Virtual Organizations

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1. The term and concept

New technological possibilities bring with them a flood of new terms. Alongside terms like information highway, multimedia or information society are the "virtual organization" expressions, terms like virtual firm, virtual administration, virtual university, virtual office, virtual files, virtual café, virtual city, virtual reality - the list could go on and on.

However, this inflationary use of terms brings with it the threat of a lack of linguistic precision. There is the chance that the term "virtual organization" means everything and nothing, that meaningful communication suffers. On the other hand, this flood of new terminology is, at the same time, a sign that we are in the initial stages of describing a new phenomenon for which the proper language has yet to be found.

Therefore, it is advisable that we first subject ourselves to philosopher Georg Wilhelm Friedrich Hegel's suggested "discipline of terms". Otherwise, we run the risk of talking over each other's head, and perhaps, we may even miss the essential point and let a fine opportunity go by.

With reference to this topic, the term "organization" calls up sufficient standard associations. However, the term "virtual" requires clarification. As is often the case, an etymological approach is useful. We can begin by taking the latin stem "virtus" as a point of reference. We can then ask ourselves what the generations before us wanted to express, what form of reasoning did they want to convey when they infused this stem "virtus" with meaning.

We will soon see that this meaning is much more than "ostensible", "invisible", "imaginary", "everywhere", "always available", or, - as it is today - "electronic", "digital".

Nevertheless, our study can begin with that use of the term: We will call "virtual" an effect, a power, an effect which really exists although one cannot observe it exactly. Such physical phenomena are known in quantum mechanics. They are known to exist but, because of Heisenberg's principal of uncertainty, they cannot be measured. A more common example would be a minister of state who, due to his actual influence in politics, is the real, the secret, the virtual president. Virtual is, then, that on which everything else depends, the prime mover which is difficult to recognize behind the scenes.

On the basis of this definition, is a virtual bank a bank without a building and teller-counter but which, in the background, still carries on financial business, i.e., transfers money from account to account or gives credit? The term "virtual organization" is actually often used in this way and, indeed, with "home-banking", one does only get forms on the screen.

However, this understanding of the term would not be complete, indeed, it would leave out something essential. We realize this when we concentrate on a meaning which is also linguistically linked to "virtus", namely, the meaning of perfection, virtue, high quality, excellence - a meaning which is similar, for example, to "virtuosity" used in the sense of a perfect mastery of a (e.g., musical) technique. However, to return to our example here, what is, in this sense, a "virtual bank"? Is it the doing away with spatial distance, the freedom from opening hours, surmounting the internal, organizational division of labor and the limits on areas of responsibility, the protection from the manipulations intended by bank employees, the freedom from their levels of ability and daily form? It is probably all of these. However, something crucial is missing. In bank business, the exchange of problem-oriented information is not the only important thing in bank business. Context communication[1], from simple human attention in a personal conversation to building a basis of trust and an improved mutual appraisal ability in business affairs or familiarity with situational circumstances, is also important.

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1 Cf. Watzlawick, Paul, Beavin, Janet H. and Jackson, Don D., Human Communication, 8. ed., Bern etc. 1990.

The meaning of the term "virtual" in the sense of complete and perfect leads us to a question of truly great importance, namely, the question as to what a bank is really supposed to be in its core, in its character, in its function. What role is it supposed to play in its surroundings, for its clients, its stakeholders? Of course, this has a lot to do with information and communication technology because these provide new forms in which functions can be carried out. "Form follows function" was a famous saying of the Bauhaus movement in design art. Whenever the designs take on new form - as in the Bauhaus period when new construction techniques and materials were created or, as in the present time, when new electronic information and communication possibilities are available - , they can and should be redesigned so that they improve functional capacity, that that which is critically important can be realized more effectively.

At closer examination, "virtual" means anything else but "ostensible". Actually, a virtual organization is reinforced in its "reality" because it concentrates on the "essentials" and is freed from physical limits and non-essentials. A "virtual computer storage" which, through rapid processors and cunning software programs, is continually growing over and beyond its actual storage capacity is really useable. For the user, the really available, the virtual amount is decisive, and not the true amount which he/she possibly does not even take into account. Or, we can take a "virtual patient" as a graphically illustrated computer-model of exactly that information which is necessary for, let's say, a therapeutic heat treatment for cancer. This graphic illustration is, for the doctor treating the case, the exact reality which he, as user, needs in order to test the correct setting of the electro-magnetic waves which emit from the heat source, and then, to use this setting on the living patient. The doctor really uses the virtual patient in order to perform his task.

With regard to our specific example of the bank, and regarding virtual organization in general, the conclusion must be drawn that in order to make a real organization into a "virtual" organization, it is, generally, by no means sufficient to simply exchange the media, e.g., paper and human actors for memory chips and processors, while allowing existing concepts and structures to more or less disappear into the background behind functions which are mainly carried out electronically. In so doing, one does not do justice to the meaning, the intellectual concept of "virtus". One would also run the risk of throwing out the baby of traditional, though often latent virtues with the bath-water of presumed progress.

The process of creating virtual organizations requires weakening the weaknesses of existing organizations and strengthening the strengths, as seen from the clients' point of view - this points the way in the direction of perfection. To combine the advantages of electronically-problem-related information with the advantages of personal, context-oriented communication in such a way as to enable a bank to play its real role in modern economic life - that conveys the real meaning of the term "virtual organization". Understood in this way, virtual organization commissions computer science, together with all the other organizational experts, to contribute to a kind of progress which is only possible and indeed, is rightly expected in the information society. This is also a commission to intensify communication among computer scientists, other experts, and executives in organizations concerning the new technical potential and its implementation in the most effective ways.

With this concept of virtual organization in mind, we can now begin to deal with the origins, forms and consequences of this new phenomenon.

2. The origins and causes

Among the origins of virtual organization, two appear to me to be equally basic and equally important. The first is that with today's computers, all the essential forms of communication can be displayed automatically. Whether we are talking with each other, writing numbers and texts, or whether we are looking at stationary or moving pictures, the information transferred can be digitalized with practically no loss in the reproduction quality. And that means that, for the first time in the history of humankind, it is possible to store and, in an extremely short time, analyze by machine, speech, writing and pictures as multimedia information.

The second origin of virtual organization is closely related to the first. In the electronic network, information loses a secondary characteristic which, until today, humankind was used to having, namely the characteristic of locality. Over and above its conceptual message, information has always been bound locally to a medium, be it paper or human memory. In the electronic network, locality as an additional characteristic de facto loses all meaning. Information is freed from all physical impediments; it becomes ubiquitous, i.e., all-present. Information becomes independent of space as geometrical distance, hierarchy as organizational distance, and time as chronometrical distance.

Providing that the economic, judicial, educational and other requirements have been fulfilled, it possible, right here and now, through the pre-conditions of electronic information and communication, for every organization and for every individual to digitalize their information, to organize and to model it and then, as far as it is sensible and desired, to make it available for use globally on the network, either to be used as a passive offer, or as an active change in the supply of information.

This novel situation has a fundamental characteristic whose power has been unknown until today: It challenges us to redesign our present-day organizations, to rethink these organizations with regard to their self-concept, their structure and their procedures. Behind all of this is the fact that, as a result of the digitalization and omnipresence of information, numerous constricting barriers which until now have guided our conceptual design have been abolished. These barriers are, for example, the limitations placed on the mobility of persons, materials, products or files due to the necessary costs of time and transportation. Many of the walls which held back a flexible adjustment on the part of our organizations have been destroyed. It is as though iron filings in a magnetic field are capable of being attracted to a newly-added pole, namely, information and communication technology. We have a new space for the creation of virtual organizations. We can now realize ideas which up until now have failed because of the restraints placed upon them by physical factors.

Here, under the sign of our times, is a repetition of what Joseph A. Schumpeter meant by the "process of creative destruction"[2] of traditional structures on the part of innovative entrepreneurs. Schumpeter describes the history of economy as a "history of revolutions" of a technical and organizational kind, as the "process of industrial mutation..., which constantly revolutionizes the economic structure *from within*, which constantly destroys the old structure and constantly creates a new one".[3] Schumpeter sees here a decisive source of competition, "the competition of new products, new technology, ... of new organizational types... - that competition that offers a decisive advantage in cost and quality which strikes the existing firms in their foundations, in their mark."[4]

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2 Schumpeter, Joseph A., Capitalism, Socialism and Democracy, Bern 1946, Chapter 7, pp. 134-142.
3 Ibid., p. 137.
4 Ibid., p. 140.

Today, when we talk about "redesign"[5] or even about "reinventing"[6] our organizations, we are talking about the same context with different words. Indeed, we are always called upon to redefine our role and our possibilities in the context of social and technical change.

3. Basic phenomena

The ability to digitalize the essential forms of human communication, as well as the ubiquity of information, lead to at least three basic phenomena which I call "omniscience", "omnipresence" and "organizational intelligence". Age-old yearnings of humankind are expressed in these three phenomena. Today, it appears that these yearnings are, at least to a certain degree, capable of being fulfilled.

a) Omniscience

As children, we all have read the story of the fairytale figure "Dr. Know-it-All" - a person who knew everything. This has in so far become reality in that I can get all the information on my computer monitor which is stored anywhere in the world, whether it is in computer storage, or with experts whom I can contact, independent of their location, by means of video or audio-communication. All that is necessary is my PC connection to a network, be it through cable or radio. In this way, I am, in principle, independent of my own position, i.e., I literally have access to any and all information which can be carried over electromagnetic waves, from any and every spot of the earth.

Of course, we don't yet have the "Nuremberg Funnel", i.e., a direct transference of knowledge and comprehension from the source to the individual à la Star Trek. At this stage, one must still process the information available on a global scale with one's own mind, before one can say that one has increased one's knowledge. Nevertheless, with regard to the availability of information at the workplace, this is obviously a quantum leap. One no longer has to work one's way to data stocks or expert information. On the contrary, all of this can be brought together in one spot on the monitor of a computer. From the viewpoint of information, the distance between time and place shrinks to nothing.

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5 Davenport, Thomas H. und Short, James E., The New Industrial Engineering: Information Technology and Business Process Redesign, in: Sloan Management Review, number 2/1990, pp. 11-27.

6 Osborne, David und Gaebler, Ted, Reinventing Government - How the Entrepreneurial Spirit is Transforming the Public Sector, New York 1993.

One can distinguish between two different cases of omniscience. In the first case, one knows exactly which information one needs; the information-search is targeted. In the second case, there is a latent need for information. As with a visit to an exhibition, a trade fair or a library, one is open to surprises; one wanders around in an information-space which, through ubiquity, is without borders. One is open to stimulation to be creative and innovative because the data one bumps into has not been edited or subjected to pre-selection. In this way, the data allows a personal, unfiltered, direct informing-process.

b) Omnipresence

The second phenomenon can also be characterized by a dream from childhood days, i.e., the dream of being everywhere at the same time, and, on top of that, of being there at any time. This means now, in the present, or in the past, or in the future. In fact, this dream has, at least in part, also become reality.

For example, through a digital world-atlas on my monitor, I can choose any region of the earth (or on any heavenly body) and, with the click of my mouse, I can call up a digital landscape model of this region. From here, I can move on to a city which interests me, and further, to a digital model of that city or, with a simple menu, go to a museum, or to a gallery to see an exhibition of art work. It goes without saying that the virtual realities that I wander through could just as easily be in the past, e.g., an historical city or a long-lost building like the Cluny Cloister which has been digitally reconstructed from old plans[7], or in the future, e.g., the digital blue-print of a city district which has yet to be built.

What we have here is the reverse of the first phenomenon. Information is not drawn together to one point (constriction) but rather, from one point, it is dispersed the world over. It can be information with which an organization wants to present itself world-wide, as is often the case with universities, firms, cities, and others in the World Wide Web of Internet. It can also be the telepresence of persons in distant places, or the telecooperation of persons by means of video, audio and computer conferences who are working together on a problem. An example for this could be several authors who produce a document through a division of work, or, the use of specialists who contribute their experience in extinguishing burning oil wells, or medical experts who give telediagnoses or teletherapy.

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7 Cf. Cramer, Horst and Koob, Manfred, Cluny - Architecture as Vision, Heidelberg 1993.

As with omniscience, one can distinguish between an intentional and targeted omnipresence, and a latent one, in which a person just takes part in *open* telecommunication, for example, in unstructured discussion forums.

c) Organizational intelligence

The third phenomenon can also be explained by using a folk-tale. It is a tale about a wine-grower who, at the time of his death, left his heirs with one important sentence. He said, "There is a treasure buried in your vineyard. You need only to dig for it." This sentence led the heirs to thoroughly work over the soil by digging. This, in turn, resulted in an increased harvest and consequently, in a real treasure, a virtual power. With regard to our topic, virtual organization, we are, of course, talking about a treasure of data which can increase organizational intelligence by intensively working-over the data.

This phenomenon is based on the fact that digitalized information can be analyzed automatically. Thereby, a certain framework for self-interpretation is provided. Harvard-professor Shoshana Zuboff calls this phenomenon "informating", which is based on "automating".[8]

Her meaning becomes immediately clear when one envisions that one has the computer data for a chain of pharmacy companies at one's disposal.[9] First of all, one has, of course, the data about the daily business operations. Above all, one has the essential characteristic of the third phenomenon, i.e., one also has the information concerning: the medications prescribed for specific symptoms, who prescribes these medications, the prescribed amount, the success-rate, the side-effects, etc., etc. This is without doubt an extremely valuable basis of information for pharmacy producers for research, development, or marketing. The advantages are increased even more when one connects this information base with other data stocks, such as statistics on population or the economy, statistics which today are available everywhere, over and beyond organizational borders.

Of course, the operative data must be modeled "so that one knows what one knows" and that the "data capital" can earn interest. In addition, it must be

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8 Zuboff, Shoshana, In the Age of the Smart Machine: The Future of Work and Power, New York 1988, p. 8 ff.

9 Cf. actual examples in Dorn, Bernhard, Computer Quakes - The Tectonic Shifts in Information Technology, Frankfurt on the Main, 1996, pp. 212-214.

analyzed (worked over) with the corresponding methods, in order that it can be made available as Information Warehouse, Executive Information Systems, Decision Support Systems, and further, to Expert Systems, or even as Automats (e.g., as automatic, sensor-directed traffic-control systems).

4. Forms and models

These fundamental phenomena can be used by combining them in every possible way in order to achieve the innovative structures and behavioral forms described in Schumpeter's "creative destruction". We shall limit ourselves here to those forms which are foreseeable in the area of government and public administration. However, just to round the topic off, it is worth mentioning that comparable developments in all other areas of life are taking place.

Among these are, for example, the way in which we carry on economic transactions, how we manage research and development, how we train and improve ourselves, how we entertain ourselves, how we transport people and goods, or how we organize the health system, environmental protection and the management of catastrophies.

The complex "government and administration" shall be studied from four perspectives: citizen/administration relations, de-coupling areas of action, process orientation, and human work. These are, so to speak, four views of the information and communication-relations network.

a) Citizen/administration relations

As citizens, we relate to the government in two ways: We are its subjects and its objects. As subjects we are voters and financiers, and, in this way, we mandate public actions. As objects of the government, we are the government's clients. We act as claimants, petitioners, appellants, recipients of subsidies, taxpayers, or, in other affairs which we carry out as private persons or as functionaries in organizations. Can these two roles be made more effective through the concept of virtual organization?

As *objects*, many of us are faced with a modern administration which is becoming more complex all the time. As the "man/woman on the street", we, as a rule, do not have a well-structured information base which allows us to adequately protect our interests. Therefore, it is without doubt a question of constitutional principles, like justice and equal treatment, when an imbalance in

levels of information can be evened-off through the use of information technology. A virtual administration could be an administration which

- is transparent in its norms, its rights and duties, and in its structure, competence and petition-requirements
- approaches, on its own and in a timely manner, those who are entitled and those who are liable and, in so doing, makes use of the data already available to it
- presents itself in a comprehensive manner which correlates to the different situations in which citizens have to deal with administration, e.g., by births, marriages, moving, building a house or starting a business
- makes possible the diverse technical forms of access, e.g., from the home, by means of a Smart Card at point-of-information kiosks in public places, in citizen service-stations which are spread out as One-Stop-Shops at outside locations close to the citizens themselves, or as mobile administration, which, in times of need, goes directly to the client with full information capacity.

Besides, computerized administrative work, as well as the possibilities for electronic communication for the clients make a concentration of their respective experience, opinions and evaluations possible. These are no longer atomized and without influence but, like sales revenues in business, are instead capable of being aggregated and, through comparisons with other authorities and regions, can be used in planning and quality escalation.

As *subjects* we take part in formulating policy through our participation in public affairs. In this area, it is doubtlessly in the spirit of the constitution when administration/citizen relations are formed on the basis of knowledge. A virtual administration could be an administration which

- is not an impenetrable, anonymous apparatus but one which presents itself to the public not only with regard to its tasks, structures and finances, but furthermore, reports on the social conditions in the different adminstrative branches like economy, education, energy, health or environment and reports on the developments which have been

targeted, the methods used and their success-rate, and in comparison to other administrations and regions

- uses the current technical possibilities of hardware and software to allow citizens an insight into those files which are of public interest

- makes the consequences of different, possible courses of action transparent to the parties in legal proceedings through the use of computer-simulation

- carries on problem-solving discussion forums which make use of electronic possibilities for citizen-panels, surveys and hearings and makes electronic interactive communication with congressmen or experts possible

- keeps close contact with the sciences and allows them to advise and evaluate.

Alongside these two quasi-vertical administration/citizen relations is the horizontal *communication among the citizens themselves*. The Internet shows that new forms of self-organization are being created. This is certainly desirable in view of the over-burdened public budget. Moreover, this development contradicts George Orwell[10] because modern information technology does not one-sidedly strengthen the state as Big Brother. Quite to the contrary, in the spirit of United States President Jefferson, it strengthens democracy from the bottom up. The freedom to inform oneself without restraint, to freely address the public as in Hyde Park Corners, to be able to organize interests, to found self-help groups - all of these often fail because of a lack of information and communication facilities. However, all of these endeavors are furthered through the described phenomena of omniscience, omnipresence and organizational intelligence. In this case, the state only has the indirect task to guarantee the technical infrastructure, the balance of content or the legal protection of a person's personal rights and of the youth.

b) De-coupling areas of action

Omniscience, omnipresence and organizational intelligence as new phenomena also improve the conditions for the object-oriented segmentation of

10 Cf. George Orwell, 1984, Frankfurt etc. 1988.

operational areas. When the observation of control-directions can be guaranteed by software, when the data which should be used is up-to-date and available on target, when the measurement and communication of the effects of actions can be improved, when speedy communication possibilities are available for cross-reference, then one can assign tasks in a more holistic manner; one can assign the responsibility for tasks, as well as for the necessary personnel, financial and informational resources to one person.

As a consequence, we see an increased use of the center-concept or of the fract organization in which units are characterized by widespread self-control and self-organization. The client/server architecture of computers as networked decentralization is an illustration of this organizational break-down.

Object-orientation creates a simpler interface among the organizational units. One can call this a contract which determines to the most exact degree possible, which products are to be made in return for the transfer of which resources from one organizational unit to the other.

This leads to a new relationship between centralization and decentralization based on the principle of subsidiarity. Strategic questions about the "why" and "for whom" become more important. At the same time, resources are used optimally because the operational questions are solved with more freedom of decision and moreover, with more personal responsibility, and thereby, with more personal identification and motivation.

Object-oriented segmentation according to the interface "product for resources" leads further to the question of whether to make or buy. The solution is seen more and more in de-coupling and de-integration. Within an organization, this is practiced in the form of greater autonomy in work-areas, or in the local distribution of branch offices. Among organizations, one form of solution is to carry out the tasks collectively through strategic alliances or "joint ventures. With this method, the partners concentrate on their respective core-responsibilities and tie them together in a synergy-bundle in order to increase their strength, and to achieve the best possible effect. The partners can be other authorities or, as with Public Private Partnership, businesses. Another form of this solution can be found in "government by proxies", whereby the tasks are privatized or are given over to the self-help of citizens, neighborhoods

and clubs. Institutional Economics deals with the requirements of such organizational de-integration.[11]

Finally, with segmentation through object-orientation, a concept in virtual administration which has until now appeared to be limited to the private economic sector comes more clearly into focus, i.e., the concept of competition. Due to the definition of products and resources, as well as the transparency of this information, it is clear that there are alternatives. Competition will also induce more client-orientation, efficiency, speed, innovation, and more flexible adjustment.

c) Process-orientation

In the future, virtual administration will be defined more and more by a horizontal arrangement of its processes. Administrative operations will not be viewed as the sum total of functions carried out more or less in isolation by various organizational units but rather, from start to finish, as a chain of procedures initiated by an event or by a specific date.

The term "value-added chain" expresses the idea that the aim is to include all the necessary - but only the necessary - work-steps, to exhaust the possibilities of parallel work and to provide all the participants with a uniform and up-to-date database. An example of actual data would be to make the currently valid version of legal regulations available at the workplace, and tailor-made in correlation to the respective problems. The quality of the work process is further improved in that all those who are involved are viewed as a cooperative network which is characterized by an extensive delegation of responsibility, and by direct communication. In this way, innovations, be they radical or steady improvements in quality, have a better chance.

Of course, such administrative processes are not seen in isolation but are connected to previous processes, as well as to those which are to follow ("a chain reaction" through a connecting of processes).

This takes place not only within the administrative departments themselves but also with regard to the clients of the administration. For example, a valid goal would be to have the building administration, the owners, the architects, the

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11 Cf. Coase, Ronald H. (recipient of the Nobel Prize in 1991), The Nature of the Firm, in: Economica, November 1937, pp. 386-405.

building contractors, the workers, the renters, and other participants communicate through the same, up-to-date, multimedial, omniscient database. In this manner, it would be possible to reduce complaints about an administration which burdens its clients with requests for data instead of checking first whether these are already available anyway.

It is probable that this process-orientation will lead to a revised view of the distribution of public tasks among the different levels of administration, the authorities and other organizations and, consequently, to a functional reform.

d) Flexibility of labor

The employees in the public sector also have two roles. On the one hand, as factors of production, they provide administrative services. On the other hand, and inseparable from the first role, they pursue their own personal goals which are not only aimed at guaranteeing their means of livelihood, but also toward fulfillment in their professional work. In the information society, virtual job-designs which include new combinations of these two roles will be widespread.

Work will be less connected to space, time and hierarchy. Working from "8 to 5", that is, the practice of working with other people at the same place and at the same time, and according to an extensive division of labor will lose importance. The mobile office with a laptop and a mobile phone demonstrates how transportable the means of work and the necessary information has become. In this context, management by contract allows, on the one hand, more responsibility for the job-results on the part of the co-workers, and, on the other, a greater freedom with regard to their work-methods.

This will change the character of many jobs. Jobs will become more demanding, and they will be characterized by more self-employment and entrepreneurial behavior. Freed from space, time and hierarchy-restrictions, the employees themselves will be in charge of self-restriction. They alone must determine when they step over the line from self-employment to self-exploitation.

Lowering the restrictions of space, time and hiearchy not only has an effect on one's own work but also on work done in cooperation with others. Open communication will mean that, independent of organization charts, one will deal directly with those persons who are important for a problem. Telepresence

permits the virtual presence of participants in the same room through the use of communication walls; telecooperation allows participants to view the same document at the same time. For example, an application for a building permit can be discussed simultaneously with the applicant at home, an officer in the building authority and with the architect in his office. In comparison to the conventional, linear transaction, with all its misunderstandings, its irritations, its time-delays and costs, the advantages of this procedure are obvious. It is clear that, also in this case, codes of conduct must still be established in ways which are compatible to the new situation. The "virtual office tyrant" who does not respect the private sphere of the cooperation-partner, or who saddles co-workers with a lot of work-clusters because of their electronic-availability will hopefully only remain a fantasy.

Finally, work will be characterized more than ever by life-long learning. Global facilities for continuing-education will be available to the employed. The transfer of knowledge between research and practical operations will increase in both directions.

5. Consequences and pre-requisites

Thus, it becomes clear that virtual organization touches each and every life deeply. Virtual organizations have serious consequences, some positive, some negative. Moreover, the interpretation of "virtus" is often subjective - afterall, criminals, too, make use of the potential of new information technologies.

And here, a second role for government and administration comes to the fore. They are not only users of the new possibilities of information and communication technology but rather, they must also create and control the necessary framework so that the potential which is inherent in the concept of virtual organizations is allowed to come to full bloom, and if at all possible, without any thorns.

Government and administration must level off obstacles which block a sensible use of information and communication technology. On the other hand, they must build up restrictions in order to restrain the undesirable consequences.

It would go beyond the scope of this address to present a thorough analysis of the action programs which must be managed by the public sector in the transition to the information society.

For this reason, I will limit myself to listing the essential action areas:

- guaranteeing an efficient infrastructure for electronic information and communication
- liberalizing the telecommunications market, with the intention of lowering fees and increasing the offerings for more diverse and more innovative services through competition
- promoting normation and standardization for the purpose of open systems in order to be able to connect sub-nets and to use service offerings interoperatively
- guaranteeing information security as a protection against destruction or unauthorized manipulation of data stocks and documents
- promoting societal acceptance through consciousness-raising and enlightenment
- training offerors and users so that neither the service-offerings nor their utilization are lost for lack of knowledge
- guaranteeing equal opportunity, not only within but also among individual states so that the gap between information-wealth and information-poverty is kept as small as possible
- promoting open communication, a pluralistic exchange of views and diverse offerings
- guaranteeing a diverse supply of information for the purpose of preserving linguistic and cultural identities
- preventing criminal misuse of global communication facilities (from the manipulation of opinions to the illegal invasion of personal privacy) by passing and enforcing the appropriate legal regulations, if at all possible: on the international level

- working toward a code of moral conduct which is developing already, not only as "Netiquette" in communication style but also as a kind of "Internet culture" which requires the observation of rules of proper conduct like uncensored free speech, trust in self-organization, or reciprocity of services

- protecting intellectual property in a world of ubiquitous information through the further development and enforcement of copyright laws

- protecting consumers in economic transactions with virtual businesses

- and last but not least, guaranteeing a sufficient number of employment opportunities by charting the proper course at the proper time in areas of research, development, economic, employment and education policy.

6. Conclusion

Let us accept, then, the assignment which, in truth, is contained in the concept - "virtual organization"!

Let us use these new design possibilities which modern information technology offers. Let us increase the efficiency of our organizations. This will be one of our most important tasks in the Approaching Information Society.