Strategy, Structure, and Performance of IT Services Firms

by

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ABSTRACT

Sales of services are becoming a major source of revenues across industries. The shift towards services has been exacerbated as human capital has gained in importance in the "knowledge economy." And yet, products businesses have historically attracted, and are still attracting, most of the attention of managers and scholars.

Centering on the information technology services industry, this thesis analyzes the strategy, structure, and performance of services firms. We analyze the information technology services industry and propose a framework to determine the drivers of performance of information technology services firms. The framework is applied to a database of 831 information technology services firms from 1990 to 2004.

Chapter II provides an insight into the dynamics of the information technology industry. Chapter III then focuses on the specificities, characteristics and structure of the information technology services firms. In Chapter IV, the business model of services firms is contrasted with that of products firms. Inter-relations between the two business models are proposed. Chapter V introduces a strategic management framework and applies it to the definition of drivers of performance of IT services firms, which are analyzed in Chapter VI, and contrasted with those of software firms.

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CHAPTER 1 Introduction

From a focus on the production of tangible goods, the creation of value in the economy of OECD countries has shifted toward the production and management of intangible goods. In this context, capabilities have become critical and services have taken a central role in the economy. For instance, in the case of after-sales services, a study showed that businesses derived 24% of their revenues from such services (Cohen and Agrawal 2006). These services accounted for 45% of their gross profit. Yet services have often been overlooked by managers and scholars.

A recent study developed by the European Commission (The Prism Report 2003) states that:

> The principal source of economic value and wealth is no longer the production of material goods, but lies in the creation, acquisition and exploitation of intangibles. Economic growth is influenced less by investments in physical capital (land, machinery, stocks of goods) than by knowledge, which is now a critical factor in the productive application and exploitation of physical capital. Consequently, competitive success today requires a critical capacity to develop, manage, measure and control the flow of knowledge and intangibles.

This general trend is particularly clear in the high tech industries where hardware (the tangible part of the offerings) has generated a demand for software and services (the intangible part of the offerings). More generally, and paradoxically, as technology has evolved to solve increasingly complex problems, the skills required to manage the technology and apply it to concrete problems - and more specifically, to business problems - has been at the core of a need for skills and a demand for services.

The trend toward services has been accelerated by the dynamics of commoditization of products. In the case of the IT business, Carr emphasized, in his famous *Harvard Business Review* article "IT Doesn't Matter" (2003), that IT products had become increasingly commoditized. Moreover, economists such as Jorgenson (2001) showed that the prices of computers were falling at a faster rate relative to those of software and services. It is thus no wonder that software and services have gained in importance in the economy to the point that the share of the US domestic IT income has shifted from a predominance of hardware income to a predominance of software and services (Fig. 1-1).

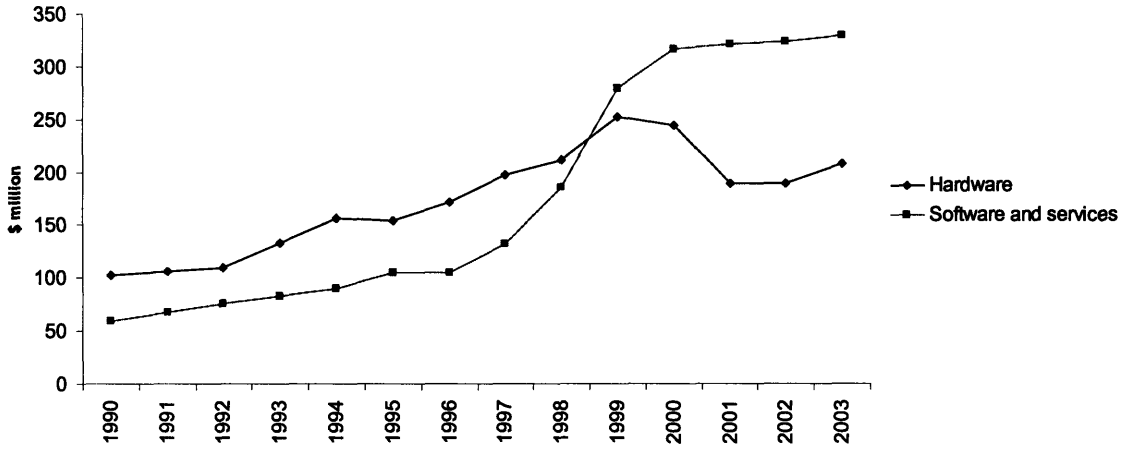

Figure 1-1 Repartition of US gross domestic income from hardware, and software and services - telecom excluded.

(source: U.S. Census Bureau, Statistical Abstract of the United States, 1990-2004)

It is also interesting to note from Fig. 1-1 the relative growth of the software and services industries compared to the hardware industry during economic growth, and their relative resilience when facing economic downturn: software and services incomes grew faster and were also more resilient to economic downturn than hardware income. Services and

products businesses clearly have different characteristics that can be leveraged in different ways. Thus, in addition to having an economic value, understanding the business of services has an important strategic value.

In order to better understand the business of professional services, we focus our study on IT services, which include services such as system integration, maintenance, and IT outsourcing, but also business process engineering and management consulting. We look into the characteristics, strategies, business models, and key drivers of performance of IT services firms.

Chapter II explores the historical roots of the IT industry in order to understand the dynamics according to which IT services have evolved. Dissecting the dynamics of this industry enables us to understand the drivers of the demand for IT services and how the industry is structured.

Chapters III and IV develop frameworks to analyze IT services businesses. Chapter III focuses on the specificities of services operations. This chapter is crucial in order to go past the paradigms specifically developed for products businesses and understand the levers of performance that are specific to IT services firms. In Chapter IV, products and services businesses are compared and related to each other. We see how strategies and business models are different and how synergies might be developed.

Chapter V introduces a strategic management framework to analyze the drivers of performance of IT services firms. The literature on strategic management is reviewed and different levers of performance are discussed. Chapter VI applies the framework of Chapter V in a quantitative analysis of the performance of IT services firms. Using the same framework, the drivers of performance of IT services firms are also compared with those of software firms. The interpretations proposed lead to the conclusion.

CHAPTER 2 The Evolution of the IT Services Industry and Subsequent Strategies

The IT industry's growth cycles were fueled by the series of opportunities that came in waves since the industry's inception – the emergence of the ISVs in the early 1970s, the minicomputer in the 1970s, the microcomputer in the 1980s, and ERP systems and the Internet in the 1990s. Evolving from the mere provision of data processing services to the re-engineering of business processes, the IT services industry has changed in many ways. Understanding what led to these changes is important to the understanding of the dynamics and structure of the IT services market. We shall thus consider IT services within the broader context of the IT industry.

2.1. From the industrial economy to the knowledge economy

2.1.1. The beginnings of the IT value chain

If we trace the IT industry back to 1951, when the first general-purpose computer for commercial use was sold under the name of Universal Automatic Computer (UNIVAC), we can observe the gradual formation of the IT industry value chain as we know it today – i.e., with its three main components: hardware, software, and services (Mahoney 1998). Words and concepts such as "software" or "IT services" would not appear before some time because they were totally embedded in the offerings of hardware vendors or within the activities of the firm. However, it is interesting to watch these concepts taking shape

in order to understand the context in which the IT services emerged, how they emerged and developed, and led to the structure of the IT industry as we know it today.

Back in the early 1950s, the word "computer" still meant a person who conducted mathematical calculations. The purpose of the new breed of "electric computers" that UNIVAC was part of was to replace human services. By taking over the work of humans, these computers were also supposed to radically impact cost models of firms replacing certain types of hourly paid personnel with fixed-cost computers. The "software" – a word coined by a professor from Princeton University in 1958 (Peterson 2000) - was typically designed internally by the owners of UNIVAC systems or supplied with the computer systems.

The 1960s were characterized by the dominance of mainframe systems, which were large computing systems sold bundled with their software (Cusumano 2004). It was not until 1969 that software was sold separately, after IBM faced anti-trust suits from the US government pushing the company to unbundle its offerings, and forcing it to charge separately for hardware and software (Ceruzzi 1999). IBM's decision was quickly followed by the emergence of independent software vendors (ISV) and the formation of a new layer in the value chain of the computing industry (Fig. 2-1).

During the 1970s and the 1980s, the rise of the minicomputer and microcomputers (also called personal computers) were announcing a new era of the computing industry. These low-cost computers made computing technology more pervasive and led to its wide

adoption by companies of all sizes. With functionalities increasingly advanced and also complex, IT was also getting deeper into the enterprise, touching critical functions of the firm and impacting its organization and mode of functioning. As IT was penetrating deeper in the enterprise, it was also being planned, designed, implemented, and serviced by teams of specialists increasingly incorporating business skills in addition to IT skills.

2.1.2. Growth of IT as a business

It was not until the early 1980s that IT was regarded as a strategic asset. One could then read articles in *Harvard Business Review* on how to improve and generate new revenue streams rather than manage IT as a mere source of costs (Porter 1985). IT was increasingly regarded as a source of strategic advantages enabling opportunities for enhanced efficiencies and performance and linkages among the diverse operations of the firm.

With the cost of microcomputers falling to commodity levels, it was natural to leverage computers' cheap processing power in order to replace costly mainframe systems. Client-server distributed architectures of the late 1980s to the mid-1990s were a low-cost flexible response to the centralized mainframe architecture. Although a priori significantly less expensive than the latter, the client-server architecture's distributed nature was also inducing much complexity and thus significant integration and on-going maintenance costs. In particular, integration of client-server architectures into mainframe architectures was especially challenging.

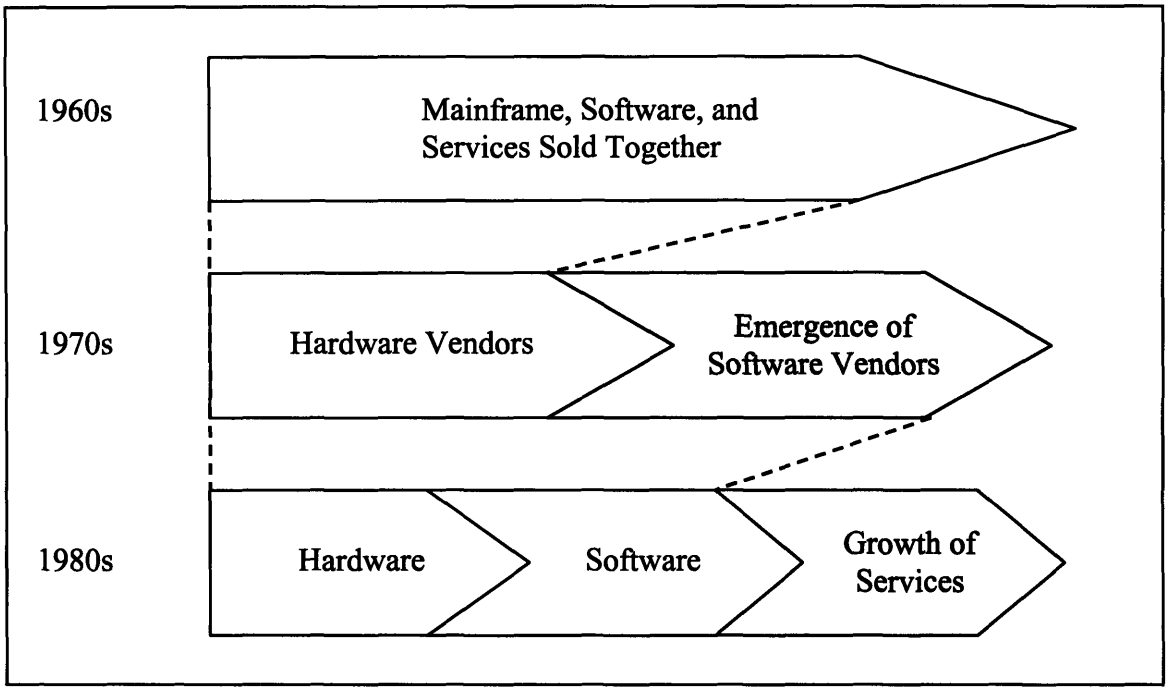

Figure 2-1 De-verticalization of the industry and formation of the IT value chain

2.1.3. Explosion of IT services

The advent of PCs coincided with the first wave of growth in the IT consulting industry (Nolan 2004). The same period corresponded to what was considered as the client-server era in the industry (see, for instance, analyst reports from BT Alex. Brown, January 1999). But it is only from the 1990s on that IT services became a major source of growth and profits (Nolan 2004), to the point that by the mid-90s, the industry was facing a shortage of skilled IT labor (in 1995, analyst firms such as BT Alex. Brown were warning investors about the primary business risk of computing and IT services companies facing the challenge of recruiting, training, and retaining skilled technology professionals).

The IT services industry understood the complexity their customers had to deal with in a constantly evolving and increasingly modular technology environment. With the success of large, customized, and often proprietary implementation projects of enterprise resource planning (ERP), customer relationship management (CRM), and supply chain management (SCM) systems developed by enterprise software vendors (*McKinsey Quarterly*, 2003, Number 2), system integrator firms such as Accenture or Cap Gemini grew significantly in importance in the value chain. These systems were capital-intensive and their implementation proprietary, thus locking in customers and constraining their users to buy from their integrator a wide range of IT services – from integration to maintenance to training. Investments in such systems were all the more important since they were touching core functions of the firm and it was not uncommon to observe contracts in the range of several million dollars. And this is not even to mention that there was little or no guarantee of business benefits.

The growth and profitability of the IT services industry attracted other participants from within the IT value chain. Software vendors, in particular, had competencies that could be leveraged in the IT services industry and could take advantage of the growth and profitability of this industry. Some products firms tried to make inroads into IT consulting through acquisitions (Nolan 2002).

The 1990s were also marked by the growth of outsourcing of IT, and then by the mid-1990s, of business processes supported by IT such as human resources or logistics (Kiely 1996). The "make vs. buy" analysis originally developed for manufacturers, was

migrating from the industrial economy to the knowledge economy. With IT becoming an increasingly complicated and costly asset of the firm associated with ballooning overhead, many companies took the step of calling in firms specializing in the management of such assets. Rationales typically invoked for these transactions have included the focus on core businesses, flexibility, and what were believed to be cost advantages (Currie 2000; Levina 1999; Lacity and Willcocks 1998).

The logic of growth of the outsourcing, IT integration, and custom programming services sectors has been exacerbated in low-income countries where labor is comparatively cheaper (labor costs in India after 2000 were 40% to 50% of US standards; Kumar 2005) and the supply of qualified worker can sustain the growth of the practice. Indeed, India and Pakistan showed the strongest pattern of information trade (Karmarkar 2004). Firms such as Wipro, Tata Consulting, Satyam, and Infosys have all shown explosive growth patterns. The example of Infosys (Kuemmerle 2003) illustrates well the trajectories followed by Indian services firms. Starting from low value-added services and leveraging their cost advantages by proposing competitive prices, these firms have since expanded from their original undifferentiated low value-added niche markets to more profitable markets enabling higher growth rates. Factors such as economic liberalization since the mid-1980s of economies opening to the global economy, the increased acceptance of English as the global language of business, the digitization of business processes, the telecommunication liberalization accompanied by the drop in the average communication price, and the skills shortage in developing countries drove the growth in IT-enabled services in certain developing countries (Kennedy and Lewis 2002).

2.1.4. The new logic of network economies

In the mid-1990s, the rapid take-off and exponential growth of the Internet caught the attention of IT professionals who were quick to introduce a new concept and coin a new word for it – "e-business". Becoming a popular technology, the Internet enabled effective communication within the company (through an "intranet") and with the different stakeholders of the business environment (through an "extranet") – customers, partners, suppliers, etc... As the Internet was expanding exponentially, so too, it was expected, would be the demand for integration services.

Over-abundant capital and a willingness to fund ever younger ventures (Jovanovic and Rousseau 2001) lead to a fall in the average age of technology firms. The rise of small, vertically-focused firms impacted the structure of the IT services industry. IT services start-ups mushroomed with all sorts of Internet-related offerings – called e-business or interactive integration services. The delivery of such offerings required skills that were not part of the average skill set of the largest IT services companies. This enabled start-up companies such as Razorfish or Agency.com to thrive on such businesses. Providing skills beyond the traditional tactical consulting and software development and integration to include strategic consulting, interactive marketing, and brand management, these start-ups addressed niche markets and enjoyed explosive growth. Though the largest accounts were still the preserve of large firms, the small firms taken all together were forming a major force in IT consulting (Nolan 2002).

The new opportunities offered by the Internet were also being captured by firms of more consequential sizes, through acquisitions. Firms fueling their growth with acquisitions typically targeted extension in services offerings and geographic coverage. A sample of the type of acquisitions that were commonly observed by the late 1990s is presented in Table. 2-1. Several vendors were then pursuing aggressive acquisition strategies. For instance, for the period going from 1996 to 1998, Thomson SDC Platinum lists more than 30 acquisitions made by USWeb, a San Francisco-based company that offered e-commerce services such as web site design, e-commerce system implementation, and site administration. In order to stay competitive with giants such as CSC (Computer Science Corporation), USWeb merged into another IT consulting firm's operations in 2000, to form marchFIRST.

Table 2-1 Sample of acquisitions in the IT services industry – March 1998-September 1998: acquisition of cross-industry skill set

Vendor	Acquisition	Date	Objective
CSC	Onward Technologies	Apr-98	Acquired presence in ecommerce integration services
Platinum Software	Vivid Studios	May-98	Acquired front-end designer to marry with e-commerce software services
Renaissance	Worldwide Neoglyphics	Mar-98	Delivers presence in interactive integration for IT services vendor
Sapient	Studio Archetype	Aug-98	Provides front-end design capabilities to Sapient's back-end solutions
Think New Ideas	InterWeb Inc.	Jun-98	Acquired IP-based applications developer
US Interactive	Digital Evolution	Jun-98	Expands back-end technical capabilities
US Web	CKS Group	Sep-98	US Web's back-end combined with CKS' front-end skills deliver leading services portfolio offering

(source: BT Alex. Brown)

2.1.5. The post-bubble trauma and new models of businesses

Between the end of 2000 and during 2001, companies such as marchFIRST, encountered what was commonly referred as "the post-bubble trauma," characterized by reorganizations, downsizing, and eventually filing of Chapter 11 with an option for Chapter 7 (i.e., bankruptcy and liquidation filings). Many of the larger companies observed flattening and even shrinking revenues in the years after 2000. Giants such as Electronic Data Systems and American Management Systems which were accustomed to double-digit growth rates of their total sales and had not reported a negative growth for more than 25 years faced this situation in 2002, 2003, and 2004.

A direct consequence of the internet bubble collapsing and revenues declining was the focus on cost and ROI. The discretionary nature of IT spending translated into a direct effect of the economic downturn on IT services revenues (Kobelsy, Richardson, Zmud 2003). Consequently, business models were adapted and the largest firms went from marketing and selling highly customized best-of-breed solutions to standardized solutions fitting better with the cost takeout trend. Non-discretionary IT spending such as outsourcing enabled the IT services industry to maintain certain levels of revenues and favored firms proposing such services relatively to their competitive environment. In particular, business process outsourcing (BPO) has grown at significant rates as companies have been outsourcing back-office functions.

Overall, the IT services business landscape as it is today is led by large global firms offering end-to-end services with deep vertical expertise, international delivery models, and a clientele made of large firms – Accenture and IBM Global Services being the archetypes of this model. The increasing demand for focused services such as single processes outsourcing motivated by tightened budgets also enables smaller vendors to become more competitive in spite of their limited offerings. This industry mix is completed by the rise of low-cost offshore firms providing services of high quality at low cost and moving up the value-added services – Wipro, Tata, Satyam, and Infosys representing this new trend.

2.2. Conclusion: drivers of IT services demand and value

Looking at the historical trends and issues and the repetitive logic of this industry, we shall conclude with a few points. Demand has historically been driven by three key trends:

- Technology
    - One of the characteristics of technology-driven markets is their relatively short product life-cycle (Meixell and Wu 1998). The shortening product life-cycle of technology increased the perishability of knowledge.
    - Increasing complexity and the nested nature of technological components have required high levels of expertise.
    - New platforms and applications have cyclically motivated the need for outside expertise.
- Market dynamics

    - Economic cycles have motivated or discouraged firms from spending on IT – thus making IT services somewhat dependent on the dynamics of the economy
    - Information technology enabled globalization of the marketplace and induced new trends of off-site work and in particular, of off-shoring
    - Outsourcing has been increasingly accepted as a common business practice
- Businesses' evolving needs
    - New technologies and market dynamics such as outsourcing have enabled new ways of running businesses. Redesigning business processes has become an important factor of companies' needs.
    - Businesses have increasingly asked for solutions to fit their business in order to derive strategic value from it (e.g., cost advantages, new revenue potential).
    - Needs have balanced from focus on costs to focus on strategic advantages, depending on the economic conditions

Value has been driven by the needs of the customers. These needs have been associated with resources ranging from "hard assets," such as equipment and infrastructure, to immaterial but highly strategic resources such as processes. At one end of the spectrum of the different types of asset, hard assets are commodities which one can manufacture, buy, observe, reverse-engineer, and copy; these assets provide little strategic advantage. At the other end of the spectrum, there are extremely "soft" assets which are difficult to

quantify, qualify, appreciate, and (a fortiori) copy. Such assets are built in the organization of a firm. They are intrinsic to the firm. Made of the web of formal and informal relations between the firm's employees and also with external stakeholders, and the knowledge shared under more or less tacit forms between employees of the firm, these assets are difficult to acquire or copy. The value of services provided by an IT services firm typically increases with the immateriality of the client's goods the service firm is working with, leading to a hierarchy among the different types of services. This viewpoint has its importance in understanding the dynamics of the IT services market, as one could predict for instance the disruption of the industry by IT services players moving up the ladder of value-added services, starting with undifferentiated low value-added commodity-like services and leveraging cost advantages, and then growing and capturing market shares in higher value-added services markets – Indian IT services and software firms seem ready to follow this path to disruption.

CHAPTER 3 From the General Characteristics of Services to the Specificities of IT Services

Service businesses are people businesses. While selling a product is selling the result of an automated process conceived in advance, selling services is equivalent to "renting" people – those then being called "consultants." The cost of such activity is a priori necessarily much higher than that of selling an automated product. Not only are people much more expensive by the hour and more complex to manage and organize than (manufacturing) machines, what they do is also much more difficult to measure. In other words, services operations have their own challenges and characteristics that product operations don't have (or don't have to the same extent). In order to understand what the drivers of performance of services firms are, it is important to first understand the core characteristics of services offerings.

However, although differences between goods and services have been recognized for a long time, literature on services is much scarcer than that on products. We shall consider the definition of services and their characteristics. We shall discuss how these characteristics impact the functioning and strategies of IT services firms. Additionally, we shall look more specifically at the characteristics peculiar to *professional* services.

3.1. The essence of IT services

3.1.1. Fundamental properties that distinguish services operations from products operations

Services are usually defined in contrast with products, leading to more or less fuzzy boundaries between the two (Parrinello 2004; Bowen and Ford 2002). Gilmore (2003), for instance, defines a service organization as one for which *"the perceived value of the offering to the buyer is determined more by the service rendered than the product offered"* (p. 4). It can be added that while a service organization can provide an almost entirely intangible offering, it can also sell products. For instance, a retail store is a service organization selling products. Services can fit into the continuity of products offerings in the form of after-sale services. However, services have features that fundamentally distinguish them from products. A series of these features have been proposed by scholars studying services industries (Andreasen and Kotler 2003, Bitran and Lojo 1993). Below is a list of core features and their descriptions (see Table 3-1)

Table 3-1 The fundamental characteristics of services

Characteristic	Description
Intangibility	The value transferred to the customer does not have a physical form, especially once the service has been consumed – although it may have some sort of physical representation (e.g., a billing statement).
Inseparability of production and consumption	The service is inseparable from the source that supplies it. For instance, it is not possible to be treated by a dentist if the dentist does not see you.
Perishability	The service or any part of it cannot be "stored" or conserved in any ways. In other words, services can't be produced in advance. There is necessarily *simultaneity* in the production and consumption of services.
Heterogeneity	Each service encounter is different. Services are characterized by a significant variance in their characteristics (those valued by the customer being designated under the term "quality") over time and between the clients. It is thus difficult to standardize offerings or have a constant quality level.
Transferability	Many of the characteristics of services offerings can be compared across sectors. This is typically not the case with a product – it is possible to buy a new car and an apple, but not to compare them in ways that would affect a next purchasing decision. Service customers may transfer their expectations across sectors.
Cultural specificity	The service encounter may be affected (usually negatively) by the difference of culture of the provider and customer. As a consequence, many offshore firms train their client service representatives in order to eliminate local accents and become familiar with customer colloquialisms. In the same vein, a common practice is to have client service representatives in developing countries adopt American personae when answering requests from American customers (Kennedy and Lewis 2002) – e.g., Ajit from Bombay becomes A.J. from Boston.

The most fundamental characteristic of services, *intangibility,* implies that the outcome of the purchase of a service cannot be known and judged in advance. Additionally, because the outcome of services is generally impossible to reverse, benefits have to be described in advance. The role of sales is paramount under such conditions. One of the reasons why a customer cannot foresee the outcome, and possibly not even understand the value of the

offering, is generally that she does not have the knowledge and skills related to the service she needs (Connor and Davidson 1985). Although a customer might understand the need for a service, there is a large amount of uncertainty associated with its purchase. Because intangibility increases the degree of uncertainty and the need for tangibility (through explanations and sales efforts), an alternate strategy that would trigger service events would be to sell products and, separately, services associated with the products. The product will call naturally for services such as deployment, maintenance, upgrade, or integration. A product can also require significantly less marketing efforts.

Intangibility of services also brings hurdles to the direct "measurement" of the different characteristics of the service provided (Bitran and Lojo 1993). The service-product does not include any "pre-test." There are two consequences to this characteristic. *First*, it is likely that the buying decision process of potential customers will be based to a significant extent on the reputation of the firm, and on referrals. In that regard, it is not uncommon to see smaller firms disclose the names of some of their most prestigious clients or at least the number or size of their clients in an attempt to build reputation by exposing credentials – even large and well known firms won't miss the opportunity to boast that their clients are among top tier firms of the industry (e.g, Accenture mentions in its annual reports that most of its clients are part of Global 500 and Fortune 1000 rankings). Marketing costs thus play a significant role in establishing the reputation of a services firm. *Second,* as mentioned earlier, benefits have to be described in advance . The role of sales is paramount under such conditions.

A service cannot be experienced without the commitment of resources from its supplier because consumption and production are *simultaneous*. There is *inseparability of production and consumption.* The provision of services typically requires the physical presence of representatives of the service firm (Kotler 1984). Progress in information and telecommunication technologies has relaxed this necessity by creating more flexible customer interfaces (e.g., email, video-conferencing). Yet while some services can be provided from distant locations, the act of providing the service requires the supplier to have labor resources allocated for the period of the consumption of the service. Furthermore, because the physical presence of a consultant can be considered as a quality gauge, most consulting firms have sent their consultants to be at the customer's site. The role of simultaneity is also a key differentiator of services products when compared to products. Indeed, while the feed-back from the customer cannot be obtained before the final delivery of a product, the consumer of a service can directly impact production of the service itself. As a result, the quality of a service will be a function of the customer's ability to describe what he or she wants (Jackson, Neidel, and Lunsford 1995).

The fact that services are *perishable* virtually eliminates the notion of inventories by making impossible the accumulation of the production of services. Anticipating future demand and developing a cost-efficient model of operations flexible enough to absorb demand fluctuations is critical to the success of service businesses. Another consequence is the importance of long-term relationships with clients, which can lead to more stable workload; additionally, long-term relationships, because they relate to customer

satisfaction and thus referrals, are likely to reduce marketing costs (Brentani and Ragot 1996).

Heterogeneity of the services is at the root of the need for quality control and a major hurdle to growth. There is heterogeneity for the simple reason that people differ in their personalities, skills, knowledge, and ability to communicate (Morgan 1991). Standardization is thus made impossible for services. Controlling heterogeneity requires measures of performance and quality. Filtering applicants at the recruitment and training of the staff is key in order to manage heterogeneity of the service encounters.

Transferability increases competitive pressure by decreasing the differentiation potential of each firm. Services firms have typically tried to hedge against transferability by developing a corporate culture and specific methodologies and by developing offerings tailored on vertical markets. Transferability may play a key role in the dynamics in which hardware, software, and pure IT services vendors with local, global, or off-shore models compete on service offerings.

On the basis of this discussion and the framework presented by Morgan (1991), we propose a framework of strategies specific to services firms in the table below (Table 3-2). This framework will help us understand different dynamics possibly observed in our analysis.

Table 3-2 Framework of differentiation strategy options based on Morgan's framework (1991)

Characteristic	Strategy options	Tactical elements
Intangibility	More tangible	Add products to the offering – e.g., develop a business model with a products component Describe the benefits rather than the features of the services
	Less tangible	Develop the firm's image and identity Invest in branding efforts
Inseparability of production and consumption	Increase separation	Off-site service provision Geographic location (off-shore) Front-office/operations split
	Decrease separation	On-site service provision Geographic location (on-shore) Staff placement with client
Perishability	Manage demand	Limit client base Practice differential fee schedules in order to manage seasonal peaks of demand Cultivate non-peak demand
	Manage supply	Yield management (sell over-capacity "at cost") Employ part-time workers Sub-contract Manage partner accessibility Increase client's participation Office hours and days
Heterogeneity	Service standardization	Technical quality assurance Develop methodologies Make reusable "tools" Use a product component
	Technology utilization	System and administration quality Technical service excellence
	Recruitment and training	Service quality monitoring
Transferability	More transferable	Propose service offerings overlapping competitors' offerings
	Less transferable	Develop highly specific offerings Develop intellectual property and capital
Cultural specificity	More cultural specificity	Recruit within the target cultural environment Train (colloquialisms, jargon, culture) Geographic localization close to the customer
	Less cultural specificity	Develop a corporate identity across cultural boundaries Educate the customer

From a broader perspective, these issues mostly fall under the category of incomplete or asymmetric information. These problems are generally classified into either moral hazard or adverse selection. There is *moral hazard* in that the buyer is unable to observe (all) the actions taken by the seller. Intangibility and its consequences – especially heterogeneity, and the difficulty in judging the service before experiencing it (and even once having experienced it) - makes the evaluation of the services rendered difficult. In particular, it is often hard to answer with certitude questions such as: "Did the consultants help us?" "Did the consultant do what was reasonable to do?" There is *adverse selection* in that it is usually difficult for the buyer to observe either the seller's characteristics or assess the situation itself. As a consequence, clients are usually uncertain about questions such as: "Did my company really need all those expensive services?" As shown by Akerlof (1970), under such situations, buyers face significant hurdles to evaluating the value of the services provided. Lower-quality services providers can enter the market with price-competitive offerings. Hence, high prices should signal high quality. However, because of adverse selection, low-quality services providers could also charge high prices. Building reputation and trust seems to be the most adequate solution to these problems (Nayyam 1990). In particular, strategies based on partnership networks enabling referrals are key drivers of success in service businesses (Jones, Hesterly, Fladmoe-Lindsquist, and Borgatti 1998; Connor and Davidson 1985; Kotler 1984). Publications and public relations (Marcus 1992; Connor and Davidson 1985), or more generally, word-of-mouth (Rogerson 1983) also have an important impact on the success of services firms. Additionally, it is also argued that high quality firms should retain and attract more customers and become larger at equilibrium (Rogerson 1983). Thus the sheer size of the

firm plays a role both in signaling quality of the services and in gaining visibility. Nonetheless, there are also opportunities for smaller firms.

3.1.2. A closer look: the specificities of business-to-business professional services

Despite the growing importance in the economy of business-to-business professional services, the literature on the subject is meager. Very little has been undertaken in order to understand the IT services industry. The literature on professional services is most often focused on health care and legal services. We shall review what has been accomplished in that field and consider the components that apply to business-to-business professional services.

From a customer perspective the key need driving demand and thus shaping professional services is uncertainty (Morgan 1991). Due to the very raison d'être of professional services – which is essentially to provide the customer with skills and resources she does not have at the same efficiency levels -- the primary need of customers is to minimize uncertainty around knowledge, technical expertise, and experience she does not possess. Professional services are defined as the services rendered by "firms [that] sell industrial services that involve highly specialized skills and are of an advisory nature" (Bentani and Ragot 1996). These firms supplement clients lacking the required specialized resources to respond to the demand of the market or to competitive pressure. Although uncertainty is a driver of demand, it is also a hurdle to it. Paradoxically, firms requiring external expertise don't always know what expertise they need – "it takes perspective to know that you

need perspective" (Marcus 1992, p. 305). It happens that the consultant himself or herself does not know what is best for the client. Thus, identifying the client's problems involves judgment exercised under conditions of uncertainty – given that the client would not ask for the services of a consultant under conditions of certainty (Watson, Rodgers, and Dudek 1998).

From the service supplier's perspective, business-to-business services markets differ from customer services markets on a certain number of points (Filiatrault and Lapierre 1997):

- customers are larger, fewer, and often geographically concentrated
- demand is fluctuating and relatively inelastic
- the number of stakeholders in the buying process is much more important
- the buying process and the process of delivering the services involve a closer relationship
- technology products play an important role

We might add that the psychology of the purchaser is very different. For instance, pricing tactics based on consumer behaviors generally don't apply to the field of organizational buyers.

Furthermore, and one might consider this as the most important point in describing professional services: it's a people business. The producers are also those who are the leaders and the owners of the business. There is a fundamental consequence to this. Contrary to the retail business, for instance, where the strategy would shape the buying, channels, and marketing capabilities, the professional services firm's strategy is

determined by its organization, skills, and experiences (Jacobs 2003). Thomas J. Tierney, former CEO of Bain & Company, gives a clear description of the situation: "[Altering a professional services firm's strategy] is far more difficult than changing the design of a product or distribution system. In this case, you're talking about changing people -- people who often hold an interest in the firm as its partners."[2] If we extend this logic to the whole organization and the more junior staff, other dynamics may appear. One of extreme importance is the management of growth and human resources. Because (usually) the more senior the professional, the more difficult to find, one observes a limit to growth above which the organization might experience a dilution of skills with an organizational diagram heavily weighted toward its lower end.

Besides, other factors might make profitable staff growth rate relatively inelastic. Webb (1982) proposes that "staff cannot be drastically cut back without negative effect on future recruiting efforts," which translates into increases in future recruiting costs. He also states that staffing increase above a certain point will result in lower profitability (per employee), which view is compatible with the proposition that a dilution of skills might occur above a certain growth rate. With the notion of recruiting comes the notion of turnover. A professional firm's employee represents skills, experience, and costs related to training and recruiting. If the latter costs are sunk, they are still incurred when a professional leaves the firm and is replaced by another one. Schlesinger and Heskett (1991) propose that in a services business, employee turnover and customer satisfaction are negatively related and that quality of the service is positively related to the skills of

[2] In Jacobs (2003).

the employees. Thus, in a situation where the growth rate of the firm would be so high that it would require the firm to loosen its recruiting standards and hire less qualified employees, a consequence would likely be an increase over time in employee turnover. In any case, and more generally (if the reason stated above is probable; we acknowledge that other forces factor into this equation), one might observe an increase in the cost of growth with growth itself.

3.2. Different models of IT services businesses

3.2.1. The foundation of IT services business models: services offerings

The raison d'être of IT services is related to the nature of the firm and of the way technology evolves. Consequently, IT services firms have continually expanded their skill sets in order to include offerings corresponding to new technologies, all the while permeating through increasingly deeper and strategic functions of the firm. In the space of offerings, positioning of large IT services providers is generally followed by small and medium firms in this market after a certain lapse of time (Currie 2000). By inspecting the offerings of the largest players as well as those of smaller players[3] over the period from 1990 to 2004, we found that although no two firms provided the same set of services, virtually any IT services firm focused on some or all of the following core skills:

- IT and business consulting
- IT and business process outsourcing
- System integration

- Application development
- Training
- Staffing
- Maintenance and technical support

Each type of service has its own specificities beyond the fact that they require specific skills. As such, they define specific markets that have specific *demand levels and growth rates*. Another way of ranking these offerings is by order of *profitability* – for instance, strategic consulting (also known as "high value consulting") has been followed by system integration, facilities management, and application development. It is also possible to differentiate these offerings by characterizing them according to their *relationships with the customers* induced by these services. For instance, different services would allow building relationships at different levels of the client company. While IT-focused and implementation services would typically deal with the IT services of a company, strategic management services would permit developing ties with the executive management of the client's firm. Relationships might also have typical *durations*. At one end of the spectrum, outsourcing is typically dealt with on an on-going basis and usually lasts anywhere between one and ten years. At the other end, IT services firms might provide training on a more opportunistic basis. In between, there are all sorts of project-based contracts - IT and business consulting, system integration, and application development.

[3] We considered: Accenture, EDS, Scient, Viant, Bearingpoint, Unisys, Equant, CSK, Diamondcluster, Digitas, The Thomas Group, Exponent, Keane, Perot, Analysts International, and Wipro.

Service offerings have also seen an overall trend toward increasing customization, with offerings being tailored to specific verticals in the 90s and then to business functions in the late 90s and early 2000s. Such differentiation strategies have been favored by smaller consulting firms, most often focusing on a vertical, trying to carve out their share of the market by addressing niches, but it has also been adopted by larger firms which started to have increasingly complex organizational structures built around "verticals" servicing specific industries and "business horizontals" providing services corresponding to specific business functions across industries (see Fig. 3-1).

Industry verticals

Functions	Financial Services	Industrial	Transportations	Business Services	Technology and Communications	Health Care	Energy and Utilities	Consumer	Government
Sales and Marketing									
Finance and Accounting									
Human Resources									
Supply Chain									
Manufacturing									
Legal									
R&D									

Figure 3-1 Organizational grid of IT services firms

3.2.2. The different types of business models

The IT services industry was not so much defined by the existing offerings as by the types of players it was made of. One way to categorize these companies is to segment them by type of activity. Moore (2005) contrasts business models that typically correspond to those of large integrator firms, with business models of large enterprise software firms. However, it is clear that such a dichotomy is far from capturing all the subtleties of products and services business models. Indeed, a consequential shift has been observed toward services from products vendors (Cusumano 2004).

Another view is proposed by Nolan and Bennigson (2002), who classify IT services players according to six paradigms:

- System integrators: with powerhouses such as Accenture, PriceWaterhouseCooper/IBM Global Services. These vendors tend to address large projects and charge premium prices by leveraging their scale.
- Web design firms: smaller firms with a technical focus and barely differentiated from each other.
- Interactive agencies: firms such as Razorfish or Agency.com focused on marketing services and proposed web-design as a natural extension of their core competencies.
- Management consultants: With top tier clients and strong brand equity, firms such as McKinsey and the Boston Consulting Group expanded from pure strategy to more technology-related offerings such as web strategy.

- Pure e-Business Players: Start-up firms such as Scient entered the market without any expertise or methodologies. Garnering diverse talents in strategy, development, and creative design under one roof, these firms were trying to capture their share of the IT services market. Most of these firms disappeared.
- Application Service Providers (ASPs): ASPs propose a particular model of application integration where the client is charged for installation fees, and then on a monthly basis. This idea of software rental has been applied by SAP, Oracle, and PeopleSoft.

3.3. Conclusion

Business operations for services are radically different from operations for manufactured goods. For services firms, intangibility, simultaneity, perishability, heterogeneity, transferability, and cultural specificity govern the behavior of the firm, its interface with the customer, and the customer's behavior. Because of these specificities, selling and buying services requires methods that are specific to the business of services.

Growth of IT services firms is subject to both positive feed-back phenomena and balancing phenomena. While reputation adds to size, which improves reputation through diverse mechanisms (e.g., word-of-mouth, network of partner companies and referrals), growth is moderated by inefficiencies in the recruitment process. Besides, a large firm is also subject to inflexibility, as noted by Tierney (see Jacobs 2003).

On top of that, IT services firms have their own complexity, with a complex matrix structure for the larger organizations. Although smaller firms can leverage the difficulty for larger firms to adapt to a high degree to specific verticals or horizontals, few have really been successful. The 'Pure eBusiness Players' of Nolan and Bennigson's categories (2002) prove that talent alone is meaningless to the business of consulting and IT services. Brand equity, customer base, and intellectual capital are core determinants of success.

CHAPTER 4 Products and Services Business Models

As we will see in the next section, services are mostly defined by contrast with products. Besides, as analyzed in Chapter 2, IT services have proved to be fundamentally dependent on the business of IT products. An integral part of the business of IT and subsequently of IT services, it is worth focusing on the IT products business and understanding how products can fit into the strategy of services firms and vice versa. We shall first consider in what sense products are different from services and require specific strategies, and then discuss how products and services can interact.

4.1. How products and services strategies differ

Large products firms are generally highly specialized and focus their efforts on more or less narrow domains of expertise corresponding to specific technology components. For instance, Intel focuses on the chip industry, Microsoft targets operating system and productivity software markets, and Oracle has historically been focusing on database software. Few companies have opted for an integrative approach, and none have emerged as leader or stayed in such positions – e.g., IBM initially sold its mainframes bundled with software and services but was not able to maintain such a way of conducting its business, Apple originally captured market share with its integrated personal computer systems, but soon had to leave most of it to its modular competitors, etc…

If economies of scale would first come to mind when thinking about products market leaders such as Intel, it might not be the only explanation (Iansiti and Levien 2002). Indeed, fabless business models adopted by firms such as Broadcom enabled them to thrive without manufacturing operations from which Intel derives economies of scale. One important driver of the dynamics of technology product industries is the importance of the notion of "standard" as shown by Cusumano, Mylonadis, and Rosenbloom (1991) with the case of the VCR industry. Cusumano and Gawer (2001, 2002) pushed this analysis further and explained the strategic role of platforms and complements in achieving industry leadership. Fundamentally, firms are not simply acting in a linear chain of value. Rather, they interact with a whole ecosystem of firms which can turn out to be complementors or competitors depending on the strategy adopted. Innovation is not only the fruit of the platform leader, but also of its complementors. Attracting and enabling firms so that they can participate in innovating, marketing, and selling products complementary around a wannabe platform is a key driver of the success of a technology firm (Cusumano 2004; Gawer et al. 2002; Cusumano et al. 2001). Christensen and his collaborators propose a viewpoint which, although different from the viewpoint expressed by Cusumano et al., is also based on the idea of industrial networks. In Christensen's theory, firms are to some extent prisoners of the *value networks* – that is, "the context within which a firm identifies and responds to customer's needs, solves problems, procures input, reacts to competitors, and strives for profit"[4] - within which they operate, and can be victims of a technology or market *disruption* led by firms developing their own value network (Christensen 2003; Christensen 1997; Christensen

[4] From Christensen (1997, p. 32).

and Rosenbloom 1995). In an industry driven by positive feedback effects such as those generated by network externalities we have explored, the firm that manages to leverage best these effects eventually comes out as a sole winner. Also, in such industries, scholars agree that technology superiority is not a gauge of success. Still, a capability focus is important – not only to develop a product that satisfies customers, but mostly in order to manage the market forces that determine leadership.

While technology products companies most often extract market power from their *installed* base, a "pure" services firm (e.g., management consulting, IT services) derives significant market power from a large *client* base for reasons observed in Chapter 3 – which does not mean that a small services firm cannot thrive. It is also important to note that while products firms put high stakes on a few technologies (which is also the best strategy, as suggested above), and are thus permanently exposed to the risk of making losing bids, pure services firms are not subject to the same extent to such bets. In fact, it is even possible to argue from the analysis in Chapter 2 that IT services firms thrive on technological changes, which are also the most uncertain times for products firms, subject to business models and technological disruptions from new entrants (Utterback and Suárez 1993; Christensen 2003, 1997).

At the industry level, other dimensions account for the different dynamics of products and services businesses. With the trend of globalization, the most pregnant issue concerning both of them is the dynamics of commoditization of the IT industry (Carr 2003). While commoditization directly concerns products vendors, it also concerns

services providers as the business of services becomes increasingly global and firms leverage specific factor conditions (e.g., qualified and relatively inexpensive labor of developing countries).

The mode of consumption of products and services can profoundly impact the variability of cash flows. In particular, discretionary spending is typically cut during economic downturns. Revenues derived from such budgets subject most product sales and also project-based consulting to unanticipated sharp decreases. However, there are a number of IT services that are mostly immune to these spending attritions. Outsourcing and maintenance are typically the two most resilient services in down economies because of focusing on costs or on functions that are most often necessary to the functioning of the client's operations.

4.2. How products and services interact

4.2.1. Services and products business models

Although services and products operations are radically different and require fundamentally different business approaches, the two share ties that affect business dynamics at firm and industry levels. However, literature is scarce on that subject and has mostly focused on a product perspective. Lifecycle models that have been proposed by scholars are essentially based on a product-process paradigm (see for instance Utterback and Suárez 1993; Utterback 1994). Recent research efforts show that this analysis is only

partly valid. Cusumano, Kahl, and Suárez (2006) suggest that models of industry lifecycle have largely overlooked the role of services. By analyzing business models of firms in software and services industries, Cusumano et al. found that a significant source of profits and revenues can be extracted from a third business cycle induced by services, and they propose that life cycle models follow a product-process-services paradigm (Fig. 4-1). In that regard, it is interesting to consider the relative importance of products and services in IT businesses.

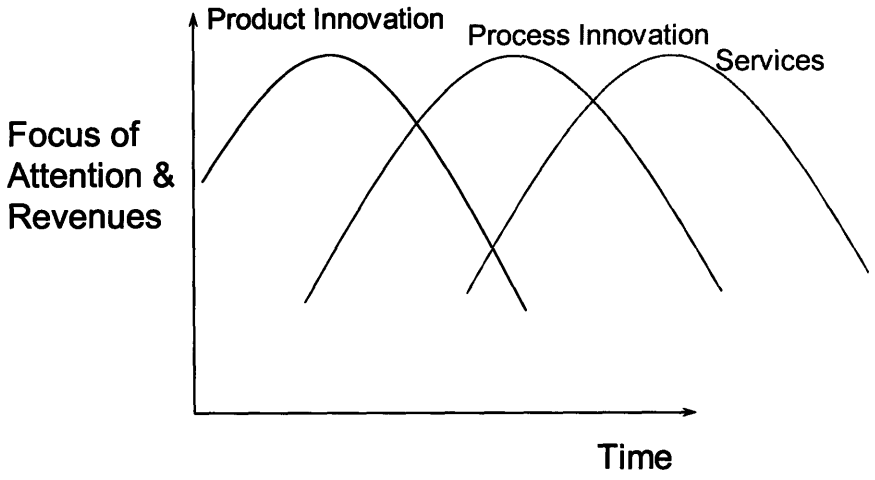

Figure 4-1 Product-Process-Services paradigm (Source: Cusumano et al. 2006)

Cusumano (2003, 2004) proposes two types of business models dubbed *products* and *services* business models, respectively corresponding to products and services firms. Products firms are characterized by revenue streams essentially derived from the sales of products such as software licenses or hardware, while services firms essentially derive revenue from the sale of services ranging from installation and maintenance, to training,

to integration work. A third category called *hybrid* corresponds to firms mixing services and products revenues.

Business models based on products and services differ widely on several points (Cusumano 2003, 2004). *First*, the patterns of cash flow over time generated by the two models are radically different. Product revenues are essentially generated at the time of the sale while service revenues are spread over time – e.g., software licenses are sold under a one-time transaction, while outsourcing engagements are billed over time under contracts that can often be interrupted any time after the beginning of the engagement. As a matter of fact, under the general principle accounting rules firms recognize immediately their products and recognize long-term services sales on a per-period basis, as the service is performed and gradually paid. *Second*, gross margins associated with products are expected to be much higher than those associated with services – e.g., the cost of production of a "shrink-wrapped" program (the cost of manufacturing and packaging a CD-ROM) is likely to be negligible when compared to the price of the offering, while the operating expenses of a consultancy activity are driven by the number of employees associated with this activity, typically ranging from 50% to 70% for large US-based IT and management services firms. Besides, product companies likely record significant marketing, support, and services expenses. *Third*, standardization is most likely what a products firm will pursue, in order to derive economies of scale, while customization is a core part of the value proposition of services firms. A corollary of the two previous points is that products firms are typically going after volume sales (e.g., Microsoft addresses mass markets), while services firms will try to capture large contract at once (e.g.,

Accenture targets Fortune 1000 firms). *Fourth*, service operations are characterized by their labor-intensity, which directly relate to the top line of such firms. In terms of head count, products firms would most likely want just enough employees to develop their products. In particular, while an addition of employees in a service firm translates into an increase of revenues, the same does not hold true for product firms.

The corollary to these attributes is that a products firm will organize itself in order to deliver a "hit" that would attract as many customers as possible. In such a firm, R&D is critical for the development of a product, which has to be better than that of its competitors in order to capture a large enough share of the market to make the business profitable. In contrast, the scalability of the sales of a services firm is constrained by the firm's head count. Thus, customer profitability, cost of services, and utilization of the employees (i.e., the ratio of the amount of time during which a consultant is working for a client to the amount of time she is not working for a client) is critical to the success of such firms. Because of their necessary case-by-case and labor-intensive approach, services sales can be an impediment to growth. In that sense, scaling up sales is a much trickier goal for services firms than it is for products firms.

These very differences between models associated with the sales of products and services motivate consideration of business models as key factors in the performance of computer services firms, who might complement their services revenues with the sales of products, thus getting closer to a product business model associated with higher margins.

4.2.2. Services sales as a result of product sales

Although services businesses can be conducted as standalone businesses – that is, without necessarily associating the sales of services with a specific product, most products businesses induce after-sale services. Those services can be provided by the products vendor or by an independent service vendor. Indeed, as noted by Cusumano (2004), of the total sales derived from an enterprise software product, a firm can generate between 15% and 20% of its revenues in maintenance fees, and up to a dollar of software services for every dollar in software license fees, for the first few years of the contract.

Delivering services requires specific competencies and assets. For instance, the delivery of integration services and maintenance services requires a network of professionals able to move on-site in order to deliver their services – for instance, field engineers might be sent on-site to diagnose issues the client is facing with its infrastructure or its software system. Furthermore, if the products sold are hardware products, maintenance requires a logistic network in order to provide the required parts to the customer or to retrieve parts from the customer and return them to the manufacturer or a specialized repair service. These physical requirements are attenuated with software products that can be diagnosed at distant places through networked architecture. The delivery of after-sale services requires specific capabilities.

In the case of after-sale services, the service sales and its life-cycle are directly related to the product's installed base. Maintenance services such as support, upgrade, and

troubleshooting, will be direct functions of the number of units of the product in use. Additionally, one might expect different life-cycle schemes for different types of services. For instance, one might expect different life-cycles for installation and integration services and for maintenance services. Installation and integration services might occur simultaneously with the first sales of a product, and also later on, in order to integrate other applications with it; one might expect integration sales related to a product to follow a life-cycle curve (e.g., the volume of sales per period) to follow somewhat closely the one of the underlying product. Maintenance occurs in a more "diluted" way and over a longer period of time than integration services and depends more on the installed base than the recent sales of a product. One example that is mostly focused on maintenance revenues is illustrated in the figure below (Fig. 4-2). It is clear according to this life-cycle model that the sales of a product can enable subsequent service sales. Especially in good times, when products sales are high, this model could explain the attractiveness of selling products, even for a services firm. Indeed, the market for ERPs was mostly based on the sales of complex products that required much integration and maintenance work. Although system integrators in general did not have the capability to deliver such systems, many partnered with enterprise software vendors to go-to-market with a full solution including software and services, and even hardware components.

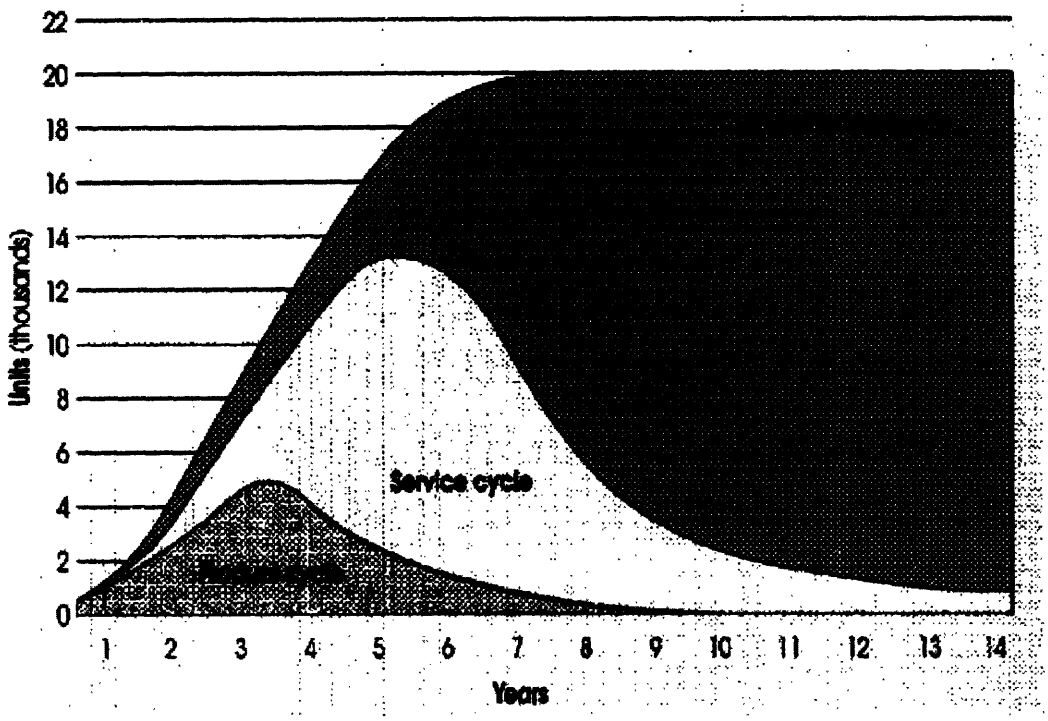

Figure 4-2 Example of product and service life cycle for a computer product firm

(Source: Potts, 1988)

It is interesting to note that although service sales can be lucrative, a certain range of services such as consulting and system integration are mostly the preserve of pure IT services vendors (excepting IBM). There are several reasons for this. *First*, as seen in Chapter 3, reputation of the firm plays a critical role in the sales of services. A firm that is well known for its software products is not necessarily known for its services. And indeed, it is generally considered that products firms' services are of lower quality and have a narrower scope than those offered by pure IT services firms. *Second*, and this is a consequence of the problem of information asymmetry discussed in Chapter 3, products firms selling services are often viewed as biased in the consulting advice they propose. Indeed, for example, if you have a problem with your car, your car dealer would be the

last person you would ask advice from (unless the car is under warranty) – as you would expect his or her very kind advice to be simply to buy a new car to "fix" the problem. The same goes for enterprise software vendors. It is thus natural to view the structure of the industry through the lens of products firm – services firms partnerships.

4.2.3. Products sales as a result of service sales

If products call for services, so too, in a less obvious but significant way, can services generate product sales. There are essentially two means by which a service generates products sales. A products firm can propose upgrades or cross-sell complementary products or modules to its clients, using its services efforts in order to determine its clients' needs; or an external service provider can sell a partner's product to its client, thus playing the role of a channel partner. The first case is what led many enterprise software firms to acquire IT services firms and graft them more or less successfully onto their organizations. More generally, Cusumano et al. (2004, 2006) have observed a shift of software products vendors toward services. Companies such as Oracle and PeopleSoft that were collecting 70% of their revenues from products and the rest from services in 1990 had reversed the proportion in 2000, selling services at a level of 70% of their revenues. It could be argued that products firms are now focusing on their services operations, which they maintain by selling the software that enables a large part of their services sales.

Nevertheless, for the reason stated above at the end of section 4.2.2, software firms and services firms maintain symbiotic relations. Sales from services related to the sales of product can be derived by IT services firms. It is thus valuable for an IT services firm to enable the sales of products (on which it can also capture channel fees). Also, many IT services companies have taken positions and formed alliances with products firm – for example, Accenture stated in its SEC SC 13 G filing of February 2000 a equity stake in Siebel of 3.14%; this alliance led Accenture to have the highest share of Siebel implementations. Such alliances enable IT services firms to sell services related to the installed base of a given product vendor. The total value to the customer is the sum of that provided by the product vendor and the services vendor. Insofar as the value of services is difficult to measure and seems mostly related to brand and size effects, such alliances make sense for both products and services vendors. Additionally, the proximity of IT services firms to the clients enables them to develop a wealth of information on their needs, which can be channeled back to the product vendor in an alliance.

4.3. Interactions across the value-chain

When the provider of services is different from the provider of products, a dynamic along the value chain might be observed, with revenues and costs supported by different actors of the chain. One of the main costs of the technology industries is the cost of innovation. Most such costs occur around the development of a product. Such products can be produced either by products vendors or services vendors. Products vendors likely sell their products to derive direct benefits from them, whereas service providers might

develop a product in order to provide services differentiated by the use of a product that makes possible new efficiencies but which no other services provider can offer.

These two different product approaches lead to very different innovation approaches. The first one is related to market dynamics. In this approach, limited amounts of resources are basically bet on a technology by means of R&D investments (as well as marketing, sales, etc...). Innovations developed by other firms can in turn either increase or undermine the value of a firm's expertise (Henderson and Clark 1990). The second approach corresponds more to the formation of intellectual capital in order to differentiate the firm. Such an approach might be pursued by smaller firms whose initial assets consist mostly of the creativity of its employees.

There is actually a third approach to innovation, which is to let others conduct it. For instance, when Accenture takes equity stakes in Siebel, what it is doing is mostly investing in an innovation (Siebel's software) and the installed base that comes with it. Such an approach requires certain features of the firm. Typically, Accenture brings value to Siebel in exchange for its partnership. Accenture's value to Siebel can be described in terms of its reputation, large customer base, and understanding of customer needs, as well as long-term relationships with many of its accounts. Accenture can thus help Siebel in the development of its products, and enable its current and future sales, all the while ensuring a high level of service quality.

While innovation is a critical factor in products businesses, it seems that this is not so much the case for large IT and management consulting firms – or at least, not all the time: as we will see, R&D investments are more opportunistic in the IT services industry than in the software products industry. For example, Accenture's R&D expenses have been around 2% since 2000. Keane decreased its R&D expenses from about 9% of its total sales in 1990 to less than 4% in 1998. Indian companies – which are known for their software-intensive business – have also shown decreasing R&D expenses since 1990, and firms such as Wipro, Satyam, and Infosys were spending no more than 10% of their revenues on R&D in 2004. Also, it is clear that R&D efforts are most important for small firms which have extremely high average R&D expenses as compared to their revenues (see Fig. 4-2).

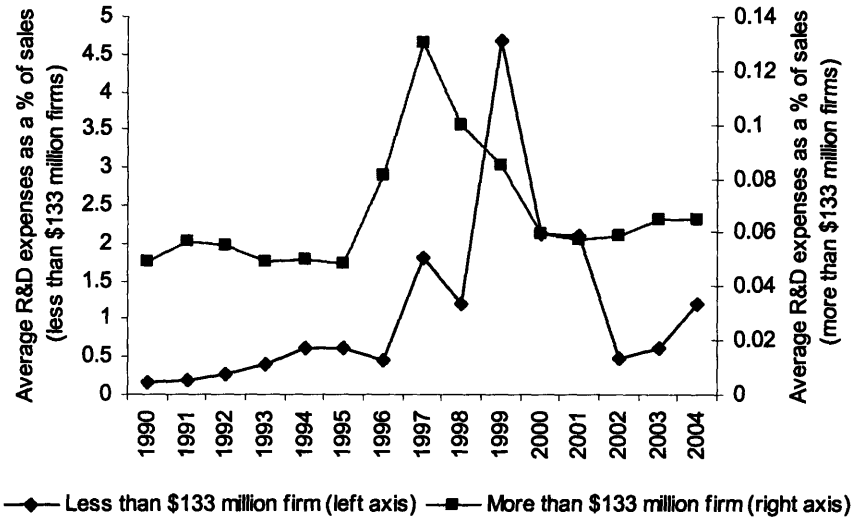

Figure 4-3 Average R&D expenses for public IT and consulting services firms[5]

(SIC codes 7370, 7371, 7373, 8742 – source: Compustat)

[5] Not all firm reported their R&D expenses. See Fig. 3 in appendix for the percentage of firms reporting their R&D expenses.

This stark difference can be explained by the difference in business models and value networks in which large and small firms operate.[6] Small firms will try to differentiate themselves through intellectual property and the development of highly specific applications, while large firms, connected with a large base of potential customers of software products, are acting as channel partners of enterprise software firms. In the large firm business model, R&D expenses are thus pushed up the value chain and left to software application vendors. Small firms, not benefiting from the asset that a large customer base is, most likely count on the uniqueness of their human and intellectual capital – which is also close to being all the assets they can afford at this stage.

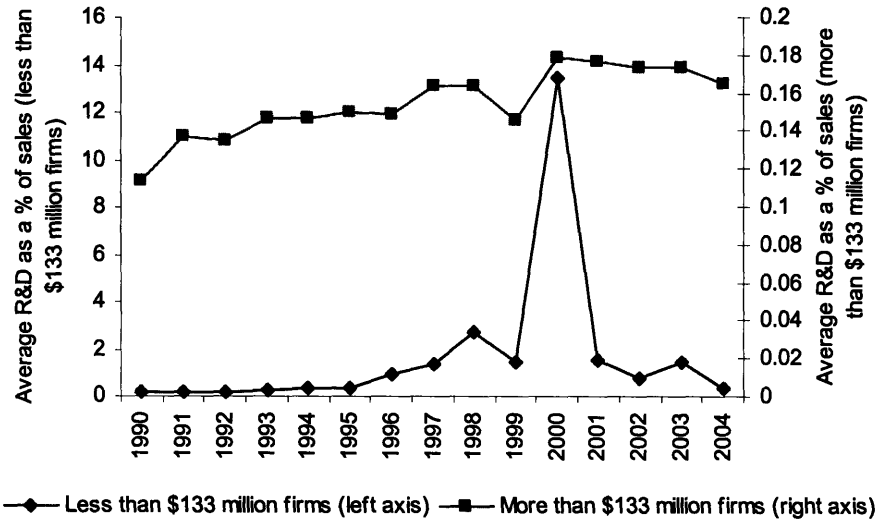

Figure 4-4 Average R&D expenses for public software firms[7]

(SIC codes 7372 – Source: Compustat)

Considering now the software industry (Fig. 4-4), it is interesting to note three facts:

[6] We consider $133 million as a cut-off value between "small" and "large" firms. Reasons for this choice are given in Chapter 5.

- The prepackaged software industry has historically been more R&D-intensive than the large (more than $133 million) IT services firms, but less so than small IT services firms.
- On average, "large" software firms (with more than $133 million in net sales per year) are investing at a steady rate, over time, of about 16% of their net sales.
- The average R&D investment as a percentage of sales of smaller software firms (less than $133 million in net sales per year) is more subject to volatility than that of larger software firms.

This likely indicates that large software firms are not subject to the same technological constraints and pressures as small software firms (which can be pressured to deliver rapidly or to deliver "better" products). Another viewpoint is that, because of externalities (as seen before), few firms manage to develop a significant installed base and to motivate the production of complementary products. As a consequence, what we observe could correspond more to a desperate attempt of smaller firms to disrupt larger firms than to a sustainable strategy. (The average R&D expense as a percentage of total sales of small firms was close to – or more than – 100% between 1996 and 2003!)

Overall, most of the technological innovation is produced upstream, by software vendors, while large IT services firms spend opportunistically on R&D during periods of economic growth – R&D being used to conduct market research (Miles 2005), build complex solutions, and capture higher value-added opportunities. During economic downturns, IT services cut their R&D expenses and expect software firms to use their

[7] Each year, more than 98% of the firms in the database reported their R&D expenses

R&D investments in order to develop standardized, low-cost packages, on top of which IT services firms likely derive their benefits by channeling the products to their customer base. It is not fortuitous that Microsoft, for example, entertains the bulk of its industrial partnerships with system integrators (see, e.g., Iansiti and Levien 2003). Hence, even though pure services firms have large costs of services and lower gross margins than software businesses (Cusumano, Kahl, and Suárez 2006), they might close the gap or even outperform software firms which bear large and seemingly incompressible R&D costs.

4.4. Conclusion

Products and services businesses differ in many respects, from operations to financials; in brief, they are based on different business models. Nonetheless, products and services can be seen as complementary activities with their own life-cycles, as proposed by Cusumano et al. (2006). The difference in properties in services and products businesses can be leveraged in order to build more complete and competitive business models. For example, services sales are more resilient to economic downturn, and products sales enable explosive growth where services operations might be constrained due to their very nature as being a people business. We have seen that the product business can generate significant services sales. Conversely, services business can be employed to develop channel strategies and enhance product development. Furthermore, looking at the case of R&D expenditures, we have seen that the structure of costs in one business model or

another might be placed in the broader context of the value chain in which a business is situated – i.e., cost structure might be strategically considered at the scale of a value chain.

CHAPTER 5 Framing the Question of the Performance of the Firm

In the previous chapter, we have seen how different ways of conducting a services business and interrelating products and services might result in outcomes impacting the performance of the firm. In other words, the business model of a firm appears to be a key determinant of its performance. The question of what drives the performance of the firm leads to that of its strategy. In this chapter, we shall consider the question of the performance of the firm within the framework of its strategic management. Basing our analysis on a strategic management framework, we shall identify key levers and variables affecting the performance of the firm.

5.1. Theory for explaining the performance of the firm: a strategic management framework

It is widely recognized that strategic management emerged with Alfred Chandler's attempt at relating systematically identifiable factors with growth (1962). Since this first attempt, strategic management has changed its methods and developed a wealth of concepts. Still, strategic management has not steered away from its initial goal: to enable the manager to navigate the tremendous range of situations and possible scenarios, overcome the perplexing variations of performance observed in the market, and make choices according to a rational analysis of the situation. Hence, for managers in general,

and for the purpose of the present research in particular, it is worth understanding the most accepted theories and current norms in this field.

Two streams of research have attracted much attention in the field of strategic management and have constituted the basis of most of the current strategy literature. The first, based on Porter's frameworks (1980, 1985, 1990, 1991) adopts an external perspective on the firm. Porter has viewed performance of the firm as being a result of its positioning within an industry and the environment in which it operates. A firm can derive superior performance by choosing a strategy that provides a position advantage relative to the market and environmental forces. The second stream of research focuses on the firm and its resources – hence its appellation: resource-based view (RBV) of the firm (Wernerfelt 1984; Teece 1984; Prahalad and Hamel 1990). Under the RBV, performance of the firm is the result of the ownership and control of unique and difficult-to-replicate assets. The literature seems to indicate a controversy as to the relative importance of firm-specific and external environment effects on performance. It has been reported that the first were more significant than the second (Mauri and Michaels 1998), but Schmalensee (1985) reports that industry effects explain most of a firm's performance variability.

Basing their framework on the two strategic management views we have just reviewed, Saloner, Separd, and Podolny (2001) propose to analyze the dynamics of business strategy according to the context, made of external (industry and nonmarket context) and internal factors (assets and organization), and the actions taken (asset acquisition and

asset deployment). It is clear that the actions taken by a firm impact the context in which it operates. Context and actions explain the performance of the firm. This framework is thus compatible with both the resource-based view and Porter's frameworks (see Fig. 5-1). This framework is hereafter used to structure the analysis of the drivers of performance specific to the IT services industry. The framework leads us to consider:

- factors related to the context:
    - Externally: industry population, competition intensity, and technology
    - Internally: importance of the size of the firm and how it relates to organizational issues
- factors related to the actions:
    - Asset acquisitions: intensity and purpose of the acquisitions
    - Asset deployment: how the firm manages its core resource: people (we approach this question from the angle of cost of services and sales and marketing efforts, as well as productivity measures).

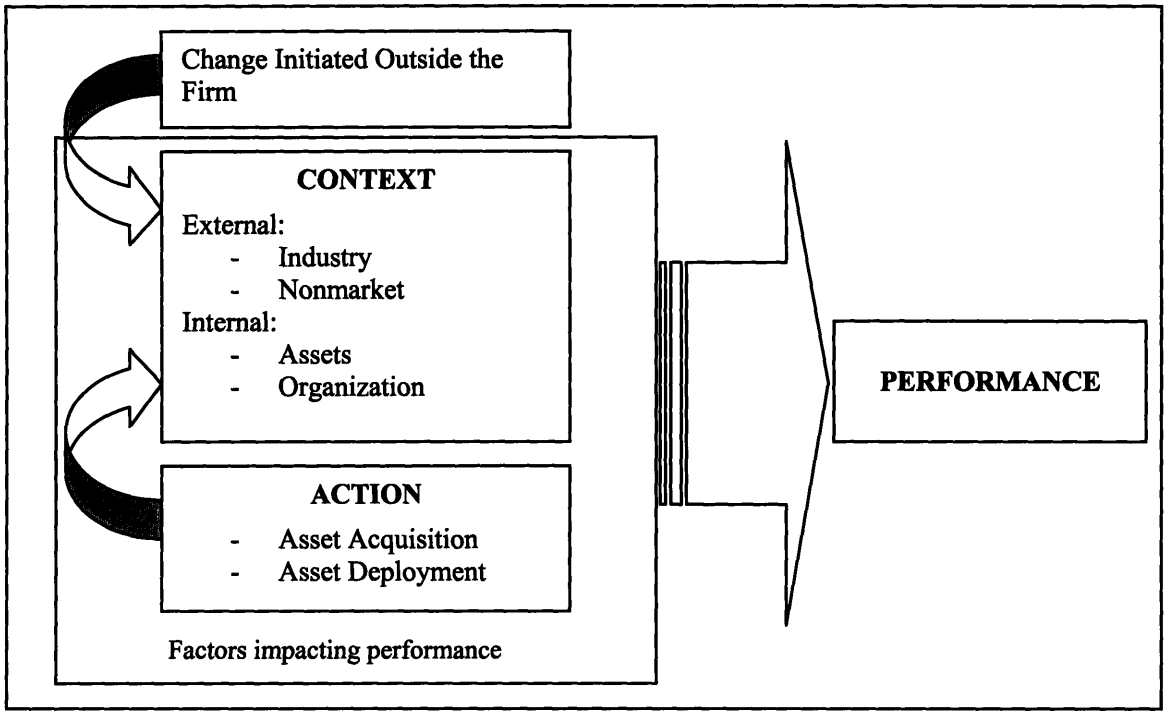

Figure 5-1 The dynamics of business strategy (adapted from Saloner et al. 2001)

5.2. Key drivers of performance

"Professional firms that do not grow or are unresponsive to rapid change will surely not survive" (Webb 1982, p. 240)

Many parameters factor into the measurement of the performance of a firm. The parameters we consider have received a significant amount of attention from management and economic scholars. We hypothesize that several parameters of the firm are driving performance of IT services firms: size, age, operational efficiency, business model (mix between product and services revenues, and provision of specific services such as outsourcing), sales and marketing intensity, acquisitions and divestitures. We shall see how these parameters may impact the performance of an IT services firm.

5.2.1. Growth and profitability: two key indicators of performance

First of all, it is worth noting that growth and profitability are the two performance indicators most cited by scholars (Campbell-Hunt 2000; Capon and Farley 1990). Studies on corporate performance are legion. A plethora of indicators have been proposed to measure performance. Among all these, two have been repeatedly considered: growth and profitability. In an attempt to review studies on corporate performance, Kirby (2005) lists ten studies, among which seven are based on quantitative analysis; and among those seven studies, as key measures of performance, two consider both net sales and net income growth, one considers net sales growth, and one considers net income growth. Other studies are looking at other measures of the growth rate of firms and at (stock) market performances.

If we consider growth and profitability as key indicators, it could seem intuitive that they are negatively related. For instance, an analyst from Baird was asserting that in 1999, "new contracts contributed about 80% of Affiliated Computer Systems'(ACS) internal growth. (...) ACS bids actively and aggressively to win new business, basing its pricing decisions on detailed analysis and 11 years of experience. The company's cost-conscious culture allows it to bid competitively (and profitability)." In other words, in the view of the analyst, ACS was trading-off some profitability against growth. This is obviously a simplified, if not simplistic view. However, it reflects the idea often found among managers that growth and profit are not independent, and are negatively related.

More fundamentally, there has been no agreement on whether there is a trade-off between growth and profit. If such a trade-off made sense, it should be possible to observe (public) firms pursuing different goals – which ought to be profitability maximization accordingly to the shareholder's interests, but might also be growth maximization if this can benefit to the management. Despite the number of studies on performance of the firm, there is no general agreement as to the nature of the motivations and incentives that may guide managers to pursue growth or profit maximization (Thomas 1980). While some argue that manager's incentives – such as pecuniary rewards, status, power, etc... - lead them to pursue growth goals (Meeks and Whittington 1975; Mueller 1972), some others argue that managers can and will likely be pressured by their companies' shareholders to pursue profit maximization (Thomas 1980). The main assumption underlying these results is that growth and profit cannot be maximized independently. Consequently, there would be a trade-off between growth and profitability (Slater 1980). On that point, a certain number of studies failed to find any significant sign of trade-off between growth and profitability (Geroski, Machin, and Christopher 1997; Cubbin and Leech 1986). Under certain circumstances, growth and profit were negatively related – when the industry is mature for instance (Day, DeSarbo, and Oliva 1987; Hatten and Schendel 1977). Capon et al. (1990) find in their meta-analysis an overall positive relation between growth and profitability. In the face of such controversies, we want to control for a potential relationship between growth and profitability. We propose to consider both growth and profitability in order to evaluate the drivers of performance of the firm.

5.2.2. Performance and the size of the firm

The effect of size on growth could seem "mechanical" and perfectly comprehensible. However, the relationship with growth might not be as straightforward as it seems. It has been posited by managers and scholars that growth is related to the size of the firm. Indeed, little is common between a 50,000-employee multinational firm and a 10 people start-up. There are obviously stark differences that lead to fundamentally different strategies, firm behaviors, and performances. For one thing, nobody would expect a multinational firm to match the growth observed by many start-ups. The idea of categorizing firms by size seems a priori very natural.

Many have defined boundaries in order to partition, or segment the market. It is not uncommon to see a breakdown of the industry by size in analyst reports and other publications. For instance, a widely published report (Software 500) of the top 500 performers of the software and services industry is annually published by Software Magazine. In their growth ranking, Software 500 partitioned the industry according to boundaries it chose (Table 5-1).

Table 5-1 An example of IT services firm categorization: Software 500 categories for software and services revenue growth ranking

Size categories. 2004 and 2003 rankings (software and services sales in $million).	<$5	$5-$10	$10-$30	$30M-$100M	$100M-$1B	>$1B
Size categories. 2002 ranking (software and services sales in $million).	Less than $30			$30M-$100M	More than $100M	

(source: Software Magazine)

While it could seem intuitive that growth is related to the size of the firm, there has been little agreement on that point among scholars. Some advanced that growth is independent of firm size (Hardwick, Philip and Mike Adams 2002; Capon, Farley, and Hoenig 1990; Jovanovic 1982; Hymer and Pashigian 1962), but the literature is also rich in cases and explanations in favor of inverse growth-size relationships (Evans 1987a, 1987b; Mueller 1972; Penrose 1955). In essence, these studies support or reject Gibrat's (1931) *Law of Proportionate Effects* stating that proportionate organic growth rate of firms is independent of their size.

Penrose's (1955) seminal contribution related growth to the organization. She proposed that the need for managerial services increases at a faster rate than that of the size of the firm, thus inducing decreasing growth returns to managerial resources. In a labor-intensive model of business such as those of services firm, this argument has important consequences. IT services firm which observe cost of services driven by human resources

and typically ranging from 50% to 80% to the total revenue, could have their growth subject to such inherent inefficiencies related to their size.

In the same time, scale also brings certain efficiency factors. For instance, large firms benefit from a large geographic coverage which enables them to deploy operations on a larger scale if required by a client. Local factors might be leveraged as well. A firm with operations in India might leverage relatively low labor cost to provide services to US firms all the while keeping a physical interface with the firm in the US. Another form of advantage can be derived from the breadth of services offered. While a smaller firm will focus on a certain skill set, larger firms propose a "one-stop-shop" model to their clients. Complex and large projects associated with a high value often require a very diverse and integrated skill set which provides advantages to typically larger firms.

From a knowledge-perspective, Ofek and Savary (2001) suggest that knowledge derived from the customer base can enable economies of scale through the exploitation of knowledge management systems. Such knowledge can be a source of value and attractiveness for the customers and a competitive advantage fro the firm possessing it. Also, because of this, it is possible that strategies to expand the customer base might impact the growth rate of IT services firms and would account for the waves of mergers. It might also (partly) explain the creation of inexpensive consulting services by the larger firms.

5.2.3. Performance and the age of the firm

It has been suggested that an old establishment would be more trustworthy, bring more experience to the projects, and be generally more stable although being old fashioned, lacking of innovation, and inflexible (Morgan 1991). All these characteristics induce different types of performance. From a product life cycle theory point of view, it is expected that most of the services offered by an "old" company will be in the mature phase, thus yielding less growth (Kotler 1983; Mueller 1972). Several scholars observed an inverse growth-age relation (Evans 1987; Jovanovic 1982).

5.2.4. Resource allocation and productivity

Both internally and externally oriented efforts enable success of IT services firms. From an externally oriented viewpoint, product superiority and innovativeness is the most important attribute enabling success (Brentani and Ragot 1996). R&D investments of IT services firms have at least two goals: develop methodologies and new services, and signal current and potential clients that the firm is investing in innovation. Typically, in a situation where the market observes a "swing" in the customer needs, one might expect a rise in R&D. For instance, after 2001, the demand (of large firms) flip-flopped from highly-customized best-of-breed to cost-efficient standardized solutions. The new services offerings associated with these solutions required a certain amount of engineering. Additionally, Gartner observed in 2003 that such flip-flops occur on a

regular basis, every 18 to 24 months. In such a situation, R&D capabilities enable IT services firm to react faster to market changes and capture opportunities by being better aligned with customers' needs. For smaller firms, typically focused on a few if not a single vertical market, R&D plays the critical role of enabling the firm to put together packaged solutions responding to specific customers' needs. It is thus expected that R&D play a key role in the performance of IT services firms.

Client and marketing fit is the second most important factor of success noted by Brentani and Ragot (1996). The service product should both fit with the market and with the company supplying it. This need of fit with the customer and the company sets the firms marketing capabilities – that is, its personnel in contact with the customer, market analysis resources, and resources allocated to communicate with the customers - as a critical component of IT services strategy. Sales and marketing expenses capture these efforts.

From an internally-oriented viewpoint, capabilities, resources, and experiences drive the performance of IT services firms. These factors both condition and are resulting from the way the services firm allocates its resources. For instance, recruiting and training highly specialized experts will increase the cost of services, while in the same time, might enable the firm to offer high value services and command higher prices. In other words, an increase in cost of services per employee might be beneficial if it enables the firm to capture significant value at the high end of the market.

5.2.5. External growth

Mergers and acquisitions (M&A) are commonly employed to generate top-line growth. Companies such as Cisco have successfully made use of M&A to grow faster than their rivals. A direct effect of an acquisition is the consolidation of financial statements. However, other reasons than direct revenue increase are often invoked. M&A can bring intellectual capital, technological resources, human capital, physical resources, and financial resources. For IT services in particular, the main reasons are expansion in the primary market, strengthening its existing operations, expanding its products and services offering, and acquiring technologies and strategic assets (Fig. 5-2). It is worth noting that while these two first purposes should provide immediate or rapid increase in revenues, an acquisition rationalized by the third purpose might not generate any significant additional revenue in several years after the merger. Also, it has been found that conglomerate firms generally exhibit low performance (Christensen and Montgomery 1981; Caves, Porter, and Spence 1980). However, acquisition strategies in the IT services industry of 1990 to 2004 were not following unrelated diversification models for the vast majority of the deals (Fig. 5-2). Furthermore, Hopkins found that marketing-related acquisitions - that is acquisitions of "firms whose products and services are sold in the same or similar manner, distributed through the same or similar channels, and [using] same or similar forms of advertising and promotion", are associated with distinctly superior position enabling them to derive above average performances. Marketing-related firms are typically serving the same markets. In that regard, a significant percentage (26%) of deals completed in the IT services industry might correspond to higher performance.

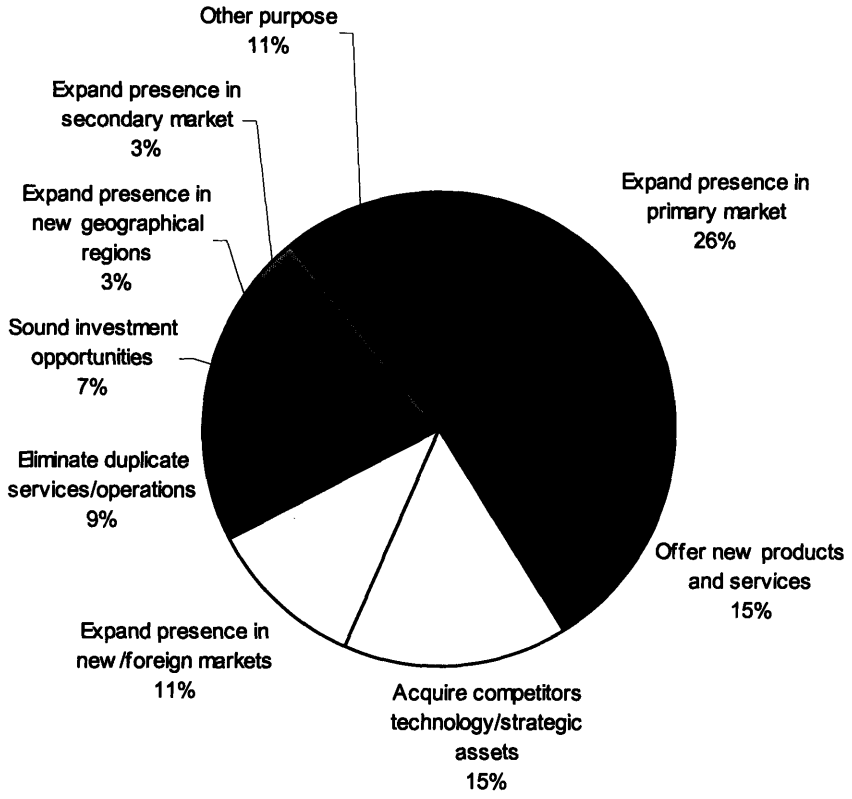

Figure 5-2 Purpose for M&A in the IT services industry
Figures are derived from 526 acquisition deals for which a deal purpose was disclosed. The deals were completed by 240 IT services firms from 1981 to 2004.
Source: Thomson SDC Platinum

The effect of acquisitions on growth is subject to a controversy especially if growth is considered under a long-term perspective. In particular, some studies lead to the conclusion that mergers and acquisitions were most likely destroying value and leading to poor performances. It has been argued that for businesses based on a "soft resource" such as human capital, mergers were often subject to failure (Dyer, Kale, and Singh 2004). Others suggest that long-term benefits from acquisitions are often lost, firms failing to retain skilled people (Chaudhuri and Tabrizi 1999). Although acquisitions might negatively impact the performance of a firm on the average, it is not excluded that acquisition-intensive strategies could enable firms to perform. In any case, as history tells

us (Chapter 2), it is clear that acquisitions have contributed to a large extent to performance of some firms. For instance, in 1999, BT Alex. Brown described ACS' growth as being equally derived from internal and external efforts with levels as high as 10% to 15% of growth attributed to each of these efforts. Furthermore, it is argued that acquisition related to the core business activities enable above industry average net income (Rigby 2001). In the light of our preliminary analysis of the deal purpose (Fig. 2), IT services firms conducting acquisitions might benefit from synergies enabling above average performances.

We might also expect that because of a mechanism of self-selection, only "good" acquirers pursuing an intensive acquisition strategy will stay on the market. However, if this effect might seem mechanical, the result we might obtain might be more subtle than it seem. Indeed, if acquisition strategies are not sustainable, it might still be possible that they could be successfully leveraged by certain categories of firms. Thus a positive relationship between acquisition intensity and growth for certain categories of firms would indicate successful strategies for such categories. Because size is of prime importance in the game of growth and deals are mostly focused on expanding primary markets, we propose that mid-size firms are trying to expand, acquire market share, develop their power in the value chain, and possibly become more attractive to large accounts through an acquisition strategy. We do not expect small firms to be acquisitive or even to leverage acquisition strategies in order to grow due to their limited resources. On the basis of our discussions with managers in the industry, larger firms might not

leverage acquisition strategies as efficiently as medium-size firms. It is indeed much more difficult to find deals of an adequate size for these firms.

CHAPTER 6 Methodology and Analysis

The sample used in this study is made of 831 public companies in the US in the computer and management services industries. We gathered financial and non-financial data from several databases. Those included Compustat North America for financial and operational information on firms, Thomson SDC Platinum Merger and Acquisitions database for information on acquisition and divestitures, and EDGAR for annual reports of the firms. We collected data from 1977 to 2004 for four SIC codes related to IT and management services and focused the analysis on the period going from 1990 to 2004.

6.1. Choice of sample

6.1.1. Firms publicly traded on American exchange floors

Our sample of companies focused on the companies publicly traded in the American markets. At least two reasons motivate this choice. First, information for this class of companies is readily available under a consistent way of reporting it due to regulations. Second, information is available for a large number of firms which enables statistical analysis. Additionally, firms traded on American floors have to abide by certain rules that it is worth mentioning that the US markets have historically been among the largest geographic IT services markets (i.e. when typically compared with the Asia-Pacific region, European and Middle-Eastern markets) and the home base of the largest global IT services players, as well as a . In 2004, IDC Research, an IT industry analyst firm,

attributed more than 43% of the global IT services market to the US, and 36% to Europe. As such, a US-focused perspective enables to have a good understanding of the dynamics of this industry at a global scale.

By considering the performance of public companies, it is possible that our results are specifically related to the behavior of public companies. Studies on corporate governance converge on the fact that there is no clear link between ownership structure and the performance of a firm (Melvin and Hirt 2004; Demsetz and Villalonga, 2001.) Consequently, there should not be any significant bias on our results on performance that relate to the nature of public companies.

6.1.2. Grouping companies by SIC codes

We selected firms associated by Compustat with four Standard Industrial Classification (SIC) codes related to computer and consulting services. The SIC system was developed by the US Bureau of the Census. It indexes firms in a four-layered classification. Each layer is comprised of 10 functional divisions (e.g. services, manufacturing, mining, etc...), up to 10 major groups (e.g. educational services, etc...) major industries, and specific products and services. Fig. 6-1 displays the layered architecture of the SIC system for the codes selected for our research.

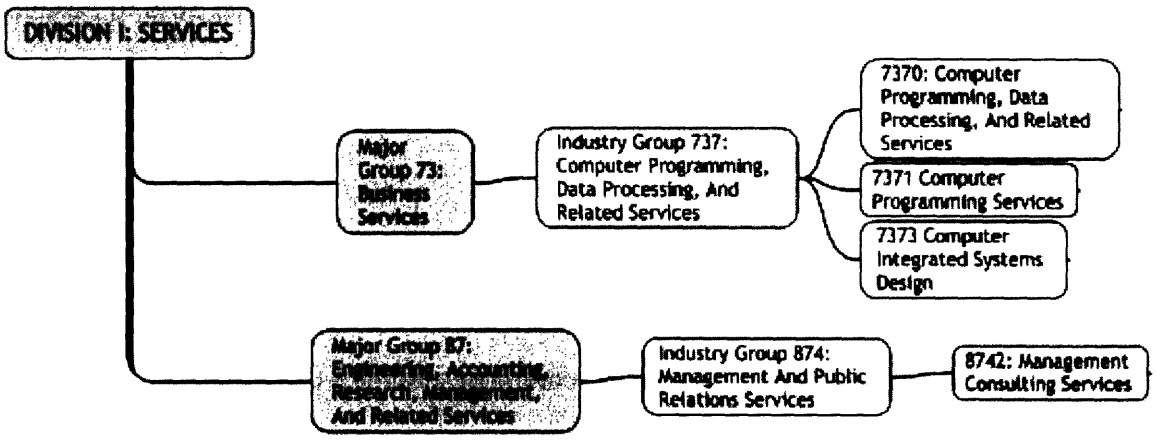

Figure 6-1 Structure of SIC codes used for this study

As noted by several studies (Thomas, Pollock, and Gorman 1999, Szeless, Wiersema, and Mueller-Stewens 2000), SIC codes are based on product-market identifications. Such distinctions can adapt with difficulty to the fuzzy notion of industry boundary. Indeed, it is not uncommon to see firms participating in multiple markets. We partly address this concern by classifying the revenue streams of each firm that excludes revenues not related to the computer and management services industry (see below for the description of the classification methodology under the services, products, and other categories). We are only partly addressing the concern of capturing an industry as a whole in the sense that we *eliminate* parts of the revenue that are not related to the industry we are considering. However, our research does not *include* all the firms that possibly derive revenues from this industry. There are two reasons for this. First, we are only considering service pure-plays (i.e. firms deriving most of their revenues from service and are not dependent on the sale of a product). Hence, enterprise software firms such as SAP, Oracle, or i2 are excluded from this database. Second, we are only considering public firms for reasons already explained above.

In order to address as much as possible the possibility of having a sample diverse enough to capture the main industry dynamics, we considered four SIC codes, three of which being described as covering computer services (7370, 7371, 7373), and one described as covering consulting management services (8742). We included this last SIC due to the close relationship between of management services and IT services. At one end of the spectrum, management services firms are adding IT-related services, while at the other end, the largest IT services players include all management services in their offerings (Nolan 2002).

6.1.3. Time horizon

When considering performance of firms within an industry, the choice of time horizon is an important question (Kirby, 2005.) From the historical perspective developed in a preceding section, we see that the 1990s constitute in itself a period associated with its own technologies and industry dynamics. Motivated by this observation, we focused the study on the interval of time spanning from 1990 to 2004.

6.2. Description and preliminary analysis of the database

The final database was made of 650 companies. We considered the time period spanning from 1990 to 2004 and discarded companies that had less than three observations in order

to avoid bias in the fixed-effect regression. Among these 650 companies, 587 were based in North America, 33 in Europe or Middle-Eastern, and 20 in the Asia and Pacific regions. Four of the leading Indian IT services are present in the database (Wipro, Satyam, Infosys, Sify, and Silverline). Altogether, they grew from 23% in 1998 of the aggregated Asia-Pacific sales figures of the firms in our database, to 83% in 2004. The total number of firms in our database varied widely during the period from 1990 to 2004 – from 133 in 1990 to 481 in 1999 and Asian firms only appeared in our database from 1997 (see Fig. 6-2).

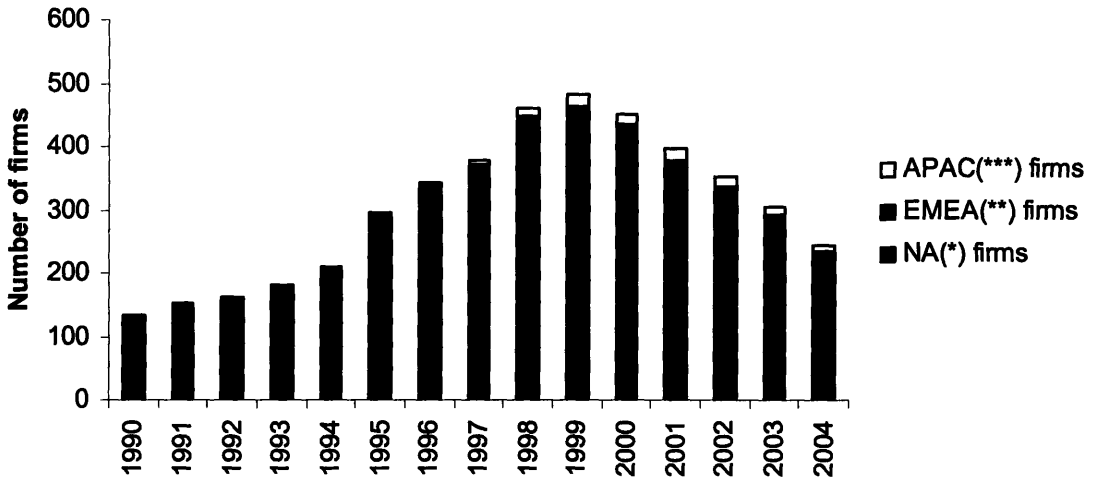

Figure 6-2 Number of firms in the database by home-base and by year, 1990-2004.
(* North-America including Caiman islands and Bermuda. ** Europe and Middle-Eastern. * Asia-Pacific region.)**

The population of the database for the different SIC codes varies from SIC to SIC and from year to year (see Fig. 6-3). The population of the four categories reached its maximum in 1999, and generally shows a similar temporal evolution.

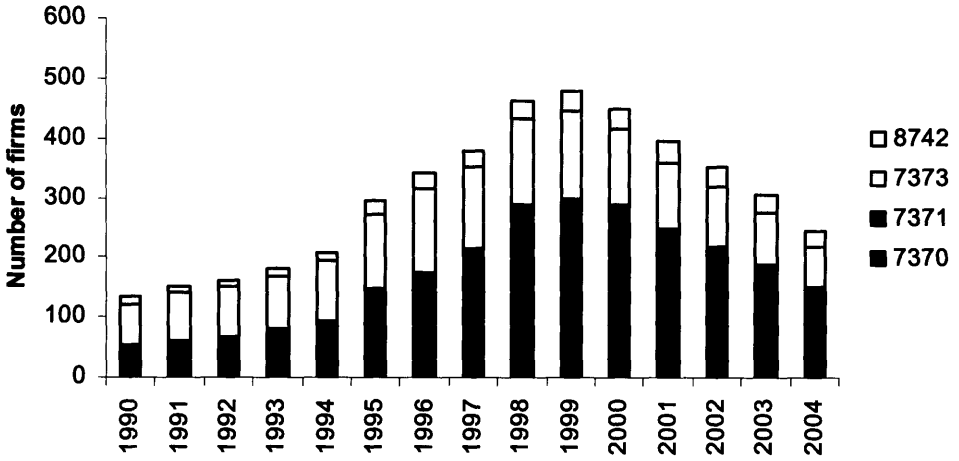

Figure 6-3 Number of firms in the database by SIC code and by year, 1990-2004.

Essentially two databases were aggregated together. The first database gathered data from Compustat. The data included annualized financial metrics such as net sales, gross margin, operating margin, cost of goods sold, general and administrative expenses, and research and development expenses. It also included headcount for most observations. The second database was gathered using Thomson SDC Platinum. Acquisitions deals and divestitures for the firms in our sample were collected for the period going from 1990 to 2004. Additionally, data were collected on the starting date of the firm. As in previous studies concerned with age of firms (Mosakowski, 1991), we collected founding date when reported, otherwise we used incorporation date. We used Securities and Exchange Commission (SEC) forms 10-K and 20-F extracted from EDGAR, the Electronic Data Gathering, Analysis, and Retrieval system of the SEC. The year of an observation was adjusted according to the following rule: if the end of the fiscal year of the firm considered ended before June 1, then the associated *adjusted year* was the previous year.

This adjustment enables to minimize inconsistencies between firms related to the time of reporting and related the disclosure to the calendar year.

In order to break down the total revenues into products and services, the firms' annual disclosure forms of the companies (SEC forms 10-K and 20-F) were used. Revenue break-down by segment obtained from Compustat was used. Sales disclosures under the form of segment break-downs are collectively exhaustive and mutually exclusive, so that the sum of the revenues for each segment adds up to the total sales for a given period and firm. Segment revenues were broken down into three categories: services, product, and other. The decision of the revenue category was based either on the description of the segment when available, on the provision of a specific break-down between product and services per segment or for the total sales, or on the general description of the business. The decision rule was the following: Any non-IT or consulting services related sales were classified as *other* (typically, activities related to diversification strategies – e.g. mining, garments, industrial machinery, etc…). Otherwise, if the segment revenue was primarily derived from the sales of services, it was categorized as *services*, otherwise, as *products*. As discussed before, the boundary between services and product can be a particularly fuzzy concept. We considered as a product sale any sale that didn't correspond to on-going activities. Typically, software licenses were classified as products. We considered on-going activities as a service sale. For instance, a consulting project would correspond to a service revenue stream. The aggregated service revenue of the firm in the database expanded at a fast rate in the mid 1990s, and somewhat flattened in the recession period from 2001 to 2004(Fig. 6-4). The industry clearly suffered dramatic changes that

occurred once the internet bubble burst in 2000. It is worth noting that the products revenues in the industry were decaying long before the internet bubble burst – from 1997, and kept on decaying after the bubble burst, indicating a direction taken by the IT services firms, rather than an industry reaction conditioned by economic factors.

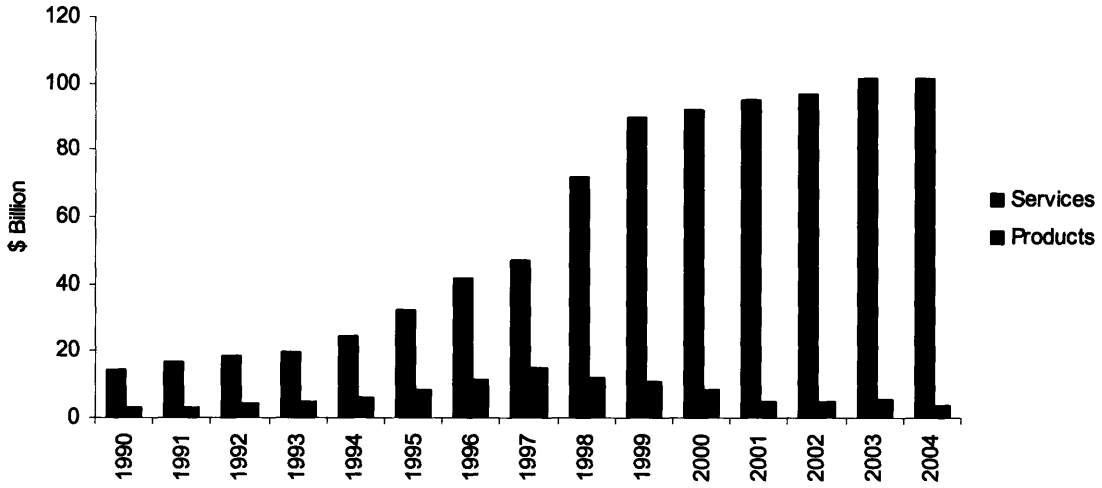

Figure 6-4 Aggregated services and products revenues sold by public computer and management services firms, 1990 - 2004.
(SIC 7370, 7371, 7373, and 8742)

6.3. Assessing the performance of IT services firms

Accordingly to our analysis in Chapter 5, we consider two kinds of effects: effects related to the context and effects related to the choices of the firm's management. According to our analysis, the firm's performance is measured by its sales growth rate, its gross margin, and operating margin.

At the firm level, the sales growth rate of the firm enables us to get a sense of the dynamics of the industry by providing information on the expansion of the firms, the

gross margin is a good proxy for operations efficiency and for most of its part accounts for the expenses related to the headcount of the firm, and the operating margin provides an indication of whether the business operations are overall profitable. The sales growth rate is related to the top line of the firm, which itself is related to the headcount of the firm, the gross margin is determined by the revenues and the cost of goods and services sold, the operating margin fluctuates mostly accordingly to the cost of goods and services sold, but also with sales, general, and administrative expenses, and research and development. The effects on the performance of the firm due to these parameters have been exposed in Chapter 5. Additionally, as discussed in Chapter 4, the business model of a technology firm selling products and services plays an important role in its performances. We measure the services vs. products revenue mix in order to account for these theories. The parameters we have covered are generally determined to some extent by the firm's management. We classify this group of variables as *action variables*.

Performance can also depend on *structural parameters* that the firm does not control, such as its age as we have seen in Chapter 5, or its size, which we measure by the natural logarithm of the total services and products sales[8]. Size, as seen in Chapter 3 and 4 is likely to have significant effects on the growth rate of services firms. Additionally, as discussed in Chapter 3, the past growth rate of the firm might be an impediment to its future growth rate because of different factors exerting a resistive pressure (e.g. recruiting skilled labor is all the more hard than the number of recruits sought is large; growing too

[8] The reason for the choice of the natural logarithm of the sales rather than the sales is the fact that we observe that the latter has a log-normal repartition (see in appendix Fig. 7-2 Repartition of firms by natural

fast might lead to unbalanced organizations, with a large bottom of pyramid; recruiting generate significant costs including training).

Eventually, the firm interacts with its *environment*. Following the ecological population theory (Hannan and Freeman 1977), we used the total number of firms as a measure of density. Density measures the competitive pressure within a given industry. In order to account for the industry considered, we used the count of firms in our database for each primary SIC code. We included all firms in this count, including those with missing financial information. As suggested in Chapter 2, the economic context played a significant role on the performance of IT services firms. During and after the year 2000, the economy brutally slowed down. After this economic shock, the industry entered into a period of lackluster earnings. We account for such exogenous shocks by considering dichotomous variables for the Y2K, and for the recession that followed in 2001-2003. The empirical variables we used are summarized in Table 6-1. The corresponding conceptual model is displayed in Appendix in Fig. 7-4.

logarithm of services and products sales) which enables to derive more accurate results from the regressions we conduct with this variable.

Table 6-1 Variable definitions

Variable	Definition
Performance variables	
(Future) sales growth	Growth rate of services and products sales from the current year to the next year.
Operating margin	Operating margin (current year)
Gross margin	Gross margin (current year)
Firm action variables	
Service %	Service revenues as a percentage of services and products sales.
R&D %	Research and development expense as a percentage of services and products sales.
COGS %	Cost of goods and services sold as a percentage of services and products sales.
SGA %	Sales, general, and administrative expense as a percentage of services and products sales.
Acquisitions	Number of acquisitions conducted in the current year.
Firm structural variables	
Age	Age of the firm since its inception.
LN sales	Natural logarithm of services and products sales*
Sales growth rate	Growth rate of products and services sales
Environmental variables	
Density	Number of competitors within the same primary SIC code of the firm considered
Y2K (1999-2000)	Dichotomous variable that equals 1 for the years 1999 and 2000, 0 otherwise.
Recession (2001-03)	Dichotomous variable that equals 1 for the years 2001 to 2003, 0 otherwise.

* services and products sales are measured in million dollars

The descriptive statistics shown in Table 6-2 thereafter are interesting to compare with those obtained by Cusumano et al. (2006) on an equivalent database composed of firms classified under the SIC code 7372, prepackaged software (see Table 6-3 in appendix). The first comment is that, as expected, the gross margin of pure services firms is on average lower than those of software firms. As discussed in Chapter 4, the business model of a products firm is based on the fact that the marginal cost of production of products (when mass produced) is expected to be low, while service firms' revenues and profits depend on the volume of personnel working for the firm and account for most of

the cost of goods and services sold. Sales, general and administrative expenses seem to be equivalent, except that software firms vary much more in their range of sales expenses, which corresponds to the observation that the products business model might have much higher sales and marketing expenses than services firms. Interestingly, R&D expenditures of IT services firms seem much higher than those of software firms, with a much higher variability too. Our interpretation of this result corresponds to the remarks at the end of Chapter 4: products firms' innovation is based on a more regular scheme – a product firm needs to continually innovate, while an IT services firm might innovate on a less regular basis; besides, mostly small firms innovated. The situation is illustrated by a graph in appendix (see Fig. 6-5 Scatter plot of R&D % (Y-axis) vs. LN sales (X-axis) in Appendix): firms below 20 million dollars in revenues tend to innovate much more than those above 20 million dollars. Besides, it is interesting to note the downward trend of the envelope of the scatter plot after 20 million dollars, which goes from around 50% at 20 million dollars (if we ignore the few points above 50%[9]) and decreases to close to single digit percentages for the largest firms.

[9] Even if we keep these points, the reasoning is unchanged: the envelope decreases to 0. But on average, the trend corresponds more to the description made, ignoring the points over 50% of R&D above $20 million.

Table 6-2 Descriptive statistics (IT services firms)

Variable	Count	Mean	Standard Deviation	Median	Min	Max
Performance variables						
(Future) sales growth	3600	2.13	24.52	.16	-1.00	929.67
Operating margin	4530	-6.04	75.16	-.02	-3346.00	0.87
Gross margin	4534	-3.55	70.14	.37	-3214.00	1.00
Firm action variables						
Service %	4239	0.80	0.36	1.0	0.00	1.00
R&D %	2573	1.24	19.25	.09	0.00	864.75
COGS %	4534	4.55	70.14	.63	0.00	3215.00
SGA %	3993	2.35	19.53	.42	0.03	617.75
Acquisitions	4540	0.48	1.38	0	0.00	29.00
Firm structural variables						
Age	3895	14.56	12.34	12.0	1.00	116.00
LN sales	4239	3.11	2.34	3.16	-6.91	9.98
Sales growth rate	3705	2.08	24.17	.16	-1.00	929.67
Environmental variables						
Density	4540	150.56	84.74	103	8.00	299.00
Y2K (1999-2000)	4540	0.21	0.40	0	0.00	1.00
Recession (2001-03)	4540	0.23	0.42	0	0.00	1.00

* services and products sales are measured in million dollars

6.4. Results

In this section, we attempt to develop a quantitative analysis of the drivers of performance of IT services firms. We analyze the data collected in our database on more than 800 firms. Although we consider all the firms when evaluating the density of the industry and use this data in our regression model, due to lagging variables and missing observations because of incomplete financial data, the regression analysis is practically conducted on 478 firms. We focus on the period 1990 to 2004.

In order to establish causality, time precedence is primordial (Asher, 1976). We thus consider the "future" sales growth rate between the year considered and the next year, all the variables being taken at the year considered (which is equivalent to considering the

"current" sales growth rate, and lag all the other variables). For operating profit and operating margin, we consider lagged variables: R&D, acquisitions, cost of goods and services sold, sales, general and administrative expense are lagged when used in the regression. However, structural and environmental variables were not lagged due to the simultaneity of their impact on the performance of the firm.

We used an ordinary least squares (OLS) regression with fixed effects. Table 6-3 displays the regression models we use to derive the relationship between the key drivers of performance identified in prior chapters and the performance of the firm, as measured by its services and products sales growth rate, operating margin, and gross profit. Interaction terms with the size of the firms were taken into account.

Table 6-3 Drivers of performance of IT services firms

Dependent Variable	(Future) Sales (i) Growth	Operating Margin	Gross Margin
Firm variables			
Service %	0.173	3.992*	-1.10
	(0.3552)	(2.0829)	(0.822)
COGS % - lag (i)	-0.045	0.000	
	(0.0478)	(0.0037)	
SGA % - lag (ii)	0.111***	0.451***	0.14***
	(0.0157)	(0.0832)	(0.033)
Acquisitions – lag (ii)	0.061**	-0.225	-0.07
	(0.0261)	(0.1499)	(0.059)
Structural variables			
Age	-0.019	0.917***	0.10**
	(0.0298)	(0.1274)	(0.050)
LN sales	-1.246***	5.248***	-0.097
	(0.1018)	(0.6045)	(0.2340)
Sales growth rate – lag (ii)	-0.002	0.116***	0.00
	(0.0022)	(0.0121)	(0.005)
Environmental variables			
Density	0.0032*	-0.055***	-0.02***
	(0.00166)	(0.0092)	(0.004)
Y2K (1999-2000)	-0.173	-0.818	-0.18
	(0.1224)	(0.6078)	(0.241)
Recession (2001-03)	-0.399**	-1.142**	-0.54**
	(0.1773)	(0.5551)	(0.219)
Interaction terms			
Service % * LN sales (i)	-0.107	-0.738	0.31
	(0.0869)	(0.4888)	(0.193)
COGS % * LN sales (i) – lag (ii)	-0.00002**	0.000	
	(0.00001)	(0.0004)	
SGA % * LN sales (i) – lag (ii)	0.025***	0.082***	0.03***
	(0.0030)	(0.0178)	(0.007)
Acquisitions * LN sales (i) - lag (ii)	0.0002***	-0.001*	0.00
	(0.00008)	(0.0004)	(0.000)
Age * LN sales (i)	0.020***	-0.197***	-0.01
	(0.0037)	(0.0231)	(0.009)
Density * LN sales (i)	-0.0005	0.011***	0.00***
	(0.00033)	(0.0019)	(0.001)
Constant	4.347***	-21.044***	0.414
	(0.4224)	(2.5038)	(0.9829)
Rho	.99	.68	.72
F-test	742.8***	3.93***	5.74***
N	2384	2368	2368

NOTES:
Standard deviations are in parenthesis; *** = P-value < .01, ** = P-value < .05, *=P-value < .1
(i) **'sales'** stands for the sales of IT products and services
(ii) The **'lag'** mention only stands for regressions with operating margin and gross margin as dependent variable.

From this regression, we observe that sales, general, and administrative expense plays a significant and critical role in the business of an IT services firm and enables higher growth, gross profit, and operating profits than average, all other things being equal. The interaction terms indicate that these returns increase with the size of the firm measured by the natural logarithm of its products and services sales. All these results are obtained with a high level of confidence (the associated P-values are less than .01). For firms between 1 million dollars and 2 billion dollars, on average, an additional percent of revenue spent in sales general and administrative expense is likely to transcribe into .1 to .2 additional percent of sales growth rate the next year, from .4 to 1 additional percent of operating margin, and from .1 to .4 additional percent of gross margin – the lower bounds corresponding to what would be observed for smaller firms, and the upper bounds, what would be observed for larger firms.

Another important determinant of performance is the size of the firm. As the firm grows, its growth rate decreases on average. However, and supporting the point developed in Chapter 3 and 4, as firms grow, they gain market power and become more efficient and profitable. More specifically, it is interesting to note that only the operating margin depends on the size of the firm – the size of the firm is not statistically relevant to the cost of goods and services.

Unsurprisingly, acquisitions conducted in a previous year enabled growth. The positive sign of the interaction term suggests that acquisitions play a more significant role on the sales growth rate for larger firms. The reason for this is straightforward. Smaller firms are

run under more stringent resource constraints than larger firms and are less prone to conducting acquisitions. Besides, acquisition might not be among the best growth options of smaller firms. Also, the larger the firm, the less interesting is the acquisition in terms of operating profits. This relates to the fact that, as already analyzed, larger IT services firms are also more profitable than smaller firms. Thus, the acquisition of a smaller firm will likely have the immediate effect of partially "diluting" profits.

Environmental parameters play a significant role. A high density (which is: a high number of firms competing with each other), as expected, leads to lower gross and operating margins. On the supply-side, this can find causes in the fact that an increase in density leads to an increase in competition for the recruitment of skilled labor. And on the customer side, an increase in competition typically translates into price competition, competition for the delivery of more value to the customer, and increased sales and marketing pressure. Nonetheless, it is interesting to note that larger firms are more immune to density increases as shown by the positive interaction terms between size and density. This observation corroborates with the fact that larger firms address different clients, or different client needs than smaller firms (see Chapter 3). Another remark on density is that it might have a positive impact on the average sales growth. At first sight this may seem odd, but it might simply be the result of the fact that small firms entering the market might have much higher growth rates than larger firms as demonstrated earlier (see also the *Analysis of the influence of the size of the firm on its growth rate* in appendix). An increase in density corresponding with the entry of small firms thus induces the industry average growth rate to increase.

IT services firms were immune to the bubble bust as show by the non significance of the Y2K variable. However, they were subject to the slow economy that followed, with their sales growth rate 40% less than what they observed prior to this period; operating margin were114% less, and gross margin were 50% less.

Eventually, the age of the firm explains its operating and gross margins. The older the firm, the more profitable it is. As companies become older, they are also likely to be more recognized and build reputation and trust. Such effect likely translates into premium pricing (see Chapter 3). Additionally, the larger the firm, the less the effect of age on the firm's operating margin. This can be interpreted by the fact that a firm with
Besides, for a given age, the larger the firm, the larger its growth rate is. In other words, young firms that grew faster than their peers will grow even faster in the future. Also, for a younger firm, age is synonymous with experience, but for an older firm, age can be pejorative and associated with rigidity. It is not evident that the relationship between age and the different performance metrics holds for particularly old firms, for instance.

We have seen in Chapters 2 and 4 that there are significant interactions between the business of products and that of services. In particular, the software business is linked with the IT services business function on the basis of mostly symbiotic links. It is thus interesting to compare these two industries. Table 6-4 shows a comparison of

corresponding regressions between public IT services firms from our database, and public software firms from another database grouping firms from the SIC code 7372[10].

If we consider the regressions for the IT services firms in Table 6-4, the set of variables slight differ from those in the regressions described above. One important remark on the IT services firm database is that the variable R&D % was missing for a significant number of observations (for about 42% of the observations). However, so as to be consistent with the regressions calculated on the software database, the variable R&D % was added to the following regressions. Furthermore, as opposed to the previous regressions, we do not take into account interaction terms. The results of the regressions on the IT services firms database are thus changed. However, there is a certain consistency among the results for the firm and environmental variables, to the exception of the effect of sales, general, and administrative expense on operating margins, which is changed. In this exception, the result is obtained with a lower level of confidence than in our previous regression and we suggest dismissing this result. Other variables that were significant in both regressions had the same sign. Some variables that were statistically significant in our previous regressions were not in the regressions of Table 6-4:

- When considering sales growth rate as the dependent variable:
    i. SGA %
    ii. Sales growth rate
    iii. Density
- When considering operating margin as the dependent variable:

[10] The regression on the software database was kindly provided by Steven J. Kahl

i. Gross margin

ii. Age

iii. Sales growth rate

- When considering operating margin as the dependent variable:

i. SGA %

ii. Age

The fact that these variables were non significant in the second set of regressions is most likely due to the fact that many observations were taken off the sample in the second regression. Indeed, except for gross margin and density for a few variables, all these variables were found significant with a high level of confidence in the regression of Table 6-3. A few variables that were not significant in our previous regression were significant in the regression of Table 6-4 where the future sales growth rate was taken as the independent variable:

- Age
- Sales growth rate

Overall, there is a strong consistency among the significant variables of the two sets of regressions on the IT services database. A few effects seem to be inversed in the second regression, but these results are obtained with a lower level of confidence and we dismiss them. As for the software database sample, the number of observations is closer to the one that was observed in the first set of regressions of Table 6-3. We shall comment on the variables that were consistent between the two regressions.

Table 6-4 Comparative analysis: the drivers of performance of IT services and software firms

Dependent Variable	(Future) Sales (ii) Growth Rate		Operating Margin		Gross Margin	
Database	IT (iv)	SOFT (iv)	IT (iv)	SOFT (iv)	IT (iv)	SOFT(iv)
Firm variables						
Gross margin – lag (iii)	-0.09*	-8.25	-0.06	-2.25***		
	(0.049)	(6.401)	(0.123)	(0.650)		
SGA % - lag (iii)	-0.01	-7.35***	-0.10**	0.16	-0.04	0.006
	(0.010)	(2.811)	(0.048)	(0.285)	(0.054)	(0.0100)
R&D % – lag (iii)	0.18**	-1.17	0.83***	-0.80**	1.02***	-0.050***
	(0.084)	(3.914)	(0.253)	(0.397)	(0.306)	(0.0144)
Structural variables						
Age	0.07**	2.47***	-0.04	-0.03	0.06	0.002
	(0.031)	(0.430)	(0.045)	(0.044)	(0.055)	(0.0017)
LN sales (ii)	-1.01***	-17.23***	1.55***	0.17	0.71***	-0.021***
	(0.061)	(1.321)	(0.150)	(0.134)	(0.183)	(0.0051)
Sales growth rate – lag (ii, iii)	0.01**	-0.12***	0.00	0.00	0.00	0.000
	(0.003)	(0.020)	(0.007)	(0.002)	(0.009)	(0.0001)
Environmental variables						
Density	0.001	0.16*	-0.006**	0.00	-0.006*	0.000
	(0.0014)	(0.087)	(0.0028)	(0.009)	(0.0034)	(0.0003)
Y2K (1999-2000)	-0.11	-1.98	-0.47	0.04	-0.31	-0.028***
	(0.151)	(2.721)	(0.329)	(0.276)	(0.400)	(0.0106)
Recession (2001-03)	-0.49**	2.89	-0.54*	-0.61**	-0.96***	-0.019**
	(0.224)	(2.299)	(0.305)	(0.233)	(0.370)	(0.0090)
Constant	3.55***	150.21***	-4.83***	-0.33	-2.23**	0.863***
	(0.364)	(15.633)	(0.862)	(1.587)	(1.045)	(0.0587)
Rho	.99	.39	.94	.30	.75	.66
F-test	1230***	1.23***	24.4***	1.58***	5.49***	7.19***
N	1460	2094	1452	2094	1452	2094

NOTES:
Standard deviations are in parenthesis; *** = P-value < .01, ** = P-value < .05, *=P-value < .1
(i) **'X'** = variable not included in the regression
(ii) **'sales'** stands for the sales of IT products and services
(iii) The **'lag'** mention only stands for regressions with operating margin and gross margin as dependent variable.
(iv) **IT** = IT services firms, **SOFT** = software firms

It is interesting to note that while the performance of IT services firms was not subject to the bubble bust, software firms suffered gross margin losses at a high level of confidence as shown by the negative coefficient of the Y2K coefficient of the software gross margin regression. This likely indicates a decrease in revenues. Indeed, software firms faced little costs of goods sold (see Chapter 4) and their gross margins were mostly driven by their revenues. Nonetheless, both IT services and software firms faced margin pressure during the recessions that followed. This observation supports the thesis of a products-services lifecycle paradigm developed in Chapter 4: the sales of services follow the sales of products. If services firms seemed to be resilient to sudden economic shocks, they were also facing difficulties during economic downturn due to downsizing effects (in terms of employees) in order to adjust the capacity to the demand level. A negative sign on the coefficient of the recession variable for the regression with future sales growth rate of IT services firms supports this viewpoint.

There is a striking difference between IT services and software firms when we consider the effect of R&D efforts on profitability. On average, an increase in R&D as a percent of sales has a negative effect on operating and gross margins for software firms, and a positive effect for IT services firms, the levels of confidences being high for these results. It is clear that the focus on R&D is much more important in software firms whose focus is typically on developing and selling products, as opposed to IT services firms whose focus is on providing services. IT services firms might employ their R&D in order to develop new methodologies and processes, and more generally, tools that can be used in order to improve the efficiency of the process of delivering services. Because R&D is

typically not part of the focus of IT services firms, developing an intellectual capital base is likely to confer competitive advantages by enabling firms to differentiate themselves. Indeed, an increase in R&D mostly impacts the gross margin: the cost of services is likely to be diminished by more efficient processes, or the pricing of the offerings might be subject to a premium. As for the software firms, R&D is much more common. The amplitude of the impact on the gross margin is not extremely high and increases in R&D expenses impact negatively the operating margin. For software firms, R&D is a cost that has to be managed in an efficient way and does not provide any competitive advantage per se.

The larger the revenue (as measured by LN sales), the slower the future growth. This is true for both IT services firms and software firms. Also, it is interesting to note the difference in amplitude of the effects. The effect seems to be an order of magnitude higher for software firms. This seems to supports the fundamental difference in the business models of (IT) services firms and (software) products firms underlined in Chapter 4: software firms' business model is mostly based on the sales of a "best-seller" which sales can relatively easily be displaced by those of competitors' products – exception being made for a few platform vendors. IT services firms' sales are related to the number of employees of these firms. A large sale at a given year is unlikely to change much in a following year due to the longer sales cycles of the IT services industry.

There are a few more variables that play a statistically significant role in the software business. Those variables cannot be directly compared with those in the regressions on

the IT services firms database of Table 6-4 because of the remarks made p.96 (that is: there are discrepancies in the results in the regressions on the IT services database displayed in table 6-3 and 6-4), but might be interesting to consider. In order to comment these results, we consider the interpretation provided when commenting Table 6-3. Contrary to IT services firms, sales, general, and administrative seems not to be a determinant of performance of software firms – and might even hurt their sales growth rate. The reason behind this might be the same as for R&D: such expenses are generally important in software firms and little differentiation might be achieved through incremental spending in such expenses.

Interestingly, and with a high level of confidence, we see that software firms might grow faster as they mature. It is also interesting to note that Cusumano, Kahl, and Suárez (2006) find that software firms migrate towards services as they mature. These two results combined together could indicate that software firms might be able to better maintain and increase their sales rate of growth by increasingly providing services. In the regression in Table 6-3, we found with a high level of confidence that IT services firms were growing slower as they matured. A priori this contrast is contradictory, but might be based on a difference in business models: IT services firms provide a different set of services than software firms. One important distinction is the focus of services, typically centered on the products offerings of software firms, and usually as broad as possible for (large) IT services firms. Products firms might thus leverage synergies with services components of their offerings and become increasingly efficient in generating new revenue streams from

new products or service sales. Additionally, a service capability might help software firms develop and channel more efficiently new products to their existing customers.

6.5. Conclusion

As compared to products businesses, services businesses have their strengths and weaknesses which depend on the context in which firms interact. The fundamental difference between an IT services firm and a software firm is that the first one is a people business, while the second one is an innovation business. The first one is mostly focused on operations efficiency and quality of services, while the second one is mostly focused on the development and sales of its products. These characteristics lead to different levers of performance. Furthermore, it is interesting to note that the core levers of performance of IT services firms are playing in opposite directions for software firms, and vice versa. While sales, general and administrative expenses, most often accounting for sales efforts, likely enhances the performance of IT services firms through growth and profitability, it does not do so for software firms. While on average, incremental R&D efforts enable IT services firms to increase their profitability, they diminish the operating margin potential of software firms. These differences seem to indicate some incompatibilities between the business models of products and services firms.

However, our analysis suggests that products firms developing services might generate a more sustainable growth. Besides, if in long periods of economic downturn, both IT services and software firms suffer, IT services firms seem to absorb economic shocks

better than software firms. Combining products and services can enable businesses to develop a business model based on after-sale services, which can also be used to develop and channel new products.

Appendices

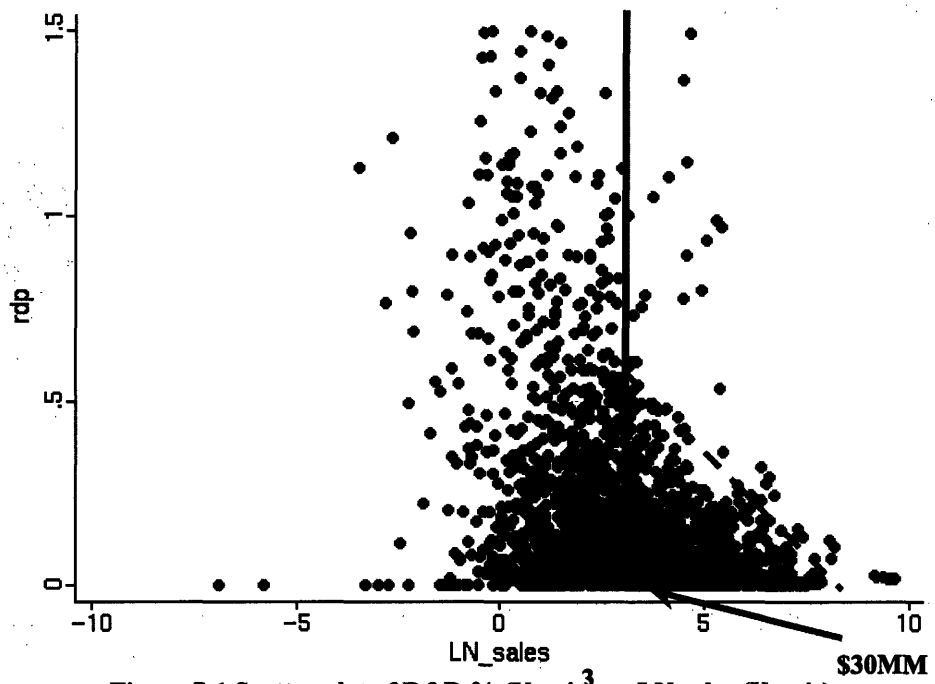

Figure 7-1 Scatter plot of R&D % (Y-axis)[3] vs. LN sales (X-axis)

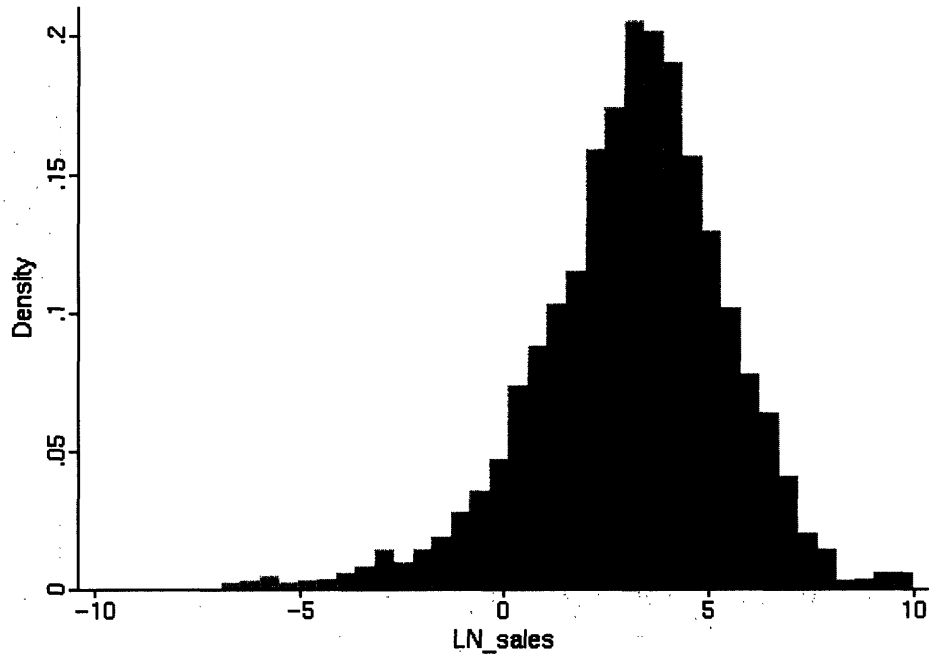

Figure 7-2 Distribution of the natural logarithm of services and products sales

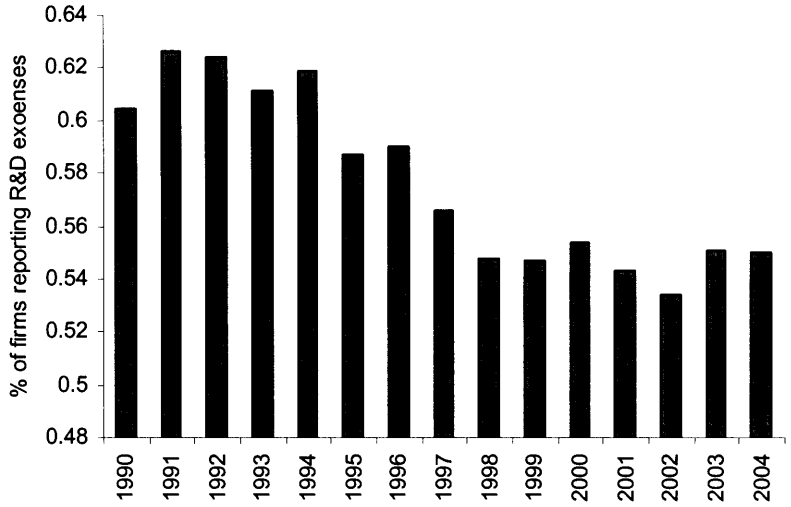

Figure 7-3 Percentage of public IT and management consulting services firms reporting R&D expenses (SIC codes 7370, 7371, 7373, 8742 – source: Compustat)

Table 7-1 Descriptive statistics of key operational variables of software firm

	Obs	Mean	Median	Std. Dev	min	max
Total Sales	4352	246732.6	31293	1419353	0	3.98E+07
Product Contribution	3378	0.597998	0.603383	0.257145	0	1
Gross Margin	4042	0.599959	0.685644	1.166553	-54	0.998602
R&D %	3939	0.700689	0.187817	5.498273	0	156.947
SGA %	4255	2.356366	0.531747	38.85322	0.00316	1967.041
Operating Income	4331	-2.78245	-0.038011	41.30814	-1966.041	0.969611
Age	4449	12.39357	11	7.484274	1	48
Market Cap	3018	2157.288	135.5	18510.05	0	596476

(source: Cusumano et al. 2006)

Table 7-2 Description statistics of key operational variables of IT services firm

Variable	Obs.	Mean	Std. dev.	Median	Min	Max
Services and products sales	4540	210.6576	1140.015	22.6	0	21543
Services sales	4540	187.9639	1130.632	13.4	0	21543
Products sales	4540	22.69366	134.9148	0	0	2911.889
Gross profit	4534	66.09885	314.3329	8.6	−1988.4	5501.579
Operating income	4534	3.098872	157.4358	-.15	−2643.1	2511.481
COGS	4538	154.8043	875.3445	14.4	0	17997
SGA	3994	53.93896	169.5865	13.5	0	3181.319
R&D	2574	9.124002	26.58674	2.06	0	395.164
Employees	3942	1.641913	8.153512	.22	0	143
Sales/employee	3912	158.5083	349.6157	116.5	0	10870.4
COGS/employee	3911	132.1287	362.3979	72.5	0	8213.903
SGA/employee	3478	104.2087	312.8759	63.9	0	10976
Market cap	3770	613.2749	3572.912	43.3	0	115267.5

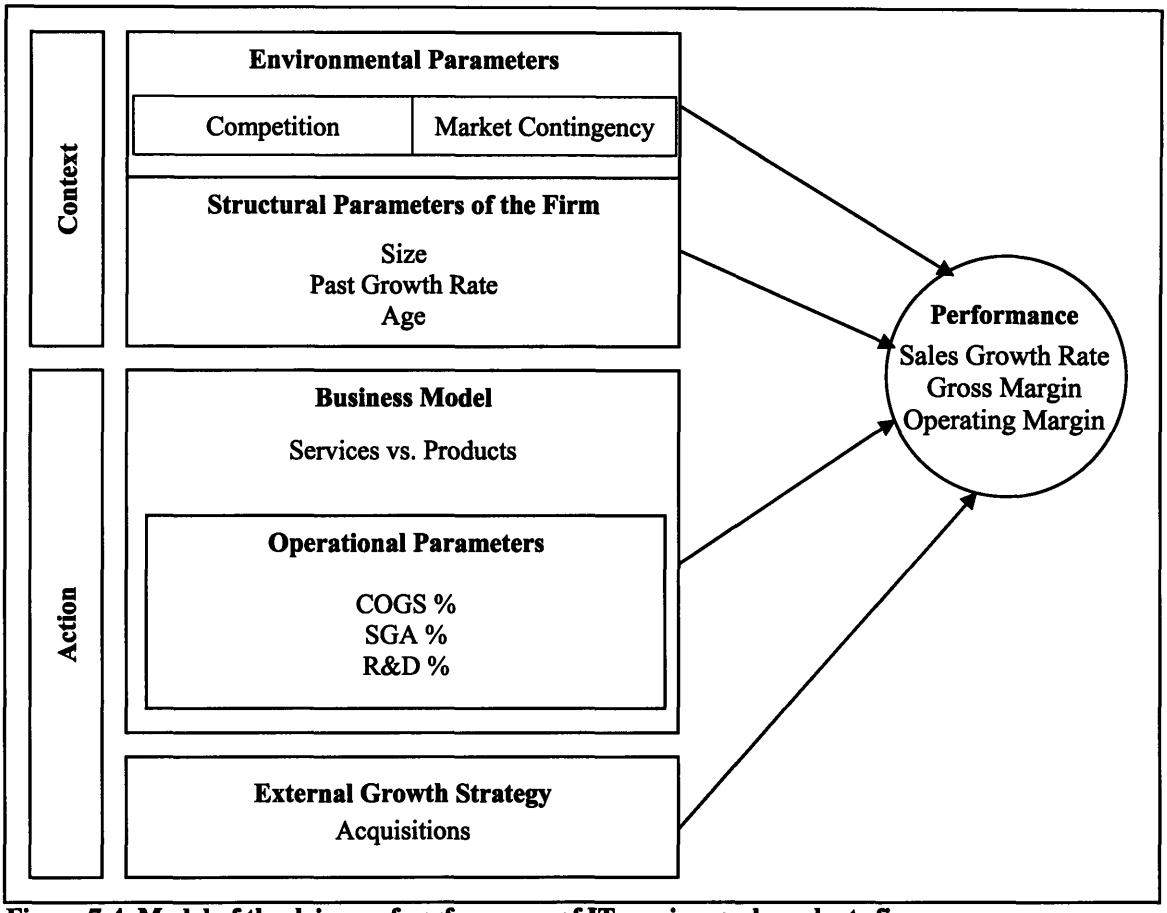

Figure 7-4 Model of the drivers of performance of IT services and products firms

Table 7-3 Correlation tables

(obs=1379)

	pssal~g1	servp	rdp	cogs	sgap	acqui~ns	age
pssalesg1	1.0000						
servp	0.0868	1.0000					
rdp	0.2657	0.0477	1.0000				
cogs	-0.0457	0.0660	-0.0434	1.0000			
sgap	0.1717	0.0253	0.5617	-0.0358	1.0000		
acquisitions	0.0167	0.0894	-0.0344	0.2020	-0.0337	1.0000	
age	-0.1326	-0.0436	-0.0762	0.1135	-0.0665	0.1196	1.0000
lnpssales	-0.2301	0.0928	-0.2721	0.4350	-0.3175	0.3581	0.3012
pssalesg	0.1149	0.0494	0.0357	-0.0156	0.0427	-0.0049	-0.0684
sicpop	0.1140	0.2199	0.0848	-0.0825	0.0472	0.1367	-0.1766
y1999y2000	0.0863	0.1399	0.0556	0.0158	0.0550	0.0939	-0.0837
y2001y2003	-0.0848	0.2074	0.0179	0.0806	-0.0209	0.0342	0.0267
servplnpss	-0.1199	0.6770	-0.1941	0.3668	-0.1636	0.3081	0.1564
rdplnpss	-0.1142	-0.0322	-0.7716	-0.0050	-0.3936	0.0293	-0.0091
cogsplnpss	-0.0371	0.0599	-0.0353	0.9939	-0.0288	0.1822	0.0825
acquisiti~ss L1.	-0.0459	0.0720	-0.0364	0.9050	-0.0310	0.2321	0.1349
agelnpss	-0.1325	0.0043	-0.1138	0.2397	-0.1145	0.2214	0.9208
sicpoplnpss	-0.1064	0.1742	-0.1772	0.1572	-0.1608	0.3436	0.0853

	lnpssa~s	pssalesg	sicpop	y19~2000	y20~2003	servpl~s	rdplnpss
lnpssales	1.0000						
pssalesg	-0.0615	1.0000					
sicpop	0.0098	0.0941	1.0000				
y1999y2000	0.0206	0.0790	0.4074	1.0000			
y2001y2003	0.1248	-0.0438	-0.0526	-0.3381	1.0000		
servplnpss	0.7053	-0.0234	0.1175	0.0882	0.2090	1.0000	
rdplnpss	0.1403	0.0118	0.0229	0.0267	-0.0327	0.0987	1.0000
cogsplnpss	0.3749	-0.0129	-0.0841	0.0114	0.0790	0.3250	-0.0051
acquisiti~ss L1.	0.4055	-0.0180	-0.0396	-0.0053	0.1323	0.3573	0.0073
agelnpss	0.5355	-0.0488	-0.0995	-0.0478	0.0440	0.3355	0.0187
sicpoplnpss	0.6658	-0.0109	0.6559	0.2696	0.0479	0.5420	0.1287

	L. cogspl~s	L. acqui~ss	L. agelnpss	L. sicpop~s
cogsplnpss	1.0000			
acquisiti~ss L1.	0.9209	1.0000		
agelnpss	0.1922	0.2543	1.0000	
sicpoplnpss	0.1120	0.1890	0.2839	1.0000

(obs=1444)

	operat~n	grossm~n	servp	rdp	L. cogs	L. sgap	L. acqui~ns
operatingm~n	1.0000						
grossmargin	0.7271	1.0000					
servp	-0.0266	-0.0288	1.0000				
rdp	-0.7624	-0.7637	0.0341	1.0000			
cogs							
L1.	0.0279	0.0045	0.0736	-0.0365	1.0000		
sgap							
L1.	-0.3231	-0.1301	0.0813	0.2855	-0.0430	1.0000	
acquisitions							
L1.	0.0304	0.0176	0.0835	-0.0308	0.1771	-0.0306	1.0000
age	0.0505	0.0090	-0.0461	-0.0501	0.1072	-0.0849	0.1118
lnpssales	0.2968	0.1263	0.1321	-0.2606	0.4208	-0.2336	0.3623
pssalesg							
L1.	-0.0285	-0.0182	0.0326	0.0358	-0.0178	0.0599	-0.0105
sicpop	-0.0274	-0.0241	0.1909	0.0521	-0.0950	0.1036	0.1281
y1999y2000	-0.0080	0.0139	0.0710	-0.0016	0.0022	0.0514	0.0677
y2001y2003	-0.0194	-0.0428	0.1994	0.0317	0.0524	0.0291	0.0463
servplnpss	0.1652	0.0921	0.6887	-0.1909	0.3623	-0.1410	0.3013
rdplnpss	0.7640	0.9457	-0.0391	-0.8565	-0.0016	-0.1488	0.0329
cogsplnpss							
L1.	0.0227	0.0037	0.0666	-0.0297	0.9943	-0.0350	0.1609
acquisiti~ss							
L1.	0.0275	0.0098	0.0803	-0.0321	0.9029	-0.0368	0.2554
agelnpss	0.1117	0.0445	0.0108	-0.1107	0.2374	-0.1153	0.2256
sicpoplnpss	0.1605	0.1034	0.1929	-0.1736	0.1221	-0.1201	0.3431

	age	lnpssa~s	L. pssalesg	sicpop	y19~2000	y20~2003	servpl~s
age	1.0000						
lnpssales	0.2538	1.0000					
pssalesg							
L1.	-0.0716	-0.0153	1.0000				
sicpop	-0.1784	0.0421	0.0749	1.0000			
y1999y2000	-0.0750	0.0472	0.0556	0.3922	1.0000		
y2001y2003	-0.0301	0.0399	-0.0144	-0.0014	-0.3443	1.0000	
servplnpss	0.1169	0.7226	0.0033	0.1317	0.0709	0.1375	1.0000
rdplnpss	-0.0121	0.1539	0.0011	0.0081	0.0341	-0.0219	0.1053
cogsplnpss							
L1.	0.0768	0.3657	-0.0147	-0.0953	0.0009	0.0490	0.3231
acquisiti~ss							
L1.	0.1079	0.4167	-0.0133	-0.0441	-0.0094	0.0858	0.3686
agelnpss	0.9156	0.5240	-0.0487	-0.0983	-0.0357	-0.0112	0.3253
sicpoplnpss	0.0393	0.6528	0.0291	0.6975	0.2963	0.0147	0.5397

	rdplnpss	L. cogspl~s	L. acqui~ss	agelnpss	sicpop~s
rdplnpss	1.0000				
cogsplnpss					
L1.	-0.0022	1.0000			
acquisiti~ss					
L1.	0.0103	0.9153	1.0000		
agelnpss	0.0372	0.1908	0.2382	1.0000	
sicpoplnpss	0.1387	0.0834	0.1778	0.2581	1.0000

Analysis of the influence of the size of the firm on its growth rate

Size plays a structural role in the way firms grow. While scholars were unable to find a common ground of agreement when considering the issue from a general viewpoint (i.e. non-industry specific), we shall first try to analyze whether the size of a firm had an impact on growth for the specific case of our industry. For this analysis we use the natural logarithm of the total product and services sales. We estimated the following regression equation where size of the firm and its powers are the only parameter:

$$pssalesg1_{it} = \beta_0 + \beta_1 lnpss_{it} + \beta_2 lnpss2_{it} + \beta_3 lnpss3_{it} + \beta_4 lnpss4_{it} + \beta_5 lnpss5_{it} + a_i + u_{it}$$ [11]

We found with high levels of confidence an overall negative relationship with size ($\beta_1<0$). Possible interpretations as we have already seen could be related to negative (growth) return to scale on management, growing complexity of managing a corporation that is expending its offerings, inefficiencies related to the management of knowledge, and difficulty to hire (highly) skilled labor above a certain point for a given geography (typically, middle management hiring is often considered by large firms as being a bottleneck of growth).

Not assuming a linear behavior between size and growth provided us with additional information which an explanation merely based on negative return to scale would not explain. Indeed, considering points where lnpss is greater than 5, we observe that the polynomial function in lnpss increases (Fig. 7-5), which means that on average, growth

increases with size. This is contradictory with an explanation based on negative return to scale. Other effects might factor in. For instance, from discussions with managers in the IT services industry, it seems that larger firms are often better positioned to capture the largest contracts. Additionally, we have seen that there are efficiencies in being a large firm such as visibility, and also as a result that size can be used as a proxy to reputation of the firm (Chapter 3).

From our regression analysis, we obtain the following sizes (in terms of total products and services sales):

- $133 million
- $523 million
- $1.6 billion

These boundaries are obviously not "absolute" in the sense that a firm under or above any of these sizes would radically modify its behaviors. Rather, it is possible to observe a continuum of behaviors across the industry.

[11] pssalesg1 is the future growth rate of sales; lnpssk is the natural logarithm of sales raised to the power of k

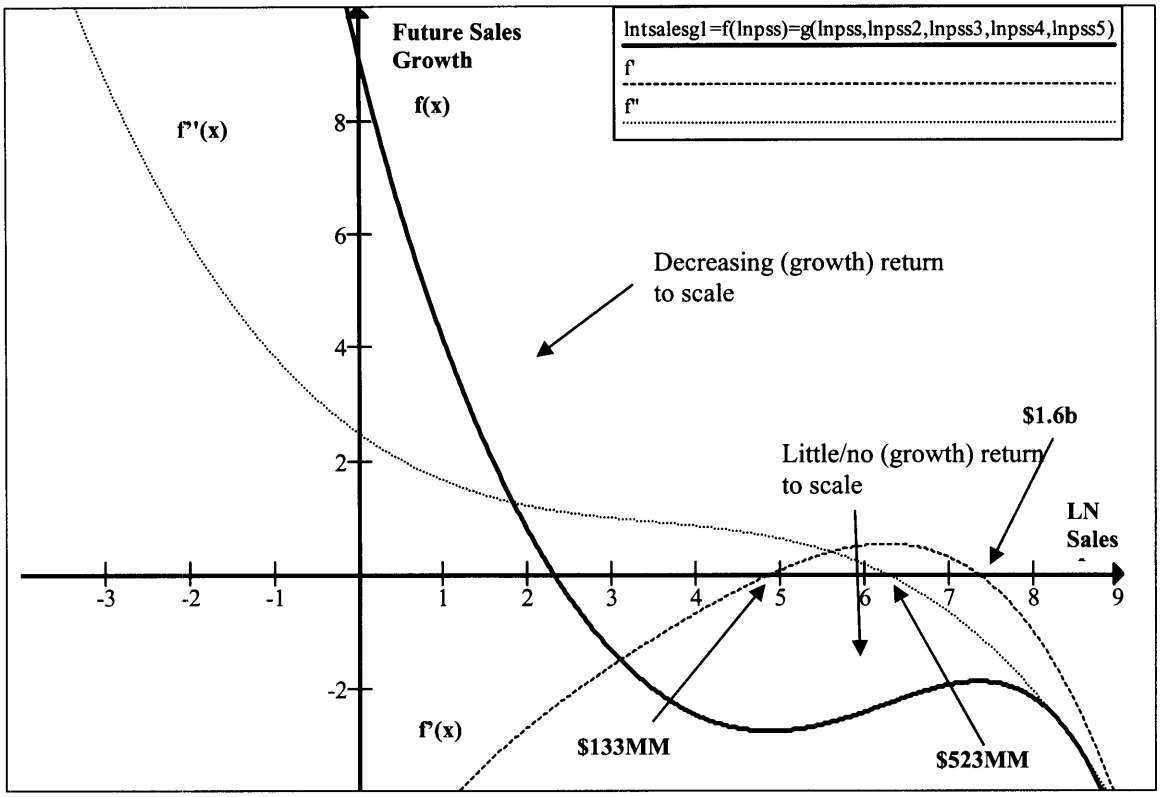

Figure 7-5 Future growth rate dependence on a polynomial function of the size of the firm (as measured by its natural logarithm of its product and services sales)

Categorization has been employed in the industry for legal and statistical purposes (OECD 2004). Although it is the case in EU, there are no standard definitions in Canada and in the US. Legally, EU considers any firm with more than 250 employees and more than 50 million euros in annual revenues, more than 43 million in assets as a large enterprise. Under the same rules, a medium enterprise has 50 to 240 employees, revenues ranging from 10 to 50 million euros and from 10 to 43 million in assets.[12] Japan distinguishes between industries. In particular, for service industries, the boundary of 100 persons and 50 million yen in capital and investments is employed. The diversity of definitions is related to specific political strategies and economic conditions. Nonetheless, as far as growth is concerned, it is important to note that the size of a firm shall be

considered on a *logarithmic scale*. Thus the apparent heterogeneity in the classification systems we reviewed is actually small. However, even though these categories are consistent between each other, they seem to have little basis on statistical analysis. Furthermore, these categories are not industry-specific and have thus little relevance as scholar have already showed (Hardwick, Philip and Mike Adams 2002; Capon, Farley, and Hoenig 1990; Jovanovic 1982; Hymer and Pashigian 1962). More interesting is the classification established (most likely empirically and not necessarily on the basis of any statistical analysis) by the Software 500 ranking for the software and services business. This classification proposes the following boundaries:

- $5 millions
- $10 millions
- $30 millions
- $100 millions
- $1 billion

The natural logarithms of $100 million and $133 million (when the unit is a million dollars) are relatively different by only 6%. The same stands for $1 billion and $1.6 billion. The category we obtained by our analysis thus shares two boundaries with Software 500. The category we propose exhibit an intermediary boundary but no sub-categories for smaller firms.

[12] according to the European Commission recommendation 2003/361/EC

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