Dieter Rehfeld/Jürgen Nordhause-Janz

On the Increasing Integration of Production and Servicing - Aspects of Restructuring of the Production Chain in Different Sectors of Economy

Discussion paper presented at the VIII Annual RESER Conference on „Service Manufacturing Links“, Berlin, 8 - 10 October 1998

1) Certain evidence can be claimed for a strong and growing relationship between productive and service functions in industry:

- Ongoing regional restructuring does not depend on specific industrial sectors. Product centered agglomeration economies (like car producing, micro technics, biotechnology) are clustered on a regional level in the same way like service centered agglomeration economies (like media, insurance, finance), (cf. Rehfeld/Wompel 1997, 1998). The common feature of regional restructuring is characterized by sectoral specialization and functional diffenrenziation (cf. Rehfeld 1994).

- New concepts of production resp. of work organization are implemented in all industrial sectors with rising speed (cf. figure 1). At the same time standardized functions in manufacturing (for instance microelectronic components) are going to be outsourced and relocated on a world wide level as well as in service (for instance standard software).

- Great companies are restructuring their activities by integrating related service functions around the core product. Doing this they are redefining their core competence: outsourcing of subordinated functions is accompanied by the insourcing of new competences.

2) This process of restructuring is market driven. There is a rising demand for integrated goods-and-service packages. Car producers traditionally are offering financing and insurance functions as well as car renting service. Forthcoming, the implementation of electronic based traffic infrastructure goes hand in hand with the integration of navigation systems into the car. Plant constructing firms are asked to include financing, refinancing and operation management, chemical industry has started to lease chemicals, facility management combines all technical and organizational functions related with the construction and operation of building complexes.

Advanced integrated goods-and-service-packages need the combination of very different technical and organizational competences and you cannot expect all these competences to be present in one single firm. Therfore, the development, production and marketing of integrated

goods-and-service-packages needs cooperation. Manufacturing and production related service have to be combined accord to the customer's specific demand. This development is well studied in the context of regional innovation systems (cf. Braczyk/Cooke/Heidenreich (ed.) 1997).

3) The understanding of these changes needs a concept that is no longer commited to traditional concepts like manufacturing vs. service, small or medium vs. large companies, new vs. old industrial sectors. The concept of production chains claims to provide a framework to analyse the changes mentioned above. A production chain is definded as the sum of all production and service functions necessary for developing, producing and marketing of a certain product or a group of products. A product can be a tangible good (for instance a car, a PC or a plant), a service related package (for instance all-finance services or a reengineering-concept), or an integrated package of material good and service like outlined above. Beside the production itself, elements of a production chain are those functions preceding and following production, and those functions necassary to carry out the manufacturing process and the integrative function of standardization (cf. figure 2).

From this point of view, the ongoing trend towards integrated packages of material goods and services can be interpretated as a reorganization of production chains. Focusing on the product resp. the product group, the production chain centers no longer around cars but around electronic based car-street systems. Actually, this reorganization can be regarded in sectors like chemistry (life science products or health care packages), telecommunication (multi-media-services), insurance (all-finance-services) etc..

4) The reorganization of production chains is not only governed by market mechanism. Sectoral studies have worked out, that new modes of governance called sectoral regulation (Dörrenbacher et. al. 1997), modes of governance (Hakansson/Johannson 1993) or conventions (Salais/Storper 1992) are of rising importance.

But the coherence and flexibility of production chains needs more than standards, conventions and networks. Changes in the production chains gave impulses for the development of producer service centered activities as production chains in there own right (cf. Coffey/Bailly 1992). The rising need of integrating different functions in a coherent way requires an infrastructural base that guarantees the continuoues and compatible flow of information and goods. This need is the base for the development of new production chains that provide integrative or infrastructural functions, especially including the management of interfaces.

Actually, the establishment of new production chains focusing around integrative products can be studied (cf. Bailly/Maillat 1991). We are focusing on::

- IT-consultance firms focusing around the management of continuous and compatible data-flow;
- firms that are providing an integrated logistic-architecture;
- firms that are organizing integrated environmental management.

5) IT-consultance is the most growing branch of consultance activities (cf. Sperling/Ittermann 1998). The core-function can be seen in strategic analysis, functional analysis and macro- and micro design related to the construction of an integrated software, but a lot of further functions are grouped around this core functions up- and downstream. Mostly, these activities start by integrating the data flow on the companie's level. But more and more, basing on the potential of new communication infrastructure and services, the data flow between producers and costumers, producers and suppliers, joint-producers or producers and external agencies have to be managed. The task is a very complex one and needs competence in organizational, technical and educational dimensions (cf. Moulaert/Djellal 1995). Due to this complex competence firms with very different professional origin did engage in the new production chain. No firm can provide all functions alone, cooperation is a „sectoral law" (cf. Rehfeld/Wompel 1998). But all firms integrate a specific combination of these functions with respect to their professional origin and the related core competence (cf. Nordhause-Janz/Rehfeld 1998). Not at least, these firms have started to offer additional functions related to the network management: the development of specific hardware, the management of customer and service related functions (call-center management), the organization and billing of on-line services, etc. (cf. figure 4).

6) The traditional transport-sector faces a fundamental change. The task is no longer to organize the in-time tranport of goods from one place to another, but the development, the implementation and the management of an integrated logistic architecture. Advanced logistic architecture includes (cf. Fiege 1998):

- Logistic engineering (System-construction, if their is need, re-engineering, too)
- Logistic systems (interface management including manufacturing functions like assembling, quality testing or installation)
- Transportation (including optimization in technical and ecological terms)
- Human Ressources Management (Work organization, communication)
- Accounting/Controlling/Insurance
- Information Technologies (Software, Network management, specialized hardware).

7) According to a very fragmented environmental protection law, environmental management related functions had been traditionally strong regulated and fragmentated. Due to the paradigmatical shift in environmental legislation in the late 1980ies in Germany the situation began to change. The interconnections and the rising complexity of the environmental task forced a trend to comprehensive environmetal magement. Environmental consultance, focusing around the optimization of the material chain in plants and along the production chain, has provided as another strongly growing branch of professional consultance. In the long run we expect the rising integration of the different functions related to environmental management as a third integrative resp. infrastructural production chain (cf. Nordhause-Janz/Rehfeld 1995 and figure 4).

8) The integrative resp. infrastructural production chains provide the communicative and logistic base for the reorganization of the production chains (cf. Ochel/Wegner 1987: 130f). The integrative approach includes a bundle of different functions that cannot be reduced to the production-service duality.

Further on, we suppose the integrative resp. infrastructural production chains to fasten the cross-sectoral diffusion of new production concepts. Interface management, cross-functional project management and related re-engineering are part of the trend to bring different industrial sectors in line.

IT consultance, logistic architecture and integrated environmental management are production chains of their own right. A high density of interaction between the complementary functions, a specialized common support, the formation of own industrial associations and fairs and a strong trend in regional clustering are indicators for the dynamic and seperate development of these production chains.

Regional clustering in these production chains is guided by innovative needs. Complementary functions related to innovation and flexible integration are spatially concentrated (cf. Rehfeld/Wompel 1997, 1998). The logic of innovation-related clustering is an informal one. It is not basing on the interconnection of material goods. Operative functions in these production chains are spatially dispersed (cf. figure 5) because there is a high need of continuous and tie relations to the customers. With repect to this trend, we suppose a shift between regional innovation systems and regional job development in these production chains.

References:

A. **Bailly**/D. **Maillat 1991**: Service activities and regional metropolitan development: a comparative study. In: P.W. Daniels (ed.): Services and Metropolitan Development: International Perspectives. Andover u.a..: 129ff.

H.-J. **Braczyk**/P. **Cooke**/M. **Heidenreich** (ed.) **1997**: Regional Innovation Systems - the role of governances in a globalized world. London.

W. J. **Coffey**/A.. **Bailly 1992**: Producer Services and Systems of flexible Production. In: Urban Studies vol. 29: 857 - 868.

Christop **Doerrenbacher u.a. 1997**: Globalisierung von Produktionsstrukturen. Eine arbeits- und industriepolitische Analyse globaler Entwicklungsverbünde. (WZB FS II 97-204). Berlin.

Fiege 1998: The world of logistic. Company profile.

H. **Hakansson**/J. **Johanson 1993**: The network as a governance structure: interfirm cooperation beyond markets and hierarchies. In: G. Grabher (Hg.): The embedded firm. London: 35 - 51.

J. **Nordhause-Janz**/D. **Rehfeld 1995**: Umweltschutz „Made in NRW". München und Mering.

J. **Nordhause-Janz**/D. **Rehfeld 1998**: Informations- und Kommunikationswirtschaft Nordrhein-Westfalen. Projektbericht. Gelsenkirchen.

F. **Moulaert**/F. **Djellal 1995**: Information Technology Consultancy Firms: economies of Agglomeration from a Wide-area Perspective. In: Urban Studies vll. 32: 105 - 122.

W. **Ochel**/M. **Wegner 1987**: Service Economies in Europe. Opportunities for Growth. London.

D. **Rehfeld 1994**: Produktionscluster und räumliche Entwicklung. Beispiele und Konsequenzen. In: W. Krumbein (Hg.): Ökonomische und politische Netzwerke in der Region. Münster: 187-205.

D. **Rehfeld**/M. **Wompel 1997**: Künftige Produktionscluster im Raum Köln. Gutachten im Auftrag der Stadtsparkasse Köln. (Graue Reihe des IAT). Gelsenkirchen.

D. **Rehfeld**/M. **Wompel 1998**: Innovationsschwerpunkte in Dortmund. Projektbericht. Gelsenkirchen (forthcoming).

R. **Salais**/M. **Storper 1992**: The four „worlds" of contemporary industry. In: Cambridge Journal of Economics vol. 16: 169 - 193.

H.J. **Sperling**/P. **Ittermann** 1998: Unternehmensberatung - eine Branche im Aufwind. Münschen und Mering (Schriftenreihe des IAT bd. 11).