

Technological Change  
and Multinational Growth  
in the International  
Telecommunications  
Services Economics

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TECHNOLOGICAL CHANGE AND MULTINATIONAL GROWTH IN THE  
NEW INTERNATIONAL TELECOMMUNICATIONS SERVICES  
ECONOMICS.(\*)

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I. INTRODUCTION

International telecommunications services markets are in a state of flux where an evolutionary process, engendered by the revolutionary technological changes introduced since mid-seventies, is drastically altering the quiet functioning of a market characterized by a strong multilateral oligopoly. In such multilateral oligopoly firms had little scope and opportunity for any form of international growth. Since the early eighties the scope for international growth of domestic telecommunications services firms is emerging as the critical issue of international telecommunications. The most appropriate way to understanding such a dynamics seems to be first a careful reconstruction of the process that lead to the new emerging situation and second the analysis of the international strategies of the leading European telecommunications carriers in the last decade. In so doing a special effort shall be paid to apply the tools of the economics of multinational firms and international trade to the new emerging economics of international telecommunications services: quite a new field in international economics. This should make it easier to focus attention on the most critical factors and on their interrelatedness and consequently to better understand the prospects for eventual steps in such a process.

(\*) A paper prepared for the CITI (Columbia Institute for Tele-Information)'s project "The End of Territoriality and the Rise of Globalism in Communications". The comments of Francois Chesnais are acknowledged.

## 2. The previous limits to international growth in international telecommunications.

In most product markets firms serving international markets can choose among three forms: exporting, direct foreign investment and a variety of non equity agreements (CAVES, 1982).

In telecommunications all the three standard forms of international growth have been barred for a long time by the idiosyncratic characters of the cost function and the consequent institutional set up of national markets of this industry. The strong increasing returns traditionally associated with the production of telecommunications services had in fact pushed towards the creation of national natural monopolies. International telecommunications was treated as an extension of domestic telecommunications and a tight, heavily regulated international oligopoly was established. The international telecommunications oligopoly was based upon bilateral trade cartels among the natural monopolists serving each national market. In most cases the natural monopoly of each country was managed by a firm, heavily regulated, and most important with a strong "national" character. In fact in most countries telecommunications services were managed either by state-owned companies or directly by public agencies.

The three standard forms of international growth were consequently barred. In fact:

i) exports of telecommunications services were de facto barred by the levels of tariffs that were bilaterally fixed so that the outflows - or imports - and the inflows - or exports- of telecommunications services were automatically balanced. No country or national firm could take advantage in the bilateral traffic by means of market competition.

ii) foreign direct investments were barred by strong institutional barriers to entry. Rarely the take-over of national companies could take place worldwide and never happened at least in advanced OECD countries after the second world war. Even more rare was the entry by means of creation of new firms. Actually the few cases of multinational companies in telecommunications services were the consequence of international captive markets strategies of multinational telecommunications equipment companies, such as

ITT and Ericsson in Latin America and Southern Europe trying to secure the markets for their products. In the years 1945-1985 a process of foreign direct disinvestment and exit of a number of multinational telecommunications services companies took place both in Latin America and Southern Europe. In most colonial possessions the State telecommunications agencies of such countries as Portugal, United Kingdom (this is the case of the "old" Cable&Wireless) and France relinquished the management of the local telecommunications services of their former colonies.

iii) non-equity arrangements, beyond the intense bilateral contacts finalised to establish the coordination of bilateral traffic, were also rare, although a number of technical agreements and management assistance contracts can be traced.

### 3. The factors of change.

The introduction of microprocessors in the production of telecommunications equipment and informatics in telecommunications software together with satellite transmission technology and optical fibers has radically changed the characters of the production function of telecommunications services. The strong empirical evidence about increasing returns, determined by economies of scale and economies of scope, in the delivery of telecommunications services, on which the natural monopoly argument was based, came more and more under question. As a consequence the traditional monopolistic supply in domestic markets and its oligopolistic extension on international markets collapsed. Liberalization and regulated competition was allowed first in the United States and subsequently in an increasing number of countries. For the same token the collapse of the natural monopolists brought to an end the need for state-owned agencies to run national telecommunications networks: hence a wave of privatizations worldwide.

Finally the same merging of telecommunications, informatics and electronics and the new data communications facilities has accompanied the globalization of the international economy by means of:

i) a rapid process of globalization of multinational firms based on high levels of international integration, both horizontal and vertical, enhanced division of labor between affiliates and local suppliers, systematic reliance on outsourcing for specialized intermediary products and services, that generates increased flows of intra-firm

and intra-industry international exchanges of goods and services and a consequent unparalleled increase of the international telecommunications traffic;

ii) the persistent growth of the arm's length international trade of manufactured products and commodities relying on high levels of telecommunications intensity;

iii) the "new" exportability of service products that can be delivered by means of data communications such as financial services, software and data processing.

The static framework that had characterized international telecommunications since the forties has been revolutionized by the convergent effect of these three dynamic forces, all of which have been clearly engendered by the pace of technological change:

- i) liberalization;
- ii) privatization;
- iii) globalization.

The economics of international telecommunications services of the mid-nineties is now facing the snow-ball effects of such events.

### 3.1. New Export Opportunities

In standard international economics exports are the main form of international growth. Firms located in a country can export when their products enjoy a competitive advantage that is sufficient to overcome a number of international transaction costs that arise from foreign duties, transportation, different standards and marketing requirements. Such an international competitive advantage in turn is the outcome of three classes of factors:

- i) locational advantages, mainly in terms of access to production inputs at lower costs;
- ii) production advantages in terms of lower production costs originated from increasing returns stemming from economies of scale, economies of scope, pecuniary and technical externalities;
- iii) technological advantages in terms of superior product and process technologies that make possible to produce at lower costs goods that are superior to the present ones;

On international telecommunications services markets the collapse of the "natural oligopoly" had a major effect in terms of new opportunities for exports. The rapid growth of an international export market for telecommunications service is a clear example of unintended result of asymmetric changes in a given static structure characterized by high levels of production complementarity and product rivalry. It is in fact the outcome of a process of asymmetric market change in alternative but heavily interdependent product markets such as inflows and outflows of international telecommunications services can be considered with respect to the common final outcome of establishing a single communication between two ends located in country A and country B.

As a consequence of heterogeneous market changes among trading partners, active in alternative and interdependent product markets, in fact the traditional symmetric conditions, that had made possible the collusive fixation of international telecommunications services tariffs on a bilateral basis, progressively collapsed. The bilateral fixation of the tariffs for international telecommunications services came under the pressure of an asymmetric mixed duopoly among rivalrous and yet complementary partners with a growing number of rival suppliers in the countries where the natural monopoly had already collapsed and still one local monopolist in other countries. Liberalization in fact meant the reduction of the extensive cross-subsidization between long-distance telecommunications tariffs and local ones and the introduction of more cost-effective tariffication with the consequent sharp decline in the levels of long-distance tariffs: the whole structure of long-distance tariffs was affected so as to comprehend the international ones.

As Noam (1989) shows already in 1981 the international tariffs from Europe to the United States exceeded those from the United States to Europe by 34 percent. After AT&T's cut in 1981 the average foreign tariff was almost 95% higher than the American.

The contradiction between a complementary production process where both telecommunication carriers must necessarily cooperate for the international communication to take place, and alternative products that are almost perfect substitutes because perform the same function of establishing the communication irrespectively of its origin, becomes here extremely relevant. Tariffs declined rapidly on the rivalrous side and remained higher on the monopolistic side. Still in 1993, more than ten years after the first unilateral reduction of tariffs especially from U.S. and U.K. telecommunications carriers and a long process of catching up in lowering the levels of

international tariffs, as one can see from Table 1, international calls initiated in Italy and Ireland towards the United States are much more expensive than viceversa and international tariffs of U.K. carriers are among the lowest worldwide.

The decline in tariffs was also the consequence of strong technological advances that made it possible mostly in liberalizing countries to reduce the actual delivery costs of telecommunications services and to introduce a broader array of product services and of the introduction of satellite transmission facilities. Satellite transmission technology is in fact such that the marginal costs with respect to distance are very low so that communication flows can be rerouted in order "to circumvent regulatory barriers and restrictive prices" (NOAM, 1987:261) All this lead to:

- i) the opportunity for bilateral telecommunications services flow inversion;
- ii) the opportunity for multilateral telecommunications services diversion.

#### i) Bilateral Telecommunications Flow Inversions.

When the tariff for an outgoing international telecommunication call to country B from country A diverges appreciably from the tariff for an incoming telecommunication call to country A from country B, the opportunity to solicit a call instead of making it becomes relevant. The same communication in fact cost much less when it is initiated from abroad in country B than when it is forwarded to country B from country A.

Such an asymmetry in the cost condition for the two strictly alternative and interdependent products such as the international telecommunications calls originated in country A and the international communication call initiated in country B, that is the same communication depending upon the market of origin, generates an important opportunity for telecommunications flows inversion. International telecommunications will flow from the cheaper country to the more expensive one irrespective of the actual origin of the call. Such a flow inversion can be the result of a variety of processes: typically within a multinational company such procedures can be decided within the framework of hierarchic coordination. Trading partners can elaborate similar procedures after clearing the accountability for international calls.

The consequences for international carriers are important. The carriers located in the country where tariffs are lower will take advantage of growing flows of traffic so that actual exports of

telecommunications services take place. It seems also clear that such a dynamics of the creation of an international market for telecommunications services is also the cause for the apparent paradox of the growing divarication between growth of traffic and growth of actual traffic revenue and the rapid deterioration of the terms of trade of international telecommunications for countries that are able to gain larger shares of international traffic. International telecommunications traffic exporters remain in fact obliged to pay hefty international access charges to high tariff countries: the share of added value that remains in the hands of traffic exporters on total revenue perceived is consequently lower the lower the asymmetric tariff reduction

ii) Multilateral Telecommunications Flows Diversion.

The breakdown of the basic asymmetry of international telecommunications tariffs has important consequences also in a multilateral context: the decline of the tariffs for international calls from country A to country B is such that the cost of an international call from country C to country B, via country A, is now lower than the tariff of the direct call from country C to country B and even possibly from country B to country C.

Now the telecommunications carriers that operate from country A have the opportunity to attract the transit traffic from country C to country B and viceversa as well the inverted traffic from country C to country A. Telecommunications carriers located in country A become the hub of an international traffic with growing shares of the market.

The new opportunities for international telecommunications flow diversion, and inversion, call attention on three important aspects of the newly emerging international economics of telecommunications services.

a) the growing globalization of the international economy and the strong increase of the telecommunications intensity of international business make the share of the demand for international telecommunications services larger and larger and consequently more and more attractive for telecommunications carriers. As the data collected in table 2 show, the average share of international telecommunications revenue for the large telecommunications carriers is in order of 15% of total revenue and in some cases, such as Dutch PTT or Swiss PT is already much more significant.



acquire that lumpy amount of expertise are such that the final average costs of a diverted international telecommunication call is higher than the direct tariff.

In such conditions an opportunity for enhanced levels of division of labor, based upon professional specialized arbitrage, emerges and a new industry as well new products can be created. Specialized firms can enter the international telecommunications market and supply that expertise that makes possible international telecommunications flow diversion to third parties at lower costs: the costs of acquiring and implementing the lumpy amount of information and technical expertise can be spread over a larger number of customers so that its average costs declines and when added to the costs of a diverted international call make it lower than the tariff of the direct international call. Such an expertise can be sold in the market place unbundled mainly to larger operators: it then takes the form of a service; or bundled: it is sold together with the actual complementary good that is the international communication.

Multilateral telecommunications flow diversion, and bilateral telecommunications flows inversion to a lesser extent, because of the lower requirements of expertise necessary to be implemented, not only give rise to growing export opportunities, but also and most important, to the creation of a new market and new products, consequently new entries in international telecommunications markets. Such entries can be:

- i) "direct entries", new stand-alone firms created just to take advantage of these new opportunities;
- ii) "cross-entry", that is entry of other firms, already incumbents in other telecommunications services markets;
- iii) "spillovers", that is the entry in this specialized market, as part of a process of product diversification, by divisions or units of other firms that had already acquired for internal reasons such an expertise and now find it profitable to sell overcapacity to third parties. In this case overcapacity can be relevant because the main asset is information with a low content of exclusivity and high levels of reproducibility.

Finally such entries can be domestic and international, that is they can come from the domestic market and from abroad. In the latter case they are the result of foreign direct investments.

At the same time however a growing number of competent, professional customers is becoming more and more aware of the high costs of international telecommunications and of the growing dent they make on their overall budgets. The combination of such a shift in the demand curve for international telecommunications services together with the increasing opportunities for a competitive entry make export markets especially price and revenue elastic.

b) The special characters of both production processes and products in international telecommunications, where cooperation in the production process coexists with competition in the product markets, make it possible to add a fourth factor to the standard analysis of international competitive advantage.

International telecommunications carriers that operate in country A benefit of a special class of location specific advantages that consist in their domestic market structure in terms of lower barriers to entry and consequently lower equilibrium prices for products that are differentiated and yet quasi-perfect substitutes with their international counterparts such as international telecommunications. From the viewpoint of economic analysis each international communication in fact consists of either one of two distinct products such as the call from country A to country B and the call from country B to country A. Each of these alternative and well specified products performs the same function, that is the communication between two ends located in two different countries. Customers, especially some classes of, can take advantage of the price differentials of the two products that are almost perfect substitutes and switch from one market to the other according to the levels of tariffs. Consequently firms located in country A benefit of the larger demand for their products and the lower equilibrium prices as it has been determined by the evolution of their domestic markets also on international markets and can get an increasing market share.

c) Single customers of international telecommunications services, especially when they are small firms involved in international trade, or households are not fully able to take advantage of the opportunities for international telecommunications flows diversion. Multilateral flow diversion in fact requires a lumpy amount of technical expertise and commercial information that is not easy to acquire and to implement. Multinational firms can overcome these obstacles but not independent customers of international telecommunications services. For the latter, especially when they are small firms or households in fact the fixed costs necessary to

TABLE 1. INTERNATIONAL TELECOMMUNICATIONS TARIFFS  
AS OF JUNE 1993 (IN E.C.U. PER MINUTE BEFORE TAXES)

| COUNTRY     | TOWARDS U.S.A. |         | FROM U.S.A. |         |
|-------------|----------------|---------|-------------|---------|
|             | FULL           | REDUCED | FULL        | REDUCED |
| BELGIUM     | 0.99           | 0.83    | 1.10        | 0.83    |
| FINLAND     | 0.67           | 0.50    | 1.17        | 0.90    |
| FRANCE      | 0.89           | 0.76    | 1.05        | 0.80    |
| GERMANY     | 1.01           | 1.01    | 1.06        | 1.06    |
| GREECE      | 1.13           | 1.13    | 1.23        | 0.93    |
| IRELAND     | 1.40           | 1.05    | 1.00        | 0.79    |
| ITALY       | 1.27           | 1.13    | 1.06        | 0.78    |
| NORWAY      | 0.72           | 0.57    | 1.05        | 0.80    |
| NETHERLANDS | 0.91           | 0.57    | 1.02        | 0.79    |
| PORTUGAL    | 1.14           | 0.92    | 1.10        | 0.83    |
| SPAIN       | 1.36           | 0.95    | 1.10        | 0.83    |
| SWEDEN      | 0.78           | 0.60    | 1.02        | 0.78    |
| SWITZERLAND | 1.03           | 0.76    | 1.10        | 0.80    |
| U.K.        | 0.55           | 0.55    | 0.90        | 0.69    |

Source SIP. (U.S. rates are AT&T's)

### 3.2. Foreign Direct Investments

From a dynamic evolutionary point of view exports on international markets are not only the main but also the first form of international growth. According to the evolutionary theory of international growth of the firm in fact the second step in taking advantage of international competitive advantage for firms is the multinational growth that takes place by means of the direct entry in other national markets and foreign direct investments.(DUNNING, 1987, DUNNIG, 1992)

Firms become multinational when they operate with affiliates located in many countries. Firms become multinational when: a) the advantages of operating on international markets from a variety of international sites is higher than from one domestic location; b) firm's specific advantages are such that entry with foreign direct investments in new markets is likely to overcome the local barriers to entry that domestic incumbents have been able to take advantage of. Such a twin multinational advantage stems from four classes of factors:

i) access to production factors that are not available in the domestic markets or cost more or technological know how and opportunities to learn in the interaction with other firms and other

advantages of the new location especially in terms of a reduction of production costs and operate at lower costs than in production sites located in domestic markets.

ii) Transaction costs associated with the sale of technological and commercial know-how on international markets. By means of a variety of tacit learning processes such as learning by doing, learning by using, learning by interacting, firms acquire relevant localized knowledge which is often implemented and elaborated into generic knowledge by means of formal research and development expenditures. Both localized and generic knowledge constitute the knowledge capital of a firm. Such a knowledge capital is difficult to be transferred to third parties and yet fully appropriated. In market transactions of knowledge capital among independent parties the risks of involuntary disclosure are high as well the problems associated with the definition of a fair price: the two contracting parties have in fact an asymmetric information on the real market value of the knowledge that is traded. Finally the transfer of localized knowledge based on informal knowhow acquired by means of tacit learning procedures is often harassed by the high costs of training and codification that is less relevant when it takes place within the same organization. The tacit transfer of know how is in fact possible for a workforce that belong to same firm. In such conditions the arms' lenght trasfer of knowledge capital is limited and coordinated transfer within a single corporation becomes a more reliable tool. The multinational corporation is an essential institution to secure the international transfer of knowledge capital yet retaining to original owners of knowledge capital a full command of their property rights. The creation of affiliates abroad makes it possible to capitalize on intangible assets and acquire a competitive advantage on new markets with respect to local incumbents.

iii) Imperfect tradeability. Many products have a strong locational content that makes it impossible to deliver them internationally: this is the case of perishable goods such as vegetables, but also and most important, of a large variety of services. Most services cannot be manufactured in one country and delivered in another as it is the standard case for most manufactured goods. The locational content of the goods push firms that have acquired a relevant technological advantage to pursue a multinational growth in order to exploit internationally: exports are not feasible.

iv) Barriers to entry and high levels of international transaction costs. Legal barriers to entry or high levels of custom rights and transportation costs may prevent firms from taking advantage of

their competitive advantage by means of exports. The price for their products on international markets is in fact higher, because of international transaction costs, than that of domestic products. In such conditions the entry on that market and the local manufacturing of products makes it possible to combine the incentive to exploit the stream of quasi-rents associated with the knowledge capital already accumulated and the obstacles to exports.

As the data of table 3 show, multinational growth of telecommunications carriers since mid eighties has increased at an astonishing pace: the overall of main acquisitions of foreign telecommunications companies, as calculated by the U.N. Programme on Transnational Corporations (UNCTC, 1993) has increased twenty-fold from 399 millions U.S. dollars to the 16,539 millions U.S. dollars in 1990. In such a context the United States have been especially active so that the outward stock of foreign direct investments increased nearly eightfold between 1989 and 1991, from 560 millions US dollars to 4,4 billions US dollars; in the same years the overall stock of outward US foreign direct investment has increased only 23%. Multinational growth of telecommunications services firms has received a strong push since the late eighties from four factors:

- i) privatization of former state-owned companies;
- ii) liberalization, with the consequent growing vertical disintegration of the telecommunications filiere and product specialization;
- iii) growing international tariff asymmetries with new opportunities for specialized entry;
- iv) globalization of multinational firms and their growing reliance on outsourcing procedures.

TABLE 2. MAJOR INTERNATIONAL TELECOMMUNICATIONS COMPANIES

| Company        | International Revenue (*) | Share on total revenue |
|----------------|---------------------------|------------------------|
| AT&T           | 5500                      | 14                     |
| DBP Telekom    | 4500                      | 16                     |
| BT             | 3146                      | 14                     |
| France Telecom | 3058                      | 15                     |
| C&W            | 2095                      | 46                     |
| STET           | 1846                      | 13                     |
| KDD            | 1787                      | 100                    |
| DUTCH PTT      | 1358                      | 26                     |
| MCI            | 1300                      | 15                     |
| OTC            | 1281                      | 100                    |
| TELEFONICA     | 1198                      | 12                     |
| TELMEX         | 1163                      | 22                     |
| SWISS PT       | 1093                      | 20                     |
| STENTOR        | 1000                      | 0.8                    |
| SAUDITELECOM   | 912                       | 36                     |

(\*)Millions of U.S. . Data for 1991 are drawn from Elixman (1993)

TABLE 3. TELECOMMUNICATIONS MULTINATIONAL GROWTH

| YEAR | No. of ACQUISITIONS | VALUE (\$millions) |
|------|---------------------|--------------------|
| 1985 | 5                   | 399                |
| 1986 | 7                   | 132                |
| 1987 | 7                   | 63                 |
| 1988 | 11                  | 117                |
| 1989 | 50                  | 2694               |
| 1990 | 67                  | 16539              |

Source: UNCTD(1993)

TABLE 4: MAIN FOREIGN DIRECT INVESTMENTS IN TELECOMMUNICATIONS SERVICES

| MARKET      | ENTRANT                                 | PRODUCT                             |
|-------------|---|-------------------------------------|
| ECUADOR     | Telefonica                              | Basic network                       |
| BRAZIL      | Telefonica                              | Basic network (SESA)                |
| CHILE       | Telefonica                              | Basic network (CTC)                 |
| CHILE       | Telefonica                              | International Services              |
| VENEZUELA   | Telefonica&AT&T                         | Basic network(40%)                  |
| ARGENTINA   | Telefonica                              | Basic network                       |
| ARGENTINA   | STET(32.5%),France Telecom(32.5%)       | Basic network                       |
| GREECE      | FranceTelecom Vodaphone                 | Cellular Phone                      |
| GREECE      | STET(80%)and NINEX(20%)                 | Cellular Phone                      |
| MEXICO      | France Telecom, SW Bell and Grupo Carso | Basic network (40% of Telmex)       |
| GERMANY     | PacTel (26%) & Mannesman                | Cellular phone                      |
| HUNGARY     | US West                                 | Basic network                       |
| POLAND      | Cable&Wireless                          | Teleport(Gdansk)                    |
| POLAND      | FranceTelecom,Ameritech                 | Cellular phone                      |
| UKRAINE     | AT&T(39%)and local                      | Basic network                       |
| UKRAINE     | DBP, Dutch PTT                          | Cellular phone                      |
| TCHECK Rep. | US West, Bell Atlantic                  | Cellular phone                      |
| USA         | BT                                      | Packet-Switching (Tymnet)           |
| WORLDWIDE   | BT                                      | Outsourcing (Syncordia) & GSN       |
| EUROPE      | FranceTelecom, DBP                      | Outsourcing(Eucom& EUNETcom)        |
| JAPAN       | AT&T, France Telecom, KDD               | Data Communication (Nippon Express) |
| UK          | AT&T                                    | Data Communication(Istel)           |
| AUSTRALIA   | Cable&Wireless, Bell South              | Basic network(Optus Comm.)          |

i) Privatization.

The collapse of the natural monopoly and the introduction of new "ex-ante" regulatory procedures that substitute the discredited ex-post ones based on rates on return approaches have made State ownership of telecommunications services firms less cogent. A wave of privatization schemes has been taking place since the mid-eighties. In the OECD area privatization has been based on the sale in the stock-exchange of large chunks of the shares previously controlled by State agencies of different kinds: this is the case of the United Kingdom where the former Department for Telecommunications has been first incorporated as British Telecom (BT) into a public company and next sold in the stock-market or in Italy where the share of control of IRI into the telecommunications firms steadily declined to less than 30%.

In most Latin American and Eastern European countries however privatization opened up the way to the full fledged entry into domestic markets of affiliates of large incumbents in other domestic telecommunications services markets.

Telecommunications services firms from USA, France, Italy, and especially Spain, have acquired important stakes in the national telecommunications services industry as a whole of such countries as Argentina, Chile, Venezuela, Mexico, Greece, Poland, Hungary, Ukraine (see table 4). The privatization programmes of these countries and the consequent take-over of the local telecommunications firms has also given birth to a new spur of multidomestic growth for telecommunications services firms. The trend towards the progressive exit of multinational telecommunications firms mainly based upon a strong manufacturing capability in telecommunications equipments such as Ericsson or ITT, that characterized the late sixties and still the seventies, is now fully reverted.

The new multinational growth moreover has a strong distinctive flavour in that it is fully based upon telecommunications services firms that now operate a plurality of general purpose and specialized networks in different countries while there is little evidence of major foreign direct investments of telecommunications equipment companies in telecommunications services. Within the broad array of telecommunications services the new wave of multinational growth takes place within a strategy of international product differentiation and horizontal integration as opposed to the previous wave characterized by international vertical integration. Actually in the case of the Telefonica, the aggressive strategy of



multinational growth is based upon the vertical disintegration of the manufacturing capacity which has been sold to the french manufacturing company Alcatel, in order to increase the financial capability necessary to enter the Latin American markets. The international competitive advantage of new multinational multidomestic telecommunications services firms lies in fact in the combination of a strong financial and technological capability. The financial capability is an essential complementary condition because of the high levels of dedicated investment that are necessary to make possible the transition from analogue networks to digital ones.

The primary factor of international competitive advantage however is the technological capability that makes it possible to update technically obsolete networks formerly managed by State Agencies unable to meet the new requirements in terms of technical competence and heavy investments necessary to adopt the new digital technologies. The transition from electromechanical to digital technologies is in fact a factor of discontinuity in the technological and managerial know how of the old State-owned firms and consequently a cause of rapid obsolescence of their specific knowledge. The specific factor of international competitive advantage of telecommunications carriers seems to consist in the experience acquired in managing the transition from analogue to digital networks and the consequent accumulation of a distinct technological and managerial competence in handling the telecommunications softwares for traffic control, intelligent networks, billing and other administrative procedures that are specific to telecommunications service firms and much less in the control of telecommunications equipment manufacturers.

ii) liberalization.

The liberalization and reregulation process that has characterized the domestic markets in a growing number of countries has led to a process of vertical and lateral disintegration of the telecommunications filiere with the growing specialization of firms in specific segments of the broad array of telecommunication services. Telecommunications service firms now tend to specialize in such products as local telecommunications, long distance telecommunications, data communications services, cellular telecommunications. Each of these provides new opportunities for specialized entries in foreign markets with a flow of foreign direct investments.

Specialized entry became especially frequent in new products and processes such as cellular telecommunications services. In cellular telecommunications in fact technological capability is essential to provide entrants with a competitive advantage with respect to general purpose incumbents. As the data of table 4 show specialized entry in cellular telecommunications constitutes the bulk of the total number of the main international entries in telecommunications markets.

The multinational growth of the Italian STET group and of France Telecom supplies large evidence about the distinctive features of a multinational growth based upon a collection of affiliates specialized in serving products to local markets:

- i) Telefonica has been especially active in entering the domestic markets of most Latin American countries;
- ii) STET and France Telecom jointly have taken over the northern network of the Republica of Argentina;
- iii) France Telecom and South Western Bell have taken over part of the Mexican telecommunications network;
- iv) STET has been awarded the first licence to operate the cellular network in Greece and operates it with a joint venture with Ninex and the joint venture between France Telecom and the British Vodafone group received the second.

Such a mode of international growth, based both upon foreign direct investments in either the general purpose telecommunication network or specialized segments such as the cellular telecommunications network, is likely to lead to the transplant into the telecommunications services industry of the multidomestic firm. The multidomestic firm is in fact characterized by low levels of interaction between affiliates, each of which is specialized in serving a well defined product market. The affiliates of the multidomestic firm share the process technology that has been usually first elaborated in the home country by the headquarters and subsequently transferred internationally. So far in the multidomestic firm there is little complementarity between exports and multinational growth. The multinational growth is essentially a mode to securing the international technology transfer and consequently a tool to make it possible the valorization of intangible assets that have been acquired and accumulated in the process of implementing and updating technologically the home networks.

A telecommunications service company that has been able to follow a multidomestic growth has a strong incentive to keep elaborating

internally the process technology that is specific to the management of the network such as the implementation of dedicated softwares for intelligent networks and billing and accountancy procedure. The web of foreign affiliates provides in fact a captive market for these technologies once successfully applied in the home markets. So far multidomestic telecommunications carriers are likely to remain on the forefront of technological advance at low average costs because of the number of lines far larger than that of the home telecommunications network, on which they can spread the strong sunk costs of dedicated softwares.

iii) International tariff asymmetry.

International tariff asymmetry creates new opportunities for division of labor, specialization and international telecommunications services trade. However it provides also and most important, significant opportunities for the international entry of multinational telecommunications services firms that search actively to divert telecommunications flows and to reroute them via their country of origin. Here there is a perfect complementarity between foreign direct investments and exports of telecommunications services. The larger the number of specialized affiliates abroad, that are active in soliciting the diversion of new flows of international traffic, the larger it is in fact the amount of international traffic that is delivered by the telecommunications carrier located in the country with the lower levels of international traffic.

The primary factor of international competitive advantage that makes possible specialized entry in the new market for the provision of new alternative routes for international traffic seems to be perfectly defined in terms of locational advantages: in fact it is clear that the lower is the levels of tariffs in country A, the larger the opportunities for international traffic diversion and consequently the larger are the opportunities for a specialized multinational growth of the telecommunications carriers located in country A. In this case affiliates in third countries can in fact be considered as complementary assets in a global strategy of growth in the international telecommunications services markets.

iv) Telecommunications outsourcing of multinational companies.

The provision of specialized dedicated telecommunications management services to multinational corporations is becoming a fast growing market. Such a process is a consequence of two distinct factors:

i) the generalized reliance of multinational companies on outsourcing. The new global strategies of multinational firms in both manufacturing and service markets are characterized by a careful management of the international chain value by means of increased levels of international division of labor among affiliates, local arm's length procurement of specialized intermediary products that are available at lower prices in each local market, and increased flow of international intracorporation trade so that affiliates export worldwide specific products and inputs to the global production process. Hence global strategies push towards outsourcing strategies based upon the systematic use of local and global specialized suppliers of specific intermediary and complementary products of the international production process.

ii) the increased telecommunications intensity of international business and its fast growth with the consequent steep increase of the amount of resources that are necessary to pay for international telecommunications services.

International telecommunications services outsourcing is consequently becoming an important market. The dynamics of supply in this market is characterized by a strong evolutionary process with the rapid interaction of learning and product innovation. Once more in fact one can see the effects of a powerful engine of growth based upon recursive interaction between the growth of demand, the opportunity for increased levels of division of labor, the introduction of technological and commercial innovations, the creation of new markets with a new demand and the entry of new firms.

The growth strategy on international markets of British Telecom here provides large evidence about the interplay of locational and firm specific advantages. The international strategy of British Telecom is in fact characterized by

i) low levels of direct investments in foreign telecommunications network: entry takes place mainly by means of minority equity partnerships such as in the case of the 20% stake acquired in MCI;

ii) a web of international affiliates specialized in serving international business by means of a few telecommunications nodes that interface the local networks with the international one, and that are especially active in the commercial activity.

The strategy of British Telecom seems to be replicate in many ways the distinctive features of the global multinational strategy with a surprising mimetic process of learning in a dense user-producer relationship with global multinational corporations which seems to affect not only the capability to generate specific product and process innovations but also the organizational structure of the telecommunications carrier. (DUNNING, 1981)

British Telecom as a telecommunications carrier located in a multinationals-abundant country, such as the United Kingdom, had in fact the opportunity to spot the new potential demand for telecommunications outsourcing both domestic and international. In the case of British Telecom first outsourcing contracts have been usually elaborated for domestic telecommunications traffic and were based upon leased lines and in some case dedicated switching centers. On the basis of such domestic telecommunications outsourcing contracts BT acquired general telecommunications outsourcing capabilities and new international outsourcing supply capabilities could be eventually elaborated and successfully marketed. In so doing BT had the advantage to fully benefit from the interaction between learning, economies of scale and economies of scope. Availability of an international network of complementary affiliates specialized in soliciting international telecommunications traffic diversion, previously built in order to sustain international telecommunications services exports, became in fact an essential complementary asset in an entry strategy into the new international telecommunications outsourcing market and consequently a prerequisite for a successful multinational growth. Location in a low international tariffs country, such as the United Kingdom, was also a complementary and essential asset in this process of multinational growth.

In this mode of multinational growth three factors play a major role in defining the international competitive advantage of firms:

a) locational advantages in terms of learning opportunities from user-producer interaction and consequently in terms of product innovation capability;

b) locational advantages in terms of lower levels of international telecommunications tariffs in the home country;

c) firm specific advantages in terms of technological and commercial know how.

In this mode of international growth there is a strong complementarity between exports and multinational growth that is both static and dynamic because of the powerful effects of network externalities. In fact it is clear that the larger is the network of affiliates, the larger the flow of traffic diversion and consequently export, but it is also clear that the larger is the network of affiliates, the larger the global reach of the international telecommunications carrier and consequently the better and more competitive the supply of outsourcing services. In turn the larger is the supply and the market share of international telecommunications outsourcing services, the larger the amount of international traffic that can be diverted and consequently exported.

##### 5. Cooperation and competition.

A careful inspection of the main foreign direct investments in international telecommunications services of the last decade reveals that most of them are based upon joint-ventures between telecommunications carriers and information technology corporations and among incumbent telecommunications carriers: once more the cases of STET and France Telecom provide clear evidence of a strategy of multidomestic growth based upon intraindustry cooperative relations in Argentina. The case of the joint venture between Transpac Network Services of France Telecom and the value added service unit of Olivetti -the former Olinet- supplies evidence of a case of strategy of interindustrial cooperation between a telecommunications carrier and an informatics corporation.

Similarly one finds strong evidence about the important role of cooperative ventures in global multinational growth focussed upon international telecommunications services outsourcing: the cooperation between British Telecom and MCI is one example, others are:

i) Eucom (and Eunetcom) the two joint-ventures between Deutsch Bundes Post (DBP) and France Telecom created to target the international value added network and international outsourcing markets;

ii) Infonet, the joint-venture between MCI, DBP, France Telecom in managed network services, transmission services and transaction services;

iii) Unisource, the joint venture between PTT Netherlands and Swedish Telecom;

Together with the multidomestic strategies and the global ones a third strategy of international growth seems to emerge: a cooperative networking mode based upon a variety of non-equity agreements such as joint-ventures and commercial alliances where each partner swaps the access to its own domestic network and to its own installed basis of international companies, both exporters and multinational, that are large and sophisticated customers of advanced telecommunications services with a significant international exposure. Underneath and parallel to the rivalrous market relation among large telecommunications carriers traditionally established in domestic markets there is a growing trend towards the creation of an international network of domestic networks based upon selective alliances..

The networking strategy makes it possible to join forces also with firms active in the information processing industries such as Olivetti in Transpac Network Services. This case shows that the reciprocity in the access to complementary competencies in technological and commercial know how is one of the main strategic factor in the creation of interindustrial joint ventures.

The economics of a global strategy based on alliances and networks, both intraindustrial and interindustrial, rest on the dynamics of network externalities: the larger the network the larger the benefit to belong to and the larger the services that can be provided at lower costs to multinational and international corporations. With respect to the global telecommunications carrier, based upon a central hub located in a low international tariff country and web of affiliates, the network of networks can rely on the higher coherence and mutuality among partners that are large established incumbents on their own domestic markets. The network of networks hence is likely to provide to its members an easier access to domestic markets both in terms of information and technical infrastructure. Moreover the network of network is likely to save dramatically in terms of dedicated investments in equipment and commercial facilities. In fact the network of networks seems able to offer the advantages of a multinational global telecommunication carrier without actual foreign direct investments. Finally the networking strategy makes it possible to integrate the variety of competencies that are found in the broad array of industries that

are affected by the merging of electronics, informatics, telecommunications services and equipment technologies.

This third mode of international growth in the new international telecommunications services market closely parallels the last developments in the strategy of "standard" multinational corporations that rely more and more on the creation of networks of specialized and selective agreements among firms that are complementary in terms of product markets and or process technology. (GILROY, 1993)

## 5. Conclusions

A new international telecommunications services economics is emerging out of the revolutionary technological and institutional changes that drastically reshaped the domestic telecommunications services industry in the early eighties in the United States and subsequently in many other countries with new important opportunities for exports of international telecommunications services and new opportunities for multinational growth of telecommunications service firms.

Both exports and multinational growth are new to this international market that has been characterized for many years by a strong institutional cartel based upon symmetric bilateral relationships framed into a global oligopolistic framework that provided consistency and stability.

The fall of the natural monopoly in many domestic telecommunications markets and the new opportunities provided by low costs satellites in delivering international telecommunications services has fragmented the established structure with a growing asymmetry in the levels of international telecommunications service tariffs.

In turn the growing asymmetry among countries in the levels of international telecommunications service tariffs is acting as a destabilizing factor that feeds a recursive process of change. Together with the liberalization of domestic telecommunications markets it provides the basic incentive to the international growth of telecommunications carriers.



Our analysis has shown that the diversity of the telecommunications services industry with respect to other service industry has been rapidly vanishing: the multinational growth of domestic telecommunications carriers is emerging as a critical issue in the new economics of international telecommunications services. Domestic telecommunications carriers are growing multinational with three distinctive strategies:

- the multidomestic;
- the global;
- the networking of alliances.

Each strategy has its own elements (See table 5) of weakness and strength:

i) multidomestic strategies require high levels of foreign direct investments but are very efficient tools of valorization of technological and commercial knowledge acquired in managing the transition to digital technology in the home networks and consequently of international technology transfer. Second and most important they make possible to enter in domestic markets, with a strong share of final demand from households, that are likely to exhibit fast trends of growth in the future with low levels of rivalry, hence their overall demand is likely to be highly revenue elastic and low price elastic with good prospects for future profitability. Specialized entry in the cellular network requires lower amounts of dedicated investments moreover the technological prospects for reintegration of mobile and fixed telecommunications networks give to multidomestic firms that have chosen a selective entry in cellular telecommunications, eventual possibilities to operate also in the fixed telecommunications market and consequently to diversify their markets with lower entry costs.

ii) global strategies take advantage of the strong complementarity between exports and multinational affiliates and of the dynamics of networks externality. They require low levels of resources to fund foreign direct investments, but high levels of technological competence especially necessary in terms of product innovations to retain the derived demand of such competent customers as multinational corporations. Global strategies offer important opportunities to accumulate specific know how in international telecommunications services especially suited for international business, but very little scope for international transfer of the telecommunications service technology acquired in home markets. Their limits consist first of all in the high levels of price elasticity of their demand, mainly a derived demand, and second in the key role

played by international tariff asymmetries. Consequently they are exposed to two dangers:

- i) a reduction in the spread of international tariffs because of the attempt of monopolistic carriers to stop the flows of traffic diversion and inversion. The data of table 1 show in fact that the strong asymmetries that emerged in mid eighties are now much smaller.
- ii) The continue reduction of the margins between the low and decreasing levels of tariffs and the high and stable levels of international access charges.

Table 5. TELECOMMUNICATIONS MULTINATIONAL STRATEGIES

| STRATEGY                           | MULTIDOMESTIC | GLOBAL | NETWORKING |
|------------------------------------|---------------|--------|------------|
| FINANCIAL REQUIREMENTS             | HIGH          | MEDIUM | LOW        |
| EXPORT/F.D.I. COMPLEMENTARITY      | LOW           | HIGH   | HIGH       |
| TECHNOLOGY TRANSFER CAPABILITY     | HIGH          | LOW    | HIGH       |
| TECHNOLOGY ACCUMULATION CAPABILITY | LOW           | HIGH   | HIGH       |

iii) Networking strategies make it possible to minimize dedicated investments and yet to maximize the variety of competencies and the opportunity of access to local demand niches and facilities, hence the returns from the dynamics of network externality. So far networking strategies offer the opportunity to blend the advantages of both accumulation of international telecommunications service for international business know how, and international transfer of telecommunications services know how acquired in the home markets. Opportunistic behavior of members and risks of collusive behavior are the main possible source of drawbacks.

The international growth of telecommunications carriers both by means of multidomestic entries and especially because of the self-feeding interaction of export capability and global multinational

feeding interaction of export capability and global multinational growth is likely to spur further competition and hence to "normalize" further the international telecommunications services industry. The emergence of a global telecommunications network can be the ultimate outcome of such a process of enhanced division of labor, product and process innovation, accrued competition and globalization of telecommunications carriers, but also of fragmentation of the universal network of each country and rapid spread of supply-rationing strategies.

The dynamics of the new international telecommunications services economics stresses the key role played by international asymmetries in international tariffs as a destabilizing factor of the "old market structure": all assessment about the future prospects for change and the chances of success of export and the global strategies of multinational growth depend upon the evolution of the international institutional arena.

The economics of international telecommunications services here binds to the international political economy of telecommunications services.

The global telecommunications market of a few multinational telecommunication carriers, epitomized by the strategy of British Telecom, can face the risks of a foreclosure of the international telecommunications arena with the progressive reestablishment of regional barriers to entry such as it is the case of the growing contraposition between the European Community and the U.S. at the GATT level where there is a strong conflict between the U.S. and to a minor extent the U.K. that push in favor of a generalized reduction of the international access charges and the Continental European countries that resist it.

It seems clear that alternative, more restrictive scenarios, would privilege the networking strategy implemented by multidomestic foreign direct investments especially when based upon integrated regional telecommunications networks such as in the European Community.

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