A list of Working Papers on
the last pages

No. 176, 1987

SERVICES IN INDUSTRY

- AN INTERNATIONAL COMPARISON

by

Tomas Pousette

This is a preliminary paper. Com-
ments are welcome.

April, 1987

SERVICES IN INDUSTRY - AN INTERNATIONAL COMPARISON

The service sector has been increasing in most developed economies during the last 20 years. This is particularly true for service employment, but also for service production. It is a general view that the service content within manufacturing industry has also increased. By this is usually meant the industrial firms' purchase and internal production of services, as well as sales of services.

In this paper we compare the service activity in manufacturing industry in eight European countries.[1] Services can be produced either within or outside the firm. Therefore we study both the internal production of services and the purchase of services by manufacturing industry. The purpose of the paper is <u>firstly</u> to see if the service intensity is different between countries. <u>Secondly</u>, if there are differences, can these be explained by economic facts. Several hypotheses have been put forward to explain the demand for services by manufacturing firms and the trade-off between internal productional and purchase on markets. Here, we test some of these hypotheses, e.g. concerning technological sophistication, firm size and organisational structure, uncertain or slow economic growth and flexibility on the labor market.

The paper is organized as follows. In section 1 data on the purchase of services by total manufacturing industry is presented. The internal production of services is treated in section 2. In section 3 various explanations of the demand for services are analysed. The paper ends with summary and conclusions in section 4.

---

[1] Germany, France, Italy, the Netherlands, Belgium, the United Kingdom, Denmark and Sweden.

1 Purchase of services

Manufacturing industries' purchase of services presented here is based on an annual inquiry carried out by the statistical office of the European Communities (Eurostat).[1] The basic reporting unit is the enterprise, defined as the smallest legally autonomous unit. Total services purchased are divided into industrial and other (non-industrial) services. The coverage of each of these concepts is given in the appendix.

The statistics refer to costs incurred by industrial enterprises directly in their trade in services with other enterprises. They do not cover costs incurred by industrial producers indirectly through the activity of externalized, i.e. legally separate, but still closely related specialized service companies. This means that the organization of the enterprise affects the statistics. If service activities are kept within the firm, their purchase and sales of services are included whereas, if service activities are organized in separate companies, their purchase and sales of services are not included. This should be kept in mind when comparing the data from various countries.

Services received by manufacturing industry vary considerably between the observed countries, as can be seen from Figure 1. In France and Italy services purchased amounted to 21.6 % respectively 16.1 % of turnover in 1983, while the corresponding figure for Belgium and Sweden was only 9.4 % respectively 6.5 %. The purchase of services, as a share of turnover, has increased during the period 1975–80 in all countries, except Belgium and the Netherlands.

Non-industrial services account for about 70 percent of the total amount spent on services (see Table 1). The share was fairly stable in the period 1975–83 except in the United Kingdom where it increased from 61.7 to 69.8 %. The increase in services purchased as a share of turnover in the United Kingdom and

---

[1] The exception is Sweden where data have been taken from national input–output statistics. These are in accordance with other Swedish survey data (Pousette and Lindberg, 1985).

Denmark is largely explained by the growth in non-industrial services. In Germany, France and Italy the purchase of both industrial and non-industrial services show an increasing share of turnover.

There is clearly a general tendency for services purchased to increase faster than the turnover although the development for different service categories varies between countries. These numbers should, of course, not be regarded as too exact. The definition and reporting of services purchased probably differs somewhat between countries. Nevertheless, the observed variation is so great that it can hardly be explained only by different definitions and measurement errors.

2   Internal production of services

Services can either be produced internally or purchased on markets. The factors assumed to determine the trade-off between internal production and externalization will be taken up later. In the preceding section the purchase of services in industry was shown to vary largely between the studied countries. There are two possible explanations to this variation. First, the total use of services may actually be quite different. Alternatively, service levels may be similar, but a high level of internal service production may compensate for low purchases.

The internal production of services in industry is hard to measure. Here we use the share of salaried employees as a rough measure of the internal service production. This proxy is of course open to many objections, but can at least give some indication of the magnitude of service production within manufacturing industry. From Table 2 we see that the tendency of an increasing share of salaried employees in manufacturing industry is the same in all countries. The share is about the same in the countries observed, except Italy where it is much larger. It is notable that Italy also has the second highest share of services purchased in turnover of the countries in the group.

The classification of total employment into salaried employees and operatives is, as mentioned, a very rough way to measure the service activity within firms. Wage-earners may be employed in service functions and salaried employees in non-service functions. A functional classification of occupations may therefore give additional information about the internal production of services in manufacturing industry.

In Table 3 manufacturing employment has been divided into five occupational categories. The first four categories are here broadly defined as service occupations. It should be observed that the data in the two country groups refer to different years and have been taken from different data sources, which may impair comparability. There are large differences between countries in the occupational profiles. Yet, these data also offer little indication of a substitution between internal production and external purchases of services.

To sum up, there is no evidence from these data that countries which buy little services on markets, have a larger internal production of services. Therefore the conclusion has to be that the service intensity in the manufacturing sector is different between countries. In the next section we will test various hypotheses to see if this difference can be explained.

It should be noted, however, that the conclusion above is based on aggregate data. From Swedish microdata, on 103 manufacturing firms, a negative correlation (-0.40) was found between internal and external service intensity (Pousette and Lindberg, 1985). In this study firms were asked in a survey to divide total labor costs according to seven functions. Internal services were broadly defined as all labor costs applied, except for factory production.

3. Explanations of manufacturing demand for services

3.1 Branch structure

Service intensity is generally much higher in certain branches of industry, e.g. manufacturing of office and data processing machinery, than in others. To what extent can the differences in national industrial structures explain the differences in services purchased? Let us assume that the branch structure in the various countries is the same and equal to the aggregate structure for the seven countries.[1] The service purchase calculated in this way is compared to the actual numbers in Table 4. The effect of differences in branch structure is of minor importance. For the Netherlands and Denmark, where the structural effect is largest, services received relative to turnover increase with only one percentage point.

Even if differences in branch structure between countries are taken into account, the large differences between services purchased remain.

3.2. Technological sophistication

A possible explanation to the differences in use of services in industry could be differences in technological sophistication.[2] The hypothesis is that more technologically advanced production needs more services for R&D, internal coordination, marketing etc. To some extent the technological sophistication in manufacturing industry is inherent in the branch structure. It could be, however, that the same branches in different countries are not equally

---

[1] Sweden is excluded here, since no comparable data on service purchase for different branches are available.

[2] See references in Krolis (1986) for studies which stress technical change as a major determinant of manufacturing demand for services.

technologically advanced.

The technological sophistication in industry is difficult to measure. Here we use R&D expenditure as a rough proxy. There is no positive correlation between R&D expenditure and purchase of services (see Table 5).[1] Sweden and the United Kingdom have the highest R&D intensity but a relatively low external service intensity, while Italy has the lowest R&D expenditure relative to value added but the second highest external service share. The United Kingdom has four times as high R&D intensity as Italy but only 60 % of the share of external services purchased in Italy. This admittedly crude measure of technological sophistication does not confirm the hypothesis that this variable is an important determinant of the externalization of services in manufacturing.

3.3 Firm size

It has been argued that firm size explains both the total demand for services and the internalization of services. The more special-ized or more advanced the services, the more likely it is to be demanded by larger firms. The tendency in large firms, as shown by Chandler (1977 and 1981) is to internalize functions to exploit possible economies of scope. Stanback et al. (1981) stress that large firm size is a necessary but not sufficient condition for internalization, because there must exist a certain minimum frequency of demand to justify specialization within the firm.

The hypothesis is then that the demand for services in industry increases with the share of large firms in industrial production. A high concentration of production to large firms could also mean that less services are purchased on markets and more services are internalized. To test the correlation between service activity and firm size the distribution of enterprises in five countries is compared in Table 6. The enterprise is, as mentioned, defined as the smallest legally autonomous unit. Manufacturing subsidiaries

---

[1] The estimated equation is given in Table 10.

are accordingly classified as separate enterprises, which means that the concentration to large firms is underestimated. To the extent that subsidiaries are integrated in the service activity of the parent company, the data will contain less information for our purpose.

The countries can be broadly classified in two groups: one with higher concentration to large firms (Germany, France and the United Kingdom) and the other with lower concentration (Italy and the Netherlands). The purchase of services relative to turnover is, however, not homogeneous in the two categories. France and Italy, where manufacturing industry relies most intensively on purchase of services, are e.g. not in the same group.

To further explore the effects of large firms on the demand for services we also use another complementary measure, namely the share of the five, ten and twenty largest manufacturing firms relative to total industrial employment. For four of the five countries compared in Table 7 the share of large firms in industrial employment is about equal. The exception is Sweden, where the industrial sector is much more dominated by large firms than in the other countries.

Thus, between Germany, France, Italy and the United Kingdom firm size does not seem to explain the differences in demand for services. Sweden's high concentration to large firms could possibly indicate that services are internalized to a larger extent than in the other countries. However, as shown in section 2 the share of salaried employees does not confirm the assumption of a higher share of internally produced services in Sweden.

3.4 Organization of firms

Closely related to the question of firm size is the question of organization of large firms. Petit (1986) has suggested that the growth of producer services is the result of diffusion of new

organizational practices which facilitates extension of services to firms. The change from functional (U-form) organization structures to multidivisional (M-form) structures in particular, is thought to have stimulated the demand for services to firms. With more decentralized decisionmaking in large firms the purchase of services is supposed to have been made easier. Several studies agree that the widespread establishment of M-form structure in Europe took place at the end of the 1960s.

The proportion of the top hundred nonfinancial firms that had a multidivisional form of organization in the beginning of the 1970s in various countries is shown in Table 8. It should be observed that there are several variants of multidivisional organization and that the classification may differ between studies. The numbers in the various studies reported for France and particularly for Italy show great dispersion. There is no evidence from these data, however, that manufacturing firms in countries with high reliance on purchase of services, like France and Italy, should have a more decentralized organization structure.

The data in Table 8 refer to the situation in the beginning of the 1970s. More recent sample data for Germany show that the share of multidivisional firms has stopped increasing and evened out around 60 percent 1975-1980 (Cable and Dirrheimer, 1983). For the other countries I have not found data for the last 10-15 years. Thus, it is possible that the picture from the early Seventies has changed and that manufacturing companies in France and Italy have adopted the multidivional organization form to a larger extent than e.g. in Germany.

According to Armour and Teece (1978) the percentage of U.S. firms in their sample with multidivisional organization form flattened out at 78 percent in the early Seventies. Since the M-form organization was adopted earlier in the US than in Europe this could perhaps be taken as an indication of the maximum penetration of the M-form.

Even if the organization structure in firms does not differ signifi-
cantly between countries, this does not exclude that the attitudes
towards decentralized decision-making differs, which may have an
impact on the externalization of services.

3.5   Labor market flexibility

The decision to produce services internally or purchase them
externally could also be affected by the nature of industrial
relations, a view stressed e.g. by Williamson (1981). Collective
agreements and labor law could have an effect on the tradeoff
between inhouse and external service production.   The more
stringent the contracts on the labor market, the more one would
expect firms to rely on outside supply of services. Ideally one
would like to have an index of the flexibility on the labor market
in different countries, taking into account laws, agreements,
restrictions on firing persons etc. In the absence of such a
measure we will use the unionization rate as an indication of the
strength of the employee side on the labor market. This means
that the labor market legislation is not directly included, which is
of course a serious drawback.

The hypothesis is that a high unionization rate should be positively
correlated with the externalization of services. In the eight
countries studied the unionization rate is highest in Sweden, 80
percent, and lowest in France, 20 percent (see Figure 2). The
figure shows that there is no positive correlation between the
unionization rate and services purchased as a percentage of
turnover. On the contrary, there is a negative correlation.[1] This
could perhaps indicate that by a high degree of unionism, unions
have been powerful enough to hinder the externalization of
services. However, one should remember that the unionization rate
is only an imperfect measure of the relations on the labor
market. In spite of the relatively low unionization rate in Italy,
job security backed by legislation, is stronger in Italy than in
most other countries (Bratt, 1982).

---

[1] The estimated equation is given in Table 10.

To sum up, these admittedly weak data indicate that the contractual setting on the labor market may be important for the decision to externalize services in industry. The effect of a high unionization rate seems to deter rather than foster the purchase of services.

3.6   Economic growth and uncertainty

It has been argued that in periods of uncertain or slow economic growth externalization of services is more likely.[1] High uncertainty encourages firms to reduce investment in service functions that are less strategically essential to the firm. To test this argument the annual growth rate of industrial production and the variation in the annual percentage changes were compared with the change in services purchased as a share of turnover (see Table 9). Germany, France, the Netherlands and Belgium all have about the same growth rates and variation in the annual growth rates in the observed period. Still, those countries show widely varying tendencies in the development of total services received. The cost of services purchased increased in Germany and France but decreased in the Netherlands and was constant in Belgium. The two countries with the largest increase in the share of services received, Italy and the United Kingdom, show wholly opposite development of industrial production in the period studied, with a yearly increase of 2.1 % in Italy and a yearly decrease of 1.1 % in the United Kingdom. During the observed period the correlation is rather weak between the growth and fluctuation in industrial production on the one hand and externalization of services in manufacturing on the other.[2]

---

[1] Krolis (1986) refer to a number of studies advocating this view.

[2] The estimated equation is given in Table 10.

4   Summary and conclusions

In this paper the purchase of services by manufacturing firms was shown to vary largely between European countries. The internal production of services in manufacturing, measured by various proxies, did not seem to be higher in countries with low purchase of services on markets. This indicates that there is a difference in total service intensity between countries.

Many a priori convincing arguments have been suggested to explain manufacturing demand for services. In the paper we tested some of these hypothesis, e.g. concerning the effects of technological sophistication, firm size and organizational form, industrial relations on the labor market and economic growth. The explanatory power of each of these factors was found to be rather weak. One exception was industrial relations, where a negative correlation was shown between the unionization rate and the purchase of services. Some of the results are summarized in Table 10.

Thus, it seems that one has to resort to other than economic factors to explain the difference in service intensity between countries. Firstly, the statistics on services in manufacturing are far from satisfactory. This is especially crucial in an intercountry comparison. It is possible that some of the variation in service intensity between countries stems from differences in definitions and classifications. Some of the data for the explanatory variables are also rather weak. Secondly, manufacturing firms' demand for services may be affected not only by economic factors, but also by culture, tradition, attitudes etc. These factors are of course very hard to quantify. Hopefully further research can shed more light on the determinants of manufacturing demand for services.

APPENDIX

DEFINITIONS OF VARIABLES

Purchase of industrial services

This item includes the value, at actual cost incurred, but exclud-
ing deductible VAT, of all work which the enterprise has had done
by others on materials in its property, as well as sums paid to
others for other industrial services received, such as current work
on repair and maintenance, including that carried out on buildings
and accommodation rented out, installation work, technical
studies, etc., but not the value of installation work on fixed
assets and the value of major repairs.

Purchase of non-industrial services

This item includes expenditure made, excluding deductible VAT, by
the enterprise for non-industrial services received, such as, costs
for legal and accounting assistance, royalties for patents and
licences based on production (but not the value of buying, on a
permanent title basis, patents and licences, since this value forms
part of the non-material assets of the enterprise), insurance
premiums, expenditure for board and assembly meetings, contribu-
tions to professional organizations, postal, telegraph and telephone
charges, sums paid for the transport by others of own-made
goods, expenses incurred for the transport - made by others - of
salaried personnel between their residence and place of work,
advertising costs, commercial travelling expenses, travel and
subsistence expenses, fees and commissions paid to persons not
belonging to the declaring unit, bank charges, excluding interest
payments, information charges, amounts paid for leasing capital
goods, non-residential buildings and transport equipment.

Table 1   **Purchase of industrial and non-industrial services in manufacturing in various countries 1975 and 1983**

Percent of turnover

	1975			1983		
	Indust-rial services	Non-indust-rial services	Total services	Indust-rial services	Non-indust-rial services	Total services
Germany	3.0	9.1	12.1	3.4	9.6	13.0
France	5.6[a]	14.7[a]	20.3[a]	6.1	15.5	21.6
Italy	3.9	9.7	13.5	5.2[b]	10.9[b]	16.1[b]
Netherlands	3.9	9.2	13.1	3.1	8.6	11.7
Belgium	3.5	5.9	9.4	3.3[b]	6.1[b]	9.4[b]
United Kingdom	2.8	4.5	7.3	3.1	7.2	10.2
Denmark	2.7	7.5	10.2	2.9	8.7	11.6
Sweden	--	--	5.6[c]	--	--	6.5[b]

[a] 1977
[b] 1982
[c] 1976

Note: Definitions of industrial and non-industrial services are given in the appendix.

Source: Structure and activity of industry, annual inquiry, EUROSTAT.

Table 2 **Salaried employees in manufacturing in various countries 1975, 1980 and 1983**

Percent of total employment

	1975	1980	1983
Germany[a]	27,8	29.6	31.7
Italy[b]	34.4	35.8	--
Belgium[c]	--	29.3	30.3
United Kingdom[d]	27.9	30.6	32.1[e]
Denmark[f]	27.8	28.5	30.0
Sweden[g]	27.8	29.5	30.6

[a] local units of enterprise with 10 or more persons engaged 1975, with 20 or more persons engaged 1980 and 1983

[b] number of persons in enterprises with 20 or more persons engaged; number of salaried employees in enterprises with 50 or more persons engaged

[c] estimates derived from social security records

[d] all establishments

[e] 1982

[f] establishments with 6 or more employees

[g] establishments with 5 or more employees

Source: Industrial Statistics Yearbook, annual, Vol. 1, United Nations.

Table 3 Employment by occupation in manufacturing in various countries in the 1970s and 1980s

Percent of total employment

	APT (1)	Clerical (2)	Sales (3)	Service (4)	Total (1)-(4)	Other
Germany (1984)	12.8	15.6	4.9	2.1	35.4	64.6
Netherlands (1981)	14.4	13.3	4.9	2.4	35.0	65.1
Denmark (1984)	11.9	10.3	4.3	3.6	30.1	70.0
Sweden (1984)[a]	20.0	8.9	4.4	2.9	36.2	63.8
France (1978)	28.6	3.4	0.7	2.8	35.5	64.5
Italy (1978)	15.0	6.2	1.3	1.2	23.7	76.3
United Kingdom (1978)	13.4	11.9	2.3	3.3	30.9	69.0

[a] ISIC 2-4

Note: APT includes administrative and managerial, professional, technical and related workers. Other includes production and related workers, transport equipment operators and laborers, agriculture, animal, husbandry and forestry workers, fishermen and hunters. Workers not classified by occupation (Germany, Netherlands and Denmark) have been excluded.

Sources: Yearbook of labor statistics 1985, ILO, Geneva (Germany, Netherlands, Denmark and Sweden), Gershuny and Miles (1983), (France, Italy and United Kingdom).

Table 4   **Purchase of services in manufacturing in various countries with average and actual branch structure 1982**

Percent of turnover

	Average branch structure (1)	Actual branch structure (2)	Difference, (1)-(2)
Germany	13.0	13.0	0.0
France	21.1	21.4	-0.3
Italy	15.7	16.1	0.4
Netherlands	13.5	12.4	1.1
Belgium	10.0	9.4	0.6
United Kingdom	9.8	9.9	-0.1
Denmark	12.6	11.4	1.2

Note: Average branch structure is the weighted average of the countries branch structure with turnover in European Units of Account as weights. NACE 26 (man-made fiber industry) and 33 (manufacture of office machinery and data processing machinery) have been excluded, since no activity was reported in these branches in some of the countries.

Source: Structure and activity of industry, annual inquiry, EUROSTAT.

Table 5   **R&D expenditure in manufacturing in various coun-
tries 1975, 1979, 1981 and 1983**

Percent of value added

	1975	1979	1981	1983
Germany	4.1	4.9	5.4	--
France	4.0	4.3	--	--
Italy	1.5	1.4	1.7	1.8
Netherlands	4.0	4.8	5.6	--
Belgium	3.4	3.8	4.2	--
United Kingdom	4.4	4.8	6.6	--
Denmark	2.1	2.4	2.7	--
Sweden	4.1	5.5	6.3	7.4

Note: Nearest year depending on availability.

Source: OECD, Science and Technology Indicators, No. 2, R&D,
Invention and Competitiveness.

Table 6   **Employment and value added by size of enterprises in manufacturing in various countries 1981**

Percent

	Number of persons employed			Value added at factor cost		
	20-99	100-499	500-	20-99	100-499	500-
Germany	14.7	24.6	60.7	12.5	22.5	65.0
France	19.7	25.4	55.0	17.1	22.8	60.1
Italy	24.3	29.1	46.6	22.9	30.1	47.0
Netherlands	28.1	32.0	40.0	24.4	31.8	43.8
United Kingdom	15.3	28.6	56.1	12.3	26.6	61.1

Note: Enterprises have been classified in size groups according to the number of employees. Manufacturing include NACE 12, 14, 152, 2-4 excl 21 and 23.

Source: Structure and activity of industry, data by size of enterprises 1981, EUROSTAT 1986.

Table 7   **The five, ten and twenty largest manufacturing firms in various countries 1983**

Percent of manufacturing employment

	Five largest firms	Ten largest firms	Twenty largest firms
Germany	10.8	16.5	21.6
France	11.5	17.1	--
Italy	13.6	15.3	--
United Kingdom[a]	10.6	16.8	25.5
Sweden	21.6	36.2	46.4

[a] Shell and Unilever not included

Source: Fortune, statistics put together by Jagrén (1987).

Table 8   The proportion of the top hundred nonfinancial
           companies with multidivisional organisation form in
           various countries 1970

Percent

	Caves (1980)	Steer (1973)	Cable and Dirrheimer (1983)
	1970	1970-72	1970
Germany	55	--	50
France	54	--	43
Italy	48	--	26
United Kingdom	72	68[a]	--

[a] Based on 200 companies, of which 9.2 percent were classified
as uncertain

Sources: Caves (1980), calculated from Table 1 based on
Thanheiser (1972) Germany; Dyas (1972) France; Pavan (1972)
Italy; Channon (1973) United Kingdom. Steer (1973) reported in
Cable and Yasuki (1985). Cable and Dirrheimer (1983) based on
Dyas and Thanheiser (1976) and Chandler and Daems (1980).

Table 9   Industrial production and purchase of services in manufacturing in various countries 1975-83

	Annual change in industrial production	Standard deviation of annual change in industrial production	Total change in services purchased as a share of turnover
Germany	1.7	3.5	0.9
France	1.4	4.1	1.3[a]
Italy	2.1	5.7	2.6[b]
Netherlands	1.7	2.8	-1.4
Belgium	1.9	3.6	0.0[b]
United Kingdom	-1.1	3.7	2.9
Denmark	3.1	3.4	1.4
Sweden	0.1	3.7	0.9[c]

[a] 1977-83
[b] 1975-82
[c] 1976-82

Sources: Industrial Statistics Yearbook, annual, Vol. 1, United Nations and Structure and activity of industry, annual inquiry, EUROSTAT.

Table 10   **Estimated equations for purchase and change in purchase of services in manufacturing**

	Purchase of services 1983		Change in purchase of services 1975-83
Constant	18.13 (4.73)	21.26 (3.26)	-2.67 (1.84)
R&D expenditure	-1.22 (0.97)	--	--
Unionization rate	--	-0.17 (0.06)	--
Annual change in industrial production	--	--	-0.40 (0.31)
Standard deviation of annual change in industrial production	--	--	0.12 (0.47)
$\bar{R}^2$	0.08	0.51	0.42
DW	1.45	2.45	1.51

Note: The models have been estimated by OLS. Standard errors in parenthesis.

Figure 1   **Purchase of services in manufacturing in various countries 1975–83**

Percent of turnover

Purchase of service
in percent
of turnover
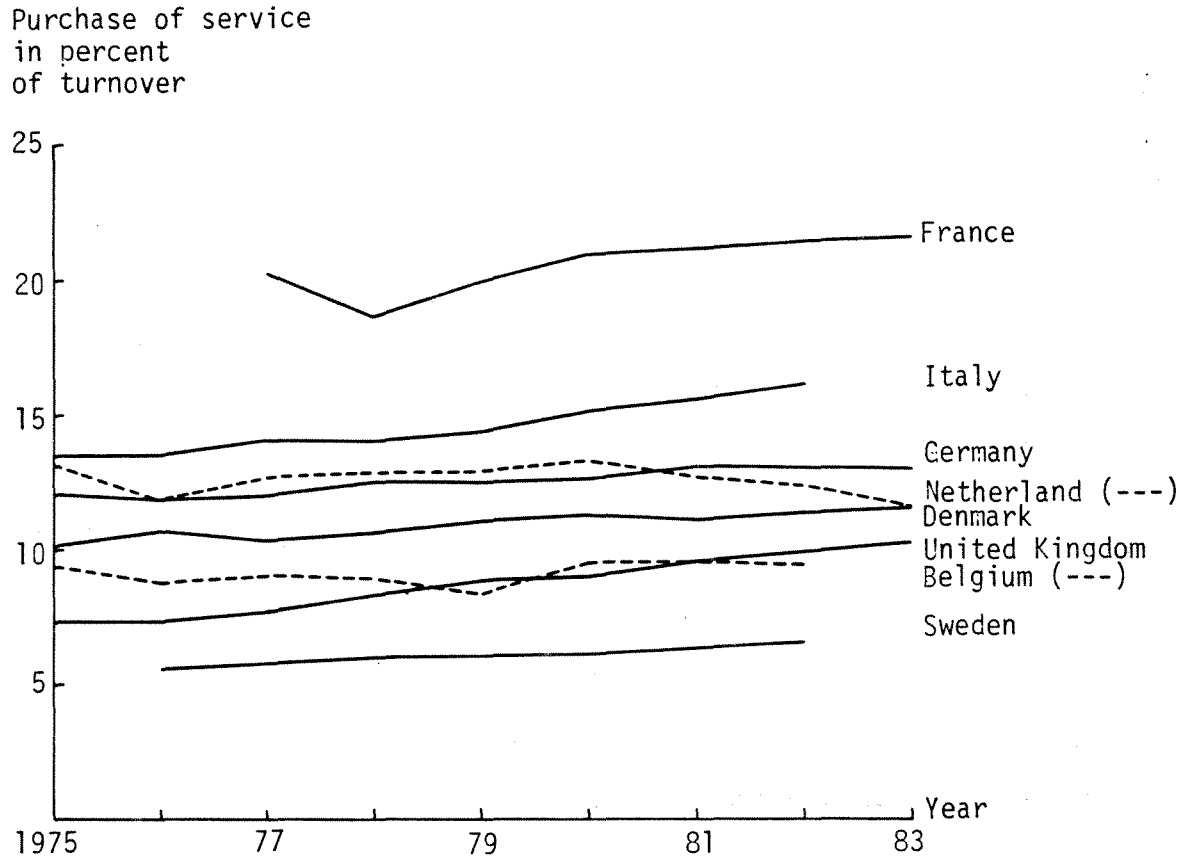
Source: Structure and activity of industry, annual inquiry, EUROSTAT.

Figure 2   Unionisation rate and purchase services in manufacturing in various countries 1983

Unionisation

▽ Germany   ● Belgium

✳ France   ■ United Kingdom

□ Italy   ▲ Denmark

△ Netherlands   ○ Sweden
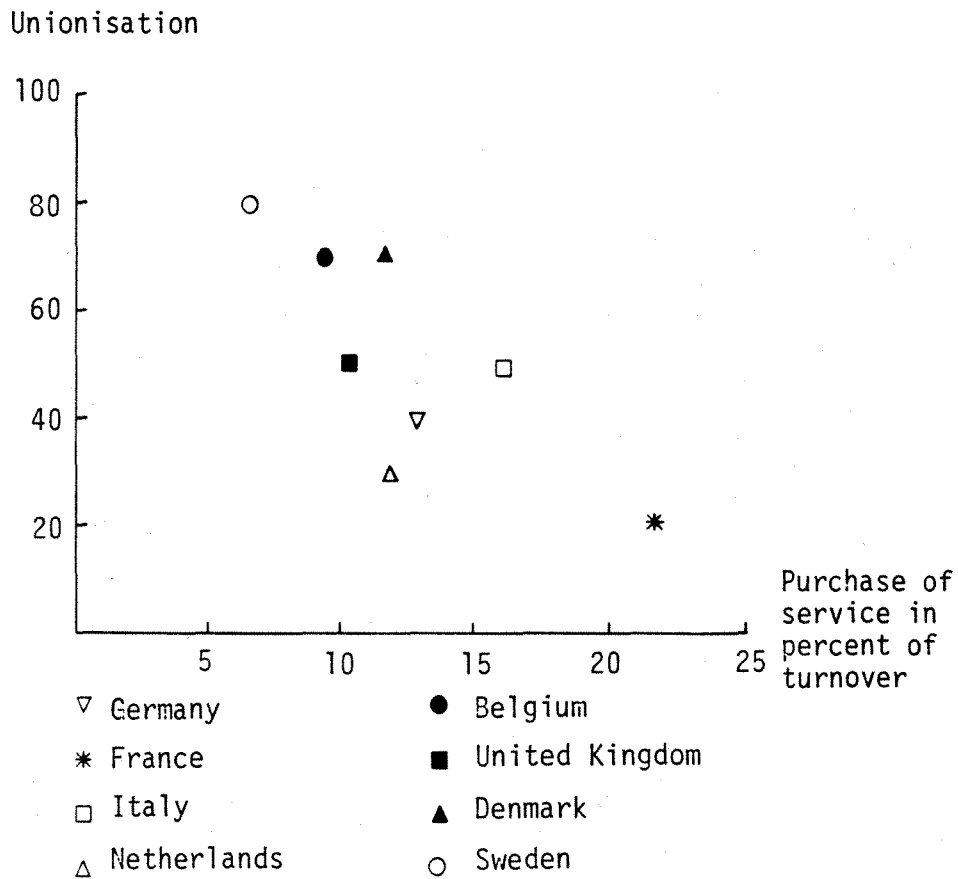
Sources: Unionisation rate, Bratt (1982); purchase of services, Structure and activity of industry, annual inquiry, EUROSTAT.

REFERENCES

Armour, H.O. and Teece, D.J., 1978, "Organizational Structure and Economic Performance: A Test of the Multidivisional Hypothesis", Bell Journal of Economics and Management Science 9, No. 1.

Bratt, C., 1982, Labor Relations in 17 Countries, Swedish Employers' Confederation, Stockholm.

Cable, J., and Dirrheimer, M.J., 1983, "Hierarchies and Markets: An Empirical Test of the Multidivisional Hypothesis in West Germany", International Journal of Industrial Organization 1, No. 1.

Cable, J., and Yasuki, H., 1985, "Internal Organisation, Business Groups and Corporate Performance: An empirical test of the multidivisional hypothesis in Japan", International Journal of Industrial Organization 3, No. 4.

Caves, R.E., 1980, "Industrial Organization, Corporate Strategy and Structure", Journal of Economic Literature 18, No. 1.

Chandler, A.D., 1977, The Visible Hand: The Managerial Revolution in American Business, Harvard University Press.

Chandler, A.D. (ed.), 1981, Managerial Hierarchies, Harvard University Press.

Chandler, A.D. and Daems, H., 1980, Managerial Hierarchies, Harvard University Press, Cambridge, M.A.

Channon, D.F. 1973, The Strategy and Structure of British Enterprise, Macmillan, New York.

Dyas, G.P., 1972, The Strategy and Structure of French Industrial Enterprise, Unpublished D.B.A. thesis, Graduate School of Business Administration, Harvard University.

Dyas, G.P. and Thanheiser, H.T., 1976, The emerging European Enterprise, Macmillan, London.

Eurostat, annual, Structure and Activity of Industry, Statistical Office of the European Communities, Luxembourg.

Eurostat, 1986, Structure and Activity of Industry: Data by Size of Enterprises 1981, Statistical Office of the European Communities, Luxembourg.

Gershuny, J. and Miles, I., 1983, The New Service Economy, Frances Pinter, London.

ILO, annual, Yearbook of Labor Statistics, Geneva.

Jagrén, L., 1987, "Företagens tillväxt i ett historiskt perspektiv", in Eliasson G. et al., Expansion, avveckling, företagsvärdering, IUI, Stockholm.

Krolis, H.P., 1986, Producer Services and Technological Change: The Internalisation Issue, Science Policy Research Unit, Research Centre for Urban and Regional Planning TNO, the Netherlands.

OECD, 1986, Science and Technology Indicators - R&D, Invention and Competitiveness, Paris.

Pavan, R.J., 1972, The Strategy and Structure of Italian Enterprise, Unpublished D.B.A. thesis, Graduate School of Business Administration, Harvard University.

Petit, P., 1986, Slow Growth and the Service Economy, Frances Pinter, London.

Pousette, T. and Lindberg, T., 1985, Services in Production and Production of Services in Swedish Manufacturing, IUI Working Paper No. 148, Stockholm.

Stanback, T.M., Bearse, P.J., Noyelle, N.J. and Karasek, R.A., 1981, Services: The New Economy, Allanheld & Osmun, New York.

Steer, P., 1973, "An Investigation into the Managerial Organisation of Firms", Mimeographed.

Thanheiser, H.T., 1972, Strategy and Structure of German Industrial Enterprise, Unpublished D.B.A. thesis, Graduate School of Business Administration, Harvard University.

United Nations, annual, Industrial Statistics Yearbook, Vol. 1, General Industrial Statistics, New York.

Williamson, O.E., 1981, "Emergence of the Visible Hand", in Chandler, A.D. (ed.), Managerial Hierarchies, The Free Press - Macmillan, New York.