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## What is New About the Digital Economy?

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### 1. *Information and Production*

The production of information and its dissemination seems to be the most dynamic market today. The "information society", the "knowledge based economy" or, with the emphasis on the information technology, the "digital economy" terms point to the new economy. No doubt, ICT is changing the *structures* of our economy i.e., the value system, fundamentally and with growing speed. At the same time the *shape of information* is changing: access media such as personal computers, organizers, the internet and further manifestations of ICT continuing to conquer ever-growing amounts of time throughout our population while providing an ocean of information.

Such changes are not entirely new. The inventions of writing, printing, the telegraph, and mass media (through newspapers, radio and television broadcasting) have produced a fundamental impact on the economy and the society, have changed our value chains and have created new products and services.

*What is the digital economy?* Is it a next step within a sequence of technological innovations, or a new epoch in our economic and social development? Which consequences can be anticipated or calculated? To further investigate this issue, we must first take a look at the places in which the new form of information operates:

1. *Perception*: Human beings live in a *cognitive space* which enables perception and interpretation of a certain reality. This cognitive space also opens a manifold of possible worlds of what could be. These possible worlds are the material for our wants, our demands, and our fears. From this, our *goals* are born as well as the possible *problems* associated with them (we here define a problem as the evaluated difference between reality and what could be).

We call this cognitive space, into which humans are embedded and which prevails (and often replaces) their sensory perception a *knowledge medium*. Knowledge media consists of three components [Schmid 97b]:

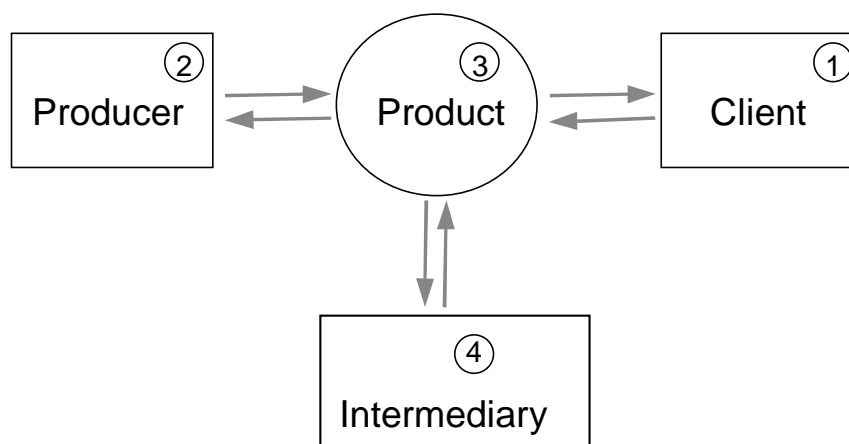
- A *logical space* which provides for the language and logic we use to communicate with others and with ourselves,
- An *organizational component* which governs our self-understanding and our understanding of others through the forms of roles and protocols, as in the roles of man and woman and the rules governing their actions, the roles and protocols of agents, of companies or of nations within a given context,
- A *channel system*, or a system of communication means which allows the physical transfer of information across time and space( for example: books, letters, conversations, databases, etc.).

It is within the parameters of this third component, the channel system, that the ICT operates. *Channel systems* and communication services thus *furnish our awareness of problems to be solved*.

As is widely concurred, the term information implies potential knowledge. We would like to take this definition a step further by referring to the Latin word "in-formare" (molding-in, to give form to), i.e., shaping the spirits [Capurro 78]: information gives form to our imagination and is molding our cognitive space. Today, this aspect of information is called *communication* as in corporate communications or marketing. What we call information today (externalized knowledge, stored in data carriers which allow for transportation across time and space) is the raw material for the process of generating knowledge. The width of our horizon and thus, the shape and volume of our *portfolio of problems* are functions of the information we receive, i.e. the functions of the channel systems and of communication services available.

2. *Production*. As is well known, the division of labor arises when humans prefer not to or cannot solve parts of their problems themselves, but need for them to be solved by others. If this is not accomplished by mere force (as in slavery) but within the frame of an economy of exchange, this game requires the development of specialized knowledge in the field of the problem solved. Thus, the weaver knows more about threads, weaving and clothes than does the blacksmith, who knows more about metals and forging. In each case, higher productivity makes both winners by a division and exchange of labor. An ongoing rise of productivity accompanies an ongoing accumulation of knowledge by the specialized groups. Knowledge and information become the central production factors, in the shape of knowledge about input products and services as well as in the shape of knowledge about the processes. Here, ICT operates on production.
3. *Design processes*. If a client disposes more knowledge, he generates more wishes and problems and eventually more demands – see 1. Thus, increasing knowledge brings forth an increasing amount of offers – see 2. But, the further the specialization of knowledge continues, the broader the *distance* between the world of production and the world of consumption. An automobile engineer regards the car with different eyes than does the client. This gap must be bridged by *design*: on one hand, the product designer must present the product in such a way that the client understands it and likes it (- he speaks the language of the client -), on the other hand, the product design must fulfill the requirements of the producer. Here, ICT changes the basket of products, as well as the *design process*.
4. *Business media*. Each economy needs an inter-mediation between the client and the producer. Spaces or *platforms* for exchange (as they emerged, for example, in the form of the market place) and intermediaries serve this purpose. They must grant the exchange of knowledge, they are to allow for the signaling of intentions to buy or sell, they must offer mechanisms for negotiation and finally, they must support the fulfillment of contracts. We call such platforms for the coordination and exchange *business media*. Business media encompass, as does knowledge media, again three components: (1) a logical space, (2) an organizational component and (3) a channel system which, in this case, also contains the infrastructures needed to transfer goods (i.e., logistic systems) and money (i.e., payment systems). Here also, the effects of the new ICT focus on the third component, the channel system. Electronic commerce and electronic markets are manifestations of this. Eventually, it will also affect the other components such as organization and logical space.

The graphic below (fig. 1) visualizes these relations and the places where the ICT operates. We primarily think of the end of a value chain as where the word client means retail client. However, the following considerations may easily be transferred to other parts of the value system where client may be interpreted as meaning, rather, an industry client.



**Fig. 1: The Starting Point for ICT in the Division of Labor Production**

The previously posed question now become more concrete: What is *new* about the digital economy? What are its effects on the 'places' in graphics figure 1? In what ways and where is it revolutionary? To answer these questions, we must first investigate the new "*Gestalt*" (formation) of digital information and then discuss its effects on the places mentioned above.

## 2. Digitized Information

Modern information technology has two roots:

- the formalization of logic, and
- the rationalization of workflow.

In the 19<sup>th</sup> century after the mathematical method was applied to logic, we turned, at the beginning our 20<sup>th</sup> century, to the formalization of information processing. To that end, some achievements of the discipline of business administration were integrated. In the 19<sup>th</sup> century, the concept of the division of labor and the rationalization of work had been prompted; the division of labor by Taylor and the assembly line by Ford marked milestones and first highlights of this development [Heintz 93].

Formalization is the true basis of a mechanization. Formal systems supply man with symbol based, collective thinking tools. One example is the formalization of geometry, i.e., the mathematical description of space, which, together with the mathematical description of time, became the fundamental basis for modern physics, which in time became fundamental for the disciplines of science and engineering. This was the starting point for the first industrialization [Basella 88]. Formalization allows human kind the ability to describe and to simulate processes of time and space in a collective symbol system. The tools of theoretical physics prevail occurrences in time and space, e.g., in electrodynamics, far deeper than the tools of our natural imagination. Whereas thinking is bound to imagination and is therefore subjective and private, symbol based reasoning can be externalized, modeled into symbols, and thus becomes intersubjective. If, in addition, the system of symbols becomes codified and regulated by exact rules, i.e. what we call today formalism, it gains regulatory power. Leibniz (1646-1716) first realized that rule based calculus is an essential element of formalism and as such, furnishes the essentials for mechanization.

Throughout history, several such symbol systems have been invented and realized for practice. In ancient times, the symbol systems of arithmetic were invented and became fundamental for the disciplines of bookkeeping and for quantitative calculation. Their partial mechanization by the means of abacus and other calculation tools, as well as their systematic data-keeping, paved the foundation for higher civilizations in their time – and for business administration until today. The analogue

applies to geometry this way. With these innovations, stocks and quantities could be made objectively for both inventory and planning reasons.

Calculus based on analytical geometry provided the formal description of constellations in space and time, and of their dynamics, i.e., mathematical physics, as mentioned before, and eventually industrialization and the culture of industrial age [Schmid 97a].

Today, it is the *realm of information* which, as a next step in this ongoing cultural history of formalization, is being unlocked by the formalization of logic. There is a new core science emerging – computer sciences, in Europe sometimes called *informatics*, with its series of spin-offs.

Industrialization enabled by these new basic innovations has burst out with full force since the middle of this century. Since the development of the computer more than 50 years ago, enormous quantities of information have been brought into a machine-readable format by encoding it into formal languages. Just the same, more and more processes have been described formally and are now available in the shape of programs which can be operated by machines. Large parts of the inventory of information, which underlies our society and economy, are being translated into computer readable and computer processable language at a terrific speed. The production factor of information is gaining new *Gestalt*.

Since the new information carrier computer is in union with telecommunication networks, this production factor is available at any time, in any place: More and more information objects present themselves ubiquitously, interactively and throughout multi-media. Today's prevailing interface, the personal computer, is going to be complemented by a variety of access media such as the mobile phone, the television, the palmtop, and even the automobile. Thus, virtually everyone gets access to extremely potential production means. There is a socialization of production which is going faster and further beyond anything Karl Marx could have imagined.

*What is the effect of this new industrialization and this new Gestalt of information on the "places" named in section 1 (fig. 1)?* We proceed as follows: first, we investigate production, then products. After, having discussed the effects of knowledge media as spaces for man, we then analyze new communication design between production and consumption, including the new fields of activity for intermediaries.

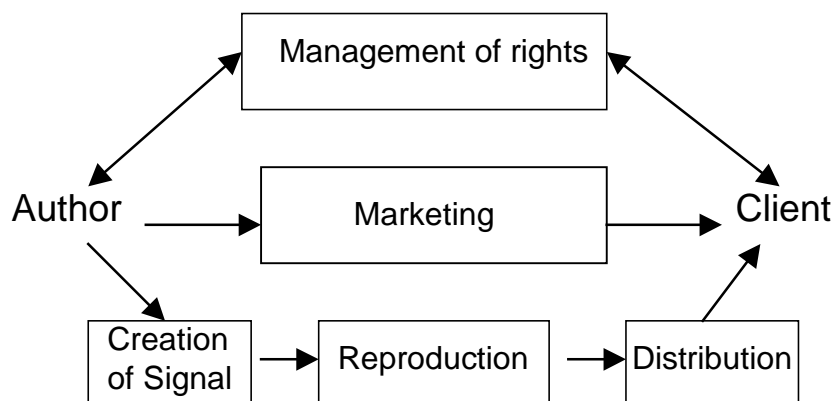
### **3. Shaping Production Anew**

Economic value creation and exchange is achieved within a network of customer-supplier relations (as shown in fig. 1). Linear sequences of quantities within that value system (value web) are called *value chains*. The granularity of the network is largely variable. When focusing on factory production, one sees again such a value web.

In describing the effects of ICT on production, mostly a description of the value system in a particular aggregation is used. For example, one looks at the effects of ICT upon a single factory or one tracks them through a reconfiguration of (parts of) the internal value chain. Such processes may ensue (since the introduction of the computer) with the automatization of back office processes, or with production operations within computer integrated manufacturing. In the meantime, we are well acquainted with such transformations of the value system due to ICT within the companies.

The changing of entire *branches or markets* due to the ICT is, on the other hand, a new challenge. Not only because this phenomenon has only recently gained momentum, but also because it requires a different point of view. On the level of inter-organizational production management, one often uses business models which apply to an entire market, have eventually emerged not as a result of a management process and which, therefore, are less investigated. We may define a market as a coherent fragment of the value system, in which the output is defined by certain products and of which

the interfacing with the rest of the network is rather clearly defined. As an example, we may model the value system of the music industry market as shown in graphic fig. 2:



**Fig. 2: The Music Industry**

Between the authentic production of works by authors (writers, singers, orchestra, etc.) and the consumption of music by retail consumers, there are the following building blocks in the value system:

- transformation of sound into a reproducible signal (encoding),
- multiplication of this signal as a recording device (gramophone record, magnetic tape, cd, dvd),
- distribution of these recording devices to the end consumer,
- administration and management of intellectual property rights, and
- marketing

The effects of ICT on the reconfiguration of the value chains within a local environment often has dramatic effects. This is seen, for example, through the automatization of information processing activities and their abolition of human resources as well as through the replacement of conventional products and connected performances by new information products. As long as such transactions evolve locally and as long as they do not affect the entire value system of a branch, thus not destroying the related business model, we may label the changes as *evolutionary*. Whereas, if the entire value system, or larger parts of it, is affected by such transformation processes, the hitherto valid business model collapses and we speak of *revolutionary* change. Presently, we can observe both types of transformation processes in the economy.

### 3.1. Evolutionary Transformations of the Value Chain

The evolutionary transformation of the value chain today is ongoing in almost all areas of the economy and this considerably challenges the markets and its enterprises. In the banking industry, for example, ICT grasped the counter services after having control of the back office. Via the internet, new distribution channels are being constructed for today's retail banking. With the production of the electronic stock exchange, practices of trade are being transformed. The working place of the trader at the floor in the stock exchange has been shifted to the workplace of the trader in the bank, then on to important clients. Today, trade occurs over the internet directly to the end consumer (considering Charles Schwab, E-Trade, Youtrade by Credit Suisse, among others). The access barriers and costs for these trading possibilities have plummeted. Dropping from the very rare and hard to get privilege of accessing a trade floor, to a trader's place in a bank (initially worth several hundred thousands of dollars), to the trading terminals for privileged customers (worth ten thousands of dollars), on to the internet trade which is now open to virtually everyone today at practically no cost to the consumer. Such changes pose enormous challenges to a market and affect business models. However, if they avoid changing crucial structures and achievements of the market, they allow the core of their business models to continue to thrive.

Mastering such evolutionary changes (which, looked at from a local point of view, indeed have a revolutionary character) requires more than just an assimilation of novelties into the existing structures and mind sets. On the contrary, we must adapt and develop structures accordingly. Still, enough identity remains to allow the discussion of the survival of the market. ICT is forcing more and more markets into a very rapid process of evolutionary adaptation and to a changed environment. Such changes of the value network are not new. They have indeed been enhancing the processes of economic development since its beginning, however, what is new is the raising number of locally revolutionary changes. In former times the revolutionary transformations of parts of the value chain seldom happened and even then they changed through a gradual process. Today, they are happening faster and more and more simultaneously. This forces us to review entire value creating systems and their re-engineering.

For example, in looking at the book market, the revolution which eliminated type setting and replaced it with photo setting had, for those affected, revolutionary character. However, for the entire print market it was just an evolution. The quest to adapt this innovation in due time and to make good use of the new possibilities in order to optimize the processes lead to the fact that authors today often are in charge of accomplishing the layout and formation of their publications themselves and must deliver ready to print prototypes. Even the change in the sales trade by the internet (i.e., Amazon.com and others) may still be labeled as an evolutionary transformation of the book market.

### 3.2. Revolutionary Transformations of the Value System

The intrinsic disruptive force of the new type of information becomes perceptible when it affects the whole value system of a market. This has already happened, is happening and will accelerate at a rapidly growing availability of more and more ICT-based powerful services. The power of such revolutionary changes is shown in the example of the electronic mail service. The postal service was established parallel to industrialization over the past 200 years. Eventually, an industry with a sophisticated organization and its processes were built, mostly with nationally grounded domains. A widely ramified hardware structure was erected, spreading from the letter-box of each household serving the dissemination of letters, to public mail boxes for the collection of letters to be sent, to district post offices, to main post offices, and so on. Numerous people found and find work within this branch.

Then began the digitalization of the post service. First in the area of a firm's internal mailing and expanding from there: The letter started its exodus from the information carrier paper to the information carrier computer – it became e-mail. With X.400 the ISO worked out an organizational model which, basically, is a copy of the classic organization model. Software companies modeled it into software, although it was the simpler SMTP (Simple Message Transfer Protocol) of the internet which won the race. The current result is the re-construction of a postal service in the digital medium, accomplished in less than a tenth of the time than was previously needed in its original medium. All information processes, from the reading and evaluating of the address by the postman, to the achievements of the international postal service, have been made automatic and are now available as software. Today, expertise in postal service comes packaged along with basic computer software at no cost. The classic business model no longer has grounding – it has evaporated.

There is quite a similar scenario in today's music industry. The format MP3 offers a digital representation of good quality music and allows for an easy transportation of the data over the internet which is freely available. This is going to change the value system of music industry, as plotted in graphic fig. 2. To encode music into digital signals (i.e., in the mentioned MP3 format) an expensive sound studio is no longer needed - at least not for the complicated processing of functions like mixing and sampling. Instead, software is added to a well equipped personal computer which allows easy access to necessary requirements for less than hundred dollars. The equivalent to a plant producing records or CDs is a server which, upon request for a piece of music, allows for the down load of the MP3 file in question at any time. Investment for such a server is a few thousand dollars. As a

distribution means there are electronic markets which today give up to 85% of their earnings to the authors, thus overturning relations in the traditional music industry. Hitherto, the traditional business model had the author to largely yield his intellectual property rights to the publisher and, very often, to be tied to the publisher beyond the publication of a single work in exchange for access to formerly expensive production means, for the protection of his rights (as far as they remained with him) and for a certain amount of marketing services provided by the publisher. What remains is the administration of the rights and the marketing. To erect on this basis a new business model convincing for both sides surely means to overcome old mind sets. However, management theory has not yet offered a convincing remedy.

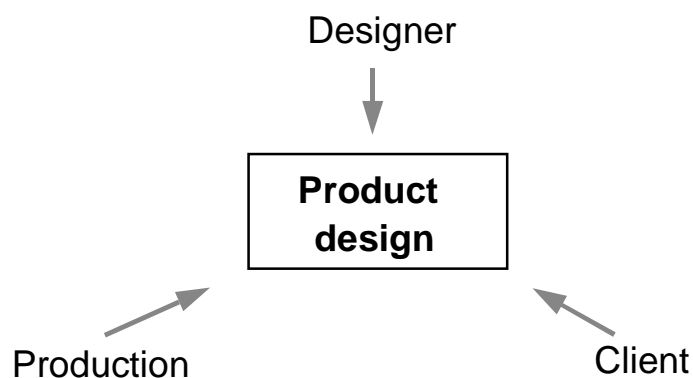
These examples suffice to illustrate the transforming power of ICT onto production processes and value systems. Mostly, it is the new format of the product which triggers such revolutionary changes. In the case of the electronic mail it was the electronic letter, in the case of the music industry it is the digital format MP-3 of a piece of music. Therefore, we now turn to the products.

#### 4. Designing Products Anew

##### 4.1. Products as Problem Solutions

We have defined problems as the difference between reality and what could be (section 1). If a person with a problem is not willing or able to solve the problem himself, and if another agent offers to solve the problem, then a product originates which can be exchanged as an economic good. As said above, such a product must be *presented* to both sides in an appropriate way. In other words, it needs a *design*. In the typical design process there are at least the three following parties involved (fig. 3):

- *the producer of the product* who disposes of the knowledge to manufacture a product and knows the main elements and the underlying conditions which must be integrated in order to determine the product,
- *the client for the product* who provides primary hints or marks of orientation about the purpose of a design. If a client understands and likes a design he is willing to pay a price which balances the satisfaction of his needs, and
- *The designer of the product* who is the intermediary between the world of the client and the product production.



**Fig. 3: The Product Design**



The resulting *product design* integrates three tasks of design:

- *the client oriented design*: This communicates the product's answer for the problem posed by the client. The design therefore must "speak" in a pleasant and easily understood language. Its outlook must be attractive and it must shield away (as much as possible) all details concerning implementation,
- *the engineering design*: If the product is a technical product, it must implement the product's concept in an efficient, reliable and elegant manner (as in the understanding of the engineer) including therein the most fitting components, and
- *the organizational design*: This aspect of product design adds managerial elements along with their connected services and processes.

Within the production industry, this three-fold design process was formerly dominated by the production side, thus the engineering and organizational design was dominant. Usually, an enterprise tried to anticipate and simulate a client's needs in order to model a product whose appearance was then created by an employed designer in charge. Within the new ICT, the environment has become much more communicative in the sense that the client becomes increasingly involved in the design and even in the production process. Reverse engineering and reverse marketing are the terms that describe this overturn of the design process, which hitherto was basically driven by the production side. A configuration in which the designer collaborates primarily with the client and where the designing process evolves as teamwork between the two (and only then goes to production) should gain more capacity. Historically, the architect was and still is a designer able to produce in this way, and has a theory for this culture of design.

This client-based solution implies, on one hand, that the designer knows the world of his client so well that he is able to express the solution for his client's problem in the very language of the client. On the other hand, the designer must know and understand the possibilities on the production side. If we understand the capabilities on the production side as *resources*, the "resource based view" is imposing itself, i.e., the production side embodies a bundle of problem solving capacities (resources) which are at the disposal of the problem solvers (the designers) in order to solve the problems of clients [Katz 99]. Thereby it is of no importance whether or not these designers are classified as salesmen or as internet solutions (as with Dell [<http://www.dell.com>], with Smart [<http://www.smart.com>]) or whether they are independent intermediaries, or employees of the client.

The new ICT opens up a rich field of designing possibilities. Currently it is being explored by de- and re-intermediation, and new organization of distribution and procurement.

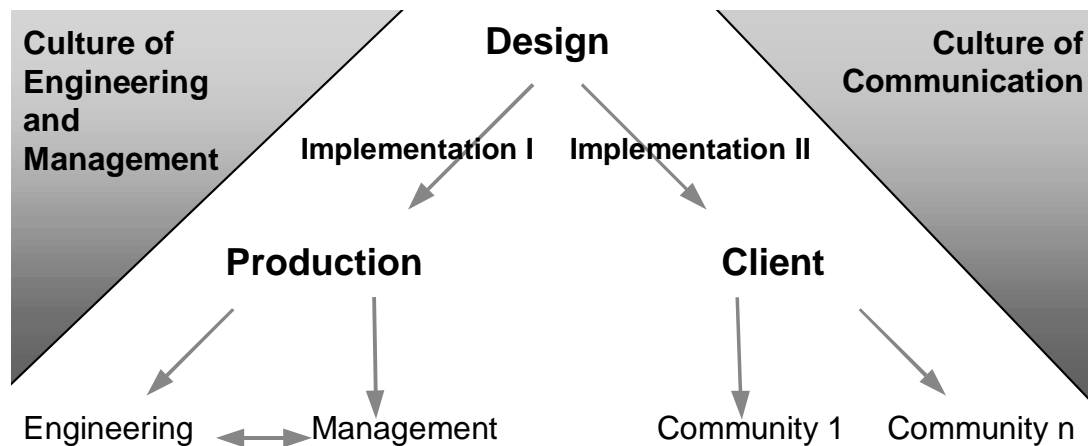
## 4.2. Implementation

If a product's design is at hand and if the transaction between producer and client should take place, the design must be realized on two sides:

- (1) on side of the production, and
- (2) on the side of the client.

- *Implementation I*: The implementation, i.e., *realization*, of a design into production relies on competence as taught and learned in schools - for technical aspects in engineering schools and for organizational aspects in management schools. These abilities are a focal point of business organization. Here lie the core competence's of traditional industries.
- *Implementation II*: The implementation of a product concept into the awareness of the client, or the *communication* of a design, introducing it into the world of the client, entails no less than the

*programming of brains*. This task traditionally belongs to the duties of sales and marketing and to corporate communications. Fig. 4 illustrates this exposition.



**Fig. 4: The Two-fold Implementation of Product Design**

The various capabilities necessary for the implementations in question are connected to two different cultures; implementation on the production side (Implementation I) follows the rationality and logic of production and organization. Here, two different sub-cultures have originated, namely those of the engineers and those of the business administrators. Integrating them both into the firm's internal organization poses a challenge for practice as well as for education. The communication of product design on the side of the client (Implementation II) follows yet another culture. The soft factors – emotions, mentality of time (*Zeitgeist*) and life style, etc.– provide codes for the elements which are of importance here.

What does the digital economy change within these relations? Rather much, although first there is a shift of the importance of Implementation I towards Implementation II (fig. 4). Then, the consumer begins to live within new media where more and more new languages for expression are currently underway. We now examine the first aspect.

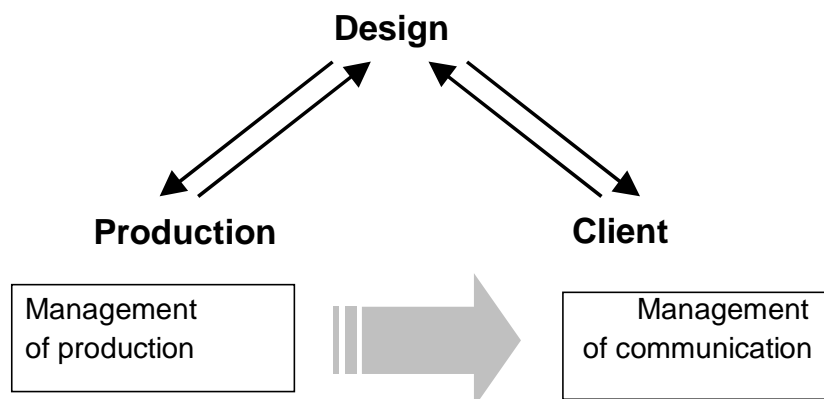
#### 4.3. The Shift Towards Communication

The shortening of the time span to implement a product design on the production side has been an evergreen theme of recent years. The time lapse from a product idea until its realization and the availability of the products on the market has been shortened tremendously. Formerly, where years were necessary, today these processes occur often in months – and those who cannot cope with this fact are rapidly losing market shares. Therefore speed counts in the internet business.

The enormous acceleration is due to the changes in production as we have seen in section 2. It came by automatization and, accordingly, by the large availability of digitized information and by the fact that such information can be integrated further and easier. This leads to a shortening of implementation time and subsequently to an enormous cost reduction for products respective to an enormous increase in productivity. In the digital economy the rate of productivity increase is an order of magnitude (ten times) higher than it was in the time of the first industrialization. While they earlier totaled only a few percent each year, today they amount to 100% per year, i.e., the hybrid product personal computer has a productivity increase of 70% per year. This is known as Moore's law.

Whereas we have such acceleration within Implementation I, the processes as described in Implementation II remain basically much the same as they did years or even centuries ago. Communication aims at programming brains, and this seems to still function as slowly or as quickly as it did in the past because the structures of our brain have remained much the same as they were in Neolithic ages. Although we have a different "software" now implemented (we dispose of more and different knowledge) the decisive soft factors have not changed.

Thus, the diverse development of inter-time development of implementation I and II lead to a shift of their importance away from the implementation on the production side towards the implementation on the communication side, as shown in fig. 5.



**Fig. 5: The Shift of Importance From Production to Communications**

The capabilities of communicating a product idea successfully into consumer markets, to gain sufficient attention and to create a brand name, have become decisive factors for business. Accordingly, new products such as mobile phone generations are being marketed with big efforts long before the products are developed, much less produced. Knowing the rules which reign the forming of common knowledge and which create appreciation in consumer markets and their transposition in communication strategies is a crucial challenge of the digital economy.

Speaking about communication must bring to notice that consumers, whom product designers want to contact successfully, are living in particular cognitive spaces (see section 1 and the following section 5). They live in association with one another and build parts of communities. The *community context* has been largely discussed recently as a question of network effects and the related increasing returns: the benefit of a product for the client is increasing along with a larger quantity of partners who also own, know or use it. (The consumer's value  $u$  is then proportional to the number of potential partners  $n$ :  $u \approx n$ ; the total therefore is  $\approx n^2$ , see [Hagel, Armstrong 97][Shapiro, Varian 99]). These square growing, welfare functions are behind a number of phenomena which characterize interacting products and services in networked economy.

Additionally, communicative behavior patterns *on* and *about* a product within the circle of a community is of no less importance. A new idea approaches a community quite like a virus, the members of the community take up the idea (contagion) and diffuse it to the group by communication, provided that there is a number of apt receivers interested enough to reproduce the idea or to speak about it to other people. In this way a community creates an exponential growth of knowledge about the product idea – which is an effect that, in theory, has not yet been treated according to its importance.

The extremely rapidly growing and globally available new channel systems of the ICT are thus changing the design process in a manifold of ways as they shift attention towards the client. However, clients are living in mediated worlds, as has been stated in section 1, and in *knowledge media* which is changing with new technology. Finally, let us turn to these ideas.

### 5. *Man in the Information Age*

The new digital medium is currently most prominent as presented by the internet. The internet will integrate, in the near future, broad band services such as television and will allow for easy access by an increasing number of different interfaces. Thus, it is realizing Ted Nelson's vision, dating back from the 1960's (that all information will be available anytime for everyone from any place). And thus, additionally, it will furnish an infrastructure for the realization of another vision dating back to the seventies when virtual reality was emerging [Krueger 83][Fisher, McGreevy 86][Rheingold91], for the elevation of *distributed virtual environments* which are *worlds* for particular communities whose members, although they are distributed across the globe, are able to interact 'live' with each other in those worlds. Current examples of this are the electronic stock exchanges, chat rooms and computer games on the internet. The richness of such distributed artificial worlds will grow rapidly and they will attach themselves to the audience (or rather, agents) much more than television could do previously. New niches in the understanding of ecology will emerge, attracting communities to settle there as well. The individual members of such settling colonies will be able to operate freely of their spatial localization.

This development brings forth a new media industry which produces mediated worlds and their services. It has a heavy impact on existing communities and their organization, especially on the ones which formerly could bind their members via geographical areas, such as global firms and nations. So, nations also need to design their business models anew.

If the *new media branch* has become a dominant player, if the basket of the future will continue to acquire growing quantities of digital products, and if we will spend more and more time within the digital media, the future will not only belong to programmers and computer literate people. We have seen for quite some time that general development is accompanied by a demand for events, adventures, wellness, therapy, and the like. The *tourism industry*, for example, is estimated to be the other branch of the 21<sup>st</sup> century. In these realms, skills and capabilities other than programming are required in addition. Therefore, we must not expect a two class society which is divided by technical skills alone.

The shaping and development of new media – media management – thus is an encompassing phenomenon which, besides technical platforms and its related services, must also consider the soft factors which are essential for a successful design of our cognitive spaces. Media enterprises such as Disney illustrate this idea well with their products like Bambi, the Lion King, Pocahontas, and Aladdin. There is a cornucopia of adventure products from movies, television series and computer games, to everyday commodities such as towels, wristwatches, mugs, stationery and other accessories which transport their fantasy contents into all sorts of living spaces and keep them there efficaciously.

### 6. *Conclusion*

We have seen an ongoing trend towards perfectionism in the division of labor, we have seen a never-ending reconstruction of the value web as well as the invention of novel products and the emergence of new societies. Such processes are not specific for the digital economy, they are simply the motor that operates a continuous civilization process that has existed throughout history. However, there are elements of a new quality in – hence – a new economy. We introduced four "places" of interaction

between producers and clients in section 1 (fig. 1). To show this, we summarize again the arguments in a slightly varied succession:

- a) The industrialization, or *mechanization of the information process* is a new dimension in the economy. We owe this advance to a basic innovation which lead to the computer sciences and the development of the digital ICT. This new industrialization causes more frequently a revolutionary reconstruction of the value system as well as an acceleration of these reconstruction processes, and causes a large growth rate in productivity.
- b) The new digital medium allows for the establishment of *new mediated homes* or distributed virtual environments for man, as well as for new forms of *telepresence*. These new media create new ecological niches towards which man can turn his attention. The competition for public attention has already become the dominant economic scenario. The success of a media design is measured by the quality and quantity of the hours people are attracted to spending with it.
- c) Within these ecological niches we may expect the evolution of *new products*, especially digital products in the field of infotainment or entertainment. These new products may eventually dominate our basket. Additionally, the new digital interactive medium allows and asks for a renovation of the *product designing processes*. At this point, the scepter is passed to the client. A new understanding of service is essential – with consequences for the shape of the value system, for competence profiles, for curricula, etc.
- d) In the digital economy, the focus thus shifts *from the production side to the communication side*, from production management to communications management. Here, the winning skills include the ability to translate the needs of a market, or more concretely the problems within a community, into a successfully communicating product design; to be able to implement a product design into a community and to have it compete successfully in this economic market.

These advancements call strongly for further development of the organizational theory. Today, most of its concepts are (explicitly or implicitly) grounded on premises which are rooted in the old economy. We must reflect on these premises and examine them critically. If necessary, we must get rid of them. The requirements of the client, as a member of a community, especially an internet community, must set the scope to define anew the services which we understand as products and how we design, implement and deliver them.

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