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**Innovation and Competition in IT Service Industries**

Abdelillah HAMDOUN

Esther SAMUELIDES

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# Innovation and Competition in IT Service Industries

Abdelillah Hamdouch\* and Esther Samuelides\*\*

\* Abdelillah Hamdouch is Associate-Professor at the University of Lille and researcher in CLERSE (University of Lille I) and CRIFES-MATISSE (University of Paris I - Panthéon Sorbonne). His research fields are Industrial Organization, and Innovation and Organizational Economics.

e. mail : [hamdouch@univ-paris1.fr](mailto:hamdouch@univ-paris1.fr)

\*\* Graduated from HEC School of Management, Esther Samuelides is lecturer and researcher in CRIFES-MATISSE (University of Paris I - Panthéon Sorbonne) where she is preparing a Ph.D. on the new characteristics of competition in the telecommunications industry.

e. mail : [samuelid@univ-paris1.fr](mailto:samuelid@univ-paris1.fr)

## **Innovation and Competition in IT Service Industries.**

### Abstract

Information Technologies (IT) induce many innovations in service industries. Innovations in IT highlight the peculiarities of innovation in service industries compared to manufactured-goods industries. Because innovations often affect competitiveness, service-providers attach a high importance to them and introduce them frequently during intense competition. The purpose of this article is to characterise innovations in these new IT service industries and to determine which innovations will ensure the success of service-providers. We explain the applications of new Information Technologies and describe how they have affected service industries, either traditional or new service activities. Then, we emphasize the main characteristics of new IT-based services and show how distinct service applications generate different types of innovations. Furthermore, we explain how innovations are often combined to introduce decisive ruptures in the market and precise how service-providers can increase their competitiveness in these new service industries by continuously innovating.

Key words : *Competition, Innovation Processes, Information Technology, Learning Loops, Service Industries.*

JEL Classification : *L10, L21, L86, O32*

### Résumé

Les nouvelles Technologies de l'Information et de la Communications sont à l'origine d'innovations significatives dans le contenu et l'organisation des prestations de services. Ces évolutions reflètent les particularités de l'innovation dans les services par rapport à celles qui affectent l'industrie. Les capacités d'innovation ont une influence tout aussi considérable sur la compétitivité des acteurs de services, ce qui explique qu'ils y aient recours fréquemment lorsqu'ils font face à une intensification de la concurrence au sein de leurs activités. L'article se propose de mettre en évidence les caractéristiques des innovations affectant actuellement les industries de services dans le but de montrer lesquelles pourront conforter la position concurrentielle des prestataires qui les introduisent et assurer le développement des marchés. Nous rappelons dans un premier temps l'apport des NTIC dans les services et donnons quelques exemples de ce que nous appelons les "nouvelles industries de services". Puis, nous mettons en évidence les principaux attributs des nouveaux services et montrons que les innovations qui les affectent dépendent de l'utilisation qui est faite des NTIC. Enfin, nous montrons comment ces innovations se développent dans une perspective d'assimilation et d'accumulation ainsi que les processus grâce auxquels les prestataires de services peuvent réussir à innover en permanence.

Mots clés : *Boucles d'apprentissage, Compétition, Nouvelles Technologies de l'Information et de la Communication (NTIC), Processus d'innovations, Services.*

Classification JEL : *L10, L21, L86, O32*

## 1. Introduction

Information Technologies (IT) induce many innovations in service industries. They have at least three effects: i) apparition of new Information and Communication services such as data/image transfer and internet access ; ii) development of intermediary services such as consultants and web-site designers in order to help companies or individuals use these technologies ; iii) evolution of traditional services using these Information Technologies such as banking, insurance, e-mail and telecommunications, retail, travel and leisure-industries. These new Information and Communications services benefit from a very high growth (Durlacher, 2000 ; OECD, 2000) and the innovations affecting them seem to further increase this growth. The purpose of this article is to characterise innovations in these new service industries and to determine which innovations will ensure the success of service-providers.

Innovations in IT highlight the peculiarities of innovation in service industries compared to manufactured-goods-industries. Indeed, service-providers do not participate in technological research which is developed by external suppliers but rather resort to technology to create attractive service-applications. The struggle for market share in these booming and competitive markets is determined by the ability of service-providers to entice customers with attractive and affordable services using these technologies. The markets are still new and the success of commercial applications based on Information Technologies remains uncertain. Moreover, the implementation of new technologies in services is time-consuming and costly. Consequently, service-providers have to explore and anticipate customer needs as well as the limitations and progress of technological applications. They introduce services with valuable content and increase their reactivity to environmental changes and acute competition by adopting flexible organisational strategies implying a reciprocal need for on-going innovations.

Because innovations often affect competitiveness, service-providers attach a high importance to them and introduce them frequently during intense competition. Companies have to preempt new service industries with high growth and network-effects generating first-mover advantages. New IT services are judged more by customer base than financial results so that the conquest for new customers and their loyalty is crucial. Market-preemption can be achieved through innovations of both service-content and changes in organisational strategy. The organisational and commercial nature of such innovations is described in (Hamdouch and Samuelides, 2000). Services issued from IT generate new functions, new communication modes and require new competencies of the companies using them. The desire to be the first service-provider using new technological opportunities implies a necessary partnership with suppliers as well as on-going market watches in order to favour assimilation of sector-evolutions and stimulate creativity. An examination of the interdependencies between technological, organisational, and commercial innovations, and the role that each innovation type has on the performance of a company helps to understand how service-providers can establish the on-going innovations' dynamics necessary to survive in these new markets.

Section 2 explains the applications of new Information Technologies. Section 3 describes how they have affected service industries. Section 4 provides an insight into the characteristics of new

services. Section 5 explains how distinct service applications generate different types of innovations. Section 6 shows that innovations are often combined to introduce decisive ruptures. Section 7 puts forward how service-providers can increase their competitiveness by continuously innovating. Finally, section 8 concludes the article in reminding the main results.

## 2. The development of Information Technologies

The first implication of IT on service industries is the use of electronic devices to support traditional services. The benefits of new IT are linked to four phenomena : digitalisation, cellular transmission, packet switching and high bandwidth transmission technology.

- Through digitalisation, carriers compress signals and recompile them upon arrival to the final user. Voice, images and data use the same transmission process.
- Cellular transmission allows mobile telecommunications.
- Packet switching, as opposed to the former circuit based transmission technology, allows multiple communications on the same network, and consequently lowers transportation costs per user.
- The development of optic fibres, satellites and cables increases the bandwidth of transmission. These new networks allow image and video transmission. Such transfer can even occur by cellular transmission with the help of Wireline Access Provider technologies (WAP). Up to now, services such as voice over Internet Protocol (I.P.) were only available within a company's Intranet because the network supported a smaller number of users and thus did not require a large bandwidth. Today, the availability of services requiring high bandwidth does not depend on future technological innovations but rather on the dimension of the infrastructure network provided by carriers.
- Recent innovations integrate computers and telecommunications networks. Provided telecommunications networks are equipped with signal converters to Internet Protocol, phone users can converse via the Internet though sound quality is still poor. Convergence between the Internet and communications networks, and between fixed and mobile networks allows access to identical services through various terminals such as televisions, computers and mobile and fixed phones (Ducatel, 1999).
- Technological innovations will allow secure and confidential transactions for electronic payment applications. Others may enable higher compression and further reduce transportation costs.

The increasing diversity of telecommunications technologies incites many carriers to build new high-performance networks through fibre optics, satellites and cable. These evolutions allow the transfer of bundled packages of images/data on proprietary or open networks, such as the Internet, which provides a network open to all users, both for consulting and diffusing information for free. Telecommunications or information-consultation can be achieved either from fixed or mobile terminals such as television, computer, fixed and mobile phone. These linked technological innovations cause innovations in service industries because they induce new service applications or improve the performances of services using these technologies.

These innovations in telecommunications differ from the previous innovations introduced in IT in the seventies. In France, for instance, Minitel and microprocessors have improved the efficiency of most companies' organisational processes and these technological innovations have stimulated and generated new industries such as software and consulting services. The more recent innovations in

telecommunications diffuse more quickly and adapt themselves to the identity and needs of each user. These technologies generate various services used both by individuals and companies, and induce numerous new service industries.

### **3. What are the new service industries ?**

In the last decade, service industries linked to Information Technologies have developed dramatically (see Figure 1). These activities consist of linking people to signal transmission technologies, be they consumers or producers, in order to exchange or sell goods, services and information. The new Information and Communication services have enabled real-time contact between people, fast large-volume information transfer, all while reducing communication and transportation costs. Companies use IT service applications for various purposes ranging from customer relationship management, internal communications and data transfer, to more sophisticated uses such as teleconferences.

The Internet, first used in research laboratories and universities, enabled users to consult databases (seminars and libraries). Internet technology then enabled companies to market their products on-line. The peculiarity of web-support is that users can immediately and directly contact their correspondents, which simplifies and accelerates commercial transactions. In the beginning, the Internet provided similar service applications to Minitel in France, a navigational tool used from a fixed telephone, for public information services, train reservations, theatre tickets, and hotels. The free access of Internet allows any firm or user to open a site and communicate with customers without an intermediary, thereby reducing costs whereas in order to use Minitel, companies pay a fee to France Télécom. With the growing number of users, firms have begun to use the Internet as an advertising medium. On-line purchasing is possible either by credit card or e-money units through specific e-business accounts. Other technological innovations have introduced new services like music or even video distribution via the Internet. The transfer of services available on Intranet to the Internet depends less on technological innovations than on carrier investment and implementation costs in network expansion.

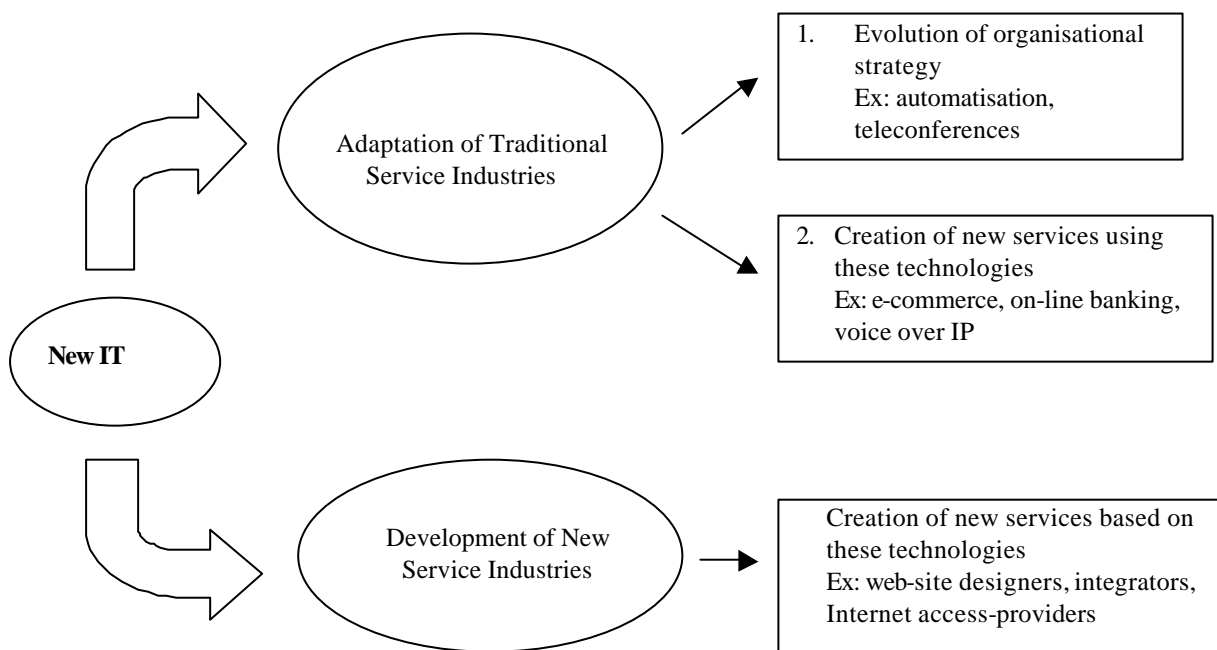
- Telecommunications services are the first being affected by new Information Technologies. Provided they have constituted a high bandwidth network, they can sell applications such as teleconferences, file-transfers, e-mails, portals of specific services, etc. (Colombo and Garrone, 1998).

- Intermediary services between technology-suppliers and users are being developed to implement electronic transactions which require different management and sales techniques. Companies need for instance systems-integrators, computer-scientists, consultants and technology-watchers to understand how they can choose, install, and use the various applications of the new technologies. Website designers and communications services are also necessary for adopting marketing strategies specific to this new medium. With the development of trade and web-based exchanges, consumers increasingly need adapted service-portals and intelligent Web-browsers.

- Companies can use the Web as an advertising medium, while Consumers can choose and shop on-line products or services. The development of technologies to secure and keep confidential telecommunications favours commercial transactions through electronic payments. The transactions

expanded from delivery of books and pharmaceuticals to a wide range of products such as frozen foods, automobiles, clothes, and global retail at on-line supermarkets.

- Beyond retail goods, service-providers can also sell on-line services. First, there was information delivery: news, weather and virtual visits in museums or towns. Then, customers could access services such as direct banking, insurance claims and commodities invoices such as electricity and gas, and on-line reservations for trains or theatres. IT also diffuse services linked to data and sounds by telecharging videos, music or books.



**Figure 1.**

**The influence of IT on Service Industries**

New IT services are developing new needs and habits, though the evolution is based upon traditional industry and only use a different technical support. These new service industries benefit from savings in logistics and sales. Marketing costs per customer are reduced because information or services are diffused at the same cost whatever the number of people receiving them. It thus allows the company to display a wide variety of products. Consumers can therefore buy products and services for cheaper prices and save time because purchases can be made without transportation. Traditional services are finally modified through the adoption of IT. IT services are cheaper than traditional services because the costs of logistics, transportation, and customer relationship



management are lowered and are therefore a threat to traditional trade. Some companies considered them as a distribution system complementary to traditional ones, i.e. the two systems are not mutually exclusive. Websites attract different target markets and increase and diversify demand, so that traditional distribution firms increasingly use this media. Consumers who discover firms on the Internet can often buy their products in traditional outlets. Traditional customers use the Internet to save time and avoid unnecessary transportation as in the case of on-line supermarkets. There is an increased competition among Internet actors who are mostly start-ups mastering web techniques, sponsoring and billing systems, and traditional actors who had enough money and a sufficient customer base to try this new trading activity which tends to generate high losses in the beginning.

#### **4. Evolutions in service content**

Because of the variety and number of industries involved in IT service applications, the role of a service-provider is to introduce the best combinations of complementary services, compare different service applications, and thus improve quality for its customers. The delivery of various services through the same media allows retailers to group various services into a package. There are many examples of this service-convergence. The association of various services is materialised in “bundled buying” according loyalty bonus in order to increase the trade on the Web site. Global retail Websites organise auctions or, inversely, reduce prices with increasing potential buyers. Service integration is a new business: it represents most of the value added for the customer because it avoids him time-loss inherent to buying from different service-providers which increases transaction costs due to searching companies, comparing different offers, and wasting on-line subscription time. Consequently, this activity represents a growing source of revenue. For instance, telecommunications carriers try to move towards such profitable activities because of the depression of telecommunications rates due to new transmission technologies. Service-integrator activities allow companies to compete on other base than costs and economies of scale, and allows thus new entrants to differentiate themselves from the traditional service-providers by proposing a pertinent and useful combination of services.

As transactions become anonymous because they occur on-line, companies need information on customer identity and needs. Data on customers are all the more precious because service-providers try to develop personalised services. These services maximise a company’s profit because service-providers sell them to each target market at a price corresponding to their revenue and consumption profile. To incite customers to give information on their tastes, some companies offer additional services or price reductions. They also use former transactions in registering them automatically each time a transaction occurs. Other electronic tools like “cookies” register the Web sites consulted and service-providers deduce from this information the interests of a user. They also need sophisticated software based on statistics and factorial analysis, and use marketing techniques for exploiting this data and develop personalised services.

Another characteristic of the new services is that companies have to convince consumers to use IT in order to benefit from their services. In Europe, where the first generation of mobile terminals had little success because of price and large size, the apparition of easier-to-use GSM terminals and attractive marketing formulas have increased the penetration of mobile phone services; the commercial strategies implemented by service-providers and suppliers have thus determined the diffusion and

success of this technology. Indeed, many of these technologies are recent and represent such a radical evolution that consumers take time to get accustomed to computer science and a new human/machine interface. This reticence concerns consumers such as retired people who do not have to use IT for work. Consequently, service-providers adopt various strategies to incite consumers to try services and turn their activities into mass-markets. They try to lower prices, subsidise terminals, introduce promotions for first-time users, and even adopt free subscription rates such as for Internet access. They also insist on advantages such as lower prices, ease-of-use, time-saving, on-line buying, automatic renewal and payment, and the enjoyment of modern tools. Consumers are invited to experience multimedia possibilities as well as interactive programs, giving an impression of choice, variety, and personalised service. The need for “intelligent” navigators will help consumers to search in the increasing volume of available data. The Website design, in order to attract the highest number of people, will contribute to the success of service-providers. Furthermore, service-providers have to keep customers and reward their loyalty by granting reductions and free optional services.

## **5. Which innovation for which type of services ?**

As shown above, there are numerous innovations in traditional or more recent service industries. All do not have the same importance and their impacts are varied. Distinguishing different types of service applications helps to better understand their diversity and how similar services can be improved, or which type of innovation is required for each category of services (see Hamdouch and Samuelides, 2000).

We distinguish four generic applications:

- services provided independently from other applications, i.e. services satisfying a global need such as banking services which allow investment financing;
- functional services to support activities such as marketing or research;
- tools used to improve the activity of an organisation;
- services which contribute to favour, or create relations. They may be the attributes of other applications developed by a service-provider, such as hotlines in phone services, but are also used in companies for internal use such as communication between a company's departments, or user/supplier relationship.

Companies often use different types of services, which are related internally. An innovation in one service often generates the evolution of another. An innovation in a working-tool sometimes induces innovations in the service content provided by the company. In the same way, innovations in service content often require significant organisational changes and, consequently, the development of new functions or innovative working-tools. Companies often introduce innovations which exploit the synergies between different services.

To better understand the distinction between the above mentioned service-applications, let us take the example of information and communication services. They can have the four applications according to the identity of their users, whether they are companies or individuals. They are the service content sold by information and communication service-providers, generate functional services such as web-designers and multimedia consultants. But for most of companies, they are

used as working-tools and as services which reconfigure the customer relationship. These multiple uses explain their growing success.

The innovations improving each type of service are described in Table 1.

**Table 1.**  
**Innovations in various service-applications**

<b>Type of Service</b>	<b>Examples</b>	<b>Innovations</b>
<b>Service as a Function</b>	Research, Marketing, Sales, International Department, Legal Department  Objectives: - Constitution of skills - Organisation and Management, - Planning and Prospection	<ul style="list-style-type: none"> <li>• New organisational chart</li> <li>• Co-design supplier/retailer</li> <li>• New decision-modes</li> </ul>
<b>Service as a Tool</b>	Surveys, interviews, statistics, data bases, quality tests  Objectives : - Prospection and information - Valuation, certification - Standardisation	<ul style="list-style-type: none"> <li>• New software</li> <li>• New employee bonus plans</li> <li>• New control systems</li> <li>• New indicators</li> <li>• New sales support</li> </ul>
<b>Service as a Product</b>	Product or service specifications specifying how, how much, what, when, where  Objectives : - Satisfy a generic need - Solve customer-specific problems	<ul style="list-style-type: none"> <li>• New service- concept</li> <li>• New characteristics in execution or content</li> <li>• Traditional services recombination</li> </ul>
<b>Service as a Relation</b>	Negotiation, information exchanges, dealing with all human interfaces  Objectives : - Improve notoriety and image - Capture ideas and information, - Entertain good working-relations	<ul style="list-style-type: none"> <li>• Introduction of assistance and consulting services in a company</li> <li>• New coordination process</li> <li>• Co-design</li> <li>• Reclamation-services</li> <li>• Development of regular contact with customers</li> </ul>

As shown in Figure 2, these innovations also occur at the Service-Relation level through the interface of the service-provider and its equipment suppliers, retailers and, of course, customers.

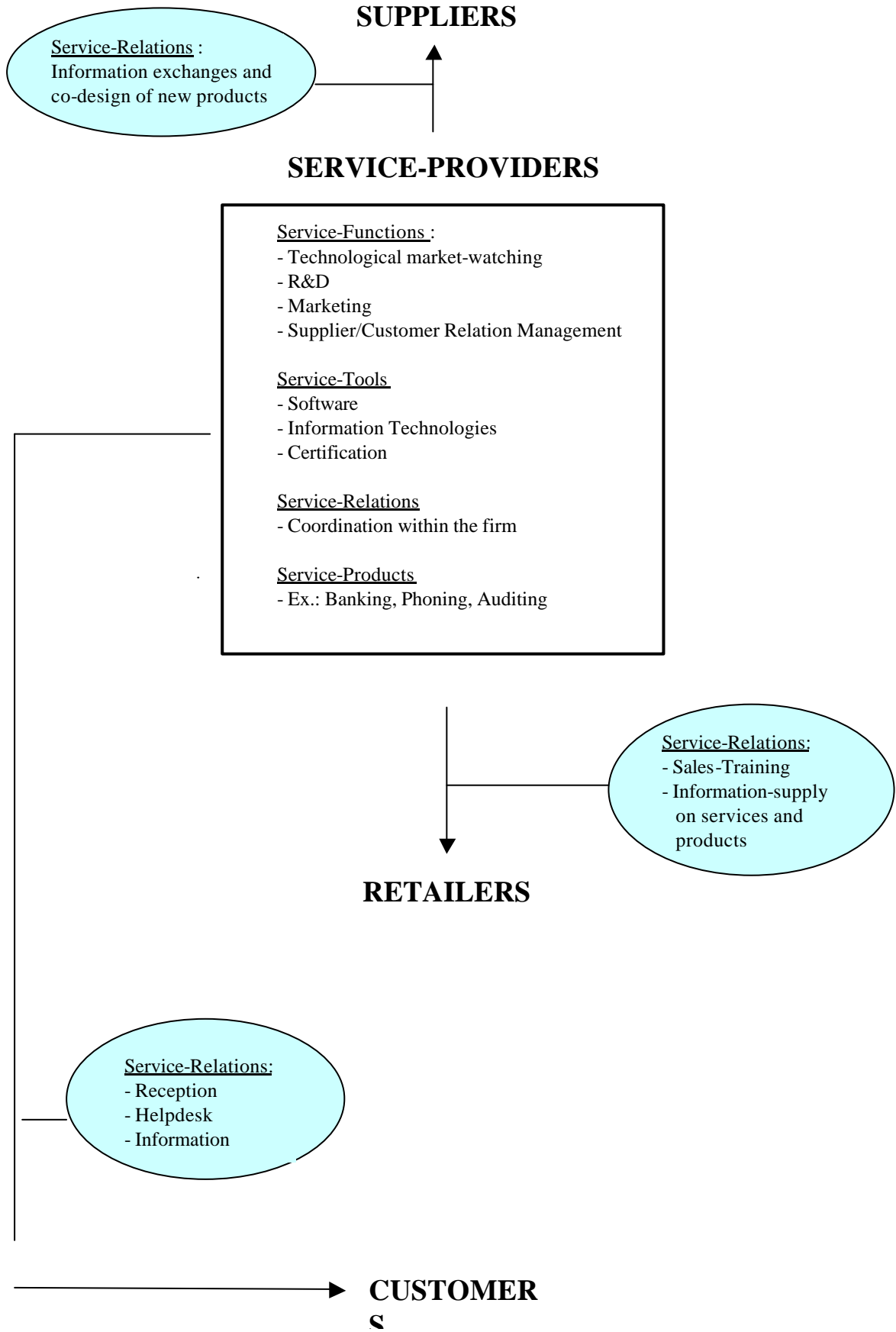


Figure 2.

### **Diversity of service-applications used by a service-provider**

## **6. The emergence of more or less radical innovations**

Innovations keep unchanged some characteristics of the existing reality. For the first theoreticians, in the innovation definition, there is no allusion to the intensity of the rupture introduced (see Schumpeter, 1912). Later, Mansfield (1968) introduced incremental innovations that consist either of improvements or the addition of service characteristics. More recently, Henderson and Clark (1990) have defined the concept of architectural innovation, which is the combination of several existing elements. We draw from these distinctions that global innovations can come from incremental or architectural innovations. Inversely, global innovations can be differentiated into different products and used again to develop architectural innovations. It helps to understand how several innovations emerge from one new concept or the recombination of existing services. The degree of rupture introduced by an innovation is also linked to the company's desire to differentiate from competitors and to the risk of introducing new uses with unknown success. For instance, to introduce a radical innovation, a company could prefer to progressively introduce incremental changes to familiarise consumers with it. That is why the introduction of a completely new service often requires several smaller innovations. That also explains how companies replicate innovations introduced by competitors and adapt them slightly to their specific needs or desires.

These connections between the different innovations and their cumulative diffusion explain how service-providers can control their own trajectories of development by (i) exploiting all the possibilities of a new concept developed within the firm, and (ii) imitating and absorbing external evolutions. This is linked to company's skills and its ability to learn from other companies' examples. Companies have to increase their knowledge of consumer tastes because the markets are young and demand is quite unknown. They have consequently to familiarise consumers to the new services and to diversify their traditional needs. So they introduce new offers to test demand, and learn to adjust the service relative to the reaction of consumers confronted with these innovations. Innovations and assimilation of the recent market evolutions determine the success of the service provider.

Network-effects (see Katz and Shapiro, 1985) and economies of scale play an important role in network industries for notoriety causes and services designed for communities of users, and because they are financed by advertising. Network-effects are important to the Internet for the following reason: with a growing number of users, the number of exchanges increases, because it increases the variety of supply and favours services for specific market targets. Another main reason is that service-providers and sites are subsidised by sponsors diffusing on-line visual advertising spots, who want to pay all the more that they are visualised (Kavassalis, Solomon and Benghozi, 1996). In services like e-mail or community sites, network-effects are evident. In France, mobile communications are less expensive when calls are made within the same network. The core competitive advantage for a service-provider is to attract and retain a customer base by developing brand-name loyalty, particularly because churn is costly due to high customer-acquisition costs (Madden, Savage and Coble Neal, 1999).

Innovations linked to Information Technologies will increase the ease-of-use and accessibility, encourage customers to try and retain services, and progressively increase their consumption. Most innovations in these new service industries are commercial rather than technological and therefore

seem relatively marginal. They consist more of improving the presentation of products, packaging, pricing, and marketing formulas. These fields change frequently because service-providers test customers tastes in order to remain competitive and determine which services will be the most successful. Announcements of innovations help them to retain attention and maintain notoriety in the market. For instance, the segmentation and commercial innovations in pricing multiply architectural innovations because they increase the number of possible combinations. Each mode of consumption can be combined to several pricing-innovations or to services already devoted to a specific market target (see Hamdouch and Samuelides (2000) for examples of innovation-extensions to existing services). The most superficial innovations concern gratuities or price-reductions implemented on a temporary basis in order to urge consumers to buy because of the emergency of market preemption. In mobile-phone services for instance, product innovations like prepaid cards, packs or fixed-rate subscriptions only affect prices or consumption modalities. Innovations also improve the accessibility of IT services by subsidising a customer's first terminal. Innovations are often introduced as temporary promotions or, when the service-content is affected, are accompanied by promotional prices. When introduced with success, they are presented as radical innovations and often differentiate carriers in a given market segment. In mobile-phone services, the possibility of data consultation is not presented as an innovation because it was announced years earlier as a project on which industrial researchers and implementing carriers were working. However, "WAP services" are presented as substantial innovations and vary for each service-provider.

This raises again the fact that techniques and technological innovations are sold as primary goods, that is to say, available for every company provided it has financial resources. Differentiation is more based on the peculiarities of the service content and the customer-provider relationship than on technical performance. Innovations are often architectural because service-providers present their services in the highest number of different categories in order to better fulfil customer needs. That enables companies to adapt an existing service to a specific demand.

## **7. Innovations' processes and competitiveness**

Before deregulation, industrial and technological research in Europe was developed by subsidiaries of state-owned monopolies. Telecommunications carriers implicated themselves in technical research projects (Lanza and Antonelli, 1998). Now, technologies developed by suppliers are openly available to all carriers who can invest in a new network. As such innovations are very costly, suppliers gather in order to co-develop them, such as for introducing a new standard, all the more that the growth of second mobile generation (GSM) terminals has shown the benefits and necessity of standardisation in Information Technologies. Indeed, contrary to Europe, in the United States, the growth of mobile users has fallen because of incompatible standards which differ from one state to another. Suppliers, like Cisco or Alcatel, introduce the technological innovations affecting these service industries and try to sell them to most service-providers. Carriers work in collaboration to implement these innovations in their existing networks and try to develop upon these networks service applications with low cost, high quality, and wide interest. But the real change is that this supplier/service-provider relationship focuses on detecting demand-evolution, rather than on favouring a potential technological discovery.

As the technology develops very quickly, service industries have to foresee upcoming technological applications and guide future technological research projects, e.g. the next Universal Mobile Telecommunication System in Europe, effective in 2002. To be able to introduce competitive services, they have to design the service applications based on technologies still in development. They have to imagine how to satisfy a demand for which technologies can not yet provide a solution. The convergence of technologies and network-effects between these various activities favour alliances of firms from different sectors, for instance Microsoft and France Télécom as well as Internet service-providers acquisitions by big carriers (Capron and Mitchell, 1998). As Felder and Liu (1999) show in their article, according to the category that is going to lead services, business models will change. This identity is itself closely dependant on customer habits. For instance, with the convergence of Internet and mobile phone services, it depends whether consumers will consider m-commerce simply as a new access to Internet or whether they would use specific web-services linked to mobility-situation. The business models are still not defined and each industry tries to take advantage upon others by forecasting demand in keeping regularly in touch with customers through co-design, surveys, or by introducing personalised service-options. This willing to fit exactly with an evolving and uncertain demand explains the growing tendency to personalise service applications.

Because of the high investment cash of new networks and technological applications development, whereas the commercial success of future service applications cannot be well anticipated, carrier size is increasingly big. There is a growing dissociation between manufacturer and service-provider, though they are forced to cooperate in order to provide customers with an integrated offer combining services and associated goods. It widens the distinction between network carriers, who build high bandwidth network with IT applications, and service-providers, who adapt their supply to market targets, forecast needs, contact and bill customers etc. The apparition of pure service-providers accelerated the sophistication of marketing practices and the segmentation of services according to market-targets (see Hamdouch and Samuelides, 2000). The ability to select profitable market-targets proportional to its resources (investment, network, partners, strategy, previous service experience) is an important strength for a service-provider.

Of course, some operators, particularly former monopolies, who position themselves as universal operators, oppose this supplier/service-provider dissociation. They wish to keep a control on both customer relation management and infrastructures because this relation management constitutes most of the service value, particularly because transportation costs are lowered by technological innovations. This explains the tendency of carriers to become service-providers, thereby multiplying transversal and vertically-integrated partnerships. These partnerships encourage specialisation and focus on core business. Not only have traditional voice-carriers begun to diversify their services in sophisticated value-added services linked to data transportation such as mobile-internet-access, partnerships with banks and auto-manufacturers, but equipment suppliers, such as Microsoft or Nokia, wish to sell personalised terminals directly to consumers or via partnerships with service-providers.

The globalization of markets, accentuated by the universality of the web, increases the size of the market and the number of competitors. This evolution encourages the concentration of the market, and takes shape through acquisitions issued from the dismantling of many alliances. In the last five years alliances between former monopolies such as France Télécom and Deutsche Telekom were dismantled, as were global consortia such as Esprit, Global One, and Unisource with the sale of Siris

to Deutsche Telekom. Information and Communication companies now acquire competitors to compete directly with their former partners, (Idate, 2000 ; Gassot et. al., 2000). Why have these alliances evolved suddenly to frontal competition? It can come from new possibilities of entering the market for carriers which compete for UMTS licences. The latter are rare because of the scarcity of frequencies and explain the intensification of competition. But the most relevant causes of this strategic shift seem to be the refusal to share profits when the first benefits come after the investment in mutual R&D, and the desire to form partnerships with other activities, or to acquire start-ups from Internet such as Access Service-Provider because it is safer than a compromise with a powerful rival. As a result, when a new alliance is established or when acquisitions occur, other carriers form partnerships to maintain a critical size. This phenomenon can explain the sequel of acquisitions and the rapidity of the structural changes in the markets. As the growth of such markets is high and submitted to network-effects, service-providers have to compete on the size of their customer-base by attracting new users, and have to improve their notoriety with original services relative to their competitors. Besides, the need for service providers to adapt their services to demand, and the competitive environment of each country, explain the necessity for service-providers to continuously innovate in order to benefit from market-growth and increase market-share.

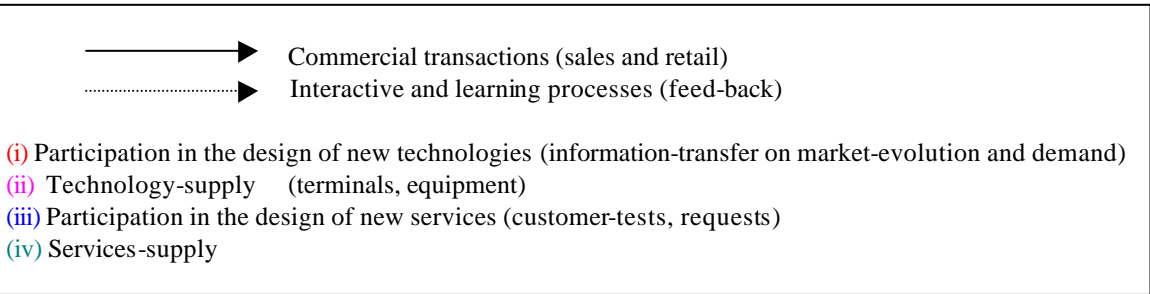
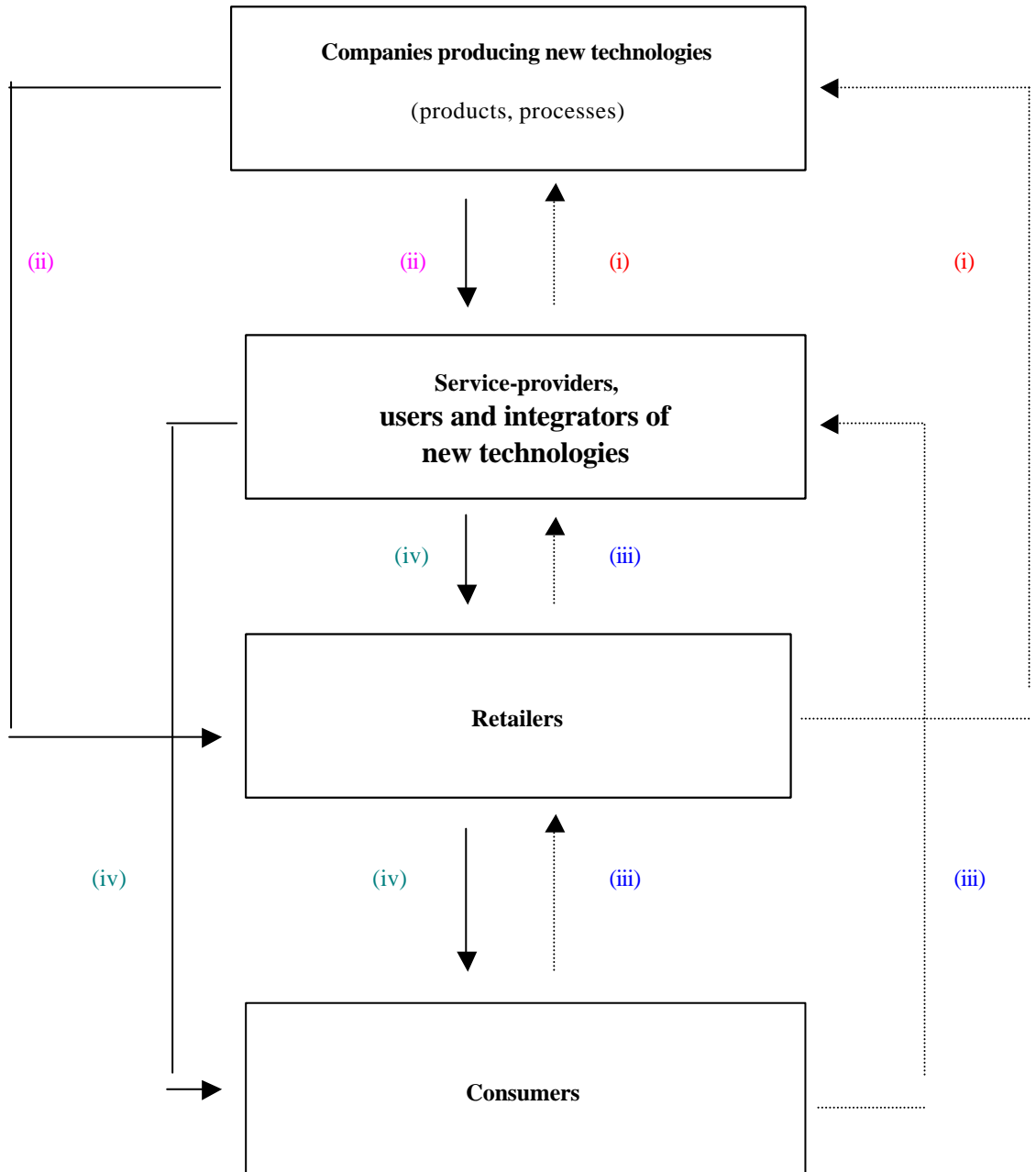
For developing or anticipating demand, learning (see Cohen and Levinthal, 1989) is a survival condition for these industries. It enables them to test the success, profitability and effects of past evolutions. In the same way, innovations are introduced upon accumulation and assimilation of previous changes. The anticipation of demand, investigation of the market, assimilation of test-results and experiment of demand, require on-going restructuring of traditional organisational modes such as market-watches and systematic benchmarking. This adaptation gives new ideas for service applications. For instance, the co-design innovation process used in telecommunications induced new services to satisfy customer requests such as the updating of terminals and service options, the possibility of choosing one fixed-price formula after a first month test and lower rates from fixed to mobiles phone services.

As shown in Figure 3, innovations and learning are closely linked in various learning loops which affect service-providers and their different partners:

- innovations allow to improve knowledge on market in learning from the success or failure of past strategies;
- such a learning helps to innovate and control as well as improve innovations' processes;
- learning takes place both within the firm and at the interface of supplier/service-provider and customer relationships.

The different partners gather know-how and information to design products, i.e. new industrial goods (terminals, equipment) as well as new services. Suppliers provide scientific and technical knowledge ; service-providers and retailers provide knowledge on market and demand-evolution. These learning loops are crucial for service innovations because they affect the ability of a service-provider to control the timing of its own innovation processes and to preserve its advance over competitors.





*Figure 3.*

**Learning patterns in IT service industries**

## 8. Conclusions

New technologies in computer sciences and telecommunications are deeply restructuring service industries and generate dynamic developments and new activities within both traditional and new companies. First, the benefits of new IT improve company's performance by increasing the transaction-speed and volume of stocked and processed information. Then, with the development of the Internet, these technologies generate new information and communication services which shape new companies providing these services. They also influence Customer Relationship Management and retail so that they allow traditional industries to renew their activities by providing their customers with innovative service applications. The new service industries have a growing tendency to provide customers with personalised, integrated, and accessible services. Service-providers need consequently to introduce commercial innovations and new organisational strategies in order to develop rapid response to the market and new service concepts in order to convince consumers to use IT. These innovations will depend from new service applications, whether they are leisure or working tools.

Service-providers often cumulatively introduce these innovations because they are quickly diffused in the industry, and because companies can combine them to increase the value for customers and progressively use them to make radical changes. To successfully innovate, service-providers will have to establish on-going creative dynamics by coupling organisational and commercial changes and assimilating technological innovations. Service-providers can install and develop processes in order to improve their ability to introduce innovations by watching demand evolution. They develop coherent innovative strategies by exploiting synergies between the different innovations and environmental changes. The interactions between equipment and demand are favoured by service-providers who act as intermediaries and establish new applications and R&D projects. The evolution of these industries is determined by demand growth which remains yet unknown as well as future technological innovations, so that service-providers increasingly focus their activity on the detection of consumer needs. This evolution implies a global industry-reconfiguration and new learning processes to detect and assimilate the continuous and rapid evolutions. Innovations allow service-providers to break in these booming service industries and, through networks-effects, occupy a dominant position in the market.

With a solid understanding of the various applications of Information Technologies, service-providers can provide customers with applications which will contribute to the creation and growth of new service industries. Innovations on such services will affect most service industries which use them to achieve commercial transactions as well as for internal communications purposes. These changes in the supply and demand imply an adaptation of the traditional industry structure through the convergence of various activities and the resulting alliances and acquisitions in a context of acute competition. This favours a reconfiguration among service industries between new complementary activities from various sectors as well as new partnerships between retailers, content-providers, carriers, integrators and suppliers.

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