This article examines the value-added services (VAS) market. The production of these services requires the cooperation of assets and competences owned by different categories of firms. The first part of the paper points out the nature of the services and identifies a number of firms which are involved in the VAS production. The second part of the paper is based on a statistical analysis of an original sample. Three classes of services are discriminated: enhanced communication services, dedicated services, and information services. Then, we focus our attention on the dedicated services. A detailed analysis of this category enables us to identify three sub-groups of services: specialized communication services, community services and online transaction services. Moreover, the production of these dedicated services is driven by users. It is concluded that users have gained control over a wide segment of the VAS market because they own some specific competences and knowledge.

Introduction

This paper presents a part of the results of a wider research project on the development of the new telecommunications services market, the so-called value added services (VAS). VAS are information-based services provided through telecommunication networks. They consist of a wide set of services that enhance the basic telecommunication services (e.g. the telephone). Some of them provide users with specialized communication features (e.g. data communication). Other services consist of enabling clients to access data processing systems (e.g. computerized reservation systems) or information sources (e.g. databases). The objective of our research — relying on a statistical study of a sample of 125 services — was to build a taxonomy linking the different types of services, the types of firms that ensure their development, and the patterns of organizational arrangements built by these actors. In our understanding, the VAS market consists of customers who demand services that are produced by the assembling of (technical) ‘functions’. It first enables us to establish a segmentation of the market. But it is essentially a means to better understand the complex competition and cooperation processes that characterize this industry.

The production of these different ‘functions’ relies on the use of specific assets. By assets, we mean a combination of tangible means of production and knowledge (production techniques, commercial know-how, R&D results, etc.) (Winter, 1987). These assets are different from one firm to another reflecting specialized talents, cumulative learning experience and competence, additive investment generations... These assets are specific because most of the firms that act on the market (network operators, computer manufacturers, data processing companies, etc...) do not own the whole set of assets necessary to produce a VAS. Consequently, this business is typically an industry where specific assets owned by different types of economic agents have to be combined to produce a marketable output. In a previous article (Brousseau and Quelin, 1992), we demonstrated that there are several organizational arrangements to initiate and control this coordination process. When a firm owns assets that are more specific than others, it can become the node of a network of subcontractors. Otherwise, the firm has to create a strategic alliance with other partners in order to collectively be the joint owners of highly specific assets. This alliance enables the alliance’s members to control the creation of the added value. Two types of alliance are distinguished: the homogenous alliance group partners that have the same type of assets and belong to the same industry; whereas the complementary alliance is composed of firms that own different types of assets.

This conception of the VAS market enables us to identify on a statistical basis two types of correspondence. First, a link between the different types of services and the different patterns of organizational arrangements can be established. Second, it can be shown that some categories of firms control the creation of the VAS in each segment of the market.

A clustering of our sample indicates the existence of three main categories of services. Two categories are
composed of services that do not rely on alliances and that are assembled by firms that are specialized in VAS production. The third category is constituted by services that are assembled by firms that are not specialized in VAS production (as compared with the network operators, the data processing companies, etc... i.e. firms belonging to the Information Technologies industries) but that are users. In this paper, we will use 'users' to refer to the categories of firms that are likely to buy these services and that are not specialized in the production of Information Technologies based services. Moreover, these users are often grouped in alliances. This class of services is statistically significantly different from the two others. This paper will examine this specific category of services in order to better understand why their production is driven by users and why they often create alliances.

Traditionally, the economic literature analyses the separation of the users from the innovating unit (Lundvall, 1985). On the VAS market, it is interesting to note that users are often closely involved in the development and the production processes. In fact, they do not own all the know-how or the physical production means that are necessary to produce a VAS. Many of these required assets belong to firms that are implicated in the production of other VAS because they belong to the IT industries. We show that the proprietary know-how of users offers them a significant competitive advantage on the VAS market (Von Hippel, 1988). Therefore, the questions are: Why can users dominate the creation process of some types of VAS? What is the nature of their assets that makes them more scarce and less substitutable and that gives them bargaining power in the assembling process? What is the role of the different types of firms in these organizational arrangements?

A framework to analyse the VAS market

In an earlier study (Brousseau and Quelin, 1991), we developed the idea that the production of the so-called 'value added' telecommunications services consists of combining four basic 'functions'.

'a': the routing of messages that consists of transmitting an information set to a chosen receiver;
'b': the communication management that consists of specifically handling the 'envelope' of a message (securing, ensuring formats' compatibilities, authenticating the actual completion of the communication, etc...);
'c': the automatic information processing (i.e. processing the 'content' through programmed processes);
'd': information editing that consists of creating and organizing information sources.

Each value added service derives from the assembling of some of these technical functions. As there are different possible combinations, we can point out the existence of diverse types of VAS:

The telecommunications services: a particular type of routing is an elementary level of added value (X.25 and other enhanced packet-switching services, for instance).
The communication management services are constituted by the combination of function 'a' (routing) and 'b' (communication management) like the EDI or electronic mail services.
The network processing services are produced through the combination of the 'a', 'b' and 'c' functions. The computerized reservation systems (CRS) are a good example of this category.
The on-line information services: these services are composed by the assemblage of the 'a', 'b', 'c' and 'd' functions. The financial, scientific and technical database services are typical of this market segment.

Thus the different types of functions have to be associated to constitute a VAS supply. Nobody in the market is able to produce all of these functions alone. Different types of firm have the necessary know-how (specific competence) to control each of these functions. However competences are not completely bounded and some actors control, at least partially, several functions:

- routing is controlled by the telecommunications network operators (PTOs, carriers) which own the physical networks;
- communication management is both controlled by the network operators and some data processing companies;
- development and the exploitation of automatic information processing systems is controlled by three categories: the users, the data processing companies and the computer manufacturers;
- information editing is controlled by two types of agents: the companies that are specialized in providing information — consultants, book publishers, press agencies, etc... — and the firms that generate information that can be marketed: airlines and transport companies, banks, insurance corporations, etc.

As VAS production implies the co-ordination of assets that belong to different types of agent, the firms have to gain control over the assembling process in order to control the organization of production. For a particular firm, the assembling consists of choosing one or several partners and determining the organizational arrangement that must link them.

We distinguish three main types of organizational arrangements. The most simple case is when a firm owns
highly specific assets and/or contracts with partners that do not own very specific assets. In this case, this firm assembles its service by buying ready-made services on the market or by sub-contracting to some services providers. It is then the node of a network of suppliers and subcontractors. In other cases, there is no central firm or this firm is not able to be the node by itself. As a consequence some firms have to create strategic partnerships to join assets that enable them to collectively be the joint-owners of specific assets. These then allow them to be the node of a network of suppliers and sub-contractors if they do not produce all the functions required to produce a VAS. The contractual arrangements that regulate these strategic partnerships are based on long-term involvements and the construction of non-market type governance structures. The structure can result from the alliance of firms that own the same kind of assets (homogeneous alliance) or from the collection of firms that control complementary assets (complementary alliances). In the first case, a category of firm tries to lock-in the market by controlling a large market share of one of the assets. In the second case, different types of players try to join their assets to obtain a collection of complementary assets which it would be difficult to imitate.

This framework has been applied to describe different type of services, producers - i.e. firms involved in the production of a VAS - and of contractual arrangements of a sample of 125 cases.

**Methodological and statistical methods**

The set of variables used in this study is based on attributes of the services. Therefore, all the investigated variables are categorical from a statistical point of view. Some of them are commonly used to describe the countries of origin of the firms, the industries, the number of involved firms in the service. Several variables were designed specifically for this research, such as the geographical availability of the service and the strategic segments. The ‘assembling process’ characterizes the organizational arrangement. Three types of arrangement are distinguished: the homogeneous alliance, the complementary alliance, and the single firm as a node of sub-contractors. Some other variables describe the industry of origin of firms involved in the organizational arrangements. Some variables describe the allies or subcontractors’ contributions to the contractual arrangements (Brousseau and Quélin, 1992). Over a total of sixty-two, twenty-one are active variables (see Appendix A).

For this study, we created an original database. The sample contains 125 new telecommunication services from developed countries. The study covers the 1980-1990 period. The information used was gathered from secondary sources: these sources were mainly specialized publications. The data on many cases were validated by interviews with industry analysts and company executives (Brousseau, 1990; Quélin, 1991).

The objective of the statistical analysis was to produce a synthesis of all the variables and a taxonomy of the observed services. The data were processed according to two statistical methods: multiple correspondence analysis and hierarchical clustering. The first is similar to principal component analysis but is adapted to categorical variables. The studied sample can be described in a few main dimensions. Both cases and attributes of services can be positioned according to their co-ordinates on the selected principal components. Second, a taxonomy describes contrasted groups of services identified by a clustering method. Finally, a general synthesis of the results can be obtained by plotting the services pertaining to each class according to the dimensions which emerged from the multiple correspondence analysis (Lebart et al. 1984; Tenenhaus and Young, 1985).

The two principal axes account for 28.9% of inertia. As the proportion of the explained inertia falls dramatically between the second and the third axis, these two first dimensions synthesize our data set in a satisfactory way. One can interpret the construction of the first two axes by studying the contribution of each categorical value to each axis. The first axis can be interpreted as discriminating the communication oriented services, on the negative side, and the information oriented services, on the positive side. We will refer to this axis as the contribution of the communication to the added-value. The second axis is interpreted as discriminating between the services that are featured to the specific needs of an industry (bottom) and the services that can be qualified as generic (top) (Figure 1).

In the second step, to determine contrasted patterns of services and associated organizational arrangements, we undertook a clustering of the sample based on all the active variables (21). Three classes characterize this sample of VAS (Figure 1).

![Figure 1 The VAS market structure on a statistical basis. Projections of the typology on axes 1 and 2](image-url)
By relating the three-class taxonomy to the interpretation of the two principal dimensions, we can synthesize the features of the three identified patterns of services and organizational arrangements (Figure 2).

The first class is dominated by services that belong to the Telecommunications or Communication management segments (described above). This class is called the enhanced communications services. The services in the second class are generally assembled by alliances dominated by users. They are often featured to fit the needs of a particular industry. This class is qualified as dedicated services. Most of the services in the third class are assembled by information providers, specialized in online information services. This class will be called information services. We will briefly describe the first and the third classes before studying the breakdown of the second.

**The enhanced communications services**

This class is numerically the most important (54 services). There are two main groups within it: the first is composed of 14 telecommunications services; the second of 40 electronic mail or EDI services. The telecommunications services are mainly assembled by network operators. The other services in this class are less transmission intensive (the share of transportation in the added-value is less). When the service becomes less transmission intensive, the know-how of network operators is not sufficient to gain control over the assemblage.

The first sub-class is very homogeneous. The network operators are in a dominant position. In most of the cases, a node firm manages the service and uses the transmission capacities of its sub-contractors. The organizational arrangement if often the 'node of subcontractors'.

In the second sub-class, the services are much more communication-management oriented. Rather than sending data directly to trading partners, companies may opt to send data to network services providers, which act as a third party. They route the data and manage electronic mailboxes. In this configuration, the third party leases transmission means to network operators and manages the network thus created. The software and data processing companies are sometimes in a leadership position, while in the sub-class as a whole, the leadership is mostly assumed by network operators.

As pointed out hereafter, this third party is most often either a data processing company or a telecommunications operator. Four of the most significant players in EDI services in Europe are GEIS, IBM, ISTE (now part of AT&T), and INS, a joint project between General Electric Information Services and ICL Computers. INS supports Tradanet network established to serve retail EDI in the UK. In its own right, GEIS is involved in a number of European EDI initiatives. It supplies EDI*Express, that is used in the retailing, transportation and other industries in order to support specialized services. ISTE has primarily concentrated on the needs of the automobile manufacturing sector (e.g. Rover Group). In October 1989, ISTE was bought by AT&T. It now offers its services to industries other than the automotive industry.

Due to the size of its information network and its involvement in EDI software development, IBM is committed to offering a full EDI service. It has been closely involved with a number of pan-European industry projects. IBM has also developed a number of initiatives to provide EDI services on a national basis (e.g. Axone, with Credit Agricole and Paribas, two French banks).

In addition to AT&T, GEIS, and IBM, the national PTOs are entering the market. British Telecom's acquisition of Tymnet in 1989 (from McDonnell Douglas) is a good example of this movement, especially given Tymnet's presence in the US (EDI*NET is the third largest US EDI service). Also, France Telecom supports full EDI services based on its Transpac Atlas 400 service. Additionally, France Telecom has an interest in an international VAS provider, INFONET. In 1990, Computer Sciences Corp. (CSC) sold a majority shareholding of Infonet to MCI Communications Corp. and a group of ten national PTOs, including Switzerland, Belgium, Spain, Germany, etc...
services, Infonet represents an exception relating to the assembling process. Most of these services are assembled by a single firm (e.g. IBM, AT&T, GEIS...) which buy ready-made services on the market or which sub-contracts to other suppliers. Therefore the dominant type of organizational arrangement is the 'node firm'.

The information services

In this class, all the services are on-line information services. Generally, specialized information providers assemble these generic services (25/28 cases).

The market can be broken down by:

- type of information, such as financial, economic, medical, etc...;
- characteristics of the information, such as its volume, complexity, and most of all, its time criticality.

Of the different market groups, financial information services is the most significant segment. Financial information available on-line can be divided into quote information and non-quote information. The former is extremely time-sensitive. Prices and rates are volatile information. Therefore, it has to be supplied in real-time. The non-quote information covers a wider spectrum of data, such as credit information, news, econometric information, company data, and time series, etc... This information is generally less time-sensitive. As there is a strong requirement for historical information, the value added depends upon the ability to recover information going back several years.

In the information services market, the dominant firms do not only control the data collection, information analysing and packaging processes. They have also developed communication management ('b' assets) and information processing ('c') capacities. They tend to have strong marketing and distribution capabilities, and are often active in several information markets. Significant vendors include Reuters, Telerate, ADP, Quotron, Knight-Rider...

The dedicated services

The dedicated services (43 cases) are especially designed to meet the needs of a particular industry. They are communication management or network processing services, and often assembled by alliances dominated by users. Most of these services are industry-specific applications. Specific services with specialized characteristics are built to serve transportation, travel, bank, insurance... industries. A detailed analysis of the statistical results enables us to identify three sub-groups: specialized communications services, community services and on-line transaction services.

Specialized communications services

These services (15 cases) are often assembled by alliances dominated by users. These alliances provide their members with communication management services (mainly EDI and electronic mail services) that are especially designed for the participant of an industry. These coalitions are composed of a large number of users. Generally the alliance sub-contracts the routing ('a') and sometimes a part of the communication management ('b') to network operators and data processing companies.

RINET SC (Brussels) is a non-profit society set up by some of the world's largest reinsurance companies. Reinsurance is a technique for spreading and exchanging risks and resources between a number of different companies. Membership of Rinet is currently restricted to insurance companies, reinsurance companies and brokers. Members are required to purchase shares in the company and to pay membership fees.

The main objective of Rinet is to improve members' operating efficiency without affecting their autonomy. Rinet acts as a service provider for a communication management service that interconnects reinsurance companies. The basic Rinet service consists of facilities for the electronic exchange of information between members (EDI, electronic mail, access to other network services).

Initially, it was decided that Rinet would only offer limited message transmission services between members, covering accounts and acknowledgements, claims, settlements, and commissions. Rinet possesses no processing facilities of its own, and IBM provides all network processing facilities.

Some other homogeneous alliances are similar in scope to Rinet but are restricted to serving specific national requirements (IVANS in the USA, LIIMNET among Lloyds companies in London, CELIAS and ASSURINET in France, RITA in Italy...). Rinet shares many characteristics with SWIFT (the banking network), both in terms of its background and its cooperative status. However, the similarities should not be over-emphasized.

In this sub-group, the pattern is to form strategic alliances that are able to conceive the logical functionalities of a particular VAS. As users have limited communication management expertise, they subcontract the 'a' and 'b' functions to PTOs or data processing companies or develop complementary alliances with them.

Within some industries, cooperation is habit because, for many years, companies have shared production capacities (e.g. the Petroleum industry...), or processing capacities (e.g. national banking systems...). For instance, under the sponsorship of the Council of Petroleum Accountants Societies (COPAS), the Petrodex family of applications was developed to meet the specific needs of crude oil and product accounting. Over 200
companies are today using one or more of these applications. Because of the wide set of intra-industry transactions, the firms have the same interest in promoting new standards and EDI transactions. As EDI is conceived as an industry-wide application, no competitive system is developed.

From the very beginning, petroleum companies recognized the necessity of subcontracting the realization of an industry-wide application to a specialized third party and selected GEIS. This solution enables the third party:

(i) to be a technical adviser during the development process: standards are defined by users but the third party supports industry members in the standardization committees;

(ii) and to be the company which is in charge of the development of the service and its single provider.

In some cases, the third party is a guarantee for each member of the alliance against the dominant position of large companies (e.g. Lidic in electronic parts retailing,...).

In this category, one finds essentially EDI and E-mail systems that rely on specific standards (confidentiality, formats, security,...). In each industry, the development of EDI or communication management services concerns many applications ranging from simple document exchanges (e.g. invoices...) to more complex applications (e.g. payments, electronic funds transfer...). In the near future, these systems will have to be interconnected because many transactions are not intra-industry but inter-industry. This evolution will be difficult to achieve. The development of new applications will require the cooperation of businesses that have very different needs, such as the banking system, the transportation industry, the manufacturing companies... For instance, in order to eliminate most of the paper work, the banks will have to be able to send electronic payments and remittance advices. The next step will be to enable users to fully automate and rationalize accounting operations and treasury management (D'Arva, Assurnet, Petrodex,...). These new developments will depend on the bargaining power distribution among manufacturing, insurance, banking industries, etc..., and on their ability to impose their sectoral standards on their trading partners.

Community services

The common characteristic of these services (8 cases) is that they are produced by homogeneous alliances controlled by users. Most of them are closed user groups (e.g. SITA, Airbus, SWIFT...). They provide restricted access to the service. The users can only communicate with other members of the assigned cluster(s).

These alliances are non-profit organizations. They are composed of a large number of members (more than ten), and all of them are users. These user alliances have developed the required competences in order to be able to control the assembling process. For instance, in the communication management services the users control the "b" types of assets and competences and obtain control over the transmission capacities by leasing them to carriers and PTOs.

The homogeneous alliance of users clearly represents a strategic advantage to its members, providing them with more efficient business processes. In order to gain control over the assembling process, these users' communities have maintained strong control over the design of services and network architecture. They have also developed their own data processing and communication management facilities. By controlling the assembling process they lock-in their suppliers (data processing companies or carriers).

Examples of homogeneous alliance in communication management services (such as SITA, and SWIFT) demonstrate the efficiency of this type of organizational arrangement.

The Société Internationale de Télécommunications Aéronautiques, or SITA, is a non-profit institution established in 1949 by 11 European and US airlines. The founders recognized that telecommunications was fundamental to the development of an effective transportation industry, and pooled their own communication circuits to establish an integrated network. SITA was created initially as a coordinating and planning entity, but quickly assumed an increasingly important operational responsibility. Today it is one of the largest closed user group communication networks in the world. It offers real-time services, as well as message switching and electronic mail services.

Since its creation, SITA has grown by impressive proportions. SITA is probably the largest and longest established communication management service in the world. It runs a variety of applications for the world's airlines including passenger reservations, cargo, and flight operations services, etc... SITA covers activities such as air transportation, freight forwarding, customs, airports, and postal authorities.

SWIFT is another good example of this type of service and organization. It is an international financial message exchange service. The SWIFT network is a dedicated financial network that banks use to move transactions and other information around the world. Users include the member banks, banks' branches and other financial institutions. The society benefits from special transport conditions in each country. SWIFT covers nine categories of financial services (e.g. customer and bank transfers, syndications, ECU meeting,...). All nine categories use the internationally accepted SWIFT standards.

The SWIFT system checks every message passing through the network for format and consistency. SWIFT
then encrypts a valid message and routes it to the destination bank, maintaining a copy for archiving. The SWIFT network maintains high levels of reliability. The high level of dependability coupled with end-to-end message and authentication, attract members to the SWIFT network. No other network operator offers such service reliability, backed by financial guarantees. SWIFT has the advantage of working in a closed market where the members define their own rules.

On-line transaction services

All of these services (15 cases) are network processing services, designed to meet the specific needs of some industries. The on-line transaction processing systems allow a consumer or an operator (e.g. travel/insurance agent, retail store clerk, bank personnel) to access payment services, make non-cash purchases, place orders for travel or event ticket reservations, or perform other application-specific transactions. These transactions generally include payments and are accomplished by inquiring and updating – in real time – a computer database that describes the status of the particular transaction.

This market segment includes some sub-categories of transaction processing: non-cash transaction authorization, credit card verification services, clearing, claims processing... All current computerized reservation systems (CRS) or financial on-line transaction services pertain to this sub-class.

CRS’ owners are airlines. Prior to the development of CRSs, individual airlines maintained their own scheduling and reservation systems (e.g. Air France’s ALPHA 3). The information carried on these systems was often national in scope, with only limited information on international connections and third party services. These early systems had several limitations. Over the years a number of systems improved this situation by incorporating multiaccess reservation systems. Today, CRSs enable airlines to offer enhanced customer services, with access to other travel services (hotels, car hire...). As on-line systems, CRSs enable airlines to manage loading factors more efficiently, discounting fares whenever there is excess capacity on a routing.

The largest and most successful CRSs, such as American Airline’s SABRE, are operated in the US. Only recently have the European airlines pooled their resources to develop industry-wide CRSs offering users a real choice of reservation possibilities. Most existing US CRSs have engineered relationships in Europe as a mean of securing growth into the European market.

The British Airways initiative GALILEO is a consortium of European airlines (Alitalia, KLM, Swissair, Aer Lingus). Equity in Galileo is split on the basis of the market size of each participating airline (passengers per year) and of their financial contribution. Galileo relies extensively on the existing national distribution infrastructure of the participating airlines. In fact Covia, a subsidiary of United Airlines is also a shareholder of Galileo. Through this association with United Airlines, APOLLO has been used to enhance the Galileo softwares and to widen Galileo’s commercial scope (by providing access to a world-wide service).

AMADEUS represents an alternative approach. It is a joint initiative by four of the major European airlines – Air France, Iberian Airway, Lufthansa, Scandinavian Airlines – each of which holds 25% of the equity. Other airlines participating in Amadeus do not own equity, but they have the right to suggest improvements and modifications to the core service. The software used by Amadeus is based on System One, developed by Texas Air (owner of Eastern Airlines and Continental Airlines).

The banking and insurance industries have also developed several on-line transaction services. Since 1981, Reuters monitor dealing service (RMDS), a computerized dealing service, permits foreign exchange dealers to communicate with one another and to conduct deals using the Reuters network. Advanced security and authentication has enabled RMDS to become the primary trading instrument within the market and between principal trading centres. For the 1990s, a new product, Dealing 2000, offers features such as confirmation matching and automated trading.

Another case belonging to this sub-class is VISA. Visa International is a for-profit, global partnership jointly owned by more than 10 000 financial institutions. Visa provides four elements: a card; some rules that govern the relationships among the financial institutions, the cardholders, and the merchants; a control service of fraud and credit loss; and a service enabling the merchant’s bank to recover the funds from the cardholder’s bank. Since 1983, the Visa services had included an electronic data service that eliminates paper transmission, and that ensures safe transmissions and verifications. Four basic services are offered: risk management; point-of-sale services; clearing and settlement; authorization manage-ment.

In each of these activities, knowledge of the commercial processes involved has been determinant in achieving a successful assemblage. This type of service is characterized by private systems and the formation of homogeneous alliances of users. Thus, this sub-class is user-led and it is difficult for IT suppliers to exert their influence.

Concluding remarks

In this paper we have emphasized how users – i.e. firms likely to buy the service – have gained control over a wide range of the VAS production. These services are especially designed to meet the specific requirements of an industry
and can be qualified as 'dedicated services'. The users institutionalize this control through the creation of 'homogeneous alliances'. These alliances buy on the market the services of the assets that are not controlled by the coalition (for instance transporation facilities). The above detailed descriptions of the different types of services that are dominated by users enables us to understand better why users are able to control the development of these services. For us there are three main reasons.

First of all, the users know in detail their business processes. As this knowledge is largely tacit and requires private information, no other category of firms is able to have such detailed information. Users are not necessarily incited to transfer their knowledge to a third party (Von Hippel, 1977). In fact, this knowledge is both technical and economic. It largely consists of detailed information on the different sources of inefficiencies. Moreover these inefficiencies have to be estimated in economic terms in order to classify the more important sources of ineffectiveness. This information enables users to have the best wisdom about the users main needs. Therefore, they are able to clearly identify the types of applications that can ensure a VAS success. On the other hand, it is very difficult for an external partner to know if one type of application is more valuable for users than another.

Second, users do not only know the problems, they also know the solutions. Their precise knowledge about their own business processes and about their sources of inefficiency often enable them – better than any others – to conceive new business processes, as well as new information handling processes. This is true because they often have good knowledge about their competitors and their own past experience. They can also estimate the cost of changes, and approximate the success probability of a project, etc... Thus they are able to conceive the specifications that will make a VAS a valuable solution. Moreover, the conception of the solution is a 'strategic' process that users want to control. Even if they do not possess all the know-how, they want to play an active role in the development process. The ability to conceive the required specifications can be pointed out in the 'specialized communication services' segment (first subcategory of the dedicated services class). In this subcategory the users subcontract the actual realization of the service to companies specialized in VAS production (GEIS, for instance). However, the users also often have good software and telecommunications systems development abilities because they have often engineered their own information systems. This is why in certain industries – such as the banking and the air transporation industries – the users do not subcontract the realization of the VAS. Moreover, this solution – adopted in the 'community services' – enables users to maintain long-term control over VAS development because no non-user company is able to acquire the users' knowledge. The adoption of this internalization solution is also explained by the fact that no telecommunications operators or software companies were able to take on the production of such sophisticated and internationalized services.

Third, the association of users often constitutes a condition of success at the time the service is launched. These users constitute an elementary community of 'clients' – i.e. firms that actually buy the service – thus lowering the development risks. They also constitute a first community on which tests are performed in order to ensure a good quality of service.

Thus because the users have a good knowledge of the problems and of the solutions and because they constitute a first community of 'clients', the users are in a good bargaining position to gain control over the development and the production process of the 'dedicated VAS'. However, although their knowledge is a specific asset, it is an asset that can not be exploited by a single company alone. If a company tries to develop its own service, the other companies in the same industry will probably adopt a similar strategy and nobody will be able to reach the critical mass. Therefore, to ensure the development of these services, that often produce strong network externalities, the users have to create coalitions. With the competing CRSs, the transportation industry is the sole significant exception to this rule.

As there are often strong network externalities (Katz and Shapiro, 1985), new clients will prefer the VAS that are the more widely diffused. Therefore, for each category of VAS developer, the ability to be present at the launching of new market segments represents a strong competitive advantage. The first mover advantage is a high level entry barrier for new comers on the VAS market.

The increasing corporate emphasis on the business value of communication systems and services rather than on the technology of basic transportation can be identified as one of the specific driving forces of the VAS market. Another is the necessity for the PTOs to increase the value of their services. The national PTOs see VAS, correctly, as a means by which third parties can capture their high value business communications revenue. However, this article demonstrates that the national carriers are severely disadvantaged in not understanding the needs of specific users and that they have little data processing knowledge or experience in establishing or operating such processes. Therefore, it seems important for PTOs to develop strategies aimed to acquire a part of the users' knowledge (Von Hippel, 1985); for instance through partnerships with users.

In a sense, the computer manufacturers and the data processing companies are in a better competitive position than the PTOs thanks to their ability to understand business needs. This ability relies upon their strong
involvement in the development of the users' information systems. The ability to analyse client requirements and to translate them in 'solution' is also one of the basic know-how of software and information system designers. Moreover, as opposed to PTOs, computer manufacturers and data processing companies are not constrained by national boundaries. Most of them are multinational firms that are able to provide continental or world-wide services. In a global economy, this ability to overcome national boundaries is a key factor of success. Large software companies may play a go-between role for a community of users which would develop international services. They can also provide interconnection abilities in order to connect different national VAS.

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References


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Appendix A

List of active variables

3—Strategic segments
   Telecommunication services
   Communication management services
   Network processing services
   On-Line information services

5—Assembling processes
   Homogeneous alliance
   Complementary alliance
   Node-firm of sub-contractors

Type of participants to the assembling process
7  Computer manufacturing company  No: 117  Yes: 8
8  Software and data processing company  No: 99  Yes: 26
9  Carrier and PTOs  No: 91  Yes: 34
10 Information provider  No: 95  Yes: 30
11 Service end-user  No: 95  Yes: 30
12 Other service provider  No: 117  Yes: 8
   Miscellaneous  Abandoned

Assets and competences covered by the arrangement
14 ‘a’: Transmission  No: 109  Yes: 16
15 ‘b’: Communication management  No: 84  Yes: 41
16 ‘c’: Automatic information processing  No: 121  Yes: 4
17 ‘d’: Editing service  No: 120  Yes: 5
18 ‘a + b’  No: 103  Yes: 22
   Abandoned
19 ‘a + b + c’
20 ‘b + c’
21 ‘b + c + d’
22 ‘c + d’
   ‘Σ’

32—Structure set up for the management of the institutional arrangement

   Single firm  77
   Balanced equity joint venture  5
   Unbalanced equity joint-venture  15
   Non-profit organization  15
   GIE  13

Assets and competences covered by the sub-contracting relations
41 ‘a’: Transmission  No: 29  Yes: 96
42 ‘b’: Communication management  No: 11  Yes: 14
   Abandoned
43 ‘c’: Automatic information processing  Abandoned
   Abandoned
44 ‘d’: Editing service  Abandoned
45 ‘a + b’  Abandoned
   No: 95  Yes: 30
46 ‘a + b + c’
47 ‘b + c’  No: 114  Yes: 11
   Abandoned
   Abandoned
   Abandoned
   Abandoned
   ‘Σ’
## Appendix B
Composition of each class

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<th>CLASS 2</th>
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