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Access as Value Addition

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Abstract

Value added information services often stress content that is given, or that generates added value. But also form plays a role. This text will comment on the value and consequences of simplified access possibilities for information systems users. Effects of disappearing borders within information systems will be discussed. These effects are likely to have broad consequences in many parts of society.

Background

It may be allowed in this context, as a point of departure for this discussion, to remind ourselves the time span we are referring to when we analyze expanded access to information resources. In an early contribution to the analysis of computer operating systems principles (Bubenko-Ohlin, 1971, chapter 10 (in Swedish, translated here)), it is noted:

> "Today´s .... computing systems .... can hardly be regarded as complex, considering what we may expect in the future, with networks of different size computers, databases and terminals .... a development- and user-friendly operating system may be very hardware resource consuming. We are left to evaluate possibly decreased personell costs, increased "user access value" and possible gains concerning system starting up time, against possibly increased hardware costs".

The discussion about balance between user access systems demand, and system performance, apparently has roots at least from the early 70s.
This paper expands further on the effects of change in system access. .
Over the years after the time when the above statement was presented, it has come to be clear for many that increased user convenience and decreased total system cost go together. This is partially because of decreased hardware costs, something which the competitive market has had as a consequence. But it is especially the fruit of a value change in the minds of many. The position of the user of information resources today is simply considered to be more important than was the case a few decades ago. This is partly because user communities today are larger and more active than they used to be, but it is also the fruit of a qualitative change of opinion.

Borderless systems

At present, around the change of the century the statement is often heard that "borders" connected to and situated around information systems are being observed to be less sharp than they used to be. The word "seamless" systems is also increasingly used. This situation to some observers seems "evident", and is simply taken for granted. "Information systems make it possible to cross over borders", it is said. And that is that. The effects of this are being noted with increasing interest by many, and consequences are starting to be

discussed. This situation has not only technical, but also organizational, social, economical, legal origin, and they are, to this authors opinion, not at all concentrated around information systems only. It is worth elucidating some of the reasons behind. Possibly there are lessons to be learnt about the expanded organizational, economical etc applications of this development. Will its importance increase, or will it change, perhaps with a result in an opposite direction, so that there is less concern?

We argue here that a decrease in application importance over time is not likely to appear. Let us discuss the reasons for this.

First, it is easy to note that the economic and technological development to increasingly low-cost communications technology, at the change of the century makes it ever cheaper to use border-overlapping "methods" in information systems. Telecommunications facilities of today make this possible, cheap and acccessible. It is simply easier to communicate because networks are easily accessable, and physical borders are easy to overcome throught efficient programming. These new bridges are ususally defined to be stable and firm.

There are also other reasons behind the changed view on the decreased importance of borders in information systems.

Conceptually, there exists unlimited different views on the concept of a systems "border". What is regarded as a border in one view is an inner systems characteristic in another, or an outer in a third. Thus, the discussion on borders here does not refer to a fixed, welldefined and standardized view on the concept. Rather, it is applied generously, on the concept "border" as it is seen in many actual applications.

It is possible that some roots for "border dissollution" have their origin in the information science field. Mathematically and logically, a border is infinitesimally narrow. However close you examine it, it is just as narrow. In "real life", however, socially, legally or organizationally, a border often is quite substancial, more like a thick hedge, a hurdle. You can even measure its thickness.

Borders in information systems are narrow, sharp. They are logical. The closer we look, the more details around the border we can find, but the border itself is untouched. The border stands there like a statue, invariant, unreachable by rain and storm. We can build a bridge over it, but we cannot touch it. When we refer to and discuss this border, we refer to its origin, the presumed border "core", that nobody really has seen or touched. We can build a bridge over that core, a small but dramatic bridge, by defining an adequate core bridge concept and include that in the actual system. It may be a simple construction, but it overlaps the border core. We know it is there, although we don't see it very clearly. As we depart from this close view, this characteristic is still there, we know there is a bridge in there, but we don't quite know where. It suffices to know that there is a bridge there somewhere, available to be used for somehow crossing the border. The border is not as relevant any longer. Crossing over it has been made possible.

A purpose for this discussion is to make plausible that even small border crossings may have large effects.

Let us look at a more market oriented technological background for the decreased border importance.

The legal and organizational system around information services in many countries has traditionally been different for "database" services than for "telecommunications" services. The roots are different. Database services were born on a market, a market where influence from western countries, especially USA, was strong, sometimes dominant. In the 1970s, the supremacy of IBM was so intense that this company was almost considered untouchable. There existed a market de facto monopoly. The functioning of market principles even around this exceptional monopoly was proved when it turned out that even

this position could be shaken, moved. Sometimes only a limited market mistake is enough, like the understanding for the importance of the personal computer. The change to today´s market dominance by another market player (in this case Microsoft) was considered to be almost impossible two decades ago. However, the facts of today prove that hardware and software development was born on a real market where competition is a reality.

The situation for telecommunications services was different. In many countries, there were natural or legal monopolies around basic telecommuniations services, and especially telephony. In Sweden, this monopoly at the start of the former century was born as a private and natural monopoly, but it grew to be placed closer and closer to public ownership. This was partly for strategical and, later, military reasons. As computing systems were expanded in the 1960s and the 70s, those systems that wanted to use telecommunications facilities had to cooperate with a public structural monopoly for telecommunications. This monopoly in the beginning definitely was not applying competitive principles for its presense on what was to beome an information systems market. But this reluctance was changed when the need for increased resources became evident, and when the principles of open markets from the computing services came to be putting increasingly stronger pressure on the telecommunications systems.

As computer technology was developed to be more and more flexible and efficient, it came to be obvious for telecommunications systems engineers and managers that more general purpose computing equipment was natural, and soon nessesary, as building blocks inside many types of telecommunications systems. This was an effect of availability of increased hardware and software efficiency, both born on the computer market.

As these computing systems elements technologically became integrated into the expanded telecommunications systems, it became evident that also the principles for their market existance had to be integrated. It turned out to be impossible to implement public or private monopoly control over integrated systems where many subsystems were organized after market principles. Development and delivery was simply principally too competitive. One side had to give up.

The fact that most information systems then as well as today integrate both database and telecommunications technologies lead to the situation that the legal and organizational forms for one of the two principal sides mentioned had to give up. This turned out to be the monopolistic one - a "market decision" that was not evident in the beginning, and which caused much questioning at the time.

However, as a result, telecommunications systems organization were moved from a monopolistic environment to a market. The divestiture of AT & T is an early but notable effect of this change. This demonopolization is a shift that has generated many followers. Still, in the beginning of the new century, in many systems this change turns out to be more of a complicated cultural shift than it is a technological and organizational one.

With a common market principle behind, it is today natural with business motivated border crossings inside many information systems that use both data base oriented and communications subsystems. A system convergence is taking place. There are many effects of this. Some important ones are cultural.

Also legally, in many countries, this convergence is demandingly difficult, because telecommuncations systems often carry much of the mass media - especially TV and radio - who nationally often are both legally and organizationally regulated in quite different forms than other, industrial and educational etc, information systems.

A third effect behind this cultural change concerns the position and the desires of the information systems users. Users traditionally have felt and expressed an unsatisfactorily limited influence over information system structures. This has included the system structure decision making. The system providers and equipment deliverers from the beginning have been placed at the steering wheel. Users have demanded better access to

the decision making. This has been supported by organizational efforts, and increasingly strong user opinions have been presented to the information system constructors. Concerning communications systems, the users have found monopolistic telecommunications organization less flexible, and demanded a greater influence through plurality.

As a result, the border between market and monopolistic structures has been challenged.

Summing up the reasoning that has been referred to, we find ourselves with a clear result about border importance: borders are not as apparent any longer inside information systems. There may also be prejudicates. Those borders that do appear, are not considered and being observed as seriosly as was the case a decade ago. It is increasingly easy to build bridges, whether real or virtual.

It is interesting to note that this, partly theoretical and to its applicability primarily limited, conclusion seems to be having exceptionally strong effects in environments outside of the information systems themselves. The effects of this have shown to be of many different types. They are social, economical, legal, and cultural, and more. They have also shown to be close to organizational and political changes. National borders are no longer as important as they used to be. It is simple to transfer data, but - more important - a change of communications culture has taken place.

User distance

Dissolved communications borders are relevant for information flows. But they also imply a change of player roles. Players who traditionally were active inside a system, now find themselves related to external activities that they often earlier simply did not know of, or were familial with.

It is of interest to consider how the decreased importance of borders affect the distance between information systems and their users.

Traditionally, when the information system referred to well defined separate pieces, hardware/software and communications equipment, there were evident borders between the system and the user. Early, in the beginning, this was espcially evident, as there were physical and logical glass doors and windows around the "computer room". You had to book time for access to these amazing machines.

As time has passed, focus, or the heart, of the information systems, has been transmitted to positions closer to the user. The rational parts of a system are being standardized to form, and more concern is placed on the non-rational, emotional, parts, "the soul in the system".

How is the user affected by this?

As the communications functions in many systems grow to be more important, the users find themselves at a physical distance from each other. But logically this naturally is not so. Users become part of a larger system, a system that often grows to be more and more distributed in structure. Then, as systems borders and boundaries are lowered and overcome, as they even disappear, with an exxageration perhaps we may say that also the users´ distinct appearances almost disappear from sight. They find themselves somewhere, out there, in the outer parts of the system. The system takes the shape of a continuum, where there are no barriers or discontinuities, and where the users are active in the outer but integrated systems parts.

New systems tend to become increasingly continuous in shape. Their parts float. In this, the user is no longer as well defined as she was before. She takes the role of a direct partner, with the original meaning of the word.

Naturally the user wants access to the fundamental parts and functions of the system. She demands not only access but also possibilities to take part in the decision making about the system, the strategic positions to be taken on what next should be given priority. This is, at least potentially, made easier through a borderfree structure.

Broadened empowerment

With this in mind, we may consider the division of information access, or "power", inside a system. Lowered borders invite to division of access, to keep the system going, to keep it "happy" by inviting all systems elements and functions to take part in the systems´ work, aiming towards the overall systems goal.

With lowered borders, the user takes a step towards being active not only as a consumer, but also in the production of information, or, to follow Toffler, she becomes a "prosumer".

The closer information systems mirror real life, the more their administration and maintenance may also mirror the type of social structure that we have built in our real world. Users are systems citizens, and the systems basic software are public administrations.

Within a system that is characterized by a lack of borders between processing facilities and input and output resources, the system usage is a continuation of the system itself.

The digital divide

The concept of digital divide often refers to unbalanced access to the Internet and subsequent applications resources. Socially, it is generally considered desirable to spread information access to all users, all citizens. This opinion is shared by many. We may formulate fundamental democratic reasons for this.

In any system, because of lack of manufacturing precision and for other reasons, there are discrepancies, functions that more or less temporarily do not work "up to specifications", parts that do not behave. As a consequence, users who are in touch with these functions at times find themselves at a disadvantage, being left without adequate access to important system resources. There appears a "digital divide". This also may be the fruit of unbalanced user knowledge, or incomplete systems planning.

Let us consider the Internet.

A recent package of supportive actions in the US has, at the turn of the century, been suggested for spread of access to the Internet. President Clinton has revealed the details of a multibillion-dollar proposal to ensure that all Americans have equal access to the Internet. Clinton's plan to bridge the digital divide offers $2 billion in tax breaks to technology companies in exchange for their participation in the effort, $150 million in technology-training funding for teachers, $100 million for the creation of 1,000 technology centers in low-income areas, $50 million to help low-income families purchase computers, and $45 million to fund the creation of technology projects in low-income areas. In addition, the plan contains $25 million to help the industry provide broadband services to rural and other areas, and $10 million to help train Native Americans for careers in technology. The hope is said to be that the plan will make Internet access as common as telephone access in America.

This last statement does not get the same meaning in the US as it gets in Sweden and Finland, with their already close to universal telephony access. Comparing to these two countries, it is an even stronger statement.

Similar plans, if not of the same quantitative size, are presented in other countries.

These measures against a digital divide are supported by the evolution mentioned earlier, with decreased borders in fundamental information systems. The efforts are aiming at common access to fundamental information and communications resources. Reasons may be looked upon as democratic rather than market oriented. For instance, providing Internet access to all users of fundamental public information systems, citizens as well as companies, refers to a type of value addition that increases the common resources for everybody in a country. A smooth society.

We argue here that, because of their borderless nature, this development is more natural for information systems than for other types of systems.

With an example from the telecommunications organizational concepts, value addition in the form of expanded public systems resource access may be looked on as a type of expanded "universal service" within an environment. Lowered systems borders no doubt will support distribution of such services.

Value addition forms

The conditions for value addition for the information systems discussed are changing as a consequence of the structural change that follows lowered borders. Value addition is looked on as a central concept for market acceptance of new ideas, products and services. The type of value addition that now appears or may appear, is built on a continuous platform.

Traditionally, the existance of friction is a basis for successful market activities. The successful business woman markets products that successfully treat relevant types of systems friction. What happens on an arena where there are less and less borders and friction? Border bridges, the increased continuums, overbuild friction. If friction may help create the basis for successful market transactions, this may result in decreased competition possibilities.

The smooth and continuous market then perhaps is not as inviting for innovative development, and not potentially as profitable as the market where there are bumps, mountains, valleys, friction. Smooth future information systems may then, at least in principle, turn out to be less inviting for profit seekers than today, because of lack of discontinuities and borders.

But then, there naturally are markets where onedimensional friction is not the only parameter of importance. There are markets where success, where the function to optimize, is multifacetted. There, smooth and soft information systems may find "profitable" natural environments. These may be looked upon as democratic fields. There, the soft and smooth systems will have good prerequisites and possibilities for success. Satisfactory systems access naturally is valuable for efficient system usage. Valueable access generates a high degree of value addition.

As access to information systems becomes increasingly integrated, borderfree and smooth, such value addition that is related to this access, also becomes less visible, apparent. There is an almost quantitative connection between access and this type of value addition. The more smooth we make the system access, the smoother we also find the degree of value addition that is related to the access.

Systems resources, in this case like access to data bases and communications facilities, in short systems power, will likely be distributed more equally and democratically in systems with low boundaries. If, on the other hand, we fear that user unequalities, for example for social reasons, will appear, there is a need - at least temporarily - to build borders around

these inqualities, in order to define specific counteractions there. However, over time also such artificial borders will be overbuilt by natural smoothening efforts.

The position for innovation

Difficult situations invite innovation in order to overcome the difficulties. Borders create difficulties. If the systems development implies decreased amounts and forms of borders, and increased systems continuums, we may find less room for innovation. This may lead to more static systems, systems that are not dynamically being developed as fast as before, and also to less creative systems. In this respect, smoothness can be balanced against the bumpy road, ground for innovation.

Smoothness thus is a positive factor for user friendly systems access. A smooth system also makes moving around inside the system easier. It invites flexibility. On the other hand, smoothness may counteract innovation. Will future information systems be less innovative and more stable because of their user friendliness?

Summary

Activities that aim towards increased access to basic communicative resources, Internet for everybody, are desirable as a democratic platform for users, citizens and companies. This type of smooth value addition forms basic prerequisites for efficient information services of many types. Without doubt, this is for many democratically desirable.

However, there is a price to pay. The smoother we make the platforms, the harder it may be to find room for creativity and development. Market oriented motives often are onedimensional, but democratically oriented motives often are more multifacetted. As more capable basic resources are being considered important for users, increased interest is being placed at the multifacetted motives for future information systems. It is surely more challenging to optimize towards these, but resulting systems may likely turn out to be more longterm sustainable.

As users are integrated in the systems of tomorrow, systems structures will likely be stronger, and user-less systems will certainly not appear as useless systems. Smoother access to many concerned will likely be considered to have positive value for large groups of people concerned.

Increased smoothness in information systems is likely to generate major organizational effects in large parts of society. The effects from these systematically and technologically motivated merges of telecommunications and data base systems have so far been amazing. They have reached far longer than expected, and in short time. Furthermore, it is not likely that these merging and smoothening effects yet have found their limits, and lost their power. On the contrary, they likely will continue to influence not only technological but also social, cultural and political information systems on all levels.

References:

Becker, T & Slaton, C	The future of Teledemocracy, 2000
Castells, M	The Information Age, vol I, 1996
de Sola Pool, I	Technologies without Boundaries, Harvard Univ Press, 1990
Farrar, C	"You left out the Italians!": Difference and Democratic Citizenship, Stockholm, Sept 1999
IA Newsletter	Internet Alliance, USA, Feb 2000
Masuda, Y	Information society, Tokyo, 1980
Ohlin, T	Sprid medborgarmakten,IT i demokratins tjänst, SOU 1999:117
Toffler, A	The third wave, 1980
Tsagarousiano, R	Cyberdemocracy. Cities and civil networks, 1998
Wresh, W	Disconnected, 1996