Border effects in videotex networks

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The network background

This paper discusses effects of organizing videotex services, where several service providers get together in an effort to increase their market success. This has become noted in Sweden, where the TeleGuide group has formed a consortium with cooperated market activities. However, the situation is of a general nature, and may well be of interest in other types of networks as well.

The paper also touches on the concept of critical mass in videotex networks.

In an open network that, for example, is built on a videotex standard, a number of service providers offer services that compete with each other on a network that is the carrier for these services. It is generally considered important that the business conditions for these service providers should be fairly equally available in an open network. No one service provider should have specific advantages in the network above other service providers. This might concern availibility of technical functions, like for instance access to search word facilities or service combination facilities, or administrative matters, like access to certain payment routines.

When a new administrative systems feature is introduced in the network, this feature ought to be available on an equal basis for all competitors in the network. An example here could be the function called reroutage that was introduced on the Télétel network in 1989. This is a network function that makes it possible for different service providers to share resources, and to form combinations of services. This was made available by France Telecom to all Télétel service providers at the same time (although some of them agreed to test it before market introduction).

On the other hand, it is naturally the privilege of any service provider to introduce her own new service development, in order to increase market possibilities. An example here could be the introduction of the use of certain very specific new logical combinations of search words, an especially user-friendly search language. Such a routine then is principally introduced as a pure market effort by a single actor, since it is of a commercial nature in scope.

Multiple services

Videotex services are most oftenly offered on a network market with large numbers of competitors. It is generally considered important that this market can offer services in numbers large enough to attract expert users as well as non-expert users. Videotex is not only considered to be a professional tool, with narrow services for sharply defined audiences. On the contrary, many observers share the view that the characteristics of videotex are defined for broad use, by more or less everybody.

We can also express this in the way that videotex offers possibilities to satisfy certain demands for services by large audiences of unexperienced users, comparable with how the newspapers fill the demand for everyday news. Newspapers are one-way media.Videotex offers interactive services for everybody.

In order to attract large numbers of such "unexperienced" users, a videotex network has to offer quite a number of services, covering many fields of interest. Examples are banking, shopping, news, mail, culture, public services, entertainment etc. This list does not principally differ very much from country to country. The needs are general. But there are innovative differences in service offers.

Such services demand expertise in many application fields. It is quite natural that the service providers that find themselves as competitors on this market start to think about scale rationalization. They form consortia, or start activities in adjacent areas of interest. This has been going on for some time during the 1980-s.

Types of cooperation

The French Télétel expansion naturally is dominating for the world´s videotex community, with over 5.5 million Minitels and over 12 000 network services - in many combinations. There is service provider cooperation on several levels.

In certain cases new types of cooperation is considered cruical also when new markets are to be born. Early getting together can be neccessary for commercial success. An example: after a number of trials by other market participants with varied success , Prodigy was started in the beginning of the1980:s in the US, combining the abilities of the world´s leading equipment and systems provider, IBM, with the knowhow from one of the leaders in retail shopping, Sears Robuck. This combination was organized to maximize chances for market success. Prodigy is expanding strongly at the present time.

IBM is also present in another - threefold - group, TeleGuide in Sweden. Here a leading Scandinavian publisher, Esselte, 1989 is joining with IBM, and with Televerket, the public telecom network operator in Sweden (with plans to become privatized at the time of this writing).

The forming of TeleGuide points at a special organizational situation for networks of videotex type. The background is the following.

In TeleGuide, the market activities are built on the development of a special dedicated terminal, making available a special software package for PC´s, and introducing a smart card for log in and user identification purposes. The terminal and the software, plus the smart card, is to be distributed in large quantities.

The TeleGuide users thus have the advantage over other users in the public Swedish videotex network that they have easier log in and identification, via what surely is more user-friendly equipment. This represents the competitive advantage of TeleGuide. TeleGuide invests in user friendliness, in order to reach market success.

TeleGuide is developing cooperation deals with a number of leading service providers, for banking, retailing, news, entertainment etc. These are to provide specially adapted services for TeleGuide users. Such adaption concerns unified formats and user behaviour rules.

For the 1990´s, the situation for Swedish videotex thus will be of a dual nature:

- Old users have access to services on Televerket´s <u>open</u> public network
- New and increasing numbers of TeleGuide users have access to TeleGuide services on the <u>closed</u> TeleGuide network (which physically is a part of Televerket´s public network). TeleGuide is an umbrella service provider.

It is stated that there will be possibilities for old users to reach the services of the new users, and vice versa. But how is this to be organized?

Border effects

TeleGuide will make use of a differentiated scale of payment levels, similar to the French kiosque price levels. These levels will vary from free access (no charge) up to SEK 10 per minute (approx. 10 French Francs/min).

Use of this payment system will make it possible for TeleGuide to collect time fees for each minute that a TeleGuide user uses a service that is available in the TeleGuide network area. TeleGuide functions as an umbrella, above a certain amount of service providers. The amount that a user pays for a session will be divided between the service provider (for instance a bank, a retail shop etc), TeleGuide itself, and the network operator, Televerket.

The problem of organizing concerns users who also want to use services that are placed outside the TeleGuide area in the network. Let us consider the situation for a user who spends the first part of her session time inside TeleGuide, and the remaining part of the session outside TeleGuide, in the other part of Televerket´s videotex network. For the first part she pays the adequate amounts to the TeleGuide service provider, to TeleGuide itself plus to Televerket. For the second part she pays to the service provider she uses outside TeleGuide, and to Televerket. The user pays differently in different parts of the network.

It might be possible to organize this practically, also if crossing-the-border costs would become used. At least in principle it could be collected part-costs for each second of use, for each user. But this would be a lot of work for the network administration, since it might well be common for a user to cross borders in the network many times in a session. Each going "back" into the TeleGuide area would imply change back to other billing routines.

Also, it might occur later - who knows - that other constellations of service providers get together under a new umbrella and propose billing levels of their own. TeleGuide might get succedents. Also these might desire definition of special rates for use of "their" services. It might therefore become relevant for a certain service provider to use different rates for usage of its services in different parts of the network.

Network border duty

If a number of umbrella service providers offer services "aside each other" in a network, then user tariffs thus may well differ from area to area. One umbrella might also want to discourage users from leaving "her" area, and therfore introduce duty for users who enter a competing area. There might even be one-way streets, streets that may be open at certain times, and closed at others.

Different area tariffs, possibly plus customs duty when passing certain borders in a network, no doubt introduce administrative complications. But it must be remembered that special investments in organizational and marketing activities from an umbrella service provider group, like for instance TeleGuide, naturally have to be paid for. A closed service that wants to make a profit must try to keep its users inside its network area as long as possible.

One way to solve the upcoming tariff administrative problems would be to collect all user behaviour costs in each users smart card. This raises a demand on the software for handling the card. But it could no doubt be managed for PC users.

It is also worth noting that from the user´s view is ought to be known what tariffs that are valid for the services she uses each moment of a session. Travelling around in a network where large numbers of tariff differences are used raises consumer information concerns.

Critical mass

The distribution of services in networks is seldom purely linear, i e is spreading straightly parallel with the number of nodes. There are borders to be passed, and threshholds to be climbed. The concept of critical mass becomes interesting.

A critical mass is often seen as a minimal number of node functions, (services, users etc), in a network that is needed for a certain activity to take place. The concept of critical mass however should be related to a certain variable in a network. In commonday use, critical mass often simply refers to a certain number of nodes in a network. This number has to exceed a certain level for the service to be successful in some sence. Usually this "sense" concerns profit. Naturally, other possible such "senses" exist.

However, pure number of node relations is not always sufficient in order to make an estimation of the critical mass for a service. Consider for instance an electronic mail system. Quite often, mail nodes (in this case physical persons) contact each other more than once in a certain time period - the contact distribution function is not a constant function. In these cases, the critical mass can not be calculated purely on the linear basis of numbers of nodes. We also have to know frequencies for the activities of each node. Estimation of critical mass becomes more complex.

From a qualitative viewpoint, it might be stated that passing of the critical mass in a network occurs when an adequate number of development activities at a certain moment in time turn towards the same direction. They decide to cooperate and pull in the same direction.

For the spreading of certain telecommunication services, like facsimile or videotex, analysis of critical mass - number of participants - have been considered interesting by many observers. For facsimile this can be seen as evident, because for such a technology to spread it is essential for a sender to know that she really is able to reach the receiver. For electronic mail the same reasoning can be applied.

For videotex the situation is not that simple. Videotex services contain much more than mail. However, one might state that for videotex services to spread in a country, it is of importance that "its" mail function is accepted.

Pure mail services in a videotex service package show less value addition than other interactive services in the same service package (for instance of type on-line ticketing or banking). The latter usually connects or refers to more fresh and sophisticated database services than the former.

Following this reasoning, we might note the following qualitatively based assumption: <u>The critical mass for a service on a higher degree of value addition is less than the comparable critical mass for a service with less value addition.</u>

As mentioned above, critical mass often refers to border for profit. But, the concept of "videotex profit" has to be defined: profit for whom? There are at least three principal participants on the videotex market: the customers, the service providers, and the network operators. The customers use videotex if it is "profitable" in some sense for them, concerning money, time or qualitative content. Quite often time here has the highest value. The service providers make a financial profit if they can attract large enogh numbers of customers. The network operators find videotex profitable if their network carries enough traffic. Since there unfortunately - so far - is available only little data to describe details of network profit for large telecommunication networks, statements about the overall videotex profit mostly concern the situation for the service providers. If large numbers of service providers are making a profit, the service as a whole is seen as successful.

Again, one of the problems with profitable videotex for network operators is the difficulty to define network profit. There are many services on most telecom networks, not only videotex. These are available for varied amounts of time. The network itself is upgraded regularly with new technical functions and higher transmission speed possibilities. How should all these financial and technical uncertainties be handled? The estimation of critical mass for network profit certainly carries questions about definitions.

The critical mass for overall videotex profit has been discussed for quite some time. For Télétel services in France, it has been mentioned the number of 1 000 000 Mintel terminals as a cruical number. This is comparing with a total population of approximately 50 million french inhabitants. After 1987, when this million Minitels was reached, proponents for the french videotex system were markedly more optimistic about its coming commercial success. The border was passed.

However, other countries tend to use much lower numbers. For Sweden, with fewer inhabitants but high penetration of telephones, and also of modems, higher than in most other countries, a relatively lower critical mass number is natural. In 1990, there are only 8.4 million inhabitants in Sweden as a whole. Taking this in consideration, the critical mass for profitable videotex (at least for a relevant number of service providors) in Sweden has been estimated to lie almost a factor ten below the french figure. The accuracy of this estimation remains to be shown.

It should be repeated that the concept of critical mass is of interest also for other concerns than profit. It may concern social acceptance, of mail or fax or even video-tex as a whole, but with the interest focused on threshholds to be passed for a service to be "accepted" as commonly accepted and available. Telephony has surely passed this level, when does fax, when does non-french videotex? Judging from the history of telephony, it might be possible to find the time period where this medium was socially accepted. From this it might be possible to extrapolate into the fields of newer media. Acceptance curves for dissimilation of different types of technology show similatities. However, they must be qualified with specific media characteristics.