

Agostino Villa  
*Editor*

# Managing Cooperation in Supply Network Structures and Small or Medium-sized Enterprises

Main Criteria and Tools for Managers

 Springer

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Prof. Dr. Agostino Villa  
Dipto. Sistemi di Produzione ed Economia dell'Azienda (DISPEA)  
Politecnico di Torino  
Corso Duca degli Abruzzi 24  
10129 Torino  
Italy  
e-mail: agostino.villa@polito.it

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# Preface

A typical character of some European countries, usually those referred to as “*Old Europe*”, is the high percentage of small mid enterprises (SME) in their industrial systems. If one takes account that SMEs are supplying labor to about 90 million citizens, this justifies that about 20.7 million SMEs are the backbone of the European Union (EU) economy. During the period 2002–2008, indeed, SMEs exceeded large-scale enterprises in the creation of new jobs: the number of jobs increased in SMEs at a rate of 1.9% per year, whilst in large enterprises only at 0.8%. Internationally active SMEs yield better results: 25% of EU SME business has been exported in the last three years, with an employment growth of 7%.<sup>1</sup> There is also a strong relation between internationalization and innovation: however, only about 13% of EU SMEs are active in markets outside the EU.<sup>2</sup> In Italy SMEs are a prevailing number of enterprises (over 99%) as in EU, often very small enterprises (about three employees), but with a contribution to employment greater than 80%.

All these data show a high propensity to entrepreneurship in several European countries, as well as a strong individualism, which could be motivated by the historical evolution of local regions and areas. Recent social-historical analyses in some industrial districts in North-East Italy show that the founders of SMEs (reference is made to persons born in the second half of the nineteenth century) were characterized by a strong ethical individualism, with adhesion to local values and customs, with a prevailing “craftsmanship-derived” culture, a refusal of management-devoted persons and a strong overlapping between enterprise and family. This individualistic approach to small enterprise creation, indeed, comes from a tradition dated the seventeenth century, when initial capitalist activities originated in the small principalities and counties in which North Italy was subdivided at that time. The stimulus to invest in manufacture and commerce came

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<sup>1</sup> European Cluster Memorandum, July 2007, re: [www.proinno.europe.eu/NWEV/](http://www.proinno.europe.eu/NWEV/)

<sup>2</sup> “Internationally active SMEs yield better results”, Brussels, 6 July 2010, Report of the Commission Vice-President Antonio Tajani, responsible for Entrepreneurship and Industry, re:

from some princes, pushed by the military necessity of their own small countries. From this followed prohibitions on the export of raw materials (wood, iron, silk) and prescriptions to establish plants inside (foundries, textile, and furniture firms) and employ local personnel.<sup>3</sup>

Similar situations occurred in old Germany and Holland, and also in other European countries, even if in different epochs and different contexts. So, it could be argued that an historical thrust to entrepreneurship gave rise to a number of local agglomerations of SMEs, which became the real “engine” of the regional development, till now being the keystone of the European regions with a higher industrial level.

The recent globalization of the markets of goods and the large disequilibrium between the labor markets of the “Old Europe” countries, on one hand, and of the “emerging countries”, among which China, India and the “Asian Tigers”, on the other, is compelling a large part of European SMEs to be no more competitive in terms of labor cost and goods prices.

During this last decade the European Commission has gradually perceived this new situation and has stimulated studies and research on what should be the real *antidote* to this crisis: the development of more and more profitable SMEs aggregations, in the form of either “clusters” or “competitive poles” or “industrial districts”. A large set of qualified researchers could be mentioned to support this point. In 1890, the British economist Alfred Marshall<sup>4</sup> gave a first discussion on geographic concentrations of specialized industrial activities. His studies showed that the presence of several SMEs in a common area reinforce themselves by attracting complementary activities at the various stages of the supply chain. They can also create a pool of specialized labor, which could support the diffusion of knowledge among firms. SMEs of a similar type might support trade or professional associations. These can maintain and upgrade standards in skills and products, lobby local or regional governments for investment in appropriate public goods or support collective marketing activities.

As studied by Michael Porter in his 1990 book “*The Competitive Advantage of Nations*”, the geographical concentration of SME clusters and districts could affect the local industrial competitiveness in three ways. First, it reduces costs: firms can operate with lower levels of stock because of the local presence of specialized suppliers, and they can have access to specialized skills, often also aided by local training providers. Second, it could increase the propensity to innovation by facilitating interaction and dissemination of knowledge. Third, it can promote new business formation through creation of new enterprises which can find lower barriers to entry than in other localities.

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<sup>3</sup> A note from L. Bulferetti, Problems of Sixteen Century, in “*Itinerari*”, n. 22–23–24, Dec. 1956 (in Italian).

<sup>4</sup> Marshall, Alfred (1920). *Principles of Economics* (Revised Edition ed.). London: Macmillan; reprinted by Prometheus Books. ISBN 1573921408.

However, the ability of a region to either generate or support SME clusters and districts greatly depends also on the government aids. National and—mainly—regional governments are really important, because of the influence they have over the ambient conditions—especially local diffused industrial knowledge and personnel skills—and the regulatory and legal environment.

This is the reason why, to effectively promote the role of employment fly-wheel played by SME clusters in the EU, a prompt application of political actions planned by the “Small Business Act (SBA) for Europe”<sup>5</sup> is expected soon. The crucial action is to force a strong cooperation between the European Commission and the national and regional governments. Some work has already been done, and some other is going to be. As written in the presentation of the European Cluster Conference 2010,<sup>6</sup> *“the future competitiveness of the European Union will depend on its ability to renew its industry base and to strengthen the thriving services sector towards a more competitive and greener economy based on knowledge and innovation. To achieve this, Europe needs more world-class clusters, which are hotbeds for turning innovative ideas into new products and services and for providing a particular fertile environment for new business formation that creates innovation, growth and jobs. A more strategic approach is needed that builds upon existing efforts and explores new cluster concepts for establishing the right framework conditions for new and innovative industries.”* In this light, some questions appear to be crucial:

- What cluster policies (instruments and tools) are needed to foster modern industries in line with the new nature of innovation?
- What are the enabling framework conditions for the development of strong clusters in innovative industries?
- What actions are needed to raise the excellence of cluster policies in order to facilitate more world-class clusters in Europe?

The scope of this “instant book” cannot surely cover all these very crucial questions. However, it aims to give to managers some ideas and concepts to approach the main aspects concerning the organization of clusters and districts in some EU countries. It also aims to give to SME managers, a “handbook” of criteria to understand when and why to become a partner in a SME cluster can be profitable for their enterprise, and which procedures must be known to be a collaborative member of the cluster itself. To this aim, an overview of some SME networks/clusters in Europe and outside will allow significant comparison of their respective strength and weakness.

Agostino Villa

P.S. The idea of this “instant book” has been suggested and promoted by the International Association EVI—The “*European Virtual Institute on Innovation in Industrial Supply Chains and Logistic Networks*”, an international non-profit

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<sup>5</sup> Small Business Act for Europe, EC Doc. COM (2008)394, June 6th 2008.

<sup>6</sup> European Cluster Conference 2010, July 2010, re: [www.europe.innova.eu](http://www.europe.innova.eu).

association of universities and research institutions, established as a “spin-off” of the project *CODESNET*—Collaborative Demand and Supply Networks, funded by the European Commission in the 6th FP. The EVI Association is located at the Politecnico di Torino, corso Duca degli Abruzzi 24, I-10129 Torino (Italy), Director Prof. A. Villa.

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# Chapter 1

## Organization in SME Networks

Dominik T. Matt and Peter Ohlhausen

**Abstract** Sustainable economic development is based on a foundation of innovative activity (development of new products and processes), entrepreneurship (converting innovation into economic activity), and industry clusters (networks of supporting markets, services, and skilled labor). The purpose of this chapter is to demonstrate how network organizations of small and medium sized enterprises (SME) can contribute to economic growth. It is concluded that network organizations are a very suitable form to sustain continuous business growth without losing the advantages of the high adaptability of a typical SME. A special focus will be given to a new concept, which proposes sustainable business growth in networks based on so called ‘core competence cells’. It allows an organization to flexibly adapt to changing environmental conditions, and thus promote sustainable business growth within an organizational network.

### 1.1 Introduction

Micro, small, and medium-sized enterprises are the backbone of Europe’s economy and the key to Europe’s competitiveness. They make up 99% of all enterprises in the EU25, representing about 25 million companies, employing almost 95 million people. As an essential source of entrepreneurial spirit and innovation,

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D. T. Matt (✉)

Free University of Bolzano, Piazza Università 5, 39100 Bolzano, Italy  
e-mail: dominik.matt@unibz.it

P. Ohlhausen

Fraunhofer Institute IAO, Nobelstraße 12, 70569 Stuttgart, Germany  
e-mail: info@ohlhausen.competer.ohlhausen@iao.fraunhofer.de

these enterprises have proved several times to play an important role in compensating for job losses in the years of general economic depression (Matt 2007). Thus, it seems important to identify the factors for sustainable success of small and medium enterprises (SMEs). In an effort to ensure such small businesses' success, owners (entrepreneurs) will have to resort to forms of collaboration or cooperation. This is most probably the only means by which countries can make sure that SME's add value and stimulate economic growth (Matt 2008).

However, small and medium enterprises (SMEs) are facing numerous challenges, i.e., to develop innovative products and services on faster cycle time, to integrate across diverse technologies in producing and servicing, and to compete with new competitors crossing not only geographical but also industry borders. Hence, organizations are facing increasing pressure to do a better job on gaining access to new knowledge in their business environment while at the same time leveraging their existing knowledge within the boundaries of the firm (Teigland 2000). In addition to this, the rapid technological and societal changes of the world have created new demands for networks.

A network is a remarkable developmental environment, especially for SMEs (Iskanius 2006). It enables each network partner to better access sources of raw materials, customers, new technologies, and innovation, etc. Networking also allows small firms to combine the advantages of smaller scale and greater flexibility with economies of scale and scope in larger markets—regional, national, and global. Above all, SMEs via networks are able to get a better and more comprehensive view of the market demand and thus help to explore new business opportunities. A quite complete list of advantages and disadvantages of networking of SMEs can be found in Table 1.1

SMEs are becoming more involved in international strategic alliances and joint ventures, both alone and in SME groups. Larger multinationals are partnering with smaller firms with technological advantages to economize on R&D, minimize the lead-time for new products, and serve emerging markets (OECD 2000). Typically, SME manufacturers are subcontracting companies that produce components or products for one or a few focal customers. If the SMEs are competitive in their production activities, their reputation will rise, and this will provide new opportunities to make new customer relationships. In addition, there can be some niche market segments that are not attractive for large enterprises. These niche market segments can be very interesting for a small firm. According to Cambell (1997), SMEs should concentrate on a specialization or niche strategy. A very important prerequisite to do this successfully is to focus on core competencies and to abandon/outsource those activities which can be considered non-core business.

The explanation for this is easy and plausible at the same time. Entrepreneurship can be defined as the opportunity to self-determine the own economic success. The perspectives of economic success and independence, stimulate to run a certain entrepreneurial risk (Matt 2008).

Therefore it is important to know the levers for increasing a company's success. In other words: a product or service offer will only be successful if it creates best

**Table 1.1** Advantages and disadvantages of networking for SMEs

Advantages	Disadvantages
More effective utilization of capacity	Varying use of capacity
Decreasing costs per unit	Varying delivery time
Increase of flexibility and volatility of production processes	Inflexibility of the production processes quality problems
Increase of reliability	Difficulties in cost management
More effective management of material flow and inventory	Difficulties in management of material flow Difficulties in management of information flow
R&D knowledge	Insufficient project management skills
Wider product and service offerings	Other information barriers in production processes
New innovation and business possibilities	Lack/change of responsible persons
Better quality of products and processes	Excessive competition
Better human resources focusing on the SMEs' own core competence	Poor information technology facilities IT incompatibility problems between companies
Better knowledge	Lack of trust
Development of the customer demand production	Unfair contract terms and short-term contracts
Better focusing of investments	Negative attitude of the personnel
Greater visibility of production processes	Problems in the relationships of personnel
Environmental concern about products and production	Difficult terms of agreement Poor internationalization abilities
Easier to recruit staff	
Easier to become internationalized	
Easier to get finances	
Financial costs decrease	

Confederation of Finnish Industry and Employers (2004)

customer value from the buyer's perspective. The probability to achieve this target increases if a company strictly focuses on its core competences (Prahalad and Hamel 1990). Thus, core competences can be simply defined as competences that create a high customer benefit, assure competitive advantages, and are difficult to imitate.

To concentrate on core competences means to promote those activities that help to achieve the company targets and to create internal know-how (Javidan 1998).

## 1.2 Networks of Core Competence Cells: The 3C Approach

There are many different definitions and types of core competences, see for example (Selznick 1957; Ansoff 1965; Stevenson 1976; Porter 1985). Nevertheless, a general classification scheme can be identified:

Basically, the variety of core competences types can be condensed to the following basic typologies: ‘perform a service’, ‘produce’, and ‘sell a product or service’ (Matt 2007).

The example of a medium sized company helps to illustrate this (Matt 2007): a producer (PR) of plastic components serves two different market segments: the automotive supplier industry as a tier 3 supplier and electric wholesalers as a brand PR for isolated tools and devices for the electrical engineering. The core competences include: a sales channel for electric wholesalers (type 1), an R&D department which offers also services to third parties (type 2) and an efficient injection moulding plant producing high quality at competitive prices (type 3).

This example and the analysis of different other business cases show that a company’s core competences can be derived from a mix of the three basis typologies. There are different scientific publications dealing with organizational units focused on autonomous, elementary units of production, cooperating in temporary networks based on customer-oriented, directly linked, smallest autonomous business units called competence cells, see for example (Teich 2003; Neugebauer et al. 2004; Ivanov 2006; Müller et al. 2006; Matt 2007). In accordance with previous publications, in the following, a different definition is introduced:

An organizational unit which concentrates exactly on one core competence classified within one of these three basic typologies is called ‘core competence cell’ or ‘3C’.

Best prospects for a sustainable growth have networks with exactly one 3C or a mini-network of 3C’s at their nodes (Fig. 1.1). In this context, it is insignificant if a 3C is represented by a legally independent company or by an autonomous business unit. According to the previously defined basic core competence typologies, three types of network cells can be differentiated: the ‘dealer (DL)’, the ‘service provider (SP)’, and the ‘producer (PR)’.

The 3C approach assumes that a core competence cell has best chances to grow within a network if it is not limited in its own development by the consideration of own activities’ effects and consequences, on the development of other competence cells. In other words: a network cell that is conditioned in its development by other network partners, risks losing competitiveness.

In terms of business contents, differentiation within a 3C might require a cell division; in such a case, an existing 3C unit splits off a new autonomous unit

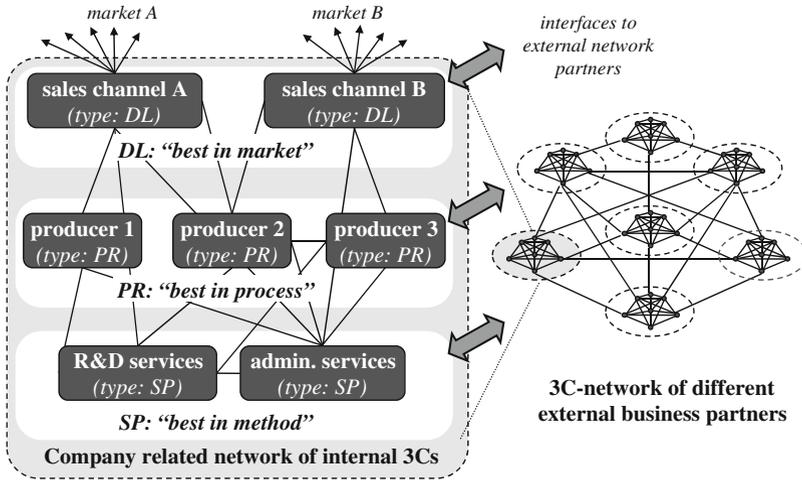
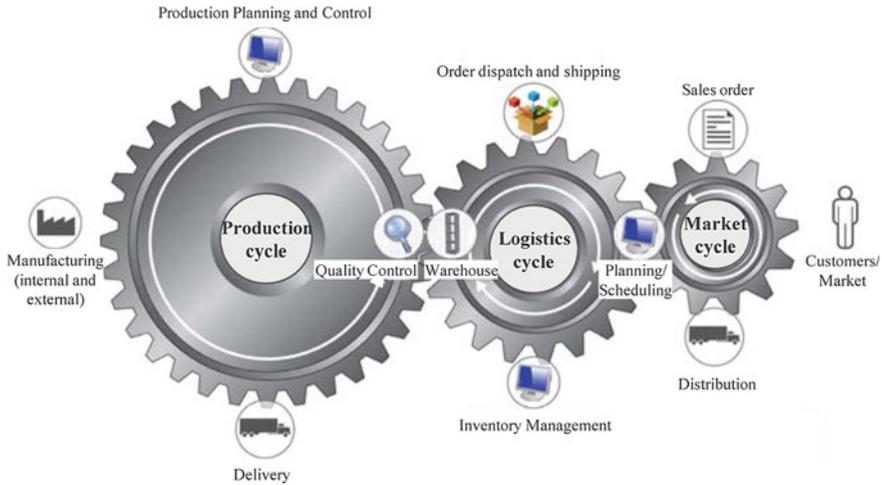


Fig. 1.1 Concept of 3C networks (Matt 2007)

with the same ‘genotype’, i.e., with the same core competence type, which continues to develop autonomously (Matt 2007). The reason for this usually lies in a strategically different orientation of the ‘spin-off’. For example, an industrial engineering consultancy starts to offer also product design besides production engineering services. At a certain point in time, it makes sense to start a spin off with a clear new focus on product design within the new core competence cell in order to create a clearer identity and even a better market visibility.

However, in some cases also an increase in the internal organizational complexity over time can be a trigger for a cell division. Thus, a core competence cell ideally maintains a small structure because the systematic reduction of the time-dependent combinatorial complexity leads to a cell division (Matt 2010). Summarizing, the 3C approach offers a set of criteria for a good design of SME networks; every network partner concentrates on own core competences, ideally within one of the three basic core competence typologies. Although being part of a collaboration network, it maintains its autonomy. When growing, every cell ideally observes periodically, its internal organizational complexity and own strategic orientation, in order to identify the right moment for a cell division. This way, it can grow with and within the network and use the advantages of a large platform without losing the flexibility and agility of a small structure. The approach is suitable for the organizational network design of legally independent partners as well as for the organizational development of single business units or profit centers of a just one company, for example in the context of a company’s organizational design in geographically distributed co-operative production (Matt 2010).



**Fig. 1.2** Three cycles based on the three core competence base typologies characterize a typical supply chain—they rotate with different rotational speed (Matt 2009; see also Matt 2006)

### 1.2.1 Supply Network Design with the 3C Approach

So far, the theoretical basics of the 3C approach have been described. However, practical application needs a design procedure which shall be introduced within this section.

#### 1.2.1.1 Design Procedure

Starting from the experiences of several organization projects in internationally working SMEs, the following explanation model has been developed (Fig. 1.2).

The three gear wheels shown in Fig. 1.1 rotate with different rotation speed's. The fastest is the market cycle; it has to react quickly to market requirements and refers to the basic core competence 'sell a product or service'. Thus, the central measure for success is the sales margin. To be successful, it has to (Matt 2007):

- Focus on the most profitable market segments.
- Build a strong sales channel and push sales.
- Select reliable and cost effective suppliers.

Production is a transformation process that produces storable goods from raw materials or semi-finished products using energy, workforce, and operational resources.

A PR aims at the minimization of manufacturing costs and the optimization of flexibility. This can be obtained only by process leadership regarding production

efficiency, quality, and organizational flexibility. Successful PRs introduce (Matt 2007):

- Suitable and modern production technologies
- New methods and techniques of production organization
- Procedures for the continuous improvement of efficiency, quality, and cost reduction

However, the production cycle is usually much slower than the market cycle. Thus, it is synchronized with the market cycle via a central gear wheel, the so called ‘logistics cycle’. The logistics cycle is a typical application of the base profile of a ‘SP’. In contrast to products, services are not storable or transferable and are related to persons, and their technical, and interpersonal skills. The target system of a successful SP comprises (Matt 2007).

- Employ only the best and most motivated collaborators.
- Train his staff continuously at the highest possible level.
- Use best practice methods and information technology support.

### 1.2.1.2 Example 1: Automotive Supplier Industry

In the following, one of several industrial cases will be described in which the above described methodology has been successfully proven (Matt 2010).

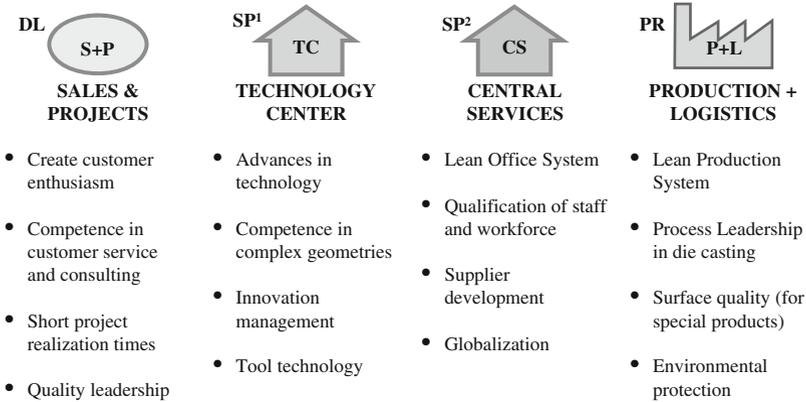
The company is a medium sized automotive supplier of aluminum die casting parts. Its strategic positioning is differentiation by quality and technology, helped the company already in recent years to successfully cope with economic ups and downs—even in the latest global economic crisis. Globalization in the automotive industry forced the company to follow its customers and thus create a geographically distributed production. However, due to the complexity of management of these different sites and the related increase of transaction costs, a re-organization project was launched with the objective to create a lean and efficient network organization structure based on process orientation.

In a total of four workshops with senior management, the new network organization was developed based on the guidelines offered by the 3C approach.

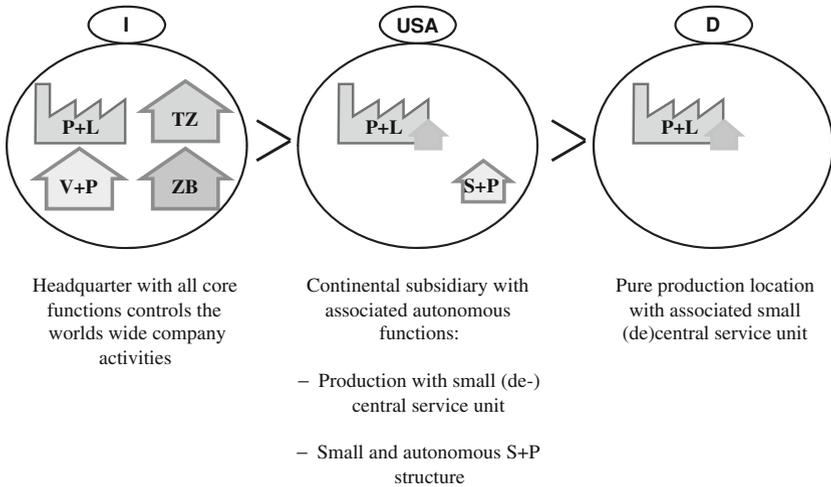
First, an actual complete list of strategic success factors for the company was developed and assigned to the three different base core competence typologies DL, PR and SP. Within the base types, sub-differentiation in the SP area was necessary due to very different competence requirements within the SP type. Finally, four so-called network modules were created (Fig. 1.3) which can be assembled to build the different company sites.

In the next step, the necessities of the different locations based on customer and market demand, and on process logic were defined. Consequently, the different modules were assigned to the locations (Fig. 1.4).

Of course, detailed work had to be done to define the next levels of hierarchy. This can be easily done using the well known approach of process orientation—also



**Fig. 1.3** The four network modules with relative success factors defined by management



**Fig. 1.4** Organizational site configuration in 3C logic

applied in this specific case. However, this does not enter into the focus of this paper that concentrates on organizational design in geographically distributed co-operative production networks.

Going back to the results shown in Fig. 1.4, it can be stated that the company now has a development logic on hand that efficiently helps senior management in decisions regarding the organizational design of new plant sites or subsidiaries. The experiences made so far are more than positive; feedback from company after the first year of implementation shows the validity of the approach.

### 1.2.1.3 Example 2: Bathroom Accessories Industry

The following example, based on a long-term study and cited from (Matt 2007), is suitable for the practical demonstration of the successful establishment of a 3C network structure between a set of different companies that gain synergy effects from the network collaboration. The example starts from a single company founded about 30 years ago as a 'one-man-show'. The founder started it literally in a garage with production and sales of the self-designed shower cabins.

Having identified the problem that the dependence from only one person causes a stagnation of growth, the founder decided to involve a companion who brought besides financial support, also a good sales network. In a next step, a young engineer was enrolled with the product design. He also became a companion some years later. Production was enforced by further employees and managed by the founder himself. Then, some years later, the companion's retirement (sales) from the operative business led to the organizational re-structuring and the introduction of an enlarged functional structure. After this organizational change, the shower cabin PR grew continuously for about 7 years, even during phases of economic depression. Suddenly, growth stagnated. The entrepreneurial reaction consisted in the attempt of 'buying' growth by differentiation, and investments in other companies working in the bathroom sector. But these activities were not really successful as the 'new buys' maintained their old organizational structure and brought neither cost reductions through synergies nor economies of scale. On the contrary, due to an increasing necessity of coordination, a central holding was introduced, creating even more costs and complexity. The effects; total revenue increased, but profitability decreased.

Thus, the entrepreneur decided to introduce the 3C concept to re-start economic growth. First, for the various market accesses, different sales channels with respective 'market cycles' were defined: one for the three-stage sales channel (wholesalers), a second for the two-stage sales channel (do-it-yourself markets), and another one for the project market (construction industry). As a kind of broker, the market cycles offer customer orders to the whole company network. In addition, two SPs were created to perform services for network internal and external customers: SP 1 offers central R&D services to all network partners; SP 2 renders general services like controlling, accounting, and administrative services. Furthermore, different PRs were defined: PR 1 supplies metal and plastic components as semi-finished products to PR 2, 3, 4 and to external customers, as well as finished goods to the market cycles 2 and 3. PR 2 manufactures bathroom accessories on customer demand, while PR 3 manufactures standard bathroom accessories. Both serve the three sales channels. Finally, PR 4 produces pre-fabricated bathroom pods for the project market. The strong orientation towards new materials in this market might lead in future to a further cell division. The single core competence cells are acting autonomously, some as profit centres, most of them as legally independent companies.

In 2009, this 'enterprise network' offered jobs for 260 employees and generated consolidated yearly revenue of about 75 million euro. According to the new EU