving orders and producing goods embodying specialised knowledge is thus two different way of economising with the costs of transferring knowledge. This explanation indicates that a decision to make or buy must also depend on the trade-off between taking advantage of low costs experimentation within the boundaries of a firm and taking advantage of specialised knowledge located in other firms".
- ¹⁰ In a hierarchical network the leading firm has to give orders to all the firms located in the lower layers of the hierarchy. These orders have to be given in an intelligible way for the subordinated firms. Therefore, all the subordinates must know the vocabulary and the rules necessary to understand the orders. This implies that tacit knowledge must be excluded from the content of the orders

References

- Acs, Z.J., Audretsch, D.B. (1993), *Small Firms and Entrepreneurship: An East-West Perspective*, Cambridge University Press, Cambridge.
- Aoki, M. (1986), 'Horizontal versus Vertical Information Structures of the Firm', *American Economic Review*, 76, 971-983.
- Aoki, M. (2001), *Towards a Comparative Institutional Analysis*, MIT Press, Cambridge.
- Arrighetti, A. (1999), 'Integrazione verticale in Italia e in Europa: tendenze e ipotesi interpretative', in F. Traù (ed.), *La questione dimensionale nell'industria italiana*, Il Mulino, Bologna, 113-147.
- Arrow K. J. (1975), 'Vertical Integration and Communication', *The Bell Journal of Economics*, 6, 173-183.
- Bensaou, M. (1999), *Collaboration Support Technologies in Interorganisational Relationships: An Empirical Exploration in Buyer-Supplier Joint Design Activities*, INSEAD Working Paper 99/78 TM/ABA.
- Bolton, P. and Dewatripont, M. (1994), 'The Firm as a Communication Network', *Quarterly Journal of Economics*, 99, 809-39.
- Camuffo, A. and Volpato, G. (2001), *From Lean to Modular Manufacturing? The Case of FIAT 178 World Car*, IMVP Working Papers, MIT's Center for Technology, Policy and Industrial Development.
- Carnazza, P., Innocenti, A. and Vercelli, A. (2000), 'Small Firms and Manufacturing Employment', in A. Boltho, A. Vercelli and H. Yoshikawa (eds.), *Comparing Economic Systems. Italy and Japan*, Palgrave, Houndmills, 158-76.
- Cohen, W. and Levinthal, D. (1990), 'Absorptive Capacity: A New Perspective on Learning and Innovation', *Administrative Science Quarterly*, 35, 103-134.
- Conti, G. and Menghinello, S. (1998), 'Modelli di impresa e di industria nei contesti di competizione globale: l'internazionalizzazione produttiva nei sistemi locali del made in Italy', *L'industria*, 19, 315-347.
- Corò, G. and Grandinetti, R. (1999), 'Strategie di delocalizzazione e processi evolutivi nei distretti industriali italiani', *L'industria*, 20, 897-924.
- Crestanello, P. (1999), *L'industria veneta dell'abbigliamento. Internazionalizzazione produttiva e imprese di subfornitura*, Franco Angeli, Milano.
- Demsetz, H. (1991), 'The Theory of the Firm Revisited', in O.E. Williamson, S.G. Winter (eds.), *The Nature of the Firm*, Oxford University Press, Oxford.
- DeCanio, S. and Watkins, W. (1998), 'Information Processing and Organisational Structure', *Journal of Economic Behaviour and Organisation*, 36, 275-294.
- Enrietti, A. (2000), 'Outsourcing', *Strumentires*, IRES Piemonte, Torino.
- Fodor, J. (1983), *Modularity of Mind. Essay on Faculty Psychology*, MIT Press, Cambridge, Mass.
- Fransman, M. (1998), 'Information, Knowledge, Vision, and The Theories of the Firm', in G. Dosi, D. Teece and J. Clyttry (eds.), *Technology, Organisation and Competitiveness. Perspectives on Industrial and Corporate Change*, Oxford University Press, Oxford.

- Garicano, L. (2000), 'Hierarchies and the Organisation of Knowledge in Production', *Journal of Political Economy*, 108, 874-904.
- Grant, R.M. (1996), 'Toward a Knowledge-Based Theory of the Firm', *Strategic Management Journal*, 17, 109-122.
- Innocenti, A. (1998), 'Gerarchia e contratti. Il ruolo dei rapporti di subfornitura tra piccole imprese nell'evoluzione dei distretti industriali', *L'industria*, 19, 391-415.
- Liebeskind, J. (1996), 'Knowledge, Strategy, and the Theory of the Firm', *Strategic Management Journal*, 17, 93-107.
- Loasby, B.J. (1986), 'Organisation, Competition, and the Growth of Knowledge', in R.N. Langlois (ed.), *Economic as a Process: Essays in the New Institutional Economics*, Cambridge University Press, Cambridge.
- Loveman, G. and Sengenberger, W. (1991), 'The Re-Emergence of Small-Scale Production', *Small Business Economics*, 3, 1-37.
- Mariotti, S., ed. (1996), *Mercati verticali organizzati e tecnologie dell'informazione. L'evoluzione dei rapporti di fornitura*. Fondazione Adriano Olivetti, Torino.
- Marschak, T. and Reichelstein, S. (1998), 'Network Mechanisms, Informational Efficiency, and Hierarchies', *Journal of Economic Theory*, 79, 106-141.
- Mediocredito Centrale (various years), *Indagine sulle imprese manifatturiere*, Mediocredito Centrale, Roma.
- Omiccioli, M. (2000), 'L'organizzazione dell'attività produttiva nei distretti industriali', in L.F. Signorini (ed.), *Lo sviluppo locale. Un'indagine della Banca d'Italia sui distretti industriali*, Meridiana Libri, Cosenza, 289-298.
- Radner, R. (1992), 'Hierarchy: The Economics of Managing', *Journal of Economic Literature*, 30, 1382-1415.
- Radner, R. (1993), 'The Organisation of Decentralized Information Processing', *Econometrica*, 62, 1109-1146.
- Sah, R.K. and Stiglitz, J. (1986), 'The Architecture of Economic Systems: Hierarchies and Polyarchies', *American Economic Review*, 76, 716-727.
- Traù, F. (1999), 'Il riemergere della small scale production, nei paesi industriali: rassegna della letteratura empirica e primi confronti internazionali delle tendenze di lungo periodo', in F. Traù (ed.), *La questione dimensionale nell'industria italiana*, Il Mulino, Bologna, 63-112.
- Volpato, G. and Stocchetti, A. (2000), *Managing Information Flows in Supplier-Customer Relationships: Issues, Methods and Emerging Problems*, IMVP Working Papers, MIT's Center for Technology, Policy and Industrial Development.

Comment

Katsuhito Iwai

The nature of the business corporation is undergoing a fundamental transformation all over the world. Huge conglomerates have downsized themselves by selling off many of their businesses and spinning off many of their divisions. Large manufacturers have flattened their vertically integrated organisations by delegating many of their production activities to independent suppliers. In recent years, business press, policy makers and academic economists are busy in documenting these changes, identifying their causes, and discussing their implications. Professor Innocenti's thought-provoking paper on production outsourcing in the Italian manufacturing industry is a welcome addition to the growing literature on this historical transformation in the nature of the business corporation.

In this paper Professor Innocenti focuses on the process of outsourcing that assumes the form of subcontracting relationships – firms turn over some of their former activities to other firms but at the same time keep long-term co-operative relationships with them. He first presents several empirical examples on outsourcing in the Italian manufacturing industry. Among them two facts are most intriguing. The first one is that not only large manufacturers but also small suppliers have shown a strong tendency for downsizing. The Italian economy is known to have a large share of small-scale firms, and this national characteristic has now become much more pronounced than ever. The second intriguing empirical fact is that the downsizing of Italian manufacturing firms began in the 1970s. This fact should be contrasted with the much reported trend of corporate down-sizing in the US economy. It was during the 1980s when the rise of hostile take-overs and pressures from institutional investors strengthened the power of shareholders that large US corporations began to outsource some of their production activities and loosen their hierarchical structure. That fact should also be contrasted with the history of the Japanese subcontract system. It is well-known that major Japanese manufacturers have kept their size relatively lean by having outsourced many of their production activities to subcontractors since around the 1950s. But there seems to be no discernable trend in Japan for further expansion of its subcontracting system from the 1970s to the 1990s. On the contrary, some of the Japanese manufacturers, a notable example being Nissan Motors, began to dismantle old subcontracting networks and replace them by the more market-orientated supply systems in recent years. The Italian experience appears to be quite different from that of the US and of Japan.

Professor Innocenti claims that the increase in outsourcing in both large manufacturers and small suppliers in the Italian economy since the 1970s can be explained by a unifying theoretical framework – the decentralisation of information in firm networks. In order to cope with the intensification of non-price competition

in ever globalising markets, large manufactures have decomposed their products into independent modules and delegated the production of many of these modules to other firms with long-standing relationships. The resulting network of subcontracting relationships can be regarded as a hybrid of a fully integrated hierarchical firm with a centralised decision-making unit and a totally decentralised assemblage of autonomous firms at arm's-length relationships with each other.

Professor Innocenti then argues that such organisational form can indeed enjoy the merits of the totally decentralised assemblage of firms and of the fully integrated firm simultaneously. The self-contained nature of the information concerning the module each subcontractor is specialised to allows it to work out improvement and innovation in its own shop or plant without worrying about the possibility of hold-up by its parent manufacturer. Of course, this would complicate the parent manufacturer's task of co-ordinating production activities because it is no longer able to use commands to gather the necessary information from suppliers of the modules that are now legally autonomous firms. But Professor Innocenti asserts that such a task has been made easier by the recent development of information-processing technology, such as CAD, which has rendered exchanges of complex information much more efficiently than before even between independent firms. More fundamentally, he insists that the problem of co-ordination can be solved by means of sharing the knowledge, especially tacit one, between the parent manufacturer and its subcontractors through long-term contractual relationships. The existence of the shared body of knowledge makes the information they possess complementary to each other and encourages their co-operation in exchanging the information that is vital for production and development.

Professor Innocenti then maintains that the same logic applies equally well to the explanation of the steady increase in outsourcing in the horizontal networks of small firms in those industrial districts that are specialised in "fashion" goods, housing goods and machinery specific to these goods. Indeed, success in markets for these highly differentiated goods is highly dependent on designs, customisation, after-sales services, and brand loyalty, which demand constant adaptation and innovation on the part of producers.

I believe that Professor Innocenti has made an important contribution to the field of industrial economics. He has not only given us an informative survey on the growth of product outsourcing in Italian manufacturing but also presented us a broad framework for its theoretical explanation. In particular, his emphasis on the informational advantage of the subcontracting system over the vertically integrated firm as well as over the totally decentralised network of firms would be a useful starting-point for the comprehensive policy-design for the Italian manufacturing sector, especially for its local industrial districts, in the 21st century.

My only concerns are that the information-theoretic framework presented in this paper is too general for differentiating the experiences of the Italian manufacturing industry from those of the US or of the Japanese manufacturing industry. In fact, in the case of the US manufacturing industry the process of outsourcing has not led to the expansion of the subcontracting system. It has gone to the far end of decentralisation by reliving more and more on open markets for

procuring necessary supplies. Also in the case of the Japanese manufacturing industry which is known to have a long-held tradition of relying on the intricate subcontracting system, some major manufacturers have abandoned that tradition and begun to adopt the more market-orientated supply system. Of course, the industrial structure is quite different between Italy, the US and Japan (though Italy and Japan have many similarities), and part of the variation in their experiences can undoubtedly be attributed to such a difference. I, however, doubt that that is all. In order to explain the uniqueness of the recent Italian experiences, it is necessary to investigate such factors as the difference in corporate government system, the extent of financial deregulation, the structure of labour markets, and even the geography of the country, along with the management of the information system. I am, however, also convinced that Professor Innocenti must have already thought about these factors. I hope that in the near future he will give us a more detailed picture of this dramatic structural change in the Italian manufacturing industry, which was one of the most exciting developments in advanced industrial societies in the 20th century and will continue to be so in this new century.