
Foreword. Collaborative organisations: the keyword for future development of industrial networks – a brief presentation of the special issue

Agostino Villa

Department of Production Systems and Business Economics,
Polytechnic of Turin,
Torino 10128, Italy
E-mail: agostino.villa@polito.it

Biographical notes: Agostino Villa is a Professor in Production Management and Control at the Polytechnic University of Turin. His main research areas include the modelling of large-scale distributed manufacturing systems and material handling networks and supply chains, to develop methods and tools for organising and managing innovation processes in industrial systems and public services. He is currently the President of IFPR, Vice-Chairman of the Technical Committee MIM of IFAC and a member of the Working Group 5.7 (Integrated Production Management) of IFIP.

1 Introduction

Several analyses and discussions on the current evolutions of existing ‘clusters of SMEs’, sometimes under development but often in crisis, can be found not only in technical meetings but also in pages of newspapers in the last few months. The problem faced by industrial analysts and managers is always the same: how it is possible to enforce such a cluster of SMEs to make it a highly profitable networked enterprise? Several doubts exist about a positive answer in general, but a widely accepted idea is the following: an ‘aggregation of SMEs’ can become a real ‘network’ if collaborative interactions among the component SMEs are activated. In other terms (more conceptual but with immediate practical implications), an aggregation of industrial bodies becomes a structured network if a collaborative organisation is applied.

This widely diffused the concept that could be justified if some examples of existing clusters of SMEs are considered and their historical evolution and present state are described. To this aim, two different Italian clusters (usually denoted ‘industrial districts’) are briefly described: similar situations can also be found in the majority of other European countries.

The first example refers to a district producing sofas in the southeast Italian region, Puglia. In the late 1980s, leading firms had such development that the *Financial Times* wrote that a unique more fashionable thing than an Italian dress is the Italian industrial district that produces it. At that time, the ‘Divan district’ had about 15,000 employees, covered 15% of the US market and 8% of the European one. This success was surely pushed by a large number of one-family small firms as well as by the Italian creative design and working ability. But other competitive advantages were also present: frequent devaluations of the Italian money and a large contribution of the so-called

'black economy'. At that time, this district was an example of 'European Chinese workforce'. At the end of the last century, sofas made in China arrived in Europe. Now, leading firms of that district have moved their production sites to China.

A different situation can be seen by analysing a district in northwest Italian region, Piemonte: it operates in the space sector, producing components and services for space satellites. Composed of about 60 SMEs around the Alenia enterprise, it has now about 9000 employees, generally highly qualified and it usually applies its own patents. Within the cluster, the seven SMEs have recently integrated their production and research management, giving rise to the Italian Technological Cluster (ITC). Indeed, the characters of the space sector suggested to them that the small dimensions of each individual firm cannot assure profit in a worldwide market; the reverse happens in the case of a robust network of complementary SMEs. Then, the ITC cluster organisation has been built around three project managers, who search for contracts, select the cluster's SME to be considered as leading firm for each contract, plan the necessary co-design and promote the cluster activity around the world.

These different examples of clusters can help the analysers in recognising some motivations of several districts' crisis: lack of an effective organisation of the component SMEs; inorganic and often conflicting independent design of similar parts/products and dispersed interactions with potential markets and customers.

The same problems have received some attention in the scientific literature in three main lines: the 'legal' line, to analyse which type of agreement among SMEs could make a more robust cluster the 'organisational' line, to define ICT-based information patterns and organisation structures assuring the best possible either coordination of SMEs or collaboration among them and the 'evaluative' line, to design procedures and platforms such as to make possible a significant testing and validation of new proposed organisations and interaction networks. Referring to the VI Framework Programme of the European Commission, some projects have been financed: among them, INTEROP to promote inter-operability in a SME's network, and CO-DESNET to disseminate knowledge about models and methods to evaluate existing networks.

In particular, CO-DESNET has been originated by having observed the lack of tools and platforms to test and validate new organisations for manufacturing and logistics networks, under the assumption that any new organisation, to be effective and promising, has to be collaborative. According to this idea (which derives from the analyses of existing industrial districts, as the ones above outlined), the CO-DESNET project is dedicated to promote the diffusion of the European scientific knowledge on the problem of designing and managing large-scale multifunctional multiagent **Collaborative DEMand and Supply NETworks**, that means networks of production and service SMEs operating in a common industrial sector. To pursue this aim, the project activities will be devoted to the organisation of a *European Virtual Institute*, which means a permanent network of connections covering the set of institutions/enterprises contributing in the CA itself and other desirable members as well. It will be based on a web portal organised in such a way to operate as a rational taxonomy of:

- 1 documentation, in terms of models and procedures, either published or future, concerning the supply chains and related topics – both academic material and industrial studies – called *Virtual Library*
- 2 data, experiences and case studies, collected by all CO-DESNET members through interactions with other industrial bodies – named *Virtual Laboratory*.

Both tools will give an industrial end-user the opportunity to search for information concerning either models and procedures for the supply chain design and management, or tools and indicators for applying some performance evaluation procedure to a proper supply chain, or data and information showing as complete as possible a description of either a specific supply chain or a firm included into a supply chain.

The main obstacles to the organisation of efficient and effective SMEs' networks also clearly detected by CO-DESNET participants in their first year of activity, have the 'difficulty of being collaborative'. This motivates the present Special Issue, which has been articulated according to the four main key statements:

- 1 classify network concepts
- 2 exploring examples of cluster practices
- 3 analyse organisations, typically ICT-based and
- 4 give suggestions for networks' evaluation.

The need for classifying concepts concerning either clusters, or groups, or networks of SMEs, and the underlying organisation characters, namely the existence of either hierarchy, or coordination, or cooperation, appears to be mandatory. A few authors often discuss the same industrial bodies and problems but using different terminology and notations to make impossible a clear understanding for industrialists and researchers. A preliminary proposal of a reference frame is given in the first paper of this issue by Antonelli and co-authors.

Two complementary analyses of SMEs networks are proposed by Matopoulos and co-authors and by C. Moller, in the second and third paper of this Special Issue. The former explores the collaborative practices in some types of different SMEs clusters, paying attention to situations with limited resources in terms of personnel, finances and technology infrastructures. The latter analyses the supply chain by using a model, which describes the portfolio of relations of the component SMEs to give suggestions in selecting an efficient management strategy.

To analyse the cluster's organisation, particularly in the case of ICT tools, is the goal of the next two papers, proposed by R. Fornasiero and A. Zangiacomi and Namin and co-authors. The first paper describes an Italian footwear district organised to support shoe producers in managing temporary links with suppliers and customers through ICT applications. The second paper presents a multilayer architecture for the software infrastructures, oriented to promote the collaboration functionalities such as workflow design, task assigning and monitoring.

Proposals and suggestions for the performance evaluation of clusters are presented in the last two contributions by Bajaj and co-authors and by McNichols and Brennan. The former present a model based on contract net protocol to facilitate and evaluate the negotiations process among the component SMEs. The latter presents an approach for analysing and positioning the potential partners for collaboration in an existing internet-based collaborative system.

The final goal of this Special Issue is to be a further occasion to increase the discussion about one of the main problems, which now faces the SMEs manufacturing and logistic networks: that of making cooperation the real tool for the development of SMEs and their new aggregations.