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The Role of Business Services on Innovation, Productivity, Employment and Exports of Spanish, Turkish and Moroccan Manufacturing Firms

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Résumé

Malgré leur rôle clé dans les systèmes de production, les services commerciaux ont toujours été ignorés dans les analyses de productivité et d'innovation. L'une des principales raisons est le peu d'informations disponible puisque la plupart des enquêtes sur l'innovation ou la performance des entreprises excluent généralement les activités de services. Par conséquent, peu d'études analysent de façon empirique l'impact des services d'entreprises sur l'innovation, la productivité ou les exportations. Cependant, Arnold et al. (2006) apporte certaines preuves qui confortent l'argument selon lequel l'amélioration des services aux industries contribue à l'amélioration de la performance des activités économiques en aval, ce qui constitue un élément essentiel pour promouvoir la croissance et réduire la pauvreté. Ce projet est une tentative de contribuer à la très restreinte littérature sur les services aux entreprises. En particulier, l'objectif principal est de trouver des preuves supplémentaires concernant l'effet des services aux entreprises sur l'innovation, la productivité et l'activité d'exportation des entreprises du secteur manufacturier. Dans ce but, nous avons utilisé des micro-données qui concernent les entreprises manufacturières espagnoles, turques et marocaines. En Espagne, la Encuesta sobre Estrategias empresariales (SEFI) contient des informations très détaillées sur l'utilisation des dix types de services aux entreprises: publicité, activités juridiques, comptables et de comptabilité, de conseil fiscal, audit des activités, les activités de gestion, le recrutement, la formation, la programmation informatique et logiciel de consultation. Non seulement des informations sur l'utilisation des services aux entreprises est inclus, mais aussi sur l'origine des services (la production interne, externe ou les deux fournis). Cela permet de prendre deux points de vue complémentaires pour analyser l'utilisation des services aux entreprises, en distinguant les situations dans lesquelles le prestataire de services aux entreprises est externe à l'entreprise des situations ou le service est fourni en interne. La disponibilité des données concernant les services aux entreprises est considérablement plus faible en Turquie, c'est pourquoi des variables proxies sont elles employées dans le but d'évaluer les fonctions les plus couramment effectuées par les services aux entreprises, à savoir, les variables visées attention à la clientèle, les services de métrologie et des services reçus pour l'innovation, l'exploitation, la stratégie et le développement de prototypes. Pour construire ces variables nous avons utilisé des données provenant de trois sources différentes: l'Enquête annuelle sur les industries manufacturières (ASMI), menée par l'Institut national des statistiques (INS), Enquête sur l'innovation menée par le SIS et l'Enquête sur les services en technologie industrielle (STI Survey), spécifiquement conçue pour le suivi et l'évaluation des effets des services technologiques. Dans le cas du Maroc, quatre types de services aux entreprises sont distingués: les services de formation en gestion, services de formation technique, les services de conseil en management et des services de consultation technique. En outre, une variable qui évoque l'utilisation de services de consultation pour le transfert de technologie est également incluse. Les informations analysées proviennent d'un rapport annuel effectué par le Ministère de l'Industrie et du Commerce et de l'enquête Investment Climate Assessment (ICA), élaborée par la Banque mondiale. L'Espagne est utilisée comme un cas illustratif de pays à revenu intermédiaire qui a stimulé sa croissance rapidement (Espagne au cours des précédentes années 90). Ce cas de référence est comparé au cas de la Turquie et le Maroc durant la dernière décennie. L'effet des services aux entreprises sur la croissance peut transiter par les prix, l'innovation, la productivité ou une stratégie de différenciation qui permet de pénétrer de nouveaux marchés. Dans notre étude, nous nous centrons sur ces trois aspects et leurs relations.

Tout d'abord, nous essayons de vérifier si l'utilisation des services aux entreprises manufacturières contribue à l'innovation. La plupart des services aux entreprises sont censés faciliter, transporter et même service de source d'information à leurs clients. Nous étudions ces liens entre les entreprises clientes du secteur manufacturier et les prestataires de services fournis. En particulier, des modèles économétriques où la variable dépendante est l'innovation sont estimés pour les trois pays. En Espagne, un modèle d'innovation unique est estimé, alors que pour la Turquie et le Maroc une différenciation entre les innovations de produit et de procédé a pu être établie. On trouve des similitudes importantes entre les pays, même si les différences entre les types de services analysés sont aussi importantes. La classification la plus détaillée des services commerciaux en Espagne permet d'identifier certains secteurs d'activité directement liée à la performance innovatrice comme la recherche et le développement, la programmation informatique, le conseil en logiciels, la publicité ou la formation. En Turquie, la majorité des variables liées aux services aux entreprises montrent un effet positif sur l'innovation, l'impact étant un peu plus faible dans le cas de l'innovation de processus. Dans le cas du Maroc, l'attention est portée sur le rôle clé joué par les services de formation et de conseil en gestion.
Deuxièmement, nous examinons si la productivité est directement touchée par intensification de l'utilisation des services aux entreprises. Nous estimons un modèle dans lequel la productivité total des facteurs (PTF) est expliquée par un ensemble de caractéristiques des entreprises et un indicateur de l'utilisation des services aux entreprises. En Espagne et au Maroc les modèles probit sont utilisés, alors qu'en Turquie, un modèle OLS est employé. La plupart des services étudiés ont un impact positif sur la productivité en Espagne, alors qu'en Turquie et au Maroc, l'impact est limité à un nombre moins élevé d'industries. Néanmoins, les problèmes de mesure en fonction de la PTF, unie au fait que l'utilisation des services est plus restreinte dans ces pays, pourrait expliquer ces différences. Troisièmement, nous examinons comment l'ouverture des entreprises est affectée par l'utilisation de services aux entreprises. La plupart des études concernant les habitudes d'internalisation des entreprises de services soulignent que l'une des motivations majeures pour les entreprises de services à internationaliser consiste à suivre leurs clients à l'étranger. Nous examinons si l'utilisation de ce type de services peut favoriser la participation à l'exportation et le volume d'exportation. Ces effets pourraient avoir lieu grâce à un accroissement de l'innovation et de productivité qui se traduit par une baisse des coûts unitaires pour les entreprises et qui augmente leurs chances d'accéder aux marchés étrangers. D'une manière générale, l'impact de l'utilisation des services aux entreprises sur les exportations semble être plus faible que dans le cas de l'innovation et la productivité, mais les cas turcs et marocains semblent opposés. Ainsi, alors qu'en Turquie la majorité des variables liées aux services aux entreprises montrent un effet positif sur les exportations, au Maroc l'utilisation des services aux entreprises, réduit la probabilité d'exporter.
Dans les sections suivantes une analyse plus approfondie des effets des services aux entreprises sur les trois variables mentionnées ci-dessous est effectuée. Ce projet peut être considéré comme une première étape concernant le rôle joué par les services, et plus particulièrement par les services aux entreprises dans les pays MENA. Les résultats positifs obtenus ouvrent la porte à de futures analyses afin de mieux comprendre ce que les services aux entreprises peuvent représenter dans un avenir proche de ces pays.

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1. Summary.

Despite their key role in production systems, business services have traditionally been ignored in productivity and innovation analyses. The scant information available (most of surveys on innovation or business performance commonly exclude service activities) has been one of the major reasons for this ignorance. Consequently, few studies empirically analyse the impact of business services on innovation, productivity or exports. However, Arnold et al. (2006) provide support for the argument that improvements in service industries contribute to enhancing the performance of downstream economic activities, constituting an essential element for promoting growth and reducing poverty. This project is an attempt to contribute to the scarce literature on business services. In particular, **the main objective is to find further evidence concerning the effects of business services on innovation, productivity and export activity of manufacturing firms.** For this purpose, we used microdata for Spanish, Turkish and Moroccan manufacturing firms. In Spain the Encuesta sobre Estrategias Empresariales (ESEE) contains very detailed statistics about the use of ten types of business services: advertising, legal activities, accounting and bookkeeping, tax consultancy, auditing activities, management activities, labour recruitment, training, computer programming and software consultancy. Not only information about the use of business services is included, but also on the origin of the services (in-house production, external provided or both). This allows taking two complementary points of view when analysing the use of business services by distinguishing those situations in which the business service provider is external to the firm. Data availability for business services in Turkey is considerably lower, so several proxies are employed in order to approximate the functions commonly carried out by business services, namely, variables referred to client support, metrology services and services received for innovation, operation, strategy and prototype development. To construct these variables data from three different sources are combined: the Annual Survey of Manufacturing Industries (ASMI), conducted by the State Institute of Statistics (SIS), Innovation Surveys conducted by the SIS and the Industrial Technology Services Survey (ITS Survey), specifically designed for monitoring and evaluating the effects of technology services. In the case of Morocco, four types of business services are distinguished: management training services, technical training services, management consulting services and technical consulting services. In addition, a variable that stands for the use of consulting services for technology transfer is also included. The information analysed comes from an annual survey carried out by the Ministry Industry and Trade and

from the Investment Climate Assessment (ICA) elaborated by Ministry Industry and Trade and the World Bank.

Spain is used as an illustrative case of a middle income country that boosted its growth rapidly (Spain during the earlier 90´s). This benchmark case is compared to the cases of Turkey and Morocco in recent days. The effect of business services on growth can translate via prices, innovation, productivity or a differentiation strategy that allows entering new markets. In our study we focus on three aspects and their relations.

Firstly, we try to verify whether the use of business services contributes to innovation. Most of business services act as facilitators, carriers and sources of innovation for their clients firms. We investigate these links between manufacturing client firms and business service firms. In particular, econometric models where the dependent variable is innovation are estimated for the three countries. In Spain a unique innovation model is estimated, whereas in Turkey and Morocco a differentiation between product and process innovation is established. Important similarities are found among countries, although differences in the type of business services analysed have to be taken into account. The most detailed classification of business services in Spain allows identifying some industries directly related to innovation performance like research and development, computer programming, software consultancy, advertising or training. In Turkey the majority of the variables related to business services show a positive effect on innovation, the impact being somewhat lower in process innovation. In the case of Morocco it calls the attention the key role played by training services and management consultancy services.

Secondly, we examine if productivity is directly affected by increases in the use of business services. We propose to estimate a model where TFP is explained by a set of characteristics of the firms and an indicator of the use of business services. In Spain and Morocco probit models are employed, whereas in Turkey an OLS model is employed. A high number of business services industries show a positive impact on productivity in Spain, whereas in Turkey and Morocco the impact is restricted to a lower number of industries. Nevertheless measurement problems in relation to TFP, in combination with the lower use in these countries, could explain these differences.

Thirdly, we investigate how the openness of firms is affected by the use of business services. Most of the studies on the internalization patterns of business service firms point out that following clients abroad is one of the major motives for service firms to internationalise. We will estimate equations to examine whether the use of this type of services can foster export participation and export volume. These effects could take place

through an increase in innovation and productivity which translates into lower unitary costs for firms and raises their probability to enter into foreign markets. On a general basis, the impact of the use of business services on exports seems to be lower than in the case of innovation and productivity, but the Turkish and Moroccan cases seem to be opposite. Thus, whereas in Turkey the majority of the variables related to business services show a positive effect on exports, in Morocco the use of business services diminishes the likelihood of exporting.

In the following sections a deep analysis of the effects of business services on the three variables mentioned below is carried out. This project can be considered a first step in the role played by services, and more specifically by business services in the MENA countries, the positive results obtained open the door for future analyses to better understand what business services can represent in the near future of these countries.

2. Literature review.

The definition of knowledge intensive business services is a controversial issue, especially in statistical terms. The pioneering studies highlighting the key influence of these services provided to firms appeared in the fifties of the twentieth century, with the contributions of authors like Machlup (1962) and Greenfield (1966). Nevertheless, it was during the second half of the nineties that the first publications trying to characterise business services, and more concretely knowledge-intensive business services (KIBS), emerged. Since then, many terms have been coined to classify and define business services. In her excellent review of the different concepts related to KIBS, Nählinder (2005) identifies up to eleven definitions, all of them closely interrelated: business services, advanced business services, professional business services, strategic knowledge intensive business services, production oriented services, producer services, R&T services, information and knowledge services, knowledge based services, knowledge intensive services and knowledge firms. Our aim in this section is not to carry out an exhaustive revision of all the concepts created, but to provide a general picture of what is commonly defined as business services. We will concentrate on the different descriptions of two of the most widely used concepts: business services and knowledge-intensive business services.

As mentioned above, the importance of business services began to be recognised during the second half of the nineties. One of the pioneers in pointing out the potential of business services was the European Commission. In the communication *"The Contribution of Business Services to Industrial Performance. A Common Policy Framework"* (European Commission, 1999, p.19), it was acknowledged that "the business services sector is the major economic sector with the highest growth rates in value added and employment over the last years. Their importance for competitiveness of European enterprises and economic growth merits stronger political attention". The project Services in Innovation-Innovation in Services (SI4S), a collaborative European research project which involved researchers from nine European countries during the period 1996 to 1998, was a clear a sign of this incipient interest in what was regarded one of the major driving forces of economic growth. More recently the European Commission has highlighted the key role that a group of business services, namely knowledge intensive business services, play for their clients (usually manufacturing) firms. Thus, in the above mentioned European Commission's Communication on business services it was affirmed that the importance of business services "lies in their

dynamic links and contribution to the competitiveness of EU Industry. An important element in EU competitiveness policy is to promote intangible investment (knowledge creation, quality, innovation, management etc.). Services are often required to supply key elements of such investments. Hence, to promote intangible investments also requires the promotion of services". More recently, in the Commission's mid-term review of industrial policy under the Lisbon Strategy it was highlighted that "the cost, quality and productivity of certain service sectors, in particular Knowledge Intensive Business Services, have an impact on the competitiveness of industry. For example, regulations which affect the performance of professional and other business services, financial services or retail and distribution also have an impact on industry. In addition, competitive network industries enhance the competitiveness of industry as a whole. Furthermore, industry is both a user and provider of a growing range of service related to innovative technologies and products". In other words, KIBS are not only important on their own, but also exert a key impact on their client industries.

But, how can we define KIBS? A quite clear definition is the one elaborated by Rubalcaba-Bermejo (1999) in his book on *Business Services in the European Industry*. He defines business services (Rubalcaba-Bermejo, 1999, p. 26) as "real activities (not financial) that influence first the competitiveness of companies (they are not incompatible with the service provision to consumers) through their use as intermediary inputs in the value chain, and via quality and innovation gains resulting from the interaction between supplier and client and service". But it is possible to identify many others definitions. Heterogeneity was (and still is) a major problem in characterising business services. Obviously, not all business services provided to enterprises influence competitiveness or contribute to innovation (take for example software development in comparison with cleaning or security services). This caused researchers to turn their attention to a sub-group of business services, those that could be classified as "knowledge-intensive". Following Hipp (2000), five main definitions of KIBS can be distinguished. The first and simplest is the one elaborated by Machlup (1962), which defines KIBS as "those firms which sell knowledge", citing as examples the cases of legal services, engineering services, consulting and accounting services and some medical services. Strambach (1997) precises that "KIBS are services that do not offer routine services" and Hipp (2000) pinpoints that "KIBS are characterised by their ability to receive information from outside the company and to transform this information, together with firm-specific knowledge, into useful services for their

customers". Muller (2001) underlines that KIBS "can be described as firms performing, mainly for other firms, services encompassing a high intellectual value-added", and a more recent study on the role played by KIBS in the innovation processes of traditional manufacturing companies in Finland (Ebersberger, 2004) tries to encompass both public and private services, defining KIBS as "innovation services provided either internally or externally to a firm or an organisation", where innovation services are understood as "services targeted towards the development of an organization and its patterns and objectives of innovation", including within this group public and non-profit institutions (such as universities).

But among the different definitions, Miles et al. (1995) elaborated the most exhaustive description, defining KIBS as "business units which involve economic activities which are intended to result in the creation, accumulation or dissemination of knowledge" and specifying that these activities share three main features, or that they "rely heavily upon professional knowledge, either are themselves primary sources of information and knowledge (reports, training consultancy, etc.) or use their knowledge to produce intermediary services for their clients" production processes (e.g., communication and computer services); and are of competitive importance and supplied primarily to businesses". They distinguish two types of KIBS: "traditional professional services" (p-KIBS) and "new technology-based services" (t-KIBS). The main difference between them is that p-KIBS are mainly users of new technology whereas t-KIBS are more active in shaping new technologies.

Starting from Miles's pioneering work, Nählinder (2005) highlight three main features of KIBS:

- One of the main functions of KIBS is to foster "knowledge development" in the economy. The key role of knowledge also implies that most of employees have a high level of education.
- The products of KIBS are usually based on new or emerging technologies, information and communication technologies being of special relevance.
- The major KIBS clients are other businesses and the public sector.

In the statistical domain the definition of business services has been more complex because of the commonly insufficient level of detail. Eurostat defines business services as composed of the industries included in NACE Rev.1.1. K72 and K74.1 to K74.5, namely, computer & related activities (K72), legal, accounting, bookkeeping & auditing

activities, tax consultancy, market research & public opinion polling, business & management consultancy, holdings (K74.1), architectural & engineering activities & related technical consultancy (74.2), technical testing & analysis (74.3), advertising (74.4) and labour recruitment & provision of personnel (74.5). As Miles et al. (1995) did in their characterisation of KIBS; it employs several classifications that try to capture the higher or lower knowledge intensity of service activities. Within these categories are included in most of the cases one or more types of business services. Knowledge-intensive services are described according to technological intensity and based on the NACE Rev. 1.1 classification at a 3-digit level as follows: water transport (61), air transport (62), post and telecommunications (64); financial intermediation, except insurance and pension funding (65), insurance and pension funding, except compulsory social security (66), activities auxiliary to financial intermediation (67), real estate activities (70), renting of machinery and equipment without operator, and of personal and household goods (71), computer and related activities (72), research and development (73), other business activities (74), education (80), health and social work (85), and recreational, cultural and sporting activities (92). This wide group of Knowledge-intensive services is divided into five subgroups:

- ***Knowledge-intensive high-tech services***: post and telecommunications (64); computer and related activities (72); research and development (73)
- ***Knowledge-intensive market services***: (excl. financial intermediation and high-tech services): water transport (61); air transport (62); real estate activities (70); renting of machinery and equipment without operator, and of personal and household goods (71); other business activities (74)
- ***Knowledge-intensive financial services***: financial intermediation, except insurance and pension funding (65); insurance and pension funding, except compulsory social security (66); activities auxiliary to financial intermediation (67)
- ***Other knowledge-intensive services***: education (80); health and social work (85); recreational, cultural and sporting activities (92)

In the case of the OECD the taxonomies are simpler. ***Business services*** include three categories of the ISIC rev.3: computer and related services (72), research and development (73) and other business services (74) and are divided into two subgroups. For one part, those called ***knowledge-intensive business services***, which are professional services, including IT-consulting (72), R&D services (73), legal (74),

accounting (74), marketing and advertising (74), business consulting and human resource development (74). For the other part, a second subgroup composed of ***operational services***, including industrial cleaning (74), security services (74) and secretarial services (74).

Nählinder (2005), in her PhD thesis goes further and tries to establish a correspondence between the pioneering classification of KIBS elaborated by Miles et al. (1995) and the classification of service industries the ISIC rev. 3 (see Table 1).

On a general basis, the same three industries identified as business services by the OECD can be classified as knowledge-intensive business services: computer and related activities (72), research and development (73) and other business services (74). Within this group, most of activities included in computer and related activities and research and development are classified as "new technology-based services" (t-KIBS), whereas the majority of the KIBS included within the industry of other business services are considered to be "traditional professional services" (p-KIBS).

Table 1. KIBS in ISIC rev.3

72 Computer and related activities	t-KIBS
721 Hardware consultancy	t- KIBS
722 Software consultancy	t- KIBS
723 Data processing	t- KIBS
724 Database activities	t- KIBS
725 Maintenance and repair of office and computing machinery	non- KIBS
729 Other computer-related activities	t- KIBS
73 Research and development	
731 Research and experimental development in natural sciences and engineering (NSE)	t- KIBS
732 Research and development in social sciences and humanities (SSH)	t- KIBS
74 Other business activities	
7411 Legal activities	p- KIBS
7412 Accounting, bookkeeping and auditing activities; tax consultancy	p- KIBS
7413 Market research and public opinion polling	p- KIBS
7414 Business and management consultancy activities	p- KIBS
7421 Architectural and engineering activities and related technical consultancy	t- KIBS
7422 Technical testing and analysis	t- KIBS
743 Advertising	p- KIBS
7491 Labour recruitment and provision of personnel	p- KIBS
7492 Investigation and security activities	non- KIBS
7493 Building cleaning activities	non- KIBS
7494 Photographic activities	non- KIBS
7495 Packing activities	non- KIBS
7499 Other business activities n.e.c.	p- KIBS

Source: Nählinder (2005, p. 79)

One of the major features of services in general and KIBS in particular is co-production, that is, the customer tends to participate in the provision of the service. Bitner et al. (1997) differentiate three levels of client participation in the provision of business services, namely, low, moderate and high. Whereas business services related to physical business processes tend to require low participation levels, in the case of KIBS participation levels are commonly higher. For example, they classify the co-production level in advertising services as medium because "consumers inputs are required to aid the service organisation in creating the service…Inputs can include information, effort or physical possessions". In the majority of KIBS the participation level is high, or in other words, "customers… have essential production roles that, if not fulfilled, will affect the nature of the service outcome".

Bettencourt et al. (2002) go deeper into the importance of a good relationship between clients and KIBS providers for a good service performance. They identify seven features of the clients´ behaviour that influence KIBS performance: communication openness, shared problem solving, tolerance, accommodation, advocacy, involvement in project governance and personal dedication (see Table 2).

These characteristics of the clients´ behaviour strongly influence the success of the collaboration between clients and KIBS, or, in other words, firms can obtain important benefits when actively cooperate with KIBS firms in the provision of services. Being opened and tolerant, firms can acquire new knowledge that they can incorporate in their production processes or even use it for developing product or process innovations. Thus, co-production involves, in most of the cases, mutual learning between providers and clients.

In brief, the close relationship established most of the times between KIBS and their clients help to explain why the use of KIBS goes beyond the provision of a particular service and can translate into higher innovativeness, productivity or even export capacity. In the following sections we carry out a theoretical and empirical review of the effects of KIBS on the three aspects mentioned. First, we centre on the effects on innovation and productivity. Later on we move to the impact of outsourcing and offshoring. Finally we describe the methodology employed in recent papers.

Table 2. Client's behaviour and co-production in KIBS

Behaviour	Definition	Examples	Benefits
Communication Openness	The extent to which the client lead is forthcoming, honest, and clear in sharing pertinent information for project success with the service provider	Articulates to XYZ a clear vision of the solution desired Communicates clear expectations and requirements for project outcomes to XYZ	Optimal solution from complete understanding of client environment Accurate problem formulation Effective utilization of client competence
Shared Problem Solving	The extent to which the client lead takes individual initiative and shared responsibility for developing solutions and resolving issues and problems that arise in the relationship.	Is proactive at identifying and resolving potential problems with the proposed solution Raises potentially problematic issues in a timely manner	Optimal solution results from give-and-take process Multiple perspectives reflected in final solution Effective utilization of client competence
Tolerance	The extent to which the client lead responds in an under-standing and patient manner in the face of minor project encumbrances, glitches, and inconveniences.	Is patient when minor problems arise Responds to project complications in an understanding manner	Reduced tension and enhanced working relationships Functional conflict resolution
Accommodation	The extent to which the client lead demonstrates a willingness to accommodate the desires, approach, and expert judgment of the service provider.	Is receptive to XYZ attempts to influence the direction of the project Relies on the advice and recommendations of XYZ	Reduced tension and enhanced working relationships Effective utilization of service provider competence
Advocacy	The extent to which the client lead acts as a vocal advocate and salesperson for the project and its merits within client firm.	Gains internal commitment among key client stake holders (i.e., secures buy in to the project) Sells key client stakeholders on the merits of the project	Active involvement of multiple client stakeholders Sense of ownership among eventual users of project solution
Involvement in Project Governance	The extent to which the client lead takes an active role in monitoring project progress toward stated project goals.	Periodically monitors the development of the XYZ solution Stays informed concerning project key issues	Client responsibilities are fulfilled in a timely and proficient manner Additional check and balance on meeting project budget and schedule goals
Personal dedication	The extent to which client led behaviours reflect a sense of personal obligation for project success by performing individual responsibilities in a persistent conscientious and responsive manner.	Stays personally involved in the project as it Progresses Makes sure that he/she is available and easy to reach by XYZ	Functional working relationships from joint acceptance of responsibilities Client responsibilities are fulfilled in a timely and proficient manner

Source: Bettencourt et al. (2002).

2.1. Knowledge-intensive business services, innovation and productivity: is there a link?

During the last decade we have witnessed a dramatic upsurge of interest in these functions of services in the innovation domain, and specifically of those called knowledge-intensive services (KIBS). KIBS are regarded nowadays as essential elements in the innovation processes of their client firms. Different perspectives can be identified in the analyses that support this general vision. For example, some studies, based on knowledge creation theories, such as the one elaborated by Nonaka and Takeuchi (1995), adopt an "organisational" perspective (Strambach, 2001; Glücker, 1999). Others take the national innovation system concept to characterise the functions of KIBS (Fischer, 2001). Furthermore, the fact that KIBS are ever more easily provided from long distances makes their "innovation supporting" role more global. The papers on the internationalisation of business service firms highlight the following of clients abroad as the major incentive for going international. This fact reinforces the hypotheses regarding the positive impact of the use of KIBS on knowledge diffusion and ultimately on innovation and productivity.

KIBS are "special" due to their close relationship with knowledge as well as being innovative in their own right. One of their main capacities is the provision of knowledge to other industries. Antonelli (2000, p.171) states that KIBS function as "holders of proprietary "quasi-generic" knowledge, from interactions with customers and the scientific community, and operate as an interface between such knowledge and its tacit counterpart, located within the daily practices of the firm".

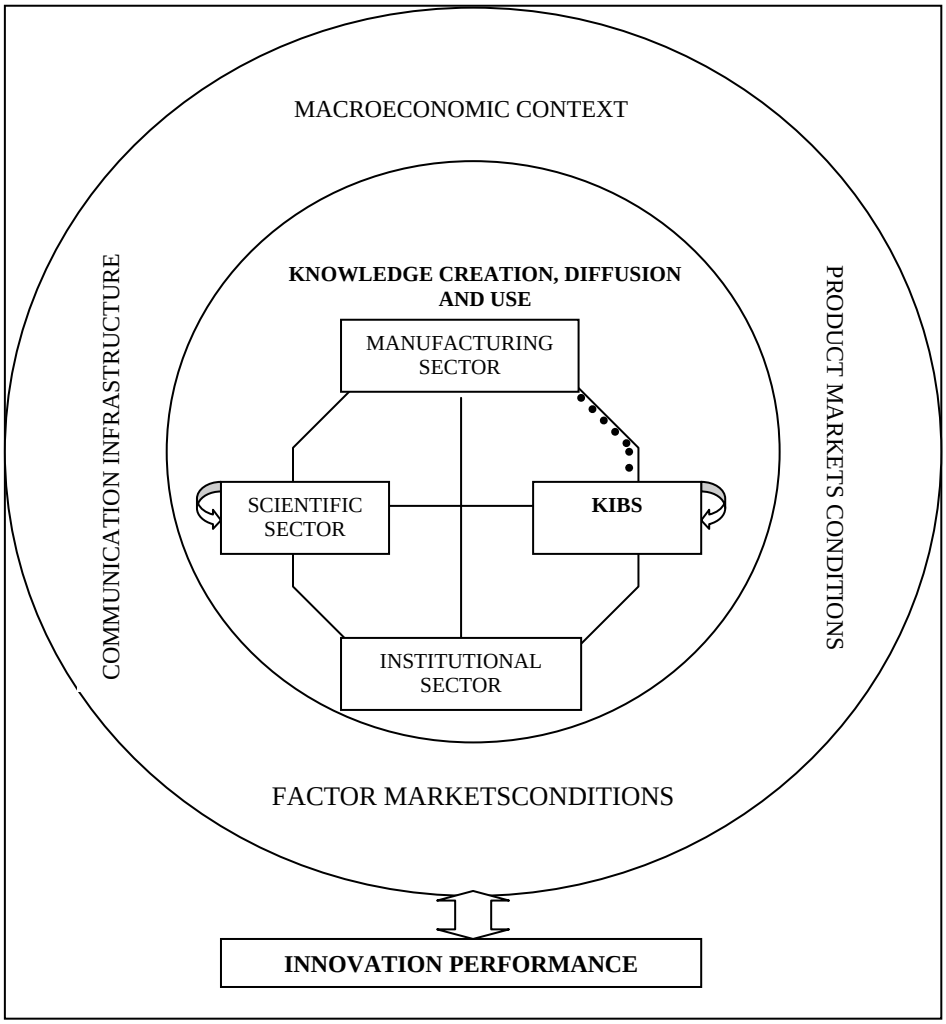
In other words, they can act as "bridges" for knowledge (Czarnitzki and Spielkamp, 2000) or, to quote Den Hertog and Bilderbeek (1998), "as a second knowledge infrastructure", even substituting for functions traditionally ascribed to the public sector.

Among the various analyses on the functions of KIBS, some studies adopt what can be described as a "management" or "organisational" perspective to describe the activities of KIBS when transmitting knowledge to their clients. This is the case of the papers by Strambach (2001), Glücker (1999) and Schulz (2000), where the emphasis is placed on the generation, diffusion and creation of knowledge by the interactions between KIBS and their clients.

A complementary approach consists in starting from the concept of national innovation system (Figure 1).

In his characterisation of the role played by KIBS within national innovation systems, Fischer (2001) points out that it is necessary to differentiate four main blocks within national innovation systems which comprise those groups of actors who share some specific characteristics as well as the institutions which govern the relationships inside and among these groups.

Figure 1. The role of KIBS in national innovation systems



Source: Fischer (2001, p. 208).

These four blocks are:

- Manufacturing sector: it is composed of manufacturing firms and their R&D laboratories.
- Scientific sector: it can be divided into two sub-groups. A qualification component, which includes educational organisations and provide scientists, engineers and other qualified workers and a research component, which comprises universities and other

research centres which generate and diffuse knowledge mainly in the form of scientific publications.

- KIBS: it is composed of organisations or units which provide assistance and support to manufacturing firms for the development and/or introduction of new products or processes.
- Institutional sector: on a general basis, there are two types of coordination: market and non-market.

In this case KIBS are considered to carry out three major functions: they are facilitators, carriers and sources of innovation for their client firms (Fischer, 2001; Den Hertog and Bilderbeek, 1998; Hipp, 2000). A knowledge-intensive business service is a facilitator when it collaborates in developing an innovation in a client firm, but the innovation is neither directly developed in the KIBS firm nor transferred from another firm. An example of this role is a KIBS firm that helps another firm to implement a new accounting system. It acts as a carrier when it participates in the transfer of innovations from one firm to another. An example is a software consulting firm that modifies new software to help its client firm to implement it. Finally a KIBS firm is a source of innovation when it plays a key role in the introduction and development of innovations in its client firms, since the innovation was directly developed in the KIBS firm. An example of this is a marketing agency that designs a new campaign for a client.

Concerning the effects of KIBS on the productivity of their client industries, we can consider that the knowledge-diffuser role described above translates into more efficient production processes, and, ultimately, into higher productivity.

Since the beginning of the study of service activities, it was commonly accepted that services show low productivity growth rates. However, if we take recent data, the picture obtained is not so clear. For instance, in a recent study carried out by Pilat (2007), he distinguishes very different patterns in the evolution of productivity in business services in the European countries during the decade of the nineties. Thus, whereas Germany and France reported negative productivity growth, The Netherlands, Denmark, the United Kingdom, Italy and Spain showed slightly positive growth rates of productivity in business services. Part of these variations can be explained by the difficulties still existing in measuring productivity in services. Pilat (2007) highlights some potentially important factor influencing productivity in KIBS. First, the regulatory reforms carried out in many services, in combination with the elimination of trade

barriers, have resulted into more competitive service markets. Other key elements are regulation, especially important in labour markets or the fostering of entrepreneurship.
Nevertheless, on a general basis, evidence provided by studies at the macro-level (and also at the micro-level (like the papers by Abramovsky and Griffith (2005) or Mann (2003)) confirms that the use of business services can enhance productivity.
From the above we can conclude that the close relationships that tie KIBS with their clients influence both innovation and productivity. KIBS collaborate with innovation in other firms and besides, thanks to ICT, they can easily be provided at long distances. This poses various questions about the different effects brought about by the increasing international sourcing of KIBS. For instance, how their use affects their client firms?

2.2. Going deeper into the role of KIBS: outsourcing and offshoring.

We mentioned in the last section that the growing international provision of KIBS can also affect their impact of innovation and productivity.
The growing globalisation of services´ provision is an undeniable fact. In addition to the general increase in the participation of services in production, employment and trade, many externalisation processes are currently carried out on an international basis. New technologies and the "digital era" have caused production processes to be organised on a global scale in many enterprises (in particular in most of multinational companies). This trend is growing so much that some authors (Bryson, 2007; Rubalcaba-Bermejo and Cuadrado-Roura, 2002) talk about a "global production system" or even "a third industrial revolution" (Blinder, 2006), where the key point is to determine whether there is a limit to tertiary delocalisation. Technological developments have transformed service activities, which are the main users of information and communication technologies (ICT). The major consequence of this "intensive use" has been an increase in services tradability: services can be provided at long distances thanks to ICT, or can de divided into tasks capable of being provided "on-line". This process is especially noticeable in the case of KIBS. The E-Business Watch Report 2004 on the use of ICT by business services distinguishes two main groups of these services in accordance with their use of ICT: KIBS and operational services. Given the high importance of the access and exchange of information and knowledge, KIBS tend to show better ICT infrastructures and are more likely to use the web or internet applications.
As Blinder (2006) point outs, the critical divide about the future impact of information technologies is to know to what extent the traditional distinction between labour-

intensive (tradable) services and knowledge-intensive (non-tradable) services will remain valid. The assimilation knowledge-intensive equals to non-tradable is changing (take for example engineering services provided by people in less developed countries), and it is expected to become more and more fuzzy in the years to come. As a result, the volume of KIBS that can be potentially offshored will grow.

In a world with a fierce competition and where services make up the major part of value added and an important part of costs in most industries (according to Hodge and Nordas (1999) services account for 10-20 % of production costs and for all the costs of trading: communications, transport, finance and insurance) it is mandatory for firms to provide high-quality services (if possible, at a low price) in order to compete. In recent years the development of information and communication technologies (ICT) has made possible to split up service activities, and, as a consequence, to outsource/offshore them. This implies that, in comparison with previous periods, firms not only delocalise labour intensive manufacturing activities but also different types of service activities. The gains from this process are clear: firms can specialise, cut costs and spread risks. On the other hand, the exporting countries can increase employment and investment and profit from spillovers. This way, we can affirm that KIBS can contribute to the globalisation of firms. Rubalcaba and Van Welsum (2007) summarise the ways in which this process happens: KIBS can improve the access to the different inputs (capital, labour, knowledge) and help to enter new markets and locations (Table 3).

Following (Morcos, 2003) from an international trade perspective, delocalisation adopts two main forms: outsourcing and foreign direct investment (FDI).

Outsourcing is defined (Greaver, 1999) as “the act of transferring some of a company’s recurring interval activities and decision rights to outside providers, as set in a contract”. The term offshoring is commonly used as a subcategory of outsourcing.

Four types of outsourcing are distinguished in the World Trade Report 2005, using location and control or ownership as distinctive criteria:

- Captive onshore outsourcing: shift in intra-firm supplies to an affiliated firm in the home economy.
- Non-captive onshore outsourcing: shift in intra-firm supplies to a non-affiliated firm in the home economy.
- Captive offshoring: supplies are sourced from an affiliated firm abroad.

- Non-captive offshoring: supplies are sourced to a non-affiliated firm and located abroad.

Table 3. Contribution of KIBS to the globalisation of firms

Global use of inputs	• Global access to capital and production of globally competitive technical innovation (e.g., Financial auxiliary services; Engineering and technical services; Tests and quality control; Research and development Design) • Global access to labour and use of new global skills in local markets (e.g., Selection and, provision of personnel; Head hunting; Professional training; Outplacement; Temporary work) • Access to and management of global knowledge (e.g., Computer and other ICT services; Internet and intranet services; Consultancy on information technologies and knowledge management) • Outsourcing and offshoring to low-costs countries (e.g., High-skilled ICT services, accountancy and reporting; Low-skilled operational services, call centres) • Transport and communication between different locations (e.g., Logistics and transport services; Communication services)
Global product markets	• Access to new markets (e.g., Management consultancy; Market research; Export aid; Fairs and exhibitions; Legal services) • Adaptation of global products into local needs & creation of new needs (e.g., Advertising and direct marketing; Public relations and press offices; Market research and management; • Distributive trades; Services related to Internet: B2B, B2C, web pages) Global reputation (e.g., Brands and mark services; Communication services; Environmental services and CSR)

Source: Rubalcaba and Van Welsum (2007, p. 218).

Thus not only the traditional externalisation of KIBS can have an impact on firms´ performance, but also the externalisation to foreign countries, namely offshoring.

2.3. A brief review of the empirical approaches.

In the last two sections we have commented on the theoretical arguments related to the relationship between KIBS in innovation, productivity and offshoring. The aim of this section is to review the empirical studies on these issues carried to date, paying special attention to the Spanish case.

2.3.1. KIBS and innovation.

Given the traditional scarcity of statistics, the techniques employed to analyse the role of KIBS in innovation and productivity using micro data are quite simple. Moreover, studies tend to concentrate on the patterns of innovation in KIBS and the characteristics

of productivity in these activities, but, in most of the cases they do not pay attention to their impact on other activities.

In relation to the analysis of innovation in KIBS, we can highlight the results of two recent papers: Leiponen (2005) and Freel (2006). In Spain, the analyses available are referred to the service sector in general (Camacho and Rodriguez, 2005).

Freel (2006) employs the "knowledge production function approach" to analyse the patterns of technological innovation in KIBS. The microdata used are part of a wider survey named "Survey of Enterprise in Northern Britain" which provides valid responses for 597 manufacturing firms and 748 business service firms. The sample employed in the analysis consist of 563 small KIBS firms, classified following Miles et al. (1995) into technology-based KIBS (264) and professional KIBS (299). The estimation method is an ordered logit. The results indicate the existence of a positive relationship between the greater employment of high-qualified workers and the innovativeness in t-KIBS firms as well as the importance of customer and supplier cooperation in innovation in t-KIBS.

Leiponen (2005) uses data for 167 Finnish KIBS firms collected through a mail survey carried out by the Research Institute of the Finnish Economy. After applying factor analysis, regression analyses (probit and tobit) are carried out. Thus, innovation in KIBS appears to be smaller scale and less institutionalised than in the majority of manufacturing industries. Again the existence of highly qualified personnel plays an important role in innovation in combination with external knowledge sourcing from clients and competitors.

In the case of Spain, Camacho and Rodriguez (2005) classify most of KIBS industries are highly innovative or science-based in their analysis of the data from the Spanish Innovation Survey 2000, the first large-scale innovation survey that included service activities in Spain. Using data for 1.193 service firms classified into 20 industries, they identify five clusters of service firms. KIBS are included within the group described as "highly innovative firms".

2.3.2. KIBS and productivity.

The first approaches about productivity and KIBS start from the introduction of KIBS (or business services) as an additional production factor. Proxies for business services are obtained from input-output tables.

The pioneering papers estimate an extended Cobb-Douglas production function with three inputs, physical capital, C, labour, L, and business services, B. This is the case of Drejer (2002). She estimates this kind of production function using panel data with fixed effects for 52 manufacturing and service industries during the period 1970-1995. In terms of results the only manufacturing sector where KIBS seems to exert a positive effect during consecutive time periods is the supplier dominated manufacturing sector, namely, food, beverages and tobacco, textiles, wearing apparel and leather, wood and wood products, refined petroleum products, furniture; manufacturing n.e.c. and construction, whereas the impact seems to be higher for other service industries.

Despite the common trend to estimate aggregate production functions of a Cobb-Douglas type which contains labour and capital inputs, given the difficulties to obtain adequate series for capital, most of the studies carried out to date construct a labour-based production function in which labour interacts with two kinds of inputs: material and immaterial. Starting form Georgescu-Roegen (1971), it is assumed that output is produced by means of labour that acts on material inputs and/or business services. Therefore, a distinction is made between "immaterial" inputs (B) and "material" inputs (the remainder of intermediate inputs). Windrum and Tomlison (1998) compare the impact of the use KIBS on productivity in the UK, the Netherlands and Japan by estimating this type of production function using input-output data. The estimated values highlight the need to distinguish between an increase in the use of KIBS and the effectiveness of the use of KIBS. In particular it is found that, whereas in UK the growth of KIBS exceeded that of the Netherlands or Japan, KIBS have a higher impact on productivity in these two countries. Entering into the analysis of the own KIBS sector, two papers can be noted.

Cainelli et al. (2006) explore the two-way relationship between innovation and economic performance in services using a longitudinal firm-level dataset which matches data from the second Community Innovation Survey, CIS 2 (1993–95), against a set of economic variables provided by the System of Enterprise Accounts (1993–98). They conclude that there is a feedback mechanism innovation-performance. Thus, innovating firms show better results in terms of productivity and growth, and, at the same time, those firms with higher productivity levels show above average innovation expenditure. Moreover, they find that, in the case of service firms, productivity is associated "not only simply with the presence of innovation, but also with the level of financial commitment to innovation and the type of innovation activity performed".

Mansury and Love (2008) relate the economic performance of US business services firms to their innovation outputs and external linkages, conditioning for a set of internal resources and other firm characteristics which may affect performance. Business services are defined as "establishments primarily engaged in providing services, not elsewhere classified, for business establishments on a contract or fee basis". Information was obtained through a mail questionnaire which provides information for 206 firms. The descriptive analysis reveals that innovators have higher productivity, sales growth and employment growth than non-innovators.

They find that the presence of service innovation has a positive effect on growth, but they do not find any effect on productivity. Nevertheless, the cross-sectional nature of the analysis limits the direction of causality: does innovation improve performance or are well-performing firms more likely to innovate?

2.3.3. KIBS and offshoring.

The trend of firms to concentrate on their core activities and externalise or contract-out the remaining activities has been widely analysed. Nevertheless, the attention has turned now to the externalisation to foreign countries, what is called offshoring. Different studies have examined the potential negative effects of offshoring on employment. The studies carried out to date focus on developed countries, in particular the US (Baily and Lawrence, 2004; Amiti and Wei, 2006; Schultze, 2004) and Europe (Amiti and Wei (2005) study the case of the United Kingdom and Falk and Wolfmayr (2008) Austria, Finland, Germany and the Netherlands). Despite the prevailing negative vision, all these studies come to the same conclusion: the effect of offshoring on employment is negative, but small.

One of the pioneering papers about the relationship between offshoring and productivity in the service sector is the one elaborated by Abraham and Taylor (1996). They argue that service firms externalise business services in order to cut labour costs and benefit from specialisation. In terms of the effects of the externalisation of services on manufacturing productivity growth the results differ considerably. For example, Siegel and Griliches (1992) obtain quite low correlations in their analysis for the eighties. On the contrary, ten Raa and Wolff (1996) find a positive relationship.

In the Spain case two papers can be highlighted: López (2002) and Merino and Rodríguez (2007). The first paper examines the externalisation of both manufacturing and service activities whereas the second one put the emphasis on business services.

López (2002) estimates the impact of offshoring on production and productivity using data from the Spanish Survey on Business Strategies during the period 1990-1999. In particular, he applies GMM to production and productivity equations. The results obtained show that, in the case of manufacturing activities, externalisation seems to exert a positive effect on production and productivity. With reference to the externalisation of services (offshoring) the impact seems to be negligible, although, as noticed by the author, measurement problems could condition these results.

Merino and Rodríguez (2007) go beyond and try to analyse the reasons beyond the decision of manufacturing firms to externalise business services instead of producing them in-house. Starting from the equilibrium model of Grossman and Helpman (2002) which highlights the trade-off between less specialisation and contract costs, they estimate probit equations about firms" propensity to externalise different types of services. They use cross-section data from the Spanish Survey on Business Strategies in the case for the year 1998 and conclude that size positively affects the offshoring of services linked to advisory activities, whereas in services like cleaning, recruitment and training the impact tends to be negative.

3. Description of statistical sources.

After the review of both the theoretical and empirical literature on the role of business services, in this section we briefly describe the main statistical sources employed in this project. In the case of Spain, the data availability is higher than in Turkey or Morocco, so one survey allows us to measure the different aspects of interest. Nevertheless, in Turkey and Morocco it has been necessary to combine information from different sources. For Turkish firms, three different databases are employed to construct the variables of interest. In the case of Moroccan firms, information coming from two databases has been merged. In the following sub-sections we provide some information on the different databases used, paying special attention to differences in the structure of the manufacturing sector in Turkey and Morocco.

3.1. Data for Spanish manufacturing firms.

The survey employed in the analysis for Spain is the *Encuesta sobre Estrategias Empresariales* (ESEE). This is an annual survey of Spanish manufacturing firms carried out by the Ministry of Industry from 1990 to 2006. The ESSE is representative of the Spanish manufacturing firms classified by industrial sector and size categories and includes exhaustive information at the firm level. The questions included in the survey can be divided into four groups:

- *Activity, products and processes*: characteristics of the firm and its operations, description of their establishments, characteristics of their products, technology employed.
- *Clients and providers*: information about the type of clients of the firm, the use of their products, distribution channels, advertising, characteristics of providers and services employed.
- *Costs and prices*: costs assumed by firms and price policies.
- *Markets*: information about the markets served by firms when they account for, at least, 50% of total sales, for example market share, number of competitors or changes in prices.

Despite the fact that the survey covers the whole period 1990-2006, it is possible to find information on business services (our object of study in this project) for four years: 1994, 1998, 2002 and 20065. The evolution of the sample covered by the survey in these years is

shown in Table 4. As can be noticed, the sample changed considerably due to disappearances of firms previously included. It calls the attention the fact that the response rate was lower in 2006 than in the rest of the year. Moreover, 2006 was the year when more firms disappeared: 181. This drop is compensated by the increase in the total number of new firms incorporated to the sample: 307. A positive fact to highlight is the reduction in the number of firms which do not collaborate, from 45 in 1994 to 14 in 2006. In brief, in spite of these changes, we can note the existence of stability in the size of the sample when the number of responses is taken account. Thus, in 1994 we had 1721 valid responses and in 2006 1716.

Table 4. Evolution of the Spanish sample, 1994-2006

	1994	**1998**	**2002**	**2006**
Sample	1869	1920	1724	1911
Answered	1721	1764	1635	1716
	(92.1)	(91.9)	(94.8)	(89.8)
Disappeared	103	134	77	181
Did not collaborate	45	22	12	14
Recovered	99	0	73	0
Incorporated this year	56	12	0	307

Source: ESEE

3.2. Data for Turkish manufacturing firms.

As in the Spanish case, data collected within the framework of firm-level surveys in the Turkish manufacturing sector are used. In particular three surveys, namely, the Annual Survey of Manufacturing Industries, Innovation Survey and Industrial Technology Services Survey are used in order to assess the contribution of business services to performance of manufacturing firms.

The more general information on the characteristics and behaviour of manufacturing firms is provided by the Annual Survey of Manufacturing Industries (ASMI), conducted by the State Institute of Statistics (SIS). The ASMI covers all public establishments and private establishments employing 10 or more people.

Concerning information about innovation, three Innovation Surveys were conducted by the SIS in 1998, 2002 and 2005, covering the data for innovation activities in the periods 1995-1997, 1998-2000 and 2002-2004, respectively. The surveys adopted a questionnaire

compatible with the Community Innovation Survey of the EU, and used the concept of innovation as defined in the Oslo Manual. They were based on samples of firms stratified by size and industry categories (depending on the number of firms in a given industry, all firms above a certain size threshold were approached). The response rates were about 55 % in the first two surveys and more than 70 % in the third one.

Finally, the Industrial Technology Services Survey (ITS Survey) was specifically designed for monitoring and evaluating the effects of technology services in Turkey. The survey was applied three times: the first one was sent to all firms which responded to the First Innovation Survey in the second half of 1999. The response rate was above 50 % (about 1300 firms). The second and third surveys were carried out together with the second and third innovation surveys in 2002 and 2005, respectively.

The main features of the sample employed in this analysis are described in Tables 5-7.

Table 5. Distribution of employment in the Turkish manufacturing sector (%), 1995-2001

Industry	1995	1996	1997	1998	1999	2000	2001
Food, beverages, tobacco	17.5	16.7	15.6	15.4	16.0	15.5	15.2
Textile, apparel, leather industries	33.4	35.0	35.5	34.7	33.6	34.7	33.6
Wood and wood products	2.2	2.2	2.3	2.4	2.4	2.5	2.3
Paper, printing, publishing	3.5	3.5	3.2	3.0	3.0	3.0	2.9
Chemicals, rubber, plastic products	8.9	8.8	8.9	9.1	9.6	9.2	9.4
Non-metallic mineral products	7.0	6.6	6.5	6.6	7.0	6.6	6.3
Basic metals industries	6.7	5.8	5.7	5.6	5.5	5.4	5.1
Fabricated metal products, machinery and equipment	20.0	20.4	21.5	22.2	21.8	22.0	21.6
Other manufacturing industries	0.6	0.6	0.6	0.7	0.7	0.8	0.9

Source: calculations from Turkstat's ASMI database.

Table 6. Distribution of value added in the Turkish manufacturing sector (%), 1995-2001

Industry	1995	1996	1997	1998	1999	2000	2001
Food, beverages, tobacco	17.6	17.5	14.1	13.8	15.5	17.2	16.9
Textile, apparel, leather industries	19.6	20.3	20.6	17.9	15.8	16.5	18
Wood and wood products	1.3	1.4	1.5	1.3	1.4	1.5	0.94
Paper, printing, publishing	3.8	4.2	3.6	2.8	3	3	2.6
Chemicals, rubber, plastic products	19.1	17.5	16.9	28.8	31.7	26.9	30.3
Non-metallic mineral products	8	7.6	8.1	7	7.3	6.9	6.2
Basic metals industries	7.7	7.2	9.1	6.1	5.3	5.4	5.5
Fabricated metal products, machinery and equipment	22.5	23.9	25.7	21.9	19.7	21.9	18.6
Other manufacturing industries	0.3	0.4	0.5	0.3	0.4	0.7	1

Source: calculations from Turkstat's ASMI database.

Table 7. Distribution of the number of firms in the Turkish manufacturing sector (%), 1995-2001

Industry	1995	1996	1997	1998	1999	2000	2001
Food, beverages, tobacco	17.5	17.2	16.3	15.7	15.8	15.4	15.2
Textile, apparel, leather industries	30.8	31.6	31.8	31	30.2	30.5	31.1
Wood and wood products	4	3.9	4.3	4.2	4	4	4.1
Paper, printing, publishing	3.5	3.5	3.4	3.5	3.4	3.6	3.6
Chemicals, rubber, plastic products	8.6	8.6	9	9	9.3	9.3	9.5
Non-metallic mineral products	8.3	7.9	7.7	7.8	7.9	7.8	7.2
Basic metals industries	3.9	3.6	3.6	3.6	3.7	3.6	3.6
Fabricated metal products, machinery and equipment	22.3	22.6	22.9	24.4	24.6	24.8	24.6
Other manufacturing industries	1	1	1	1	1.1	1.1	1.2

Source: calculations from Turkstat's ASMI database.

The evolution of the share of major industries within the manufacturing sector over the period 1995-2001 is presented in terms of the distribution of employment, value added and number of firms. Industrial Standard Industrial Classification (ISIC) at the two-digit level is used here for illustration purposes. In terms of industries, it turns out that the industries of food, beverages and tobacco and textile, wearing apparel and leather products together accounted for half of the manufacturing sector in terms of the aforementioned variables. In addition, their participations remained relatively stable over the period analysed.

We have to note that the share of the second sector doubles the share of the first sector as far as employment and number of firms are concerned, but not in terms of value added. These figures confirm the importance of labour intensive and low (medium) technology activities in the Turkish manufacturing sector by the late nineties. Another major sector is fabricated metal products, machinery and equipment. This sector is more heterogeneous compared to the two previous ones: indeed, it contains low-medium as well as high-technology sectors like the manufacture of fabricated metal products, the manufacture of transport equipment and the manufacture of professional and scientific instruments. The share of this sector was relatively stable over the period 1995-2001: it accounted on average for 20% of all the three variables.

Finally, another important sector is the one pertaining to chemicals and petroleum, coal, rubber and plastic products: although its share in manufacturing employment and in the number of firms was much lower than the three previous sectors, its weight in sector-level value added increased from 19.1% in 1995 to 30.3% in 2001. This divergent

evolution is likely to be explained mainly by the existence of very few capital-intensive state-owned firms in petrochemicals.

Table 8 summarizes information on the size distribution of firms in the Turkish manufacturing sector in the year 1996 and the share of the different size classes – seven in total – in terms of number of establishments and employees, wage bill, and value added.

Table 8. Size distribution of the Turkish manufacturing sector (%), 1996

Size classes	Number of establishments	Number of employees	Payments to employees	Value added
10-24	36.4	5.7	2.2	2.2
25-49	28.5	10.3	4.8	4.9
50-99	14.7	10.4	6.2	7.2
100-199	10.1	14.3	11.4	10.8
200-499	7	21.8	22.5	24.1
500-999	2.3	16.1	21.7	19.2
> 1000	1.2	21.4	31.2	31.6
Total	100	100	100	100

*Size is measured by the number of employees.
Source: calculations from Turkstat's ASMI database.

Firms belonging to the first two categories represented 65% of the total number of firms but accounted only for 16% of all employees, 7% of the wage bill and 7.1% of the value added in the manufacturing sector in the year 1996. This pattern is not modified if the third size category is included in the analysis: it then turns out that 80% of firms in the Turkish manufacturing firms accounted for 26.4 % of employees, 12.3% of the wage bill and 13.3% of the value added created in 1996. On the other hand firms with more than 500 employees account for slightly more than 50% of payments made to employees and value added, 37.5% of the number of employees whereas they represent 3.5% of all firms with more than ten employees.

Data provided in the table points to the massive presence of small and medium size enterprises in the formal manufacturing sector in Turkey and at the same time to their poor performance in terms of the four indicators of manufacturing activity included in the table. The causes of this situation are manifold and include factors such as poor access to capital markets, low human capital, lock-in into low-technology sectors that are open to fierce international competition based on low wages, insufficient in-firm training and a tax and regulatory system that penalizes SME activity.

3.3. Data for Moroccan manufacturing firms.

The empirical work undertaken in the case of Morocco is based on two firm level databases. The first database is drawn from the yearly survey conducted by the Ministry Industry and Trade. This survey covers all manufacturing firms with at least 10 employees or with an annual turnover higher than 100,000 dirham. It collects firm level data on a set of variables such as turnover, output, value added, exports, investment, gross labour cost, and the number of permanent and temporary employees. The second database is constructed using data from the "Investment Climate Assessment" (ICA) survey carried out in 2004 by the same ministry jointly with the World Bank. This survey covers a representative sample of 850 firms in the seven most important industries in Morocco. It provides very detailed data on the skill composition of the manufacturing sector labour force, on technology, innovation and other related variables. It also covers business services such as firms' demand for technical and managerial services, and the use of information and communication technologies (computers, internet). The same identification code is used in both surveys, which makes it possible to merge the two databases and better characterise the profile of the Moroccan manufacturing firms regarding the issues investigated in this project. The manufacturing sector in Morocco represents around 17% of GDP and provides jobs for 12% of the labour force. The contribution of the sector to GDP has remained roughly unchanged over the last two decades. The formal manufacturing sector is made of some 7000 firms operating in various industries. Although some evolution has been recorded in the structure of the manufacturing sector since the mid eighties, it has not led to any significant transformation. Three industries continue to dominate the whole manufacturing sector either in terms of employment, exports or value added. These are: agro-food industries, textile and garment industries and chemical and par chemical industries. Metallic and metallurgic industries are less important in terms of their contribution to the manufacturing output as well as in terms of exports. As far as electric and electronic industries are concerned, their contribution to production and employment is of limited importance; however they seem to be very dynamic and tend to increase gradually their shares in foreign markets.

For a long time, the manufacturing sector in Morocco has been characterised by its high specialisation, its excessive economic as well as geographic concentration, its limited domestic competition and its low exposure to international competition.

As far as size distribution of firms is concerned, the manufacturing sector in Morocco appears to be highly concentrated with few dominating firms. More than 90% of manufacturing firms are small and medium enterprises SME (less than 200 employees). Although large firms do not represent more than 8% of the total number of firms, their sales amount to 63% of total manufacturing sales, their value added 70% and their exports 72%. Even in terms of employment, large firms contribute by roughly 58% of total manufacturing employment. Overall, large firms appear to be more stable as indicated by their older age, more productive (higher labour productivity) and tend to pay higher wages, and to generate higher profits compared to small and medium enterprises. Finally, both foreign and state ownership are concentrated in large firms. Conversely, small and medium firms seem to be largely owned by Moroccan private capital.

The manufacturing sector in Morocco, similarly to other countries in the MENA region, has developed in the sixties and seventies under the import substitution strategy. Most industries benefited from protection through tariff and non-tariff barriers such as import licenses, quotas and exchange rate restrictions. Since the early 80s, the Moroccan authorities have decided to switch from a closed import substitution economy with a relatively large public sector to trade liberalization and a market oriented economy. The country speeded up the process of economic reforms during the 1990s. The new strategy is thought to set the economy on a path of higher efficiency as a result of the intense competition and thus foster growth and development.

4. Empirical results.

Once described the statistical sources employed in the project, the main empirical results reached in the econometric estimations for each country are summarised in this section. The structure followed in the analysis by countries has been the same. Firstly, some data on the use of business services by manufacturing firms are presented. In the case of Spain, in addition to the use of business services, data on the externalisation of this kind of services are shown. Secondly, the econometric results on the impact of business services on innovation, productivity and exports are discussed. In relation to innovation, two dependent variables are distinguished in Turkey and Morocco: product innovation and process innovation. Estimation techniques are in all cases, probit models, except in the Turkish model for productivity where OLS is employed. In Morocco two indicators of total factor productivity are used: one based on the book value of capital and another on the market value of capital.

4.1. Analysis of the impact of business services in Spanish manufacturing firms.

4.1.1. Descriptive statistics.

As mentioned before, the main objective of the ESEE is to collect information on the decision made by firms in relation to those aspects that can affect their competitiveness, from changes in prices to R&D expenditures. Given the fact that decisions are conditioned by the environment, the survey also includes information on business environment. Thus, the ESEE provides information about characteristics of the company. In particular, it contains information about: product differentiation (advertising expenditure and R&D expenditure), size (number of employees, sales), quality of labour, participation of public or foreigners in capital, innovation (if the firm does any of the following activities: technical and scientific information services, quality normalisation and control, imported technology assimilation efforts or design activities, R&D results, patents or process innovations) and characteristics of the market (market share). In addition, it offers information on the volume of exports and imports. For each firm, we know the region where it is located in and the sector of the NACE- Rev. 1 classification to which it pertains. Concerning business services, the set of reported services is composed of activities that cover almost all business services according to the European Classification of Economic Activities (NACE divisions 72 to 74). Information related to business services, and more concretely to knowledge-intensive business services (KIBS), is available for the years 1994, 1998, 2002, and 2006. Firms are asked about the use of external services (not

used/carried out by the own firm/partially externalised/externalised). This is our main variable to measure the use of business services in our model. Therefore, two main options are offered when analysing the use of business services (they don't use or they use a specific type of business service). In a positive case, firms have to indicate the degree of externalisation of the services. Three options are offered (own production/partial externalisation/total externalisation).

Ten business services industries are distinguished:

- *Advertising*
- *Legal activities*
- *Accounting and bookkeeping*
- *Tax consultancy*
- *Auditing activities*
- *Management activities*
- *Labour recruitment*
- *Training*
- *Computer programming*
- *Software consultancy*

Advertising includes the provision of a full range of advertising services (i.e. through in-house capabilities or subcontracting), including advice, creative services, production of advertising material, media planning and buying. For example, the creation and realization of advertising campaigns (creating and placing advertising in newspapers, periodicals, radio, television, the Internet and other media; creating and placing of outdoor advertising, e.g. billboards, panels, bulletins and frames, window dressing, showroom design, car and bus carding etc.; media representation, i.e. sale of time and space for various media soliciting advertising; aerial advertising; distribution or delivery of advertising material or samples; provision of advertising space on billboards etc.; creation of stands and other display structures and sites) and conducting marketing campaigns and other advertising services aimed at attracting and retaining customers: promotion of products, point-of-sale marketing, direct mail advertising or marketing consulting.

The group of *legal activities* includes the legal representation of one party's interest against another party, whether or not before courts or other judicial bodies by, or under supervision of, persons who are members of the bar, such as advice and representation in

civil cases, advice and representation in criminal actions, advice and representation in connection with labour disputes. It also includes preparation of legal documents such as articles of incorporation, partnership agreements or similar documents in connection with company formation, patents and copyrights, preparation of deeds, wills, trusts, etc. as well as other activities of notaries public, civil law notaries, bailiffs, arbitrators, examiners and referees.

Accounting and bookkeeping services are referred to the recording of commercial transactions from businesses or others, whereas *tax consultancy* includes the preparation of personal and business income tax returns and advisory activities and representation on behalf of clients before tax authorities. *Auditing activities* encompass the examination of accounts and certification of their accuracy and the preparation of personal and business income tax returns.

Management activities include the provision of advice, guidance and operational assistance to businesses and other organizations on management issues, such as strategic and organizational planning; decision areas that are financial in nature; marketing objectives and policies; human resource policies, practices and planning; production scheduling and control planning. This provision of business services may include advice, guidance or operational assistance to businesses and the public service regarding: public relations and communication, lobbying activities, design of accounting methods or procedures, cost accounting programmes, budgetary control procedures advice and help to businesses and public services in planning, organization, efficiency and control, management information etc.

Labour recruitment refers to activities of listing employment vacancies and referring or placing applicants for employment, where the individuals referred or placed are not employees of the employment agencies, supplying workers to clients' businesses for limited periods of time to supplement the working force of the client, and the activities of providing other human resources.

Training includes general continuing education and continuing vocational education and training for any profession. Instruction may be oral or written and may be provided in classrooms or by radio, television, Internet, correspondence or other means of communication. It also includes the provision of instruction in athletic activities to groups or individuals, foreign language instruction, instruction in the arts, drama or music or other instruction or specialized training,

Computer programming includes designing the structure and content of, and/or writing the computer code necessary, namely, to create and implement: systems software (including updates and patches), software applications (including updates and patches), databases and web pages.

Software consultancy consists in customizing of software, i.e. modifying and configuring an existing application so that it is functional within the clients' information system environment. The firms classified in this class often install the system and train and support the users of the system.

Table 9 reports the average use of the business services described above by the Spanish firms.

Table 9. Use and externalisation of business services by Spanish manufacturing firms, 1994-2006

	Use of business services			
	1994	**1998**	**2002**	**2006**
Legal activities	87	89	87	88
Accounting and bookkeeping	83	86	86	87
Tax consultancy	98	98	97	97
Auditing activities	56	57	59	64
Management activities	95	96	95	95
Labour recruitment	87	88	88	90
Training	84	85	88	89
Computer programming	84	89	88	87
Software consultancy	83	90	93	90
Research and development	34	35	33	33
	Externalisation of business services			
	1994	**1998**	**2002**	**2006**
Legal activities	87	91	94	92
Accounting and bookkeeping	50	56	61	66
Tax consultancy	86	87	90	89
Auditing activities	95	96	96	97
Management activities	11	13	16	15
Labour recruitment	20	21	23	26
Training	32	43	48	49
Computer programming	61	69	74	73
Software consultancy	65	74	76	75
Research and development	57	57	64	65

Source: ESEE

As can be observed, this type services is widely used by Spanish manufacturing firms. Thus, more than three out of four firms employed the different types of business services

distinguished, the percentages being especially noticeable in the cases of tax consultancy and management activities (with percentages of 97% and 95%, respectively, in 2006). In general, the percentage of usage reported is around 90% with two remarkable exceptions: auditing activities (because of the fact that, given national legislation, only big firms have to audit their accounts) and research and development. In this latter case we have to note the severe differences in comparison with the rest of the business services analysed. Its use has slightly diminished from 1994 after a recovery in 1998. This fact points out the need to foster innovation expenditures in the Spanish production system: "hard" and "soft" expenditures are both complementary in order to innovate. Although the soft side seems to be well developed in the Spanish innovation system, an important effort needs to be carried out in order to increase the use of research and development services by the Spanish firms. In terms of growth, in we compare the first and the latter year available, the percentages of use grew in the majority of industries, the increases being specially noticeable in auditing activities (8 percentage points) and software consultancy (7 percentage points). This evolution can reflect two main phenomena: for one part, a higher size of the Spanish manufacturing firms, and, for the other part, the introduction of information and communication technologies. At the opposite end of the scale we can note the decreases of 1 percentage point in the use occurred in the industries of research and development and tax consultancy.

Turning to the analysis of externalisation process, we have to note that the relevance of this trend varies considerably from one type of service to another. Thus, for one part, we find business services where the degree of externalisation is quite high, namely auditing activities, legal activities or tax consultancy. For the other part, we observe other business services where externalisation seems to be scarcely used, that is, management activities or labour recruitment. The remaining of business services show an intermediate position in the implementation of externalisation strategies ranging from around 49% in training and accounting and bookkeeping to 73% and 75% in computer programming and software consultancy.

Nevertheless, what it is important to highlight is the general increase in the degree of externalisation of business services during the period analysed. Again, if we take the first and latter year available, we can observe increases in all the industries analysed, although of a very different magnitude. Thus, whereas in services like tax consultancy and auditing the increases were relatively small (because of the higher initial degree of externalisation), in the case of training and accounting and bookkeeping the rises reached 17 and 16

percentage points. The externalisation process has been also relevant in computer services, with increases of 12 percentage points in computer programming and of 10 percentage points in software consultancy.

4.1.2. Effects of business services on innovation.

In order to verify if the use of business services contribute to innovation in manufacturing firms, a probit model where innovation depends on the type of industry, firms' characteristics and the use of business services is estimated. We estimate the probability of innovating (X =1 if firm innovates and 0 if not). Innovation in firms is assumed to depend on basic firm characteristics and variables like export and import ratios, productivity levels, the share of foreign capital, the Herfindahl index or the market share. Panel data techniques with fixed effects among industries and time are employed to estimate a model which can be summarised as follows:

$$X_{it} = \alpha_0 + \alpha_1 CHAR_{it} + \alpha_2 BS_{it} + \partial_t + \varepsilon_{it} \qquad (1)$$

where X_{it} is the dependent variable for firm *i* in year *t* (in this case innovation), $Char_{it}$ is a set of characteristics of the firm (size, age, presence of foreign capital, openness, competition, productivity), *BS* is a vector of variables reflecting the use of business services and others variables represent fixed effects for the total industry *i* and year *t.*

More concretely, the variables included in this model are:

- Size: it is measured as the natural logarithm of the number of employees
- Age: it is measured as the natural logarithm of the age of the firm
- Foreign participation: it is measured as the share of foreign capital in the firm
- Openness: two variables are included which measure export propensity and import propensity
- Competition: two variables are included, the market share and the Herfindahl index. This latter is measure of industry concentration. Its value is obtained as the sum of the squares of the market shares of all firms in an industry. Higher values indicate greater concentration.
- Productivity: it is measured in two ways, total factor productivity and labour productivity.

In addition, the use of business services is measured both in general terms (that is, the use is recorded independently from the origin domestic/external of the provision of the service) and distinguishing when the service is externally provided. A summary of the variables is reported in Table 10.

Four models are estimated. The first two models show the general impact of the use of business services on innovation. The main difference between them is the variable employed to measure productivity: in model 1 is total factor productivity and in model 2 is labour productivity. Models 3 and 4 try to evaluate possible differential effects when business services are externally provided. Again, the main difference between them is the indicator used for measuring productivity.

Table 11 shows the estimation results. Entering into the general impact of the use of business services, we can identify three business services that exert a positive and significant effect on innovation, namely, research and development, computer programming and software consultancy. These results are in accordance with traditional innovation theories which sustain that research and development is a key activity for firms to success in innovation. The positive impact of those business services related to information technologies can be explained by the great importance that the introduction of new technologies has on firms´ performance. It calls the attention the fact that labour productivity shows a quite high effect on innovation, whereas in model 1 total factor productivity seems to have no effect. Leaving aside this fact, in all models there are two variables that show a positive effect on innovation: size and export propensity. In the case of size there is a strong debate about whether the size of firms condition innovation activity. For one part, it can be argued that bigger firms can devote more resources to innovation. For the other part, small firms are more flexible to assign resources. In this case, as we are measuring innovation from a “traditional” viewpoint, that is, in terms of the introduction of product or process innovations, size reveals as a key determinant. With reference to export propensity the more plausible explanation is that more innovative firms are also more competitive, and, as a result, are more prepared to compete in international markets.

If we turn to the impact of those business services externally provided, we can observe how research and development continues to be a key activity for innovation, although its impact is somewhat lower.

Table 10. Variables included in the Spanish innovation model

Variable	Description
TFP	Total factor productivity
Size	Log of the number of employees
Age	Log of the age of the firm
Foreign participation	Share of foreign capital in the firm
Export propensity	Share of exports in production
Import propensity	Share of imports in production
Market share	Share of sales of the firm
Herfindahl index	Sum of the squares of the market shares of all firms in an industry
R&D	Binary variable equals to 1 when the firm contracts R&D and 0 otherwise
Legal activities	Binary variable equals to 1 when the firm uses legal services and 0 otherwise
Accounting and bookkeeping	Binary variable equals to 1 when the firm uses accounting services and 0 otherwise
Tax consultancy	Binary variable equals to 1 when the firm uses tax consultancy services and 0 otherwise
Auditing activities	Binary variable equals to 1 when the firm uses auditing services and 0 otherwise
Management activities	Binary variable equals to 1 when the firm uses management services and 0 otherwise
Labour recruitment	Binary variable equals to 1 when the firm uses labour recruitment services and 0 otherwise
Training	Binary variable equals to 1 when the firm uses training services and 0 otherwise
Computer programming	Binary variable equals to 1 when the firm uses computer programming services and 0 otherwise
Software consultancy	Binary variable equals to 1 when the firm uses software consultancy services and 0 otherwise
Labour productivity	Labour productivity
External R&D	Binary variable equals to 1 when the firm contracts external R&D and 0 otherwise
External advertising	Binary variable equals to 1 when the firm spends on external advertising services and 0 otherwise
External Legal activities	Binary variable equals to 1 when the firm uses external legal services and 0 otherwise
External Accounting and bookkeeping	Binary variable equals to 1 when the firm uses external accounting services and 0 otherwise
External Tax consultancy	Binary variable equals to 1 when the firm uses external tax consultancy services and 0 otherwise
External Auditing activities	Binary variable equals to 1 when the firm uses external auditing services and 0 otherwise
External Management activities	Binary variable equals to 1 when the firm uses external management services and 0 otherwise
External Labour recruitment	Binary variable equals to 1 when the firm uses external labour recruitment services and 0 otherwise
External training	Binary variable equals to 1 when the firm uses external training services and 0 otherwise
External Computer programming	Binary variable equals to 1 when the firm uses external computer programming services and 0 otherwise
External Software consultancy	Binary variable equals to 1 when the firm uses external software consultancy services and 0 otherwise

Source: Own elaboration.

Computer programming also shows a positive effect but in the case of software consultancy the external provision does not seem to exert a positive effect. This points out to a direct relationship between in-house software consultancy and innovation. Advertising (which is only included when the provision is external) also has a positive effect on innovation. Again, when measuring productivity by total factor productivity (model 3) no clear effect is shown, but when labour productivity is introduced the effect is positive and significant (model 4). Another curious fact is the impact of external training, which is significant in model 3 but not in model 4.

Table 11. Estimation of the impact of business services on innovation, Spain

	Model 1	**Model 2**	**Model 3**	**Model 4**
TFP	0.009		0.001	
Size	0.066**	0.060*	0.116***	0.107***
Age	-0.010	-0.026	-0.003	-0.022
Foreign participation	0.034	-0.015	0.043	-0.011
Export propensity	0.228*	0.217*	0.321**	0.305**
Import propensity	0.165	0.123	0.209	0.160
Market share	-0.020	-0.081	0.027	-0.045
Herfindahl index	0.018	0.084	-0.199	-0.063
R&D	0.694***	0.661***		
Legal activities	0.007	-0.012		
Accounting and bookkeeping	0.082	0.091		
Tax consultancy	-0.059	-0.053		
Auditing activities	-0.040	-0.090		
Management activities	-0.096	-0.087		
Labour recruitment	0.000	0.001		
Training	0.144	0.147		
Computer programming	0.262**	0.234**		
Software consultancy	0.176*	0.162*		
Labour productivity		0.235***		0.266***
External R&D			0.436***	0.410***
External expenses advertising			0.140*	0.127*
External Legal activities			0.003	-0.001
External Accounting and bookkeeping			-0.076	-0.062
External Tax consultancy			0.097	0.095
External Auditing activities			0.012	-0.030
External Management activities			-0.077	-0.061
External Labour recruitment			0.040	0.033
External Training			0.143**	0.110
External Computer programming			0.138**	0.126*
External Software consultancy			0.012	0.009
Intercept	-1.078***	-2.842***	-1.080***	-3.054***
Observations	2320	2320	2319	2319

*** Significant at 1% level, ** Significant at 5% level, *Significant at 10% level

Source: ESEE

In brief, research and development, advertising and those business services related to information and communication technologies have a positive effect on innovation, whereas the impact use of external training is not so clear. In relation to other variables not directly related to business services, size and export propensity are key determinants of innovation performance.

4.1.3. Effects of business services on productivity.

As in the previous section, we estimate a probit model. In this case productivity is explained by a set of characteristics of the firm and the use of business services. The variables included in this model are mostly the same:

- Age: it is measured as the natural logarithm of the age of the firm
- Foreign participation: it is measured as the share of foreign capital in the firm
- Openness: two variables are included which measure export propensity and import propensity
- Competition: two variables are included, the market share and the Herfindahl index. This latter is measure of industry concentration. Its value is obtained as the sum of the squares of the market shares of all firms in an industry. Higher values indicate greater concentration.
- R&D intensity: ratio of external R&D expenditures to production

Again, the use of business services is measured both in general terms and distinguishing when the service is externally provided. A summary of the variables is reported in Table 12. Three models are estimated. The first model estimates the general impact of the use of business services. Models 2 and 3 estimate the effects of the external provision of business services on productivity. The main difference is the variable employed to measure the use of R&D services. In model 2 a binary variable is used, whereas in model 3 R&D intensity is incorporated.

From a general viewpoint (model 1), the same business services identified in the previous section as drivers of innovation also have a positive effect on productivity, that is, research and development, computer programming and software consultancy. In addition to these industries, two other services positively affect productivity: legal activities and auditing. This can be explained, at least in the case of auditing, by the strong correlation between size and auditing because of the fact that only firms with a certain turnover have the obligation to audit their accounts.

Table 12. Variables included in the Spanish productivity model

Variable	Description
Age	Log of the age of the firm
Foreign participation	Share of foreign capital in the firm
Export propensity	Share of exports in production
Import propensity	Share of imports in production
Market share	Share of sales of the firm
Herfindahl index	Sum of the squares of the market shares of all firms in an industry
R&D	Binary variable equals to 1 when the firm contracts R&D and 0 otherwise
Legal activities	Binary variable equals to 1 when the firm uses legal services and 0 otherwise
Accounting and bookkeeping	Binary variable equals to 1 when the firm uses accounting services and 0 otherwise
Tax consultancy	Binary variable equals to 1 when the firm uses tax consultancy services and 0 otherwise
Auditing activities	Binary variable equals to 1 when the firm uses auditing services and 0 otherwise
Management activities	Binary variable equals to 1 when the firm uses management services and 0 otherwise
Labour recruitment	Binary variable equals to 1 when the firm uses labour recruitment services and 0 otherwise
Training	Binary variable equals to 1 when the firm uses training services and 0 otherwise
Computer programming	Binary variable equals to 1 when the firm uses computer programming services and 0 otherwise
Software consultancy	Binary variable equals to 1 when the firm uses software consultancy services and 0 otherwise
Labour productivity	Labour productivity
External R&D	Binary variable equals to 1 when the firm contracts external R&D and 0 otherwise
External advertising	Binary variable equals to 1 when the firm spends on external advertising services and 0 otherwise
External Legal activities	Binary variable equals to 1 when the firm uses external legal services and 0 otherwise
External Accounting and bookkeeping	Binary variable equals to 1 when the firm uses external accounting services and 0 otherwise
External Tax consultancy	Binary variable equals to 1 when the firm uses external tax consultancy services and 0 otherwise
External Auditing activities	Binary variable equals to 1 when the firm uses external auditing services and 0 otherwise
External Management activities	Binary variable equals to 1 when the firm uses external management services and 0 otherwise
External Labour recruitment	Binary variable equals to 1 when the firm uses external labour recruitment services and 0 otherwise
External training	Binary variable equals to 1 when the firm uses external training services and 0 otherwise
External Computer programming	Binary variable equals to 1 when the firm uses external computer programming services and 0 otherwise
External Software consultancy	Binary variable equals to 1 when the firm uses external software consultancy services and 0 otherwise
External R&D intensity	Share of external R&D expenditures to production

Source: Own elaboration.

If we focus on the external provision of business services (models 2 and 3), research and development continues to show a positive effect, which is not maintained in the case of computer programming and software consultancy. In general we have to highlight the positive effect of the external provision of most of the business services included in the analysis. Thus, in addition to research and development, the external use of accounting and bookkeeping, auditing services, labour recruitment and training exert a positive effect on productivity. This general positive impact of most of business services could support those hypotheses that sustain a direct effect of the externalisation on productivity.

Table 13. Estimation of the effects of business services on productivity, Spain

	Model 1	**Model 2**	**Model 3**
Age	0.080***	0.080***	0.083***
Foreign participation	0.230***	0.220***	0.221***
Export propensity	0.051	0.076**	0.100***
Import propensity	0.080	0.111	0.121*
Market share	0.350***	0.357***	0.368***
Herfindahl	-0.320**	-0.351***	-0.351***
R&D	0.174***		
Legal activities	0.047*		
Accounting and bookkeeping	-0.021		
Tax consultancy	0.014		
Auditing activities	0.221***		
Management activities	-0.031		
Labour recruitment	0.010		
Training	-0.006		
Computer programming	0.122***		
Software consultancy	0.073***		
External R&D		0.130***	
External expenses advertising		0.065***	0.070***
External Legal activities		0.001	0.002
External Accounting and bookkeeping		-0.071***	-0.073***
External Tax consultancy		-0.011	-0.011
External Auditing activities		0.207***	0.218***
External Management activities		-0.019	-0.024
External Labour recruitment		0.044*	0.052**
External Training		0.107***	0.114***
External Computer programming		0.024	0.026
External Software consultancy		0.024	0.023
External R&D intensity			3.365***
Intercept	7.567***	7.798***	7.787***
Observations	3966	3965	3965
Adjusted R-squared	0.27	0.27	0.26

*** Significant at 1% level, ** Significant at 5% level, *Significant at 10% level

Source: ESEE

In terms of the rest of variables, most of them also show a positive effect, like age, the share of foreign capital or the export propensity. In the case of the variables related to competition, these show, as expected, opposite signs: the market share shows a positive effect on productivity, and, on the contrary, the Herfindahl index shows a negative relationship with productivity, that is, a strong concentration of the market negatively affects firms´ productivity.

Concerning the effect of external research and development, we can confirm the importance of devoting enough resources to R&D, given the differences in the coefficients of models 2 and 3.

To summarise, we can affirm that there is close relationship between use of business services and productivity performance. Most of the industries analysed show positive and significant effects on productivity, and these effects are more visible when business services are externally provided.

4.1.4. Effects of business services on exports.

Finally, in order to evaluate the potential effects of business services on exports, a probit model where the export status is explained by a set of characteristics of the firms and the use of business services is estimated. The variables employed in this case are (Table 14):

- Size: it is measured as the natural logarithm of the number of employees
- Age: it is measured as the natural logarithm of the age of the firm
- Foreign participation: it is measured as the share of foreign capital in the firm
- Openness: two variables are included which measure export propensity and import propensity
- Competition: Herfindahl index.
- Labour productivity
- R&D intensity: ratio of external R&D expenditures to production

As in the rest of the cases the estimations are carried out both for the general use of business services and for their external provision. Three models are estimated. Model 1 evaluates the general impact of the use of business services, whether externally provided or produced in-louse. Models 2 and 3 take into account only those business services externally provided. In model 2 the use of external R&D services is measured using a

binary variable whereas model 3 employs external R&D intensity. The results are reported in Table 15.

Table 14. Variables included in the Spanish export model

Variable	Description
Size	Log of the number of employees
Age	Log of the age of the firm
Foreign participation	Share of foreign capital in the firm
Import propensity	Share of imports in production
Market share	Share of sales of the firm
Herfindahl index	Sum of the squares of the market shares of all firms in an industry
R&D	Binary variable equals to 1 when the firm contracts R&D and 0 otherwise
Legal activities	Binary variable equals to 1 when the firm uses legal services and 0 otherwise
Accounting and bookkeeping	Binary variable equals to 1 when the firm uses accounting services and 0 otherwise
Tax consultancy	Binary variable equals to 1 when the firm uses tax consultancy services and 0 otherwise
Auditing activities	Binary variable equals to 1 when the firm uses auditing services and 0 otherwise
Management activities	Binary variable equals to 1 when the firm uses management services and 0 otherwise
Labour recruitment	Binary variable equals to 1 when the firm uses labour recruitment services and 0 otherwise
Training	Binary variable equals to 1 when the firm uses training services and 0 otherwise
Computer programming	Binary variable equals to 1 when the firm uses computer programming services and 0 otherwise
Software consultancy	Binary variable equals to 1 when the firm uses software consultancy services and 0 otherwise
Labour productivity	Labour productivity
External advertising	Binary variable equals to 1 when the firm spends on external advertising services and 0 otherwise
External Legal activities	Binary variable equals to 1 when the firm uses external legal services and 0 otherwise
External Accounting and bookkeeping	Binary variable equals to 1 when the firm uses external accounting services and 0 otherwise
External Tax consultancy	Binary variable equals to 1 when the firm uses external tax consultancy services and 0 otherwise
External Auditing activities	Binary variable equals to 1 when the firm uses external auditing services and 0 otherwise
External Management activities	Binary variable equals to 1 when the firm uses external management services and 0 otherwise
External Labour recruitment	Binary variable equals to 1 when the firm uses external labour recruitment services and 0 otherwise
External training	Binary variable equals to 1 when the firm uses external training services and 0 otherwise
External Computer programming	Binary variable equals to 1 when the firm uses external computer programming services and 0 otherwise
External Software consultancy	Binary variable equals to 1 when the firm uses external software consultancy services and 0 otherwise
External R&D	Binary variable equals to 1 when the firm contracts external R&D and 0 otherwise
External R&D intensity	Share of external R&D expenditures to production

Source: Own elaboration.

The first fact to point out is that the relationship between exports and use of business services is less clear than in the case of innovation or productivity. In the general model (model 1) only two industries show a positive effect: research and development and computer programming. When externalisation is taken account, advertising also appears as a relevant service. It calls the attention the fact that the way of measuring external R&D influences the results obtained. Thus, in model 2, where a binary variable is used, the impact is positive and significant. On the contrary, in model 3, external R&D intensity does not appear as a significant variable.

Table 15. Estimation of the impact of business services on exports, Spain

	Model 1	**Model 2**	**Model 3**
Size	0.395***	0.428***	0.444***
Age	0.068*	0.057	0.057
Foreign participation	0.239*	0.286**	0.277**
Import propensity	1.850***	1.819***	1.822***
Market share	-0.261	-0.314*	-0.308*
Herfindahl index	-0.504	-0.572	-0.582
R&D	0.494***		
Legal activities	0.097		
Accounting and bookkeeping	0.053		
Tax consultancy	-0.126		
Auditing activities	0.048		
Management activities	-0.234		
Labour recruitment	0.099		
Training	-0.059		
Computer programming	0.191*		
Software consultancy	0.030		
Labour productivity	0.257***	0.277***	0.288***
External advertising		0.481***	0.485***
External Legal activities		0.067	0.068
External Accounting and bookkeeping		0.010	0.011
External Tax consultancy		0.052	0.054
External Auditing activities		0.118	0.121
External Management activities		-0.149	-0.157*
External Labour recruitment		-0.008	0.003
External training		-0.033	-0.021
External Computer programming		0.068	0.075
External Software consultancy		0.028	0.024
External R&D			4.901
External R&D intensity		0.268***	
Intercept	-3.885***	-4.556***	-4.683***
Observations	2320	2319	2319

*** Significant at 1% level, ** Significant at 5% level, *Significant at 10% level
Source: ESEE

Concerning those variable not referred to business services, size, the share of foreign capital and import propensity show a positive effect on export activity. In other words, big multinational firms have a higher propensity to export.

To conclude, we have to note that few business services seem to exert a positive effect on export activity, that is, research and development and advertising.

4.2. Analysis of the impact of business services in Turkish manufacturing firms.

4.2.1. Descriptive statistics.

As was mentioned in previous sections, the data employed to carry out the econometric estimations for Turkey come from different surveys. Before entering into the estimations, we briefly describe the sample employed. The variables are divided into two groups, depending on the survey they are extracted from.

Table 16 reports several variables from ASMI database, namely:

- Exporter: share of exporting firms
- Foreign: share of firms where at least 10% of capital is owned by foreigners
- Innovator: share of firms which introduced product (product), process (process) or product and process (both) innovations
- Technology transfer: share of firms which declared they were involved in technology transfer process (know-how, licensing …)
- Firm size: share of firms with more than 49 employees (high) or less than 49 employees (medium)

In relation to export activity in Turkish manufacturing firms, 40% of all firms produced for the world market in 1997 but this proportion fell to 36.7% 2000 and 2004, which indicates a decrease in the openness of firms, probably explained by a stronger competition in international markets. The same trend is observed in the evolution of foreign firms, but this trend can be misleading: they represent about 2% of all firms but are known to produce 40% of the manufacturing value added in the medium/high technology industries and 20% in the low tech industries. In other words, they are few but they have a big size. In the development of innovation activities a very positive evolution is observed: in 1997 only 14% of surveyed firms introduced only product innovations, 18% process innovations and 22.6% both types of innovations.

Table 16. Description of the Turkish sample of manufacturing firms, 1997-2004 (I)

	Exporter	Foreign	Innovator			Technology transfer	Firm size	
			Product	Process	Innovate		Medium	Large
1997	40	2.1	14	18	22.6	n.a.	19.1	19.3
2000	36.7	2.7	19.7	23	31.1	7.9	19.1	12.3
2004	36.7	1.9	24.3	24.7	34.8	10.5	13.4	7.2

Source: ASMI database

These percentages have considerably increased in all cases, reaching 24.3%, 24.7% and 34.8% in the year 2004, respectively. In terms of the participation in technology transfer processes, this has also grown, from less than 8% of firms in 2000 to 10.5% in 2004. As to firm size, the evolution is in accordance with the decrease mentioned in the participation of foreign firms: 19.3% of firms employed more than 49 employees in 1997 while this proportion fell to 7.2% in 2004.

Data shown in Table 17 come from the Industrial Technology Services Survey conducted by the SIS. In this case four main variables are reported:

- ISO 9000: share of firms with the ISO 9000 certification
- Client support: share of firms which received technical support to improve product quality from its clients/users
- Metrology service: share of firms which received metrology service
- Services received for:
    - Innovation: share of firms which applied to universities or research institutes to get knowledge in order to develop new products/processes/materials
    - Operation: share of firms which applied to universities or research institutes to get knowledge in order to solve technical/operational problems
    - Strategy: share of firms which applied to universities or research institutes to get knowledge in order to conduct strategic research
    - Prototype: share of firms which applied to universities or research institutes to get knowledge in order to develop a prototype

As no direct information on the use of business services is provided in the Turkish survey, variables referred to client support, metrology services and services received for innovation, operation, strategy and prototype will be employed as proxies for the use of business services. This approach is justified by the fact that business services mainly

provided knowledge to their clients firms, and this knowledge leads, in many cases, to the development of innovations and to productivity improvements. Thus, we directly measure a type of services (metrology services) and indirectly measure technical support (client support) and knowledge diffusion (services received for innovation, operation, strategy and prototype).

Table 17. Description of the Turkish sample of manufacturing firms, 1997-2004 (II)

	ISO 9000	Client support	Metrology Service	Services received for			
				Innovation	Operation	Strategy	Prototype
1997	13.7	18.8	26	7.2	7.7	1.3	1
2000	17.8	21.3	33.5	9.1	9	1.4	1.4
2004	19.2	23.3	22.3	5.8	2.5	0.8	0.9

Source: Industrial Technology Services Survey (various years)

In line with the increases in innovation activity and technology transfers commented before, we can note how the use of most of the types of services considerably grew during the period analysed. Thus, for example, client technical support increased from 18.8% in 1997 to 23.3% in 2004. Nevertheless, a clear distinction has to be made between the first period (1997-2000) and the latter one (2000-2004): a growing trend is observed in the first one but this tendency shifted in the latter period. For example, metrology services were one of the most widely sources of information for innovation, although its use diminished during the period 2000-2004, probably due to a cut in innovation efforts explained by the crisis experienced in the country. The same explanation seems to be valid when entering into the getting of knowledge from universities and research centres: whereas the percentages grew during 1997-2000 they fall in all cases in the years 2000-2004. As referred to the incorporation of the ISO 9000 certification, a continuous increase took place, from 13.7% to 19.2%.

To complete the descriptive section, in Table 18 we show the total factor productivity level for the manufacturing sector as well as its growth rate over the period 1992-2000. This TFP index has been calculated according to the Olley-Pakes method. As can be noticed, the trajectory experienced by TFP in Turkey was quite varied during the period: after a considerable growth in 1992-1993, TFP started to decrease in 1994 and remained constant until 1997, when a recovery seems to begin. Excepting the year 1998, growth rates are positive in the following years.

In summation, we can describe the changes experienced by the Turkish sample as positive, although the crisis experienced at the beginning of this century have caused a shift both in terms of foreign firms and in terms of innovation activity.

Table 18. Total factor productivity in Turkish manufacturing firms, 1992-2000

	TFP level	TFP growth rate
1992	2.48	
1993	2.51	3.00
1994	2.49	-2.00
1995	2.49	0.00
1996	2.49	0.00
1997	2.53	4.00
1998	2.51	-3.00
1999	2.53	2.00
2000	2.56	0.03

Source: ASMI database

4.2.2. Effects of business services on innovation.

In order to analyse the impact of the use of business services on innovation, two types of innovations are distinguished: product and process. A probit model where the dependent variable takes the value 1 if the firm innovates and the value 0 otherwise is employed to investigate the role played by business services in the introduction of product ad process innovations by Turkish manufacturing firms. Several models which include indicators on the use of business services and a number of control variables related to firm size, foreign ownership, export activity and two year dummies for 2000 and 2004, with 1997 being the reference year, are estimated. As was mentioned in the previous section, almost no direct information on the use of business services is available for the Turkish firms. This is why we employ "proxies", namely, technical support for clients (suser), use of metrology services (smetro) or contact with universities and research centres in order to develop new products, processes or materials (sinno), to solve technical or operational problems (soper), to conduct strategic research (sstra) or to develop prototypes (sprot). A more detailed description of the variables employed is provided in Table 19.

Besides the business services variables, the first model includes the two year dummies. In the second model, the firm size indicator – number of employees– was removed and replaced by two dummy variables taking the value 1 for firms that are part of the medium

and large categories, respectively. All firm size indicators – continuous or discrete – were removed from the third model and a dummy variable taking the value 1 if a firm owned by foreigners and 0 otherwise was introduced in the model.

Table 19. Variables included in the Turkish innovation model

Variable	Description
suser	Binary variable equals to 1 if the firm receives technical support to improve product quality from its clients/users and 0 otherwise
smetro	Binary variable equals to 1 if the firm uses metrology services and 0 otherwise
sinno	Binary variable equals to 1 if the firm applies to universities of research institutes to get knowledge in order to develop new products/processes/materials and 0 otherwise
soper	Binary variable equals to 1 if the firm applies to universities of research institutes to get knowledge in order to solve technical/operational problems and 0 otherwise
sstra	Binary variable equals to 1 if the firm applies to universities of research institutes to get knowledge in order to conduct strategic research and 0 otherwise
sprot	Binary variable equals to 1 if the firm applies to universities of research institutes to get knowledge in order to develop a prototype and 0 otherwise
Ln(size)	Logarithm of the number of employees
medium	Binary variable equals to 1 if the firm has less than 50 employees and 0 otherwise
large	Binary variable equals to 1 if the firm has 50 or more employees and 0 otherwise
foreign	Binary variable equals to 1 if at least 10% of the capital of the firm is owned by foreigners and 0 otherwise
exporter	Binary variable equals to 1 if the firm is exports and 0 otherwise
year00	Dummy variable for the year 2000
year04	Dummy variable for the year 2004

Source: Own elaboration.

Finally, the last model included all the variables used in the previous model plus the two size dummies. The reason firm size and foreign ownership variables were introduced successively is that we wanted to prevent a possible multicolinearity problem associated with these with these variables. Finally, the last two models (model 3 and 4) include dummy variable at the four-digit ISIC (rev. 2) level.

Separate equations are estimated for product and process innovation. In Table 20 the estimation results for product innovation are reported.

As can be observed, most of the proxies employed for measuring the impact of business services show a positive effect on product innovation. More concretely, the coefficients associated with four indicators of business services were positive and statistically significant at the 1% level: suser, smetro, sinno, sstra. Therefore, the results indicate that firms that received technical support from their clients to improve quality of their products, used metrology services or external services to develop new products/processes/materials were more likely to introduce product innovations than

firms which did not use such services. This finding is also valid for the manufacturing firms that made use of external services to conduct strategic research. The coefficients obtained for the "suser" variable might indicate the importance of user-producer interaction in the development of new products or, in other words, the relevance of co-production, not only as a specific feature of services, but also as a driving factor for product innovation.

Table 20. Estimation of the impact of business services on product innovation in Turkey

	Model 1	**Model 2**	**Model 3**	**Model 4**
suser	0.267***	0.271***	0.231***	0.230***
smetro	0.415***	0.504***	0.338***	0.324***
sinno	0.567***	0.578***	0.550***	0.546***
soper	-0.152***	-0.133***	-0.056*	-0.065*
sstra	0.428***	0.452***	0.459***	0.451***
sprot	0.282***	0.250***	0.118*	0.112*
Ln(size)	0.090***			
medium		0.061***		0.007
large		0.118***		0.116***
foreign			0.078	0.054
exporter			0.337***	0.324***
year00	0.165***	0.206***	0.221***	0.234***
year04	0.511***	0.455***	0.417***	0.433***
Sector dummies	no	no	yes	yes
Number of obs.	4790	5138	5138	5138
Pseudo R2	0.0734	0.0716	0.1113	0.1118

*** (** or *): significant at the 1% (5% or 10%) level
Source: INSS

The variable which indicates if the firm used external services to deal with technical or operational problems shows a negative sign in all the models. As to its significance level, it goes down from 1% level in the first two models to 10% level in the last two models. In relation to the "sprot" variable relating to the use of external services aimed at developing prototypes, it has a positive and significant coefficient with diminishing significance levels. The results for these two variables are therefore less robust than the remaining business services indicators.

Concerning the control variables, the results point to existence of a positive impact of the firm size on the probability of introducing product innovations – a finding similar to the one obtained in the innovation literature and in the Spanish case. Being an exporter is associated with a higher probability to introduce product innovation although the impact might exist in the other direction as well. Since we are using basically cross

section data it is difficult to sort out the direction of causality – if any. We also observe that being a foreign firm is not associated with a higher probability to introduce product innovation.

Entering into process innovation, a probit model was also used to investigate the role played by business services in the introduction of process innovations by Turkish manufacturing firms. The variables are those reported in Table 19. The findings for the impact of business services on the dependent variable are more robust than in the case of the product innovation decisions. Coefficient estimates are presented in Table 21.

Table 21. Estimation of the impact of business services on process innovation in Turkey

	Model 1	**Model 2**	**Model 3**	**Model 4**
suser	0.212***	0.236***	0.235***	0.230***
smetro	0.592***	0.637***	0.525***	0.477***
sinno	0.596***	0.639***	0.584***	0.584***
soper	0.049	0.061*	0.104***	0.088***
sstra	-0.048	0.076	0.056	0.068
sprot	0.236***	0.100	0.102	0.085
Ln(size)	0.174***			
medium		0.303***		0.218***
large		0.290***		0.228***
foreign			-0.011	-0.058
exporter			0.499***	0.443***
year00	0.107***	0.137***	0.147***	0.165***
year04	0.413***	0.336***	0.287***	0.323***
sector dummies	no	no	yes	yes
Number of obs.	4790	5138	5138	5138
Pseudo R2	0.1120	0.1008	0.1345	0.1378

*** (** or *): significant at the 1% (5% or 10%) level
Source: INSS

The first three indicators of business services ("suser", "smetro" and "sinno") turn out to influence positively and significantly the probability to carry out process innovations. On the contrary, the indicators for business services related to prototype development ("spro") and conducting strategic research ("sstra") do not exert any significant effect on the dependent variables in the probit regressions. In the case of the development of prototypes, it is clear that this variable is closely related to the development of product innovations but has little or no impact in the introduction of process innovations. Nonetheless, the results for the "sstra" variable represent an important difference with respect to the factors influencing introduction of product innovations where the "sstra"

variable had a positive and highly significant coefficient. A possible explanation for this difference could be the existence of "product-oriented" strategies in Turkish manufacturing firms. As to the effects of the control variables, firm size and the export status exert a positive and highly significant impact on the probability to carry out process innovations while foreign ownership does not have a significant impact. Findings for these variables are similar to those obtained previously in the case of the product innovation model and coincide with the results obtained for the Spanish model, where size and export propensity showed a significant impact on innovation activity.

4.2.3. Effects of business services on productivity.

In the analysis of the effects of business services on productivity the dependent variable is the growth rate over the period 1997-2000 of a TFP index calculated according to the Olley-Pakes method (reported in Table 18). In this case, instead of a probit model the ordinary least squares OLS method was used to investigate the impact of business services and other control variables on the firm-level TFP growth, detailed in Table 22.

Table 22 Variables included in the Turkish productivity model

Variable	Description
suser	Binary variable equals to 1 if the firm receives technical support to improve product quality from its clients/users and 0 otherwise
smetro	Binary variable equals to 1 if the firm uses metrology services and 0 otherwise
sinno	Binary variable equals to 1 if the firm applies to universities of research institutes to get knowledge in order to develop new products/processes/materials and 0 otherwise
soper	Binary variable equals to 1 if the firm applies to universities of research institutes to get knowledge in order to solve technical/operational problems and 0 otherwise
sstra	Binary variable equals to 1 if the firm applies to universities of research institutes to get knowledge in order to conduct strategic research and 0 otherwise
sprot	Binary variable equals to 1 if the firm applies to universities of research institutes to get knowledge in order to develop a prototype and 0 otherwise
year00	Dummy variable for the year 2000
exporter	Binary variable equals to 1 if the firm is exports and 0 otherwise
foreign	Binary variable equals to 1 if at least 10% of the capital of the firm is owned by foreigners and 0 otherwise

Source: Own elaboration.

Four OLS models are estimated. The first two models do not incorporate sectoral dummies at the four-digit ISIC (rev. 2) level, whereas model 3 and 4 do. In both cases the difference between model 1 and 2 and model 3 and 4 is the incorporation of two variables: "exporter" a binary variable taking the value 1 when the firm exports and 0

otherwise, and "foreign", a dummy variable taking the value 1 if a firm owned by foreigners and 0 otherwise.

The results are presented in Table 23. Two types of business services exert a positive and statistically significant impact on firm-level TFP growth: firms that used metrology services and accessed to external knowledge to develop new products or processes show higher TFP growth rates. For example, using metrology services was associated with an average increase of 0.07% in the annual TFP growth rate over the period 1997-2000 (model 4).

Table 23. Estimation of the relationship between business services and TFP in Turkey

	Model 1	**Model 2**	**Model 3**	**Model 4**
suser	-0.026***	-0.030***	-0.010	-0.017**
smetro	0.181***	0.148***	0.112***	0.077***
sinno	0.075***	0.077***	0.026**	0.027**
soper	0.007	0.009	0.008	0.009
sstra	0.013	0.027	0.015	0.032
sprot	0.001	-0.018	0.025	-0.001
year00	-0.024***	-0.024***	-0.026***	-0.024***
exporter		0.034***		0.065***
foreign		0.457***		0.395***
sector dummies	no	no	yes	yes
number of obs.	3143	3143	3143	3143
adjusted R2	0.0427	0.0661	0.1479	0.1695

*** Significant at 1% level, ** Significant at 5% level, *Significant at 10% level

Source: INSS

Similarly, receiving external advice as to how develop product or process innovations increased TFP growth by 0.03% over the same period. A puzzling finding – which no doubt requires further investigation – is the negative and statistically significant coefficient of the 'suser' variable, that is, receiving technical support from clients would exert a negative impact on a firm's TFP growth.

A possible explanation could be that firms that need technical support from clients are, in general, less technology-intensive, and, as lower is the use of new technologies lower should be TFP growth.

The results for the remaining business services variable are acceptable: none of the three variables "soper", "sstra" and "sprot" exert a statistically significant effect on TFP growth.

Being an exporter or a foreign firm exerts a positive and statistically significant effect on TFP growth, although the direction of causality in both cases clearly requires additional examination with time series data.

An interesting result is the negative and statistically significant sign of the dummy variable for the year 2000 – with 1997 being the reference year. This could be explained by the financial economic crisis experienced by the Turkish economy in 2001.

4.2.4. Effects of business services on exports.

To analyse the relationship between business services and exports, a probit model where the dependent variable takes the value 1 if a firm exports and the value 0 otherwise is employed. We estimate several models which include all the indicators of business services and a number of control variables related to age, firm size, foreign ownership and two year dummies for 2000 and 2004, with 1997 being the reference year (Table 24).

Table 24. Variables includes in the Turkish export model

Variable	Description
suser	Binary variable equals to 1 if the firm receives technical support to improve product quality from its clients/users and 0 otherwise
smetro	Binary variable equals to 1 if the firm uses metrology services and 0 otherwise
sinno	Binary variable equals to 1 if the firm applies to universities of research institutes to get knowledge in order to develop new products/processes/materials and 0 otherwise
soper	Binary variable equals to 1 if the firm applies to universities of research institutes to get knowledge in order to solve technical/operational problems and 0 otherwise
sstra	Binary variable equals to 1 if the firm applies to universities of research institutes to get knowledge in order to conduct strategic research and 0 otherwise
sprot	Binary variable equals to 1 if the firm applies to universities of research institutes to get knowledge in order to develop a prototype and 0 otherwise
Ln(age)	Logarithm of the age of the firm
Ln(size)	Logarithm of the number of employees
medium	Binary variable equals to 1 if the firm has less than 50 employees and 0 otherwise
large	Binary variable equals to 1 if the firm has 50 or more employees and 0 otherwise
foreign	Binary variable equals to 1 if at least 10% of the capital of the firm is owned by foreigners and 0 otherwise
year00	Dummy variable for the year 2000
year04	Dummy variable for the year 2004

Source: Own elaboration.

Four models are estimated. Besides the business services variables, the first model includes the two year dummies and the age variable. In the second model, the firm size indicator – number of employees– was removed and replaced by two dummy variables taking the value 1 for firms that are part of the medium and large categories, respectively. All firm size indicators – continuous or discrete – were removed from the third model and a dummy variable taking the value 1 if a firm was owned by foreigners and 0 otherwise was introduced in the model. Finally, the last model included all the variables used in the previous model plus the two size dummies. As was mentioned in section on innovation,

the reason why firm size and foreign ownership variables were introduced successively was to prevent a possible multicolinearity problem associated with these with these variables. Finally, the last two models (model 3 and 4) include dummy variable at the four-digit ISIC (rev. 2) level.

Estimation results for the export decision model are presented in Table 25. Coefficients associated with almost all the business services variables are statistically significant at the 1% level in the export decision model. Therefore, firms which were able to improve product quality thanks to technical support received from their clients are more likely to export.

Table 25. Estimation of the effects of business services on exports in Turkey

	Model 1	**Model 2**	**Model 3**	**Model 4**
suser	0.160***	0.177***	0.189***	0.137***
smetro	0.303***	0.375***	0.567***	0.387***
sinno	0.211***	0.204***	0.272***	0.267***
soper	-0.113***	-0.031	0.088***	0.028
sstra	0.046***	0.165**	0.230***	0.271***
sprot	0.401***	0.382***	0.263***	0.238***
Ln(age)	0.101***	0.153***	0.270***	0.194***
Ln(size)	0.410***			
medium		0.822***		0.800***
large		0.928***		0.904***
foreign			0.797***	0.604***
year00	0.139***	-0.029	-0.116***	-0.055***
year04	0.282***	0.188***	0.047**	0.152**
Sector dummies	no	No	yes	yes
Number of obs.	4510	4774	4774	4774
Pseudo R2	0.1361	0.1213	0.0994	0.1493

*** Significant at 1% level, ** Significant at 5% level, *Significant at 10% level
Source: INSS

This finding may point to the fact that information on product specifications, quality requirements on foreign markets or even on the external appearance (package) of products, on methods of production or on the organization of the production process transferred from the (foreign) clients of Turkish manufacturing firms may help them enter export or foreign markets, probably because they face important sunk costs associated with the exporting activity. It remains to be seen whether this technology or know-how transfer is carried out by foreign firms that subsequently use export products as inputs in their production process or sell under their brand name. As to the metrology services received by manufacturing firms or external services used in order to develop new products or processes, they

influence positively and significantly the export decision of manufacturing firms – and to a larger extent then, the previous variable. The negative and significant coefficient of the "soper" variable –indicating whether firms use external knowledge aimed at solving technical/operational problems– is puzzling although sign and significance level associated with this variable are unstable– it has a negative and non significant sign in the second model, a positive and significant coefficient in the third and a non significant one in the last model. The remaining business services variables ("sstra" and "sprot") have both positive and statistically significant coefficients, pointing out the importance of external relations in the field of strategic research and prototype development for launching export activity.

Firm size indicators –continuous or discrete– both have positive and statically significant coefficients, highlighting the importance of sunk costs in entering export market and to the facilitating factors affected or correlated by "being large" (accessing information on the existence of export markets, foreign consumers' preferences, national regulations on exports, etc…). The positive and significant coefficient of the age variable – proxy for experience – can be interpreted similarly.

Everything else equal, our results indicate that foreign firms – i.e. firms of which at least 10% of capital is owned by foreigners – are more likely to export then domestic firms. This result can be explained by the external linkages of foreign subsidiaries of MNCs operating in Turkey and informs us that foreign investment in Turkey is not oriented solely towards the domestic market.

4.3. Analysis of the impact of business services in Moroccan manufacturing firms.

4.3.1. Descriptive statistics.

Data drawn from the ICA survey provides valuable information on the degree of use of information and communication technology by Moroccan manufacturing firms, their propensity to engage in innovation initiatives as well as their demand for business services. A summary of the technological status of Moroccan manufacturing firms is shown in Table 26. The survey shows that 70% of the manufacturing firms have an internet subscription among which almost 80% rely on emails in their communications with clients and suppliers. However, only 12% of employees use computers for their work, and 17% of firms have a corporate website. These figures reveal that the margin for improving technological development in Moroccan manufacturing firms remain substantially high. Curiously, when firms were asked on their technological status with respect to competitors, around three quarters of firms (73%) responded that their

technology was comparable to that of their competitors; and only 17% qualified their technology as more advanced. In other words, the lack of awareness of firms about their low technological level can be an important barrier for improving it.

Table 26. Technological status in Moroccan manufacturing firms

Use of computers and Internet	Percentage
Share of employees using computers for their work	12
Share of firms with internet subscription	70
* Among which use emails with clients and suppliers	79
Share of firms with corporate website	17
* Among which use website for sale	16
Technological advance compared to competitors	
Less advanced technology	10
More advanced technology	17
Comparable technology	73
Total	100

Source: Moroccan Ministry of Trade and Industry

In terms of innovation activities, Table 27 summarises some indicators. The survey reveals that less than 10% of firms have an ISO certification and only around 5% are using technology under a foreign license. However, almost 45% of manufacturing firms declared that they were engaged in product innovation and 34.5% in process innovation. Product innovation is mostly undertaken internally except for 17% of firms which have developed new product lines with their clients, 5% with their suppliers and only 1% with universities. This latter figure is a clear indication of the weakness of cooperation between universities and firms in the area of innovation and R&D in Morocco.

Regarding business services (Table 28), the survey collected information on four main types of business services: management training, technical training, management consulting, and technical consulting.

Data presented in Table 28 show that the majority of Moroccan manufacturing firms do not use business services. Only 16% of firms have already benefited from technical training and 14% use management training. The demand for consultancy services both technical and managerial is even lower as the share of firms using those services do not exceed 8% and 6% respectively. Surprisingly, three quarters of firms that has never used business services do not feel the need to do so. Conversely, 17% of the firms recognise their interest in using business services; but they consider themselves to be financially unable to afford their costs.

Table 27. Innovation activity in Moroccan manufacturing firms

	Percentage
Innovation	
Share of firms with ISO certification	8.6
Share of firms using technology under foreign license	5.2
Forms of innovation	
Share of firms that upgraded or improved an existing product line	44.8
Introduced a new product process	34.5
Opened a new factory	8.1
Closed an existing factory	2.5
Obtained a new production license	2.6
Started to subcontract a part of the process previously done internally	6.0
Innovation's partners	
Share of firms that developed a new product line	
With a client	17
With a supplier	5
With a Moroccan university or school	1

Source: Moroccan Ministry of Trade and Industry

These results reveal that a significant proportion of firms are not aware of the potential effects of using business services on their performance. They also indicate that the government support is crucial in some cases in order to facilitate the access to those business services especially costly for small and medium enterprises. The three main motivations that lead firms to rely on business services are the search for organisational change, to improve their productivity or to comply with specific market requirements. The importance of each of these three motivations varies depending on the type of services. For firms recorded as users of "management training" services, the main motivation, as could be expected, is achieving organisational changes. The second motivation is the search for productivity improvement and the third is compliance with market requirements such as standards and certification of processes. Demand for technical training services, on the other hand, is mainly driven by the objective of productivity improvement. This is also the case of technical consulting. These findings seem to be conforming to expectations. Interestingly, the three motivations have roughly the same importance in driving the demand for management consulting services. Those firms that decide to open their doors to management consulting companies are generally doing so with the aim of facilitating organisational change, improving productivity and, by the same token, conforming to market requirements.

Table 28. Use of business services in Moroccan manufacturing firms

	Percentage
Share of firms that have already used the following services	
Management training	14
Technical training	16
Management consulting	6
Technical consulting	8
Main reason s for not using services	
No Need	74
Financial constraints	17
Other reasons	9
Total	100
Main objectives for using these services	
Management training	
Organizational change	43
Productivity improvement	19
Comply with market requirements (standards)	15
Technical training	
Organizational change	15
Productivity improvement	41
Comply with market requirements	18
Management consulting	
Organizational change	29
Productivity improvement	27
Comply with market requirements	27
Technical consulting	
Organizational change	15
Productivity improvement	32
Comply with market requirements	23

Source: Moroccan Ministry of Trade and Industry

The main hypothesis in the econometric analysis is that business services, as defined earlier on the basis of available data from ICA survey, have a significant impact on the performance of firms. The objective of the econometric exercise, as in the analysis carried out for Spain and Turkey, is to test whether the demand for this type of services helps firms to improve their productivity, strengthen their competitiveness and hence their exports, and increase their chances to engage in innovative activities. Therefore, three dependent variables are considered. The first is a proxy for involvement of the firm in innovative activities. The second is a measure of total factor productivity and the third is a measure of export orientation. We take into account; roughly, similar explanatory variables in the three econometric equations. First, we include proxies for the use business services coded as follows: use of Management training services (MTS),

use of Technical training services (TTS), use of Management consulting services (MCS), and use of Technical consulting services (TCS). We also introduce the variable (CSTT) that stands for the use of consulting services for technology transfer. Second, we control for firm's size using two proxies: the number of employees and size dummies. Finally, we include the share of the firm's foreign capital and sectoral dummies. We expect that the demand for business services has a positive impact on productivity, as well as on export orientation and would also increases the firm's likelihood to innovate. We also expect that size matters in the three cases. Regarding foreign capital, our hypothesis is that foreign ownership would also exerts a positive effect on productivity, export orientation and innovative behaviour.

4.3.2. Effects of business services on innovation.

In order to examine the potential impact of using various business services on the innovative behaviour of the Moroccan manufacturing firms, two probit models are estimated. The first one investigates the determinants of product innovation and the second the determinants of process innovation. In both cases the dependent variable is binary. The explanatory variables are, in addition to business services proxies, other explanatory variables such firm's size, foreign ownership and export status. A more detailed description of the variables included is reported in Table 29.

Table 29. Variables include in the Moroccan innovation model

Variable	Description
MTS	Binary variable equals to 1 if the firm uses management training services and 0 otherwise
TTS	Binary variable equals to 1 if the firm uses technical training services and 0 otherwise
MCS	Binary variable equals to 1 if the firm uses management consulting services and 0 otherwise
TCS	Binary variable equals to 1 if the firm uses technical consulting services and 0 otherwise
CSTT	Binary variable equals to 1 if the firm uses consulting services for technology transfer and 0 otherwise
Size (employ)	Logarithm of the number of employees
Medium	Binary variable equals to 1 if the firm size is medium and 0 otherwise
Large	Binary variable equals to 1 if the firm size is large and 0 otherwise
Foreign K	Share of foreign capital
Export status	Binary variable equals to 1 if the firm exports and 0 otherwise

Source: Own elaboration.

The results of the probit model for product innovation are reported in Table 30. Three values are shown for each explanatory variable. The first is the coefficient, the second is z-stat and the third is the odds ratio. When the latter is above (below) 1 this means the explanatory variable increases (decreases) the likelihood of the firm being an innovator. If odds ratio is equal to 1, this means that the explanatory variable has no effect on the innovation performance of the firm.

Table 30. Estimation of the impact of business services on product innovation in Morocco

	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**
MTS	0.51	0.55	0.58	0.68
	(1.64)	*(1.81)*	*(1.75)*	*(2.08)*
	1.66	**1.74**	**1.80**	**1.99**
TTS	0.52	0.71	0.56	0.74
	(1.81)	*(2.51)*	*(1.88)*	*(2.52)*
	1.69	**2.04**	**1.76**	**2.11**
MCS	0.20	0.28	0.10	0.16
	(0.34)	*(0.49)*	*(0.16)*	*(0.26)*
	1.22	**1.32**	**1.10**	**1.17**
TCS	0.16	0.13	0.04	0.02
	(0.35)	*(0.30)*	*(0.09)*	*(0.04)*
	1.17	**1.14**	**1.04**	1.02
CSTT	1.94	1.95	1.86	1.86
	(4.83)	*(4.91)*	*(4.57)*	*(4.62)*
	6.97	**7.01**	**6.47**	**6.46**
Size (employ)	0.53		0.52	
	(7.03)		*(6.21)*	
	1.69		**1.69**	
Size dummy				
Medium		0.69		0.62
		(4.18)		*(3.43)*
		2.00		**1.85**
Large		1.05		0.99
		(4.55)		*(3.94)*
		2.86		**2.70**
Foreign K			0.02	0.002
			(0.86)	*(0.94)*
			1.00	**1.00**
Export status			0.42	0.53
			(1.95)	*(2.55)*
			1.52	**1.71**
Sectoral effect	**NO**	**NO**	**YES**	**YES**
Number of obs.	832	832	821	821
Pseudo R2	0.146	0.125	0.167	0.148

Source: Moroccan Ministry of Trade and Industry

We can observe how the use of training services, both technical and managerial, increases significantly the likelihood of the firm engaging in innovative activities. This finding is valid for product innovation as well as for process innovation (Table 31). This can be

explained by the fact that a higher use of training services translates into higher human capital levels. A well qualified labour force not only contributes to improve key aspects of firms´ performance like productivity or competitiveness but also exerts a direct impact on their capacity to innovate.

Table 31. Estimation of the impact of business services on process innovation in Morocco

	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**
MTS	0.34	0.39	0.32	0.40
	(1.20)	*(1.36)*	*(1.03)*	*(1.30)*
	1.41	**1.47**	**1.37**	**1.49**
TTS	0.31	0.42	0.32	0.41
	(1.13)	*(1.56)*	*(1.13)*	*(1.49)*
	1.36	**1.52**	**1.37**	**1.51**
MCS	-0.21	-0.15	-0.28	-0.23
	(-0.43)	*(-0.31)*	*(-0.53)*	*(-0.43)*
	0.80	**0.85**	**0.75**	**0.79**
TCS	1.00	0.99	1.01	0.99
	(2.41)	*(2.38)*	*(2.32)*	*(2.28)*
	2.74	**2.68**	**2.75**	**2.68**
CSTT	1.17	1.22	1.16	1.19
	(4.03)	*(4.20)*	*(3.87)*	*(3.95)*
	3.22	**3.38**	**3.18**	**3.28**
Size (employ)	0.28		0.28	
	(3.86)		*(3.45)*	
	1.32		**1.32**	
Size dummy				
Medium		0.35		0.27
		(2.00)		*(1.44)*
		1.41		**1.30**
Large		0.51		0.52
		(2.26)		*(2.06)*
		1.67		**1.68**
Foreign K			0.001	0.001
			(0.69)	*(0.76)*
			1.00	**1.00**
Export status			0.19	0.27
			(0.88)	*(1.25)*
			1.21	**1.31**
Sectoral effect	NO	NO	YES	YES
Number of obs.	832	832	832	832
Pseudo R2	0.09	0.08	0.08	0.11

Source: Moroccan Ministry of Trade and Industry

Management consulting services appear to be weakly connected to innovation. On the one hand, while technical consulting services exert a very low impact on product innovation, their use seems to significantly increase the probability to engage in process innovation. The latter result is robust to the inclusion of sectoral dummies. Finally, consulting services for technology transfer (CSTT) emerge as one of the most important drivers of innovation

within firms. Their impact on product innovation is almost twice as big as for process innovation.

The econometric estimates also reveal that size is a relevant variable when it comes to innovation, as occurred in the Spanish and Turkish cases. The size effect is significant and tends to be larger for product innovation compared to process innovation. Being an exporting firm appears to significantly increase the chances of firms to engage in innovation. The impact is relatively more important for product innovation compared to process innovation. Curiously, the opposite trend was found for Turkish firms, where the impact was higher for process than for product innovation. Finally, foreign ownership does not seem to exert any effect on the likelihood of firms' engagement in innovation.

4.3.3. Effects of business services on productivity.

In order to assess the role of business services in contributing to the improvement of productivity, we need first to have an adequate proxy for productivity. Instead of using labour productivity, directly observable but which may not be appropriate, we estimate total factor productivity (TFP). We used two specifications: the first is based on the book value of capital and the second on the market value of capital. The variables included in the estimations are those referred to the use of business services plus export status and the presence of foreign capital (Table 32).

Table 32. Variables employed in the Moroccan productivity model

Variable	Description
MTS	Binary variable equals to 1 if the firm uses management training services and 0 otherwise
TTS	Binary variable equals to 1 if the firm uses technical training services and 0 otherwise
MCS	Binary variable equals to 1 if the firm uses management consulting services and 0 otherwise
TCS	Binary variable equals to 1 if the firm uses technical consulting services and 0 otherwise
CSTT	Binary variable equals to 1 if the firm uses consulting services for technology transfer and 0 otherwise
Export status	Binary variable equals to 1 if the firm exports and 0 otherwise
Foreign K	Share of foreign capital

Source: Own elaboration.

In Tables 33 and 34 the estimations results are shown.

Table 33. Estimation of the impact of business services on productivity in Morocco (book value of capital)

	Model (1)	Model (2)	Model (3)	Model (4)
MTS	0.47	0.39	0.28	0.28
	(3.98)	***(3.33)***	***(2.28)***	***(2.61)***
TTS	0.06	0.07	0.004	0.005
	(0.59)	*(0.78)*	*(0.04)*	*(0.06)*
MCS	0.14	0.11	0.06	0.07
	(0.69)	*(0.52)*	*(0.32)*	*(0.37)*
TCS	-0.24	-0.20	-0.22	-0.21
	(-1.2)	*(-1.03)*	*(-1.22)*	*(-1.17)*
CSTT	0.21	0.22	0.10	0.11
	(2.06)	***(2.36)***	*(0.89)*	*(1.20)*
Export status		*-0.27*		*-0.02*
		(-4.02)		*(-0.37)*
Foreign K		0.001		-0.0003
		(1.14)		*(-0.4)*
Number of obs.	813	813	813	813
Sectoral effects	No	No	Yes	Yes

Source: Moroccan Ministry of Trade and Industry

Table 34. Estimation of the impact of business services on productivity in Morocco (market value of capital)

	Model (1)	Model (2)	Model (3)	Model (4)
MTS	0.67	0.54	0.39	0.38
	(5.30)	***(4.46)***	***(3.69)***	***(3.46)***
TTS	-0.05	-0.03	-0.07	-0.07
	(-0.51)	*(-0.27)*	*(-0.82)*	*(-0.78)*
MCS	0.27	0.19	0.09	0.08
	(1.30)	*(0.98)*	*(0.56)*	*(0.52)*
TCS	-0.25	-0.18	-0.19	-0.18
	(-1.30)	*(-0.91)*	*(-1.12)*	*(-1.07)*
CSTT	0.21	0.23	0.08	0.09
	(2.03)	***(2.53)***	*(0.98)*	*(1.03)*
Export status		*-0.46*		*-0.06*
		(-6.60)		*(-0.91)*
Foreign K		0.001		-0.004
		(1.16)		*(-0.58)*
Number of obs.	808	808	808	808
Sectoral effects	No	No	Yes	Yes

Source: Moroccan Ministry of Trade and Industry

The first model includes only business services proxies. The second accounts, in addition, for the firm's export status and the presence of foreign ownership in its capital. The third and the fourth model are similar to the first and the second respectively,

except that they also control for sectoral dummies. Given the fact that the econometric estimates are quite comparable whether book or market value of capital is used, we comment on both tables at the same time. The use of management training services appears to have a positive and significant effect on productivity. This econometric result conforms to our expectations. In addition, it is robust to the inclusion other control variables or the sectoral dummies. Curiously, the use of technical training services does not seen to exert any significant effect on TFP.

This is particularly surprising when we consider that firms' demand for TTS is mainly driven by their willingness to improve their productivity. One explanation could be related to the existence of measurement errors in TFP. However, this could also mean that the improvement of managerial skills, embodied in management training services, are much more important in driving TFP than strict technical skills.

On the other hand, management and technical consulting services do not seem to have any impact of TFP. These results, although unexpected, may be simply due to the fact that only a thin minority of Moroccan manufacturing firms is currently using those services. Consulting services for technology transfer (CSTT) are statistically significant with the expected sign. However, this is only the case when sectoral dummies are not accounted for in the regression. Export status seems to be significant in explaining the behaviour of TFP too, although with the opposite sign. This apparently counterintuitive result is explained by the fact Moroccan exports are mainly made by labour intensive firms in garment and leather industries. This explains why when the sectoral dummies are incorporated in the regression; the coefficient associated with export status fails to be significant as reported under specification (4) in both tables. Finally, foreign ownership in the Moroccan manufacturing firms does not seem to be a driver for productivity improvement.

4.3.4. Effects of business services on exports.

In order to investigate the potential impact of using business services on export orientations of the Moroccan manufacturing firms, two models are suggested. The first is a probit model where the dependent variable is the export status. It takes the value 1 if the firm sells part of its production to foreign markets and the value 0 otherwise. The second is a model where the dependent variable is the proportion of firm's exports in its total sales.

In addition to the business services variables, the list of potential explanatory variables includes firm's size, its age, the share of foreign ownership and sectoral dummies. A more detailed description is provided in Table 35.

Table 35. Variables included in the Moroccan export model

Variable	Description
MTS	Binary variable equals to 1 if the firm uses management training services and 0 otherwise
TTS	Binary variable equals to 1 if the firm uses technical training services and 0 otherwise
MCS	Binary variable equals to 1 if the firm uses management consulting services and 0 otherwise
TCS	Binary variable equals to 1 if the firm uses technical consulting services and 0 otherwise
CSTT	Binary variable equals to 1 if the firm uses consulting services for technology transfer and 0 otherwise
Size (employment)	Logarithm of the number of employees
Medium	Binary variable equals to 1 if the firm size is medium and 0 otherwise
Large	Binary variable equals to 1 if the firm size is large and 0 otherwise
Foreign K	Share of foreign capital

Source: Own elaboration.

The econometric results are reported in Tables 36 and 37. With reference to the export status, again Tables 36 and 37 present for each explanatory variable three values. The first is the coefficient, the second is z-stat and the third is the odds ratio. When the latter is above (below) 1 this means the explanatory variable increases (decreases) the likelihood of the firm being exporter. If odds ratio is equal to 1, this means that the explanatory variable has no effect on the exporting behaviour of the firm.

Surprisingly, it appears from the econometric estimates, that overall the demand for business services, as defined earlier; tend to reduce the likelihood of exporting. These results are opposite to those obtained in the analysis for Turkish manufacturing firms, where most of the variables referred to business services showed a positive impact on export activity. An intermediate position was found in the Spanish case, where a small group of business services showed a positive effect on export activity. One would expect that the use of business services is a mean of improving the firm's competitiveness and therefore its chances to enter foreign markets. However, in Morocco most exporting firms operate in the garment sector and their activities are mainly confined in subcontracting for foreign suppliers. Export industries in Morocco

tend to be labour intensive, and as shown in the Table 36, size measured by the number of employees tends to significantly increase the chances of exporting.

Table 36. Estimation of the effects of business services on export status in Morocco

	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**
MTS	-1.31	-1.18	-1.21	-1.03
	(-3.39)	*(-3.16)*	*(-2.51)*	*(-2.21)*
	0.27	**0.30**	**0.30**	**0.36**
TTS	-0.46	-0.13	0.04	0.25
	(-1.40)	*(-0.41)*	*(0.09)*	*(0.60)*
	0.63	**0.88**	**1.04**	**1.28**
MCS	-0.41	-0.32	-0.60	-0.57
	(-0.65)	*(-0.52)*	*(-0.75)*	*(-0.72)*
	0.66	**0.73**	**0.55**	**0.57**
TCS	0.21	0.17	-0.005	0.06
	(0.42)	*(0.34)*	*(-0.01)*	*(0.10)*
	1.24	**1.18**	**0.99**	**1.06**
CSTT	-0.31	-0.29	0.11	0.19
	(-0.89)	*(-0.86)*	*(0.27)*	*(0.46)*
	0.73	**0.75**	**1.12**	**1.21**
Age	-0.09	-0.09	-0.07	-0.07
	(-10.8)	*(-10.0)*	*(-6.64)*	*(-6.57)*
	0.90	**0.91**	**0.93**	**0.93**
Size (employ)	**1.03**		**0.78**	
	(11.1)		*(7.32)*	
	2.80		**2.17**	
Size dummy				
Medium		1.58		1.30
		(8.36)		*(5.81)*
		4.87		**3.67**
Large		2.74		1.85
		(9.21)		*(5.37)*
		15.4		**6.34**
Foreign K			0.01	0.02
			(4.14)	*(4.32)*
			1.01	**1.01**
Sectoral effect	NO	NO	YES	YES
Number of obs.	832	832	737	737
Pseudo R2	0.27	0.26	0.41	0.39

Source: Moroccan Ministry of Trade and Industry

Finally, the age of the firm and the presence of foreign ownership do not seem to exert any effect on the likelihood of entering exporting markets. As export status is only a dummy variable that does not account for the intensity of export orientation of manufacturing firms, the share of exports in total sales is suggested as an alternative explanatory variable. The results are reported in Table 37.

Table 37. Estimation of the effects of business services on the share of exports in total sales in Morocco

	Model (1)	Model (2)	Model (3)	Model (4)
MTS	-0.88	-0.81	-0.47	-0.40
	(-2.43)	***(-2.31)***	*(-1.02)*	*(-0.90)*
TTS	-0.36	-0.03	0.09	0.42
	(-1.08)	*(-0.09)*	*(0.22)*	*(0.98)*
MCS	-0.46	-0.46	-0.56	-0.61
	(-0.74)	*(-0.75)*	*(-0.65)*	*(-0.73)*
TCS	0.33	0.25	0.29	0.24
	(0.63)	*(0.49)*	*(0.41)*	*(0.35)*
CSTT	-0.38	-0.39	-0.13	-0.09
	(-1.16)	*(-1.17)*	*(-0.33)*	*(-0.23)*
Age	-0.08	-0.08	-0.06	-0.06
	(-10.2)	***(-10.0)***	***(-6.75)***	***(-6.45)***
Size (employ)	1.12		0.97	
	(11.87)		***(8.77)***	
Size dummy				
Medium		1.5		1.23
		(8.19)		***(5.76)***
Large		3.09		2.44
		(9.61)		***(6.49)***
Foreign K			0.02	0.02
			(4.44)	***(4.53)***
Sectoral effect	NO	NO	YES	YES
Number of obs.	832	832	832	832
MTS	-0.88	-0.81	-0.47	-0.40
	(-2.43)	***(-2.31)***	*(-1.02)*	*(-0.90)*
TTS	-0.36	-0.03	0.09	0.42
	(-1.08)	*(-0.09)*	*(0.22)*	*(0.98)*
MCS	-0.46	-0.46	-0.56	-0.61
	(-0.74)	*(-0.75)*	*(-0.65)*	*(-0.73)*
TCS	0.33	0.25	0.29	0.24
	(0.63)	*(0.49)*	*(0.41)*	*(0.35)*

Source: Moroccan Ministry of Trade and Industry

When sectoral dummies are not accounted for, such is specifications (1) and (2), only management training services appears to be significantly but negative linked to the intensity of exporting. Other business services do not appear to be significant. Once sectoral dummies are introduced into the regression, none of the business services seem to exert any effect on the export propensity of firms. The size effect is strong and tends to be robust, as in the estimations carried out for the rest of countries. Finally, foreign ownership emerges also as having a significant, although limited in level, on the exporting behaviour of the Moroccan manufacturing firms.

5. Synthesis and policy recommendations.

Business services are an important input in the production function of the manufacturing firms and can play role in strengthening productivity and stimulating innovation. The domain of services is very wide and ranges from basic services such as electricity, access to roads, ports and airports to more sophisticated services such as knowledge based services, marketing and information technologies. However, due to the scarce data available on demand for business services, few studies have been devoted to investigating their potential impact of firms' performance, especially in developing countries. Recently, various empirical studies have shown that access to those services help firms to improve the quality of their products, the quantity of their sales and allow them to penetrate into new markets. The purpose of this project was to assess the potential impact of the use of business services on the performance of manufacturing firms in Spain, Turkey and Morocco. It dealt in particular with the way business services affect innovation, productivity and exports.

The first question to answer was: how much do manufacturing firms use business services? The answer differs depending on the country. In Spain this type of services is widely used by manufacturing firms. Thus, more than three out of four firms employed the different types of business services distinguished, the percentages being especially noticeable in the cases of tax consultancy and management activities (with percentages of 97% and 95%, respectively, in 2006). In general, the percentage of use reported were around 90% with two remarkable exceptions: auditing activities (because of the fact that, given national legislation, only big firms have to audit their accounts) and research and development. In this latter case we have to note severe differences in comparison with the rest of the business services. An important aspect to highlight is the general increase in the degree of externalisation of business services by Spanish manufacturing firms over the period 1994-2006, although some differences among industries are found. Thus, whereas in services like tax consultancy and auditing the increases were relatively small (because of the higher initial degree of externalisation), in the case of training and accounting and bookkeeping the rises reached 17 and 16 percentage points. The externalisation process has been also relevant in computer services, with increases of 12 percentage points in computer programming and of 10 percentage points in software consultancy.

In Turkey, as no direct information on the use of business services is provided in the Turkish survey, variables referred to client support, metrology services and services received for innovation, operation, strategy and prototype were employed as proxies for

the use of business services. The use of most of the services analysed considerably grew during the period 1997-2004. Thus, for example, client technical support increased from 18.8% in 1997 to 23.3% in 2004. Nevertheless, a clear distinction has to be made between the first period (1997-2000) and the latter one (2000-2004): a growing trend is observed in the first one but this tendency shifts in the latter period. For example, metrology services were one of the most widely sources of information for innovation, although its use diminished during the period 2000-2004, probably due to a cut in innovation efforts explained by the crisis experienced in the country. The same explanation seems to be valid when entering into the getting of knowledge from universities and research centres: whereas the percentages grew during 1997-2000 they fall in all cases over the years 2000-2004.

Firm level data drawn from manufacturing sector surveys conducted by the Moroccan Ministry of Industry and trade were used to investigate the use of business services and their contribution in Morocco. The survey collected information on four main types of business services: management training, technical training, management consulting, and technical consulting. Descriptive data indicate the demand for business services is very limited among the Moroccan manufacturing. Only 16% of firms have already benefited from technical training and 14% from management training. The demand for consultancy services both technical and managerial is even lower as the share of firms using those services did not exceed 8% and 6% respectively. Surprisingly, three quarters of firms which never used business services do not feel the need to do so. Other firms recognise the interest of business services; however they seem to be financially unable to afford their cost. These results reveal that a significant proportion of firms are not aware of the potential effects of using business services on their performance. They also point out that the government support is crucial in some cases as access to business services may turn to be especially costly for small and medium enterprises. The three main motivations that lead firms to rely on business services are their search for organisational change, to improve their productivity or to comply with specific market requirements, although the importance of each of these three motivations varies depending on the type of services.

In order to analyse the impact of business services on innovation, probit models were estimated for each country. In Spain a distinction was established between the general use of business services and the use of externally provided business services. On a general basis, three business services exert a positive and significant effect on innovation, namely,

research and development, computer programming and software consultancy. These results are in accordance with traditional innovation theories which sustain that research and development is a key activity for firms to success in innovation. The positive impact of those business services related to information technologies can be explained by the great importance that the introduction of new technologies has on firms´ performance. It calls the attention the fact that labour productivity shows quite a high effect on innovation, whereas total factor productivity seems to have no effect. Turning to the impact of those business services externally provided, we observed how research and development continues to be a key activity for innovation, although its impact is somewhat lower. Computer programming also shows a positive effect but in the case of software consultancy the external provision does not seem to exert a positive effect. This points out to a direct relationship between in-house software consultancy and innovation. Advertising (which is only included when the provision is external) also has a positive effect on innovation. In addition, external training shows a positive impact in one of the estimated models. In relation to other variables not directly related to business services, size and export propensity are key determinants of innovation performance.

In the Turkish case, most of the proxies employed for measuring the impact of business services showed a positive effect on product innovation. More concretely, the coefficients associated with four indicators of business services were positive and statistically significant at the 1% level. In particular, the results indicate that firms that receive technical support from their clients to improve quality of their products, use metrology services or external services to develop new products/processes/materials are more likely to introduce product innovations than firms which do not use such services. This finding is also valid for the manufacturing firms that make use of external services to conduct strategic research. The importance of user-producer interaction in the development of new products or, in other words, the relevance of co-production, not only as a specific feature of services, but also as a driving factor for product innovation, has to be highlighted. Concerning the control variables, the results point to existence of a positive impact of the firm size on the probability of introducing product innovations. For one part, being an exporter is associated with a higher probability to introduce product innovation although the impact might exist in the other direction as well. For the other part, being a foreign firm is not associated with a higher probability to introduce product innovation.

The results for Moroccan firms showed that training services, both technical and managerial, increase significantly the likelihood of the firm engaging in innovative activities. These findings are valid for product innovation as well as for process innovation. Management consulting services appear to be weakly connected to innovation. In addition, while technical consulting services exert a very loose impact on product innovation, their use seems to significantly increase the probability to engage in process innovation. Consulting services for technology transfer emerge as one of the most important drivers of innovation. Size effect is significant and tends to be larger for product innovation compared to process innovation. As in the Spanish and Turkish models, being an exporting firm also appears to significantly increase the chances of firms to engage in innovation but foreign ownership does not seem to exert any effect on the likelihood of firms' engagement in innovation.

In terms of productivity, probit models were estimated for Spain and Morocco, whereas an OLS model was employed in the case of Turkey. In Spain, from a general viewpoint, the same business services identified as drivers of innovation also had a positive effect on productivity, that is, research and development, computer programming and software consultancy. In addition to these industries, two other services positively affect productivity: legal activities and auditing. This can be explained, at least in the case of auditing, by the strong correlation between size and auditing because of the fact that only firms with a certain turnover have the obligation to audit their accounts. Concerning the external provision of business services, research and development continues to show a positive effect, which is not maintained in the case of computer programming and software consultancy. In general the positive effect of the external provision of most of the business services included in the analysis has to be highlighted. Thus, in addition to research and development, the external use of accounting and bookkeeping, auditing services, labour recruitment and training exert a positive effect on productivity. This general positive impact of most of business services supports those hypotheses that sustain a direct effect of the externalisation on productivity. In terms of the rest of variables, most of them also show a positive effect, like age, the share of foreign capital or the export propensity. In the case of the variables related to competition, these show, as expected, opposite signs: the market share shows a positive effect on productivity, and, on the contrary, the Herfindahl index shows a negative relationship with productivity, that is, a strong concentration of the market negatively affects firms´ productivity.

The OLS model estimated for Turkey reveals that two types of business services exert a positive and statistically significant impact on firm-level TFP growth: firms that used metrology services and accessed to external knowledge to develop new products or processes show higher TFP growth rates. For example, using metrology services was associated with an average increase of 0.07% in the annual TFP growth rate over the period 1997-2000. Similarly, receiving external advice as to how develop product or process innovations increased TFP growth by 0.03% over the same period. A puzzling finding – which no doubt requires further investigation – is the negative and statistically significant coefficient of the variable that summarises the use of technical support from clients: it exerts a negative impact on a firm's TFP growth. In relation to the control variables, being an exporter or a foreign firm exerts a positive and statistically significant effect on TFP growth, although the direction of causality in both cases clearly requires additional examination with time series data. An interesting result is the negative and statistically significant sign of the dummy variable introduced for the year 2000 – with 1997 being the reference year. This could be explained by the economic crisis experienced by the Turkish economy in 2001.

The econometric investigation for Morocco indicates that the improvement of managerial skills, embodied in management training services, are much more important in improving productivity than strict technical skills. Export status of the firm seems to be significant in explaining the behaviour of productivity, although with the opposite sign. This apparently counterintuitive result is explained by the fact Moroccan exports are mainly made by labour intensive firms in garment and leather industries. In the case of foreign ownership, in the Moroccan manufacturing firms does not seem to be a driver for productivity improvement.

Finally, the estimations for the impact of exports are quite varied. In Spain the first fact to point out is that the relationship between exports and use of business services was less clear than in the case of innovation or productivity. In the general model only two industries show a positive effect: research and development and computer programming. When externalisation is taken account, advertising also appears as a relevant service. It calls the attention the fact that the way of measuring external R&D influences the results obtained: when a binary variable is used, the impact is positive and significant. Concerning those variable not referred to business services, size, the share of foreign capital and import

propensity show a positive effect on export activity. In other words, big multinational firms have a higher propensity to export.

In Turkey the coefficients associated with almost all the business services variables were statistically significant at the 1% level in the export decision model. Therefore, firms which were able to improve product quality thanks to technical support received from their clients are more likely to export. This finding may point to the fact that information on product specifications, quality requirements, on foreign markets or even on the external appearance of products, on methods of production or on the organization of the production process transferred from the (foreign) clients of Turkish manufacturing firms may help them enter foreign markets. It remains to be seen whether this technology or know-how transfer is carried out by foreign firms that subsequently use export products as inputs in their production process or sell under their brand name. As to the metrology services received by manufacturing firms or external services used in order to develop new products or processes they influence positively and significantly the export decision of manufacturing firms – and to a larger extent then the previous variable. The negative and significant coefficient of the variable indicating whether firms use external knowledge aimed at solving technical/operational problems is puzzling although sign and significance level associated with this variable are unstable: it has a negative and non significant sign in the second model, a positive and significant coefficient in the third and a non significant one in the last model. The remaining business services variables have both positive and statistically significant coefficients, indicating the importance of external relations in the field of strategic research and prototype development for launching export activity. Firm size indicators have positive and statically significant coefficients, highlighting the importance of sunk costs in entering export market and to the facilitating factors affected or correlated by "being large" (accessing information on the existence of export markets, foreign consumers' preferences, national regulations on exports, etc…). The positive and significant coefficient of the age variable – proxy for experience – can be interpreted similarly. Everything else equal, our results indicate that foreign firms – i.e. firms of which at least 10% of capital is owned by foreigners – are more likely to export then domestic firms. This result can be explained by the external linkages of foreign subsidiaries of MNCs operating in Turkey and informs us that foreign investment in Turkey is not oriented solely towards the domestic market

Surprisingly, in the case of Morocco, it appears, that, in general, the demand for business services tends to reduce the likelihood of exporting. One would expect that the use of

business services is a mean of improving the firm's competitiveness and therefore its chances to enter on foreign markets. However, in Morocco most exporting firms operate in the garment sector and their activity are mainly confined to subcontracting for foreign suppliers. Export industries in Morocco tend to be labour intensive, and size measured by the number of employees tends to significantly increase the chances of exporting. Finally, age of the firm and the presence of foreign ownership don't seem to exert any effect on the likelihood of entering exporting markets.

To conclude, we can affirm that business services do exert a positive impact on innovation, productivity and exports of their client firms. A major problem to solve in countries like Turkey and Morocco is the awareness of firms about the positive effects related to the use of this kind of services (take the case of Morocco where 75% of the firms which have never used business services consider that they do not need them). As described below, the use of business services, in particular of those related to innovation (research and development, training) and to new technologies (computer programming, software consultancy) directly impacts on innovation performance. The effects on productivity are especially remarkable in Spain, which indicates that a wider use translates into higher TFP. In terms of exports, it calls our attention the case of Turkey, where a high number of the proxies for the use of business services showed a positive impact.

In brief, in an ever more tertiarised world, those services directly related to production processes, as it is the case of business services, can help countries to develop, not only by contributing to the growth of the service sector itself, but, more importantly, by helping manufacturing firms to improve their competitiveness via more innovations, higher productivity or export propensity. A better measurement and understanding of the role played by business services reveals as a key element for a better design of economic policies.

Bibliographical references

Abraham, K.G.; Taylor, S.K. (1996) "Firms' Use of Outside Contractors: Theory and Evidence", *Journal of Labour Economics*, Vol. 14(3).

Abramovsky, L.; R. Griffith (2005) "Outsourcing and Offshoring of Business Services: How Important is ICT?", *Institute for Fiscal Studies Working Paper* WP05/22.

Amiti, M.; Wei, S. J. (2005) "Fear of service outsourcing: is it justified?", *Economic Policy*, Vol. 20(42).

Amiti, M.; Wei, S. J. (2006) "Service offshoring, productivity, and employment: evidence from the United States", *NBER Working Paper* No. 11926.

Antonelli, C. (2000) "New Information Technology and Localized Technological Change in the Knowledge-Based Economy". In M. Boden and I. Miles (Eds.) *Services and the Knowledge-based Economy*, London: Continuum.

Baily, M.N.; Lawrence, R.Z. (2004) "What happened to the great U.S. job machine? The role of trade and electronic offshoring", *Brookings Papers on Economic Activity*, 2.

Bettencourt, L. A.; Ostrom, A. L.; Brown, S. W.; Roundtree, R. I. (2002) "Client Co-Production in Knowledge-Intensive Business Services", *California Management Review*, Vol. 44(4).

Bitner, M.J.; Faranda, W.T.; Hubbert, A.R.; Zeithaml V.A. (1997) "Customer contributions and role in service delivery", *International Journal of Service Industry Management*, Vol. 8(3).

Blinder, A.S. (2006) "Offshoring: The Next Industrial Revolution?", *Foreign Affairs*, Vol. 58(2).

Bryson, J.R. (2007) "The 'Second' Global Shift: the Offshoring or Global Sourcing of Corporate Services and the Rise of Distanced Emotional Labour", *Geografiska Annaler*, Vol. 89.

Cainelli, G.; Evangelista, R.; Savona, M. (2006) "Innovation and economic performance in services: a firm-level analysis", *Cambridge Journal of Economics*, Vol. 30(3).

Camacho, J.A., Rodriguez, M. (2005) "How innovative are services? An empirical analysis for Spain", *The Service Industries Journal*, Vol. 25(2).

Czarnitzki, D.; Spielkamp, A. (2000) *Business services in Germany: bridges for innovation*, Discussion paper No. 00-52, Mannheim: ZEW.

Den Hertog, P.; Bilderbeek, R. (1998) *The New Knowledge Infrastructure: The Role of Technology-Based Knowledge Intensive Business Services in National Innovation Systems*, SI4S Project, STEP Group, Oslo.

Drejer, I. (2002) "Business Services as a Production Factor", *Economic Systems Research*, Vol. 14.

Ebersberger, B. (2004) *The Use and Appreciation of Knowledge-Intensive Service Activities in Traditional Industries*. Working Paper No. 8. VTT Group for Technology Studies, Espoo.

European Commission (1999) *The Contribution of Business Services to Industrial Performance. A Common Policy Framework*, European Commission: Brussels.

Falk, M.; Wolfmayr, Y. (2008) "Services and materials outsourcing to low-wage countries and employment: Empirical evidence from EU countries", *Structural Change and Economic Dynamics*, Vol. 19.

Fischer, M.M. (2001) "Innovation, knowledge creation and systems of innovations", *Annals of Regional Science*, Vol. 35(2).

Freel, M. (2006) "Patterns of Technological Innovation in Knowledge-Intensive Business Services", *Industry and Innovation*, Vol. 13(3).

Georgescu-Roegen, N. (1971) *The Entropy Law and the Economic Process*. Cambridge, MA: Harvard University Press.

Glückler, J. (1999) "Management Consulting – Structure and Growth of a Knowledge Intensive Business Service Market in Europe", Institut für Wirtschafts- und Sozialgeographie, Department of Economic and Social Geography, Johann Wolfgang Goethe-Universität Frankfurt, IWSG Working Papers 12-1999.

Greaver, M. F. (1999) *Strategic Outsourcing. A structural approach to outsourcing decisions and initiatives*. American Management Association, New York.

Greenfield, H.I. (1966) *Manpower and the Growth of Producer Services*, Columbia University.

Grossman, Gene M.; Helpman, E. (2002) *Outsourcing in a Global Economy*, CEPR Discussion Paper No. 3165.

Hipp, C. (2000) "Information Flows and Knowledge Creation in Knowledge-Intensive Business Services: Scheme for a Conceptualization". In J.S. Metcalfe and I. Miles (Eds.) *Innovation Systems in the Services Economy: Measurement and Case Study Analysis*, Boston: Kluwer Academic Publishers.

Hodge, J.; Nordas, H. (1999) “Trade in Services: The Impact on Developing Countries”, *South African Journal of Economics*, Vol. 69(1).

Leiponen, A. (2005) “Organization of Knowledge and Innovation: The Case of Finnish Business Services”, *Industry and Innovation*, Vol.12 (2).

López, A. (2002) “Subcontratación de servicios y producción: evidencia para las empresas manufactureras españolas”, *Economía industrial*, Vol. 348.

Machlup, F. (1962) *The production and distribution of knowledge in the United States*, Princeton University.

Mann, C. L. (2003) *Globalisation of IT Services and White Collar Jobs: The Next Wave of Productivity Growth*, Institute for International Economics Policy Brief No. PB03-11, December.

Mansury, M.A.; Love, J.H. (2008) “Innovation, productivity and growth in US business services: A firm-level analysis”, *Technovation*, Vol. 28(1-2).

Merino, F.; Rodriguez, D. (2007): “Service outsourcing by manufacturing firms: theory and application”, *Industrial and Corporate Change*, Vol. 16.

Miles, I.; Kastrinos, N.; Flanagan, K.; Bilderbeek, R.; den Hertog, P.; Huitink, W. and Bouman, M. (1995) *Knowledge Intensive Business Services: Their Role as Users, Carriers and Sources of Innovation*, EIMS Publication No. 15, Innovation Programme, DGXIII, Luxembourg.

Morcos, J.L. (2003) *International Subcontracting versus Delocalization? A survey of the literature and case-studies from the SPX network*. United Nations Industrial Development Organisation, Vienna.

Muller, E. (2001) *Innovation Interactions Between Knowledge- Intensive Business Services and Small- and Medium sized Enterprises — Analysis in Terms of Evolution, Knowledge and Territories*. Physica, Heidelberg.

Nählinder, J. (2005) *Innovation and employment in services: The case of knowledge intensive business services in Sweden*. Linköping studies in arts and science, 334. Doctoral thesis, Department of Technology and Social Change, Linköping University, Sweden, 2005.

Nonaka, I.; Takeuchi, H. (1995) *The Knowledge-Creating Company*. New York: Oxford University Press.

Windrum, P.; Tomlinson, M. (1999) “Knowledge-intensive services and international competitiveness: a four country comparison”, *Technology Analysis and Strategic Management*, Vol. 11.

Pilat, D. (2007) “Productivity in Business Services”. In L. Rubalcaba and H. Kox (Eds.) *Business Services in European Economic Growth*, Edward Elgar.

Rubalcaba, L. (1999) *Business Services in the European Industry*. European Commission, Luxembourg.

Rubalcaba, L.; Van Welsum, D. (2007) “Globalisation and Global Sourcing in Business Services.” In Rubalcaba, L. and Kox, H. (Eds.) *Business Services in European Economic Growth*, Palgrave Macmillan.

Rubalcaba-Bermejo, L.; Cuadrado-Roura, J.R. (2002) “Services in the age of globalisation: explanatory interrelations and dimensions”. In: Cuadrado-Roura, J.R.; Rubalcaba-Bermejo, L. and Bryson, J.R. (Eds.) *Trading Services in the Global Economy*, Edward Elgar, Cheltenham.

Schultze, C.L. (2004) *Offshoring, import competition, and the jobless recovery*. Brookings Institution Policy Brief Number 136.

Schulz, C. (2000) “Environmental Service-providers, Knowledge Transfer, and the Greening of Industry”, Paper presented at IGU Commission on the Organization of Industrial Space Annual Residential Conference: Industry, Knowledge and Environment, Dongguan, China, 8–12 August.

Siegel, D., Griliches, Z. (1992) “Purchased services, outsourcing, computers, and productivity in manufacturing”. In Griliches, Z.; Berndt, E.R.; Bresnahan, T.F. and Manser, M.E. (Eds.) *Output Measurement in the Service Sectors*, National Bureau of Economic Research (NBER) Studies in Income and Wealth, Volume *56*, The University of Chicago Press, Chicago, IL, pp.429-60..

Strambach, S. (2001) “Innovation Process and the Role of Knowledge-Intensive Business Services”. In K. Koschatzky, M. Kulicke and A. Zenker (Eds.), *Innovation Networks – Concepts and Challenges in the European Perspective*. Heidelberg and New York: Physica-Verlag.

Strambach, S. (1997) *Wissensintensive unternehmensorientierte Dienstleistungen-ihre Bedeutung für die Innovations- und Wettbewerbsfähigkeit Deutschlands*. Vierteljahreshefte zur Wirtschaftsforschung, DIW 66, 230-242.

Ten Raa, T.; Wolff, E. (1996): *Outsourcing of services and the productivity recovery in U.S. manufacturing in the 1980s*, Centre for Economic Research, Tilburg University, Discussion paper 9689.