Internationalization and the demarcation between services and manufactures. Theoretical and empirical analysis

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1. Introduction

Most economic and social changes of the last two decades have their roots in two main developments: (1) the increased degree of international integration worldwide; and (2) the introduction of new technologies particularly the information and communication technologies (ICTs). These two developments are interconnected in that the globalization process could not have taken off without the ICTs. Moreover, the rate of diffusion of the new technologies is greatly enhanced by the economic forces behind the globalization process and in particular by the activities of the transnational companies (TNCs).

These developments have profound effects on a variety of economic and social elements including the introduction of new products and processes, the need for new skills, the development of new forms of organisation of production within firms and industries and of stronger linkages between products and between industrial sectors. This paper is concerned with the latter effect and in particular with the analysis of how internationalisation and innovation interact with the demarcation between services and manufactures.

Demarcation and taxonomy in general are theory-driven and this is true also in the case of the demarcation between services and manufacturing. In our case the issue is now further complicated by the impact that the new technologies are having on the nature of products and their relationship with each other, the production processes and the organization of production in time and space.

The chapter will briefly consider two main demarcation criteria based on the tangibility of the products and on the productivity of the sectors, in sections two and three respectively. It will examine issues arising from the demarcation criteria, particularly those related to innovation and to internationalisation. Section four analyses the implications of these developments for the international division of labour. The paper will then go on to consider different theoretical frameworks for the analysis of internationalisation and will introduce two specific indices (section five and six). This is followed by an empirical study which assesses the degree of internationalisation of manufactures versus services as it emerges from the direct activities of the world’s largest transnational companies (section seven). The last section will be on implications and conclusions.
2. Demarcation criteria and their implications: tangibility

The most used demarcation criterion for manufacturing and services is related to a characteristic of the product: its tangibility or materiality (Grubel, 1987; Enderwick, 1992; Clegg, 1993). There are several reasons why this characteristic has analytical and practical relevance, and in particular the following ones. Unlike material products, immaterial ones cannot be stored and thus their transferability in space and time, is impaired. This has implications for the tradability of products and for firms’ strategies on how to meet demand in space and time. It has also implications for the space and time relationship between producers and consumers or ‘providers’ and receivers’ of services: the extent to which they have to be in the same place and at the same time and if so who is to move and where (Stern and Hoekman, 1987; Sapir and Winter, 1994; Roberts, 1998).

Not everyone is happy with the demarcation criterion based on tangibility. In particular, Hill in a widely cited paper (1977) defines a service not in relation to its immateriality but in relation to what it does to the receiver be it a person or a good. This definition is effect-centred rather than product-centred and focuses on the interactivity between producer and consumer. It therefore overcomes the problem of material versus immaterial component of a product. Hill writes (p.318): “A service may be defined as a change in the condition of a person, or of a good belonging to some economic unit, which is brought about as a result of the activity of some other economic unit, with the prior agreement of the former person or economic unit”.

Moreover, the characteristic of materiality does not necessarily provide such a strong clear-cut case for demarcating between manufactures and services for various reasons. First, because most immaterial products involve elements of material ones for their full delivery either as part of the production process or as part of the final product. The production process leading to a service always involves material products: buildings where the service takes place; scissors for the hairdresser to cut my hair. The final product is very likely to have both a good and service component (Gray, 1990 and Grubel 1987): food to be served in a restaurant; paper (book) to embody the result an intellectual effort; computers for the financial analyst; discs to embody software or music. This means that it is not easy to disentangle the contribution of the material from the immaterial component in the final product. In other words, there is a strong complementarity between manufacturing and service products.

Moreover, in terms of organisation of production, any firm which is classified as manufacturing (or service) will be heavily involved in services (or manufacturing) products as well. Because all firms – no matter what the nature of their final product is – need business services as well as material products such as offices, vehicles and computers.

Nonetheless, in service products we do have a full or partial element of intangibility and its implications for tradability in time and space (including tradability across frontiers) are huge: immaterial products cannot be stored and sold at a different time or in a different location. They therefore exhibit less flexibility in the mode of delivery and in the timing of supply to meet demand.

Traditionally, this characteristic had two major implications one for technical progress and one for internationalisation. On the first one, Bhagwati (1984) developed an analysis of how technical progress has often led to the ‘splintering’ of goods from services. In his view, the ‘progressive’ part of the old service would be incorporated in a material product leaving behind a reduced and ‘unprogressive’ service. Material
products embodying traditionally immaterial services, have often been developed in order to achieve storability and flexibility of delivery in time and space; examples include records and record players.

As regards the organisation of production across space, the immateriality of the product makes it impossible to store and transport it to other locations including other countries. Conventional exports and imports are not possible given the nature of the product. This means that foreign demand must be met either by the consumers moving to the production location or by production being moved where the consumers are. The latter may involve direct production in another country by the original producers - foreign direct investment – or through an intermediary via licensing and franchising.

This picture sees services as the cinderella in the innovation field: they are lagging behind manufactures and they are seen as unprogressive unless they can be incorporated into a material product. However, the information and communication technologies are dramatically changing this picture for a variety of reasons.

First, the ICTs have increased the services content of production in all the sectors of the economy and are further blurring the distinction between manufacturing and services. Manufacturing products are becoming more service intensive and service output is becoming more manufacturing intensive (Miles, 1993, Nayyar, 1988 Kitson and Michie, 1996). In particular, because both goods and services needs the services of computer specialists as well as the hardware and infrastructure required by the ICTs. Thus manufacturing and services are acquiring a stronger complementarity characterised by new qualitative elements in which the ICTs are increasing the scope for linkages between products as well as sectors. It also increase the scope for the diffusion of innovation between industries (Tomlinson, 2001).

Second, the ICTs are giving scope for further splintering of goods from services (to use Bhagwati’s terminology): information-intensive services can be embodied in a compact disc which can then be supplied to consumers spatially located elsewhere from the producer. Third and most relevant, is the fact that the ICTs are also creating a new mode of delivery for information-intensive products: an electronically transmittable mode which eliminates completely the space and time constraints. These effects of innovation have considerable implications for internationalisation and I will go back to this issue in section four.

3. Demarcation criteria and their implications: productivity

The other main demarcation criterion between manufacturing and services is based on the contribution that the two major sectors of the economy make to the performance of the economy via their contribution to employment, development and growth.

Traditionally, manufacturing was considered to have wider scope for technical progress which resulted in higher levels and growth rates of productivity in manufacturing (Verdoon, 1949, Kaldor, 1967) compared to agriculture and services. Indeed, this was the reason for the current sectoral taxonomy as originally developed in the works of Fisher (1939) and Clark (1940). The sectoral structure of production developed by economists was linked to the employment potential and to the process of development. The traditional taxonomy therefore reflected the underlying theory behind the explanation of development and employment potential.

Is this traditional taxonomy still appropriate in the era of ICTs? Is the demarcation manufacturing versus services the best one to capture the contribution of industries and sectors to the economic performance of countries?
Three major elements due to the ICTs are creating the need to rethink this traditional Fisher-Clark sectoral taxonomy. First, the wider scope for increased complementarity between manufacturing and services mentioned in the previous section. Second, the fact that the introduction of new technologies goes hand-in-hand with changes in the organisation of the production process in all industrial sectors and that indeed organisational as well as technological changes contribute to the performance of various industries.

The third element and probably the most important one is the actual and potential contribution that the widespread use of ICTs can make to productivity and growth. Before I consider this issue a word on the problem of the ICTs and the productivity changes.

There is a prima facie expectation that the widespread use of information and communication technologies (ICTs) would affect the productivity of both manufacturing and services. However, until recently there has been no conclusive evidence about the effects of ICTs on productivity. Some literature has pointed out that even in countries with high ICTs intensities, productivity does not appear to have increased substantially and/or throughout many industries. In 1987 Robert Solow while discussing the slowdown in productivity world wide, came out with his now famous paradox: “You can see the computer age everywhere but in the productivity statistics.” (p. 36).

Scepticism is shown, more recently, also by Gordon (2000) who maintains that increase in productivity outside the production of computers is very limited and destined to remain so because the human factor – necessary for the analysis of problems and results - causes diminishing returns even in the face of exponentially increasing computer power.

However, in spite of these sceptical positions, evidence of increased productivity is now beginning to come through at a fast pace. Tomlinson (2001) reviewing several empirical studies, reports a "...highly significant relationship between value added, gross output and productivity and the value of knowledge-intensive business services purchased by each sector after taking into account labour and capital." (p. 102-3). He refers to knowledge-intensive business services (KIBS) rather than the ICTs. However, these services are very ICTs-intensive.

There is evidence also from work specifically related to the ICTs. In particular, Oliner and Sichel (2000) find that the contribution to output and productivity growth (in the US non-farm business sector) of computer production and of the use of information technology (which includes computer hardware, software, and communication technology) was very low in the early 1990s. However, it appears to have become very substantial in the second half of the decade. Indeed, on the basis of their empirical results, the authors estimate that: “...information technology accounted for about two-thirds of the step-up in labor productivity growth between the first and second halves of the decade.” (p. 21). They predict a continuation of this performance in years to come particularly as the productivity gains from e-commerce are also likely to come on stream. Oliner and Sichel’s conclusion highlights the discrepancy between short and long run results. This has both an empirical and a theoretical basis.

Dalum et al. (1999) point out that the nature of ICTs require profound and widespread changes in the economy and society. This means that the full impact – including large and widespread increases in productivity - requires a considerable degree of adaptation and developments in society. Longer time may therefore be needed for the full impact to be felt.
Brynjolfsson and Hitt (2000), in an empirical micro study, stress the relevance of organisational changes and training for the full positive impact of the ICTs on productivity to be felt. Their firm-level studied point to “…organizational complements such as new business processes, new skills and new organizational and industry structures as a major driver of the contribution of information technology.” (p. 45). All this involves the firms in extra expenditure in the short-run in order to implement the necessary organisational changes and training programmes as well as meet the cost of hardware. However, it brings large productivity gains in the long run. The authors also stress the possible lack of consistency between micro and macro data on productivity and the need to concentrate on micro studies to get the full picture. The increased productivity and growth potential are brought about by the ICTs for a variety of reasons including: reduction in costs per unit of output; increased investment opportunity; facilitation of complementary innovation across firms and industries (Brynjolfsson and Hitt, 2000)8.

Thus several authors stress the positive effects of the ICTs on productivity. However, the introduction of organisational changes alongside the ICTs seems to be a necessary condition for reaping the full productivity effects. In the pre-ICT era organizational changes at the firm and industry levels were part and parcel of technological changes whether brought about by economies of scale (Bhagwati, 1984; Stigler, 1951) or by the desire to cut down market transaction costs (Coase, 1937; Williamson, 1975 and 1981). In the new technological environment, organizational changes are seen as necessary as technological ones in order to gain increases in productivity. The combination of technological and organisational innovation takes time and therefore productivity improvements may have longish lags in relation to the introduction of the new technology. This explains why the growth in productivity appears to be significant only from the mid-1990s onwards.

The strong and increasing role of the new technologies in the production processes means that high levels and growth of productivity are increasingly more likely to be linked to the intensity of use of such technologies whether they occur in the production of goods or services: productivity growth may no longer be the prerogative of manufacturing only9, therefore the scope for analyses of development and growth based on the Fisher-Clark sectoral demarcation can be called into question. A new demarcation based on technology intensity (Preissl, 1995) and usage that cuts across the manufacturing versus services divide may become more appropriate for the analysis of development, growth and employment potential in the twenty first century.

4. A ‘new international division of labour’ for the electronic age?

The effects of the ICTs on productivity are bound to have considerable impact on the companies’ competitive advantages as well as on countries’ comparative advantages and thus on the pattern of international specialisation.

In the pre-ICT era, developing countries were ‘specialising’ in primary products though there were manufacturing pockets linked to low-skills and labour-intensive processes. The new technologies are bringing about a new phenomenon albeit at a small level of development as yet: the location of some specific skills intensive components in developing countries.

Section two considered the introduction of e-transmission as a way of trading information-intensive services. This is indeed also a completely new internationalisation mode as the service can be transmitted electronically within and
across borders. This new mode can be used to trade final products (for example to deliver a final report or music) or it can be used to transmit component(s) of a service that can be further processed in the different location – within the same country or abroad – and returned electronically to base.

Why would a firm want to have part of the product processed in other location(s)? There are two main reasons: (1) in order to use labour which is skilled though cheaper than in the main production location; (2) in order to access specific highly skilled labour which is unavailable in the main production location. Either of these two reasons apply within and across nation states. Many developing countries have pockets of skilled labour which can be bought at much cheaper rates than the corresponding ones in developed countries: they range from accountants to software engineers to data and text processors to copy editors.

This creates incentives for splitting the production process of many services into discreet components, some of which can be downloaded and processed by pockets of skilled specialists in developing or intermediate countries. The organisation of production within and across countries will therefore be done in accordance with the skills requirement of components and the availability and costs of purchasing such skills on the labour markets of the world.

We see here an application of the principles of ‘new international division of labour’ (NIDL) put forward in the 1970s and early 1980s (Frobel et. al. 1980). According to this theory the interests and activities of TNCs lead to new developments in the production process by which the product would be divided into several components according to the skills required. The components requiring low skills would be located in developing countries – often in export processing zones – and those requiring high skills would be located in developed countries. One consequence of this NIDL is the increase in international trade as components are moved from country to country. Such trade would often be intra-industry as well as intra-firm as the components belong to the same industrial category as the final product and are transferred internally to the firm though across frontiers.

A similar pattern is now developing for many services or services components of goods - because of the new technologies. We could be talking of an electronic-age ‘new international division of labour’ (E-NIDL) in which the ICTs allow increased scope for the conditions which led to the NIDL. In the E-NIDL the scope for division of the manufactured products into appropriate components is still applicable. However, to this we must now add the scope for division of services into components some of which can be transmitted electronically for further processing in other locations. Thus the E-NIDL comprises two elements: a manufacturing element to which the NIDL applies and a service element to which the e-transmission mode applies.

There are many similarities and differences between the NIDL and the E-NIDL. Both originate through the activities of TNCs; both involve division of the production process into discreet components and an appropriate organisation of production within and across countries; both involve activities in developed and developing countries; both impact on the international division of labour and on trade; both are likely to give rise to intra-firm and intra-industry trade.

However, there are also some major differences. The NIDL refers to manufactures while the E-NIDL applies to services or services components of manufactures. The scope for internationalization increases in the E-NIDL as new forms and modes (through e-transmission) are added in the E-NIDL to the traditional imports and exports of the NIDL. In the NIDL the division of the production process
into various components is done in such a way as to allow the utilisation of cheap unskilled labour. In the E-NIDL, the strategic element in the design of the production process for services is the utilisation of cheap skilled labour. Pockets of such labour can, in fact, be found in developing or intermediate countries (such as India or Ireland) at much lower rates than in developed countries.

Though stress is laid here on the international division of labour, some of the points made are more general and apply to the spatial division of labour. They therefore apply to regions – within nation-states – as well as between nation states. Thus, for example, the new technologies allow the location of call centres in places within the nation-state spatially separated from the headquarters of the business or its main production location(s).

Many of the developments mentioned in this section are still at an early stage. Nonetheless we already see some clear signs now: pockets of specialisation in relatively high skills are to be found in Singapore (financial services) in India (software) and Brazil (engineering) (Miozzo and Soete, 2001). Scotland and the north of England seem to have the lead on UK call centres. The rapid diffusion of the new technologies and the coming on stream of the full effects of these developments are likely to increase their relevance in the years to come.

5. The internationalisation of services versus manufactures

The introduction and widespread use of new technologies together with the existence of other favourable conditions (John et al. 1997; Dicken, 1998) have led to a tremendous increase in internationalisation for all the sectors of the economy and in all its aspects and modes. This by itself has produced a bandwagon effect on services particularly from the 1980s onwards (Mallampally and Zimny, 2000).

So, how internationalised is the service sector compared to manufacturing? Before we can begin to tackle this question we need to clarify two conceptual issues. First, the fact that, ideally, the assessment of the degree of internationalisation should take account of the different modes of reaching foreign customers. These range from: production abroad directly via FDI or indirectly via franchising and other contractual arrangements; exportation of services embodied in material goods such as CDs; movements of the customers to the producer’s country as in tourism; delivery via the temporary movement of expert labour; and electronic transmission.

Second, the spatial/cross-countries dimension in the assessment of internationalization. At the micro level, this is usually conceptualised as the degree to which companies’ activities are located abroad rather than at home. In this framework indicators of internationalisation assess the degree of foreign projection of the company’s activities, whichever of the activities are considered and indeed whether a single activity and variable or several. The indicators are usually constructed as ratio of foreign to total (foreign and domestic) activity. This is the approach taken in most indicators of internationalization whether seen as a single element/variable or as multi-elements/variables (Dunning and Pearce, 1985; Sullivan, 1994; UNCTAD, 1995). In this approach we get the same degree of internationalization (for the firm and or activity) whether the foreign activity takes place in one, few or many foreign countries.

A different way of looking at internationalization is to consider the geographical extensity of operations specifically in terms of number of nation-states in which production or sales or business activities in general take place. This conceptualisation sees the degree of geographical spread of activities into the various
foreign countries as a relevant element in assessing the degree of internationalization (Ietto-Gillies, 1998 and 2001: ch. 4; Palmer, 2001). The theoretical relevance of this approach stems from the key role played by the nation-state(s) in the decisions of transnational corporations (TNCs).

There are several dimensions to producing in different countries. First, the purely geographical/spatial dimension and therefore the spatial distance between business points, be they plants or production sites in relation to markets or in relation to suppliers or distributors. This is a question of spatial distance and transportation costs and it applies almost equally between and within frontiers. There is also a cultural dimension in which the distance tends to be greater between nation-states though this is not always the case. Third, there is a regulatory dimension linked to the fact that different nation-states tend to have different ‘regulatory regimes’ by which I mean a set of specific regulations which apply to people, firms, institutions within the borders of the nation-state. Some of these regulations stem from the legal or institutional system, some from government policies.

Different nation-states are characterised by different regulatory regimes. Within each nation-state the same – or more uniform – set of regulatory regimes tend to apply. Do companies benefit from operating across different regulatory regimes over and above any advantages they may have of operating in different geographical locations and thus over and above any advantages deriving from the efficient use of resources available in each location?

There may indeed be extra benefits from operating across different regulatory regimes. These benefits can derive from three sources: (1) enhanced scope for the manipulation of transfer prices and thus for taking advantages of different tax and currency regimes; (2) spreading of risks linked to the political situation in different countries; and (3) strong bargaining power towards governments and labour. In particular taking advantage of different labour regimes, i. e. of the fact that labour can organise itself more easily within nation-states than across them.

A strategy of wide locational network of production diminishes the risks of production disruptions through industrial action. Moreover, and most important, it also fragments the labour force employed by the same company as labour is, on the whole, unable to organise across different countries. Such a strategy may, therefore, diminish the bargaining power of labour compared to a situation in which all or most of the company’s production is located within one or few countries (Cowling and Sugden, 1987; Peoples and Sugden, 2000; Ietto-Gillies, 1992: ch. 14; 2000 and 2001: ch. 6). A wide network spread of direct activities may also give credibility to any threat of relocation of production. It can therefore be used also when bargaining with governments for special incentives designed to attract inward investment.

The difficulties faced by labour in organising across nation-states are in stark contrast with the transnational companies’ position: the TNCs are able to plan, organise and control production activities across nation-states: this is what the TNC is about.¹¹

Any strengthening of the company’s bargaining power towards labour and/or governments is likely to have also positive effects on its power towards rivals. However, there are also costs associated with a strategy of locational spread in terms of possible missed economies of scale as well as higher managerial and organisational costs (Hymer, 1960 published 1976).

A strategy of spread of direct activities by host country may also bring advantages of knowledge acquisition and diffusion¹². It can be knowledge about markets and production conditions to be utilised for future direct investment plans or
for alternative modes of organisation of production. Moreover, the knowledge acquisition may lead to innovation processes of both organisational and technological types. There are knowledge spillovers internal to the firm, within and across countries as well as within the industry in the countries where the TNCs operate (Cantwell, 1989 and 1995).

Is there an *a priori* link between internationalisation mode and the cross countries dimension of internationalisation just discussed? There are some. Whether we accept a relationship of substitution or complementarity between trade and FDI (Cantwell, 1994; Ietto-Gillies, 2001: ch 2), the cross-countries network extensity may tend to be the same for exports and FDI. Nonetheless, in the case of substitution in the relationship, there is a linear time sequence and therefore the extensity is not contemporaneous, while in the case of complementarity it is.

The e-transmission mode for information intensive services makes it theoretically possible to reach users in a very large number of countries and therefore increase the scope for geographical network spread of internationalization. Moreover, the new mode of delivery may pave the way for full FDI and thus the dynamic sequence export and FDI could be replaced by e-transmission and FDI. For example, a positive experience with the processing of downloadable products from US or UK to Ireland, may lead the investing TNCs to expand their activities in Ireland and thus may lead to further FDI by the same companies or indeed by others.

6. Indices of internationalization

The rest of the paper will present an empirical study that attempts a comparative assessment of the degree of internationalisation of the world’s largest TNCs operating in services and/or manufacturing. Two indices are developed and estimated corresponding to the two approaches to the cross-countries dimension discussed in the previous section. The assessment refers to one mode only: the direct production abroad mode for which we have a reasonable amount of information on the two approaches.

The first index is designed to assess the *degree of foreign projection* of the company and is constructed as the percentage of direct linkages abroad in relation to the total number of direct linkages (domestic and foreign). The linkages refer to total affiliates which include subsidiaries (with an ownership stake of at least 50 percent) and associates (with a stake of between 10 and 50 percent).

\[\text{Ii} = \frac{\text{FA}}{\text{TA}}\]

Where:
- \(\text{Ii}\) = Internationalization index
- \(\text{FA}\) = Foreign Affiliates
- \(\text{TA}\) = Total Affiliates

This index assesses the propensity of the company to operate away from the home country. For any random direct linkage (be it affiliate or subsidiary) of a company, the index assesses the probability that it is located abroad.

The second index used, the Network Spread index (NSi) is designed to take account of whether the company operates abroad in few or many countries and thus to assess the *degree of spread* of direct activities among the various countries of the
world. The index is developed in Ietto-Gillies (1998)\textsuperscript{14} and is arrived at as follows. Let:

\begin{align*}
n & = \text{the number of foreign countries in which the TNC has direct linkages} \\
n^* & = \text{the number of foreign countries in which, potentially, the company could have located direct linkages.} \\
NSi & = \frac{n}{n^*} = \text{Network Spread index}
\end{align*}

Theoretically, \( n^* \) could include all the countries of the world; in practice I have taken it to be the number of countries, world-wide, which have been in receipt of foreign direct investment. This is, in fact, taken as a willingness on the part of the host country to accept inward FDI and therefore as a real possibility for the companies to invest there. I have, therefore, taken \( n^* \) to be the number of countries in which there is inward stock of FDI minus one, in order to exclude the home country of the TNC. From the data in UNCTAD, DTCI (1997: Annex, table B.3 and 2000: Annex, table B3) \( n^* \) is equal to 178 for 1997. The actual value of \( n^* \) is not very relevant because the analysis which we shall be making is based on comparison of the index between countries and sectors and the actual scale of the index is not relevant. I shall also give the value of \( n \) that is the actual number of foreign countries in which the companies have direct linkages.

In our empirical work both indices are expressed as percentage. Thus the Network Spread index measures the percentage of foreign countries in which the TNC has direct linkages in relation to the total number of foreign countries in which, potentially, it could have located affiliates. Given any randomly selected country - from those that are in receipt of world FDI - the index assesses the probability that the TNC under consideration may have located direct activities in it. The Network Spread index focuses on the spread of activities into many foreign countries and not on the “foreignness” only, as in the Internationalisation index.

Two data sets were used for the study: (a) the list of the world’s 1000 largest companies by market capitalisation published in Business Week (BW) and (b) the information on the companies’ ownership trees from Dun and Bradstreet’s \textit{Who owns Whom}, (1997) (WoW). The BW list also provides information on the home country of the company and the industry classification within which it operates. The 664 companies selected are those with the following characteristics; they are the ultimate companies and have subsidiaries in at least one foreign country\textsuperscript{15}.

7. The results for the world’s largest TNCs

The empirical work\textsuperscript{16} presented in tables 1, 2 and 3 groups the companies according to whether they belong to the manufacturing or services sectors following the companies’ sectoral allocation in \textit{Business Week}.

Table 1 gives the number and percentages of companies by home country and major sector. It shows that by far the biggest number of the world’s largest TNCs are in manufacturing: 410 or 61 percent.

As regards the countries participation to the 664 TNCs, the US has by far the largest number (259 or 39 percent). Japan follows with 122 (18 percent) companies and the UK with 88 (13 percent). The latter country’s high participation is quite remarkable given the size of its domestic economy. These three countries are represented in most industries both in services and manufacturing (table 2 first three rows).
Manufacturing TNCs figure in all the listed countries, while services figure in all the countries but two: Norway and Finland. However, within services, two industries (banking and telecommunications) are in the portfolio of most countries. This is the case for only one sector in manufacturing (energy sources), if we ignore multi-industry which is by its nature a hybrid and therefore likely to include both manufacturing and services industries.

Tables 3 gives the values and ranking for the two indices discussed in section six and for the various industries within manufacturing and services respectively. The manufacturing sector exhibits the highest values for the two indices: 58.4 for the Internationalisation index (Ii) and 14.3 for the Network Spread index (NSi), against 43.9 and 9.6 respectively for services.

The following patterns emerge for manufacturing. The industries with high foreign projection and with spread of activities in a very large number of countries are mainly those in consumer products: data processing and reproduction; electrical and electronic products; appliances and household durable; food and household products; health and personal care products. The inference from these results is that in these industries internationalisation is driven by market-seeking strategies on the part of the companies.

Low levels for both indices are shown by: utilities; forest products and paper; metals; aerospace and military as well as construction and housing. These are all industries for which production is very location-specific and the location is mainly the home country with a few foreign ones. A variety of reasons are likely to lead to these results ranging from: resource-seeking strategies (forestry and metals) to political (aerospace and military) to the competitive advantages of the home countries’ own firms for the construction industry which tends to be dominated by medium and small local firms.

Some industries have a high foreign projection (high Ii) but the foreign activities tend to be concentrated in a few foreign countries. They tend to be industries producing machinery and equipment (electrical components and instruments; industrial components; textile apparel). Gold mines activities figure as high on foreign content because the companies involved in them operate from countries other than the ones where the mines are located. On the other hand the number of countries where mines are located is very low which explains the low level of NSi (3.4 percent).

Thus the results are the outcome of companies’ strategies; the distribution of ownership of resources by country of origin of the TNC; the TNCs’ advantages vis-à-vis local firms; political/military considerations.

What about the pattern for the corresponding results for services? Table 3 shows high levels for both indices in the following industries: transportation (shipping and airlines); business and public services and wholesale and international trade as well as banking and insurance. All these are consumer products or have a high level of consumer product elements. They therefore exhibit the pattern of internationalisation strategies that are market-seeking.

Low levels for both indices are shown by the following service industries: transportation by road; leisure and tourism; merchandising; telecommunications; and real estate. These are industries which are very location-specific and tend to be bound to the domestic arena. The exception is leisure and tourism for which internationalisation takes different forms from the direct production one. Financial services give results of high foreign projection and low spread by nation-state: an indication of strategies of direct production that are highly international but concentrate in a few foreign countries.
Overall these results show that services are less internationalized than manufacturing and that the firms in these two main sectors of the economy tend to follow similar strategies in the context of their specific industry. Nonetheless there are limitations to a study of this nature and in particular the following.

First, the fact that the classification system takes no account of new complementarities between services and manufacturing products and industries. The high service content of many material goods cannot be reflected in the results. Neither is the fact that many firms classified as manufacturing are increasingly heavily involved in services.

Second, as the study refers to one year only we are unable to see dynamic changes due to the new technologies and/or new patterns of internationalisation. Third, the study refers to one particular type of internationalisation mode: foreign direct investment and indeed not to the amount of investment but to the presence in a foreign country of affiliates. Neither traditional modes – such as trade or licensing – nor new ones are taken account of in the indices and this is likely to bias the results. Licensing can indeed be very relevant in services while the e-transmittable mode is becoming increasingly relevant for information-intensive services. Thus the overall degree of internationalization of services may be underestimated by the empirics based on FDI only. In particular these empirics may fail to capture the full impact of the new technologies.

8. Implications and conclusions

Any study of services – including those related to their internationalisation pattern – is confronted by our difficulty in conceptualising services and in classifying products, firms and industries within services or manufacturing. The new information and communication technologies have created new products, production processes, industries and modes of delivery for products. They have also strengthened the linkages and complementaries between manufacturing and services products and industries.

Our conceptual frameworks in relation to services are still largely ‘assimilationists’ (Miozzo and Miles, ch. in this volume) and this means that we attempt to fit services within the conceptual scheme of manufacturing for both innovation and internationalisation. This conceptualisation sees services as laggards in innovation and productivity and constrained in the delivery modes as regards internationalisation.

However, the new technologies and the changes they are bringing about have made these frameworks obsolete and we must start considering services in their own right and within their specific conceptual frameworks regarding innovation (Howells, 2001 and ch. in this volume), internationalization and the linkages between the two. Indeed services can now utilise a new delivery mode that affects the mode and degree of internationalisation. Moreover, services are the key adopters of the new technologies and this makes them central to the current technological revolution (Barras, 1986). With the increased complementarity between the two main sectors of the economy (Gibbs, 1988) appropriate infrastructures in both sectors may be needed for development and growth (Miozzo and Soete, 2001). Thus the debate about international comparative advantages in services versus manufacturing may become increasingly misplaced: they are both necessary.
The paper starts with a discussion of two specific demarcation criteria for services and manufacturing. The first one based on the tangibility/materiality of the product and the second one based on the sectoral contribution to productivity.

Issues of innovation and internationalisation are closely linked to these demarcations. Specifically it was argued that the new technologies of information and communication are: affecting the divide between manufacturing and services; creating new complementarities between products, between production processes and between industries; generating new modes of internationalisation; leading to new products and components; leading to an electronic-age ‘new international division of labour’. Most of these processes are at the initial stage and they are likely to become more relevant in future years as the diffusion of ICTs and their effects expand.

The discussion on the degree of internationalisation started with an analysis of different theoretical frameworks for the assessment of the cross-countries dimension of internationalisation. Two indices were presented and estimates were given for the 664 world’s largest TNCs in manufacturing and services. By far the largest percentage of these companies (61 percent) is classified as manufacturing, however, banking and telecommunications are in the portfolio of all the countries which are home to the world’s largest 664 companies in the study.

The results show that in terms of affiliates’ presence in host countries, services tend to be less internationalised than manufactured products. The firms in both manufacturing and services sectors appear to follow similar strategies whenever they deal with consumer products.

The overall conclusions are the following. The new technologies are generating enhanced scope for internationalisation including a new mode: via e-transmission of the products. They are also generating new complementarities between manufacturing and services. There may also be complementarities between delivery modes as for example FDI may follow an initial penetration via electronic transmission of service components. The traditional classification between the three main sectors of the economy and in particular the demarcation between manufacturing and services, may no longer be fully adequate for understanding the features of the economic system: the productivity levels and changes.

The new technologies are generating strong specificity for services in both the innovation and internationalization fields and indeed even more in the interface between the two. This means that we can no longer use for services the conceptual frameworks developed for manufacturing. Accordingly, more research is needed on the sources of productivity growth in the economy and on the impact of the ICTs on: productivity; internationalisation processes modes and degrees; and the impact on the international division of labour.

We also need to develop statistics that take account of the ICT-intensity of products and processes on the industrial classification side. While on the side of international data we need statistics on the various delivery modes including the electronic ones.

References


Grubel, H.G. (1987), All Traded Services are Embodied in Materials or People, World Economy, September, pp. 319-330.


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These issues are further developed in Ietto-Gillies (2001, particularly chs. 1, 2 and 9).

Of course they all use factor services, but here I am concerned with product services only.

Wilkins (1998:122) writes: “The obscurity of the line between industry and services was recognized when in 1995, Fortune abandoned its separate lists of manufacturing and services companies…”.

Technology and mechanisation have spillover effects from manufacturing to agriculture which eventually lead to high productivity and low employment in this sector.

His analysis seems to ignore the social nature of work which can overcome the diminishing returns of a single person’s brains.

Evangelista and Savona (2002) in a study of data from the Community Innovation Survey II for Italy, find that the ICTs have a negative effect on employment.

Jorgenson (2001) acknowledges the productivity gains from the new technologies and points out how changes in the quality of both inputs and outputs require also better statistics to allow economists a proper analysis of their impact.

Quah (1997) points out that successful economies are increasingly weightless economies in which immaterial products absorb an increasing share of output and growth. His weightless products include all services rather than just ICT-intense products. However, he finds that some successful economies show a rising emphasis on IT. He also calls for a revision of the standard industrial classification.

Roberts (1998) denotes the latter two as transhuman exports and wired exports respectively.

These arguments are developed more extensively in Ietto-Gillies (2001) and, to some extent, in Ietto-Gillies (2000).


Zanfei (2000) finds that a direct entry mode facilitates future external linkages with local businesses. This points to a complementary rather than a substitution evolutionary relationship between different entry modes.

A brief discussion of the framework for the Network Spread index is also in UNCTAD (1998: Box II.2, 43-44); See also UNCTAD (2001: 103-4).

Though these companies are chosen from the BW world largest 1000, they may not be the largest 664 because of these inclusion criteria. The list of companies is available from the author on request. It should be noted that five of these companies (ABB, RTZ, Shell, Reed and Unilever) have headquarters in two countries and thus appear in both whenever the analysis refers to the countries of origin. This is why the total number of companies appears as 669 in tables 1 and 2.

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