International Competitiveness in Services in Some European Countries: Basic Facts and a Preliminary Attempt of Interpretation

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Abstract

In spite of the increasing economic and social importance of services, the analysis of their international competitiveness is still in its very preliminary stages. The lack of adequate statistical information and theoretical background explains that backwardness. The aim of this paper is to contribute to a better understanding of competitiveness in services activities of European countries. To carry out this task the investigation is divides into two parts: the first consists of the classification of the competitive position of the economies along 1990-2001 according to the competitiveness matrix developed by the UNO and the World Bank. Secondly, a first attempt of interpretation is made by exploring the factors which can explain the different behaviour of the countries, giving an especial importance to elements related to knowledge incorporation. In both cases, three sub-sectors are considered: transport and communication, travel and other business services. Finally, a number of recommendations as well as future research topics are included in the conclusions.

Key words

Services, competitiveness, internationalisation, knowledge.

Resumen

A pesar de la creciente importancia económica y social de los servicios, el análisis de su competitividad internacional está todavía en sus fases preliminares, como consecuencia de las dificultades de información estadística existentes, así como por el escaso desarrollo de una teoría convincente. El propósito de este estudio es contribuir a un mejor conocimiento de la competitividad de los países europeos en los servicios. Para llevar a cabo esta tarea la investigación se divide en dos pare complementarias: la primera consiste en una clasificación de la posición competitiva de los países siguiendo la matrices de competitividad desarrolladas por la ONU y el Banco Mundial, la segunda incluye una primer intento de interpretación de aquellas posiciones y su evolución en el tiempo, dando especial importancia a factores relacionados con el conocimiento. En ambas fases el estudio se hace para tres sectores ampliamente representativos: transporte y comunicaciones, viajes y otros servicios a empresas. Por último, en las conclusiones se ofrecen algunas recomendaciones de actuación, así como futuras líneas de trabajo.

Palabras clave

Servicios, competitividad, internacionalización, conocimiento.

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Índice

1. Introduction

Over the last two decades most of the economic activity setting has been deeply modified due to various local and international circumstances. Service sector is one of the economic activities where most of the prominent transformations have taken place. Such changes are related to economies' specific aspects as well as other factors influenced by economic activity. In particular, economic liberalization has enhanced the role of the market as a basic mechanism of allocation of resources and influenced every economic activity. Furthermore, the worldwide wave of technological innovations experienced in modern times has reinforced the increasing importance of the tertiary activities. As a result of this, international trade of services has recently become a relevant feature during last years. The WTO General Agreement on Trade Services (GATS), set up in January 1995 under the Uruguay Round framework, was the first international agreement on trade of services. During the IV Doha Ministerial Conference in 2001, about 140 countries established the specific criteria under which companies and individuals operate regarding services trade. Nevertheless, the recent fifth WTO Ministerial Conference in Cancun raised some doubts about the progress of commercial liberalization in services.

Services had been ignored in international commercial negotiations due to the "traditional" view that services are non-tradable activities, either because of legal, political or economic reasons, or technical restraints[1]. Besides, the traditional outlook considered services as barely dynamic and scarce innovative activities with low-skilled employees and depleted productivity. Fortunately, this perception has been changing, and now services are seen as highly knowledge-based, greatly productive and intensely innovative activities since they can be adapted to specific consumers' needs. However, technology affects each service sector in different ways, especially the strongly knowledge-based ones, such as the financial, business and communications services, which have been the fastest growing sectors ever.

The recent literature places the impact of services trade liberalization on welfare as equally relevant to the one associated with complete liberalization of trade of merchandise. Yet, in order to understand services in a better way, we should split them up into specific sectors because the particularities of services sectors may affect their exchange properties in different ways. Services are becoming more tradable, so they have increasingly been exposed to competition as a result of trade liberalization. The existing literature relates the benefits of services trade liberalization with economic performance, economic development, consumer savings, innovation, more transparency, and technology transfer[2]. The rationale for trade liberalization of services is similar to the one for goods since it assumes that market openness encourages quality and innovation, reduces waste of resources and guarantees supply of goods; thus, trade liberalization of services may enhance competition by affecting the market structure in the economy.

Moreover, efficient services are the backbone of economic productivity because they encourage international trade and competitiveness. Imports of services may provide countries the necessary inputs to produce and export goods when countries have a comparative advantage. Although the great worldwide sellers are still the industrialized countries[3], developing countries are becoming important producers and potential exporters of services as well[4].

This work analyses the primary changes in the world competitiveness of three major service sectors -Transport and Communications, Travel, and Other Business Services- by using the market share position of a set of 21 European countries. The approach we use measures the

[1] Tradability is defined as "the possibility for the cross-border delivery of final services, or of individual components (intermediate products) in the production chain of a service, without the establishment of local service facilities or the movement of either the provider or the customer". UNCTAD (2002, p. 1).

[2] The benefits derived from the liberalization of services are recognized by many scholars. This is shown in various studies such as Azad (1999) on Bangladesh; Hoekman and Mattoo (1999) on sea transportation and the reduction in flag discrimination; Wellenius (2000) on telecommunications in the Chilean economy; Van Grasstek (2001) on telecommunications in the Japanese economy; Hufbauer and Warren (1999) and Hufbauer and Findlay (1996) on transportation services in the UK and USA.

[3] For instance, in 1999 Irish computing services exports were about 5.100 million dollars and they held more than 10% of the world market share of computing services.

[4] India is a good example of success as a software exporter; Indian computing services exports increased from 225 to 1.750 million dollars within five years (from 1992-93 to 1997-98), which means a cumulative annual growth rate of 50% (Rubbin, 1999).

competitive position of the selected service sectors and analyzes their evolution based on a methodology similar to the one followed in those studies that tackle the industrial sector, which allows us to evaluate the world insertion of the European countries and, given a certain world demand, their position either as a supplier or a consumer of those services. Finally, through an empirical analysis we examine the factors explaining the competitive position adopted by those European countries in the three selected service sectors. The first step of the empirical analysis is to explore the underlying technical change and internationalization patterns of the countries using a set of economic and technological variables. Secondly, we attempt to highlight the factors determining the competitive position of the three categories of services. The model is specified and tested in a cross-sectional analysis in two world demand scenarios (1990-1995 and 1995-2000) in order to contrast different behaviours of services sectors throughout the time period.

The study is structured as follows: The first section exposes the difficulties involved in the measurement of international competitiveness. Section two develops the methodology approach for the descriptive analysis of the competitive position of the European countries, and the third section tests a dependent model to find the factors explaining the competitive position of the three selected service sectors. The final section discusses some general conclusions.

2. The measurement of the international competitiveness

It is well known that under a microeconomic scope the measurement of competitiveness does not mean, in principle, big difficulties thanks to the numerous indicators already accepted. Nevertheless, when measuring international competitiveness of a country or economic activity the difficulties tackled get much more complex. For instance, exchange rates instability halts international comparisons when comparing variables in a common unit. Therefore, one of the methods frequently used to compare competitiveness across countries is the estimation of the effective real exchange rate.

Nowadays, competitiveness is not defined only by the evolution of productivity, but other factors influencing economic activity in world markets, such as technology, innovation, available infrastructure, transnational companies' strategies, and the nature of public policies. In addition, gains or losses of competitiveness have also been related with the degree of commercial openness, public sector size, education improvements and capacity to raise exports. Thus, synergies among those elements will favour the economic dynamism.

Because of the effects of these synergies, during the last years World Economic Forum studies have become popular on the measurement of international competitiveness[5]. An alternative measure of competitiveness in industry gained importance in the last decade. At the beginning of the decade, the United Nations published "The Competitive Analysis of Nation" referred to the period of 1977-1993. The origins of this approach can be found in the works of O. Mandeng[6] based on a model of a unique equation derived from the analysis of the constant participation in the market and the planning of portfolio firm's strategies to show and compare the changes in the competitive position. More recently, a new version of this work referred to the 1985-2000 period has been published[7].

Which is the underlying methodological approach in this other form of measurement of competitiveness?

In this case, the measurement of the international competitiveness is based on the idea that the economy that improves its degree of competitiveness is the one that is able to enhance the size of its exports from goods to a certain market. The one that declines its degree of competitiveness is due to the one that increases the size of the imports coming from other countries. The greater or smaller degree of competitiveness of a sector or country shows the nature and degree of participation it has -through its exports- in the imports carried out by the analyzed market, *i.e.*, a country improves its competitiveness in the way that the

[5] The yearly publication "World Competitiveness Report" shows the classification of a broad sample of developing and industrialized countries based on their level of competition.

[6] See Mandeng, O. (1991), "International competitiveness and international specialization" in *Eclac Review*, Nº 45, December.

[7] TradeCAN, Eclac and the World Bank, Washington, 2002.

other country increases its imports coming from the former one.

In addition, the process of insertion of a country in the international economy is a phenomenon not only related to the exporting progresses carried out by the analyzed economy, but the behaviour and the actions of other competitors. With this idea, we introduce the aspect of the dynamic nature of the markets. With these approaches and without considerations of theoretical nature, *an ex—post* assessment of competitiveness is implemented, without offering an explanatory theoretical frame of the same one. Only a descriptive reference on the changes produced in the competitiveness forms and specialization of the international trade is provided. Basically, the commercial advantages and disadvantages are deduced from the actual results of the commercial exchanges. The *commercial advantage* is *revealed* through the evolution of exports -which reflects improvements in the competitiveness-, and through the evolution of imports that reflects a worsening of the commercial advantages.

Based on the aforesaid arguments, changes in international competitiveness experienced over time are measured through the analysis of different variables. The first variable is the *market share* or participation in the market which measures the portion of the market that is supplied by certain country or sector. The second variable is the *export structure* of the country. This variable reflects the relative weight of each exporting sector in total exports of that country. Finally, the *import structure* of the market means the degree of dynamism that every sector has in the analyzed import market. Thus, we apply the mentioned variables to analyze the competitiveness of the service sector. However, we should mention that research on the field of competitiveness measurement of services are still scarce, and trade statistics in services are not completely reliable (see the Appendix B for further explanation about the data coverage and reliability of the statistics of services trade).

Notwithstanding and considering the existing heterogeneity between the productive schemes of the economies, we try to identify the characteristics of the sectors that each country use in order to enter into the world market. This approach is connected with the notion of structural competitiveness which a number of authors have referred as a broad set of circumstances beyond the evolution of the relative prices, and which have an impact in the greater or smaller presence in the international economy of an country.

Certainly, behind the typology proposed is the intention to settle the importance of the technical change concerning competitiveness between countries. This argument has been set on the basis of the illustration of the international trade of natural resources versus manufactures. Nowadays, the same rationale is applied to the increasing international trade of services. This typology also links with the more recent updated studies that throughout 70´s and 80´s have been carried out concerning the description of the international trade between countries. As it is known, different economists have deepened in the research aimed at finding the logic of the present patterns of the commerce between countries, especially when a relatively broad set of emergent economies has burst into the world markets with an enormous exporting capacity and a factorial endowment that in principle would not meet the obtained levels of specialization.

Through the combination of the aforementioned variables we construct different typologies or "*competitiveness matrices*" that allow us to describe the profile in which the foreign trade of an economy develops, and suggest some evidence about why same sectors of different countries may behave differently in several markets. Bringing these variables into relation we are able to construct a number of taxonomies in order to classify the countries according to their level of competitiveness. In this work we are going to use exclusively the Market Share Competitiveness Matrix defined as follows[8]:

Different sectors of services exports might be classified according to their international competitiveness through the behaviour of the market share and the evolution of world imports over time. In fact, the world market share of each country in certain service sector may increase or diminish through time, and such modifications simultaneously take place with increases or decreases of world exporting activity.

[8] Similarly, two other matrices can be developed just by substituting the market share axe with either export structure or the specialization index, as it is shown in graph 1.

The aforesaid methodology allows classifying the exporting sectors as rising stars, missed opportunities, declining stars and retreats. The rising stars are those economic activities in which a country is raising its market share, in circumstances in which those activities have an increasing importance in the worldwide commerce. The missed opportunities take place in those sectors in which the country is losing market share in a growing world context. The declining stars are the situations of those sectors of the economic activity in which the country increases its market share in circumstances in which the international market is decreasing. Finally, we define the situation of a sector as retreat when not only the country is loosing market share, but the world import structure is decreasing (Graph 1).

Graph 1
The Competitiveness Matrix

MARKET SHARE / EXPORT STRUCTURE / SPECIALIZATION INDEX	DECLINING STARS	RISING STARS
	RETREATS	MISSED OPPORTUNITIES

IMPORT MARKET STRUCTURE

3. The international competitiveness of services in some European countries: A descriptive analysis

3.1. CONSIDERATIONS ABOUT THE DATA AND THE SAMPLE

Many scholars such as Karsenty (1999); Baker, Miozzo and Miles (2003) have been arguing that the Balance of Payments (BOP) data should be treated as "only rough proxies for services trade" because there are still some statistical problems associated with services trade data (see Appendix A for further detail). Despite the troubles, we believe that the forthcoming descriptive analysis could bring some interest highlights on competitiveness and the factors determining commercial position in services.

The sample is drawn from UNCTAD-IMF-BOP Statistics on Trade in Services by sector and country, a data-set which covers exports (credits) and imports (debits) of 11 principal services categories according to the concepts and definitions of the IMF Balance of Payments Manual (1993, BPM5)[9]. Data-set comprises 178 countries and covers a yearly time period from 1980 to 2002. The last update when finishing this paper was January 2004. The overall sample contains 21 European countries that jointly accounts for about 50 per cent of total world trade in services. The countries are listed in Table 1 which also shows the market share of each country.

We select three service sectors among the 11 BOP principal categories of services: Transport and Communications; Travel; and Other business services (see Appendix B for a detailed description) due to the following reasons:

- Recent trade developments by service sectors show that these 3 categories are highly relevant since they have accounted for more than 80% of total services trade during the decade;

- As Hauknes (1998) pointed out, services may be characterized by several features stemming from client intensity or product intangibility, so there will be consequences for their exchange properties, economic character and market structures; Therefore, by contrasting highly standardized mass services such as Transport and Communication services and highly customized services such as Travel and Business services, it allows to analyze the competitive characters of each service category;

- Trade data is more reliable for these sectors than for other service categories since most of the countries of the sample have been compiling statistics of the main categories over the whole decade[10] (see Appendix A for further detail in data coverage and reliability) and;

- These sectors have been very dynamic during the decade. Graph 2 presents the market share of the three service categories for several regional groupings in 1990 and 2000. Both European groupings (developed and developing) represent the countries of the sample. These two groupings accounted for 43% of the world market of Transport and Communication services, 54,5% of Travel services and 59,3% of Other business services in 1990. In 2000, European countries decreased its market share in all of the three service sectors up to less than 50 percent. However, during the decade the European developed countries group has decreased its market share while the European developing countries group has increased these figures. In particular, the share of the European developing countries in Travel services has significantly increased over the decade from 5,6% in 1990 to 7,3% in 2000. One of the most interesting features is that developing countries groups, either European or others, jointly accounted for

[9] The 11 principal BPM5 service components included in the figures are transport, communications, travel, construction, insurance, financial services, computer and information services, royalties and license fees, other business services, personal, cultural and recreational services and government services n.i.e.

[10] The WTO Council for Trade in Services has been noticing about data problems that could hamper the description or, even more ambitiously, the analysis of trade flows in services. The table of Appendix B reveals the sectoral level at which individual countries currently report data to the IMF. The Table shows that the ability or willingness of countries to report data for sub-sectors, where these exist (e.g. computing and information services), is rather limited.

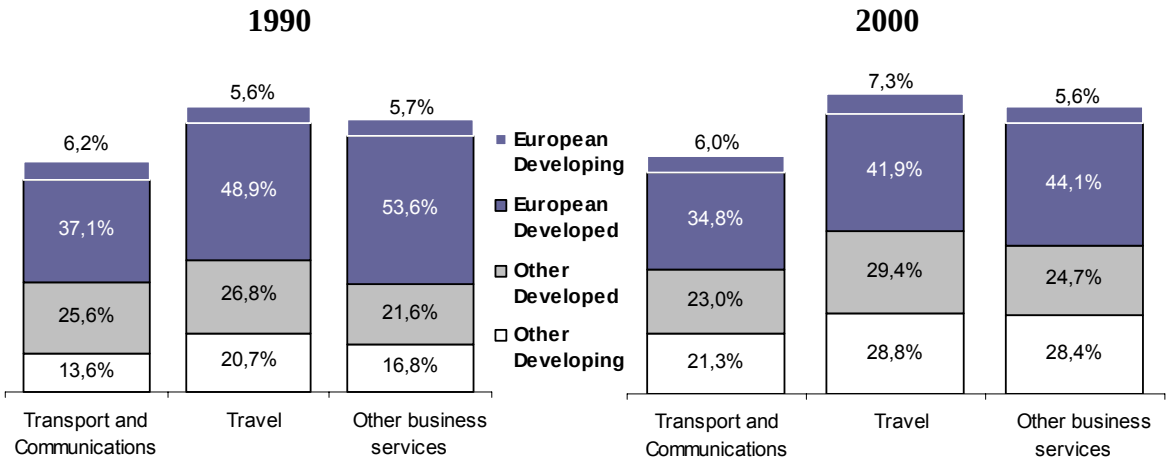
Table 1
Trade in services

	1990 – 1995		1995 - 2000	
	Total trade (Millions of US dollars)	Share in world (%)	Total trade (Millions of US dollars)	Share in world (%)
Austria	278.238,9	2,4	495.022,0	2,2
Belgium-Luxembourg	406.068,5	3,5	831.540,1	3,8
Czech Republic	46.373,7	0,4	103.340,9	0,5
Denmark	150.655,4	1,3	303.991,6	1,4
Finland	77.167,0	0,7	119.701,6	0,5
France	885.025,4	7,5	1.186.375,6	5,4
Germany	1.043.722,4	8,9	1.826.853,0	8,3
Greece	71.068,8	0,6	159.721,6	0,7
Hungary	36.175,2	0,3	88.567,1	0,4
Ireland	68.710,0	0,6	318.547,7	1,4
Italy	624.241,3	5,3	964.953,9	4,4
Netherlands	451.988,6	3,8	788.056,9	3,6
Norway	150.818,6	1,3	246.758,4	1,2
Poland	57.749,0	0,5	138.678,0	0,6
Portugal	68.395,7	0,6	122.198,5	0,6
Slovakia	11.682,4 (1)	0,1	24.928,1	0,1
Spain	309.451,3	2,6	636.893,8	2,9
Sweden	185.289,6	1,6	276.719,0	1,3
Switzerland	203.461,8	1,7	296.011,6	1,3
Turkey	84.522,0	0,7	203.429,0	0,9
United Kingdom	716.931,9	6,1	1.533.607,0	6,9
Total	5.927.737,55	50,4	10.665.895,4	48,2
World (178 countries)	11.753.363,27		22.124.783,6	

(1) 1993-1995
SOURCE: IMF-BOP Statistics on Trade in Services.

Graph 2

Market share of the service categories of study by region groupings



European Developing: Czech Republic, Hungary, Poland, Slovakia, Turkey.
European Developed: Austria, Belgium-Luxembourg, Denmark, Finland, France, Germany, Greece, Ireland, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.
Other Developed: Australia, Canada, Israel, Japan, New Zealand and United States.
Other Developing: Rest of the world.

SOURCE: Own estimations, IMF-BOP Statistics on Trade in Services.

around one-fourth of the world market in 1990 and have increased its market share up to more than one-third in 2000 in most of the service sectors. Indeed, between 1990 and 2000, European developed countries' market share significantly dropped in all sectors while developing countries and non-European developed countries obtained a better market position, which may mean that some of these groups gains might have been at the expense of European developed countries.

3.2. THE COMPETITIVE POSITION OF THE EUROPEAN COUNTRIES

In this subdivision we examine the main transformations taken place in the selected countries with regard to their international competitiveness and their penetration in the world economy, *i.e.*, the competitive position of each country in the world market of services. The evolution of the market share shows the penetration ability of the exporting sectors of each country in the international economy. Over time, countries may gain or lose presence as international suppliers of tertiary activities. Table 2 reflects the evolution of the quotas of the world market maintained by each of the selected countries.

Throughout the decade the expansion phase of the market share maintained by each one of the economies reflects different competitive behaviours. During 1990-2000, considering the total exports of services, Greece and Ireland, amongst other industrialized countries, as well as most of the developing countries showed a very competitive behaviour since they increased its market share in the world market in percentages swinging 40 percent. On the contrary, Denmark, Spain and United Kingdom improved its competitiveness moderately. Such behaviours differed from France, Finland, Germany, Italy or Norway, among others, who lost market share. The analysis by sectors showed that in 2000 the European developed economies held around a half of the world market of transport and communication services and other business services, and about two fifth parts of travel services.

In the transport and communications services sector, six of the twenty countries showed very competitive behaviours since they considerably raised their market share in 2000. Austria, Denmark, Greece and in a lower degree Spain as well as Hungary and Turkey registered a strong penetration capacity in the international market since their market shares rapidly increased (Table 2). Nevertheless, the tendency observed in the more competitive countries should not necessarily match with the world exports. Thus, in 2000 the large world exporters of this kind of international trade of services were Belgium-Luxemburg, Denmark, France, Germany, Italy, Netherlands and United Kingdom. These seven economies generated around a third of the world exports of the transport and communications services.

But as already has been said, not all of them were equally competitive. The idea of competitiveness highlighted in this paper aims at the fact that the implications for the whole economic system when being as exporter as Denmark –whose share rapidly increased from 1,9% in 1990 to 3,9% in 2000- are different from the ones caused when being an exporter like Germany –whose market share varied from over the 7% of the same n 1990 to slightly less than the 6% at the end of the decade.

In 2000, through the travel services exports, only three of the 16 industrialized European countries (Belgium-Luxemburg, Ireland and Greece) and all of the developing European countries showed very expansive commercial behaviours, so in some cases the growth rates more than duplicated. The largest world suppliers were France, Germany, Italy, Spain and United Kingdom, which as a whole controlled more than a fourth part of the world sales. Nevertheless, at the end of the period all of them lost competitiveness -specially, Germany and the United Kingdom-.

In 2000, the world exports of other business services were specially dynamic for Ireland, Spain, Sweden, United Kingdom and Czech Republic. In all of the cases, the improvement of their market shares were higher than 40% and some of them grew almost the double. Since the competitive behaviour not necessarily has to coincide with the size of the commercial presence in the market, the great world suppliers were Austria, France, Germany, Italy, Netherlands and United Kingdom, which as a whole carried out the third part of the world exports. France and Italy were the countries with the largest losses of competitiveness, since their market share declined in more than a half along the decade. These general tendencies in the sphere of competitive-

ness were in turn, very different between both five-years periods.

Indeed, between 1990 and 1995 more than a half of the European industrialized countries (13 of them) registered decreases in the market share maintained throughout its *total services exports*. On the contrary, from 1995 to 2000 a lesser number of advanced economies registered a decline in its market share (8 countries). According to the available information, between the first and the second half of the 90´s, the exports of the different categories of services showed different behaviours by countries.

In fact, during the period of 1990-1995 the world sales of transport and communications services increased only in four of the 16 industrialized European countries, while in the second half of the decade eight developed countries increased. Nonetheless, not all the economies had similar behaviours. During the first five-years period Austria almost doubled its presence in the international markets and in the second quiquennium it experienced slightly changes; Denmark registered a symmetrical competitive behaviour, since experienced a slight increase in the world market share during 1990-1995 and an increase higher than the 80% in the second half of the decade. France decreased its market share in the first time period as well as in the second one. Hungary increased its market share in both time periods.

In its turn, between 1990 and 1995, four European developed countries increased their presence in the world market of travel services (Belgium-Luxemburg, Greece, Italy and Netherlands), whereas for 1995-2000 that list was extended to five countries, excepting Italy and the Netherlands and including Ireland, Spain and Sweden with minor increases.

Behaviours in different countries were diverse during both periods; thus, in Greece the rate of expansion of shares was remarkably greater in the second five-years period than in the first one. In Italy the world market share increased in the first period and decreased and decreased in the second one; Spain experienced the contrary. The world market share held by Hungary and Poland grew more quickly in the first five-years period than in the second one.

Finally, through the exports of other business services only six of the industrialized economies increased its presence in the international markets in the first period and the second half of the decade. Between 1990 and 1995, the more dynamic industrialized European economies of other business services exports were Austria, Finland, Ireland and Spain; In all of the cases the market shares growth swang around 20-30%, while they continued being small exporters excepting Austria. Nevertheless, one of the biggest losers was France, which lost more than 30 percent of the market. During the second half of the decade, some of the more dynamic countries lost competitiveness, while others increased their market share and new competitors came into the scene; Thus, Austria and Finland lost presence in the world market (more than 10 y 50%, respectively); Ireland and Spain continued broadening its presence with much more intensity than in the first quinquennium, and Norway recovered by far the retreat registered during the first half of the decade.

Table 2
Market Share

		1990				1995				2000			
	SECTOR	Total services	Transport and communicat.	Travel	Other business services	Total services	Transport and communicat.	Travel	Other business services	Total services	Transport and communicat.	Travel	Other business services
European Countries													
Austria		2,8	0,7	5,2	3,3	2,6	1,3	3,4	4,1	2,1	1,3	2,2	3,6
Belgium-Luxembourg		3,4	3,4	1,4	4,7	2,9	3,4	1,5	3,2	3,3	3,4	1,6	2,8
Denmark		1,6	1,9	1,3	2,5	1,2	2,1	0,9	1,6	1,6	3,9	0,9	1,7
France		9,3	7,4	7,8	11,8	6,8	6,6	7,0	8,2	5,4	5,4	6,7	5,4
Finland		0,6	0,8	0,5	0,6	0,6	0,7	0,4	0,8	0,4	0,5	0,3	0,4
Germany		7,7	7,3	5,5	7,5	6,7	6,9	4,6	7,6	5,7	5,9	4,0	7,5
Greece		0,8	0,1	1,0	1,8	0,8	0,1	1,0	1,7	1,3	2,2	2,0	0,3
Ireland		0,4	0,5	0,6	0,4	0,4	0,3	0,6	0,5	1,1	0,5	0,6	0,8
Italy		6,0	4,7	6,3	8,2	5,0	3,5	7,3	4,6	3,7	2,9	5,9	3,8
Netherlands		3,6	6,0	1,6	4,0	3,7	5,9	1,7	4,2	3,1	5,0	1,6	3,4
Norway		1,5	3,9	0,6	1,1	1,1	2,7	0,6	0,6	1,1	2,7	0,4	1,1
Portugal		0,6	0,4	1,4	0,3	0,7	0,6	1,2	0,2	0,6	0,4	1,1	0,2
Spain		3,4	2,2	7,2	1,2	3,3	2,0	6,4	1,5	3,5	2,3	6,7	2,2
Sweden		1,7	2,3	1,1	0,9	1,3	1,8	0,9	0,9	1,3	1,4	0,9	1,8
Switzerland		2,3	1,5	2,9	1,6	2,1	1,4	2,4	1,5	1,9	1,5	1,7	1,2
United Kingdom		6,8	6,1	6,0	6,4	6,4	5,6	5,2	6,0	7,7	5,9	4,7	9,1
TOTAL EUROPEAN		52,5	49,3	50,3	56,3	45,6	45,1	44,9	47,2	43,8	45,2	41,3	45,4
Central and Eastern European Countries													
Czech Republic		0,3	0,7	0,2	0,2	0,5	0,6	0,7	0,6	0,5	0,4	0,6	0,4
Hungary		0,3	0,0	0,4	0,8	0,4	0,2	0,7	0,6	0,4	0,2	0,7	0,3
Poland		0,4	0,8	0,1	0,4	0,9	1,1	0,6	0,4	0,7	0,7	1,2	0,4
Slovakia						0,2	0,3	0,2	0,2	0,1	0,3	0,1	0,1
Turkey		1,0	0,4	1,2	1,5	1,2	0,5	1,3	1,2	1,4	0,8	1,7	1,5
TOTAL OTHERS		2,0	1,9	1,9	3,0	3,2	2,6	3,4	3,1	3,0	2,4	4,4	2,8
TOTAL SAMPLE		54,5	51,2	52,2	59,3	48,8	47,6	48,3	50,3	46,9	47,6	45,6	48,2

Market Share
Rate of Growth

SECTOR	1990 - 1995 Total services	Transport and communicat.	Travel	Other business services	1995 - 2000 Total services	Transport and communicat.	Travel	Other business services
European Countries								
Austria	-7,3	88,1	-34,3	25,0	-20,8	3,9	-36,2	-11,5
Belgium-Luxembourg	-16,4	0,5	3,2	-31,8	14,3	0,1	8,9	-10,7
Denmark	-20,1	14,5	-27,5	-34,7	29,7	82,0	-5,8	3,8
France	-26,3	-11,2	-10,8	-30,6	-21,6	-17,8	-3,7	-34,6
Finland	6,8	-15,5	-8,8	33,4	-32,2	-26,9	-26,5	-52,2
Germany	-13,4	-5,4	-17,4	1,8	-14,5	-15,3	-12,5	-1,9
Greece	-1,9	-18,2	4,8	-4,4	63,1	1784,1	91,1	-85,1
Ireland	-2,5	-26,9	-0,7	24,6	172,5	36,6	2,6	71,6
Italy	-16,9	-25,5	14,4	-44,2	-25,2	-17,7	-18,0	-15,9
Netherlands	5,0	-2,5	3,8	5,5	-18,2	-15,4	-6,2	-18,5
Norway	-28,3	-29,0	-6,5	-45,9	2,8	-2,9	-21,5	88,1
Portugal	8,3	62,7	-10,9	-26,0	-16,0	-23,3	-7,0	-8,7
Spain	-3,6	-6,9	-10,0	21,3	8,4	13,7	4,1	51,0
Sweden	-23,8	-22,6	-21,9	-1,6	5,6	-24,1	0,3	102,6
Switzerland	-7,7	-11,0	-16,3	-4,7	-9,6	8,2	-29,6	-20,5
United Kingdom	-6,5	-9,0	-13,8	-7,2	20,8	4,9	-8,9	52,5
TOTAL EUROPEAN	-13,2	-8,7	-10,6	-16,1	-3,8	0,2	-8,1	-3,8
Central and Eastern European Countries								
Czech Republic	68,5	-14,9	300,3	154,1	-17,2	-25,4	-11,5	-37,4
Hungary	20,3	699,9	76,2	-23,3	-5,0	5,6	11,4	-43,6
Poland	123,4	27,4	322,3	-1,4	-20,8	-30,9	111,0	-18,4
Slovakia					-23,3	2,9	-40,4	-37,1
Turkey	22,0	30,0	0,8	-20,9	13,9	49,5	32,0	29,7
TOTAL OTHERS	58,0	34,8	74,5	2,9	-5,4	-7,1	28,8	-10,0

3.3. IMPORT STRUCTURE OF THE WORLD MARKET

Table 3 reflects the exchanges registered between 1990 and 2000 by the world imports of services. The table shows the activities that gained importance within the international trade and the ones that lost it. The idea is that the greater or smaller degree of dynamism in the international trade of services is associated to the greater or smaller weight that such activities have within the import structure of the world. Those imports of services that gain weight within the world imports will be the reflection internationally dynamic activities and the contrary in the inverse case.

The first relevant fact was, according to the available data, the three analyzed service sectors lost some dynamism in the international trade since in 1990 jointly represented more than the four fifth parts of the world imports while in 2000 were little more than the three fourth parts. In the analyzed decade the *world imports* of services of *transport and comunications*, travel and other business services as a whole registered a slight slowdown (-4.5%) (Table 3).

The second significant fact that is shown is that all the analyzed activities of imports decreased its importance within the worldwide commerce of services. That it to say, that all of them were less dynamic at the end of the period than at the beginning.

In that lapse the less dynamic activity was the one related to imports of *transport and communications services* that due to a decline of almost 10%, passed from more than a fourth of the world imports to represent slightly less than 25%. Also, the world imports of *travel services* and *other business services* decreased, while the size of the declines was by far less.

Between 1990 and 1995 only the exports of *travel services* seemed to be slightly dynamic; they increased their relative weight in the world import structure from 31% to 32%. At the same time, imports of *other business services* and *transport and communication services* fell between 3 and 4%, respectively.

On the other hand, in the space 1995-00 the exports activities of *transport and communications services* and *travel services* lost dynamism (-5% and -6%, respectively) while *other business services* increased it slightly (2%).

Table 3

World Import Structure

	1990	1995	2000
Total services	100,0	100,0	100,0
Three sectors analyzed:	82,4	81,3	78,6
Transport and communicat.	26,8	25,7	24,2
Travel	31,5	32,2	30,6
Other business services	24,1	23,4	23,8

World Import Structure
Rate of Growth (%)

	1990	1995	2000
Three sectors analyzed:	-4,6	-1,3	-3,3
Transport and communicat.	-9,7	-4,1	-5,8
Travel	-2,9	2,2	-5,0
Other business services	-1,2	-2,9	1,7

3.4. THE MARKET SHARE COMPETITIVENESS MATRIX

As it has been already indicated, a first procedure of measurement of a country's competitiveness consists of analyzing simultaneously the changes in the market share that an economy holds in the world market with the changes that are taken place in this last one throughout time. An exporting sector of a country can be winning or losing world market share at the same time that the international trade of that sector is enhancing or reducing. Such behaviours allow classifying the different sectors from the perspective of their greater or smaller competitiveness.

Countries´ behaviours are very different. They are bringing about by the international economy as demander of tertiary activities and by the capacity of penetration in the international markets by the exporters countries. This idea is reflected in Table 4 and in the Appendix C. In effect, in this table countries and sectors examined in accordance with those criteria have been ordered. In general terms there is a variety of situations throughout the two sub periods analyzed. Thus, in the lapse of 1990-1995 all the economies classified the export activities of transport and communications services and of other business services as declining stars or retreats. By contrast, in the same space of time, the exports of travel services were rising stars or missed opportunities (Table 4).

Likewise, in the second quinquennium those behaviours were modified and the exports activities of transport and communications services continued classified as declining stars or retreats, joined by the travel services ones; by contrast the exports of other business services were considered as rising stars or missed opportunities. Thus, along 1990-95 while the worldwide markets of transport and communications services lost dynamism because world import decreased, some countries increased their market share and others reduced it. As it is evident, each country increased or decreased its market share in a different proportion; the dispersion between each of them varied according to the cases. The first ones were declining stars and the second ones retreats.

For Austria, Belgium-Luxemburg, Denmark and Portugal among other countries, this activity was considered as declining stars, because at the same time that the world market dropped, their market share rose. For instance, Austrian market share grew almost 90% and world imports reduced 4%; in the same contest exports from the Danish and Portuguese economy gained market share (14,5 and more than 60%, respectively). These countries increased its competitiveness levels in the contest of an activity internationally less dynamic (Table 3). For France, Finland and Germany, among others, transport and communications services exports were a retreat because at the same time that the world market decreased their market share declined; their market shares decreased (11, 15,5 and 5,5%, respectively) in a declining international market. This behaviour was worse than the one associated to the declining stars.

Along the same period of time, the worldwide markets of other *business services* lost dynamism because world imports decreased and in that context some countries increased their market share and others decreased their market share. The first ones were *declining stars* and the second ones *retreats*.

Among others, Austria, Finland, Ireland and Spain increased their market shares; all of them around 20-30%; as these circumstances developed in a context of a world imports reduction (-3%), this activity was a *declining stars* to them. These countries rose its competitiveness levels in the context of an activity internationally less dynamic. On the other hand, to Denmark and Norway for instance, the same activity was classified as *retreats* due to the market share reduction that they registered; for those countries the economic implications of this performance was rather worse (Table 4).

Finally, between 1990-95 while the worldwide markets of *travel services* gained dynamism because world import increased, some countries rose their market share and others reduced it. The first ones were *rising stars* and the second ones *missed opportunities*. For Greece, Netherlands and Italy, among others, exports of these services gained market share; around 4-5% the two first ones and 15% the third one. These behaviours developed at the same time that the world import of these types of services increased (2%). As a consequence these exports were classified as *rising stars* and these countries performed in the best way its competitiveness levels.

Nevertheless, to Austria or Denmark, for instance, this export activity was considered as a *missed opportunity* because they dropped their market shares about 30%; these countries were less competitive because they lost market share in the context of an internationally dynamic activity.

As it has been already indicated, in some cases these tendencies changed along 1995-2000. The pattern showed in the second quinquennium by *other business services* and *travel services* were very different. However, *transport and communications* showed the same behaviours than in the first half of decade (Table 4 and appendix C).

While the worldwide markets of *other business services* increased its dynamism because world imports grew, some countries increased their market share and others decreased it. The first ones were *rising stars* and the second ones *missed opportunities*. Exports from Ireland, Norway and Sweden increased their market shares in a strong way and at the same time world imports rose almost 2%. As a result these exports activities were considered as *rising stars*. These exporters countries gained competitiveness. But to France or Finland, for instance, these exports were *missed opportunities* due to despite the world imports increase they reduced its market shares (35 and 50%); as consequence they reduced its competitiveness level.

In turn, in a context in which the worldwide markets of *travel services* lost dynamism because world imports decreased, some countries increased their market share and others decreased their market share. The first ones were *declining stars* and the second ones *retreats*. So, world market imports dropped 5% and France and Italy –among others- decreased their market shares 4 and 18%, respectively. To these countries exports of travel services were *retreats*. In competitive terms this was equivalent to the worse ones of all words. To others countries (Greece and Spain) the same type of exports was a *declining star* due to they increased its market share in different proportions (4% and 90%, respectively) despite the worldwide fall.

Finally, according with the available data, between 1990-95 and 1995-00 there was no changes in competitiveness level to exports of *transport and communications services*. Throughout the second quinquennium world import decreased around 6%. And in this context, some economies (Denmark, Ireland) rose highly their market shares (80 and 35%, respectively). They were *declining stars*. Others countries (France and Germany) dropped their commercial presence (around 15%) and then were classified as *retreats*.

Table 4
Competitiveness Matrices
Market Share

1990 - 1995

	TRANSPORT AND COMMUNICATIONS			TRAVEL			OTHER BUSINESS SERVICES		
	WORLD IMPORT MARKET		MARKET SHARE BY COUNTRY	WORLD IMPORT MARKET		MARKET SHARE BY COUNTRY	WORLD IMPORT MARKET		MARKET SHARE BY COUNTRY
European Countries									
Austria	-4,1	D.S.	88,1	2,2	M.O.	-34,3	-2,9	D.S.	25,0
Belgium-Luxembourg	-4,1	D.S.	0,5	2,2	R.S.	3,2	-2,9	R.	-31,8
Denmark	-4,1	D.S.	14,5	2,2	M.O.	-27,5	-2,9	R.	-34,7
France	-4,1	R.	-11,2	2,2	M.O.	-10,8	-2,9	R.	-30,6
Finland	-4,1	R.	-15,5	2,2	M.O.	-8,8	-2,9	D.S.	33,4
Germany	-4,1	R.	-5,4	2,2	M.O.	-17,4	-2,9	D.S.	1,8
Greece	-4,1	R.	-18,2	2,2	R.S.	4,8	-2,9	R.	-4,4
Ireland	-4,1	R.	-26,9	2,2	M.O.	-0,7	-2,9	D.S.	24,6
Italy	-4,1	R.	-25,5	2,2	R.S.	14,4	-2,9	R.	-44,2
Netherlands	-4,1	R.	-2,5	2,2	R.S.	3,8	-2,9	D.S.	5,5
Norway	-4,1	R.	-29,0	2,2	M.O.	-6,5	-2,9	R.	-45,9
Portugal	-4,1	D.S.	62,7	2,2	M.O.	-10,9	-2,9	R.	-26,0
Spain	-4,1	R.	-6,9	2,2	M.O.	-10,0	-2,9	D.S.	21,3
Sweden	-4,1	R.	-22,6	2,2	M.O.	-21,9	-2,9	R.	-1,6
Switzerland	-4,1	R.	-11,0	2,2	M.O.	-16,3	-2,9	R.	-4,7
United Kingdom	-4,1	R.	-9,0	2,2	M.O.	-13,8	-2,9	R.	-7,2
CEECs									
Czech Republic	-4,1	R.	-14,9	2,2	R.S.	300,3	-2,9	D.S.	154,1
Hungary	-4,1	D.S.	699,9	2,2	R.S.	76,2	-2,9	R.	-23,3
Poland	-4,1	D.S.	27,4	2,2	R.S.	322,3	-2,9	R.	-1,4
Slovakia							-2,9		
Turkey	-4,1	D.S.	30,0	2,2	R.S.	0,8	-2,9	R.	-20,9

Competitiveness Matrices
Market Share

1995 - 2000

	TRANSPORT AND COMMUNICATIONS			TRAVEL			OTHER BUSINESS SERVICES		
	WORLD IMPORT MARKET		MARKET SHARE BY COUNTRY	WORLD IMPORT MARKET		MARKET SHARE BY COUNTRY	WORLD IMPORT MARKET		MARKET SHARE BY COUNTRY
European Countries									
Austria	-5,8	D.S.	3,9	-5,0	R.	-36,2	1,7	M.O.	-11,5
Belgium-Luxembourg	-5,8	D.S.	0,1	-5,0	D.S.	8,9	1,7	M.O.	-10,7
Denmark	-5,8	D.S.	82,0	-5,0	R.	-5,8	1,7	R.S.	3,8
France	-5,8	R.	-17,8	-5,0	R.	-3,7	1,7	M.O.	-34,6
Finland	-5,8	R.	-26,9	-5,0	R.	-26,5	1,7	M.O.	-52,2
Germany	-5,8	R.	-15,3	-5,0	R.	-12,5	1,7	M.O.	-1,9
Greece	-5,8	D.S.	1784,1	-5,0	D.S.	91,1	1,7	M.O.	-85,1
Ireland	-5,8	D.S.	36,6	-5,0	D.S.	2,6	1,7	R.S.	71,6
Italy	-5,8	R.	-17,7	-5,0	R.	-18,0	1,7	M.O.	-15,9
Netherlands	-5,8	R.	-15,4	-5,0	R.	-6,2	1,7	M.O.	-18,5
Norway	-5,8	R.	-2,9	-5,0	R.	-21,5	1,7	R.S.	88,1
Portugal	-5,8	R.	-23,3	-5,0	R.	-7,0	1,7	M.O.	-8,7
Spain	-5,8	D.S.	13,7	-5,0	D.S.	4,1	1,7	R.S.	51,0
Sweden	-5,8	R.	-24,1	-5,0	D.S.	0,3	1,7	R.S.	102,6
Switzerland	-5,8	D.S.	8,2	-5,0	R.	-29,6	1,7	M.O.	-20,5
United Kingdom	-5,8	D.S.	4,9	-5,0	R.	-8,9	1,7	R.S.	52,5
CEECs									
Czech Republic	-5,8	R.	-25,4	-5,0	R.	-11,5	1,7	M.O.	-37,4
Hungary	-5,8	D.S.	5,6	-5,0	D.S.	11,4	1,7	M.O.	-43,6
Poland	-5,8	D.S.	-30,9	-5,0	D.S.	111,0	1,7	M.O.	-18,4
Slovakia	-5,8		2,9	-5,0	R.	-40,4	1,7	M.O.	-37,1
Turkey	-5,8	D.S.	49,5	-5,0	D.S.	32,0	1,7	R.S.	29,7

4. Exploring some determinants of the competitive position in services

The main focus of this section is on the empirical analysis of the factors explaining the competitive position -analyzed in prior sections- adopted by the 21 European countries in service sectors: 1) Transport and Communications; 2) Travel; 3) Other Business Services. First, using a set of 12 variables the empirical analysis performed here examines the underlying technical change and internationalization patterns of the European countries. Second, we attempt to highlight the factors determining the competitive position of the three categories of services. The model is tested in a cross-sectional analysis in two world demand scenarios of the 90's.

In order to accomplish the first objective, we use factor analysis to identify the structure relationships among the 12 variables and find the patterns of technical change and internationalization of the European countries of the sample during two time periods (1990-1995 and 1995-2000). Afterwards, dependence techniques allow us to describe the competitive position of the three service sectors for each time period.

4.1. VARIABLE SELECTION AND MEASUREMENT ISSUES

The competitive position is determined for both time periods (see Table 5). As acknowledged in prior sections, the country's competitive position in a particular service sector is determined on the basis of its market share path, either increasing or decreasing, due to the world market path, *i.e.*, the world import structure. Thus, the market share reflects the capacity that each country has to penetrate different international markets; this is the dependent variable.

Table 5
Competitive position

	1990-1995 Market share path			1995-2000 Market share path		
	Transport and Communicat.	Travel	Other Business Services	Transport and Communicat.	Travel	Other Business Services
Austria	I	D	D	I	D	D
Belgium-Luxembourg	I	I	D	I	I	D
Czech Republic	I	I	I	D	D	D
Denmark	I	D	D	I	D	I
Finland	D	D	I	D	D	D
France	D	D	D	D	D	D
Germany	D	D	I	D	D	D
Greece	D	I	I	I	I	D
Hungary	I	I	D	I	I	D
Ireland	D	I	I	I	I	I
Italy	D	I	D	D	D	D
Netherlands	I	I	I	D	D	D
Norway	D	D	D	D	D	I
Poland	I	I	I	D	I	D
Portugal	I	D	D	D	D	D
Slovakia	I (1)	I (1)	D (1)	I	D	D
Spain	D	D	I	I	I	I
Sweden	D	D	I	D	D	I
Switzerland	D	D	I	I	D	D
Turkey	I	I	D	I	I	I
United Kingdom	D	D	D	I	D	I
World demand path	D	I	D	D	D	I

(1) 1993-1995
I Increasing during the period
D Decreasing during the period

SOURCE: IMF-BOP Statistics on Trade in Services.

As UNCTAD has pointed out, the potential for international trade in services is given by the tradability of a service depending on many factors such as market and supply conditions or the competitive advantages of different countries. In the case of services embodied in goods, delivery implies physical cross-border transportation, but for intangible services and embodied in information, supply involves telecommunication networks. Consequently, the tradability of a service depends on technical factors that determine the possibilities for its transport and economic factors related to the economic viability of the cross-border transport of a service, as well as rules and regulations that allows cross-border transactions to take place in the concerned service.

Following most of the recent literature in the field, we specify a set of 12 variables affecting competitiveness in services. Table 6 shows the variables and sources we use for the empirical analysis. The variables were drawn at a country level from several sources and time periods. When no yearly data of the independent variables were available we drew existing values closest to the time periods of study.

Table 6
Description of the variables and sources

	Variable	Time period	Source
X_1	High education: Students in tertiary education as a % of total population.	1988-1990 and 1998-2000	UNCTAD estimates, World Investment Report 2002.
X_2	Education expenditure as Gross National Product.	1985-1987 and 1995-97	UNESCO, Informe sobre el Desarrollo Humano 2002.
X_3	Cross-border mergers and acquisitions purchases of country purchaser as % of world mergers and acquisitions purchases (average).	1990-1995 and 1995-2000	UNCTAD, cross-border M&A database, World Investment Report 2002, Annex B.
X_4	Inward FDI Performance Index (country's share in global FDI flows to its share in global GDP).	1988-1990 and 1998-2000	World Investment Report 2002, UNCTAD.
X_5	GDP per capita (average).	1990-1995 and 1995-2000	Penn World Table, version 6.1, Center for International Comparisons at the University of Pennsylvania, 1950-2000.
X_6	Country risk.	1991 and 2001	World Investment Report 2002, UNCTAD.
X_7	Cross-border mergers and acquisitions sales of country seller as % of world mergers and acquisitions sales (average).	1990-1995 and 1995-2000	UNCTAD, cross-border M&A database, World Investment Report 2002, Annex B.
X_8	R&D Scientists and researchers per million of inhabitants.	1987 and 1997	World Development Report 2000/2001, UNCTAD.
X_9	R&D expenditures as % of GDP.	1997 and 1999	UNCTAD estimates, World Investment Report 2002
X_{10}	Connectivity Index (Internet hosts per capita, PC's per capita, telephone mainlines per 1.000 inhabitants, mobiles subscriptions per capita).	1999 and 2000	STARS database, International Telecommunication Union (ITU), UNCTAD, Telecommunications database.
X_{11}	Access Index (Internet users per capita, literacy, GDP per capita, cost of a local call).	1999 and 2000	STARS database, International Telecommunication Union (ITU), UNCTAD, Telecommunications database.
X_{12}	High technology imports as total manufacturing imports.	1990-1995 and 1995-2000	United Nations Statistics Division (database COMTRADE and estimates).

As noted by the UNCTAD, tradability of services has been enhanced by technological developments, in particular, by rapid progress in diffusion and application of advanced information and communication technologies. *Economic factors* play an important role in creating the necessary conditions for tradability. We select some of the variables (GDP per capita, Country risk and High education) used by UNCTAD to bring in the FDI Potential Index -

to rank countries according to their potential to attract FDI- because these variables are host factors expected to affect competitiveness.

The *Gross Domestic Product per capita* is a measure of the level of economic development of a country. It captures the size and sophistication of the demand of goods and services. It also shows the availability of developed institutions. In many sectors, a strong domestic market plays a key role as the platform for developing export capacity. This pattern is evident in communications and related services and higher education services. In addition, higher GDP often connotes stronger innovative and competitive capabilities.

Country risk is an indicator of the degree of political, economic and social stability for a country. It includes the political and commercial risks related to investing in a country. Political risk is related with factors such as government's ability to fulfill its commitments and commercial risk to factors such as currency shortages and sudden devaluations or financial crises that affect the ability of investors to plan for and meet financial commitments. In this sense, country risk plays a crucial role in determining export structures of the countries. Country ratings are on a scale of 0-100; the higher the number, the lower the risk.

Students in tertiary education as a percentage of total population is a measure of the extent of higher education and related skills that a country's workforce embodies. An educated and skilled workforce is an inducement for industries facing global and regional competition. In addition, *Education expenditure* means the investment effort in the skilled workforce.

The Inward FDI Performance Index introduced by UNCTAD is the ratio of a country 's share in global FDI flows to its share in global GDP. Countries with an index value of one receive FDI exactly in line with their relative economic size. Countries with an index value greater than one attract more FDI than may be expected on the basis of relative GDP. On the other hand, countries with index values below one may suffer from instability, poor policy design and implementation or competitive weaknesses in their economies. The Inward FDI Performance Index is formulated as follows:

$$IND_i = \frac{FDI_i / FDI_w}{GDP_i / GDP_w}$$

Where,
IND_i = Inward FDI Performance Index of the i^{th} country
FDI_i = FDI inflows in the i^{th} country
FDI_w = World FDI inflows
GDP_i = GDP in the i^{th} country
GDP_w = World GDP.

Mergers and acquisitions have played an important role in the process of internationalization, including different modes of delivery for various services. However, as some studies have stated internationalization has often taken place through FDI in certain services such as management consulting and accounting. In contrast, engineering consulting internationalization often involves temporary movement of people, as consultants travel to new project sites to gather information and design new solutions to technical and operational problems. Consequently, we may analyze the impact of different modes of internationalization on increased tradability of the selected services categories.

While macroeconomic factors play a role, we argue that *technological variables* have an equally significant role in accounting for the competitive position. As mentioned previously, the increasing tradability of services and the growth of trade in services are related to new possibilities created by the development of technological factors. For instance, by using information and communications technologies (ICT), service products can be transported instantly over long distances. The most visible outcome of this development so far has been the globalization of currency markets based on the establishment of international financial networks and the growing international trade in banking services (UNCTAD, 2002). Moreover, many studies from the World Trade Organization have shown that travel services seem particularly well suited to exploit the opportunities for internationalization of activities. Some studies have argued that the development of international tourism relies on the effective commercialization of tourism products to consumers at tourism-originating countries. World information and distribution networks play a decisive role in the international tourism sector, since they bring the buyers and producers of tourism products into contact. Internet is the backbone of world information

networks, which provide the infrastructures and networking facilities for airlines, tour operators, travel agencies and other tourism operators to process and obtain information, make reservations and market tourism products.

The *Connectivity Index and Access Index* are two of the four ICT development indices formulated by UNCTAD (2003) to evaluate countries' ICT capabilities. Connectivity refers to the physical infrastructure available in a country. It represents the minimum set of measures necessary for ICT access comprising: Internet hosts per capita as a measure of the Internet penetration of a country and the degree of national connectivity; PCs per capita as key components of Internet access with significant implications for ICT adoption; Telephone mainlines per capita as a basic limiting factor of connectivity and representative of potential levels of dial-up access and; Mobile subscribers per capita as an increasing ICT access. The Connectivity Index excludes supporting infrastructure (such as electricity supply and transport), affordability and broadband access. The Access Index refers to the factors determining use of ICT. It includes Internet users per capita as an ex-post measure of the level of Internet use achieved by a nation in realized access to the Internet; Basic literacy as an identified pervasive barrier to Internet access; GDP per capita and Cost of a local call as income and prices are an important measure and determinant to access.

The R&D expenditures as a percentage of GDP and *R&D scientists and researchers per million of inhabitants* indicate the *technological capabilities* of an economy, including innovative capacity. As some authors have emphasized, R&D in services may be less formal in both its content and forms of organizations, and the output of R&D activity has traditionally been less "patentable" than in manufacturing due to the highly intangible nature of services (Cowan, Soete and Tchervonnaya, 2001). Nevertheless, some service sectors are now recognized to be significant R&D performing sectors and play a significant role in the generation and distribution of new technology (Hauknes, 1998).

The *High technology imports as total manufacturing imports* is an indicator of performance in high-tech industries. The share of high-technology products in any country's own import structure depicts how much any particular country or region adapts its demand structure to high technology products. High-tech imports play a crucial role in improving not only the global allocation of physical resources (goods and specialized equipment), but in transmitting technology globally and affecting competitive advantages.

4.2. SOME THEORETICAL PROPOSALS OF THE RECENT LITERATURE

Once we defined the main concepts and relations between the variables, we considered pertinent to show the manner several scholars have interrelated such concepts and relations on a theoretical basis. As we have mentioned in prior sections, research in the field indicates that services may be characterized by several features (client intensity and product intangibility), so they will affect the exchange properties of services. Scholars argue that characteristics like these might be relevant for activities within the tertiary sectors of the economy, and they will have consequences for their competitiveness. Therefore, the following propositions flow in recent literature from these considerations:

- Technological improvements have revolutionized the scope and range of services tradability across borders (White, Griffith and Ryans, 1998). The revolution in ICT has important qualitative effects on the structure and management of services. ICT applications are particularly apparent in some service sectors (such as transport and travel which involve support for logistics and route planning). As Miozzo and Ramirez (2003) note, developments in ICT enable services to considerably expand their market for domestic and international transactions. Transportability of services has traditionally been constrained by the need for geographical or time proximity of production and consumption, often underpinned by large-scale capital investment in infrastructure. New technologies act simultaneously to collapse the space/time dimension and to reduce the need for infrastructure (Miozzo and Soete, 2001).

- Knowledge-intensive services, such as consulting services, are activities increasingly traded within and across national borders. This is a function of both a dramatic increase in services in relation to the value of

physical products and the growing externalization of a number of service sectors. However, it has been pointed out that recourse to external business services involves not just a simple substitution of internal services but is, instead, a rather more complex process of knowledge transfer that requires reciprocal learning and interaction. The supply of these knowledge-intensive services is highly segmented between relatively dominant TNCs and national and local small and medium-sized firms in the most developed economies. Information technology plays a crucial role as the increased use and capacity of computers stimulates the externalization of formerly in-house information processing, analytical and knowledge functions and facilitates the operation of a number of small specialized firms (Miozzo and Soete, 2001).

- It is possible to identify which services are more oriented towards international trade, FDI or mergers and acquisitions; therefore, services can be linked with modes of supply[11].

  Travel and some transport and communications services broadly correspond to international trade under modes 1 and 2. FDI (mode 3) requires low mobility of both provider and clients and, normally, overcomes high reputation costs and is linked to retailing, banking or business services. In particular, business services are increasing in importance and now lead the number of mergers and acquisitions operations in Europe (Rubalcaba and Cuadrado, 2001).

- As some scholars have stressed[12], there might be a variety of innovation patterns within service sectors, which certainly should discourage any simple generalization about innovation in services. Since innovative capacity may be an important source of competitiveness, R&D activities might affect the competitive position of services in different ways, depending on the varied nature of service activities.

4.3. MODEL SPECIFICATION

We use factor analysis to identify the structure relationships among the 12 variables and find out the patterns of technical change and internationalization of the European countries of the sample. Factor analysis can identify the structure of the aforementioned set of 12 variables. By grouping the variables, we will be able to see the "big picture" in terms of understanding the technological and internationalization patterns of the European countries of the sample during the target decade.

In order to determine the appropriateness of factor analysis we use the Bartlett test of sphericity and the measure of sampling adequacy (MSA). The statistical tests show that nonzero correlations exist at a significance level of 0,001. The reduced set of variables collectively meets the necessary threshold of sampling adequacy for both time periods (see correlation and anti-image matrices in Appendix D). Each of the variables also exceeds the threshold value, indicating that the reduced set of variables meets the fundamental requirements for factor analysis.

We use Principal Component Analysis to extract the components. For both periods we decided to retain four components which represent 88 percent of the variance of the 12 variables in the first time period, while in the second time period the four factors retained represent 86 percent of the total variance. The VARIMAX[13] rotated component analysis factor matrices are shown in Tables 7 and 8 for each one of the time periods.

[11] Following the *General Agreement on Trade in Services* and to clarify how trade in services takes place, the *Manual on Statistics of International Trade in Services (MSITS)* describes four modes through which services may be traded internationally. It does so by considering the location of both the supplier and consumer of the traded service. "The first of these modes, mode 1 or *cross-border supply*, applies when suppliers of services in one country supply services to consumers in another country without either supplier or consumer moving into the territory of the other. Mode 2, *consumption abroad*, describes the process by which a consumer resident in one country moves to another country to obtain a service. Further, enterprises in an economy may supply services internationally through the activities of their foreign affiliates abroad. This mode of supply, mode 3, is called *commercial presence*. The last of these modes of supply, mode 4 or *presence of natural persons* describes the process by which an individual moves to the country of the consumer in order to provide a service, whether on his or her own behalf or on behalf of his or her employer." (MSITS, 2002, p. 1).

[12] For example, using the results of the 1993-95 Italian innovation survey, Evangelista concludes that R&D activities represent an important innovation source only for a small number of science and technology-based industries (Evangelista, 2000).

[13] The VARIMAX rotation is orthogonal, meaning that the factors remain uncorrelated throughout the rotation process.

The first matrix (period 1) shows for the factor one two groups of variables. The first group is concerned with economic conditions (high education, GDP per capita and country risk) while the second group refers to ICT circumstances, both of which have positive signs. Thus, economic performance and ICT development vary together.

For factor 2, we note that variables of innovation capabilities (R&D scientists and R&D expenditures) are both related to education expenditures. The three variables are of the same sign, suggesting that innovation and education efforts of the countries are positively related among the countries of the sample.

Factor 3 has two significant loadings in M&A sales and purchases variables, both are of the same sign. This result would indicate that as M&A sales increase, M&A purchases increase as well.

Turning next to factor 4, we observe that the FDI Performance Index and imports of high technology move in opposite directions to each other. This situation suggests that countries with low performance of FDI have to acquire foreign technology that is not being locally created.

Table 7
Rotated Component Matrix

	1990 - 1995					
Variables	Component				Communality	
	1	2	3	4		
High education	,896					,854
Access Index	,852					,858
GDP per capita	,840					,911
Connectivity Index	,787					,909
Country risk	,772					,882
R&D scientists		,854				,891
Education expenditures		,828				,821
R&D expenditures		,823				,822
M&A sales			,979			,984
M&A purchases			,974			,976
FDI Performance Index				-,816		,814
High tech imports				,722		,858
					Total	
Sum of squares (eigenvalue)	3,8	3,1	2,3	1,4	10,6	
Percentage of trace	31,9	26,1	19,2	11,0	88,2	

We observe in the following Table 9 that factors in the second matrix (second period) may be grouped in a different way.

Table 8
Rotated Component Matrix

Variables	1995 - 2000					
	Component				Communality	
	1	2	3	4		
R&D scientists	,915					,903
Access Index	,850					,910
R&D expenditures	,844					,864
Connectivity Index	,824					,918
Education expenditures	,802					,811
Country risk	,778					,894
GDP per capita	,725					,902
High tech imports	,540					,419
M&A sales		,965				,953
M&A purchases		,955				,938
High education			,896			,838
FDI Performance Index				,950		,932
					Total	
Sum of squares (eigenvalue)	5,1	2,2	1,8	1,2	10,4	
Percentage of trace	42,6	18,3	15,0	9,8	85,7	

For new Factor 1 we see that has grouped not only the economic and ICT variables of former Factor 1, but the variables of prior Factor 2 (innovation and education efforts). This situation suggests that both economic and ICT performance, as well as innovation and education efforts are becoming quite similar among the countries of the sample at the end of the decade.

For factor 2, we note that M&A sales and purchases variables remain together with significant higher loadings. However, high education variable of Factor 3 has drift apart from former Factor 1, which would indicate some rift between economic and technology performance and high education.

Finally, for Factor 4 we observe that high-tech imports variable has a lower communality in the second time period, which means that a substantial portion of its variance is unaccounted for by the factors. For this reason the variable has moved away from the FDI Performance Index of former Factor 4. To summarize, the factors were labeled in order to assign some meaning to the factor solution and make an easier interpretation (see Tables 9 and 10).

Table 9
Interpretation of the factors, 1990 – 1995

Factor	Label	Variables	Meaning
1	Economic and ICT performance	GDP per capita, Country risk, High education, Access Index, Connectivity Index	Structural factors related to the use and infrastructure of ICT
2	Capital investment	R&D scientists, R&D expenditures, education expenditures	Innovation capabilities associated with human investment
3	Mergers and acquisitions	Sales and purchases of M&A	Internationalization through M&A
4	FDI / High tech	FDI Performance Index, High tech imports	Internationalization through foreign technology and investment

Table 10
Interpretation of the factors, 1995 – 2000

Factor	Label	Variables	Meaning
1	Economic, technological and innovative performance	GDP per capita, Country risk, Access Index, Connectivity Index, R&D scientists, R&D expenditures, education expenditures	Structural and technological factors associated to capital investment
2	Mergers and acquisitions	Sales and purchases of M&A	Internationalization through M&A
3	High education level	High education	Skilled human capital
4	FDI	FDI Performance Index	Internationalization through foreign investment

Factor analysis has been useful to examine the underlying relationships of the variables among the countries of the sample and the changes in these patterns along the decade.

The next objective is to identify the affecting competitive position in both time periods. In other words, we want to determine which of the 12 variables (independent variables) contribute the most to explaining the competitive position (two-group dependent variable). To do so, logistic regression analysis was selected as the appropriate statistical technique when the dependent variable is categorical and the independent variables are metric. We apply binary regression models at a sectoral level, *i.e.*, for each one of the three service categories (Transport and Communications; Travel; and Other business services), in a cross-section analysis for both time periods. The models were estimated using forward the stepwise method to only include predictors that contribute significantly to the model. In the following section, we present the models' results for each one of the service categories contrasting both time periods.

In the case of other business services, logistic models showed for both time periods that no variables are significant to explain the competitive position, so the results for his service category were omitted from our analysis. For the rest of the service sectors of study (Transport and communications and Travel services) the results of the logistic regressions are shown in Table 11.

Table 11 shows that the estimated coefficients (β) present positive values excepting for the FDI Performance Index variable. This indicates that the variables with a positive sign explaining the competitive position do decrease the probability of increasing the market share, while the negative values increase the predicted probability. Positive estimated coefficients show, as it was expected, antilog values (e^{β}) greater than one, so the odds ratio increase and the model has a higher predicted probability of occurrence. However, it is interesting to note that Education expenditures coefficient is close to zero, resulting practically in no change in the odds of the Transport and communication models for both time periods. The same situation occurs for the FDI Performance Index coefficient with a value near to zero, which may cause no effect in the odds of the Travel services model for the second time period.

Table 11
Logistic Regression results

	Transport and Communications services		Travel services		
	Period 1	Period 2	Period 1	Period 2	
Variables in the equation	High education	Education expenditures	Connectivity Index	Access Index	FDI Performance Index
Regression coefficient (β)*	1,77	,72	9,16	22,22	-,67
Sig.	,012	,027	,002	,000	,023
e^{β} **	5,85	2,05	9.503,5	$4,45x10^{9}$	,51
Model Nagelkerke R^2	,347	,277	,472	,696	
Omnibus test of model coefficient	,012	,027	,002	,001	
H-L goodness-of-fit test ***	,121	,150	,914	,296	
Percentage correct predicted by group:					
Increasing	,60	,818	,60	,857	
Decreasing	,727	,60	,818	,929	

* The regression coefficients are estimated through maximum likelihood method.

** e^{β} represents the ratio-change in the odds of the event of interest for a one-unit change in the predictor.

*** The Hosmer-Lemeshow statistic indicates a poor fit if the significance value is less than 0,05. Here, the models adequately fit the data.

For the first time period, the logistic regression model for Transport and communications services is described by the following function:

$$\pi_i = \frac{1}{1 + e^{-(-4{,}08 + 1{,}8\ \text{High education}_i)}}$$

As for the second period the logistic regression model is:

$$\pi_i = \frac{1}{1 + e^{-(-4{,}07 + 0{,}7\ \text{Education expenditures}_i)}}$$

where,

π_i = predicted probability of the i^{th} country that increases its market share of transport and communications.

The following casewise lists for both time periods show the predicted probability calculated as well as the predicted group for each country.

Period 1

Country	Observed Group	Predicted Probability	Predicted Group
Austria	I**	,666	D
Belux	I**	,666	D
Czech Republic	I	,106	I
Denmark	I**	,704	D
Finland	D	,852	D
France	D	,772	D
Germany	D	,626	D
Greece	D	,704	D
Hungary	I	,090	I
Ireland	D	,626	D
Italy	D	,584	D
Netherlands	I**	,828	D
Norway	D	,873	D
Poland	I	,167	I
Portugal	I	,327	I
Slovakia	I	,144	I
Spain	D	,802	D
Sweden	D**	,496	I
Switzerland	D**	,367	I
Turkey	I	,144	I
United Kingdom	D**	,452	I

I = Increasing, D = Decreasing, ** = Misclassified cases.

Period 2

Country	Observed Group	Predicted probability	Predicted Group
Austria	I	,453	I
Belux	I	,137	I
Czech Republic	D**	,400	I
Denmark	I**	,852	D
Finland	D	,790	D
France	D	,560	D
Germany	D**	,350	I
Greece	I	,137	I
Hungary	I	,318	I
Ireland	I**	,560	D
Italy	D**	,366	I
Netherlands	D**	,400	I
Norway	D	,812	D
Poland	D	,790	D
Portugal	D	,525	D
Slovakia	I	,333	I
Spain	I	,383	I
Sweden	D	,870	D
Switzerland	I	,453	I
Turkey	I	,076	I
United Kingdom	I	,435	I

I = Increasing, D = Decreasing, ** = Misclassified cases.

In order to assess the goodness of fit of the model from the classification table we observe that of the cases, 60 percent of the countries that previously obtained an increasing competitive position are classified correctly in the first period and 81,8% of the countries were classified correctly in the second time period. Overall, for the first time period 66,7 percent of the countries were classified correctly by the model and 71,4 % for the second one. This suggests that our model is in fact correct about two out of three times for the first time period and three out of four times for the second time period. Pseudo r-square statistics[14] indicate that 34,7% of the variation is explained by the model for the first

[14] The pseudo r-squared statistics are based on comparing the likelihood of the current model to the "null" model (one without any predictors).

period, while for the second one is only 27,7 percent.

For Travel services, those variables in the equation with the highest estimated coefficient values (β) are the main factors explaining the competitive position, in this case, the Connectivity and Access Indices. The great antilog values for the explaining parameters for each time period mean that the odds for a country of improving its competitive position, *i.e.*, increasing its tourism market share is extremely sensitive to positive changes in its infrastructure and use of ICT, all other things being equal.

For the first time period the logistic regression model for Travel services is described by the following function:

$$\pi_i = \frac{1}{1 + e^{-(-3,9 + 9,2\ \text{Connectivity Index}_i)}}$$

As for the second period the logistic regression model is:

$$\pi_i = \frac{1}{1 + e^{-(-10,8 + 22,2\ \text{Access Index}_i - 0,67\ \text{FDI Performance Index}_i)}}$$

where,

π_i = predicted probability of the i^{th} country that increases its market share of tourism.

The following casewise lists for both time periods show the predicted probability calculated as well as the predicted group for each country.

Period 1

Country	Observed group	Predicted probability	Predicted Group
Austria	D	,663	D
Belux	I**	,568	D
Czech Republic	I	,154	I
Denmark	D	,904	D
Finland	D	,924	D
France	D	,575	D
Germany	D	,547	D
Greece	I	,285	I
Hungary	I	,126	I
Ireland	I**	,615	D
Italy	I**	,508	D
Netherlands	I**	,819	D
Norway	D	,965	D
Poland	I	,070	I
Portugal	D**	,332	I
Slovakia	I	,119	I
Spain	D**	,246	I
Sweden	D	,932	D
Switzerland	D	,876	D
Turkey	I	,066	I
United Kingdom	D	,706	D

D = Decreasing, I = Increasing, ** = Misclassified cases.

Period 2

Country	Observed group	Predicted probability	Predicted Group
Austria	D	,976	D
Belux	I	,003	I
Czech Republic	D**	,082	I
Denmark	D	,992	D
Finland	D	,982	D
France	D	,935	D
Germany	D	,974	D
Greece	I	,393	I
Hungary	I	,353	I
Ireland	I	,500	I
Italy	D	,926	D
Netherlands	D	,876	D
Norway	D	1,000	D
Poland	I	,072	I
Portugal	D	,741	D
Slovakia	D	,686	D
Spain	I**	,530	D
Sweden	D	,980	D
Switzerland	D	,997	D
Turkey	I	,025	I
United Kingdom	D	,979	D

D = Decreasing, I = Increasing, ** = Misclassified cases.

In order to assess the goodness of fit of the second model, from the classification table we observe that of the cases, 60 percent of the countries that previously obtained an increasing competitive position are classified correctly in the first period, and 87% of the countries were classified correctly in the second time period. Overall, for the first time period 71,4 percent of the countries were classified correctly by the model, and 90,5 % for the second one. This suggests that our model is in fact correct about three out of four times for the first time period, and nine out of ten times for the second time period. Pseudo r-square statistics indicate that 47,2% of the variation is explained by the model for the first period, while for the second one is 69,6 percent.

5. Main results of the empirical analysis

In this section, the factors determining the competitive position of the three service categories are investigated by an empirical analysis with macro data for 21 European countries from the Balance of Payments statistics on trade in services.

- First, following the recent theoretical literature on competitiveness in services, 12 economic and technological variables are proposed to identify the structure relationships among the variables, and test the factors explaining competitiveness. Both economic and technological factors create the necessary conditions for tradability of services.

- Second, on a theoretical basis, we show several scholars' arguments regarding the intrinsic characteristics of services affecting their exchange properties, and having consequences for their competitiveness. On the one hand, technological improvements have affected services tradability by reducing the need for infrastructure and geographical proximity; Thus, ICT encourages internationalization, especially in knowledge-based services by facilitating the operation of foreign related companies. On the other hand, internationalization affects services in different manners depending on the modes of supply in services. Moreover, innovation capacity is an important source of competitiveness, and affects services in different ways depending on the varied nature of service activities.

- Third, through factor analysis four patterns of technological change and internationalization of the 21 European countries are identified by using the set of 12 variables. The analysis is carried out in two time periods of the 90's in order to contrast the changes that occurred in the structure relationships of the countries.

- Fourth, by using logistic regression, determinants of the competitiveness are examined. Logistic models showed no significant variables to explain the competitive position of Other business services. For Transport and communications services, the results exemplify the prominent role of high education in competitiveness, whereas for Travel services ICT indices proved to be the most significant factors explaining the competitive position.

6. Concluding remarks

In spite of the efforts done by the international institutions in order to progress in the knowledge of the service sector it is necessary to have wider and more reliable statistics.

In the first two sections, measurement of competitiveness and a descriptive analysis of the competitiveness in services were exposed. The results showed no specific competitive patterns in developed and developing European countries during the decade of the 90's.

In this work, starting off the evolution of the imports of services performed by the world economy, we explored different forms to measure the competitiveness of the service sector and applied one of them.

Through the market share that each country of the world market holds we can construct a typology that classifies the sectors in accordance with its degree of competitiveness, while providing the drawn up of behaviour patterns.

The macroeconomic effects derived from the fact that a country increases the quota that maintains in the world market, are different depending on the own behaviour of the inter-

national economy and the sectors in which such changes take place.

In macroeconomic terms, the forward and backward linkages derived from the export of services are different depending on their technological content. It is not the same that a sector with high technological content gains or loses competitiveness, that this situation of profit or loss takes place in one of low technological content.

Exports of services can be classified taking into account their factorial content, making a distinction between knowledge-intensive branches and non-intensive.

The results of the factor analysis showed that countries with higher income performance, economic stability and a skilled workforce are likely to have a better telecommunications infrastructure and make extensive use of ICT. In the long run, countries with better economic and technological performance are likely to enhance technological capabilities, including innovative capacity. Furthermore, at the beginning of the decade it seems that more unstable countries with competitive weaknesses in their economies reflecting a low performance of FDI, may be more dependent on purchases of foreign high-tech (higher ratio of high-tech imports to manufacturing imports).

Utilizing a binary logistic regression we explored the variables explaining the competitive position of the three service categories. The first relevant conclusion drawn from the logistic regression results is that for either time periods, none of the independent variables were good predictors of the competitive position of Other business services. Second, logistic models for Transport and communications services showed that the competitive position is explained by High education for the first time period, while for the second one Education expenditure determines the competitive position. This conclusion is not surprising since new skill sets and capabilities are needed for all countries to ensure their competitiveness in the international market place and create the necessary conditions for a sustainable development process. However, in a previous work[15] we found that not only a skilled workforce is a determinant of the competitiveness of Transport and communications services, but the use of the Internet has been at the source for countries' traders to improve their market position.

With regard to Travel services, the competitive position was explained by the Connectivity Index in the first quinquenium, whereas in the second time period the variables determining the competitive position of tourist services are the Access Index, and to a smaller degree, the FDI Performance Index. Numerous studies all agree with considering tourism as an information-intensive industry in which ICT is expected to play a significant role. It is argued that, well used, ICT can make countries more self-sufficient in constructing their own brand images and promoting their own tourist attractions. Countries can thus maximize their comparative advantage in this sector, adjust their tourism services to suit their own development strategies, and become better integrated in the world economy.

Nowadays, more and more tourists make use of the Internet. The Internet is one of the determining factors in the world growth of the tourist industry, giving every potential tourist immediate access to information on possible destinations. In this way, ICT is stimulating the emergence of a new kind of tourism, e-tourism, creating a demand for customized services. At the same time, ICT require investment in hardware and software as well as capacity development. The empirical evidence found in this work allows us to confirm that, for the period 1990-1995, ICT infrastructure was a determinant to enhancement of the competitiveness of travel services. At the end of the decade, in light of the results, application of ICT -as a tool for trade- explained the competitive position of tourism services.

Finally, we should mention that while limits to the generalizability of the results of this study exist, the findings do offer insights into the factors explaining the competitive position in certain service sectors of some European countries, and provide a better understanding of their technological and internationalization patterns during the last decade. Future researchers may wish to more narrowly delineate other regresors of export competition in order

[15] We refer to a research project that examined the determinants of the competitive position of services by using a wider sample of 42 countries. The results of this project confirm that ICT and economic development are important factors determining competitiveness for both travel and transport and communications services. For other business services, mergers and acquisitions had a significant weight in explaining competitiveness.

to explain better service determinants of competitive position.

Nevertheless, while the importance of the services sector in both the domestic and world markets has increased dramatically, the amount of empirical research addressing international trade and competitiveness in services still remains relatively low.

APPENDICES

Appendix A
Data Coverage and Reliability

"Although many international efforts have reached in improving comparability and coverage of service trade statistics, one should have some caution on interpreting and concluding results due to some reasons. First, some countries record service transactions only up to a certain detailed component disaggregation level so statistics does not reflect the economic significance of the various services components to their economies; second, certain international transactions of services simply are not included. This is the case of electronic commerce transactions especially those operations within related parties. Third, sometimes transactions are recorded incorrectly on a net basis (credits minus debits) such as in communications and rail services due to compensation agreements. Fourth, alternative sources of information specially in non IMF member countries are not compiled according to the balance of payments definitions; Fifth, misclassification of services shall underestimate trade value since some government transactions are computed as commercial services. Lastly, limits in goods and services definitions have been differing, *e.g.*, freight insurance which is included in insurance services in BPM5 and in goods in BPM4; goods procured in ports by nonresident carriers and repairs of transportation equipment which are included in goods in BPM5 and in transport services in BPM4.

Therefore, the trade values must be viewed in a variety of technical/statistical constraints, including gaps in data availability. Especially at the detailed sectoral level, differences in reporting, reliability, definitions and collection methods must be taken into account. Abrupt changes in individual countries' position may be due to (methodological) changes in data preparation and presentation, as well as to the inclusion of additional countries in individual data sets. The reported shares in world trade and associated country positions necessarily cover only those countries that actually provided information for the sectors and years concerned. It is worth noting, however, that the number of reporting countries – and thus the coverage of the statistics– has improved in recent years, as the following table shows".

From WTO (2002).

Appendix B
Detailed description of the service categories of study

Category	Definition	Concepts excluded
Transport and Communications	*Transportation* covers all transportation (sea, air, and other—including land, internal waterway, space, and pipeline) services that are performed by residents of one economy for those of another and that involve the carriage of passengers, the movement of goods (freight), rentals (charters) of carriers with crew, and related supporting and auxiliary services. *Communications* services cover communications transactions between residents and nonresidents. Such services comprise postal, courier, and telecommunications services (transmission of sound, images, and other information by various modes and associated maintenance provided by/for residents for/by nonresidents).	Some related activities are excluded: freight insurance, which is included in insurance services; goods procured in ports by nonresident carriers and repairs of transportation equipment, which are included in goods; repairs of railway facilities, harbors, and airfield facilities, which are included in construction services; and rentals (charters) of carriers without crew, which are included in other business services.
Travel	*Travel* covers primarily the goods and services acquired from an economy by travelers during visits of less than one year in that economy. The goods and services are purchased by, or on behalf of, the traveler or provided, without a quid pro quo, for the traveler to use or give away.	Excluded is the international carriage of travelers, which is covered in passenger services under transportation.
Other Business Services	*Other business services* provided by residents to nonresidents and vice versa covers *merchanting*[16] and other trade-related services; operational leasing services; and miscellaneous business, professional, and technical services (leasing, legal, accounting, auditing, bookkeeping, tax, business and management consulting, public relations, advertising, market research and public opinion polling, research and development, architectural, engineering and other technical services, waste treatment and de-pollution, agricultural, mining, and other on-site processing services, placement of personnel, security and investigative services, translation and interpretation, photographic services, building cleaning, real estate services to businesses. Included are the distribution services of electricity, water, gas and other petroleum products, where these are identifiable separately from transmission services).	Excluded are franchising fees (included in franchises and similar rights), brokerage in financial services (included in financial services) and transport related fees (included in the appropriate component of transportation services). Excluded are financial leasing (sometimes called capital leasing), leasing of telecommunications lines or capacity (included in telecommunications services), rental of ships and aircraft with crew (included in transportation services) and rental of vehicles to foreign travelers (included in travel).

SOURCE: IMF Fifth edition of the Balance of Payments Manual (BPM5).

[16] Merchanting is defined as the purchase of a good by a resident of the compiling economy from a nonresident and the subsequent resale of the good to another non-resident; during the process, the good does not enter or leave the compiling economy. The difference between the value of goods when acquired and the value when sold is recorded as the value of merchanting services provided. If the purchase and sale take place within one accounting period, then this is the time at which the merchanting services are recorded. If the good is not resold by the merchant in the same accounting period as that in which it is purchased, then the *merchanting* transaction is recorded at the time of the sale of the good, in the later period. *Merchanting* transactions may include both commodity arbitrage, where goods may be bought and resold almost simultaneously, and wholesale trading, where the merchant may own the goods for a period of time and take responsibility for moving them from the country of the seller to the country of the ultimate buyer. In the latter case, the merchant may incur various costs, such as for transportation, insurance or interest, in connection with the movement and holding of the goods; where these represent transactions with residents of countries other than that of the merchant, they are to be separately recorded, rather than deducted from *merchanting* services, in consonance with the BPM5 principle of recording current account transactions on a gross basis.

Coverage of international trade statistics
Number of countries reporting trade data for specific services sectors, 1996-1998

Code	Service description	Exports			Imports		
		1996	1997	1998	1996	1997	1998
	TOTAL SERVICES	143	137	125	143	137	125
1	TRANSPORT	139	134	122	142	137	125
1.1	Sea transport	68	68	65	76	78	73
1.1.1	Passenger transport on sea	25	27	31	29	29	31
1.1.2	Freight transport on sea	50	52	52	66	68	67
1.1.3	Supporting, auxiliary and other services	47	47	46	43	45	45
1.2	Air transport	77	79	72	76	78	72
1.2.1	Passenger transport by air	63	65	64	70	72	67
1.2.2	Freight transport by air	48	52	56	48	51	52
1.2.3	Supporting, auxiliary and other services	53	53	52	52	53	52
1.3	Other transportation	61	66	60	53	57	54
1.3.1	Passenger	35	37	36	30	37	35
1.3.2	Freight	46	48	45	39	42	42
1.3.3	Other transportation services	42	48	48	37	41	40
2	TRAVEL	139	134	122	140	135	123
2.1	Business travel	45	50	46	57	61	60
2.2	Personal travel	67	70	69	75	78	76
2.2.1	Health-related expenditure	21	21	18	32	31	31
2.2.2	Education-related expenditure	31	31	30	45	42	38
2.2.3	Other personal travel	53	54	52	60	59	58
3	COMMUNICATIONS SERVICES	97	97	95	95	95	96
4	CONSTRUCTION SERVICES	50	59	59	60	65	63
5	INSURANCE SERVICES	106	101	92	125	121	111
6	FINANCIAL SERVICES	62	69	70	68	72	77
7	COMPUTER AND INFORMATION SERVICES	51	53	55	53	56	62
8	ROYALTIES AND LICENSE FEES	57	60	62	87	82	79
9	OTHER BUSINESS SERVICES	134	130	117	142	134	122
9.1	Merchanting and other trade-related services	50	52	50	48	49	47
9.2	Operational leasing	40	44	44	48	51	55
9.3	Miscellaneous business, professional and technical services	89	87	83	92	90	87
9.3.1	Legal, accounting, management, consulting and public relations services	24	27	27	32	30	30
9.3.2	Advertising, market research and public opinion polling services	24	27	27	25	29	29
9.3.3	Research and development services	17	20	20	17	19	19
9.3.4	Architectural, engineering and other technical services	18	22	25	19	24	25
9.3.5	Agricultural, mining and on-site processing services	10	13	15	11	16	18
9.3.6	Other services	52	46	48	56	49	50
10	PERSONAL, CULTURAL AND RECREATIONAL SERVICES	46	50	51	53	57	60
10.1	Audio-visual and related services	29	33	31	34	38	40
10.2	Other personal, cultural and recreational services	32	34	35	37	40	43

SOURCE: compiled by the WTO Secretariat from IMF Balance-of-Payments statistics, in WTO (2002).

Appendix C
Market share competitive matrices

Chart 1
Matriz of Transport and Communications
(1 and 2 correspond to the position in 1990-95 and 1995-2000 respectively. Arrows indicate changes between periods)

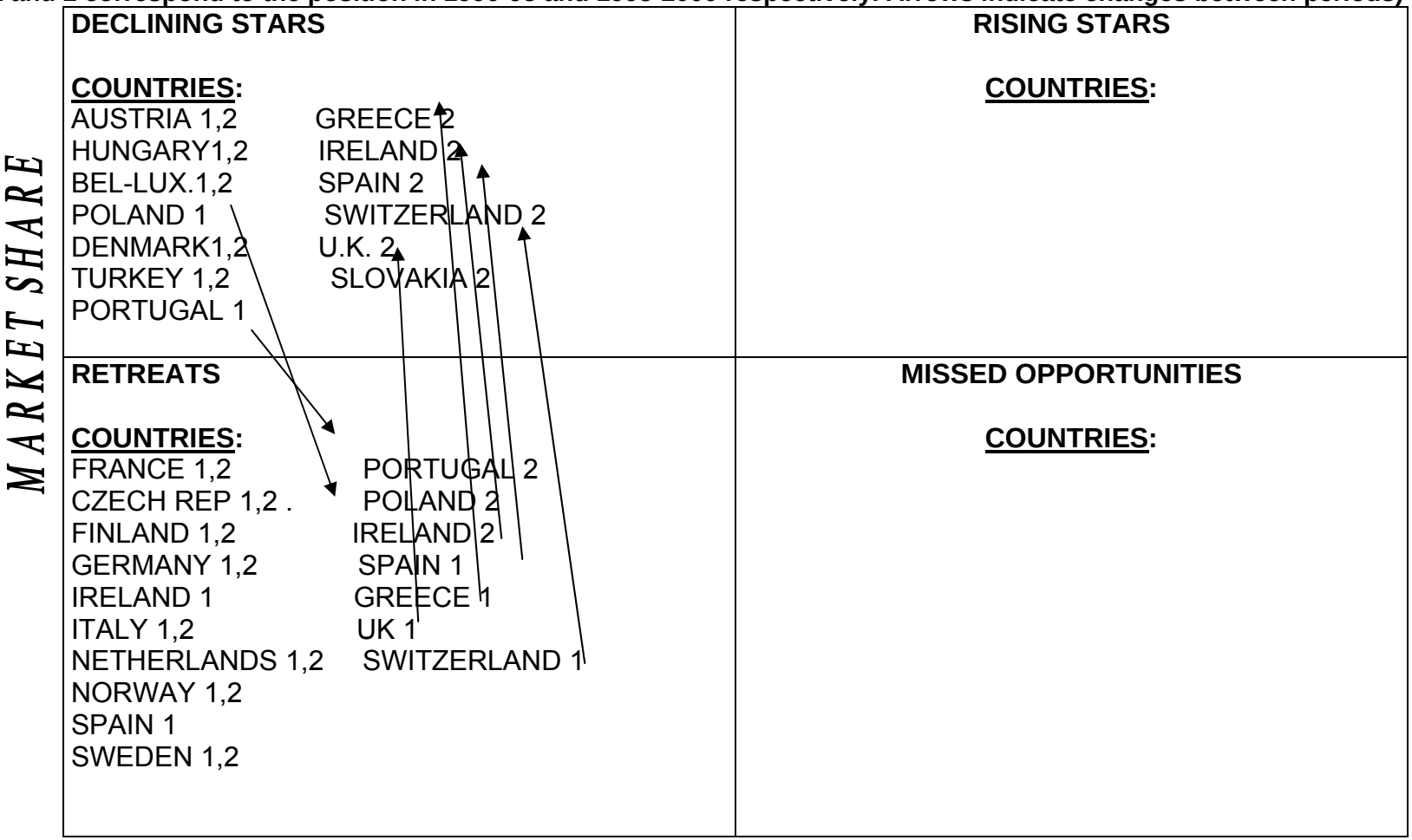


Chart 2
Matrix of Travel

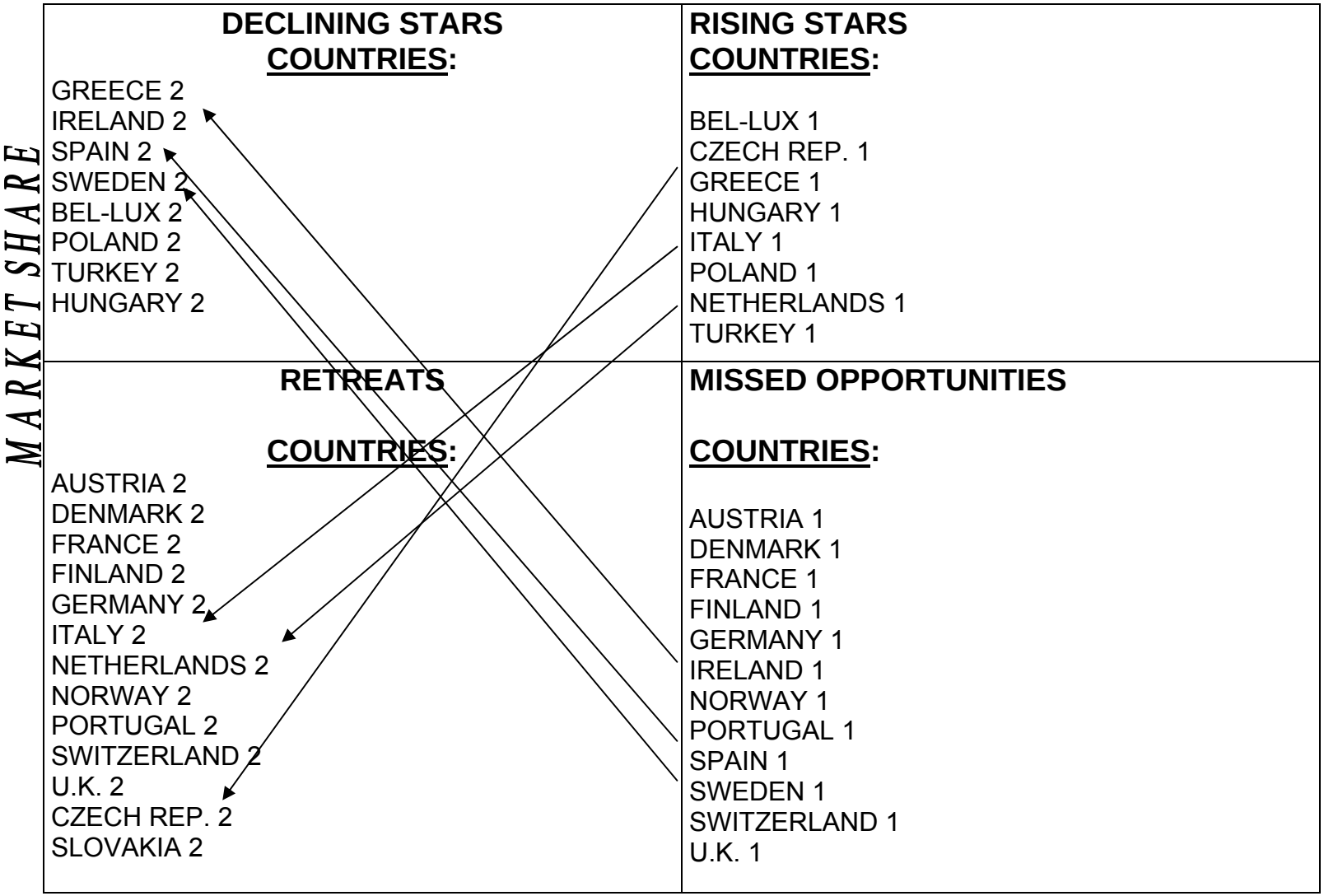
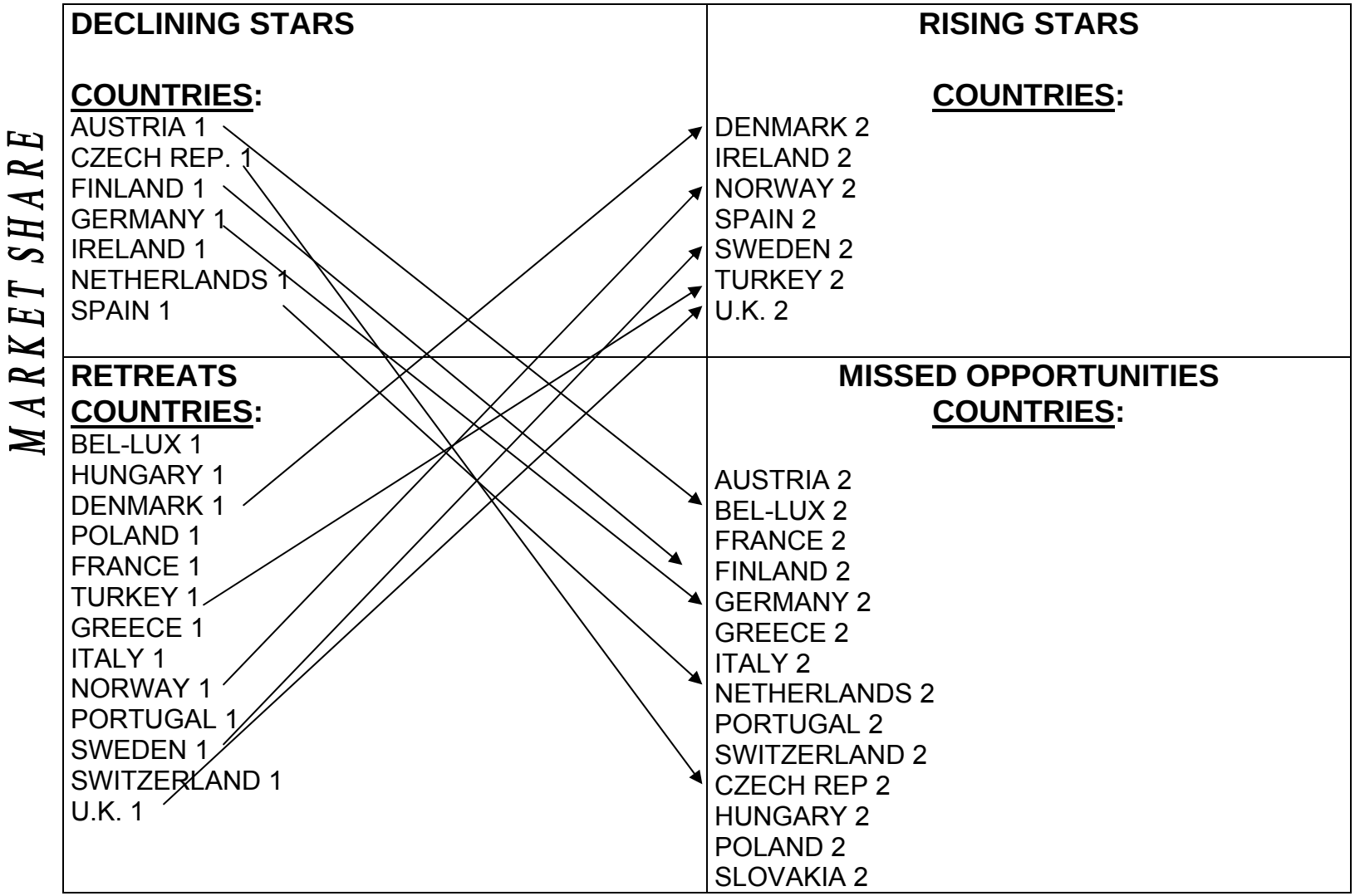


Chart 3
Matrix of Other Business Services



Appendix D
Assessing the appropriateness of factor analysis of the revised set of variables: Partial correlations among variables, KMO and Bartlett's Test and Measures of Sampling Adequacy (MSA)

Correlations, 1990 - 1995

	High education	Education expenditures	M&A sales	FDI Potential Index	GDP per capita	Country risk	M&A purchases	R&D scientists	R&D expenditures	Connectivity Index	Access Index	High tech imports
High education	1	,340	,151	-,349	,694**	,618**	,172	,288	,103	,712**	,742**	,225
Education expenditures		1	,034	-,027	,577**	,672**	,087	,743**	,581**	,661**	,549*	,490*
M&A sales			1	,147	,307	,288	,974**	,333	,432	,200	,136	,406
FDI Potential Index				1	-,267	-,126	,154	-,037	,032	-,314	-,309	-,315
GDP per capita					1	,920**	,311	,655**	,591**	,879**	,795**	,270
Country risk						1	,274	,689**	,581**	,815**	,784**	,303
M&A purchases							1	,339	,444*	,205	,080	,397
R&D scientists								1	,852**	,717**	,611**	,431
R&D expenditures									1	,540*	,356	,370
Connectivity Index										1	,860**	,431
Access Index											1	,313
High tech imports												1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,690
Bartlett's Test of Sphericity	Approx. Chi-Square	235,371
	df	66
	Sig.	,000

Anti-image Correlations Matrix, 1990 - 1995

	High education	Education expenditures	M&A sales	GDP per capita	Country risk	M&A purchases	R&D scientists	R&D expenditures	Connectivity Index	Access Index	High tech imports	FDI Potential Index
High education	,772[a]											
Education expenditures	,105	,702[a]										
M&A sales	,396	,549	,446[a]									
GDP per capita	-,044	,036	,143	,736[a]								
Country risk	-,089	-,339	-,286	-,726	,803[a]							
M&A purchases	-,453	-,435	-,972	-,221	,298	,458[a]						
R&D scientists	,217	-,278	,118	,366	-,155	-,182	,755[a]					
R&D expenditures	,128	-,009	-,176	-,443	,173	,168	-,729	,730[a]				
Connectivity Index	-,144	,068	,189	-,505	,223	-,125	-,280	,082	,855[a]			
Access Index	-,472	-,159	-,614	-,150	,013	,650	-,413	,376	-,309	,704[a]		
High tech imports	-,029	-,569	-,347	,384	-,057	,196	,189	-,097	-,385	,106	,558[a]	
FDI Potential Index	,070	-,358	-,158	,382	-,248	,037	,110	-,075	-,143	,061	,580	,425[a]

a. Measures of Sampling Adequacy(MSA)

Correlations, 1995 - 2000

	High education	Education expenditures	M&A sales	FDI Potential Index	GDP per capita	Country risk	M&A purchases	R&D scientists	R&D expenditures	Connectivity Index	Access Index	High tech imports
High education	1	,265	,067	,162	,541*	,547*	,018	,329	,214	,529*	,431	,167
Education expenditures		1	-,023	-,102	,425	,571**	-,017	,684**	,524*	,545*	,589**	,293
M&A sales			1	-,058	,276	,169	,925**	,252	,436*	,237	,259	,309
FDI Potential Index				1	,279	,298	,008	,260	,218	,223	,190	,121
GDP per capita					1	,907**	,284	,798**	,726**	,912**	,913**	,359
Country risk						1	,194	,794**	,650**	,888**	,896**	,415
M&A purchases							1	,304	,469*	,267	,287	,285
R&D scientists								1	,865**	,836**	,918**	,381
R&D expenditures									1	,811**	,782**	,480*
Connectivity Index										1	,910**	,459*
Access Index											1	,335
High tech imports												1

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

KMO and Bartlett's Test, 1995-2000

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,761
Bartlett's Test of Sphericity	Approx. Chi-Square	224,579
	df	66
	Sig.	,000

Anti-image Correlations Matrix, 1995 - 2000

	High education	Education expenditures	M&A sales	FDI Potential Index	GDP per capita	Country risk	M&A purchases	R&D scientists	R&D expenditures	Connectivity Index	Access Index	High tech imports
High education	,717[a]											
Education expenditures	-,109	,677[a]										
M&A sales	-,244	-,052	,555[a]									
FDI Potential Index	-,066	,535	,112	,344[a]								
GDP per capita	-,193	,367	-,147	,001	,891[a]							
Country risk	-,039	-,456	,082	-,404	-,417	,828[a]						
M&A purchases	,170	,194	-,891	,000	,145	-,126	,607[a]					
R&D scientists	-,124	-,501	,217	-,420	,043	,167	-,190	,757[a]				
R&D expenditures	,371	-,056	-,233	-,080	-,152	,303	,026	-,530	,796[a]			
Connectivity Index	-,394	-,024	,285	,079	-,207	-,182	-,143	,288	-,580	,835[a]		
Access Index	,253	,217	-,167	,381	-,284	-,335	,118	-,719	,273	-,351	,785[a]	
High tech imports	,121	,024	-,218	,046	,122	-,293	,132	-,104	-,092	-,244	,301	,787[a]

a. Measures of Sampling Adequacy(MSA)

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