

# **Information Age - Deformation Age - Reformation Age**

## **An Assessment of the Information Technology Kondratieff**

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### **ABSTRACT**

In our view new information technology did change the world in the last 20 years in a dramatic and irreversible way. In a sense it seems to be one of these major technology advances, which have been assumed to cause 'long swings in economic life' (compare Kondratieff and Schumpeter). The paper investigates how this very recent set of basic innovations influenced the global socio-economic development. The first sections compare the 'information revolution' with previous long cycles (drawing on work done by one of the authors). Impacts are shown not only to consist of direct economic stimuli, but to reach political and cultural spheres producing feedbacks and interactions that literally *deform* and *reform* our whole environment. We interpret these unprecedented repercussion effects, which did not appear in comparable strength in former 'long waves', as stemming directly from the peculiar properties of the commodity 'information': To acquire this commodity does not necessarily exclude others from its consumption - it is difficult to define property rights, while on the other hand its production can cause severe behavioural changes and distortions - actions of individual agents and groups are guided by models. Developing this special character of information production and consumption contributes to an understanding of the specific forms of current socio-economic phenomena. In a final section we present a qualitative mid-term perspective based on most recent technological, economic and political trends.

## ***Introduction***

This paper tries to bring together several lines of arguments brought forward by quite different and distinct research communities in recent years. The first of these streams of thought is the one preoccupied with the long-term socio-economic behaviour of the world economy, in particular with the existence of long swings, so-called Kondratieff cycles, in economic activity. Each of these cycles, so goes the argument of the proponents of this research, is connected with a certain set of basic technological innovations, which is thought to be so influential that it can stimulate and shape the socio-economic development of half a century. There has been an extensive discussion concerning the question of what comes first, the set of basic technological innovations or the new social context in which it appears<sup>1</sup>. In our reading the strong interdependence between the two phenomena necessarily undermines any strong conclusion on this matter, though we tend to see the socio-economic contexts driving technological innovations as dominating the feedback forces at least in the first phase of a Kondratieff cycle. The interesting point is how the contemporary state of the world economy, the current socio-economic context, and the basic innovative technology, which we propose to be information processing, work together in stimulating a new long-term upswing. Section 1 tries to throw some light on this 'information technology Kondratieff'.

But information is a very special kind of commodity. To grasp its characteristics we have to study the ways in which information becomes relevant for micro-behaviour, which necessarily leads to the consideration of individuals as model-builders. This goes beyond the generally accepted view that expectation formation is a pivotal issue in economics - even the tools with which expectations are formed are socially produced and sold. How individual model building is influenced and shaped, be it through the influence of central 'ideological institutions'<sup>2</sup> or be it through the unconscious influence of technical carrier systems like computer games, becomes

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<sup>1</sup>) See for example (Di Matteo/Goodwin/Vercelli. 1989).

<sup>2</sup>) The term is borrowed from Althusser (Althusser L. 1970).

crucial for any forecast of the current development. Evidently such an approach goes beyond the narrow borders of mainstream economic reasoning, where the concept of information enters only in the form of commodity prices. Economists should be urged to take a closer look at theories of ideology, philosophical research on the essence of information and the like. Section 2 surveys what we think to be the large turn from the emphatic aspirations of the progressive role of information distribution starting with the French enlightenment towards the contemporary deformation of individual models by cheap technology steered by conservative groups in power.

The third section evaluates how and where this rather sinister scenario can breed contradictions which are strong enough to lead to resistance. In other words we try to find areas in which sustained reformation of the social context seems to be possible, since there is a social group which is pushing for this reform. Social groups, in particular social classes to use the classical term, have to share mental models to act as conscious agents in the socio-economic development. It is this common world view, which acts as catalyst for mass action and which again strongly depends on the use of technical means for information production and information destruction. As a consequence this section has to draw on political theory, organisation theory, comparative studies of institutional solutions and similar research areas.

Needless to say the high aspirations set out in this introduction will not be fully satisfied by what follows. This paper is rather a guide through a larger research project, than an in-depth study of the questions concerned<sup>3</sup>. As such the concluding chapter tries to give some hints on future research rather than presenting decisive results of singular problems.

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<sup>3</sup>) In particular this applies to the fact that we centre in this paper on the developments in industrialised countries and do not give an explicit account of the relation to the developments in the third world.

## ***Section 1: Is there an 'Information Kondratieff'?***

In our view Nikolai Kondratieff's<sup>4</sup> major point in explaining the long-term behaviour of the economy was that all relevant phenomena have to be explained endogenously in the long-run<sup>5</sup>. As a consequence (applying our contemporary knowledge about the behaviour of deterministic dynamic systems not available at his time) the existence of any type of economic laws governing this motion 'naturally' should give long swings of slowly changing variables. At this point Joseph Alois Schumpeter stepped in and propagated Kondratieff's work for Western economists, since it fitted well with his own view: His vision was that the interplay of two countervailing types of forces lie at the heart of the motion of a capitalist economy - on the one hand the equilibrating forces of markets working via the price and quantity reactions of supply and demand and on the other hand the disequilibrating forces of swarms of innovative entrepreneurs. Coupling these two types of forces responsible for long-term behaviour evidently could lead to a fully endogenized system of long periods<sup>6</sup>. This is what fascinated Schumpeter when he read Kondratieff. Periodic pushes of entrepreneurial activities could produce waves in Walras' 'smooth lake' of equilibrium.

Market equilibrium à la Walras was already a standard concept in Schumpeter's time. What was exciting about his economic theory was the new concept of swarming of innovations. To assume that capitalism is constituted by a special type of disequilibrating activities directs research in two different directions. First the agents carrying out these activities can be studied, in particular the dynamics of the social context they are part of have to be described. Second, one can investigate how the effects of their activities cumulate at certain times in economic history to produce what can be termed 'swarming' - a set of basic innovations. It is the latter question which involves the study of the technical nature of certain types of innovations and which until

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<sup>4</sup>) Compare (Kondratieff N. 1926).

<sup>5</sup>) This argument is developed in more detail in (Hanappi G. 1989).

<sup>6</sup>) See in particular (Schumpeter A. 1939).

recently preoccupied long-wave theorists<sup>7</sup>. In our view the social context of entrepreneurial activity and the technological features of candidates for basic innovations have to be studied *simultaneously*. This is so, because they condition each other.

Let us look at the phenomenon from one perspective - the technological one - first, and from the other one - the socio-economic one - only afterwards. We state that there has been a long wave in global economic activity after World War II and that this long cycle reached its lower turning point in the early eighties. Without going into the questions of economic history concerning existence, timing and nature of observed Kondratieff cycles, we think that at least this recent motion is quite obvious<sup>8</sup>. The question at hand now is whether we are already witnessing a new upswing.

Consider figure 1, which presents a 5-year moving average of real GDP growth rates of the USA<sup>9</sup>. There is some evidence, though some would like to call it only plausibility, that there have been three business cycles superimposed on the post-war Kondratieff of the US economy. Moreover, after the lower turning point of the long wave - the year 1981 for the USA - there seems to have been a first Juglar cycle<sup>10</sup> of a new long wave.

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<sup>7</sup>) A notable exception to this rule is (Gordon D. 1978, 1980).

<sup>8</sup>) An interesting evaluation of the post-war Kondratieff can be found in (Kleinknecht A. 1987 pp.127-214).

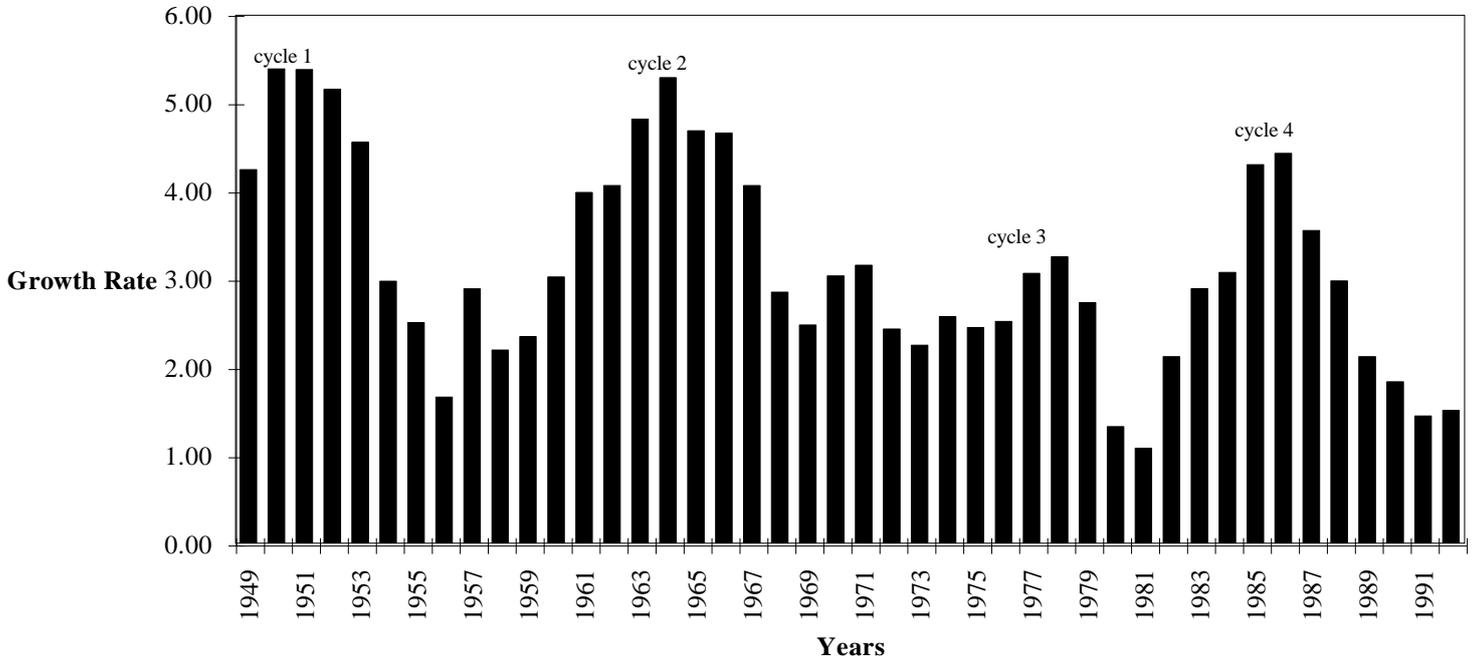
<sup>9</sup>) A five year moving average is necessary to smooth the curve without eliminating Juglars.

<sup>10</sup>) Schumpeter calls Juglar cycles what is usually meant by the term 'business cycle': a cycle lasting some 4 to 8 years (Schumpeter 1939). In many empirical studies this type of cycle has been shown to last about 10 years, as is the case for the series shown in figure 1.

**Figure 1**

**Growth of GDP in the USA**

(5 - year moving average of real growth rates)



Source: OECD, National Account Statistics

The growth pattern of the USA, the hegemonial economy of this century, is paralleled by the development of its two major competitors: Europe and Japan (see figure 2). Long waves clearly are a global phenomenon, though the country-specific characteristics can be important: Evidently the post-war Kondratieff saw an immense growth of the Japanese economy, strengthening its position relative to the USA<sup>11</sup>.

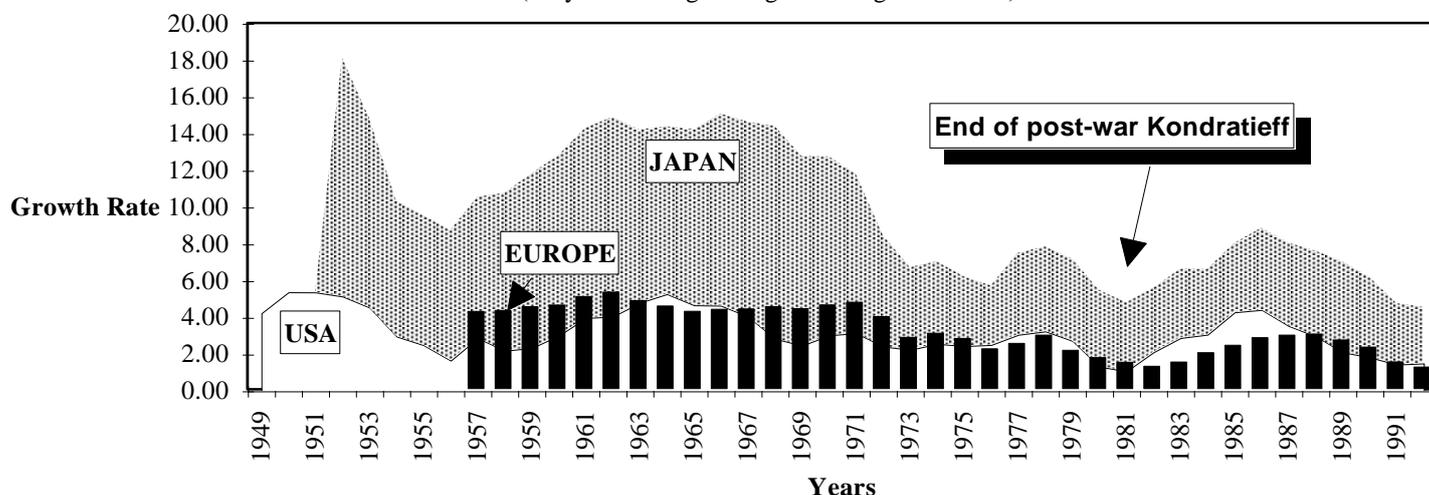
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<sup>11</sup>) There are different competing explanations for this fact, see e.g. (R.Z.Lawrence 1993).

Figure 2

### Growth of GDP - Comparison

(5 - year moving average of real growth rates)

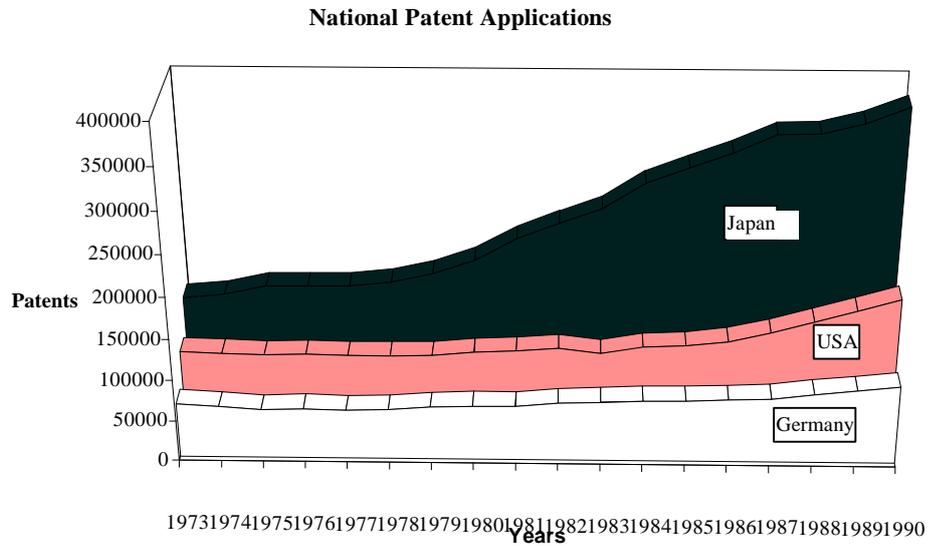


Source: OECD, National Account Statistics

The second big competitor, Europe, also improved its position: business cycles in Europe have been less dramatic than in the US. The more developed socio-economic integration of European nations in that respect seems to have played an important role. In the meantime post-war Europe not only became an economic giant, but under the less and less hidden leadership of Germany also challenges the political hegemony of the USA. As figure 2 shows all three competitors experienced a quite fierce first Juglar cycle of the new Kondratieff. We will come back to the socio-economic implications of the increased international competition later on.

According to Schumpeter, and many neo-schumpeterians like Kleinknecht follow him in this respect, innovative activity starts already at the lower turning point. It is a reaction to low and unprofitable production. That is, an increase in patent time series might be used as indicator. Figure 3 shows the increase in national patent applications during the eighties. Though there are different patenting rules in different countries, which means that absolute levels should not be compared, there still remains the fact that growth rates of absolute numbers were highest in Japan.

**Figure 3**



Source: OECD, Science & Technology Indicators

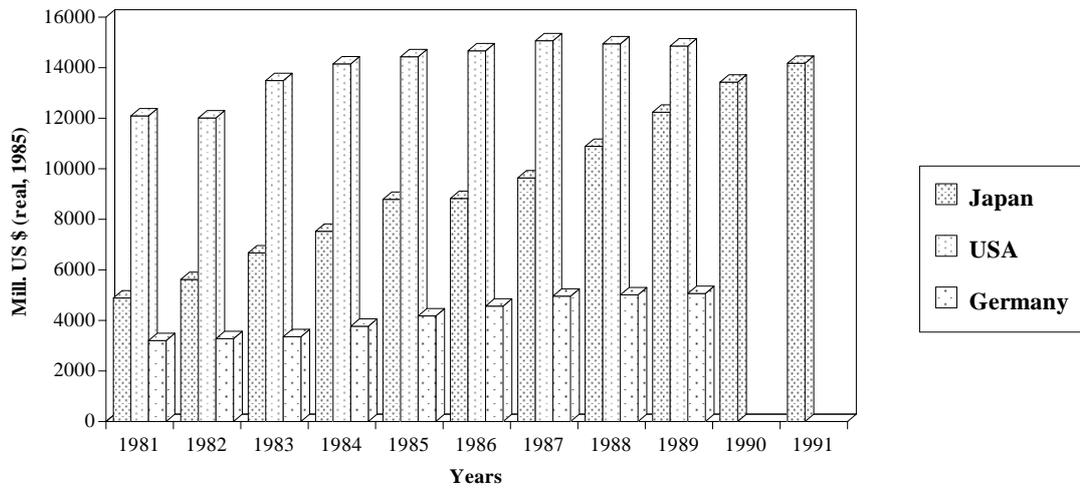
Looking at figure 4 shows that research and development expenditure for new information technologies as forerunners for the actual use of the new machines really indicate a boom in the near future. Moreover Japan again seems to become the major supplier of IT. The inner dynamic between the leading industrial nations<sup>12</sup>, economically and politically, clearly is of utmost importance for the future of this key industry too. A stronger Yen clearly will weaken Japanese exports, but given the overwhelming use of the new technology in almost all sectors of the economy the increase of importance of Japanese producers might not be easy to break.

**Figure 4**

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<sup>12</sup>) Giovanni Arrighi in a recent contribution presents a view on this dynamic which is similar to the one implicit to our analysis, compare (Arrighi G. 1993).

### R&D Expenditure of Firms for Electronic Equipment



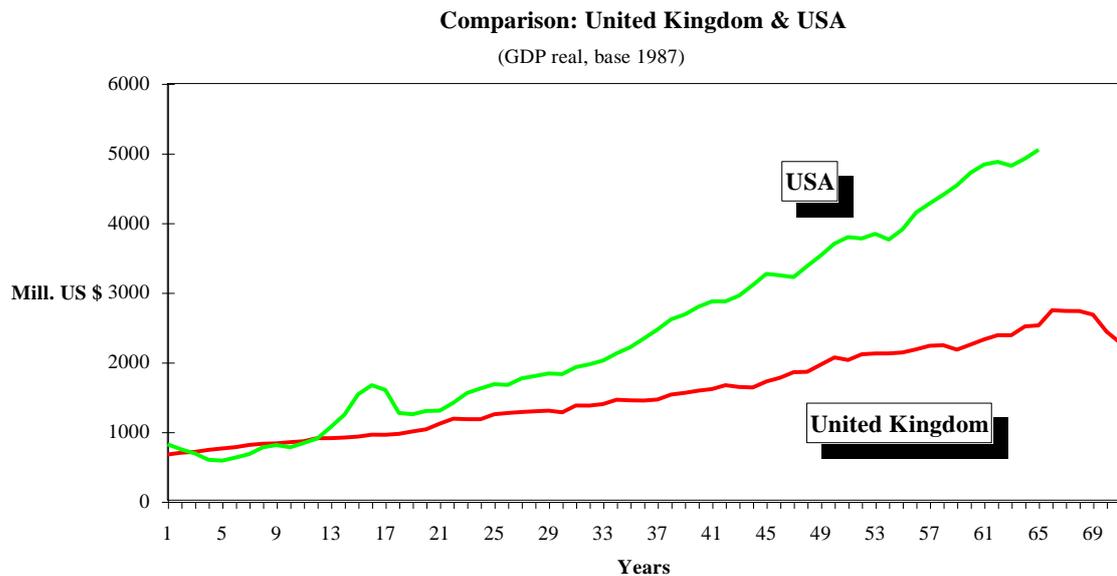
Source: OECD, Science & Technology Indicators

Europe's future importance on the other hand seem to stem from it being the world's largest market place while the USA have to cling to their military dominance<sup>13</sup>. In fact the US economy seems itself to rely more and more on its demand for military purposes. Part of this source of demand might be hidden by the indirect way in which it is generated, e.g. for I&C technologies. With a loss of political importance in the world due to the rising new competitors this demand might shrink, if competition goes civilised ways, or increase, if it does not.

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<sup>13</sup>) In an interesting study Domhoff shows how military and economic elites in the USA melt together (Domhoff 1993).

**Figure 5**



Remark: for the UK year 1 refers to 1850, for the USA to 1929.

Sources: USA: 'Economic Report to the President 1992', UK: [Mitchell, 1975] and OECD, National Account Statistics

Basically the global socio-economic state we have to face is a situation similar to the one before World War I, dangerous but not without hope. Even a rough comparison between the British Empire and US hegemony (as given in figure 5) shows that the world economy will probably go for another, though perhaps interrupted Kondratieff with the USA as leading economy. It is this prospect which leads us to the conclusion that socio-economic intervention, i.e. reformation, is of greatest importance in the current situation. We will come back to this point in section 3. Before we are ready to do so, some peculiar features of the commodity 'information' have to be discussed, which play a crucial role for the specification of this intervention.

## ***Section 2: From Information to Deformation***

Let us extrapolate the trend of developments of the information and communication technologies. Besides their well-known multi-functionality, computer based systems are

starting to be multi-medial too. This means that the existing types of information carriers - which are pictures, sound, text and signals - can be transmitted and processed via the same digital network; the different types of media melt into one stream of digital signals. The terminals where this information stream enters the single household retranslate it into the original shape. Evidently the functional abilities of these new terminals will be broadened substantially: They combine the traditional technologies such as TV, telephone, computer and consumer electronics<sup>14</sup>.

A considerable part of the services consumed by a traditional household through outdoor activities - like e.g. shopping, banking, working, leisure time activities, further education (represented by the various circles and ellipses in the following figure) - will be satisfied by the use of the multifunctional terminal.

A similar idea was already realised by TV: The single household is provided with a certain offer of channels from which the persons can choose. This means that one of the fields of activity, namely the set of leisure time activities, has been codetermined by this technology. To a certain extent further education could be an analogous case if courses come via TV. While this technology left space for large fields of activity, in particular the working sphere and most parts of the service sector, to take place outside the private sphere in a narrow sense, it is foreseeable that the new technology will incorporate a centralisation of these fields of activity within the private sphere.

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<sup>14</sup>) For further discussion compare (Brand 1987).

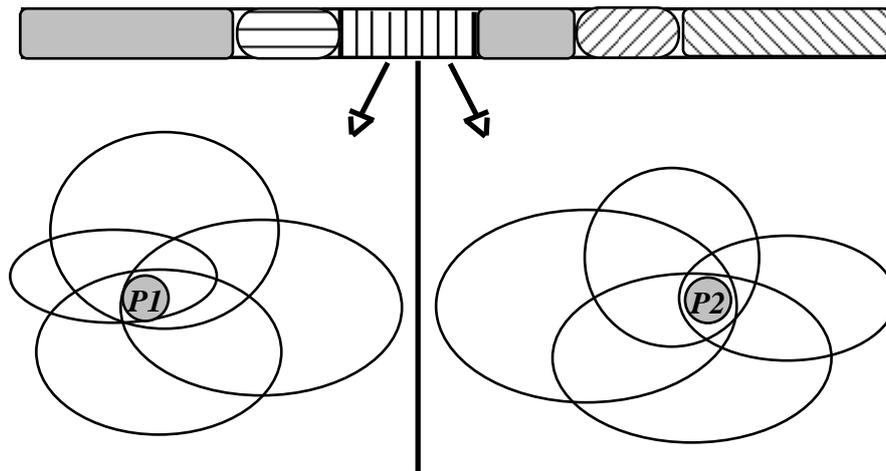


Fig. 6: Household's activity via digital network

But staying within one's private sphere means a decrease of social interaction with others. The big change in the behaviour of household members as compared to the classical situation will be the way they master their everyday problems: In times when the various life spheres were more separated, locally and perceptually, people were forced to engage actively in interaction with others. This included an active search for relevant information, spontaneous learning within social groups - in short, the accumulation of social experience as personal experience. As a consequence intersections with the activity fields of others will appear frequently (Fig.7 gives a graphical representation).

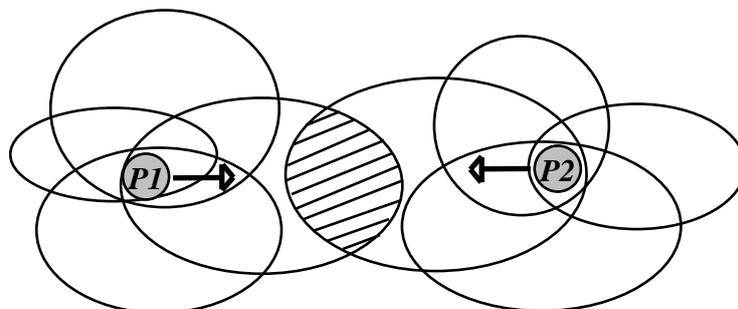


Fig.7: Common activity spheres without IT

The trends described make it easy to anticipate that in the future active search for relevant information in many cases will be replaced by a supply of information via the household terminal. Of course, the crucial question is: who provides the content of the information stream available?

Let us take again the example of television supply. The most important argument of proponents of a privatisation of television stations was that the amount of programs supplied will increase dramatically and will reflect the diversity of consumer demands. The experience of the last decade of privatisation falsifies these aspirations: Free choice within a set of possibilities chosen by the producer is pseudo-choice. The threat of a similar development in all the fields covered by a household terminal seems to be clear.

What we call 'deformation' is the danger that in many fields of life the households become passive receivers of pre-selected information. In particular 'information' more and more consists of models, of interpretation schemes, and not of data concerning facts. It is the supplier of information who determines *what* is worth presenting, *which aspects* are highlighted and *how* the information is prepared.

Let us again use the TV supply as an example: The first step is to choose the topics promising high participation rates at low production cost. This is why TV stations are highly selective concerning their broadcasts. As can currently be observed, the entertainment section is invaded by quizzes and prize winning games while broadcast times for (expensive) news are continuously shrinking. In a second step special features for highlighting are selected. That is, the type of questions for a quiz is chosen, the genre of movies is specified, the language for the language course is determined, certain aspects from a political event are sorted out, and so forth. The final step is the most challenging one for the producer: To keep the high level of strong emotions necessary to attract attention, the amount of messages transferred has to be speeded up tremendously.

High velocity of cut sequences, uncountable hidden messages aiming at subconscious consumption, all the tricks of 'commodity aesthetics' are applied.

What is observable for television holds for the future multifunctional household terminal at least in an analogous, though more sophisticated form: Remember the information suppliers depicted in the information channel in figure 6. TV stations as well as telephone companies, banks and insurance companies, employers, suppliers of all types of consumer goods, political parties - in brief all types of enterprises are choosing the products or services they present (step 1). In doing so suppliers define the space of available products and services. Note that this is a first *ideological* intervention into household behaviour: In principle persons still could leave their homes and look for alternative possibilities, but they will not do so because they expect gains from this action which will not repay the additional cost of search they expect. It is by the force of ideas, of expectations influenced by the information channel, that they behave the way they do - this is what we call ideological intervention.

The highlighted special features of one's product are the topic of the information presented. In other words, in step 2 a *message* is determined, which is thought to be well received by the consumer. To get messages to work, that is to stimulate consumption, they have to be grounded on real problems of the prospective consumer. Messages usually transform these real-life difficulties into illusory dream worlds, where they seemingly could be resolved by the 'right' choice of product, service or whatever the supplier wants to sell. In general the message does not even reveal the motivating problem but simply displays a shifted, simulated world. Of course this treacherous mirror is no real remedy for the underlying difficulty but only gives temporary satisfaction<sup>15</sup>. The ideological purport of step 2 is evident: High speed sequences of pictures feed the consumer by use of his emotional reactions. There is no time any more for thinking over the content of a message analytically, for analysing it critically. In this way the view of things in one's mind is influenced without being

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<sup>15</sup>) As a profitable side-effect for the supplier the consumer will be eager to consume again and again at accelerating speed, a phenomenon called 'addiction'.

recognised<sup>16</sup>. Persons start to change their mental *models* of things by using a subconsciously delivered *interpretation schemata*.

To accomplish this, in step 3 an appropriate way of wrapping up the messages has to be found. The décor has to be designed - certainly a quite challenging task which demands much knowledge about current political and social sentiments and about their symbolic reproduction in a designed solution. Once a design trend is set, it is advantageous to work with the recognition effect of consumers - 'the medium is the message'<sup>17</sup>, but it also works the other way round - the message is the medium of the medium. It thus becomes clear why graphic interfaces are booming: The ability of human beings to catch messages from visualised presentations more easily than by reading text or listening to speech, makes visualisation into a source of manipulation if the speed of bombarding with pictures is high enough<sup>18</sup>.

An additional aspect of the trend to digital multifunctional and multimedia networks is that more and more life fields are concerned: While similar problems were already discussed when TV was introduced, the new technologies will also cover the

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<sup>16</sup>) The manipulation of consumers via media is a widespread phenomenon. In principle there is no difference whether a supplier signals "environmental protection" via the car boosted or "communism is bad" via scandal news. In both cases self-reinforcing interpretation schemata are propagated, which are based on real, though not expressed, problems of the consumer: Of course he suffers from several instances of environmental damages as well as from economic crisis.

<sup>17</sup>) See (McLuhan M. 1964).

<sup>18</sup>) At step 3 the ideological force of information does not even consist of an 'idea', like a certain argument or interpretation, but of an image, an icon, which hints at a hidden argument. The latter enters behaviour only subconsciously, is nurtured and reinforced by new incoming icons and is rather hard to discover for the individual itself.

Therefore many countries have state regulations, as e.g. the Netherlands: 'The advertising that is allowed (it accounts for more than a third of the public broadcasting system's income) is confined to certain times, administered through a public foundation (STER), forbidden on Sundays and subject to strict codes designed to protect consumers.' (McQuail 1992 p.102).

working sphere, the education and training sphere and many others. This means that in more and more areas people will get used being bombarded with certain - externally determined - models and interpretation schemata which will not and can not be criticised anymore, since they satisfy a need - though in a perverted way. A horror vision? If there will be no counter reaction it seems to be a rather realistic assessment of the future development. Transferring all the spheres mentioned to the private sphere of households, as the technological trends as well as economic and political trends of 'privatisation' clearly indicate, is dangerous in many respects. The problem has been discussed for a long time by feminists in the context of reproduction: Since the reproduction sphere is declared as being private, all questions related to this sphere are withdrawn from political discussion. It can easily be anticipated that the more areas go 'private' the less intervention by public regulations is possible - and this will lead to very severe problems. This is so, because the other side of the anarchic privacies of households is the strongly interwoven structure of socio-economic production - and this is where the real difficulties arise.

There will be the strong and rather centralised power in the form of ideological force on the side of information suppliers like firms and (their?) political administrators which will enable them to keep the highly complex and fragile system of world production together. And, as already suggested in section 1, there will be a boom in world production which is stimulated by the very products - information technologies - needed to control this system. There will be a new type of political regime fostered by these technologies - and at the same time necessary for the dispersion of the new technology. De-socialisation breeds deformation and vice versa.

Nevertheless we are only talking about possible future scenarios. There still might be some room for design. In the following section we will evaluate possible sources and opportunities for changing the way information and communication technologies will be used to a more acceptable scenario.

### ***Section 3: From Deformation to Reformation***

For any change, if it is to have a profound impact on the socio-economic development, it is necessary that it is grounded on a contradiction perceived by the involved parties. Therefore the first step to formulate a political program is to identify the relevant conflicts. This also applies to questions of information politics. So what are the 'battlegrounds' of a social information environment as sketched in section 2?

Privatisation in the information- and communication sector lead to the same problems as privatisation in other sectors: What has been a supply of infrastructure made available by the state was transformed into an oligopolistic market for a few private firms - and this implied a basic change of this supply. In many cases the welfare of consumers has decreased. In particular all regulatory measures of the state to enable the socially weak groups to have access to technological goods have ceased to exist. Let us take as an example public transport: While public supply leads to a broad network covering also rural and marginalized areas, private companies will surely eliminate the latter since they are not profitable<sup>19</sup>. The analogue is true for communication supply: The policy of the big telephone suppliers in the USA leads to a price increase for inner city calls, the necessity to have telephone cards, a confusing variety of telephone companies competing with aggressive advertisements. Note as a contrast that in Austria socially weak persons are exempted from paying the basic fee. Applying these ideas to the above mentioned network services, it is evident that private supply, being led by profitability considerations, would lead to a socially unequal information distribution: expensive information (like news) for financially potent customers, inexpensive information (shoddy entertainment) for the financially weak.

These failures of privatisation can be attributed to the fact that firms act according to their profit expectations - and these are at best mid-term. In the long-run

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<sup>19</sup>) The possible impact of deficitary public enterprises on the budget deficit, and via that route on consumers' welfare, will, of course, have to be balanced by an appropriate tax policy. The important point is that the state still has means to execute a politically formulated and legitimated goal set.

this kind of policy will lead to severe damage to the economy caused by inappropriate infrastructure. Long term goals have to be taken care of by far-sighted intervention by the state.

Another field where personal experiences might clash with the new ideology of privatisation has been treated as the contradiction between real and artificial needs. Extending the views held in the well-known discussion in the New Left years ago, we think that even real needs can be artificially satisfied by products by shifting the real needs to artificial needs for products. Let us take an example from commercial advertisements: There is a famous jeans commercial suggesting that the possession of these well-known jeans leads to the feeling of freedom and independence. As a matter of fact many people - and in particular youngsters - are attracted by this ad. How does this happen? Obviously living in a certain society means internalising certain culturally determined values - like e.g. freedom and independence. Growing up with this positive assessment of these concepts leads to a real need for freedom and independence. Contrary to this 'vision' real life experiences show that the individual is very dependent on others and a given system of rules. The resulting frustration offers a fertile ground for satisfaction by way of substitution. This is the point where product commercials enter the game. Children suffering from a very strict educational system will try to overcome the frustration by accepting the offered substitutes.

Evidently the real need is not satisfied by these products. Instead the real needs are only repressed temporarily by a certain product. The whole process must be repeated after a while in order to get the artificial satisfaction again. The chance of reformation arises precisely from the persistence of the underlying contradiction.

Along with the argument in the last paragraph goes another marketing strategy, namely 'personal products': computers become personal computers, banking becomes personal banking, all kinds of commonly-used consumer goods become part of the inventory of each household or even of each person in the household. To support this transition, the standardised mass products are marketed as their mere opposite, as reflecting the uniqueness of the buyer. Of course, neither the buyer nor the product are

unique. As far as the latter is concerned, at best some features can be customised, in the case of the former his real need for uniqueness and recognition is the source of his use of artificial satisfaction as discussed above. Mass industry provides both, the standardised product and the illusory ideological release from the grey mass of consumers.

Taking this contradiction on the product level to the field of 'personal ideology' proper reveals another contradiction. As personal ideology teaches, each individual is priced like a product - everybody gets what she/he is worth. The individuals at the lower end of the social hierarchy are there because their worth for society is correspondingly low. But since this individualistic view has not reached everybody, and since there still exist individuals whose personal historical experience runs counter to this view, who did experience that solidarity, class action or group action did improve their position more than mere individual action<sup>20</sup>, since therefore different views on the matter co-exist, it should be possible to use this contradictory situation for reformation and institutional design.

Reformation consists of counteracting the observable tendencies described in section 2. In other words the socio-economic environment of the network presented has to be designed so as to prevent the problems indicated. Basically this means fighting the current tendencies towards privatisation. Let us argue this point along the lines of the contradictions listed above:

The threat that society through the working of privatisation in the narrow sense<sup>21</sup> falls into two parts, an information rich one and an information poor one, clearly

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<sup>20</sup>) An interesting phenomenon concerning this trend of 'individualisation' are the observable psychotherapies mushrooming up, which support the idea that everything is individual and personal. This goes so far that conflicts emerging (e.g. in the job) are treated as personal conflicts which can be solved only by concentrating on oneself. The result of this ideology can be imagined - there will be no political agitation, but only individual pseudo-problem solving.

<sup>21</sup>) Privatisation in the narrow sense means a transformation of public enterprises into private firms.

can only be prevented by state intervention. The state has to provide access to the knowledge produced by the society. In consequence the future network will have to supply various information bases comparable with public libraries. The interactive use of the network might also offer the opportunity to support political decision processes or the establishment of groups. Evidently the latter two objectives call for an institutional environment which executes the outcomes of the information processes.

Concerning the discussion of real versus artificial needs we would stress that visions should replace utopian personal ideals. A vision is a model which represents a possible future solution of a socially-relevant problem. Though a vision might only sketch the most essential features of a desired future situation, its difference from the current state of affairs is a necessary ingredient for what we call a real need: it motivates and indicates the causal links, the instruments, to reach the desired state. If a vision really grasps the essence of the problem one can call it adequate and a sharp distinction from inadequate personal ideals can be drawn. This latter perverted form of models is systematically distorted to fuel repetitive illusory satisfaction via products. The method to formulate adequate models is thus an important part of a society's knowledge. The network should help to educate all members of society to become model-builders, visionaries, i.e. conscious political agents.

Take a second look at figures 6 and 7: In a certain sense what we propose is to reverse the development shown there. Contrary to the tendency to shift more and more life spheres into one's private sphere and to separate individuals and groups from each other, we suggest as development an opening of most life spheres. The underlying idea can be taken from the feminist discussion on the reproduction sphere: By defining it as 'private' it is withdrawn from political treatment<sup>22</sup>. Therefore most fields concerned by the network (e.g. labour, education and the like) have to be declared as 'public'. Furthermore the network is to be seen as supplementary to direct group building (between persons P1...Pn) as shown in figure 8. Collective experience as foundation for the capacity for political action is to be extended and supported by communication

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<sup>22</sup>) For a more detailed discussion see (Firestone 1970) and (Millet 1970).

facilities via the network. Joint problem solving will be preferred to the isolation of individuals. Those groups and individuals which still rely on collective historical experience as described in the third of the above-listed contradictions will profit from such support.

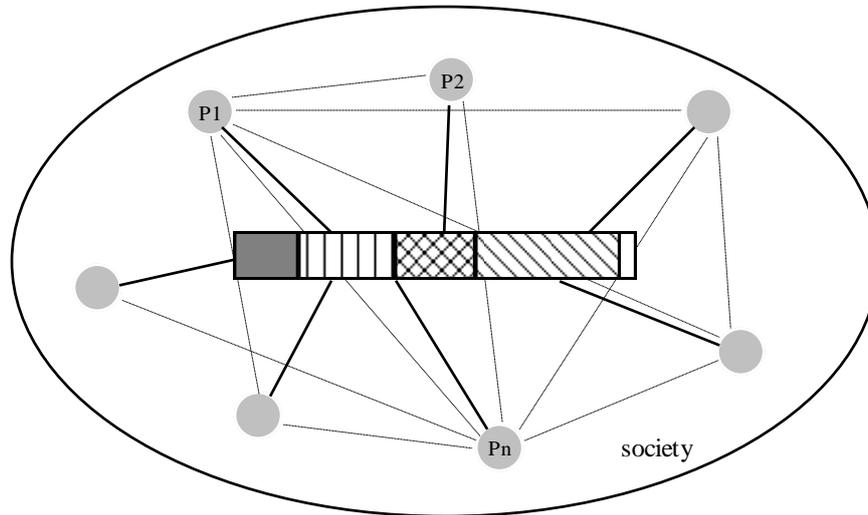


Fig. 8: Interaction via the network

It is clear that designing such a network is part of a political process. As precondition general guidelines for the use of the network have to be formulated and legitimised by a qualified majority of all users. They have the character of constitutional laws and sanctions for disregarding them have to be defined<sup>23</sup>. The prohibition of neo-fascist and sexist propaganda as well as the definition of minority rights falls under this category. There will also exist a body of less basic, dynamically changeable rules, corresponding to ordinary laws, subject to the political will of users as it will be indicated by democratic voting mechanisms<sup>24</sup>. Several approaches to voting theory - coming from

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<sup>23</sup>) Clearly the question of 'cultural identity' will arise since networks are international (Schlesinger 1991).

We consider this to be an interesting field of research.

<sup>24</sup>) A lot of speculation on 'teledemocracy' has already been made in literature (compare (Barber 1984), (Hollander 1985), (William 1982)).

logic, from game theory and from a technical perspective - have thrown new light on the matter recently; reformation will have to draw on these results.

As can be seen, it has to be the political context which must provide the framework within which the technical system can be designed. This takes us back to the line of argument expounded in section 1, the interaction between socio-economic context and technical innovation.

## ***Conclusion***

In section 1 we suggested that in the early stages of a long-term upswing it is the socio-economic context which shapes the technological advancements rather than the other way round. In the course of the paper we came to a position that allowed us to state more clearly what we mean by such a socio-economic reformation. A common, easily derived conclusion is 'beware of privatisation'. In a more and more interdependent world 'privatisation' is mainly an ideological vehicle for the needs of the politically and economically powerful. Other issues are more difficult to analyse and need further specialised research. Let us name a few:

The first set of research questions are those asking for the '*how*': How have certain institutionalised mechanisms to be designed? For example:

- Which kind of voting mechanisms have to be designed?
- In which way has the time spent by everybody for political decision-making to be balanced with time spent for work, leisure time, education, etc?
- How has a language for collective decision making, which is at least partly supported by the network, to look?
- How could a change of the political guidelines, the 'laws' of the network mentioned in the last section, be formulated in order to support reasonable adjustment while preventing distorting manipulations by influential lobbies?

- In which way can democracy be direct democracy involving more knowledge of decision makers and less intermediate representatives?

The newly defined mechanisms clearly give a new, at least a more precise meaning to some key concepts - they specify *what* they are:

- What is direct democracy?
- What does the concept of privacy really mean? What does it mean that some fields of life are private?
- What happens to the concept of work and its opponent, the concept of leisure time?
- What happens to the function of unions and other bodies representing social groups?
- What is the role of cultural and national units in an international setting?
- What is to be understood as innovation, including not only product and process innovation but also social innovation<sup>25</sup>?

Implicit in the answers to the first two question sets are assignments of entities to the key roles in the mechanisms - *who* has to take the described actions:

- Who will provide new inventions, latent innovations (again including social innovations)?
- Who will construct the models serving as possible building blocks for the interpretation schemes for people's visions?
- Who is going to select relevant information to be included and to discard irrelevant information from the databases? Who produces records of collective experience to be stored?

Finally questions on 'how do we get from here to there', i.e. questions of transforming the current situation into the new socio-economic context have to be faced. Questions how to *operationalize* the (r)evolutionary reforms envisaged:

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<sup>25</sup>) An interesting distinction between the public and the private side of innovation can be found in (Nelson R. 1987 pp.73-92).

- Who should finance the network?
- Where should the time taken for political decision making be taken from?
- Which groups can be considered, or 'won' if one takes the position of classical enlightenment, as carriers to push for the new socio-economic design?
- Can the current situation of increasing international competition (compare section 1) be exploited for the purposes of reformation - and if so, how?

It is evident that questions dependent on each other can be grouped to form interdisciplinary research projects. In our view such projects are not only of academic interest, they are urgently needed for policy making, for setting the frame within which the next Kondratieff will develop<sup>26</sup>. Policy making in an age of reformation, as we understand it, does only partly consist of supporting certain professional politicians, but as a main goal provides visions - and how to make them come true - for the underprivileged.

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<sup>26</sup>) As Hodgson rightly points out this idea is what recently has been labelled 'path-dependency':

'Such matters relate to the notion of path-dependency, ... In the historical context this suggests that events occurring during a crucial and formative period of change may greatly influence later socio-economic outcomes.' (Hodgson G. 1991 p.162).

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