

**Executive Summary of the Final Report  
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**The Significance of Competitive  
Manufacturing Industries  
for the Development of the Service Sector**

An Analysis of the Determinants of the Expansion  
of Business-Related Services  
in Modern Industrial Societies

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## EXECUTIVE SUMMARY

### **“The Significance of Competitive Manufacturing Industries for the Development of the Service Sector — An Analysis of the Determinants of the Expansion of Business-Related Services in Modern Industrial Societies” (Project No. 22/02)**

Though the share of the service sector has been steadily increasing in Germany, both the employment share and the gross value added share are still lower than in the USA. This phenomenon has been denoted as the service gap and has often been regarded as backwardness. Some economists therefore called for a special promotion of services, which implies to neglect the manufacturing industries. In the study it is shown that the service gap concept is too simplistic, mainly because it ignores the interdependence between manufacturing and the service sector.

The study provides a thorough analysis of the complex relationships between the manufacturing sector and the service sector, thus clarifying the significance of an internationally competitive manufacturing sector for the development of the service sector in Germany. Concerning the latter, the focus is on business-related services as they show the closest connection to the manufacturing sector. In addition, product-related services are investigated in finer detail.

To address the complex questions several distinct methods are employed. A special computer software has been developed to examine structural change and the linkages between the manufacturing and the service sector within an input-output framework. Besides evaluating the German input-output tables 1991 – 2000 themselves, it computes subsystems, growth rate decompositions, and a variety of model scenarios. The software is given to the reader and allows them not only to reproduce our calculations but also to modify them. In particular, the aggregation scheme may be changed or refined. The study moreover includes an analysis of other, more specific studies and statistics on the German economy and other industrial countries.

Our investigations reveal the ongoing and vital importance of the manufacturing sector for the German economy as a whole. It is especially shown that essential impulses for output and employment growth in the service sector originate in a few core branches of manufacturing.

*Results from statistics and other studies*

- The different definitions of business-related services notwithstanding, employment and total revenues of this sector show an above-average increase in Germany over the 1990s. This development also results in higher employment shares.
- A pronounced structural change took also place within the sector of the business-related services itself. For example, the importance of "architects and engineers" decreased in the 1980s and 1990s, while the significance of the branch "data processing and databases" increased.
- An international comparison of Germany, France, Japan and the USA shows great differences between the countries regarding the growth dynamics of the single branches within the aggregate of business-related services.
- In 2000, the business-related services in Germany accounted for 14% of total employment, which was slightly less than in the USA where the employment share was 16%. The shares of value added were equally high in both countries (17%). As other studies on the German economy in the 1990s also indicate, the importance of business services as intermediate inputs in manufacturing did not lag behind the corresponding values in the USA.

*Results from an evaluation of the intersectoral input-output linkages*

- The hypothesis of an increasing significance of service sectors cannot be maintained in this generality. It is instead necessary to differentiate: while the output shares of consumer services and social services remained roughly constant in the 1990s, the share of business-related services (in a wider sense) increased by 4%. This suggests that the growth in service production is primarily due to an increased demand on the part of businesses rather than private households.

- From the perspective of manufacturing, more than two thirds of the intermediate inputs come from within this sector. However, the deliveries of intermediate inputs from services to manufacturing exhibit above-average growth rates. The intermediate goods linkages between services and manufacturing have thus been reinforced.
- From the perspective of the business-related services as a supplier of intermediate inputs, the share of these deliveries in total sectoral output added up to 69% or even 88% – depending on the precise definition of these services. Compared to 1991, both shares increased by roughly one percentage point.
- The alleged loss of significance of manufacturing is also qualified when we ask for the production in the economy as a whole that has been induced directly or indirectly, through the intermediate goods linkages, by the final demand for manufacturing products. In 1991, this share amounted to 39%, decreased thereafter, and then rose again to reach the original level in 2000. The corresponding share in those branches of manufacturing that are highly export-oriented was even continuously increasing; this subsector, which also proves important in other respects below, is called the “export core”.

#### *Quantitative results from input-output model scenarios*

- Employing slightly different tools of input-output modelling, we find that a change in the final demand for manufacturing products has a considerable impact on the demand for business-related services in the same direction, whereas conversely the impact of the business-related services on manufacturing is much lower. The magnitude of this asymmetry is quantified in different frameworks. Altogether, these results cast serious doubt on the idea of a service-led growth. It can rather be concluded that it is the factors favouring the manufacturing sector that also have a positive effect on the growth of business-related services.
- Business-related services have, in particular, benefited from a general increase in the technological input-output coefficients. In the 1990s, one third up to almost half of the growth of business-related services – which itself was twice as high as total economic growth in Germany – can be attributed to this type of technologi-

cal change. The explanatory power of this factor for the increased output shares of the business-related services is still higher.

- Even if, hypothetically, technological change and the increased export shares are restricted to the abovementioned export core of manufacturing alone, high output gains in the business-related services can be identified. If induced investment due to higher output is integrated, but on the other hand also the higher import shares are taken into account, we compute that – depending on the definition – business-related services grew already by 7% to 11% over the 1990s. In terms of employment, the structural change in the export core created half a million jobs in the business-related service sector. In the economy as a whole, the increase in employment added up to 842.000 jobs, whereas *ceteris paribus* the productivity increase in the export core would have led to a labour displacement of more than one million jobs.

#### *Results from the technological linkages*

- The analysis of the technological linkages between sectors is based on the idea that manufacturing as a highly innovative sector provides the service sector with new technology and new knowledge mainly *via* deliveries of intermediate and investment goods. As expected, in an aggregate perspective manufacturing is more a technology providing sector and services are more a technology absorbing sector.
- The technological spillovers from manufacturing to services via intermediate goods show a high magnitude but from 1995 to 1999 the trend is mixed. Within the service sector, the share of these spillovers received from industry declined from 70% (1995) to 43% (1999) since the significance of the service sector as a technology providing sector increased.
- Within the service sector, consumer services and social services are the main beneficiaries from the technological spillovers. The most important provider of technology in manufacturing from 1995 to 1999 was the branch office machinery, computers, electrical and optical equipment.
- There are indications that technological spillovers are primarily induced by social interactions and absorptive capacities. Since in addition spatial proximity has a

positive impact on the emergence of these spillovers, it can be concluded that innovation activities in the domestic manufacturing sector have positive effects on the development of services.

*Results from the analysis of the product-related services*

- It is getting more and more important for manufacturing businesses to offer a suitable service in addition to the product itself. This combination often merges the material product and the service to a new “hybrid product” or “compact” (complex package). This trend increasingly blurs the boundaries between manufacturing products and services.
- Though for manufacturing as a whole, product-related services are of secondary importance, their role is nevertheless improving. In 2000, for example, the share of total revenues originating from product-related services was already 23% in electronics and 22% in machinery manufacturing. This is tantamount to an increase of 5% and 13%, respectively, compared to 1997 – a trend that still seems to persist.

*International aspects: some results*

- Value added in business services increased faster than in the total economy. This holds true for Germany as well as other countries.
- International trade of services gains in importance, although for Germany’s exports trading of manufacturing goods is still dominant.
- The significance of the business-related services for the German export performance should not only be judged by the volume of their direct exports, but also by the demand for intermediate goods in the form of business services on the part of all other sectors in order to produce for their exports. For example, the business-related services (in a narrow definition) had, in this sense, indirect exports that were nine times higher than the direct exports. Or, to give another indicator of the importance of export-induced production: Whereas business-related services (narrowly defined) contributed only 1.5% to Germany’s export, they had a share of 7% in export-induced production.

- Relocating manufacturing industries abroad is often combined with a relocation of various business-related services, including R&D. In general, additional R&D-activities of German enterprises abroad in order to participate in international knowledge networks are desirable. On the other hand, by shifting production abroad the economy runs the risk of reducing existing R&D capacities and thus negatively affecting the technological performance of Germany.

### *Conclusions*

As a result of the increasing linkage between industry and services in so many respects, a one-sided promotion of the service sector is not an adequate policy to stimulate aggregate growth and employment. The results of the study demonstrate that the decreasing output share of manufacturing to be observed in the statistics does not imply a general loss of its significance. The reasons for this statement are in particular:

- Those services that show above-average growth – the business-related services – depend directly on the demand of manufacturing.
- A multitude of services can only be sold in combination with manufacturing products.
- Manufacturing as a technology and knowledge providing sector is indispensable in promoting product and process innovations in the service sector.

We furthermore find that within manufacturing the export core, consisting of pharmaceuticals, chemicals, machinery and vehicles, plays a key role in the German economy, its special characteristics being:

- As its name indicates, it is first and foremost the export core that is responsible for the export success of the German economy, while the share of services in total exports is still low.
- In the period from 1991 to 2000, the output share of manufacturing as a whole decreased by three percentage points, whereas the output share of the export core increased significantly. The decline of manufacturing is therefore not a general phenomenon.

- Compared to the rest of manufacturing, the export core exhibited high growth rates in the demand for business-related services. That is, this subsector represents a demand factor of particular importance.
- The export core (together with one other branch of economic activity) showed the highest expenses in R&D.

Germany has competitive advantages mainly in high-tech manufacturing products. A mistaken structural policy that concentrates merely on services would imply to gamble on these advantages. It is instead of vital importance to foster economic growth in general, and the collaboration between services and manufacturing in particular.