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From industrial economics to digital economics: an introduction to the transition

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Contents

Abstract 9
Introduction 11
I. New basic conditions 11
1. Revolution, evolution or hype? 11
2. The knowledge society 13
2.1 The positive loop effect of knowledge creation 13
2.2 The impact of modern ICT 15
2.2.1 Computer 15
2.2.2 Interconnectivity 15
2.3 Production process and evaluation of knowledge 17
2.4 The knowledgeable worker 18
3. Inter-net-working 19
3.1 Cyberspace 19
3.2 The net of nets 20
3.3 Think network 20
3.4 Information overload 21
4. The dynamic of science 22
5. Measuring the digital economy 23
5.1 Virtual guesswork 23
5.2 Customer convenience 23
5.3 Network effects 24
5.4 The four layers of internet economics 24
5.5 Definitions 26

II. Structure-conduct-performance 29
1. Performance 30
1.1 Digital vs. Non-digital goods 31
1.1.1 Non-digital goods 31
1.1.2 Digital goods 33
1.1.3 Additional value 33
1.1.4 Tradable- and non-tradable goods 34
1.1.5 Services 34
1.1.6 Degree of digitality 35
1.2 Production and allocative efficiency 36
1.3 Progress 37
1.4 The 'good performance' 38
2. Digital market structure 39
2.1 Big is beautiful? 39
2.1.1 Economies of scale and economies of scope 39
2.1.2 Network effects 40
2.1.3 Integrational movements 41
2.2 Redefinition of industries and competing groups 42
2.2.1 IT-classification 42
2.2.2 Product differentiation 43
2.3 Transparency 44
2.3.1 Search engines 44
2.3.2 Transparency creating patterns 46
2.4 Barriers of entry 46
2.4.1 Entering virtual markets 46
2.4.2 Making business in virtual markets 47
3. Conduct 49
3.1 Money and payment 49
3.1.1 Credit cards and checks 50
3.1.2 Electronic cash 50
3.1.3 Micropayments 51
3.1.4 Smart cards 51
3.2 Innovation 51
3.2.1 Common understanding 52
3.2.2 Pace of innovation 52
3.3 Pricing behavior 55
3.3.1 Transparence 56
3.3.2 Price discrimination 57
3.3.3 Online auctions 59
3.3.4 Dynamic pricing 60
3.4 Behavior of firms 62
3.4.1 Inner-firm management 62
3.4.2 Networking between firms 62
3.4.2.1 Efficiency (Marshallian economies, B2B, Collaboration) 62
3.4.2.2 Affiliate programs 64
3.4.2.3 Dis- and re-intermediation 66
3.4.2.4 Trust 69
3.5 Product strategy and advertising 69

3.5.1 Production 70
3.5.2 One-to-one marketing/CRM 71
3.5.3 The unconditional consumer focus of internet economics 73
3.6 Market equilibrium 75
3.6.1 Demand forecasting 75
3.6.2 Built-to-order 75
3.6.3 Retrospective adjustment 76
3.7 Company finance and the growth of firms 76
3.7.1 E-capital 77
3.7.2 Survival, development and growth? 79
3.8 Legal tactics 81
3.8.1 Model law on electronic data interchange 81
3.8.2 Security 82
3.8.3 Privacy 83
3.8.4 Intelecual property 83
3.8.5 Standards 84
4. Competitive strategy in the digital economy 85
III. Macro 89
1. Role of organizations 90
1.1 Government 90
1.1.1 The private sector should lead 90
1.1.2 Market failures 90
1.1.2.1 Maintaining task 91
1.1.2.2 Promoting task (education, extra-efforts) 92
1.1.3 Supranational moderation 95
1.2 Non-governmental guidance 96
2. Growth 98
2.1 The productivity paradox 98
2.2 Real cost reduction 99
2.3 Direct effects of IT growth 101
2.4 Indirect effects of IT-growth 102
3. Digital divide and the catch up 103
3.1 A natural "sideeffect" of development? 103
3.2 International divide 104
3.3 The catch up 108
3.3.1 The big divider 108
3.3.2 The big equalizer 109
3.4 Domestic divide 111
3.4.1 Households 112
3.4.2 Business 114
4. Labour markets 114
4.1 Employment demand 115
4.2 Skill requirements 117
4.3 Geographical requirements 118
4.4 Wage differentials 120
IV. Final Remarks 123
Bibliography 125
Serie de desarrollo productivo: issues published 131

Tables

Table 1 Retailers' Income United States 1998 30
Table 2 What consumers can do at auto dealers' web sites 32
Table 3 Links 65
Table 4 International e-trade International trade of selected e-commerce firms, 1997 70
Table 5 Distribution costs online savings E-commerce impact on various distribution costs .. 100
Table 6 Access cost 107
Table 7 Domestic digital divide in the U.S. The growing digital divides by income and education: 1997-1998. Internet access 112
Table 8 Digital Divide by Education* 112
Table 9 IT-related occupations 115

Figures

Figure 1 The Positive Loop Effect of Knowledge Creation 14
Figure 2 Impact of Modern ICT on the Positive Loop Effect of Knowledge Creation 16
Figure 3 The Four Layers of Internet Economics 26
Figure 4 Internet Economics as part of the Digital Economy (=the changes modern ICT is bringing with it) 27
Figure 5 Saving online 34
Figure 6 Degree of Digitality Graphs 35
Figure 7 Degree of Digitality Portfolio 36
Figure 8 Reasons Why People Shop Online 37
Figure 9 Economies of Scope 40
Figure 10 Online Transparency 45
Figure 11 The Creative Destruction of Innovation 53
Figure 12 Pricing Transparence 56
Figure 13 How would you pay? 58
Figure 14 Customer-to-Customer 59
Figure 15 Dynamic Pricing; MYPS 61
Figure 16 Savings B2B 63
Figure 17 Frictionless 67
Figure 18 Infomediaries 68
Figure 19 Marketing in the Digital Economy 74
Figure 20 Capital commitments to US venture funds 77
Figure 21 US investments 2nd quarter 2000 77
Figure 22 Charts: amazon.com, yahoo 80
Figure 23 Five forces affecting competitive strategy 85
Figure 24 Cisco's e-commerce customer support savings 100
Figure 25 Direct effects of IT-growth 101
Figure 26 IT-producing industries, contribution to real growth in the US 102
Figure 27 Internet population 2000 105
Figure 28 Human development and internet diffusion 105
Figure 29 Worldwide e-commerce 106
Figure 30 Internet access 1999 106
Figure 31 Website2 distribution 107
Figure 32 Online spending going to foreign sites 109
Figure 33 Falling through the Net 113
Figure 34 IT-share of total equipment 114

Figure 35 Churning effect 116
Figure 36 Skill requirements 117
Figure 37 Wages in IT-industries 120

Abstract

This paper focuses on creating a basic awareness of the new economic coherence, which has been provoked by the introduction of modern Information and Communication Technologies (ICT). It is based on methods of traditional Industrial Economics (bricks-and-mortar economy). The paper shall endeavor to show the differences that exist between Industrial- and Digital Economics, but shall also show that we do not need to burn the old textbooks. Nevertheless there is an urgent need to rewrite them, in a sense of refocusing. Starting from the new basic conditions of the Digital Economy, which get especially emphasized in section (I.2.) The Knowledge Society, and (I.3.) Inter-Net-Working, the focal point is becoming the conduct between buyers and sellers, which is demonstrated in sections about innovation (II.3.2); pricing (II.3.3), behavior of firms (II.3.4), product strategy and advertising (II.3.5) and market equilibrium (II.3.6). The most essential issue in the Macro part is surely in section (III.3) Digital Divide and the Catch Up.

This paper aims to lay a wide-ranging base for untangling the Digital Economy, in order to facilitate and moderate the high-speed evolution. It does not claim to be a complete economic research of the New Economy. The fields it touches are too far-reaching and manifold to make this possible. Further academic and practical effort to explore and research the all-penetrating New Age Economy is indispensable. Especially for developing countries, the advent of the New Economy could be a historical chance to make a big leap, regarding their relative degree of development, but could also mean a dangerous set back. In the actual state of development the paper is part of an investigation of the Digital Economy in Latin America on behalf of ECLAC.

I. New basic conditions

The advent of the "NEW ECONOMY" has often been compared to the second Industrial revolution at the end of the 18th century. It is true that there are various similarities. Some people claim that the impact of the Internet will be even larger. Their argumentation is based on the fact that not only industries and goods are getting revolutionized, but in the long run every single aspect of life gets invaded: including sociology, psychology, cultural or political science and many more fields. This is based on ideas about the transformation to the "Knowledge Society".

Though the big economic impact of the new Information and Communication Technologies (ICT) seems obvious already, and since mankind naturally focuses on the money making aspect at first --due to its survival instinct--, we as economists have to begin investigating the impact that modern Information and Communication Technologies bring about.

1. Revolution, evolution or hype?

Before we start focusing specifically on issues of the Digital Economy itself, I would like to examine the question of whether or not modern Information and Communication Technologies (ICT) is really bringing a new reality or is it just another "blitz" in the history of human kind.

The Internet is often compared with the "Great inventions of the past" (Gordon, 2000). Economists discuss whether the Internet measures up to the economic breakthrough of the steam engine, electricity, the

internal combustion engine, chemical pharmaceutical inventions or many more. There is a major debate as to the real impact of ICT on productivity growth, particularly among US economists.

The discussion about the 'Productivity Paradox' is a discussion about weather ICT technologies do have a positive impact on productivity, or not (see: Growth). Some believe that there is an impact, but that it simply does not show up in collected data because of inadequate measurement techniques. Others believe that ICT has not had a measurable impact on productivity because business has not yet reorganized their operations in order to take advantage of modern Information and Communication technologies. They note that the lag between investments and their full payoff generally takes many years (U.S. Department of Commerce, 1998).

It took more than a century after the invention of the steam engine before it became the dominant source of power in Britain. Work by Paul David (of Oxford University) shows that productivity growth did not accelerate until 40 years after the introduction of electronic power in the early 1880s. The evidence shows that electrically powered machinery reached a 50% penetration rate at a slow pace, as companies needed time to reorganize their factories. The Internet is approaching 50% penetration in the US only seven years since it was launched commercially in 1992. However, we have to understand that, only 6 percent of the world's population is online; even in the rich countries, the figure is on average only 35 percent.

It is difficult to talk about the New Economy, while the full and equally distributed integration of Internet into economic processes, is not yet largely diffused neither on the demand side, nor on the supply side. On the demand side, we are still far from more or less equal access, inside and between societies (see: Digital Divide and the Catch Up). On the supply side, one cannot yet foresee how professional infomediaries, improved supply chain management or Customer Relationship Management are and will be affecting virtual markets in general.

This is having a major effect on the way we carry out research on this field. Much of this thinking is based on speculation or sporadic, anecdotal evidence.[1]

Moreover we must face the fact that the changes we experience today, appear at an unprecedented speed. Changes get introduced at a velocity that has never before been experienced by mankind. At a rough estimate it is claimed that one week of real world development is one day of development in the cyber world. Long term planing in Internet means no more than one year.

Obviously this discussion about revolution, evolution and hype will only be completely solvable retrospectively, once we have the 'big picture' about what was going on at the beginning of the third Millennium. The trouble is –as is the case so often in academic discussions-- that commentators go over the top at both extremes. Either they deny that anything has changed, or they encourage burning the old textbooks and totally reinventing everything. Like in most cases, the truth might lie somewhere in the middle. I will therefore try to simply describe the changes introduced by modern ICT, which we can already see. One thing we can see already is that the Internet diffusion is a lot quicker, compared to when the 'old inventions of the past' invaded the planet, and that the Internet is turning out to have a greater economic impact.

Personally I would, up to a certain degree, agree with the provoking statement recently made by Shapiro and Varian (Shapiro, 1998): "Technology changes. Economic laws do not". But I also know, and will show in this paper, how the focus of Economic laws is shifting dramatically and very fast, and that it is unavoidable to introduce some new elements in our theorizing about economic organization, in order to explain the new economic coherence properly.

[1] People easily tend to get futuristic when talking about the effects a great new invention or system will have on society. This is easily observable on the stock market. The famous 'Bubbles' get usually created at times like this. Further classic examples would be that the *New York Times* predicted in 1938, that the invention of the typewriter means the end of the pencil. In 1975, BusinessWeek marked that computers will very soon create the paperless office...
In the same way these two predictions were mistaken, there might be a lot of wrong assumptions in our research as well. But this lies in the nature of discussing with the future and is unavoidable. The only thing we can do, is keep in mind that's the way things are…

In my own words I refer to the whole process as: "*IT-high-speed-evolution*"[2].

2. The knowledge society

The Internet is the recent step in a long chain of different Communication Technologies (starting from signs of smoke, over the pony express, the installation of the transatlantic cable, to radio...) and will continue to develop into the future (Wireless Application Protocol, UMTS, Fusion with TV...). We have to be aware that Communication Technologies are having --and have always had-- a very big impact on society, since communication is always a fundamental necessity. Like every other Communication Technology, Internet is penetrating every aspect of life. Furthermore, due to its generic character, the Internet converged and integrated many other features, leading to the creation of a special "space", where people can go, meet and communicate. This space is known as "cyber-space". In the next chapter, we will take a closer look at what this actually is.

The impact of this evolution on society, is culminating in the emergence of a "new society", which throughout the world is known as the "information society" or "knowledge society". Fundamental theories in the old economy are based on the optimization of physical, labor and financial capital (land, capital, labor). Having a look at economic processes nowadays, we quickly realize that intellectual, creative, and innovative capital brings in the same weight and sometimes even more. We could categorize this kind of capital generally as 'knowledge'.

The importance of knowledge and information in the contemporary economy has long been established[3]. The notion that information and knowledge are of central importance both in the process of production, as well as an essential part or the final commodity produced, is uncontroversial and it always has had some weight. Knowledge was needed to make a spear, as well as to make a microchip. What has changed, apparently, are the quantity, the quality, and the density of knowledge and information, the speed in which it circulates and changes, the proportion of it which is embodied in the final product.

In order to be able to untangle the New Age Economy, we will have to clarify this issue first. Let us specify what knowledge and information actually is, how it gets created, what role it is playing in the production process, how we can evaluate it and what impact the Internet is having on this whole process[4].

2.1 The positive loop effect of knowledge creation

First of all we have to be aware that knowledge is not a normal 'input factor'. To be able to understand knowledge, we have to avoid treating knowledge so much as a thing and instead move towards considering it a process itself. Like this we will also avoid the mystification of knowledge that infuses much of the literature. While digging deeper into the problem we can see that there are essentially two types of knowledge to be considered (Curry, 1997).

The first one might be termed imaginary or creative knowledge. Fantastic hobbits, character based skills --like presentation skills--, as well as the creative power of team dynamics are all

[2] As pointed out to me many times already, I am fully aware of the fact that this is just a play on words. Every revolution could be defined as a "high-speed-evolution", since nothing comes out of nowhere. But the phrase "high-speed-evolution" is reminding me of this fact, every time I use it. And this is important, in order to keep on standing with both feet firmly on the ground --while travelling through ´cyberspace´.

[3] See, for example: Mandel, E. (1975), "Late Capitalism", London: Verso; Bell, D. (1976), "The Coming of Post-Industrial Society: A Venture in Social Forecasting", New York; Basic Books; Block, F.(1990), "Postindustrial Possibilities: a Critique of Economic Discourse", Berkeley: University of California Press; Toffler, A. (1991), "Third Wave", NewYork: Bantam Books; etc.

[4] The following theories about 'knowledge' are presenting one of the many ways to decipher this complex process. I chose this way in order to be able to explain the impact of Internet on economic coherence. I do not claim that this is the only way to characterize the complex process of knowledge. I will, in order to keep within the frame of this paper, just use these very basic and simple explanations, and will leave the rest to the specific literature.

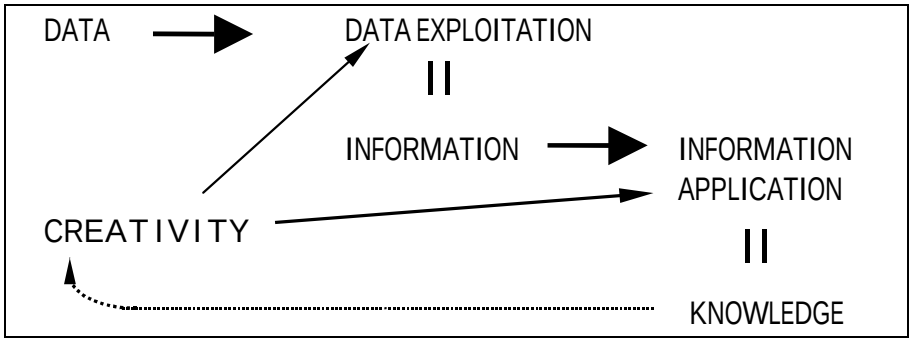
knowledge, which can be used to create. The second type of knowledge can be termed practical knowledge. Practical knowledge is mainly based on data and therefore information. To grasp the idea of this approach it is helpful to think of a book. A typical book consists of data. In the case of a book written in English, the data consist of discrete markings (letters) arrayed in rows across the pages. Hypothetically these data points could be anything (numbers, random symbols, tiny drawings, etc.) and mean anything (Curry, 1997). This data can be absorbed and exploited. As data is getting exploited it is becoming information. We are able to make sense out of all the symbols and letters, by using a technique_called reading. Of course this technique need to be learned beforehand as well. Once, in the past, we absorbed information about 'reading'. Now we are applying this information as a method to decipher the data of the book. Here we can already see the interrelated process of the incessant knowledge creation. We could say that knowledge is the application of information. Once the student internalized the information presented to her by a basic algebra book, the student will be able to deal with the information presented to her by a more complicated physics textbook a lot better. The student internalized the information of the algebra book and is now applying her new knowledge to physics. This is an incessant process, where knowledge is needed to obtain and to use (adoption requirements) knowledge. The same as the student needs to be capable of reading, in order to be able to decipher the data of the algebra book.

If we review the whole process backwards, we would need to work with terms like "innate", "inborn" or "a priori" to justify the start of this process.

The creative side of our knowledge is helping us with the exploitation of data and the application of information. On the other hand, the new knowledge obtained can help us to motivate and improve the dynamics of our creativity. One can inform oneself about workgroup management techniques, and apply them, to a certain extend, to his next group-moderation-show.

Very basically we could draw the following conclusion:

Figure 1
THE POSITIVE LOOP EFFECT OF KNOWLEDGE CREATION



Source: author

Let us call this "the positive loop effect of knowledge creation", in order to give it a name.

2.2 The impact of modern ICT

How and where is the Internet fitting into this picture now?

All the Internet can do is work with digitalized data. Everything which can be expressed as a sequence of Ones and Zeros is digitalizable (a bit --as the smallest, indivisible unit, is either 1 or 0). This can either be letters, a movie or whatever. Due to the capacity of the ever increasing bandwidth, data transmission and its diffusion are getting highly accelerated. The endless vastness of cyberspace is providing an unprecedented capacity to 'store' this data and its network effects see to it that the interactive data exchange is exponentially increasing (see Inter-Net-Working). Starting from these new basic conditions, the positive loop effect of knowledge creation became highly accelerated. Every variable of it was affected.

Here we should keep two things separate. One new feature in this process has been *computers*. Computers increased the 'brain power' of humankind tremendously. The other new feature is the *interconnectivity* of these superbrains on one hand, and the new interconnectivity of people, on the other hand. Let us take a look on how they are influencing the process of knowledge (see Figure 2).

2.2.1 Computer

Computer and their software are helping us to better exploit data. Concerning Internet Economics one important example would be search engines. They became indispensable to find the needle in the haystack of cyberspace. They help us to filter and to set priorities. Helping us realizing information, where others just see data. Computers are also helping us to apply the information obtained. Complicated research-computer or simulation computer would be a case in point. By feeding a computer with information about the dynamics of a carcrash, the 'super-brain' is able to apply this information to simulate a crash and to show us where and how we can start to improve the security of a car (see grey arrows in Figure 2).

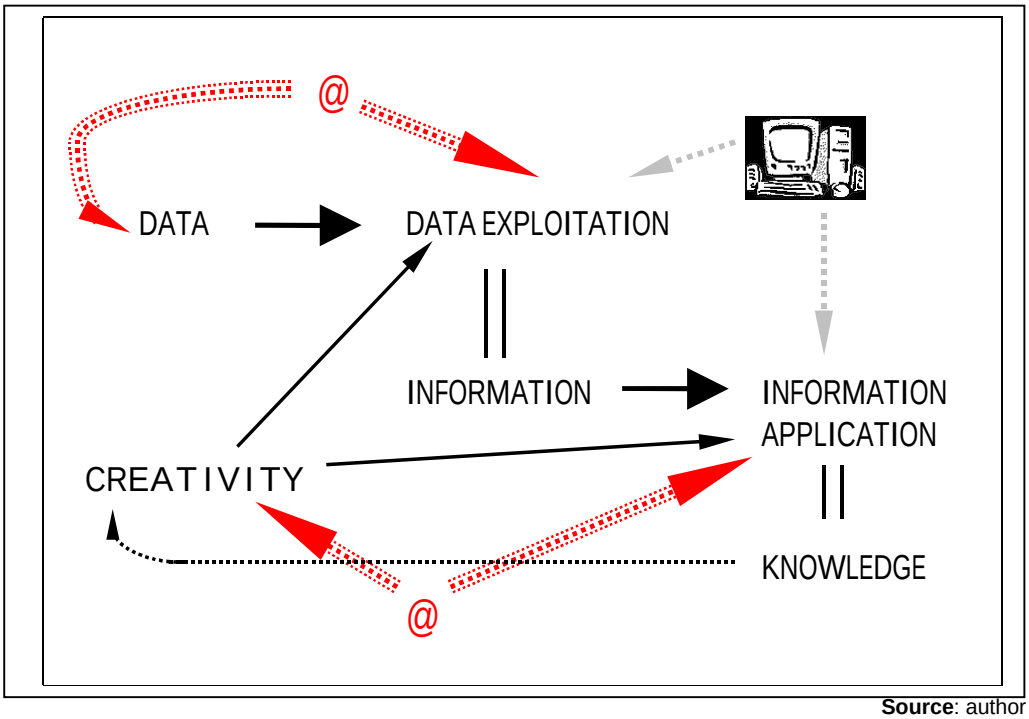
2.2.2 Interconnectivity

The new interconnectivity is having even a more generic impact on the process. First of all, the data available reach an unprecedented dimension. We are actually experiencing a data overflow. It became too much, and our 'human brains' are not capable to exploit and consider "99.9 percent" of the data provided. On the other hand the all-embracing and omniscient Internet is helping us exploit the data we have. Let us suppose somebody is reading an economic article and is stumbling over the term "economies of scope". Let us suppose he had never heard about this term. Given the new interconnectivity it will take him a few mouseclicks to reach thousands of explanations about what is meant by this "data". Like this he will be able to withdraw information from plain data. Being interconnected is also facilitating the application of the information obtained. Let us suppose two engineers are working separately on inventing the car. They both work on the same idea. One of them in Germany, the other one in the United States. Both around the same time. Would it not have been a lot easier if they would have joined forces? Imagine if they would have been 'online'! These are the commonly known advantages of teamwork. One is applying the same information differently as his partner, because they do not have the same basic knowledge to apply the new information. Based on their particular knowledge that they had obtained before, they define different priorities. Yet they help each other out and in the process create a more complete and more objective picture. Like this the process is getting accelerated, helping both to reach the common goal a lot faster and often of higher quality as well. Of course a new problem will then appear at this point: appropiability. We shall come back to it at various parts of the paper again.

We can also use the new interconnectivity to improve the creative part of our knowledge. As already mentioned above, we can stimulate our creativity by plain information input. Let us take a newscaster. A lot of his art is based on knowledge about how to present the news. He could learn

new techniques or receive input on how to improve this skill, by browsing through a thousand presentations made by his colleagues. Of course he will not be able to substitute his own experience on how best to announce something completely, but he will be able to speed up the process by observing others. It is the stimulation of our thought machinery, which the interconnectivity is motivating. These techniques are nothing new. We all know and experienced the tremendous dynamics unleashed when using teamwork techniques like 'brainstorming'. We could say that the Internet provided us with 'external economies'[5] --intentionally or unintentionally is actually not of importance here--, which are enabling a "worldwide brainstorming" (see multiple arrows).

Figure .2
IMPACT OF MODERN ICT ON THE POSITIVE LOOP EFFECT OF KNOWLEDGE CREATION



Source: author

This is how the development of the means of communication have led to the "unprecedented speed" of Internet Economics. This speed is having enormous effects on the production process and the aggregate value of things, as we will see a little bit later on.

Looking at knowledge as a process, we can see that knowledge is circulating by definition. This is logical, considering that knowledge, which goes un-utilized, which is locked-up, thrown away, or forgotten, is, for all intents and purposes, not knowledge. As already specified, the circulation of the positive loop effect of knowledge creation, got accelerated through the advent of modern Information and Communication Technologies (ICT). Like this we can also expect that through modern ICT, knowledge can get multiplied faster (in a sense of vertical dispersion; spread of knowledge) and therefore evolutionize easier (in a sense of picking it up, developing and elaborating it: innovation). This also happened when the printing press got introduced in the 15th century. That is why many people consider the printing press the most important invention of the last millennium. Here lies a major key to the "productivity paradox" discussion. The computer itself just multiplied our brainpower. But in order to create knowledge, we need to 'get the loop going'.

[5] In allusion to the "Marshallian Economies" of Internet Economics, which we will discuss in the chapters 'Big is beautiful?' and 'Innovation'.

The interconnectivity provided by modern ICT boosted the circulation of the loop with an unprecedented speed. The "revolutions per minute", with which the loop is feeding human- and computer-brains with new input, and therefore driving progress, got tremendously accelerated.[6]

So why is all of this important economically?

To answer this question we will have to look at the role knowledge is playing in the production process. Then we have to take a look at the value of knowledge. Because only if knowledge = value, then we can use it economically.

2.3 Production process and evaluation of knowledge

As generally accepted, the omnipresent "Knowledge Society" is an economic and social system in which the generation, processing and distribution of knowledge and information are the fundamental source of productivity, power and prosperity. They are becoming the most important 'input factors' (meaning: the driving force). Remembering the creation of a spear, we know that knowledge has always been important in the production process. All commodities have what might be termed a knowledge composition. This proportion seems to have more weight now.

Let us take a look at a Software producing company like Microsoft. Microsoft represents what might be the paradigmatic knowledge-based corporation insofar as its production organization is a form of Taylorism applied to knowledge production (Curry, 1997). Microsoft is a company that has developed a very fast moving, learning-by-doing, perpetually innovating organization for the production of software.[7] To stay on top of this industry, a company must innovate, innovate, innovate. For Microsoft, production is Research and Development (R&D), R&D are professionally aimed on knowledge expansion and therefore knowledge production is Microsoft's business.[8] Indeed, the process never really finished. The 'loop' is circulating for ever --sometimes slower, sometimes faster. Actually, a perfect, error-free, bug-free code is never released. Bill Gates claimed that "there's not a single line of (computer) code here today (at Microsoft) that will have value, say, in four or five years time"(Curry, 1997). Therefore, Microsoft is stopping its knowledge producing process 'every once in a while' (sometimes rather arbitrarily), to materialize the degree of knowledge achieved. The decision to 'freeze' a project, ready to be released to the outside world, is reached after considering a number of factors (market pressure, internal planning schedules, etc.) not limited by the incessant process of driving the technological frontier. They could also withhold information from the production process, or withhold a new product from release for a year. But since the velocity of innovation sequencing in their industry is so high, they are taking a risk every time they do so, since many companies are trying to stay on the technological frontier by processing information inputs. And the final product in this industry is almost plain knowledge. Never in the history of the industrialized world has a single industry offered more powerful economies of scale. The vast majority of the product costs are fixed (R&D). The production of cars was still applying to the law of scarcity. Looking at our example we can easily see the impact the 'non-rivalry' of information and knowledge is having on economies and the production process. It may cost millions of dollars to create a software, but almost nothing to duplicate it. It is requiring special care to make money out of knowledge.

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[6] Of course we have to be aware that not everything emerging from connectivity is actually useful. There are also may negative effects.

[7] See: Cusumano, M.A. and R.W.Selby (1995), "Microsoft Secrets: How the World's Most Powerful Software Company Creates Technology, Shapes Markets, and Manages People", New York: The Free Press. Manes, S. and P.Andrews (1993), "Gates: How Microsoft's Mogul Reinvented an Industry--and Made Himself the Richest Man in America" New York: Touchstone. Moody, F. (1995), "I Sing the Body Electric: A Year with Microsoft on the Multimedia Frontier", New York; Viking. Wallace, J. and J.Erickson (1992), "Hard Drive: Bill Gates and the Making of the Microsoft Empire", New York: Harper Business.

[8] We have to be aware that we are talking about the limit of what we know until know. To some weaker degree this is also true to many other industries.

Due to its non-rivalry and its almost non-excludability, knowledge is characterized by uncontrollable spillovers and externalities. Economists, as well as businesses do have a lot of problems with handling the "input factor information". An example would be the online bookmarket. It is not a hot tip anymore that the customer can go to Amazon.com and use the good information infrastructure offered by the marketleader. After searching and obtaining all the information required, he could switch with one mouseclick to a page like addall.com, which will help him to search 41 different bookstores for the cheapest price of the book selected, in few seconds.[9] Following these thoughts will lead us again to the appropiability issue and from there to the second best characteristic of the knowledge market and to the current intellectual property rights discussion, as a 'seemed best' solution to induce knowledge generation. On the other hand, we know that the faster data are getting spread, the faster the 'loop' is spinning. The knowledge about how to make gunpowder needed some centuries before it started its triumphant advance around the world. And only as soon as more and more people got to 'know' about it, the idea got developed and perfectionized faster and faster. Also the Just-in-Time technique needed some years from its 'discovery' by this Japanese supermarket owner, before it started to influence the production processes in various parts of the world. Nowadays the uncontrollable spillover effects and externalities of 'good ideas' get spread in no time, due to modern IT. More people pick up the ball and develop the idea. Like this a new idea is reaching maturity and is getting perfectionized sooner. This is the idea of the "worldwide-brainstorming" again. For example, new techniques like the streamlined business process or B2B e-commerce are already commonly accepted and highly advanced very shortly after their introduction.[10]

2.4 The knowledgeable worker

Of course the Knowledge Society also requires a more **'knowledgeable worker'** in the system. We are talking about "life-long learning" and "on-the-job-training" nowadays. In the past it might have been enough to train a worker on one production method. The method did not really change for many years. Given that the 'loop' is spinning a lot faster now, means the speed of knowledge creation got accelerated, workers need to get retrained with an increased sequence. This sequencing is becoming so fluent that constant retraining has become an integrated part of the job.

'Life-long learning' which gets implemented through constant 'on-the-job-training', requires a different attitude of the worker towards his profession. This is what I understand by the term *knowledge worker*. Therefore, knowledge worker applies not only to brainworkers, information jockeys or information mechanics, employed by knowledge-based software companies. Also a simple technical mechanic, repairing machines every day, is finding himself nowadays in the middle of this high-speed spinning knowledge loop. He will need to make a constant effort in order not to loose track of current developments, regarding his art.

Due to the all-embracing and omniscient character of the Internet, every connected worker has a better, cheaper and easier possibility to educate himself, as well. As we saw, knowledge can -- up to a certain extent-- be created by the exploitation of data, and the application of the information obtained. Given that we created another space, the 'cyberspace'--a space which provides interactivity and is very similar to our 'real world'--, a worker can even go there to obtain personal experience in their profession.

[9] Using this method does also have many negative effects for the customer, as we will see in later chapters. For this we will have to analyze how modern Customer Relationship Management (CRM) techniques work (see Product Strategy and Advertising).

[10] Talking about B2B and networking between firms, I would like to add some words on the so-called "social capital" of an individual. This is also a very valuable form of knowledge for a firm. In contrast to "know-what" and "know-why" (which are covered by the terms information), and the important "Know-how" (which is already information application), the social capital of a company could be characterized as "know-whom"10. 'What's the suppliers phone number?' -- 'Who is the cheapest and most reliable?' -- etc. These are all questions, sometimes worth millions of dollars. Of course we cannot claim that modern IT is rendering these social ties obsolete. In some respects, they are even more important nowadays, due to the trust-question (see Behavior of the Firm). On the other hand, the transparence of Internet Economics (for example B2B-marketplaces) is striking at the heart of some long established network relationships that link manufactures with their preferred suppliers and retailers (like the *keiretsu* system in Japan).

A very clear and vivid example would be the small group of programmers in the Philippines. As a country which has been for long, one of the poorest and less developed countries in Asia, the Philippines is accommodating a new generation of programmers, which is calling international attention. Often they are poor students, which are using the very basic tools to mount the wave of the Digital Economy.[11] By taking part in 'courses' and reading textbooks provided by the Internet, they are deciphering informatic codes, on computers that might be assembled by hand and kept from falling apart with adhesive tape and cables. The work, orders and job offers that these highly professional 'knowledge workers' are receiving does not end (Wall Street Journal Americas, 2000).

In short, the knowledge society implies, for the first time in history, that knowledge, will not only be a decisive element in the production process, but also is becoming a direct productive force itself, subject to large economies of scale, scope and synergies in its production process.

3. Inter-net-working

"The only way I have been able to make sense of the Internet, and everything that happens on it, is to think of it as a 'space' " (McGovern, 2000).

3.1 Cyberspace

What exactly we call this space –the Internet, **cyberspace**, virtual space– is not that important. However, in order to understand the Digital Economy, it is important that we understand what constitutes this new space, what its characteristics and rules are, and how best to behave within it. Whether we like it or not, this new space will become an increasingly important part of our lives. In the long run it is likely to become the dominant medium through which people create and share information and ideas. The first thought coming to our mind, might be: What is cyberspace made of?

In a most basic way, cyberspace is made out of digital bits. Cyberspace is a digital realm. That means it consists of chains of ones and zeros. Everything in it is made up of bits and bytes. Every letter, every word, every line of every code of software, every part of every picture or sound is constructed with digital bits and bytes. After that, it begins to become fuzzy.

In order to understand what cyberspace is about --which is a lot easier than to analyze what it is made of, and is serving our purpose a lot better-- we could say that cyberspace is one big net.

It is not a normal net.[12] It is **the net of nets**.

3.2 The net of nets

Looking at it historically, we could say that the network has always been a central part of our economy and society. "In its simplest form, networking simply means making connections to make

[11] All you need is a PC and Internet, and you are in the very same game as the rest of the world. (...) You do not need capital, nor real estate. All you need is some basic skills and you can start making business." Samuel Sendon II, one of the Philipenean 'high-tech-students' (The Wall Street Journal Americas; 09/26/2000).

[12] Also our understanding about what is a net and what is networking is changing. The Chambers Dictionary defines a 'net' as "an open fabric, knotted into meshes: a piece or bag, or a screen or structure, of such fabric used for catching fish, butterflies, etc." and defines the noun 'network' as "any structure in the form of a net: a system of lines, as, e.g. railway lines, resembling a net: a system of units, as, e.g. buildings, agencies, groups of persons, constituting a widely spread organization and having a common purpose". The Cyberspace Lexicon2 on the other hand, defines 'network' as "a system that links computers and other information/telecommunications technologies together, either by cable or by 'wireless' (radio or optical means), so that they can exchange information" (Cotton, B. and R. Oliver (1994), The Cyberspace Lexicon: An Illustrated Dictionary of Terms from Multimedia to Virtual Reality, (Phaidon Press Inc.)).

exchanges easier. This can be social, personal, professional, or even technical." (Profnet.org, 2000).[13] It could be a network of roads or running water or human networks.[14]

We as economists have to get rid of the idea that the Internet is about technology.[15] Yes, there are wires. Yes, there are computers, modems and routers, websites and the like. There are all these things that all work –or should work– to help people interact and share information with each other. And that is what it is all about when it comes down to it. The Net is about people communicating. Cyberspace is about people exchanging information. Sooner or later the tools will become invisible. The Network will become invisible and omnipresent. We are already able to lock into the Net almost everywhere. Networking in the Metro or in Patagonia.

The society is the network → and the network is the economy!

The great network of networks, is unifying all the little different communication networks we used to have. In the Internet a soap-opera fan-club is networking just one click away from where Daimler-Chrysler, Ford and General Motors are networking (see Behavior of the Firm). People are the network. Everything we do in the net of nets, we should do with people in mind. Thinking in business, it might be the staff, customers, collaborators, partners, rivals, public, media, investors or whomever.[16]

3.3 Think network

In the long run we will also have to change our way of thinking about interpersonal conduct. We will have to start to "**think network**". This is about adopting a different inner attitude, to accept the liberalization of information flow, win-to-win network, almost a constant pareto optimum...

If an individual or an organization does not think like the network, does not behave like the network, does not embrace and run with the network, does not become like the network, then it will be left behind by the network economy. This is throwing a totally different light on the appropiability issue. The verb 'to network', in some ways, is as old or older than human civilization. Families, groups, clubs, gangs and communities network. The ability to network is one of humanity's greatest strengths.

Why do we network? We network because there is benefit in networking. If I participate in a network, I have the opportunity to gain information and contacts which are valuable to me either in a social, economic or spiritual manner. If I didn't network I wouldn't have these contacts (McGovern, 2000). If we take it to the basics, we can say that the opposite to being networked is being alone. The opposite to thinking network is thinking 'me'. The opposite approach would be for

[13] Profnet, business networking organization, statement about networking.
http://www.profnet.org/faq.html; also see: http://www.profnet.org/groupfaq.html for more information

[14] In the professional setting, networking is getting to know people and businesses, and developing trust and communication to make the process of business easier and more profitable. This usually involves the exchange of "leads", or referrals to potential customers, between businesses." (Profnet.org, 2000).

[15] One day somebody asked me if I could help him to change something on a Web-page, since I am "so deep into this Internet and computer kind of stuff". He was very surprised when I told him that I do not know how to write html or the like, and that I am not intending to learn it.

[16] "In the early years of computer development, the idea that computers would be used for communicating would have been anathema to many computer engineers. The concepts of the 'end-user' and 'computers-made-easy' were simply not on the horizon of people developing computer hardware and software. Computers were designed to solve the 'great' problems of the world. They were not designed to be understood, or used, by us mere mortals, they were designed by computer engineers for other engineers.
The general result of this ethos for the last 30 or 40 years has been an information technology industry focused on the machine and the process, rather than on people and the needs of people. It's been an industry focused on cost cutting and getting rid of people, rather than growth and empowering people. Thus, we have had a flow of hardware and software that you needed a degree to understand. People were supposed to adapt to technology, rather than technology adapting to people.
It is not surprising the Internet was not invented by Microsoft, Intel, IBM, or any of the other major players in the computer industry. It is not surprising that while born out of a military need, the Internet evolved and grew strong as a result of multidisciplinary co-operation and sharing. It is not surprising that the Internet has thrived as a result of being bare bones but useful, rather than being a multimedia feast for the senses". (McGovern, 2000).

me to hoard all my knowledge and to expect the network to come to me without me making any effort to reach out to it.[17] It goes back to Hobbes and Hume.

Let us visualize this with an interesting comparison Garry McGovern made in his "The Caring Economy". He compares the digital age with the agricultural age and claims that both are "very organic places".

"The 1980s and 1990s have seen the absolute triumph of 'me' values in much of Western society. Communities have been under constant threat, and in many countries have been seriously weakened.In the agricultural age, people had to work together and co-operate, since their very survival depended on it. Families and extended families lived together. Children learned skills from their parents. Everyone helped out on the farm, and when the hay needed to be put in cocks, the neighbors all joined in, because nobody knew when the rain was coming. In the agricultural age, people operated in 'community networks'[18]. (...) The Internet, and networks in general, are more reflective of organic systems than of industrial mechanisms. In many ways, you grow and cultivate a network and business within that network, than in the traditional sense, build and construct it. Co-operation and sharing are an inherent part of economic and social life in agricultural societies."

Of course the Internet will never replace human contact, but there is no doubt that cyberspace, as the network of networks, will be the core-aid to this process.

To put it like John Hagel and Arthur G. Armstrong, who opened their influential book "Net Gain: Expanding Markets Through Virtual Communities" with quoting Proverb 11:24: *'One man gives freely and yet gains even more. Another withholds unduly, but comes to poverty'* (Hagel, 1997).

3.4 Information overload

This inner attitude towards open networking is also bringing threats with it. One would be the **information overload.**

The 'empire' of cyberspace is growing, but it is very often growing without planning and without order. The significant danger exists that cyberspace might well collapse under its own weight if some sort of underlying order is not achieved. Data is perhaps the core material of cyberspace. Data might be called the 'water of cyberspace'. It is everywhere and part of practically everything that exists in cyberspace (McGovern, 2000). While in the Industrial age societies often faced issues of scarcity, in the Digital age we are fighting with a deluge. The point is to see information where others just see data (see The Knowledge Society). Unfortunately our capacity to process the information provided remains limited. The focus in a knowledge-based economy is often shifting from analyzing coherences and creating new information, to synthesizing the information already provided. This is evolving naturally because of the synergies emerging from worldwide interconnectivity. Suddenly I am able to reach information from a research institute in Malaysia by a single mouseclick. I do not need to start my own investigations. We have to make use of this division of labor more effectively. The network economy first has to learn how to network efficiently –without producing an input factor deluge. Until then, we will have to be very careful, harsh and strict with our priority setting selection.

[17] We can already see how these kinds of "philosophies" are getting implemented into practice. The system `Mojo Nation` for example is a normal file-exchange system, basing on the Peer-to-Peer (P2P)- technique (basically like the famous Napster). Research reveals that at least 70 percent of the user, which taking part in the data exchange are pure "parasites", means they do not offer new input. In this new system one has to earn "Mojos" by offering files, storage capacity or unused bandwidth. New downloads can be paid of with `Mojos`. (http://www.spiegel.de/netzwelt/technologie/nf/0,1518,99028,00.html)

[18] Digital age thinker and philosopher, John Perry Barlow, writing in Wired 12 in 1998 stated that:
It is my belief –originating in my own personal leap from the 19th century to the 21st– that the mental habits of agriculture are much more conducive to understanding the essentially biological qualities of information economy than is the mechanical skull vice of the industrial worldview (Barlow, 1998).

As conclusion we can say that a lot of the knowledge, which we need to understand the processes of today, relates to the nature of the Internet. In other words, there is a huge need to understand the medium itself, to see what works and what does not work within it. The more we interact with the Internet the more we learn. In a way we are all apprentices in the digital age these days, learning our trade on the shop floor of the New Economy.

4. The dynamic of science

"The whole development of the twentieth-century state and society can (...) be regarded as the application of the principles of scientific management. Information, knowledge, and science — including social science— are self-evidently the central requirements of this process. They provide the means necessary to coordinate and control the increasingly complex operations of the economy and the polity. Thus it can be argued that ìt was the exponents of Scientific Management, in its broadest sense, who unleashed an Information Revolution." (Kumar, 1995)

Originating from the already mentioned generic, all-penetrating character of the Internet, one quickly becomes involved in a fascinating mélange of political, social-cultural and even moral issues related to the transition and utilization of information and to the diffusion of knowledge. The further the development of the ICT-evolution advances, the more difficult it gets to keep all of the different aspects of the "big picture" separated and many claim that we should not.

Looking at the incredible speed at which nowadays products, industries and markets get created and destroyed, (see Redefinition of Industries) one has to consider the impact of the various different sciences influencing this process.

Old definitions blur. Like we already mentioned above, the great network of networks, is unifying all the little different communication networks we used to have. While for my parents' generation there still has been a clear distinction between newspaper, radio, writing a confidential letter or making a direct phone call, for me this distinction is not so clear anymore. Boundaries melt and get created at an incredible speed and all aspects of life are influenced.

To complicate the whole story, the signals transmitted over the Internet do not recognize national borders. Companies which operate online are by definition global players, because they use the "World-Wide-Web" (www)[19]. Here we have to watch out not to confuse the New Economy with Globalization. Even though they are very closely related, going hand in hand, like a master and his executing instrument, they should not be used as substitutable concepts[20]. Of course, globalization contributed to the problem with the "dynamics of science". We know which impact cultural or religious differences may have on the demand. We can see this situation with increasing frequency in the sale strategies of companies such as McDonalds or MTV. Likewise, these influences shift directly to the focus of every strategic selling strategy of a global operating internet company.

It might be nothing special that new movements is creating new lines of thought, while the unstoppable process of development is rolling on. Twenty five years ago the ´newest and the latest´ might have been nuclear energy. Heaps of scientists --be it engineers, mathematicians or whomever-- flocked to this new trend, creating and coming up with new ideas, new views and schools. Then we heard about sciences like "mecatronics" (a fusion of metalworking and electronic industries) and the like. We know that no science is 'absolute'. The only difference is now, that due to the ´global brainstorming´, the entire dynamic of sciences got extremely accelerated. Information and Communication Technology is penetrating every other science. This is simply due to the fact

[19] Does not mean that they *have* to exhaust the complete capacity of possibilities.

[20] Sometimes the instrument paradoxically even seems to go against its master. Like the Internet helped to organize the protests in the streets of Seattle or in Prague, against the meeting of the WTO.

that every science is basing on information and communication. Given the worldwide interconnectivity and the therefore accelerated spin of the "positive loop of knowledge creation", this creative destruction of the dynamics of science is rolling on at an incredible speed.

The problem we are facing is that one never knows where this dynamic is leading to. Features and sciences where we never would have thought that they could have an impact on each other, are affecting each other mutually, and this at an unprecedented speed. Therefore, it is getting very hard to leave some aspects out of the big picture. Perhaps if we would do so, we would at the same time limit our way to the creation of new sciences, which may be needed to explain our "brave new world".[21]

5. Measuring the digital economy

5.1 Virtual guesswork

Measurement problems are technical problems economists have to put up with. There is no common consensus yet about what one means by the digital economy for data collection and measurement purposes. The nature of how goods and services are produced, the nature of goods and services themselves, and means by which goods and services are brought to market are changing at a rate too fast for statistical institutions.[22] Statistics designed for the industrial age are ill equipped to measure output in the 21st century. It is still more of a **'virtual guesswork'**.

5.2 Customer convenience

Furthermore, it is almost impossible to include an increase in **customer convenience** in traditional measurement statistics. These improvements can stem from better performance (like the convenience ATM machines gave customers in the banking sector) or in a greater range of choices consumers enjoy. Neither the higher quality of output is considered adequately in commonly used productivity statistics. These are commonly known problems.[23] The high-speed innovation sequencing (Schumpeter's 'creative destruction') of the New Economy (see Innovation), moved this problem into the spotlight of every productivity discussion and often makes it very hard to verify theory with numerical evidence.

5.3 Network effects

To complicate the whole story, **network effects** (see also: Big is Beautiful?) and network externalities are as important in new economic coherence, as they are difficult to measure. Network externalities arise for a product for which the utility that a user derives from consumption of the good increases with the number of other agents consuming the good (Katz and Shapiro, 1985). Therefore the value of a subscription to the network is higher when the network has more subscribers.[24] Suppose I already have one million people connected in a country and connect two million more. This advance will not only be beneficial to the second two million, but due to

[21] In allusion to the ambiguously, provoking novel by Aldous Huxley (1932).

[22] See: Haltiwanger, John and Ron S. Jarmin (1999): "Measuring the Digital Economy", Censuns Bureau , the department of Commerce. Barua, A, J.Pinnell, J.Shutter and A.B.Whinston (1999), "Measuring the Interment Economy: An Exploratory Study", Center for Research in electronic Commerce, The University of Texas. Moulton, Brent R. (1999), "GDP and the Digital Economy: Keeping Up with the Changes", Bureau of Economic Analysis, U.S. Department of Commerce.

[23] Official American statistics about health care (based on output figures like numbers of doctors or hospital beds) claim that total factor productivity in this sector now is almost 40% down on 1960. However there is no serious doubt that medical care is much better today than it was 40 years ago.
There are different ways to judge technological breakthroughs; the obvious one and most appealing to economists is the impact on output and productivity. Maybe this *most appealing way* is just not valid any more.

[24] For more information see: Nicholas Economides' on-line paper: "The Economics of Networks"; http://edgar.stern.nyu.edu/networks/top.html (Economides, 1996).

network effects, also to the first one million. First of all network effects are quite counterintuitive to us, since we know that market demand should slope downward and utility functions should not intersect. Secondly, network effects make it very difficult to quantify the utility and the value of a network, because they are based on team dynamics.[25] However, it is important to demonstrate the entire impact of changes ICT introduces and the benefits, which could be achieved through its promotion and implementation, also with numbers. I will try to do so occasionally, keeping these problems in mind.

Obviously the way of measuring is also an important key to solve the 'productivity paradox' puzzle.

5.4 The four layers of internet economics

To obtain a more conceptual overview of interactors of the Internet Economy, statistical institutions broadly agreed that from a conceptual standpoint, the Internet Economy can be divided into **FOUR LAYERS**:

Each Layer is listed below with descriptions of the types of companies and names of some of the actual companies in each category.

Layer One: The Internet Infrastructure Layer

This layer includes companies with products and services that help create an ICT based network infrastructure, a prerequisite for electronic commerce. The categories in this infrastructure layer include:

Internet backbone providers (e.g., Qwest, MCI Worldcom).

Internet service providers (e.g., Mindspring, AOL, Earthlink).

Networking hardware and software companies (e.g., Cisco, Lucent, 3Com).

PC and Server manufacturers (e.g., Dell, Compaq, HP).

Security vendors (e.g., Axent, Checkpoint, Network Associates).

Fiber optics makers (e.g., Corning).

Line acceleration hardware manufacturers (e.g., Ciena, Tellabs, Pairgain).

Layer Two: The Internet Applications Layer

Products and services in this layer build upon the above IP network infrastructure and make it technologically feasible to perform business activities online. The categories in this applications layer include:

Internet consultants (e.g., USWeb/CKS, Scient, etc).

Internet commerce applications (e.g., Netscape, Microsoft, Sun, IBM).

Multimedia applications (e.g., RealNetworks, Macromedia).

Web development software (e.g., Adobe, NetObjects, Allaire, Vignette).

Search engine software (e.g., Inktomi, Verity).

Online training (e.g., Sylvan Prometric, Assymetrix).

Web-enabled databases (e.g., Oracle, IBM DB2, Microsoft SQL Server, etc; only Internet/intranet related revenues are counted).

[25] To visualize this a little bit better we could think of the two Peer-to-Peer (P2P) file-sharing systems Napster and Gnutella. Napster counted 38 million subscribers in 11/2000. Gnutella merely one million. This does of course not imply that the value of Napster is 38-times higher. Network effects make it worth a lot more!

Layer Three: The Internet Intermediary Layer

Internet intermediaries increase the efficiency of electronic markets by facilitating the meeting and interaction of buyers and sellers over the Internet. They act as catalysts in the process through which investments in the infrastructure and applications layers are transformed into business transactions. The categories in this intermediary layer include:

Market makers in vertical industries (e.g., VerticalNet, PCOrder).

Online travel agents (e.g., TravelWeb.com, 1Travel.com).

Online brokerages (e.g., E*Trade, Schwab.com, DLJDirect).

Content aggregators (e.g., Cnet, ZDnet, Broadcast.com).

Portals/Content providers (e.g., Yahoo, Excite, Geocities).

Internet ad brokers (e.g., Doubleclick, 24/7 Media)

Online advertising (e.g., Yahoo, ESPNSportszone).

Layer Four: The Internet Commerce Layer

Internet commerce involves the sales of products and services to consumers or businesses over the Internet. The categories in this Internet commerce layer include:

E-tailers (e.g., Amazon.com, eToys.com).

Manufacturers selling online (e.g., Cisco, Dell, IBM).

Fee/Subscription-based companies (e.g., thestreet.com, WSJ.com).

Airlines selling online tickets.

Online entertainment and professional services" (internetindicators.com, 2000).

It is important to note that many companies are players at multiple layers. For instance, Microsoft and IBM are important players at the Internet infrastructure, applications, and Internet commerce layers, while AOL (before the acquisition of Netscape) is a key player in the infrastructure, intermediary and commerce layers. Similarly Cisco and Dell are key players at the infrastructure and commerce layers. Even though the four-layer Internet Economy framework makes it difficult to separate revenues for multi-layer players, the framework presents a more real-world view of the Internet Economy landscape versus a single-layered measurement process. Further, the multi-layered approach lets us analyze how companies choose to enter one Internet layer, choosing later to extend their activities to the other Internet layers (internetindicators.com, 2000).

Figure .3
THE FOUR LAYERS OF INTERNET ECONOMICS

Source: www.internetindicators.com

5.5 Definitions

The **definitions** of the terms "e-commerce, e-business, Information Technology (IT), Information and Communication Technologies (ICT), Internet Economics, Digital Economics, New Economy" or every word combination with "cyber-" are very blurry and do often get mixed up in literature. In order to avoid confusion one has do be clear about what we are talking about:

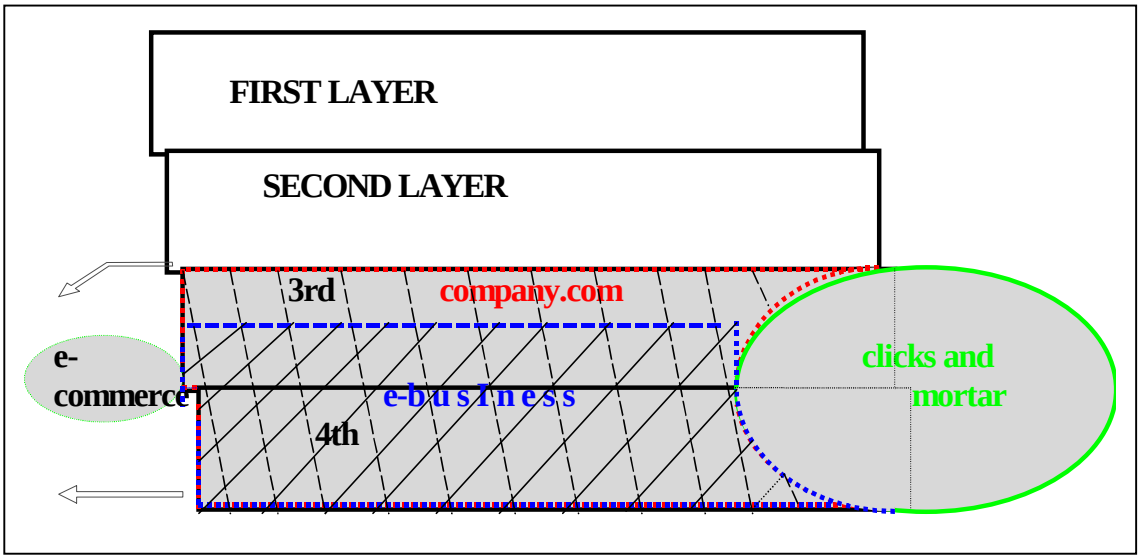
When I refer to *'Information and Communication Technologies' (ICT)* or *Information Technology (IT),* I will be referring to information processing and related equipment, software, semiconductors, and telecommunications equipment and Internet. The terms *'New Economy'* and *'Digital Economy'* are used to describe all changes modern ICT is bringing with it, while there is no difference made, between electronic scanners of a supermarket or an on-line Discount broker. *'Internet Economics'*, on the other hand, are based on the 4 Layers described above and deal with economic coherence related to the Internet itself. Part of the 3rd and the entire 4th Layer of the Internet Economics contain e-commerce and e-business. Due to the early stage of the development we have to make a distinction here between two different streams:

One is what we call the "*clicks and mortar version"* of online working firms. It is mainly about already established companies, which adapt the new technology to extend or alter their business. The online-banking or newspaper "showcases" would be an epitome for this alternative. The other possibility would be what I refer to as a "*company.com"* (company dot-com). This version implies the creation of new, virtual enterprises, which often integrate the advantages of Internet right into their basic business idea. Even though the separation of these two variants will not be necessary anymore once the Internet is profoundly rooted in general business[26], it is still necessary to consider.

[26] A good and famous example for these two alternatives would be Amazon.com vs. Barns & Nobles. Here we can also observe the transformation to some kind of final and homogeneous form of organization of a company of this type. In the long term, we will not need to differentiate any more.

While *'E-commerce'* covers all the firms, which offer products and services on-line, *'e-business'* exclusively considers 'companies.com' in the *'cyber-world'* of trade.

Figure 4
INTERNET ECONOMICS AS PART OF THE DIGITAL ECONOMY
(=THE CHANGES MODERN ICT IS BRINGING WITH IT)



Source: author

In order to keep the focus of the paper I will often not be able to differentiate between the different Layers, like one should. We have to keep in mind that one certainly could analyze many of the issues discussed, more profoundly as regards to the different Layers. In the second part of this paper we will mainly deal with the third and the fourth Layer of Internet Economics. In the third part I will often refer to Digital Economics as a whole.

II. Structure-conduct-performance

An outsider to the field of economics would probably take for granted that economists have a highly developed theory of the firm. But in fact, until the 'final days' of plain Industrial Economics "little could be further from the truth" (1989: Oliver Hart; "An Economist's Perspective on the Theory of the Firm"). There have been many different attempts to address this issue lately.[27] Most formal models of the firm are extremely hypothetical and rudimentary or lack precision and rigor. Therefore they are facing acceptance problems by the theoretical mainstream or by the real-world organizations. Technical Progress did not give us time to converge, perfectionize and complete the theory of how firms are behaving, before it got turned upside down again, due to the advent of the New Age Economy. Readers already acquainted with the literature of industrial organization will recognize in the conceptual scheme a heavy intellectual debt to the work of Joe S. Bain. (Bain, 1959)[28].

This paper is based on the theories Industrial Economists usually use on purpose. This paper does not claim to provide a complete renewal, but rather an extension to the existing theories of the firm. Whenever possible I will try to use commonly known pattern to describe the new economic coherence. This is possible, because the mayor part of the Digital Economy in general is simply dealing with

[27] Neoclassical, principal-agent, transaction cost, nexus of contracts, property rights...

[28] *Bain* is considered to has been to converging force between the *Deductive Theory* (namely: E.H. *Chamberlain*, "The Theory of Monopolistic Competition"; Harvard, 1933) and the *Empirical Approach* (namely: E.S. *Manson*, "Price and Production Policies of Large Scale Enterprise", A.E.R.Supplement, 1939). His structure-performance relationship (only one out of fifteen in his 1959 text was devoted explicitly to the analysis of conduct) is considered the heart of Industrial Economics. (for detailed historical information see: Hay,D.A and D.J.Morris,1978, pp.1-33)

re-focusing. We do not need to burn the old textbooks, but definitely have to rewrite them in order to be able to explain Internet Economics. Besides, as we will see in this chapter, we cannot help redefining old features completely and could not get along without introducing some new ones.

In this Second Part of this paper I will point out some changes regarding the:

@ Digital MARKET STRUCTURE;

@ CONDUCT of sellers and buyers;

@ final PERFORMANCE,

based on Bain and following all the literature, which elaborated the Structure-Conduct-Performance analyses. Additionally I shall endeavor to sum up this part of the paper by analyzing the interesting question: can modern Information Technologies finally realize the textbook model of perfect competition?

This paper considers the difficulties, which have existed in theorizing the behavior of an industrial firm, and is not claiming to be able to render these problems obsolete by describing the coherence of the Internet Economics.

1. Performance

Broadly speaking, "what society wants from producers of goods and services is good performance." (F.M. Scherer; Industrial Market Structure and Economic Performance, 1970).

In order to be able to analyze the performance, let us take a look at what people are buying on the Internet, up until now:

Table 1

RETAILERS' INCOME UNITED STATES 1998

(in US$ million)[29]

Computer/Hardware/Software	4650
Financial Services	3400
Travel	1600
Books/Music/Entertainment	1300
Auctions	500
Presents	500
Household	500
Clothes	300
Food	200
Cars	70
Toys	40

Source: Boston Consulting Group.

As we can see, even only seven years after its commercialization, the Internet invaded a very wide range of industries. It seems applicable for performances with very different features. Therefore, we should start this analysis with questioning the basic assumptions:

What are *"goods and services"* and what is meant by *"good performance"*? These are the questions we will analyze in the following section.

1.1 Digital vs. Non-digital goods

[29] Of course the allocation differs between countries. In Chile, for example books and music take alone take around 53 percent of the sales volume (Universidad de Chile, 2000). But in general books/music/entertainment, computers/hard-/software and financial services take the lead in every statistic.

First of all, we will have to draw attention to what were known as physical and non-physical goods, goods and services in the traditional 'bricks-and-mortar' economy. Even before the advent of the New Economy we have been able to observe with increasing frequency, how goods and services were sold as an indivisible unit. Services got incorporated to the sale of a good and often you could not say for sure if the 'something' you just purchased has been more good or more service. And in the end- it did not make a difference anymore.

In the New Economy things got even more complicated. Here the frontiers melted down to what we call "*digital*- or *non digital"* goods. To come to the point beforehand: we still cannot really see clearly through their blurry distinguishing marks.

Software, CDs, books, magazines, news broadcasts, stocks, airline tickets, insurance policies, movies and the creation of a cyber store... how to categorize them?

Firstly I should like to draw the attention to what I will refer to as the *"additional value"* of the on-line shopping experience. To avoid confusion from the start: these additional values count for digital, as well as for non-digital goods. They include all conveniences the new ICT is able to provide additionally, comparing an on-line purchase with its offline counterpart. They are often not difficult to provide in e-commerce, but offline they are an extraordinary customer service. An example would be the intelligent software agents, provided by Excite or Yahoo!, which help the consumer search for a particular product. These agents save the consumer the time and effort he otherwise would have to spent 'visiting' every single virtual shop or shopping mall. Other additional values would be the given transparency, the greater freedom of priority choices and the individualization of the on-line shopping experience (see Transparency). All in all, these 'additional values' save time and money and lead to a higher customer satisfaction.

As we will see, additional values turn out to be paramount as regards to the performance.

1.1.1 Non-digital goods

The distinction between digital and non-digital goods is decisive when it comes to geographical requirements and cost structures. Non-digital products must be physically delivered to consumers. To some extent, they continue the tradition of catalogue retailing, but in a more interactive way. In countries like the U.S., where increasing demands on leisure time and the improvement of overnight and second-day delivery services have spurred the growth of catalog shopping in the 1980s and 1990s, the implementation of Internet shopping is not very difficult. People are used to this system and the delivery and logistical companies (United Parcel Service/UPS, Federal Express (in 211 countries)...)[30] work very professionally and are reliable -- FedEx reports a 99% on-time delivery rate (FedEx, 2000).

In order to successfully retail non-digital goods, an efficiently, smoothly working value-chain must be developed. It is not enough just to set up a Web page and to offer goods. The successful realization of the entire process is the key here.

Given the early stage of development, many people are still feeling uncomfortable or doubting the new system (see below: Legal Tactics).

Table 2
WHAT CONSUMERS CAN DO
AT AUTO DEALERS' WEB SITES

[30] These companies are taking a key role in the trade of non-digital on-line sales. Pulled by the increasing demand driven by e-commerce, their services also improve. Often additional value gets added here as well. You can for example often add a product-tracking feature, and will always be informed where your product is and when it should arrive.

Access vehicle inventory	>50%
Schedule sales appointment:	28%
Apply for financing:	26%
Order new and used cars:	22%

Source: National Automobile Dealers Association,10/97

It is a matter of habit. While some years ago the big question was if you "would buy a car over the Internet?", we can see that nowadays all the big car-companies have discovered this alternative and take its implementation very seriously.[31] First the consumer might look for car insurance options or financing possibilities on-line and slowly but surely he might discover some benefits in making the whole deal on the Web. Like this consumer get –"slowly" but surely (rather "fast" than slow)[32]– introduced to online shopping.

A serious obstacle for on-line retailing is of course the question of how to "make a virtual purchase more real" (U.S. Department of Commerce, 1998). How can virtual images on the Internet replicate the sensation of picking up a product, feeling the material and its texture or sturdiness, trying it on or sitting down on it. The solution is as simply as hard:

It cannot! If you want to know how a cherry tastes, you need to try one...[33]

The only chance for the virtual shopping mall is, to come up with more benefits than its 'bricks and mortar' counterpart. Here the additional values enter the scenario. One example would be furnishing your home. Using the virtual furniture-retailer, you can 'drag and drop' your furniture and accessory icons and change colors or styles, until everything fits perfectly into your room. Another competitive advantage which is used by some companies, would be to focus on goods the customer already knows and is used to purchase. If the customer already knows how a cherry tastes, he would be better off making use of the timesaving and transparency provided by on-line supermarkets to buy a couple of cherries.

Furthermore the "death of distance" (Cairncross, 1997)[34] also applies to non-digital goods. It may seem difficult to see the relation at first glance, but by considering that about 15-20 percent of the online business of '1-800-Flowers' came in 1997 from outside the U.S. already (much of it from Americans working oversees who send flowers to their friends or family back home) the relation becomes more obvious. This example is showing how the 'world-wide-web' is making a habit of what would have been complicated international trades before.

I will come back to this very same example later again to point out the difficulties of redefining what were once considered tradable and non-tradable goods.

1.1.2. Digital goods

[31] The North American car marketplace 'Auto-by-Tel' already generated $500 million a month in auto sales and processed over 100,000 purchase requests each month, by 11/97.
40% of the new car owners stated that they were using the Internet to help them in their decision making process.

[32] According to a recent report by the Conference Board and NFO Worldwide, already 34% of American households have made an online purchase in 2000 -- up 24% from 1999. According to the Boston Consulting Group (BCG) and Harris Interactive, online shopper spent $170 on holiday gifts in 1999. In 2000, that same person is expected to spend $240.

[33] Nevertheless we can see a lot of technical advances aimed at overcoming these obstacles. In the Israelian Weizmann Institute two scientists developed a method to transmit odor over Internet. Of course not the smell itself gets transmitted. A little device, which is containing chemicals, gets attached to the computer. This gadget possesses the capacity to decipher the digitalized information of an odor and to reconstruct it. (La Tercera; 16/05/2000)

[34] In 1995, Francis Cairncross wrote an interesting article for The Economist entitled "The Death of Distance". It dealt with the impact the advances in telecommunications and the Internet were having on distance: "The cost of communications will probably be the single most important economic force shaping society in the first half of the next century".

In contrary to non-digital products, **digital goods** can bypass the transport and often even the wholesale and retail network. They are non-rival and the difference between a digital good and plain information is mainly its excludability.

Let us take a look at the broadcasting-industry to visualize this theory.[35] Nearly 90 percent of Web users go online to get news and information (Maddox, 1997). Every big newspaper or magazine has a Web presence already and every TV stations anyway. What are the advantages of online news?

Just to keep some historical context beforehand: the *New York Times* invested $350 million in its new printing press in 1996. Readers can now see front-page photos in color instead of black and white...! (U.S. Department of Commerce, 1998)

Online news broadcasts combine the benefits of TV news and newspaper. They are much more updated than their paper counterpart, and additionally give the reader the freedom to decide how much time he wants to spend on which topic. There are dozens of videos, ready to download, on 'www.CNN.com', waiting to get chosen, whenever the visitor desires. Moreover, in the course of Customer-Relationship-Management (CRM), news can be completely individualized. This does not only save time, but brings all the commonly known benefits of one-to-one Marketing with it (see: Product Strategy and Advertising).

We should not forget, that this simple online information system became the basis for with what the majority of business executives, the Investment and Financing sector and generally everybody, who's work depends on up-to-date broadcasts, are basing their daily business.

1.1.3 Additional value

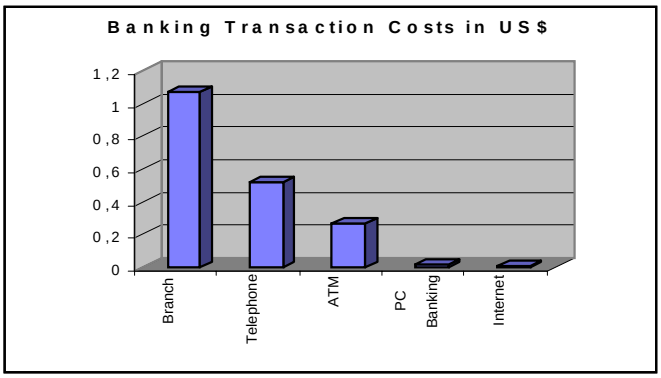
Come to think of it, the possibilities of adding **additional value** to the product go much further beyond the timesaving, individualization and up-to-date advantages. It is a lot easier to incorporate information service into the sold good. *Business Week* reports that visitors to its Web site read the front page article and then use the site to research the magazine's archives and special report sections, features they do not have in the print version (U.S. Department of Commerce, 1998).

The same counts for almost every digital good. Just have a look on the possibilities a potential traveler has nowadays, to plan his trip, before booking the desired tickets and hotel reservations. He can almost virtually pre-travel.

The obvious trend towards digitalizing goods whenever possible is not only being pulled by the demand of the customer (actually the broad mass has not yet discovered the advantages mentioned above). It is rather pushed by the supplier, due to the benefits resulting from the almost no-existing duplicating and distribution costs. Digital products may have very different (non-linear) pricing structures due to their high fixed cost and low marginal cost nature, since information is expensive to produce, but cheap to reproduce. Digital goods do not fit in the market system as described by Adam Smith 200 years ago, which was based on the notion of scarcity, including a cost structure in which it is more expensive to produce two of anything than one. It may cost millions of dollars to develop a new software program, while its duplicating cost, with averaged 20 to 50 cents per transaction, is almost zero.

[35] Further classical industries would be: Software, financial transactions and stocks, airline tickets insurance policies, music and most of entertainment...

Figure 5
Saving online



Source: Booz-Allen & Hamilton.

Cost to Process Airline Tickets:

@Travel agent books, using computer reservation system:
= $8.00
@Travel agent books direct airline:
= $6.00
@Customer books 'electronic ticket' direct with airline:
= $1.00

Source: Air Transport Association of America, 11/20/97.

As regards to newspaper and magazines, distribution costs added 30 to 40 percent to the cost of the product (U.S. Department of Commerce, 1998). Since in online broadcasting the prophet is no longer coming to the mountain, but the mountain to the prophet, these costs vanish.

Obviously there seem to be a lot of benefits originating from digital goods. However, their long-term success is tied to solutions for protecting property rights and to improvements in the Internet infrastructure. The downsides of the low-cost distribution channel are the rising copyright infringements[36]. (see: Innovation) Further obstacles are the low access distribution and transmission speed. As long as it takes many hours to download a video, we will still prefer to walk over to the 'bricks-and-mortar-Blockbuster' around the corner.

1.1.4 Tradable and non-tradable goods

To add insult to injury the Internet is also confusing our comprehension about **tradable and non-tradable goods**. ICT allows some previously non-tradable services to be traded just like physical goods. This does have a mayor impact on geographical requirements and therefore on the international division of labor (see Digital Divide and the Catch Up). Digital goods are considered tradable, by definition. They do not recognize borders and can be sold and purchased globally. The only difficulty to be overcome here is the payment process (see: Money and Payment). Many products previously considered as non-tradable became tradable now, due to their digitalization. Any activity that can be conducted via a screen and telephone can be carried out anywhere in the world. Computer programming, revenue accounting ad bookkeeping, insurance claims, the design of the (virtual) shop, call centers have already been outsourced to developing countries. For example education is seriously 'endangered' in becoming a tradable good. (see: Education)

1.1.5 Sevices

What happened to "**services"**? A lot of services are naturally incorporated in the 'additional value' of the on-line shopping experience, but there are also plain service providers on the Web. A basic example would be the designer's work to create the virtual shop. Here we can easily see that on-line services can be tradable goods. Having a look on non-digital services (like our 1-800-

[36] Also interesting: www.WIPO.org : World Intellectual Property Organization

Flowers example from above) we can clearly see how easy it got to order services from all over the world. There is no extra effort required. It takes the customer the same amount of mouseclicks.

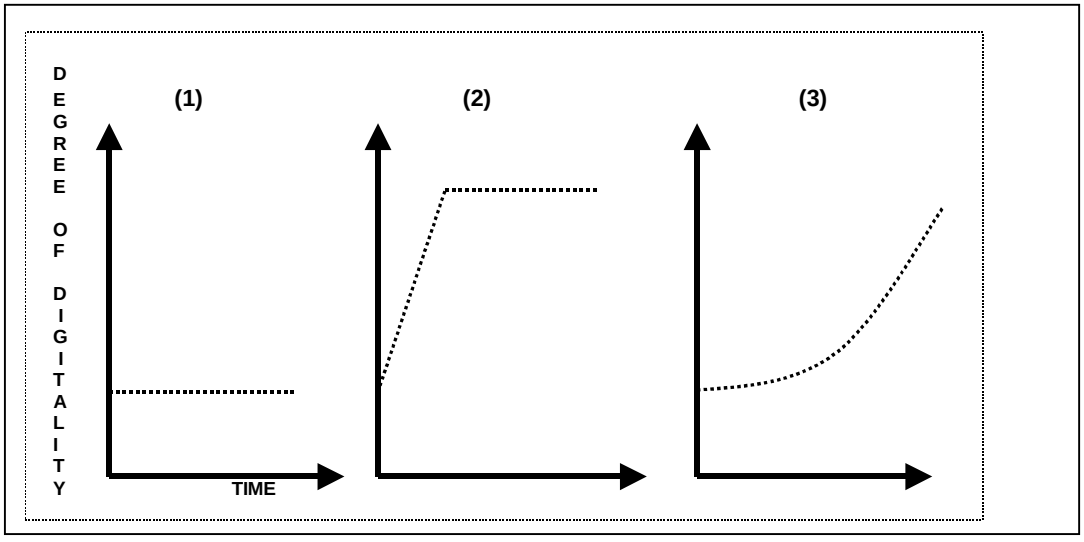
The main difference between online services and digital goods is their individual, personal character. The scope for duplicating a digital good is very small. Even if economies of scope decrease the duplication of services, they are still completely rival products; whether the information based characteristics of digital products makes it difficult to use them up. The fact that the law of scarcity mainly applies to services is of course affecting their price structure as well. This stays the same, on or offline. The trend towards individualization in Internet Economics (the 'unconditional consumer focus' we discuss later) makes it more and more difficult to keep goods and services separate, and is causing major definition problems, as we discuss a bit farther afield.

1.1.6 Degree of digitality

After introducing these basic ideas about the final products in the Digital Economy, we will have to consider that digital and non-digital goods are only the two extremes. Like always when working analytically in a field of technical progress we have to consider the 'evolution' concept. In order to be able to deal with this, regarding this chapter, I would like to introduce the idea of *'degree of digitality'*:

It could be seen like a kind of 'elasticity' of digitalization over time:

Figure 6
DEGREE OF DIGITALITY GRAPHS

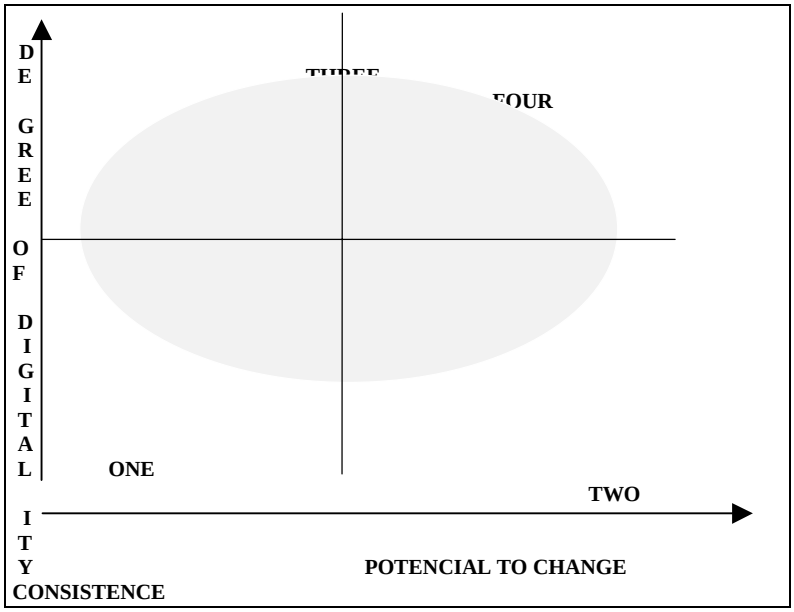


Source: author

Some goods, like food, will obviously never become digitalized (1). Others are very susceptible to digitalization, like Software, and hardly get distributed physically anymore (2). Some will have to overcome technical or habitual obstacles (like movies), but will in the long run eventually get digitalized (3).

We could also demonstrate this scheme through a portfolio diagram:

FIGURE 7
DEGREE OF DIGITALITY PORTFOLIO



Source: author

Goods located in square one, are not likely to be affected by the process of digitalization. For them the Internet will just change the way of trading, not its consistence. Goods located in square two have a high potential to eventually get digitalized, but are still facing implementation problems. Square three is hosting products which always have had features, similar to the ones we can assign to digital goods (everything related to information transmission...). Square four is obviously the most dynamic. Here we can find the music industry, broadcasting, entertainment and others.

1.2 Production and allocative efficiency

"Decisions as to what, how much and how to produce should be efficient in two respects: Scare resources should not be wasted outright, and production decisions should be responsive qualitatively and quantitatively to consumer's demands" (F.M.Scherer; Industrial Market Structure and Economic Performance, 1970).

First of all --rather obvious-- thinking in terms of Internet Economics, the validity question of the capitalist system for the best allocation of resources of an economy is no more part of the discussion (like still seriously argued about 20 years ago). The capitalist system is given 'a priori'.

The New Economy will also help to tone down one of the biggest problems of welfare economics: the misallocation of resources. Very generally speaking this is due to the increased **competitiveness** in markets ("where the rival is only one mouseclick away"), the **transparency** of virtual markets and the global dimension of the **worldwide** Web ("the world at your fingertips"). All of this is having tremendous impacts when applied to theories like X-inefficiency[37] or diverse misallocation theories of monopolistic models.

Modern Information Technologies make it possible to allocate resources a lot more efficiently. The transparency in virtual markets and the high mutual knowledge between consumer and producer (see Product Strategy and Advertising), as well as the highly flexible network between companies, due to the given interconnectivity (see Behavior of Firms) is contributing to make this possible. Due to the interactivity of Internet, it also became also possible to better adjust prices (see

[37] e.g.: Harvey Leibenstein, "Allocative Efficiency vs. X-efficiency"; 1966

Pricing Behavior). In the long run all three of them could even make it possible to reach a permanent market equilibrium (see Market Equilibrium), once the New Economy is 'completely' implemented.

The better allocation of scare resources can also be seen in the capital market. In this sector the Internet is used very successfully. Spring Street Brewing, a beer company, launched in1995 the world's first Internet public stock offering in order to raise capital. After ten months, more than 860,000 shares had been sold to 3500 new stockholders. The capital totaled $1.6 million, the amount needed for a viable marketing and sales initiative. Spring Street's initial public offering shows how the Internet is supporting the better allocation of capital (OECD, 2000). Without the Internet many investors would probably never have heard about the possibility to invest in such a small and early stage enterprise. Other example for highly efficient allocation of capital can be seen on pages like 'IPO.com' or 'vcmarketplace.com'. It has never been as easy to allocate or to raise capital, especially for the small investors and entrepreneurs (see Company Finance and the Growth of Firms).

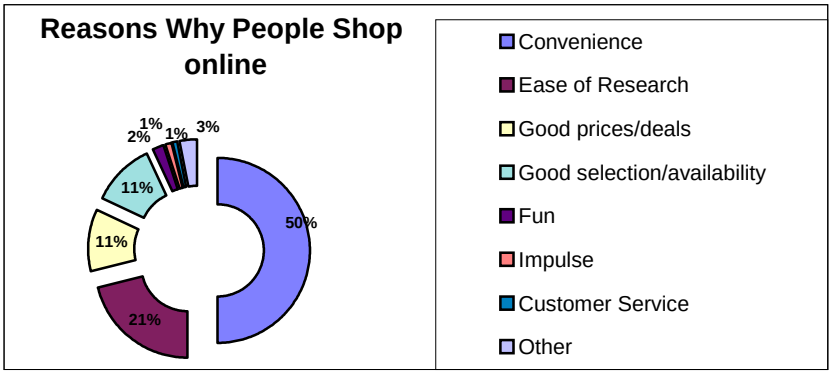
Like we will also see in later sections (see Product Strategy and Advertising; and Market Equilibrium), the mutual knowledge lead to a better forecast in demand, as well as a better adjustment about what and for which price to produce for the single customer. On balance we could even claim that the Digital Economy is bringing economies back, from the odyssey of mass-production and mass marketing of Industrial Economics, to the roots of real demand satisfaction.

1.3 Progress

"The operations of producers should be progressive, taking advantage of opportunities opened up by science and technology to increase output per unit of input and to provide consumers with superior new products..." (F.M. Scherer; Industrial Market Structure and Economic Performance; 1970).

Internet consumers report that they shop on the Web because of convenience, ease of research and good prices.

Figure 8
REASONS WHY PEOPLE SHOP ONLINE



Source: Forrester Research.

The adoption and successful installment of 'additional values' (see Digital vs. Non-Digital Goods) is one major trend a company has to keep up with in order to not loose track and therefore its customers. But the "opportunities opened up by science and technology" go much further:

Which high school teenager did not sit in his room, frustratingly counting his pocket money, dreaming of having all the relevant records, tapes or discs existing on the music-market right there at his stereo? Nowadays, teenagers of the 'Nintendo generation' would not be satisfied with any

other performance than typing the title or interpreter's name into Napster[38] and having the desired song 15 seconds later ready to download.

Peer-to-Peer-technologies (P2P) like Napster could be used for many other industries as well. Every good, which can be digitalized, can be spread over these kind of 'file-sharing' models. Some people try to stop the trend with jurisprudential actions, like property rights suits. We did not yet reach an agreement on how intellectual property will be treated in the Knowledge Society. And only time will tell. What we can observe until now is that the 'progress' is destroying and creating markets and industries at an incredible speed[39]. Until now we cannot clearly see yet where this development is leading us. It is difficult to make prognosis, because often these innovations seem irrational. Just over one year after its foundation, Napster was looking for a way to make money out of its monopoly power.[40] In its beginning it seemed simply driven by the "creative destruction" of its innovation, without the absolute certainty of eventually making profit.

1.4 The "good performance"

Obviously it is not a new thing that performance is improving, but the shocking aspect is the speed in which it takes place and how deep and profoundly these improvements cut.

Markets and industries are getting destroyed and created at such an unprecedented speed that one might be tempted to highlight 'progress' as the dominating draw of performance expectations.

By analyzing digital- and non-digital goods, we saw how urgently we sometimes need to redefine. Of course, it is nothing new that some 'products' can be transmitted in a non-physical way. But these old phenomena are in no comparison with the significance digital goods claim in economic coherence nowadays. Moreover, real e-commerce means more than just selling a generic set of products on the Web. Today's businesses and consumers demand a more customized set of products and services, based on knowledge developed through a co-operational relationship between all the firms in the value chain. We will study the feature of personalization and individualization, pro- and interactivity regarding the performance in the later chapters more specifically. The new means of production (see Behavior of Firms, Product Strategy and Advertising, Market Equilibrium) also contribute a lot in providing a better performance. Modern software opens new horizons in this aspect as we will see.

In short, different basic assumptions and new tools contribute to the need of redefining what is known as "good performance". Therefore let us take a look at which assumptions virtual *markets* are based on, and which new tools are *conduct*ing the trade between sellers and buyers:

2. Digital market structure

To fully grasp the entire significance of electronic markets one has to keep in mind the early stage of the newborn coherence and therefore has to consider many different influential trends pointing in various directions. We face a wide-ranging variety of questions when analyzing and trying to deal with a heap of tendencies:

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[38] Napster is a very controversial software program that allows finding music at MP3 format with no cost, by connecting to the computers of millions of other users. Napster was founded in 1999 from the 18-year-old student Shawn Fanning, and is hence the fastest growing application on the Internet. In 10/2000 it registered already 38 Million users, and 20 to 30 million music titles got downloaded every day through this network.

[39] We will have a closer look on this force in the later section about Innovation ("the creative destruction of innovation")

[40] There are already more than 150 clones of the Napster idea in the U.S. But nobody is reaching a user group bigger than two million(spiegel.de,2000: http://www.spiegel.de/netzwelt/ebusiness/0,1518,101005,00.html). Only in 11/2000 Napster announced a strategic alliance with Bertelsmann, where it was considered to raise a fee for the use of the Napster service for the first time. (napster.com, 2000: http://www.napster.com/pressroom/001031b.html)

Do we have to redefine industries and competing groups? Are the barriers of entry to online trading really as low? Is the high drop-out rate of startups[41] just a normal phenomenon of emerging markets or is becoming the rule for the fast Internet world? Will electronic markets have less friction than comparable conventional markets? What is meant by the 'transparency of virtual markets'? Is big still beautiful, or rather hindering? Are the 'small ones' really as dangerous in virtual markets as often claimed? Then why do 'giants' rule the markets? At the end this will lead us to the question, if the textbook model of perfect competition is really getting realized in virtual markets?

2.1 Big is beautiful?

2.1.1 Economies of scales and economies of scope

Like with almost everything, also the omnipresent **economies of scales** have to be investigated as regards to the new light they are shining in. As far as public opinion about internal economies of scales[42] is concerned, the disagreement could not be larger.

Having a look at company internal economies of scales, Internet Economics give the impression that scales will get more and more irrelevant (Dyson, 1997), that Internet will act as an equalizer between big and small firms. The increasing transparence of Internet Economics (see: Transparency), the fact that the entire business world (big and small) literally lies at the fingertips of the customer and that this therefore accelerated competition, might underline this impression.

On the other side, economies of scales are the only survival ticket through the Internet jungle. According to the price structure of digital products especially, (see Digital vs. Non-Digital Goods) meaning the minimization of additional marginal cost such as product, transport, logistics and distribution costs, one might get the impression of being able to realize economies of scale indefinitely. There is already proof today that economies of scale have increased. In the days of Stanford Oil early in the 20th century, if a firm was twice as big as its rivals, its average unit costs might be 10% lower. Today, if a software firm is twice as big as its competitor, its average unit costs might be up to 50% lower (Woodall, 2000). It might cost millions of dollars to develop a digital good, but each extra copy costs next to nothing to make, especially if it is distributed over the Internet.

I am inclined to believe that in the future, when analyzing the digital economy one will always have to consider **economies of scope**, when dealing with economies of scale. Baumol (Baumol, 1982) has devised the term “economies of scope” to describe the impact on total costs, plant-specific and product-specific, attributable to production of more than one product. The issue of scope economies is historically very closely related to Information and Communication Technologies. It moved for the first time into the center of attention in early debates over the AT&T monopoly, when economists representing this firm, argued that significant economy of scope justified the vertical integration of AT&T (Love, 1995).

Economies of scope refer to a situation in which average costs (unit costs) are lower when two complementary products are produced by a single enterprise (either the same facility, the same management team, the same firm or trademark owner, or the same proximate location) than when they are produced separately[43]. Generally speaking, we can refer to the synergy created as the 'cross product'. It could, for example consist of 'cross-learning effects'.

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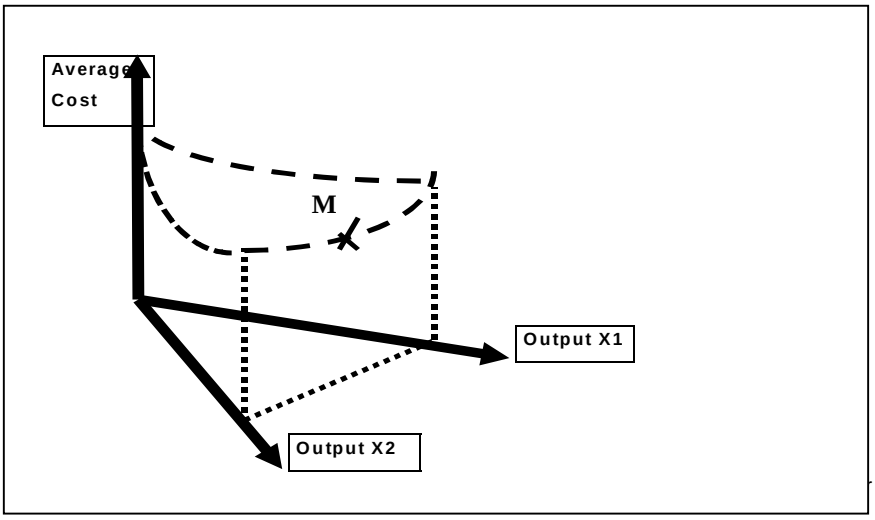
41 1/1000 of the companies.com reach the point of raising more than $5.000.000 financing; 1/10.000 reach the stock market.

42 I shall endeavor to keep internal and external (‘Marshallian’) economies of scale separated. I will come back to the latter in the chapter about Innovation.

43 Economies due to multiproduct or multiservice production:
A company produces 2 products, Q1 and Q2. Scope economies are present if the average cost of producing the products jointly is less than the average cost of producing the products separately.
AC[Q1, Q2] < AC[Q1, 0] + AC[0, Q2]; Economies of Scope
AC[Q1, Q2] > AC[Q1, 0] + AC[0, Q2]; Diseconomies of Scope

Figure 9
ECONOMIES OF SCOPE



This economy to joint production is fairly common in Internet Economics. They are, for example clearly important in information dissemination. Many of the fixed costs of online systems, such as staffing and software development, are relatively insensitive to the number of databases that are offered. To provide an online service like databases and files, that are used by different agencies, could be multiplied without any increases in staff or hardware. Furthermore, all of the techniques that make it possible to individualize products, due to data collecting mechanism (like these used in customer's preference tracking; (see: Product Strategy and Advertising)) automate and therefore facilitate the process of product- and service individualization tremendously.

2.1.2 Network effects

There are also economies of scope in the consumption of online information services and online products. This is what we could call '*consumer's economies of scope*'. It is much easier, and therefore "cheaper" in terms of time, training and bureaucratic hassle, to get several items from the same source, rather than from several sources (Love, 1995). Therefore the uncertainty and doubt of Internet users related to the entire new way of making business is beneficiary to big, well known and established companies (Microsoft, Amazon, Yahoo...). This results from security questions, low user skills, economics of reputation, credibility, consumer habits, switching costs (like becoming aquatinted to a new shopping system) and the like. In short we could call them 'network effects', due to the fact that in a system where everything is basing on a network, these issues are very decisive. According to the Boston Consulting Group (BCG) and Harris Interactive, 96% of 1999's online holiday shoppers will return to the web in the 2000 season. BCG/Harris note that although one-half of returning shoppers experienced purchasing problems in 1999, most are willing to try again in 2000. Only 27% will not return to problem sites. These numbers are very important if we consider that it is expected that in 1999, the average online shopper spent $170 on holiday gifts. In 2000, that same person is expected to spend $240. That implies that, once people get accustomed to one system, they are willing to purchase more (different) things from the same source. Like this, we could also look at network effects as a *'demand side- economy of scale'*, in a sense that obviously the consumer is experiencing synergies when sticking to what he is used to.

Technological change can either provide greater or lesser potential for economies of scope. Lesser potential may produce niche companies, greater potential would favor big companies.

Additionally one of the most persistent advantages of corporate size is of course seen, when it comes down to capital raising. Like in the old economy, this has not changed. (more monopoly power, ability to spread risks, loss compensation between sectors...)

2.1.3 Integrational movements

Concerning **integrational movements** in the New Economy we need to consider that there are different trends, and until now we cannot really make heads or tail of where this is leading us.

The fact is that for one thing the technique of outsourcing is rooted very deeply into Internet economics. This stems from the new way of collaboration between the companies (see below, Behavior of Firms). Ronald Coase explained 60 years ago that firms are vertically integrated because of imperfect information and the need to minimize transaction costs (Woodall, 2000). If the information flow is high and transaction costs are reduced dramatically (see Digital vs. Non Digital Goods), it will probably be cheaper for a company to buy a component part or services in the marketplace, instead of producing it themselves. Vertical integration, seen from this angle, is not as necessary anymore, and outsourcing becomes natural in the Digital Economy.

For another thing, the diversification of products and services of Internet corporations is becoming so common that customers will not be surprised anymore, when an online book retailer suddenly starts offering travel-tours as well[44]. A mayor driving force here, are economies of scope. It is a process we have seen in recent years, not only in the virtual world. The trend represents a continuos continuation of what globalization started. Many 'bricks and mortar' companies use their scale to horizontally integrate new products (like McDonalds started to sell toys in addition to burgers...). The use of these synergies is very common for 'born-global' online companies. Especially in the 3rd Layer of the Internet Economics, companies often make use of their intermediary function to integrate horizontally.

The trend of diversification could also be seen as a result of the high-speed process of the creative destruction of innovation (see: Innovation). Taking a look on the history of Nokia we can see how this company developed from an established wood-pulp mill in Southern Finland to become one of the leading companies in wireless communication and multimedia terminals (nokia.com, 2000). The dynamic of development and the high-speed sequencing of innovation is requiring a tremendous flexibility from companies that want to survive. Otherwise they will just get integrated into big companies. Often a company is only built for this purpose. This is resulting into the 'buying up mania' that we observe nowadays. Thus, the integration of new ideas into an existing company is leading to vertical integration...

To conclude, we have to consider that this needs to be analyzed with regard to the different Layers of the Internet Economics and their industries. In some industries where digital goods and network effects are more important, the development might favor giants, due to the realization of economies of scope. In other purely knowledge-based industries, the small ones will be a threat.

2.2 Redefinition of industries and competing groups

The old question of at what point one can draw a line around a group of products and refer to it as an industry got intensified tremendously due to the movements (already mentioned in the introduction) between the different economic sectors. While 15 years ago the discussion was about definitions of four-or five-digit classifications (are record players and hi-fi in the same industry?), the confusion of the dawning days of the new economy is melting and creating new industries up to its one-digit IT-classification code, which is on the other hand invading every other one-digit industry almost over night.

[44] Microsoft, for example, is positioning itself to become a trusted intermediary in retail banking. Its platform includes leading players in each product segment of retail banking, e.g. Schwab and Fidelity for mutual funds, E*Trade for online trading, CheckFree for electronic payments, and over 50 major banks for credit and transaction products. (OECD, 2000)

2.2.1 IT-classification

As IT goods and services are increasingly incorporated into non-IT goods and services, it is difficult to draw hard-and-fast boundaries[45]. Due to the difficulty in isolating IT, no standard definition exists. Different governmental and private sector bodies propose their own definitions, sometimes breaking out IT as a separate sector, sometimes including it as part of a set of industries that they consider to be high-tech[46]. The U.S. Department of Commerce defines Information Technology as industries which "produce, process, or transmit information goods and services as either intermediate demand (inputs to production to other industries) or as final products to consumption, investment government purchase, or export" (U.S. Department of Commerce, 1998). Furthermore they consider other industries to be Information Technology industries since they "provide the necessary infrastructure (communications) for the Internet to operate"[47].

The conclusion to the debate about industry determining schemes is --in the New Economy as well as in the older days—"that this does indeed involve some arbitrary classifications of products, but that the concept of the industry is so useful analytically that the exercise is worthwhile." (Hay and Morris, 1979)

In general, Industrial Economics provided two alternative, though related frameworks for the problem. One framework goes back to the work of Chamberlin (1951) who illustrated his argument by an analogy drawn from spatial economics. Since the prevailing 'death of distance' of Internet Economics also killed most of geographic requirements discussed in spatial economics, most of Chamberlin's assumptions got outdated. The other framework derives from the "goods characteristics" theory of demand developed by Lancaster (1966) and by Archibald and Rosenbluth (1975). On balance, both frameworks base on the premise that a good is a bundle of characteristics desired by the consumer, which constitute the qualities incorporated in the good. These qualities vary from one good to another[48]. It is the elasticity of substitution what we are taking into account. Therefore we have to look for certain homogenous characteristics on the demand, in order to identify industries or competing groups.

2.2.2 Product differentiation

In Internet Economics we can obviously observe a profound trend towards individualization and adjustment to personal preferences of products. New technical tools make it possible to better decipher the demand, which is individually tailored to the single customer. (see Product Strategy and Advertising; Equilibrium). Therefore, **product differentiation** can be perfectionized.

Tibor Scitovsky recognizes in his "Welfare and Competition" (p.343, 'The technological efficiency of the Industry'; 1952): "...the variety of tastes in the informed market encourages competing firms to produce slightly different products whenever there is scope for product differentiation."

It is safe to claim that digital markets are very well informed (a rather theoretical assumption in the days of Scitovsky, what he calls: free competition). The key in Internet Economics is lying in the size of the 'scope' (see: Economies of Scale and Economies of Scope) and the increased competition. Since, due to automated information processing (see: Conduct: "built-to-order, CPFR,

[45] For instance, semiconductors are used in computers, but they are also used in automobiles, home appliances, and a variety of other goods.

[46] For example BEA assesses high-tech industries- including a array of hardware for military defense (like aircraft engines); The Bureau of Census has in 1997 launched the use of the new industry classification system, called the North American Industry Classification (NAICS)- replacing the current SIC system. The NAICS is not considering hardware items. Also the OECD proposed a "Draft Definition of the ICT (Information and Communications Technologies) Sector"; (08/97; pp.28-47). Industry associations have also produced varying definitions of IT and high-tech industries, but their selection was naturally in part driven by their membership. (see U.S. Department of Commerce; "The emerging Digital Economy", 1998; A1)

[47] Namely this is covering: Hardware Industries; Software/Services Industries; Communications Equipment Industries; Communications Services Industries.

[48] For more information about both approaches see: Donald A. Hay and Derek J. Morris; "Industrial economics, Theory and Evidence" pp. 83-92.

One-to-One, CRM") in Digital Economics this scope is very small this process is culminating in, what I refer to as the 'unconditional consumer focus of Internet Economics' (see: Product Strategy and Advertising). In other words, the trend goes towards the individualization of every product, uniquely for its specific customer.

Scitovsky continues to argue: "This raises the problem of when to regard two goods as different variations of the same product and when to regard them as altogether different products"[49]. Hay and Morris ask: "Can we give rigorous meaning to products being 'less' and 'more' differentiated?" (Hay and Morris, 1980). The typical situation of product differentiation is when goods have closely similar characteristics, but certain modifications in quality. Thinking in terms of classifying, we are not even particularly concerned here about whether the quality differences are real or just subjective[50]. But as long as at least some consumers believe they exist and attach a value to them, then for our purposes they are significant. Using the tools of Internet Economics, the customer is even able to demand subjective preferences. While in the past, persuasive marketing has been used to create such subjective differences by manipulating and operating on the consumer's preferences, the bottom-up governance of Internet re-focuses marketing on satisfying the 'real need' of the customer (see: Product Strategy and Advertising).

Thoughts in this direction are bringing us back to the discussion about the difference between products and services. In the chapter about digital vs. non-digital goods we saw how the gap between digital goods and services is narrowing. If we think about individualizing a novel, for example, according to the reader's preference[51], we can see how definitions are blurring.

Another method of product classification in upheaval is the specification of tradable and non-tradable goods. We already specified this problem in the chapter about Digital vs. Non-Digital Goods.

All of these are not very helpful in solving the old economic question of "how do we compare products, which are different, and how do we measure product differentiation?" (Hay and Morris, 1980). The focus on economies of scope and the demand driven individualization may lead us to introduce some six-or seven-digit classifications, which we then will not be able to specify by name, anymore. They will be an individualized mixture between goods and services, based on specific homogenous features. The homogenous features will be characterized in lower-digit classifications, the individualized good itself will defy any general classification.

Here we can see that it is not only necessary to often redefine industries and competing groups, but that our commonly used measurements systems are ill-equipped to deal with the output of the Digital Economy (see also: Measuring the Digital Economy).

2.3 Transparency

Economists at UBS Warburg suggest that the 'New Economy' should really be called the 'nude economy' due to the exposure and high transparency introduced by the Internet.

2.3.1. Search engines

Talking about transparency of the virtual markets, we are surely considering the omnipresent **search engines**. They are programs which can be adjusted by specific features, matching the input data of the user with data provided by offering party. The first generation of search engines are

[49] At this point, I purposely took these two quotes -which originally belong together- from Scitovsky's classic of the year 1952, in order to make my point, that we do not need to burn the old textbooks. They are a very useful guide in order to untangle Digital Economics. We just have to rewrite them, in a sense of refocusing the old economic theories.

[50] Clearly there are real quality differences between say a Golf and a Rolls-Royce. Not so clear are the differences between some brands of clothes.

[51] Let's say I want a novel involving a married detective, a sexy-but-intriguing lady and a funny ending -oh- and the carnival in Rio should be incorporated-; high capacity computers will be able to 'knit' this individual novel, adjusted by the preferences of the Internet shopper in real time, and provide him his personal bed time story, -like from grandmother to her grandchild.

basic programs like provided by Yahoo!, Exite, WebCrawler, Infoseek, Lycos, Altavista... and many more. Almost everybody who has ever been connected already used one of them. These search machines are of very high capacity and make it very easy to reach some first, general locations, by basically doing keyword searches against a database[52]. Indexing hundred millions of pages, they searches not only web sites, but also images, newsgroups, news, company profiles, phone numbers, and email addresses.

Often, specific Web pages have further, proper search engines. For example the search engine of nber.org enables us to locate every author, title or single words contained in an article published by the National Bureau for Economic Research, in a few seconds. Other search engines focus on looking for specific features, like standardized products or prices. They are adjustable to specific variables and search according to the conditions set. For example, a client could look for the lowest price of a specific product offered at a virtual shop. Overcoming technical problems (like slow transmission speed) we would be able to use them, searching the Web for specifications like this in real time! (see: Pricing Behavior).

As simple as it sounds, and as used to as we are in relying on them[53], these little machines are turning many aspects of the economy upside down. Let us take a look at some theories of the old economy to lay emphasis on this bold assumption.

Let us suppose an oligopolistic market of the old economy and let us suppose some price variation among firms, so that the average price is *m*, but the dispersion of prices can be approximated by the standard deviation μ (where $\mu > 0$). Given variability between firms, it will be advantageous to the consumer to initiate a search for a low-priced supplier. Such a search used to be costly: it involves time and even money to obtain a number of quotations. *P*, according to the given equation below would be the minimum price that we can hope to find after inquiring at *n* firms [54]:

$$P = m - \mu\sqrt{2 \log n}$$

The rational consumer used to stop searching as soon as search costs exceed the prospective reduction in price quotation. i.e. exceeds $q(\partial P/\partial n)$, where *q* is the quantity required...

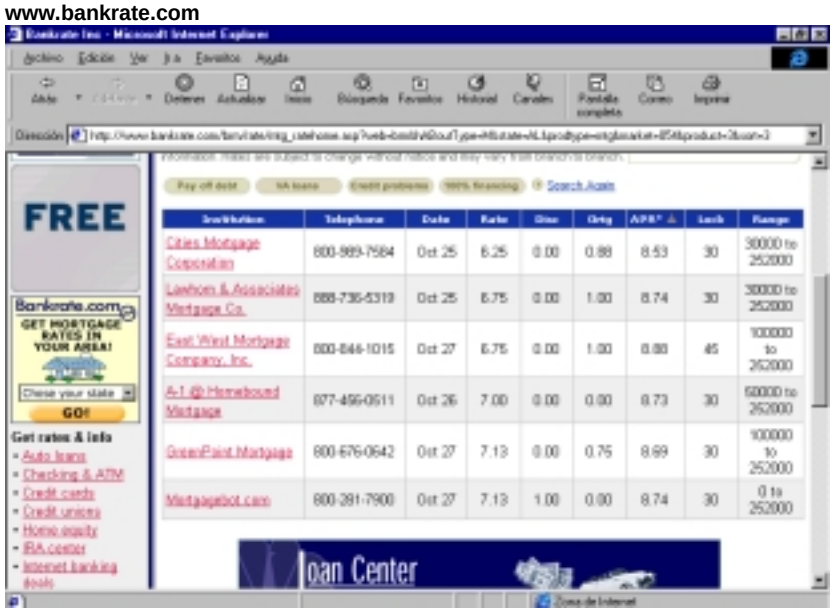
Given the transparency of pure Internet Economics, we know that reflections about returns to search efforts lose importance.

Figure 10
ONLINE TRANSPARENCY

Charges in real time, telephone companies;
Germany-Argentina; weekday 13h-14h:

[52] Not surprisingly the most sear
[53] Sometimes I ask myself how
[54] See: Alchain, A., (1970) "Ma
"The Economics of Informati

Mortgage offers:
www.bankrate.com



As we can see in the pictures above, a so-called "ShopBot", an electronic assistant, will scan market sites for the lowest real-time prices in a couple of seconds. The snowball effect of this for example, renders theories about how search cost have an impact on the concentrations of a market obsolete[55].

Retrospectively, it is interesting to see how Stigler pointed out in 1958 that the costs of search would be determined by "institutional elements" in the market. Obviously the institutional elements changed. Based on this, he expected that more search and more information would lead to a more 'competitive' situation in which price differentials would tend to disappear. We will take a look at this assumption in the chapter about Pricing.

2.3.2 Transparency creating patterns

Looking a bit farther afield, transparency is not given in analytic methods, like using search machines. Modern ICT also enables us to actively create a better, clearer view about the market. Given the high capacity of recognizing, tracking, collecting and, finally interpreting heaps of data, (for example with CustomerRelationshipManagement (see Advertising) or simple scanner at a supermarket counter), it is possible to actively create a detailed and clear picture by an interactive synthesis.

Both kinds of transparency do for example lead to a high mutual knowledge between consumer and producer. Consumers are able to identify competitive advantages of certain product offers very easy, and producers know their customers quite well. We will talk about the far-reaching effects of this, in the latter section on Equilibrium, once we have a better insight into the techniques in use.

[55] By concentration is implied the extent to which an economic activity is dominated by a few large firms. There are two dimensions of measurement. The first is the number of firms. The second is the relative size of these firms, measured for example by their market shares. In textbooks about Industrial Economics we find sophisticated theories about how the search cost and time is having a major impact on concentration. e.g. (Hay and Morris, 1980, p.93)

2.4 Barriers of entry

Quite often while browsing through literature about the New Economy, we can read about how the new economy is rendering theories about barriers of entry obsolete. Thinking about the 'virtuality' of these markets, the low fixed costs and inventory required, this might seem reasonable.

2.4.1 Entering virtual markets

As a virtual retailer, Amazon.com has, for example, **no physical** store infrastructure. Rent and depreciation represent less than 4 percent of Amazon's sales compared to 13 percent for the traditional retailer. Amazon.com's labor cost are lower as a percentage of sales (sales/operating employee >$300,000 vs. $100,000 for the traditional retailer) and it also has **less** capital tied up in **inventory**: its books turn 20-40 times per year versus two to two-and-a-half times per year for the traditional retailer (U.S. Department of Commerce 1998). While not stocking a book, Amazon.com receives payment for its goods before it has to pay its vendors.

Due to the fact that start-up companies.com usually own or control very little of the supply chain or physical production, or focus right from the start on information trading, they are often set up virtually overnight. The "Job Site" laborum.com:

"with its offices in Argentina, Chile, Colombia, the United States, Mexico and Peru (...), the application of advanced technologies (...), 309 enrolled companies and more than 15.000 resumés registered on **our first operational day**, and a considerable rate of growth, that envisions laborum.com in a place of honor as a market leader; (which) the most effective and efficient point of contact between the region's employers and prospective applicants" (www.laborum.com), was set up during a weekend seminar at the end of 1999.

Due to the common practice of outsourcing, it is very easy to place one's new business idea into a **market niche** (of a value chain), taking advantage of the already existing, very consolidated supporting net, without the risk of fixed cost spending. To the consolidated supporting net would also account that everybody is able to purchase goods at the lowest prices, making use of B2B online ordering.

Geographical requirements for entering a market also loose importance. The death of distance also killed many of the requirements, spatial economics laid upon a market entry. By definition, the worldwide-Web is also helping to enlarge existing markets by cutting through many of the distribution and market barriers that can prevent firms from gaining access to *foreign markets*. This is resulting extremely beneficial for small and medium-sized firms. For them the former seemingly insurmountable barriers of entry to global markets (especially in the supply chain, procurement and outsourcing) have now almost vanished[56].

Sometimes authors do get as excited about Inter-Net-Working that they claim "everybody-is everywhere-every time" is already blurring the borders about who is buyer and who is seller[57]. This reasoning seems justified given the rapidly growing C2C (customer-to-customer)[58] e-commerce. Looking as far ahead, we would all live in a 'virtual-reality', where the cyberspace is transmitting actions too fast as to observe and to analyze them, companies entering --just for the sake of making the quick buck-- and exiting the market almost in the same breath, open house...

While some of these theories might still face some implementation problems, in general it might make sense to us that the barriers of entry are lower in digital markets. Dealing with the very

[56] For the illustration of some case studies see: "Putting Australia on the New Silk Road" (Australian Department of Foreign Affairs and Trade, 1997)

[57] "Clave de tendencias en el Paradigma que termina: Consumidores y productores en sus lados; Claves de tendencias en Internet: Todos son productores y consumidores al mismo tiempo"; (Melnik, 2000).

[58] These are mostly second hand auction sites: deremate.com; mercadolibre.com

low fixed costs[59] of creating a company-dot-com, it sometimes seems like, often companies just get created to test an idea, or to get sold as soon as they reach the market. While in the old economy the focus of a firm was clearly set in maintaining and improving the actual business, one might by observing the events taking place in e-commerce, easily get the impression that the goal of the new economy instead is to continuously initiate new, innovating businesses (see the 'creative destruction of innovation'). This fast sequencing life-cycle rotation seems also to be approved from the point of view of capital-returns-expecting investors. The barriers to set up a business, in a sense of presenting a new idea to the market, are quite low. Before the company will actually start to make business in the virtual markets, it is getting sold and the new idea will be integrated into a big brandname. Having a look at the flourishing venture capital markets we can see that actually mergers and acquisitions are the most common type of successful exit for venture investments (see: Company Finance and the Growth of Firms).

2.4.2 Making business in virtual markets

On the other hand, somebody will have to make "commerce". E-commerce does not live from the presentation and selling of new ideas. Having a look at who is dominating economic activities in virtual markets, we can see a heavy trend to concentration. Is it only the economy of scales (demand and supply side economy of scales) that make the 'big ones' as important? Why do most of Internet companies write red numbers in their first years, if the barriers of starting a business are so low, due to non-physical store infrastructures, low labor costs, little capital tied up in inventory? Is the theory of the 'direct entry-quick buck-exit' not applicable to companies, which actually want to participate in e-commerce?

The real key question in e-commerce is not whether a company is **able to enter** the virtual markets, or not. As we have seen above, barriers to entry in the way they are traditionally understood, are comparatively low. In e-commerce the question is rather about if it does **make sense to enter**! Everybody can set up a Web-page for free, investing two hours in studying the self explaining guide of Yahoo!GeoCities. But this has nothing to do with e-commerce. In order to make a stand in the 'creatively destructive Internet Darwinism'; an executive of an Internet company needs to come up with a lot more than some nice customer-facing components of his front office space.

The first obstacle is that the web page needs to be found in the endless vastness of cyber space. Research has shown that the average Internet user has no more than twenty favorite bookmark websites that they will go back to on a regular basis (McGovern, 2000). Getting a company's website into the top twenty bookmarks of a target market is therefore a prime objective. This is not a simple and definitely not a cheap task[60].

Having a look at some of the most successful websites on the Internet, a highly positive relation can be seen between success and a substantial number of other websites to link to the companies (see: affiliate programs).

After finding the virtual shop, it comes basically down to how useful the Internet surfer finds the site. Naturally, also the first question of every investor, is about the "content" of the company-dot-com. It is the successful implementation of an innovative idea where so many fail. Trust needs to be built between the customer and the virtual shop. This implies reliability and discretion regarding every single step of the business deal, every single time the deal gets realized. Naturally it needs time to built up such a situation of trust.[61] Trust is extremely important in e-commerce, and

[59] Estimates of the costs of setting up and maintaining an e-commerce Web site range from 'e-commerce' in a box at $349, to about $8.000 for start-up and $10.000 for yearly maintenance for a service, to hundreds of millions of dollars for a state-of-the art site. (OECD, 2000)

[60] A very common practice to ,capture eyeballs` would be the participation in affiliate programs (see Behavior of Firms), where the affiliate is creating commerce and the merchant pays a commission.

[61] Obviously it has a larger impact when Amazon.com is claiming on their site, that nobody ever got financially damaged when doing business with then, as when some brand new Internet retailer would be claiming the same.

failure can be unforgivable. According to the Boston Consulting Group (BCG) and Harris Interactive, 25 percent of the 1999 holidays shoppers will never return to the sites again, where they once experienced purchasing problems. The goal is to create a "good-will", a "positive image" or economies of reputation". Making a name is paramount in virtual markets. At least until now. Once high capacity search engines become more available and widely accepted, the virtual markets, -- which are still opaque and obscure for many people-- will start to become transparent. Also once the consumer becomes less suspect of e-commerce, once they loose their insecurity and get used to this new shopping experience, and once quality differences can confidently be identified (through infomediaries or official certificates) then these tremendous efforts of creating a goodwill, may no longer be necessary. But we are not there yet.

In Internet Economics, the problem is therefore not to enter the market, but to start making business and to finally survive in the market. This is the real barrier of entry into the virtual markets. Like we saw on the example of laborum.com, it became quite easy to 'create' an online-empire, literally over night. Non-physical shop infrastructure, hardly any inventory, minimum staff and focus on information trading, combined with the very profound and liquid sector of venture capital investors, make this possible. The question is, whether it is worthwhile to create this empire. I do not want to cut the survival of an online firm down to advertising expenses, but they are certainly one key to enter the virtual markets successfully. With sales of $148 million in 1997, Amazon.com generated a loss of $29.2 million owing to "...heavily (investing) in marketing and promotion, product development and technology, and operating infrastructure development" (U.S. Department of Commerce, 1998); (see also: Company Finance and Growth of Firms). Of these three investments, the first one accounted for over two-thirds.

It is commonly known that a company, which is operating in cyberspace, is facing this type of entrybarriers. These expenses usually get financed with the help of investors (business angels, venture capitalists (see: Company Finance and the Growth of Firms)) who believe in the business idea and are confident that they will get rewarded some day. As we can see, there are enough of these investors around, which may have changed the way how a start-up can overcome barriers of entry, this does not mean that they do not exist. The 'debts' one has to incur in order to start ("start" not in the sense of 'creating'- but rather in the sense of 'getting going') one's company on the Web, seem to be even higher and for sure bear much more uncertainty, due to the immaturity of the Digital Economy, rather than the difficulties a 'brick-and mortar' company had to overcome in order to establish their business.

To conclude, we see that in Internet Economics, barriers of entry depend on the final goal of the company. Financing, setting up, presenting and finally selling the new idea, might be one strategy typically used. In order to start making business in virtual markets however, a company needs to make its name in the endless vastness of cyberspace. Here the barriers of entry for a company are high. Network effects and economies of scale are favoring the established firms, raising further the entry barriers for e-commerce newcomers.

3. Conduct

Coming down to the conduct of sellers and buyers in terms of the Digital Economy, one of the main focuses is obviously set pricing behavior. But there are also tremendous changes in marketing and advertising strategies or the new forms of management, company's orientation, cooperation and interdependence between firms, which are actually the core of the economic high-speed evolution. The possibilities modern Information and Communication Technology is opening might lead economies to a state where markets are constantly, almost automatically being cleaned. A permanent Market Equilibrium? This section will also deal with how Internet companies get financed, how they grow and why "they all loose money anyway". Finally we will specify some of

the major legal concerns, which are the countries in transition to a New Economy are concerned with.

3.1 Money and payment

Secure methods of payment are the prerequisite for widespread commercial use of the Internet. Important characteristics for an Internet payment system include security, reliability, scalability, anonymity, acceptability, customer base, flexibility, convertibility, efficiency, ease of integration with applications, and ease of use[62]. Some of these characteristics, like anonymity, are more important in some communities, or for certain kinds of transactions, than they are in other communities (Neuman and Medvinsky, 1995). These principles were presented at the MIT Workshop on Internet Economics march 1995. Since these very first days of Internet Economics a number of competing electronic payment alternatives have been introduced. It is still too soon to tell which if any of these products will become widely used. National governments are highly concerned about digital cash because they fear that it facilitates illicit transactions, and makes money laundering easy. Different types of digital cash have significantly different implications for law and policy regarding anonymous digital commerce. Here we will easily move into legal matters (see Legal Tactics) or into technical details where economics disappears from view.

Because of this, I will just introduce the basic systems such as credit cards and cheques, electronic cash, micropayments and smart cards, leaving final analysis to the to specialized literature.

3.1.1 Credit cards and cheques

[62] **Security** : Since payments involve actual money, payment systems will be a prime target for criminals. Since Internet services are provided today on networks that are relatively open, the infrastructure supporting electronic commerce must be usable and resistant to attack in an environment where eavesdropping and modification of messages is easy.
Reliability: As more commerce is conducted over the Internet, the smooth running of the economy will come to depend on the availability of the payment infrastructure, making it a target of attack for vandals. Whether the result of an attack by vandals or simply poor design, an interruption in the availability of the infrastructure would be catastrophic. For this reason, the infrastructure must be highly available and should avoid presenting a single point of failure.
Scalability: As commercial use of the Internet grows, the demands placed on payment servers will grow too. The payment infrastructure as a whole must be able to handle the addition of users and merchants without suffering a noticeable loss of performance. The existence of central servers through which all transactions must be processed will limit the scale of the system. The payment infrastructure must support multiple servers, distributed across the network.
Anonymity: For some transactions, the identity of the parties to the transaction should be protected; it should not be possible to monitor an individual's spending patterns, nor determine one's source of income. An individual is traceable in traditional payment systems such as checks and credit cards. Where anonymity is important, the cost of tracking a transaction should outweigh the value of the information that can be obtained by doing so.
Acceptability: The usefulness of a payment mechanisms is dependent upon what one can buy with it. Thus, a payment instrument must be accepted widely. Where payment mechanisms are supported by multiple servers, users of one server must be able to transact business with users of other servers.
Customer base: The acceptability of a payment mechanism is affected by the size of the customer base, i.e. the number of users able to make payments using the mechanism. Merchants want to sell products, and without a large enough base of customers using a payment mechanism, it is often not worth the extra effort for a merchant to accept the mechanism.
Flexibility: Alternative forms of payment are needed, depending on the guarantees needed by the parties to a transaction, the timing of the payment itself, requirements for auditability, performance requirements, and the amount of the payment. The payment infrastructure should support several payment methods including instruments analogous to credit cards, personal checks, cashier's checks, and even anonymous electronic cash. These instruments should be integrated into a common framework.
Convertibility: Users of the Internet will select financial instruments that best suit their needs for a given transaction. It is likely that several forms of payment will emerge, providing different tradeoffs with respect to the characteristics just described. In such an environment it is important that funds represented by one mechanism be easily convertible into funds represented by others.
Efficiency: Royalties for access to information may generate frequent payments for small amounts. Applications must be able to make these "micropayments" without noticeable performance degradation. The cost per transaction of using the infrastructure must be small enough that it is insignificant even for transaction amounts on the order of pennies.
Ease of integration: Applications must be modified to use the payment infrastructure in order to make a payment service available to users. Ideally, a common API should be used so that the integration is not specific to one kind of payment instrument. Support for payment should be integrated into request-response protocols on which applications are built so that a basic level of service is available to higher level applications without significant modification.
Ease of use: Users should not be constantly interrupted to provide payment information and most payments should occur automatically. However, users should be able to limit their losses. Payments beyond a certain threshold should require approval. Users should be able to monitor their spending without going out of their way to do so. (MIT, 1995)

Credit Cards and Cheques are by far the most commonly used ways of payment on the Internet. Credit Card payment systems are wide spread and it is commonly known how the plastic money is working. The Internet is using specific security systems to grant the validity of the proceeding. The leading standard is *SET* (Secure Electronic Transactions). As the result of a joint force of Visa and Master Card, with the help of GTE, IBM, Microsoft, Netscape, SAIC, Terisa and Verisign, it is a collection of specifications that allow the realizing of transactions with banking cards through the Web in a trustful and secure way. The use of digital certificates to verify the user is, on the other hand making the system about three times slower (20 to 30 seconds) than traditional transaction processing, which will increase costs, depending on the volume and the merchant, by 1 to 6 percent of the value of the transaction (OECD, 2000). *Cybercash* would be another alternative. This system requires however that the purchasing party as well as the tradesman be registered in the Cybercash database. *Digital Cheques*, like Netcheque, Checkfree or Paynow are virtual simulations of the traditional cheque system. It involves working with a password and a central server, which sends a randomly assigned code at the customer's request. The advantage to credit cards is the lower transaction costs.

3.1.2 Electronic cash or digital cash

Electronic Cash or Digital Cash[63] are the virtual attempt to adopt the principal characteristics and benefits of real cash. A major advantage is the anonymity of the buyer (Froomkin, 1996). The downside is that it requires the installation of a 'Cyber Wallet' in the computer and that there is no type of protection regarding the non-acceptance of the money. Unless legal rules change significantly, consumers who live in jurisdictions that provide legal protections for debit or credit cards transactions will tend to use them for larger payments. After all, why use e-cash when you can use a credit card and cancel the payment if the seller fails to deliver what was promised? (Froomkin, 1997) That is leading us to a special variant of electronic Cash:

3.1.3 Micropayments

Many people predict that these new payment media, like Digicash will have economic effects only in the part of the economy that uses small and micro-transactions. While the fee per transaction of a Credit Card would not make it profitable to use it for settling a 10 cent bill, micropayment systems can be used to cover page-view charges or similar small transactions. It requires the integration of an intermediate or 'broker', which is in charge of consolidating and accumulating transaction at cost, in order to reduce them through economies of scale. Like Digital Cash, micropayments require the purchase of a virtual currency, and the verification of the customer is realized with the help of the responsible ISP (Internet Service Provider).

3.1.4 Smart cards

Smart Cards already became very familiar to daily business. They are used as public phonecards or to recharge cellulares. There exist two different types of Smart Cards: with or without contract. The microprocessor installed on the plastic card is equipped to pick up, store, process and transmit digital data like digitalized amounts of money, medical information or personal identification.

Resuming, one should take the wind out of the overheated money and security discussion's sails. As we will see in the *Legal Tactics* chapter, experts are working very hard on the topic and cryptographic techniques, digital signatures and certificates ensure a high level of security for online transactions. It is just a matter of time until online payments will be more secure than walking around with your wallet.

3.2 Innovation

[63] The company Digicash was created by David Chaum. He is considered one of the most demanded experts for cryptographic algorithm.

In this section I want to analyze two different aspects of innovation. One is about our **common understanding of innovation** and its importance as regards to the Digital Economy. Joseph A. Schumpeter's vision (1934) of the 'creative destruction' captures much of this story. The second part is about the **pace of innovation** regarding the ICT sector itself, which is of major importance for this 'unprecedented speed' we have mentioned so many times before.

Deeply rooted in the new product strategy -and actually in everything related to the Internet- is the idea of innovation. Probably we will even have to change our common understanding of the term.

Joseph A.Schumpeter stated in his trendsetting "Process of Creative Destruction": "The fundamental impulse that sets and keeps the capitalist engine in motion comes from the *new* consumers' goods, the *new* methods of production or transportation, the *new* markets, the *new* forms of industrial organization that capitalist enterprise creates". He would have probably added: "and new information", if he would had known about the Knowledge Society. He concludes that this "process of industrial mutation (...) that incessantly revolutionizes the economic structure *from within*, incessantly destroying the old one, incessantly creating a new one (...) is what capitalism consists in and what every capitalist concern has got to live in." (Schumpeter, 1934).

3.2.1 Common understanding

In literature of industrial economics, innovation was usually related to theories about Research and Development (Scherer, 1980). It has been related to pecuniary expenses, the need for scientific or technical experts and expensive equipment. Of course R&D will not vanish, even though it will surely change its outer appearance due to ICT[64]. More important is, that in the Knowledge Society, innovation is once again more seen as the simple implementation of a new idea. Simple 'new ideas' do have a major effect on the output, as we consider the importance of the input factor information. Innovation is becoming the key of survival in a market with abundant information flow. In many fields of the old economy one initial business idea was enough, with the focus then set on maintaining and improving the business. The focus of e-commerce is based on continuously coming up with new ideas.

In another hypothesis of Schumpeter, he linked firm size and innovation, giving three distinct reasons: First, only a large firm could bear the cost of R&D programs. Second, a large and diversified firm could absorb failures by innovating on a wide front. Third, it needs some element of market 'control' to reap the rewards of innovation (Hayand Morris, 1980). At first glance this might seem acceptable, considering that AOL, Microsoft, Yahoo! and Amazon.com are generally setting the pace of what is the newest and latest. At second glance we will recognize, that it is rather the standard setting power, which they are demonstrating openly. It is not the force of new inventions that is driving them. New ideas often get integrated into the brandname by buying up new, small, flexibly reacting companies and their ideas. On the other hand, this is showing that small companies are not able to succeed with their innovations by themselves neither. The new ideas need the scale of big companies in order to get widely accepted. Since we know that innovation is not equal to invention and since we know that development costs occupy the major part of a 'good performance', this did not give us an answer yet.

To build the bridge, we should take a look at interfirm cooperation:

Firms are more likely to innovate successfully if they are able to access and implement acquired knowledge rapidly. This accounts for the invention as well as for the completion of the new idea (Remember the positive loop of knowledge creation and the global brainstorming we used to explain the dynamics of knowledge creation. New information can be used to invent something new and also to innovatively complete a new idea…). Furthermore this accounts for a positive relationship between internal innovation capabilities and the use firms can make of external links. Firms with higher internal innovative efforts also have a greater ability to co-operate with other actors and to adopt knowledge produced outside the firm. This positive relationship between innovation and co-operation seems also to work the other way around, as empirical studies have confirmed that collaborating firms are more innovative than non-collaborating ones (OECD, 2000). This accounts for a big company, as well as for a small start-up. Here the ubiquitous networks move into the center of attention again. Come to think of it, these collective efficiency can be identified as being nothing else than the well known "Marshallian economies". Very simply, Marshall explains that external economies are distinguished from internal ones inasmuch as they develop not within but outside the firm:

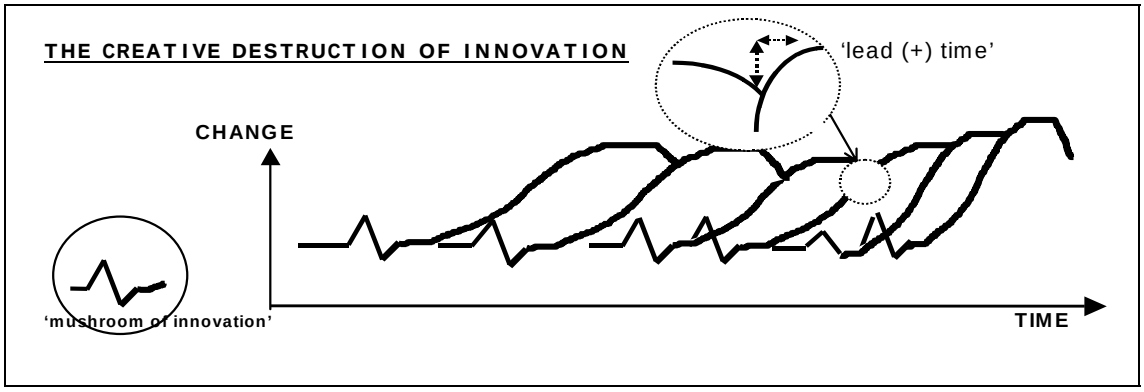
"We may divide the economies arising from an increase in the scale of production of any kind of goods, into two classes - firstly, those dependent on the general development of industry; and secondly those dependent on resources of individual houses of business engaged in it, on their organizations and the efficiency of their management. We may call the former external economies, and the latter internal economies." (Marshall, 1920) We already had a brief look at the internal economies in the section of 'economies of scale and economies of scope'. External economies in

[64] The fact that through advances in IT, R&D can be realized a lot cheaper, will be another driving force for further innovation. In 1985, it still cost Ford $60,000 each time it crashed a car into a wall to find out what would happen in an accident. Now a collision can be simulated by computer for around $100.- (Woodall, 2000).

Marshall's view are in practice externalities describing a situation in which the activity of one agent involves 'spill-over effects', which, not intentionally, have an impact on the activity of another agent (Tommaso, Dubbini, 2000). By definition these 'spill-over effects' have to be characterized by non-rivalry and non-excludability. The input factor information fits these requirements. External economies of scale are therefore a basic driving force in a knowledge-based economy.

Given the vanishing asymmetry of information, inasmuch as Internet is facilitating and generalizing information flows (see Digital Divide and the Catch Up; Internet as the 'Big Equalizer') all companies seem to work together on the same level of information, making use of economies of scale outside the firm, but inside the same industry (Marshallian economies) (Agosin, 2000). Not necessarily with intention, they are constantly developing and extending the current frontier by joint force, unable to exclude somebody from the process[65]. They swim from one single, same wave of innovation onto the next one together. Driven by the 'popping up' of 'mushrooms of innovation', giving the gist of Harberger[66] (also see Digital Divide and The Catch Up).

Figure 11
THE CREATIVE DESTRUCTION OF INNOVATION



Source: author

This would be in accordance with Schumpeter's 'creative destruction' and fits our understanding of the Knowledge society, where the most important input factor is non-excludible and its spread gets facilitated by the new Global Information Infrastructure (see also: Digital Divide and the Catch Up; Internet as the Big Equalizer). First a "mushroom of innovation" is popping up: the LP got invented. Then the idea got developed and at at certain point the innovation reached its maximum penetration. Meanwhile the cassette tape already started to conquer the music industry. Slowly but surely the LP has been replaced. It is no longer able to provide "good performance", etc, etc… This is the incessant chain of the creative destruction of innovation.

Various authors assume a pecuniary and a technical nature to the external economies in question (Viner, 1932; Scitovsky, 1954; Nadvi, 1996). Given the high information flow of an Internet operating in the Knowledge Society, and the theory about the 'creative destruction of innovation', we might as well add an innovational nature to external economies of scale in an industry, as the mayor driving force for collective efficiency in the Digital Economy.

[65] Keeping in mind that Marshall was thinking about specific industries. Here we can see how on the Internet the information flow is so high and quick that many industries start to get influenced and to interact often unintentionally. This is again coming back to the "Dynamic of Science".

[66] Harberger claims that economic growth is basically not growing gradually, equally distributed - like a balloon, being filled up with air or like 'yeast'. Economies are more likely to grow like 'mushrooms', having the habit of popping up, almost overnight, in a fashion that is not easy to predict (A.Harberger,"A vision of the growth process"; The American Economic Review, March 1998).

This would also explain why 'lead time' is so essential in the Digital Economy. In order to make a gain in Internet Economics, the essential question is often not about: 'how good'? -but rather: 'how fast'?!

The sequence with which 'mushrooms of innovation' are sprouting, is very high and the spread of the new ideas, for the benefit of the general public of the Internet society, as well. Being the 'first mover' over and over again, in order to skim off some profit, becomes the survival task in the incessant process of innovational creative destruction[67]. Of course a company could codify their knowledge -- like Microsoft and their notorious source codes-- and lock it in a safe --like the recipe for making Coca Cola. But in the long run, this only works, if the product is possessing as much monopoly power as Microsoft or Coca Cola. The model more likely to become the rule, is to start "thinking network" (see: Inter-Net-Working). This of course implies that making use of the "first-mover-advantage", by constantly trying to swim at the outermost edge of the "creatively destructive wave of innovation", is the only way to skim off profit. The attempt to consolidate the first-mover-advantage, and like this to achieve a more or less considerably stable temporary monopoly power is the only pecuniary force driving companies[68]. This incentive principle is recognized, for instance, in the patent system for inventions. In a knowledge-based economy it just does not make sense anymore to guarantee the protection a software program patent for 20 years. Maintaining marketing power in the Digital Economy depends on continued innovation at a rapid pace[69]. In the New Economy we are talking about "Economies of time", the importance of "cycle times" and "Internet Time". They are closely linked to the 'first-mover-advantage'. Cycle Time is considered to be the time it takes to bring a new product to market or to upgrade an existing one (hotwired.com, 2000). Prior to the industrial revolution, cycle times could often be measured in centuries. They have been declining ever since, pulled along by ever larger and ever hungrier markets and pushed by increasingly supple technology. Today exhausted Web developers talk about "Internet time", where the cycle time gets close to zero – essentially, nonstop continuous change and innovation[70].

Actually, the only way to protect intellectual property, in a economy driven by the creative destruction of innovation, is to act on it.

Of course there are many 'real world' components influencing a picture where innovation might be the central key to success. Network effects, historically unique circumstances (like with Microsoft), extreme use of monopoly power, the omnipresent uncertainty, high switching costs and inertia of consumption habits, the problem of making oneself a name in the 'endless vastness of cyberspace', privacy policies, and other moral and legal restrictions, etc... blur the theory, but cannot deny its driving force.

3.2.2 Pace of innovation

In this part I should like to talk about the Innovation inside the ICT sector itself. The first programmable electronic computer, with a memory of 20 words, was built in 1946 but was not

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67 Garry McGovern; "The Caring Economy":
"There is no point in hanging around in a world of change. You need ideas, sure, but the only way you can really protect them is by acting upon them. As John Perry Barlow wrote in his Wired article "The Economy of Ideas":
"As we become fixated upon information commerce, many of us seem to think that originality alone is sufficient to convey value, deserving, with the right legal assurances, of a steady wage. In fact, the best way to protect intellectual property is to act on it. It's not enough to invent and patent; one has to innovate as well. Someone claims to have patented the microprocessor before Intel. Maybe so. If he'd actually started shipping microprocessors before Intel, his claim would seem far less spurious." (...)
As Morris Tabaksblat (Chairman of Unilever) has stated: „Change: Regard it as an ally and not as an enemy. Understand the process that drives change and you can use it, instead of being used by it. Change: use it, or be used."

68 This has also been one of the major arguments of Microsoft's defense, in the Monopoly-process U.S. vs Microsoft. For more information about this case (in point), see: http://raven.stern.nyu.edu/networks/ms/top.html

69 See also: Robert J. Barro: "Why the Antitrust Cops should lay off High Tech"; 1998;
http://post.economics.harvard.edu/faculty/barro/bw/bw98_08_17.pdf

70 To visualize this theories we could think of the software industry again. As we can easily observe, software producers will have to offer their programs online, sooner or later. MS is already working on an online version for Office, and Sun Microsystem orientated most of their strategy on this alternative. Paying a monthly fee, the user would be able to work with a software program, which is ever learning and improving => in real time. Meaning: Internet Time.

really able to obtain the center of attention until the microprocessor got invented in 1971. Keeping in mind that mankind considered the electrical storage of 20 words the forefront of knowledge only 50 years ago, it is amazing how we are now living in a world where artificial intelligence is no big deal anymore and people openly talk about the creation of a 'virtual reality'. Innovational progress in Information Technologies invades the planet at an unprecedented speed.

One method of **gauging the pace** of technological change is the rate of decline in cost of a new technology. Over the past three decades, the real price of computer processing power has fallen by an average of 35% a year (Woodall, 2000). This means in numbers that a computer, which can be obtained for about US$1.000 today, would have had a steep price of US$400 million in 1970. (see also: non-inflational Growth). Considering Moore's law[71] a typical computer in 2010 is likely to have 10million times the processing power of a computer in 1975, at lower real cost.

Hand in hand with innovation and the decline in its costs, goes of course the diffusion of technology. The higher the innovation sequence, the steeper the decline in costs, and the more probable the faster shift of the diffusion curve to the left. Today a Ford Taurus car contains more computing power than the multimillion-dollar mainframe computers used in the Apollo space program (Woodall, 2000).

Innovation-fever thrilled everybody. Corporate America's R&D have increased by an annual average of 11% over the past five years. It is claimed, strikingly, that about 90% of all scientists who have ever lived are alive today (Woodall, 2000). The pace of innovation does not only seem to be faster: on these numbers we can see that it has really increased, which suggests that innovation will go on.

3.3 Pricing behavior[72]

Thinking very basically about prices in the Internet Economy, one is quick to conclude that they should be falling in the long run for the average consume[73]. Although retailers and research institutes claim that better prices are seen as a positive side effect with many customers the main reasons for Internet shopping are still convenience, ease of research, availability and product variety (U.S. Department of Commerce, 1998). Apart from differences in real prices the networking realities of the Internet combined with direct customer access to vendor pricing systems has resulted in an explosion of different (even though not new) pricing models, and no one can put this genie back in the bottle.

However pricing is one of the fields, which is bringing the most visible changes with it[74]. We can confidently fall back on the 'old textbooks' again to explain what is happening in Internet pricing behavior. But once again we do need to reset the focuses, due to the new light the old economic rules are shining in. Some of the changes the Internet introduced in pricing are already obvious to every online-shopper. Like in the past, pricing is still the driving force of the competitive

[71] Gordon Moore is one of the co-founders of Intel. He forecasted in 1965 that the power of a silicon chip would double every 18 months. Considering the development from the 8008 microprocessor (1973) until Intel's Pentium III (1999), his approximation turned out to be valid.

[72] In this chapter I will again refer only to e-commerce, the third and fourth Layers. But also in the first and second Layers we can see interesting dynamics. The use of monopoly power by Microsoft is only one commonly known example. Hard- and Software pricing is very related to time and technical development. The unprecedented speed with which prices are falling in this sector, as well as new possibilities to charge, initiate a interesting dynamic. For example we could imagine that once the transmission speeds are fast enough, the user does not need to download specific software anymore. The user just locks into the 'Microsoft Word-Webpage', using the program, covering a charge. This would make sense especially for big software programs. Here we can clearly see the pressure laid on the first and second Layer.

[73] Basically we could say, that the higher, better and cheaper information flow provided by the Internet, will lead to a fall in the cost of input (not only in the form of information itself, also B2B...), which will shift the supply curve to the right, increasing output, decreasing prices.

[74] In general 'every-day-surveys' when people are questioned about Internet pricing, they usually consider the discounts of some book retailers, in comparison to their 'bricks-and-mortar' counterparts. One needs to consider that discounts typically do not include the cost of delivery. Depending on the cost of delivery and the amount of items purchased, the total cost of an item may be higher on the Internet than at a physical 'take-away' store.

process. Looking a bit further afield, pricing will also be seen in a different light due to its consistence.

3.3.1 Transparence

The **transparence** Internet is bringing into economy has of course a big impact on pricing theory. The effect which in the old economy was known as “oligopolistic interdependence in pricing“ got exponentially intensified.

Figure 12
PRICING TRANSPARENCE

Source: jango.excite.com; half.com

On markets with such an unequivocal transparence as we can see it in the pictures above, it would be difficult to offer the "Body Glove Palm BDA", from "Everything wireless" for a different price than $24.95 (first picture). Every little difference is more than easy to identify (second picture). The fast identification of price leaders and the therefore very unstable positioning in price leadership, brought tremendous competition into virtual markets (third picture).

Electronic assistants are scanning market sites for the lowest prices in no time. Price cutting and discount policies have common practices. This accounts for every item, from baby toys, to telephone fees in real time, to banking deals. Actually between every group of substitute goods. A major part of the B2B e-commerce idea is based on the creation of this transparence.

3.3.2 Price discrimination

The transparence and the global range of the Internet are also making it more difficult to **discriminate in prices**[75]**.**

In the long run, there will of course be major changes as regards to *spatial pricing methods* (Scherer, 1970). Obviously the 'death of distance' is rendering most of spatial economics obsolete. Geographic market definitions loose more and more importance as e-commerce is penetrating the entire dimension of the planet. Of course there are the delivery costs for non-digital goods, but they are in general fixed, additional prices.

Regarding the *first-degree price discrimination*, we can take a story, which caused a little stir between online shoppers in May 2000. It is normal for retailer to sometimes test price elasticity, regarding specific customer groups, by secretly offering different prices. Customers comparing prices on a popular bargain hunter message board (An and Tech "Hot Deals") discovered very quickly how Amazon.com was offering the 'Diamond Rio MP3 player' on some sites for $51, while on others the usually list price of $233.95 showed up (Volverton, 2000). Many customers felt disturbed by this kind of 'randomly' seeming price setting.

Second-degree price discrimination is affected by the better possibilities of customers to make use of it. Syndicated buying got majorly facilitated through the new tools of communication. It allows companies, even if they are competitors, to band together to place higher volume orders for strategic items. This means that many small companies can buy at the same volume discounts as one large company.

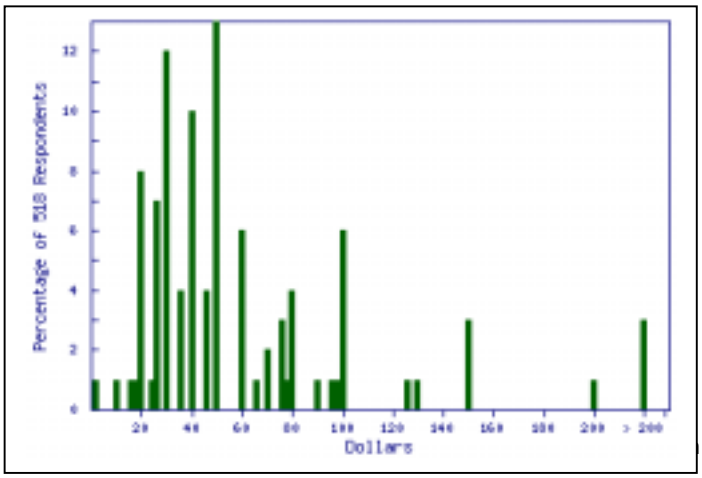
Also *third-degree price discrimination*, which used to be the most common one in the days of plain industrial economics, is facing the music of modern Information Technologies. Due to the continuing loss of importance of spatial pricing, it will also be very difficult for a company to discriminate prices as regards to the time of the purchase. Trading online is blurring fixed business

[75] The traditional classification of the forms of price discrimination is due to A.C.Pigou, "The Economics of Welfare", 1920; p240-56; (see also: Louis Philips, "The Economics of Price Discrimination", 1983):
First-degree price discrimination involves the seller charging a different price for each unit of the good in such a way, that the price charged for each unit is equal to the maximum willingness-to-pay for that unit. Also known as perfect price discrimination.
Second-degree price discrimination occurs when prices differ depending on the number of units of the good bought, but not across consumers. Also known as nonlinear pricing.
Third-degree price discrimination means that different purchases are charged different prices, but each purchaser pays a constant amount for each unit of the good bought.

hours. It is the 24-times-7-week, where the merchant does often not even know where in the world its client is situated. These new basic assumptions are paramount, especially for tradable goods. While in the days of the old economy it was generally accepted that a service provided by a firm was charged differently during different hours of the day, the online shopper might as well get this service from some online operating shop, situated in a different time-zone, but only one mouseclick away. 'The world at your fingertips' and the therefore increasing competitive pressure, will sooner or later make it almost impossible for the merchant to discriminate prices like it was commonly accepted in the past.

Talking about perfect price discrimination, opinions as regards to which trends the Internet is bringing in the long term are very distinct. While the Internet allows consumer to easily collect retailer information about prices, the same characteristics allow retailers to gather better information about consumer characteristics, allowing to draw conclusions about the consumer's willingness to pay very easily. It is a question about who is using the full potential of the Internet for his best benefit. The graph shows very clearly the differences in how many customers would be willing to pay for one book (sitesell.com, 2000). The transparence obtainable is amazingly scary.

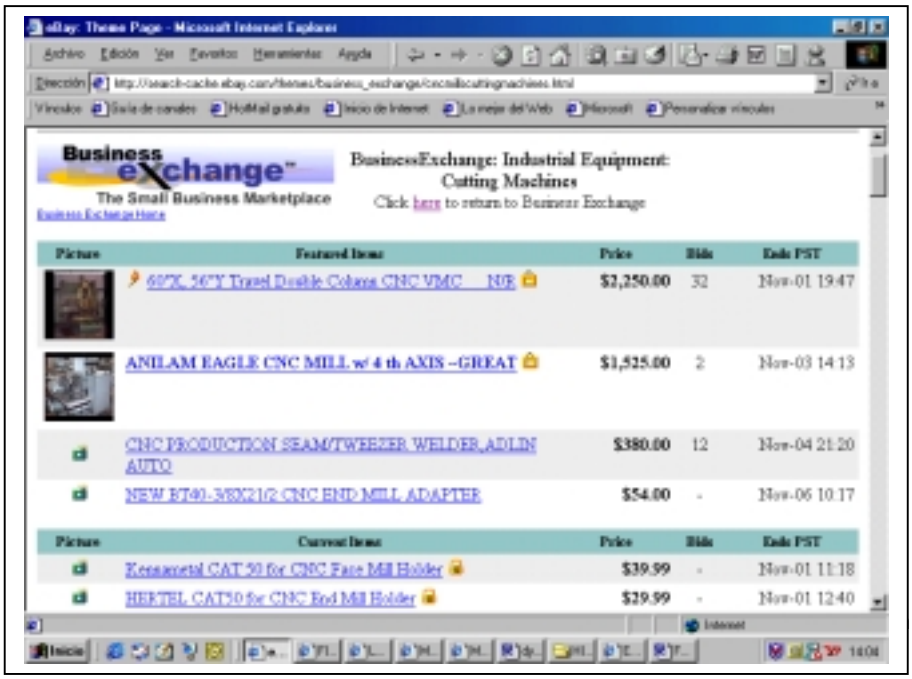
Figure 13
HOW WOULD YOU PAY?



3.3.3 Online auctions

Another aspect of Internet pricing is of course **online auctioning**. This way of fixing a price is nothing new. Only that auctioning became a lot more common, due to the interconnectivity the Internet is providing. *Customer-to-Customer* (C2C) sites experience a major boom recently. The sites act like an intermediary, facilitating the private deal between buyer and seller. This kind of second hand trade is quickly gaining popularity between Internet surfers[76].

Figure 14
CUSTOMER-TO-CUSTOMER



The interactive nature of Internet also made *reverse auctioning* popular. In these new models, the customer dictates the price of a product he specifies, and the merchants are reacting on this demand in real-time. The e-commerce cradle for this type of pricing has been the travel industry[77]. It was seen as the logical, interactive elaboration of what we know as the "last-minute-tickets-sale" at the airport. Meanwhile it applies to almost every item[78].

3.3.4 Dynamic pricing

[76] "This is like having dozens and dozens of used record and CD stores at your finger tips." (Johnson, Dean (1999), "MUSIC; Long-Gone Releases Caught by the Web", The Boston Herald, May 30)

[77] e.g.: Priceline.com about airline tickets: "Tell us where and when you want to go, the number of tickets you need, how much you want to pay and provide a major credit card. Priceline then searches for an airline willing to release seats at your price. In just one hour, you'll have an answer! If we find tickets at your price, we immediately purchase those tickets and charge your credit card. Because you get to name your own price, tickets purchased through priceline cannot be changed, transferred or cancelled" (Priceline.com, 2000).
Other firms later copied and improved the system: e.g.: http://www.travelocity.com/ and http://www.expedia.com/

[78] In a similar mortgage industry model, companies like http://www.lendingtree.com/ and http://www.getsmart.com/ allow customers to enter personal profile data and define the mortgage rate and points they want, and within a matter of hours a selection of lenders will respond directly to the consumer with either acceptance of the customer's terms or a counter-offer.
Aggregator sites serve the mortgage consumer as well, with the most popular sites including http://www.quickenmortgage.com/, and http://www.eloan.com/. These aggregator sites ask a range of very personal questions about income, expenses, assets and liabilities, etc. without requiring customers to identify themselves specifically. They compare an applicant's data to a matrix of approval and pricing criteria, then deliver to the applicant a list of providers and rates that has been dynamically built for them. These sites link directly to credit agencies while the customer is on the site in order to present a qualified approval based on the consumer's credit history.

Above all, the most striking catchword of Internet pricing is undoubtedly **Dynamic Pricing**. Nevertheless there is a big confusion in literature about what this actually is. We could say it is a mix of all the price fixing techniques mentioned above. On the other hand, it is nothing new. I would rather say, dynamic pricing is the original form of setting a price, and all of the techniques we mentioned above are just modifications, adjusted to the rigidity, which was introduced by the industrial age. For thousands of years, pricing was dynamic. Market vendors would see competing vendors' prices for potatoes and balance that against buyer demand, and constantly adjust their prices accordingly. This was a very raw, low-tech kind of dynamic pricing. Later, mass manufacturing and mass marketing of the industrial age simply did not allow for any kind of dynamic pricing anymore. It became impossible to haggle over the price of every single item sold. It was no longer manageable to constantly balance the price according to supply and demand for the millions of items in stock.

But we did not loose the system of dynamic pricing over the years. We even perfectionized the raw idea and made the technique applicable for the masses. Dynamic pricing is nothing different from what we can observe every day on the stock market. Prices of a stock on a stock exchange adjust constantly, on a second-to-second basis, a perfect reflection of market conditions at any given moment. As a result more customers buy more product at a price that makes the most sense to them. A mutual inability to skim off extra profit got created. Markets are in equilibrium (see Market Equilibrium).

These ideas are of course very theoretical, and seem hard to implement. Therefore let us take a look on what is happening already in Internet Economics, as regards to these ideals.

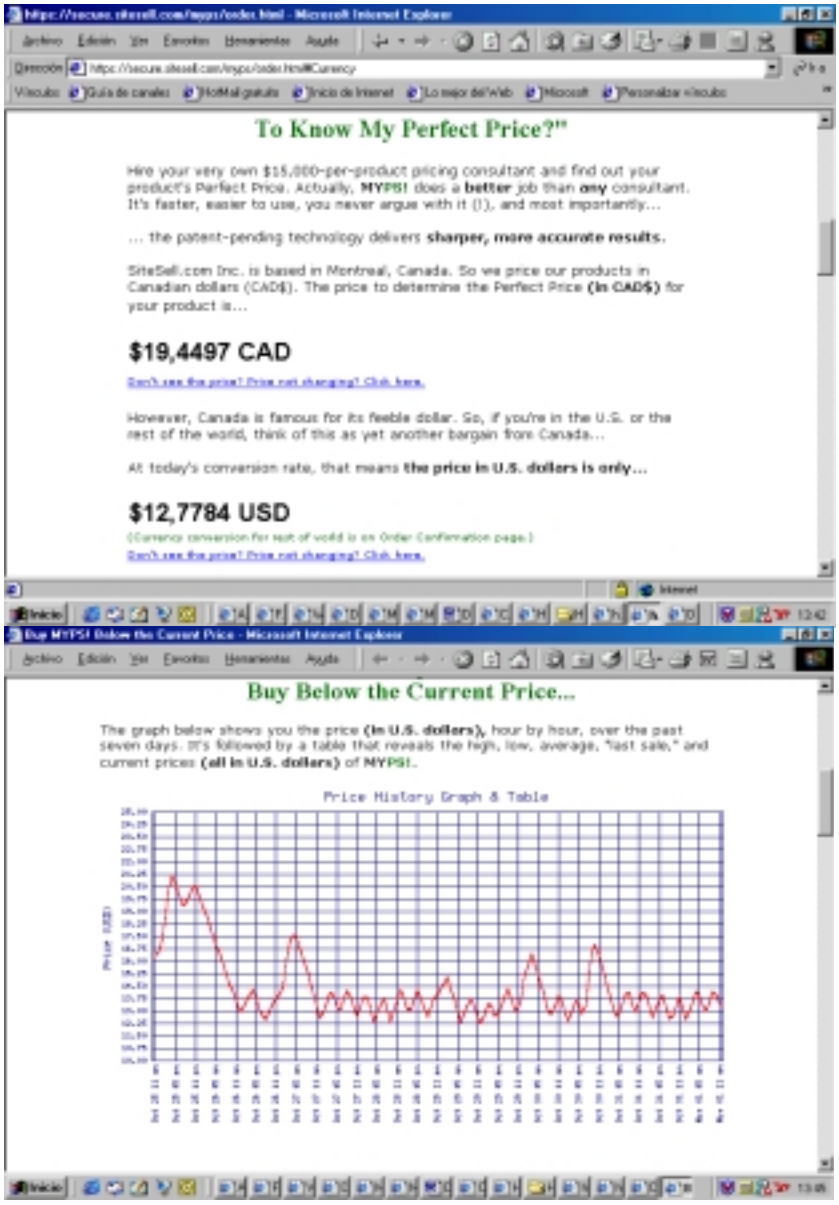
One pricing model going into the dynamic pricing direction is known as ‘demand-based pricing’. It based on the concept of volume discounts in the beginning. Shopping sites[79] allow users to commit to buy a product if the price drops at least to a specified level within a time period, usually a few days. When enough people have signed up, the price drops to the next threshold, and then if enough people agree to buy at the new price, the price will drop again to a third level. Eventually the clock runs out and everyone gets the same price – the price associated with the final number of people who committed to buy.

But as we know, the shifting demands of buyers ebb and flow in real time. Some companies elaborated therefore mechanism which allow real-time pricing online. A very vivid and clear example is the book of Ken Evoy, “Make Your Site Sell!” (sitesell.com, 2000). Evoy wrote a book about Internet marketing techniques and decided to sell his own product according to the theory of dynamic pricing.

The site actually reminds us of a very basic form of a stock market. Without interference the price of MYSS! is continuously dropping. Sitesell.com even claims that: “if no sales occurred in a day or two, we'd be giving it away!” (sitesell.com, 2000) Every time a sale occurs, the price increases by a small amount, spread over 30 minutes. The ticking price fluctuation on the order page is therefore a perfect reflection, at that moment, of the balance between the buying pressure from visitors to the site and the selling pressure of the continuously dropping price.

[79] Like http://www.mercata.com/, and http://www.mobshop.com/

Figure 15
DYNAMIC PRICING; MYPS



Source:sitesell.com

Like in a stock market, the purchaser does not have to buy "at the market price" (i.e., at the current price he can see ticking on the order page). The client may also submit a bid below the current selling price. If the price of MYSS! drops to the level of the bid, the order gets automatically fulfilled. The right graph is showing us a price history of MYSS!, provided on the bidding page.

I do not think I need to spend a lot of time stressing the advantages of Dynamic Pricing. It already starts with the launching of a new product. The 'perfect price' is maximizing utility on both sides right from the outset.

3.4 Behavior of firms

Having a close look at the firms and their behaviors, there have to be two things investigated. First, the entire **firm itself**. How is it organized? What are the different kinds of organizations as regards to 'companies.com' or 'clicks and mortar alternatives'? What are their objectives? . . .

Secondly we should research in the field of **inter-firmal behavior and cooperation**. Considering what we specified about the "Network-Economy", we should expect some drastic changes there.

3.4.1 Inner-firm management

The fist approach leads us to administrative, bureaucratic and organization theory, social and management psychology and management science (Taylor, 1997; Weber, 1947). On the whole, it is easy to see how tremendously better the information flow can increase management efficiency. It is a lot easier and a lot cheaper to communicate through modern IT[80]. This high potential of communication leads to an accelerated speed in decision making, less staff, flat organizational hierarchies and more democratic leadership models, a more effective matrix organization, etc. Also new features and business habits got introduced. It is normal nowadays to conduct 'virtual pre-meetings'; exchanging proposals online got a lot easier. Videoconferences and virtual work groups are also features that are having enormous effects on the management and the organization of a firm. Like the computers increased the 'brain power' of the individual, modern ICT multiplied the teamwork potential. Since production as well as product life cycles are getting shorter and shorter, also management needed to react. The unprecedented speed of Internet Economics led to a situation where 10 years planning became impossible. Long term thinking in virtual markets means one year.

3.4.2 Networking between firms

As already mentioned in the introduction, from a technical perspective, the Internet is an interrelated network of computers. From a business perspective, it is a way to interact with people who share similar interests. We have to remember that these similar interests can have positive and negative effects for an individual company. In virtual markets, competitors as well as collaborators are only one mouse click away. In this section we will have a look at interfirmal collaboration through the Internet.

3.4.2.1. E*fficiency*

This recently developed enormously flexible **network of firms** demonstrates an amazing field of activity**.** Indeed, some authors argue that networking must now be considered as powerful as hierarchy and the market as a co-ordination mechanism.

To begin with, I shall remind us of the "**Marshallian economies**" again (see Innovation). Even though these spillover effects are by definition without intention, they do have a major effect on dynamics between firms. They became paramount, due to the new dynamic, Internet brought to these external economies of scale. Since information became such an important input factor and inasmuch as this input factor is characterized by non-rivalry and non-excludability, our comprehension about what is considered *interfirm cooperation* needs to change in order to fully grasp the network of online operating firms.

To stress the differences modern ICT brought into the already existing links of cooperation between firms, we do not get along without mentioning the changes in regards to how one business is trading with another business --the famous **B2B** relations.

Even though there is a lot to say about B2B, I shall just explain the basic ideas by giving an example of a B2B cooperation between General Motors Corp., Ford Motor Co. and DaimlerChrysler AG. In March 2000 the so-called Big Three agreed to create a cyberbazaar

[80] In 1970 it would have cost $187 to transmit "Encyclopaedia Britannica" as an electronic data file coast to coast in America, because transmission speeds were slow and long-distance calls expensive. Today the entire content of the Library of Congress could be sent across America for just $40. (Woodall, 2000)

designed to handle as much as US$740-billion or more in on-line parts ordering, sales and distribution. According to officials of all three companies, the venture will streamline purchasing (see below; streamlined business process) of everything from basic raw materials to mops to paper clips to whole sections of automobiles. Not only would it manage $240-billion in annual spending by the Big Three, but perhaps as much as an additional $500-billion in purchasing by the auto makers' suppliers.

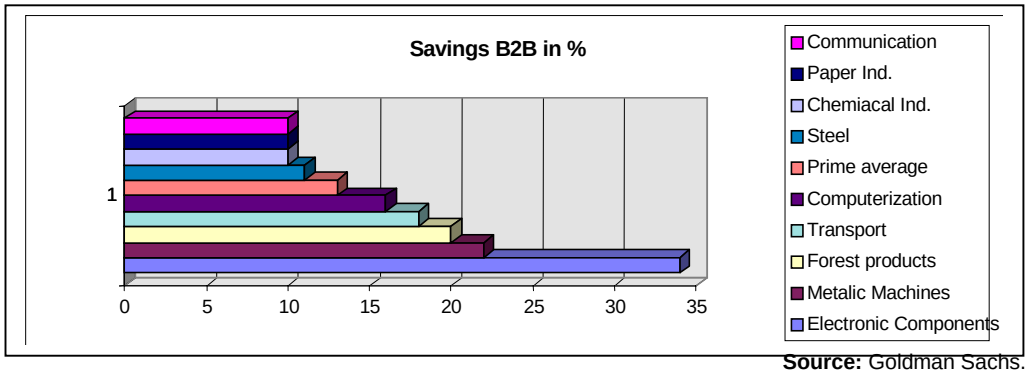
"This venture will revolutionize every aspect of our company, and all of our companies, and in the industry, from suppliers all the way to consumers." --Brian Kelly, President of Ford's ConsumerConnect e-commerce division (globetechnology.com, 2000b).

In essence, the Big Three have agreed to create a common platform for communicating on-line with suppliers and for suppliers to communicate with each other. Software platforms like this, help not to loose track of the complexity of online purchasing networks[81]. Officials from GM, Ford and DaimlerChrysler suggest the venture could eventually include more than 10,000 suppliers around the world and a dozen auto makers. Once it's up and running, the cyberbazaar will hold the promise of reducing waste and speed in the time it takes to develop new cars and trucks. Indeed, the network would not only manage electronic bids from suppliers, taking a commission along the way, but also act as a medium to pass all data and engineering design work among auto makers and their suppliers. The hope is that it will save time off what is currently a 24-month, $1-billion design effort for a typical new vehicle. Even a reduction of one month can save as much as $40-million (globetechnology.com, 2000b).

Basic ideas like this have been elaborated by specialized B2B companies[82]. They provide a vitrual platform where companies can offer their goods. The transparency is leading to a high fluctuation between buying and selling companies, allows the better allocation of resources, creating a mutual inability to skim off extra profits and in the end is leading to into the direction of the theory about ‘perfect competition’.

Very roughly and generally calculated a company could save on average up to 20 percent in product purchase and between 10 to 25 percent in process rationalization using B2B techniques (CCS, 2000).

Figure 16
SAVINGS B2B



Source: Goldman Sachs.

Moreover, since time is money, the time savings due to using B2B techniques are equivalent to monetary savings. Firms report cutting the time needed to process purchase orders by 50 to 96 percent (OECD, 2000).

[81] In this case a deal was struck to bring together Ford's AutoExchange and GM's TradeXchange procurement systems with DaimlerChrysler's already extensive but less formalized electronic supplier ties.

[82] The ten biggest of them are run by: Marshall Industries, Federal Express, Cisco Systems, IBM, Bay Networkd, W.W.Grainger, Dell, 3Com, Compaq, First Union Corp. (NetMarketing.com, 2000).

Later we will talk about how companies, due to the modern ICT are better able to accurately estimate the demand (see below; Equilibrium). By passing this information on to partners, thereby lowering their costs and probably the overall price, it will lead to a reduction in overall inventories[83]. An association called VICS, for example, developed a set of guidelines known as collaborative planning and forecasting replenishment (CPFR) (syncra.com, 2000). Through company extranets and industry trading exchanges, this solution is supposed to help manufacturers, distributors, logistics providers and retailers **collaborate** with their trading partners, significantly reducing inventory, increasing sales and improving service levels.

Trading partners share their plans for future events, and then use an exception-based process to deal with changes or deviations from plans. By working on issues before they occur, both partners have time to react. A supplier can build inventory well in advance of receiving a promotional order, and carry less safety stock at other times. A retailer can alter the product mix to reduce the impact of supply problems. The idea is that both sides win, and the competitive advantage will be in the ability to lower prices. Software programs like this are a sophisticated elaboration of what M. Porter called "interrelationships among business" (M. Porter, "Competitive Advantage", 1985, Ch.9-11)[84]. The interrelationship became visible and manifest. They are a driving force for the "Marshallian Economies" in Internet Economics, which we mentioned above.

3.4.2.2 Affiliate programs

As mentioned above, virtual markets, where the collaborator as well as the rival is only one mouse click away, are also opening new perspectives to customer fluctuation. Building brand awareness through advertising and marketing is critical to success in a market without physical existence. One feature visualizing this dynamics is **affiliate programs**.

Amazon.com really started the affiliate ball rolling. In July 1996, it launched its "associates" program and now counts over 450,000 sites in its network. The basic model works something like this: A small website owner registers with an affiliate program, then puts various links, banners or hot links (buttons with underlined and highlighted text which can be clicked to take the viewer to another site) and products on the web site, to 'capture eyeballs' (in other words, to attract the viewer to another site). When visitors click through on these links and purchase a product, the web site owner is paid a commission for generating the sale. While Amazon.com only pays when a sale is made, merchants selling big ticket items like cars, or marketing services like credit cards, have modified the model – paying a commission for referrals, clicks or qualified leads, or any kind of techniques that drive traffic towards their site (Gehman, 2000). In short: the affiliate is generating commerce and the merchants pays a commission.

Due to the high need for advertising for a non-physically existing firm (see Barriers of entry), commissions paid to affiliates can be large: e-Toys pays 25 percent of the sale price to the referring affiliate, Amazon.com shares from 5 to 15 percent of the sale (OECD, 2000). Affiliate programs, as a special professionalized kind of Economies of Reputation, became a basic part of the Inter-Net-Work. They are paramount for a company to survive in the creatively destructive Internet Darwinism.

"If you create a hyperlink page, you're suggesting to readers of one page that they should go out and read another page," inventor of the Web, Tim Berners-Lee, has stated. "Those suggestions are very powerful. It's the links which are actually creating order on the Web." Keeping the‚anarchical order' of the Web in mind, we can see how important such guides are in order to canalize clicks (see Barriers of Entry)

[83] Ernst and Young estimated $250 to $350 billion, or about 20 to 25 percent reduction in current US inventory levels for 1998.

[84] "Potential interrelationships among the value chains (...) can involve any value activity, including both primary (e.g., a shared service organization) and support activities (e.g., joint technology development or shared procurement of common inputs)." (Porter, 1985, p.56)

Table 3
LINKS
SELECTED WEBSITE LINKING INFORMATION, DECEMBER 1999

Website Name	Links to the Website
Amazon.com	1,023,629
Yahoo!	477,580
Microsoft	463,259
Netscape	149,346
ZDNet	95,568

Source: Garry McGovern, alexa.com

The box is showing some very roughly calculated numbers, just to get an idea of the magnitude of this kind of interfirm network.

Looking a bit further afield, consider merchants that do not even have formal affiliate programs: auction buying clubs like Mercata and MobShop. These sites work on the premise of variable volume discounts – as demand for an item increases, the price goes down. Both sites encourage buyers to get their friends to buy too[85]. Instead of earning a commission, the affiliate is rewarded with a lower purchase price.

As merchants have rushed to build programs, an entirely new category has been born: affiliate networks. Running a network of affiliates is not rocket science, but it does require quite a bit of time and commitment. For that reason, many merchants are finding that outsourced providers offer a compelling solution.

Forrester predicted that by 2002, the revenue potential for Internet-based content sites would exceed $8.4 billion from advertising, subscriptions and transactions fees. This would be almost 5 percent of the $175 billion advertisers spent in newspaper, TV, radio, direct mail, billboards, and other traditional media in 1996 in the U.S.

Having a second look on our example of Amazon.com, we recognize one of its major problems: a limited number of sites become the 'funnel' that guides a viewer through its vast content[86]. In the long run this could loose importance, once the use of intelligent search engines is become more commonly accepted. This leads us to our next topic:

3.4.2.3 Dis- and re-intermediation

Moreover there are completely new features and participants appearing in the scene of digital economy's network.

In a market with friction, intermediation in the value chain may reduce this friction because the **intermediaries** can specialize in some market roles (Bailey, 1998). There are two types: distributors such as wholesalers and retailers, collectively referred to as *margins*, which are located

[85] So-called 'We-Commerce': "pool the purchasing power of buyers who have a common goal of purchasing and receiving a discount on goods and services. Then, connect those buyers with the sellers of those products and services. Each buyer can generally benefit by achieving a lower price than would have been possible for an individual, and sellers can benefit by engaging in one large, low-cost transaction. In short, it's often a win-win for both buyers and sellers." (mercata.com, 2000)

[86] Netscape is the prime example of this. When you install a browser the homepage it generally defaults to is that of the maker of the browser. (Research has shown that the majority of Internet users do not know how to change their homepage.) It was the Netscape browser that exploded the use of the Web. At one stage some 85 per cent of Web users used the Netscape browser. The Netscape website was the most popular on the Internet. However, Netscape did not see this diamond underneath its nose, and did not fully exploit its potential. The fact that the Netscape website was not as useful as it could have been meant that over time the number of visits to the Netscape website dropped significantly in comparison to other websites, such as Yahoo. During 1998, Netscape finally recognized the potential and turned its website into much more of a portal entity. (Gerry McGovern; "The Caring Economy"; 2000)

between the producer of tangible goods and the consumer; and *service*s which act as intermediaries for other services. With the advent of Internet, some argue that **disintermediation**, the removal of intermediation from the valuechain, will occur (Gellman, 1996; Hoffman1995). This is a trend which already started in 1994, as Dell pioneered what within the Computer industry became known as the "*direct business model"*. The distribution chain was eliminated and close relations with customers and suppliers were established by the use of customized Intranet sites (OECD, 2000). The key element in Dell's strategy is to speed up every element of its business. One possible solution to reduce margin could therefore be as a logical extension of Dell's direct model. In the chain of activity between the final producer and the final consumer, intermediaries perform three services -transportation, wholesaling, and retailing. According to the OECD these margins typically add about 33 percent to the final price of the goods. The 'elimination' of these margins, due to 'direct business models' would mean complete disintermediation.

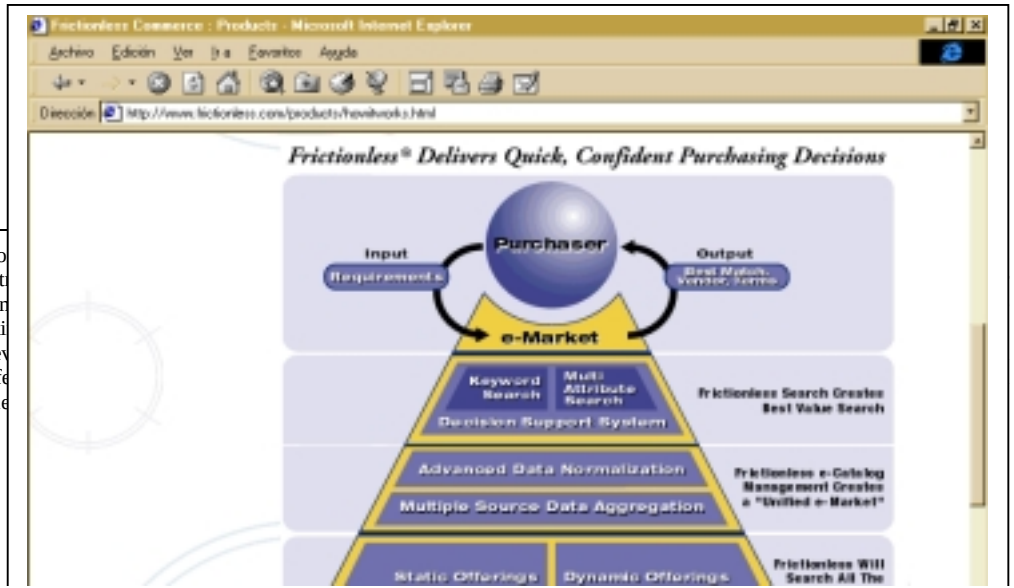
Having a look at the majority of 'companies.com' trading non-digital goods, we can easily see that the new e-commerce merchants are not really disintermediating, but rather simply competing existing intermediaries for the retail role. For a 'clicks and mortar' online working company on the other hand, it may be very risky to bypass distributors and to have to weigh the gain of a few Internet customers against the loss of a large number of traditional ones. This is what is called 'path dependencies'. One interesting case of showing 'direct business model'-failure concerns IBM:

IBM thought in 1996 it could use its computer network to deliver client and challenge the physical distribution chain, by launching Informat (an electronic-content delivery initiative) and World Avenue (a cyberspace mall). It soon had to realize that it lacked the editorial and circulation skills of publishers and the merchandising and advertising skills of retailers. As a result, both initiatives were abandoned in the following year (OECD, 2000).

Thus, 'disintermediation' due to the elimination of the wholesale and retail sectors as an intermediary is likely to be important for some sectors, but for the majority it will simply change the way they get 'intermediated', not the fact that their sales do get facilitated by some kind of intermediary.

There is another theory, regarding the '*re-intermediation*', which is working with the term '**infomediary'**, a concept introduced by Hagel and Singer in their book "Net Worth" (HBS) (Hagel, Singer, 1999)[87].

Figure 17
FRICTIONLESS



[87] "Net Worth" co
for customers' t
capturing inform
loyalty, and ulti
analyzed, and ev
deal and the safe
as "infomediarie

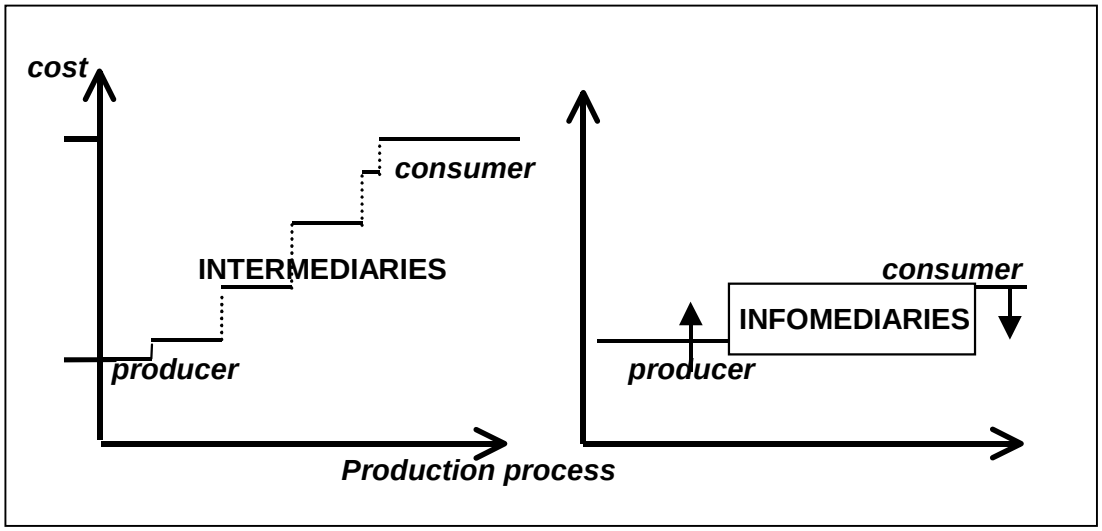
Source: frictionless.com

Thinking about the intensified competition and high fluctuation of e-commerce, where customer can switch without cost from one retailer to the next, trusted third parties become necessary, which are intermediaries who will look for and connect customer and retailer. Given the decreasing search costs of digital markets, consumer may be left with an information overload problem that compels them to use a search intermediary (see Transparency) (Smith, Bailey, Brynjolfsson, 1999). These kinds of engines are of course not intelligent. Their program is often very basic, matching input against a database. They are neither distinguishing quality, nor validity of the search results. Since it takes a person time to intelligently filter through all of these search matches, which is costly to do, it might be cheaper and more efficient to use a professional intermediary for this. Infomediaries facilitate the search process to help the user find products that best match his individual preferences. "It is all about transforming e-marketplace inefficiency into value, by creating confidence in commerce." (Frictionless.com, 2000)[88].

Like this infomediaries are expected to make markets more and more frictionless:

[88] Frictionless.com: "Frictionless brings the breadth of product and vendor offerings directly to the buyer. We create a "Unified e-Marketplace" for buyers by offering a single entry point into all the purchasing options created by e-commerce. Therefore, buyers do not have to search multiple data sources manually, constantly logging in and out of sites. We aggregate product and vendor data from all of the different sources in a market space - giving buyers instant access to all of the detailed information that is appropriate and available in any e-market. Key to this is our ability to aggregate both static-priced and dynamic-priced data. The result is that buyers don't just see standard catalog offerings, but they also see relevant offerings from auctions, all in one place simultaneously. Using our Frictionless e-Market Suite software, e-markets can provide purchasers with the most automated, comprehensive search and most targeted product recommendation service available." (frictionless.com, 2000)

Figure 18
INFOMEDIARIES



Source: author

They thus lead quicker to the long term stationary state and reduce transaction costs. The re-intermediation process has already started with companies such as TRUSTe, BBB Online. There are also infomediaries specializing in specific industries (metalsite.com, chemdex.com). On general we could also classify B2B e-commerce sites as infomediaries. The outcome would generally speaking be the same. Just that the idea of infomediaries bears a lot higher potential. Thinking about the theory on infomediaries, one can come up with something which I would call a "**B2B2B2C**" as one homogenous horizontal chain: supplier (B) to producer (B) to distributor (B) to customer (C). Since this chain is digitalized, the infomediary is making it possible to reach from the left to the right of this chain, with a single mouseclick. In other words: the longer the supply chain, the bigger the potential gains from the infomediary.

Infomediaries are already commonly used in the financing sector: Various clearing agents for stock transactions showed that the Internet could be used to provide moderate liquidity. Would-be sellers and would-be buyers met over the Internet to buy, sell, and swap stocks without needing to go through brokers, deal with dealers, or have a seat on the stock exchange. They save fees and commissions, and, by executing trades directly with other investors, they avoid the spreads charged by the market makers and specialists who are the middlemen of every traditional market trade (OECD, 2000).

Surely the plain existence of infomediaries will not completely displace middlemen overnight. Like always we have to consider the early stage of the process and as well we should consider that new, theoretically better possibilities to do something, do not need to be accepted by the consumer in practice. Having a look at SABRE[89], which became the most important infomediary in the travel industry, we can see that, while online travel sites have become very popular, 80 percent of all tickets are still issued through travel agencies, due to the advantages of a face-to-face communication, when planning a trip (OECD, 2000).

[89] The 'Semi-Automated Business Research Environment' computerized reservation system began already in 1959 as an internal organizational database for American Airlines. 1996 the SABRE group expanded their business model to the www, with the creation of EasySABRE and Travelocity, providing schedules for over 700 airlines, being able to make reservations for more than 400 of them, providing information for over 60 car rental companies, and a hotel reservation system which integrates photographs, location maps, and reviews for over 35,000 hotels world-wide.

3.4.2.4 Trust

Infomediation is a question of **trust**.

In the old days trust in an economical sense meant "believing that when offered the chance, he or she is not likely to behave in a way that is damaging to us" (Gambetta, 1998). In other words, "trust exists when an agent, exposed to the risk of opportunistic behavior by others, has to believe that the latter will not exploit the opportunity." (Tomasso, Dubbini, 2000) This understanding of trust might still be valid. But living in the days of the New Age Economy where the asymmetry of information is getting reduced, the transparency is extremely high and companies do have a severe problem with the information overflow, the main focus of trust is concerning the reliability of data. The first step in achieving this is to recognize potential information where others just see dates. The focus is shifting from analysis to synthesis. Then there is the question of validity of the spotted information[90]. It is about the question of whom is accountable if something goes wrong. There are some attempts by various Chambers of Commerce to brand mark information sources with certificates. These kinds of certificates are not only very useful regarding absorption of information, but also for the retrospective accountability for the interaction.

Obviously the degree to which producers are willing and able to entrust their business to infomediaries depends in fact on various factors -e.g. institutional, social, subjective- and a variety of path dependencies.

Bailey and Bakos (Bailey, 1997) identify four different functions of market intermediaries: *@aggregation* of buyer and seller (to achieve economies of scale/scope and reduce bargaining asymmetry); *@agent of trust*; *@facilitation* (to reduce operating costs); and *@matching* buyers and sellers. Although they only explored thirteen case studies of firms participating in electronic commerce, they definitely support the point that one should not go as far as to talk about 'removal' of the middlemen, but rather about a re-intermediation in various forms. Intermediaries will simply take on new roles to provide value, in different ways than the traditional intermediaries.

3.5 Product strategy and advertising

In order to analyze the impact Internet product strategies have on conduct, we will need to research the differences in producing the good, the differences in the final aim of the outcome (product differentiation, good performance...) and finally, strongly related to the final consistence of the final product, the new ways of thinking in the world of marketing.

Cases like the one of the Encyclopedia Britannica,[91] completely devastated by the advent of the Digital Economy almost overnight, made it clear for many executives how risky it can be, not to consider the changes Internet brought into product strategies. The famous Barnes&Noble versus Amazon.com 'book-store-war' is another epitome on how online services can pose a threat to traditional agents who do not incorporate the new features in there product strategy.

[90] There are various examples about the effects and threats of invalid information. For example, on the 25th of August 2000, some statements declared as "press release", were announced by a small online news agency regarding the American firm 'Emulex'. The information released was absolutely wrong, and Emulex tried to clarify the confusion one and a half hours after the release. But the damage was already made. The stocks in the Nasdaq had fallen 60%, causing a loss of $2,450 million in market value. (The Wall Street Journal Americas; El Mercurio; 08/29/2000)

[91] Since 1990, sales of the Encyclopaedia Britannica multi-volume sets have deceased by more than 50 percent. The reason is simple: it costs in the range of $1500-$2200 to buy the paper version, while a digitalized encyclopaedia sells for about $50 and customer often get it free because it is bundled with their personal computers as CD-ROMs. Interestingly, the largest part of Britannica's cost structure was not the editorial content, which constituted only about 5 percent of costs, but the direct sales force: (cost of production: traditional: $200to300; CD-ROM: $1.5). When Britannica realized the thread, it created a CD-ROM version, but to avoid undercutting its sales force, the company included it free with the printed version and charged anyone buying the CD-ROM alone $1000. Revenues continued to decline, the best salespeople left, and Britannica's owner finally sold out. Under the new management, the company is now trying to rebuild the business around the Internet. Source: (U.S Department of Commerce, 1998).

Real e-commerce means more than just selling a generic set of products on the Web. Today's businesses and consumers demand a more customized set of products and services based on knowledge developed through a co-operational relationship between all the firms in the value chain.

3.5.1 Production

Since we mentioned the differences in the final aim of the outcome of products, so many times before (see Digital vs. Non-digital Goods; Big is Beautiful/ economies of scope; Redefinition of Industries and Competing Groups, Innovation), I do not want to get too deep into it again. I should just add the international influence on product strategy. By definition, online operating companies are considered global players. They are 'born-global', with a worldwide operating Web as their playground. Of course this does not imply that every online operating company does have to make full use of these possibilities. But having a look at some big online selling companies, we recognize that international revenues attain about one-third of total revenues.

Cultural differences, consumer habits, preferences, all have to be considered when talking about selling.

Table 4
INTERNATIONAL E-TRADE
INTERNATIONAL TRADE OF SELECTED E-COMMERCE FIRMS, 1997

Company	Segment	Online revenues as % of total	Internat. rev. as % of total
Cdnow	Music	100	35
Music Boulevard	Music	100	33
Amazon	Books	100	26
Barnes & Nobel	Books	0.5	30
FastParts	Electronic components	100	30
VirtualDreams	Pornography	100	25
Dell	Computers	50	20
1-800-Flowers	Flowers	10	15-20
Sabre	Travel	67.3	17.5
E*Trade	Consumer brokerage	63	2.8

Source: OECD, 2000

Let us now directly start with the influence Information and Communication Technologies has on the production and selling process. The differences here are mainly due to the possibilities modern software is providing. In other words, we are talking about the Second Layer of the Internet Economics here[92].

Software solutions facilitate the entire customer lifecycle: from driving web traffic to the website, to capturing leads, guiding customers through their buying process, enabling online purchasing and payment, coordinating delivery and providing them with pre or post-sale customer service. Due to Customer Relationship Management (CRM) techniques, these pre and post-sale services have a much different and far-reaching significance than in the days of the old economy, as we will see.

Dealing with the production process, one will certainly stumble on terms like **'streamlined business production'** or 'automated supply-chain integration', sooner or later. Let us clarify them first.

Streamlining how quickly a company delivers products and services to customers primarily involves:

[92] For more detailed information about this section, the reader may want to surf the web pages of Oracle, Microsoft, IBM or the like.

@ a *supply chain planning system*, which allows the firm to forecast and plan how they are going to match supply to demand on a real-time basis;

@ a *procurement system*, which enables the user to share information with the suppliers and service providers to ensure that they have the right supply of parts and components available;

@ a *logistics system*, which ensure that the company delivers the product to the customer in the shortest possible time. (cio.com, 2000).

When talking about supply-chain integration, the Internet is used to collaborate between parties and to facilitate instantaneous information exchange across the specific supply chain. Demand and supply chains get integrated, which shortens lead times and delivers faster time-to-market for the company's products. Creating an efficient, responsive supply chain linking all customers, suppliers, factories, warehouses, distributors, carriers and other trading partners is the real challenge for companies. By using the Internet to collaborate across the extended network of trading partners, companies are able to fulfill customer demand profitably by delivering high quality, customized products, in the shortest time and at the lowest cost.

Analysis-driven workflow can streamline business processes even further. For example, software can be implemented that will automatically notify the suppliers when inventory levels fall below established thresholds. Using analytic software, these systems can identify needs based on historical usage patterns that take various factors, such as seasonality and linkages to marketing promotions, into consideration. We will have a closer look on these tracking and data analyzing techniques in the following section. Like this, intelligently learning programs make it possible to add more capacity added just-in-time, where and when it is needed. One logical consequence of faster input ordering and delivering by using fully integrated, end-to-end internet based supply chain management solutions, is the decreasing need for a large inventory. It is estimated that for retailers, the cost of carrying an inventory for a year is equivalent to at least 25 percent of what they receive in payment for the product (OECD, 2000). Very simply calculated, a two-week reduction in inventory would represent cost savings of 1 percent of sales. As most retailers operate on margins of 3 to 4 percent, this is significant[93].

The streamlined business process is also facilitating sales and provide high-quality customer support. For example, Cisco built an online system called Cisco Connection Online, based on Oracle's Internet Platform and ERP applications. By offering self-service applications for customers and partners, it has delivered technical support productivity improvements measured at 200 percent without additional help-desk head count[94].

3.5.2 One-to-one marketing/ CRM

Another field of extreme dynamics in Internet Economics is marketing. Even though the layperson might think that cement is cement, one might imagine the importance of the degree to which consumers subjectively impute quality differences to products of online cement trade associations as a result of influences as advertising or additional pre- and post-customer services.

[93] The impact on costs associated with decreased inventories is most pronounced in industries where the product has limited shelf life (e.g. banana), is a rapid flow of new products (e.g. books, music), or where there it is subject to, fast technological obsolescence or price declines (e.g. computers; lose about 1% value each week); (see Innovation).

[94] According to Oracle: Nearly 73 percent of Cisco's sales and 79 percent of Cisco's customer support are now handled on the Internet. Resulting savings have tallied to nearly $400 million, including $125 million in staff cost savings, $180 million in distribution savings and $50 million in printing savings.
At the same time, customer satisfaction has increased by 52 percent. Cisco has achieved a 500 percent revenue growth with less than a 1 percent increase in overall head count; its product delivery lead times have been reduced from three weeks to three days and Cisco is now serving over 115 countries via the Internet. By using the Internet to drive down costs, retain customers and expand markets, Cisco has solidified its position as the market leader in networking equipment (Oracle.com, 2000).

To promote one's company and product is extremely important in virtual markets[95]. But trading in virtual markets does not only make it indispensable to put extra effort in advertising it also opens new possibilities in how to offer products to the customer.

"Remember, that they (in our case the customers) are alone at their computer, willing to visit with another human - but not another machine" (Burg, 1999).

The New Economy has given us an incredible diversity of **marketing** models. We have viral marketing, B2C marketing, affinity marketing, partner marketing, affiliate programs, B2B marketing, comarketing, e-marketing, m-commerce marketing... the list goes on. Of course all of these special arts of business administration do have major spill over effects on the entire economy. In order not to loose sight of the fundamentals, I shall endeavor to focus on what is generally known as Marketing **'One-to-One'**. This is a basic principle of commercialization in Internet Economics, and its far-reaching effects are paramount, as we will see in the following chapter.

"The electronic store of the future is really not one store, but one store per customer." (Oracle.com, 2000)

While the high transparency of Internet allows consumer to collect easily retailer information about prices, for example (see Pricing, Transparency), the same characteristics allow retailers to gather better information about consumer characteristics. Every interaction with the customer generates information about his preferences that can be captured and analyzed so that the producer can provide his client with exactly what he supposedly wants. This process of 'capturing and analyzing' is commonly known as **Customer Relationship Management (CRM)** in Internet Economics. It works as follows:

As generally known an e-business incorporates three key components in its technical infrastructure:

- @ Front Office applications which are architected for the Internet
- @ Enterprise Applications (such as financials, inventory, order entry, etc.)
- @ A mature and stable platform (database, application server)

The CRM e-commerce products provide web-based, *customer-facing components* in the front office space. **CRM Solution**s deliver a complete lifecycle view of customer interactions. From creating targeted marketing campaigns, generating leads and forecasting the potential sales opportunities to managing customer relationships across multiple integrated channels, gathering data on their customers' preferences, buying patterns, support needs through their corporate web site, over the phone, and face-to-face, use this information to tailor products and services to customer needs, and ultimately develop 1:1 relationships with the customers. The goal is the complete **personalization** of the virtual store.

Besides the personalization, Internet companies are compiling huge databases that hold subtle nuances of users' on-line behavior and interests. Amazon.com was one of the first to harness suggestive selling capabilities. Just click on the bookseller's site for Clive Barker's latest horror opus, Galilee: A Romance, and you'll be offered a CD choice for your consideration: S&M by the heavy-metal cult band Metallica. Marketers are applying sophisticated mathematical models with 'collaborative filtering' to fashion customized images and product suggestions tailored to individual users. "The new advances in technology let us compare what one person likes to the tastes of many. So we can make excellent predictions on the fly on what you might like to buy," (S. VanTassel, vice-president of product management for Net Perceptions Inc.). Software programs' algorithms capture 'clickstream data', the march of millions of mouse clicks that Web surfers make. Their real-

[95] As mentioned in different parts of this paper, this is due to the high transparency and competition (where the competitor is only one mouseclick away), the loss of spatial advantages (death of distance), network effects (also basing on the customers' uncertainty and lack of trust), etc...

time data-mining engine instantaneously sift through the minutiae of information to make sensible recommendations. Once they find the behavioral traits of like-minded buyers, they know what products the customer will most likely want and can display them. "In the process, we enhance the browsing experience and make the time spent on the site more productive for the shopper" (VanTassel) (globetechnology.com, 2000a).

This enables merchandisers to better capitalize on advertising and **cross-selling** opportunities. Cross-selling has less to do with the personalization of the product, but rather with the optimization of the offer. The adventure traveler whose last trip was to Nepal at the height of trekking season may receive information about the newest hiking boots and multi-day packs to hit the market or an invitation to join a team traveling to Patagonia. Sometimes buying links are not so obvious. By an attempt to lean about the buying patterns of their customer Bid.com made an interesting discovery. Shoppers who select software such as Adobe Photoshop are found also to be interested in items such as color printers and large monitors. That is expected because all the items are connected to graphic design. But, according to the management, the company got an incongruous seeming correlation to cordless phones. Follow-up calls from the auction site found that many of the cordless phone/computer graphics buyers were running home businesses.

Furthermore, analysis of customer data can also help the company to identify its most profitable customers. It optimizes the return on its business investment by focusing on these most valuable customers. No doubt, all of this on-line profiling -- where you browse, what you buy and even what you think -- is a growing concern for those who care about e-privacy. We will get back to this problem later in the chapter about Legal Tactics.

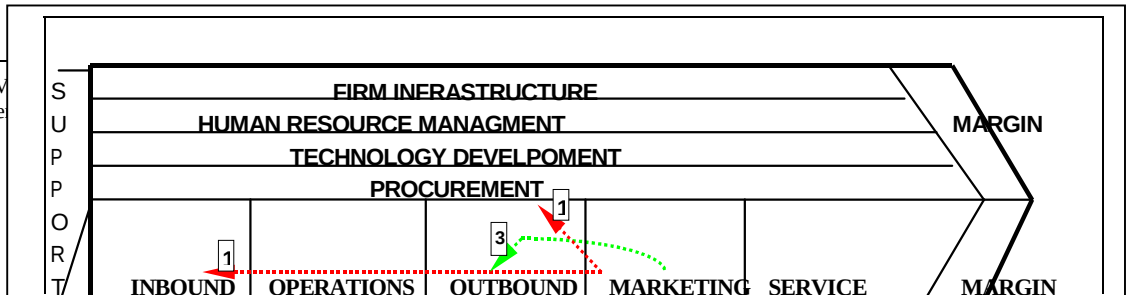
These observations lead us to see how One-to-One Marketing does have a much larger effect in Digital Economics as just trying to sell the product: it even influences retrospectively and interactively the consistence of the performance. This is easiest to see by having a look at digital goods. The combination of data collected by CRM from a cross section of shopping behavior and the personalized virtual store will in the long run lead to individualized books or preference adjusted movies. There is no total complete quality anymore. A product is never cheap, good or innovative enough, according to the individualized demand of the single client. To keep a long story short, I usually refer to all of the aspects touched in this and the two previous sections, as the **'unconditional consumer focus of Internet Economics'.**

3.5.3 The unconditional consumer focus of internet economics

It is decisive to understand what is meant by the 'unconditional consumer focus' in order to totally grasp its entire dimension. To keep it short again, I will use the well-known value chain scheme of Michael Porter's "Competitive Advantage" (1985).

Porter pointed out that "value activities (in his value chain scheme) should be assigned to categories that best present their contribution to a firm's competitive advantage." (Porter, 1985) Let us therefore have a look at Marketing, and to what and where we could assign it. We should focus on what Porter called "linkages within the value chain"[96], and how the linkages which are tied to Marketing got intensified in Internet Economics: Marketing in Industrial Economics was mainly seen as activities associated with providing means by which buyers got induced to purchase a product (Porter, 1985). Therefore marketing was generally assigned to the stage of sales. Considering the unconditional consumer focus of Internet Economics, we will have to highlight some significant linkages in Porters model:

Figure 19
MARKETING IN THE DIGITAL ECONOMY



[96] "V
pe

Source: Michael Porter, "Competitive Advantage"; p.37; author.

First of all, the individualization of a product, an offer or an entire store does of course have a big impact on inventory control and purchasing practices. (see arrows marked with "1"). The function of purchasing inputs, as well as logistics "associated with receiving, storing, and disseminating inputs to the product", needs to be able to adjust extremely flexibly to the specific demand of the single customer (like built-to-order techniques; see Market Equilibrium). The process of "transforming inputs into the final product form", does of course also get influenced by the special wishes of the customer (see arrow marked with "2"). This is more obvious when we think of individualized products (like a personally arranged digital newspaper). Tracking techniques of CRM are definitely bound to output logistics. Order processing are laying the basis for the realization of a one-to-one marketing strategy (see arrow marked with "3"). That a 1:1 relationship between buyer and seller does have a big impact on "activities associated with providing service to enhance or maintain the value of the product" does not need further explanation, given that the name of the technique is Customer Relationship *Management*, which implies cultivation (see arrow marked with "4"). Supporting activities are bound to marketing anyway. Only now in a different light as well. The effect of a 'one store per customer' philosophy on the organization of a firm are obvious.

As conclusion we can draw that Marketing got more and more a supporting activity itself. The 1:1 consumer focus is generically penetrating all stages of the value chain. Sticking to Porter's model, we could claim that one-to-one relations are building a profound bridge between what Porter called the company's- and the buyer's value chain[97]. Porter already recognized how the "relationship between the buyer's value chain and the firm's value chain (is) creating and sustaining differentiation" (Porter, 1985). This interactive relationship got intensified.

[97] "Buyers also have value chains, and a firm's product represents a purchased input to the buyer's chain." (M.Porter, "Competitive Advantage"; p.52)

3.6 Market equilibrium

"The genius and explosive success of the Internet can be attributed in part to its decentralized nature and to its tradition of bottom-up governance" (The White House, 1997).

This bottom-up governance, which is also reflected in the 'unconditional consumer focus of Internet Economics' mentioned above, could lead us as far, as to claim that the old economic dream of a constant, permanent, almost perfect market equilibrium could be established. If virtual market are really governed 'bottom-up', if it is not only possible to decipher the complex process leading to the single customer, but if the clearness and transparence of these markets also lead to the exact satisfaction of the individual demand, then the equilibrium should adjust automatically.

3.6.1 Demand forecasting

To start with, let us think of how **demand** was **forecast**ed in the days of plain industrial economics. Common techniques included qualitative analyses, trend analysis and projection, econometric methods, input/output analysis (Humboldt, 2000). A major problem with these techniques has been the critical role of data quality in forecasting analysis. Issues included the care taken in the data gathering process, and the number of observations from which the future is projected. While Digital Economics will not question the basic assumption of commonly used demand forecasting techniques, it will surely have a major impact on the reliability and therefore the significance of these techniques.

Given the transparency of the Digital Economy, where we have an electronic scanner in every supermarket, and the means to track heaps of online transaction due to automatic information processing systems, the producer does not need to rely on indirect guesswork of determining consumers' preferences anymore. Electronic commerce merchants, who allow consumers to select from a wide variety of choices, obtain valuable information on consumer preferences, once the purchase is made. With the help of modern ICT we are able to directly keep track, pile and interpret preference patterns, making it able to forecast demand a lot better. It finally got possible to decipher the complex processes, which are individually tailored to the single customer.

Manufacturers, wholesalers and retailers can also use the Internet, working together to form standards and guidelines for better forecasting. One example would be the so-called Collaborative Planning Forecasting Replenishment (CPFR) mentioned above. With CPFR, a retailer and its supplier electronically post their latest sets of forecasts for a list of products. A server tied to the Internet compares the forecasts and flags differences in those that exceed a normal safety margin. Differences are then reconciled by planners at both the retailer and the supplier. Software companies are already working on programs that automatically handle exception messages based on rules that apply to that business (Verty, 1997). This not only enables the reduction of inventory levels (which is helping business to realize substantial savings in materials handling, warehousing, and general administrative costs)[98], but is obviously also favoring the achievement of equilibrating supply and demand, by a precisely forecasting demand.

3.6.2 Built-to-order

B2B techniques and streamlined production process can be used to culminate in what is called **'built-to-order'** systems. Ford's deployment on an Intranet, which connects 120,000 workstations at offices and factories around the world, is attributed with contributing to reducing the time needed to get new models into full production from 36 to 24 months. This is saving billions of dollars in inventory and fixed costs. The goal is to extend this system so as to manufacture on demand, in other words, deliver two weeks after the order (OECD, 2000). This is on the one hand bringing all the benefits from B2B and streamlining with it (lower costs, less inventory...).

[98] According to Ernst&Young, CPFR could yield an inventory reduction of $250 billion to $350 billion across the US economy, which accounts for a reduction of 25-35 percent in finished goods inventory across the supply chain.

Furthermore, it is again making it able to individualize orders, leading to greater customer satisfaction --(what can be seen as a big improvement, considered that one of the basic principles of Henry Ford was still that you could buy any car, in any size and color from him, as long as it is black!). On the other hand it is preventing the merchant from becoming ignorant of the consumer's true preferences. For a traditional merchant, with limited availability of products in his 'bricks and mortar' store, this was very difficult to figure out and to keep track of.

3.6.3 Retrospective adjustment

With the better estimate of demand, and the higher flexibility to adjust the supply, the Internet is also providing tools to **retrospectively** 'finetune' what was produced and what is wanted. This mainly works via price. Obviously firms can use the Web to sell excesses of their stock. Online auctioning and offering special 'cyberfares' are two already very common techniques made possible by the Internet. These techniques are the sophisticated, interactive elaboration of what we know as the "last-minute-tickets-sale" at the airport. We also specified already what is so-called reverse auctioning (see Pricing Behavior). The customer is dictating his requirements and the company can decide if it wants to accept or not. In the case of an airline, the company then models the likelihood that they will be able to sell the seat at full price and determines whether it is in their best interest to take the lower fare now rather than nothing at all later. Under this model, the airlines must respond using either automated systems or dedicated teams of reservations agents to efficiently manage the volume of inbound offers from customers. The complete realization of dynamic pricing, like we have seen above, of course depends on the product produced and on the flexibility of the supply and production chain. But if we take the principle theoretically, the 'perfect price' should always get hit, due to dynamic pricing. True dynamic pricing for every product would naturally equilibrate markets by definition. But this is for the future...

But even by considering the techniques mentioned before --in theory-- all of this shall lead to a scenario where the markets should constantly, almost automatically be cleaned. The Internet should make it possible to equilibrate supply and demand a lot better.

Of course this is only theory. In reality man is unfortunately a lot more irrational, as we know[99]. Therefore the problem of the market equilibrium stays for now, just maybe with a different focus. It is now less a measurement problem, less a problem of predicting demand and the ability to flexibly adjust supply and prices. Rather it has become a problem for 'economic psychologists- and sociologists' to find out about the 'true demand'- what people really want, in order to be able to best satisfy their needs. This has led us back to the "dynamics of sciences" again.

3.7 Company finance and the growth of firms[100]

Of course, we will not be able to analyze this field profoundly and it would not serve the purpose of this paper. But in order to understand Internet Economics, it is essential to clarify terms like "business angels" and "venture capital". Furthermore we will have to touch the question, why Internet companies are getting financed in the first place, since we know that, in general "they don't make profit anyway." The question becomes how and when they will really start to grow on their own.

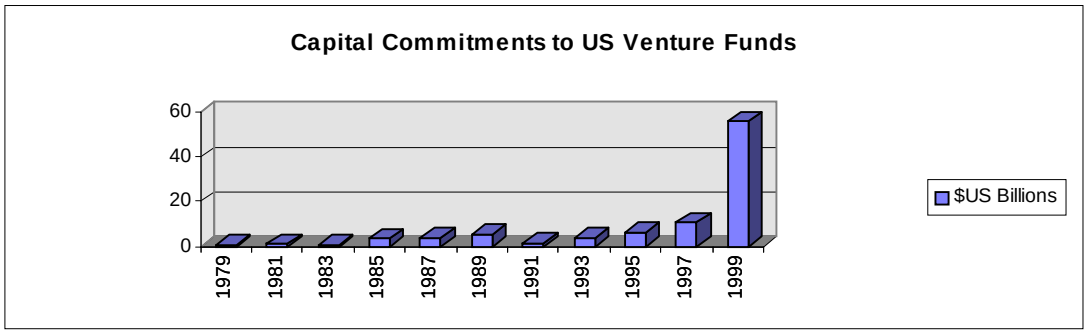
[99] Bid.com located a pitch for hickory smoked hams at one site where shoppers were ordering diet books. For those weight watchers who clicked to buy the hams, another offer: a barbecue. A surprising number bought something more expensive and less healthy. Even the most sophisticated systems and techniques with the largest capacities will not be able to deal with the sometimes bizarre seeming behavior of people.

[100] In order to keep the frame of the paper I shall only focus on the third and forth Layer of Internet Economics in this section.

3.7.1 E-capital

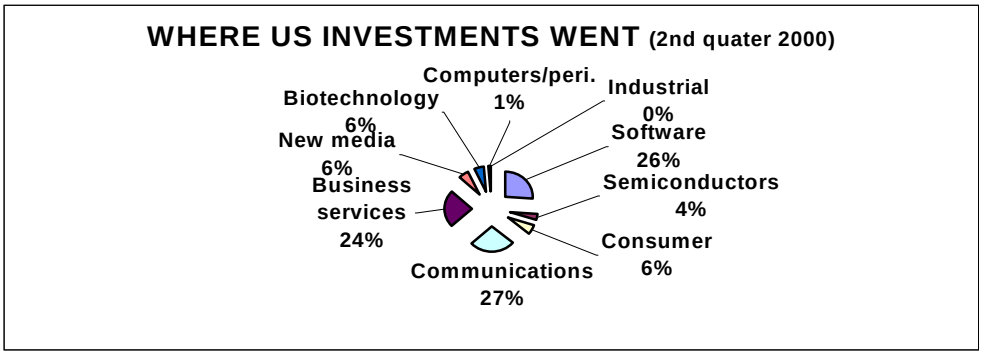
Venture capital[101] has been the fuel propelling much of the New Economy during the past several years[102]. As a relatively new technology with many untested applications, Internet startups are clearly high-risk. Traditional risk-averse financial institutions wanted no part of such a high stakes gamble, leaving the field open to more risk-tolerant so-called venture capital firms. Of course, the venture capital business is nothing new[103]. But it surely exploded with the advent of the New Economy. To say that the venture capital industry is growing rapidly would actually be an understatement. According to Venture Economics, flows into U.S. venture capital funds topped $56 billion in 1999, up from a mere $3 billion in 1990. Overall, more money flowed into these funds in the past two years than during the previous 20 years combined. The trend does not appear to be slowing. Nearly $23 billion was invested in startups in the first quarter of 2000 compared to just over $6 billion in the first quarter of 1999 (Mercurynews.com, 2000). Venture Capital has become a viable and significant part of the institutional and corporate investment portfolio.

Figure 20
CAPITAL COMMITMENTS TO US VENTURE FUNDS



Source: www.incubatorinc.com and Venture Economics

Figure 21
US INVESTMENTS 2ND QUARTER 2000



Source: The Money Tree, PWC LLP; Mercury News

[101] Just for definition reasons: While in the US, Venture Capital is considered a part of Private Equity (e.g. a Management Buy Out/ or Buy In (MBO/MBI) is part of VC, but not of Private Equity), in Europe both terms get used as synonyms.

[102] Companies such as Digital Equipment Corporation, Apple, Federal Express, Compaq, Sun Microsystems, Intel, Microsoft and Genentech are famous examples of companies that received venture capital early in their development.

[103] Before World War II, companies typically raised venture capital from wealthy families on an informal basis. Some of the families eventually formalized their investment operations and began what is now known as professional venture capital. The first private venture capital management firm was American Research Development Corporation ("ARD') which was established by General Georges Doriot in 1946. ARD is recognized as the first professional venture capital provider to raise an institutionally capitalized fund, educate the marketplace, and harvest a successful investment with Digital Equipment Corporation. (Web Incubator, 2000: http://www.webincubatorinc.com/Resources/links_venture_capital.htm)

In 1997, the average amount of financing per company was $5.4 million. Driven by the rise of ICT (see graph, and consider the problem of defining the ICT industry mentioned above), venture capital firms generated an internal rate of return of 150 percent in 1999. This trend has resulted in more venture capital providers doing more deals with a higher average dollar amount put into each investment. Therefore, what is a '*venture capitalist'*?

Far from being simply passive financiers, venture capitalists foster growth in companies through their involvement in the management, strategic marketing and planning of their investee companies. They are entrepreneurs first and financiers second (NVCA, 2000). "The typical person-on-the-street depiction of a venture capitalist is that of a wealthy financier who wants to fund start-up companies." (NVCA, 2000). The perception is that a person who develops a brand new change-the-world invention needs capital; thus, if they cannot get capital from traditional sources such as banks or from their own pockets, they enlist the help of a venture capitalist[104]. Professionally managed venture capital firms generally are private partnerships or closely-held corporations funded by private and public pension funds, endowment funds, foundations, corporations, wealthy individuals, foreign investors, and the venture capitalists themselves (NVCA, 2000).

There are several types of venture capital firms, but most mainstream firms invest their capital through funds organized as limited partnerships in which the venture capital firm serves as the general partner. Once the domain of wealthy individuals and institutions, venture capital opportunities are becoming more widely dispersed. Some companies have setup their own venture funds that give employees a chance to invest in startups. There also are a few funds that allow low net worth clients to invest as little as $5,000. Some argue that the NASDAQ is itself largely a venture capital fund with investors buying shares of profitless high-tech firms in anticipation of a large future payoff (Web Incubator, 2000).

Even individuals may be venture capitalists. In the early days of venture capital investment, in the 1950s and 1960s, individual investors were the archetypal venture investor. While this type of individual investment did not totally disappear, the modern venture firm emerged as the dominant venture investment vehicle. However, in the last few years, individuals have again become a potent and increasingly larger part of the early stage start-up venture life cycle. These "business angels" (B.A.) will mentor a company and provide needed capital and expertise to help develop companies (NVCA, 2000). The British Venture Capital Association defines Business Angel capital as: "*equity capital provided directly to new and growing unquoted businesses by wealthy private individuals - usually acting as individuals or as part of informal syndicate"*.

Apart from being wealthy private individuals, Business Angels are often experienced business owners or senior executives themselves. They often take an active part in how the business is run. From the entrepreneurs' point of view, the contact with the B.A. should bring networking possibilities, constructive co-operation on a regular and informal basis, a "hands-on" approach while securing entrepreneurs' independence and a quick access to finance along the growth needs (about.com, 2000).

On balance, it is a complementarity between venture capitalists' funds and Business Angels. Indeed, informal investors are acting in a segment of the market not attractive for VC funds, where the figures of failure rate (65%) and return on investment (< 0) do not compensate the high costs of due diligence and management. Therefore, the financial market is not very successful in financing start-ups. As a consequence family, friends and fools still represent 80% of risk capital for newcomers (businessangels.com, 2000). Again, Business Angels' understanding of the market and their realistic views play a key role in structuring the project, assuring the existence of a market for

[104] "Venture capitalists generally: Finance new and rapidly growing companies; Purchase equity securities; Assist in the development of new products or services; Add value to the company through active participation; Take higher risks with the expectation of higher rewards; Have a long-term orientation." Not all venture capitalists invest in "start-ups." They provide capital at different developing stages, as: "seed investing"; "early stage investing"; "expansion stage financing" (NVCA, 2000).

the product and giving an innovative approach to the technologies presented. They want to be looked upon as partners rather than just investors, for example helping to build up a good management team.

Coming to shareholding, the participation of Business Angels ranges from 10 or 20 percent to 49 percent (businessangels.com, 2000). Once venture financing became more common, B.A. started to create their own funds, with no shortage of investment capital. There are many of these independent public funds, whose main function is to provide 'matching service', either through an Internet program or 'by hand'.

Depending on the investment focus and strategy of the venture firm or individual, the investor will seek to exit the investment in the portfolio company within three to six years of the initial investment. While the initial public offering (IPO) may be the most glamorous and heralded type of exit for the venture capitalist and owners of the company, most successful exits of venture investments occur through a merger or acquisition of the company by either the original founders or another company (NVCA, 2000). We can observe very often how small, innovative Internet companies get integrated into a big one (see also the 'creative destruction of Innovation'). "In recent years technology IPOs have been in the limelight during the IPO boom of the last six years, (...but...) mergers and acquisitions represent the most common type of successful exit for venture investments"[105] (NVCA, 2000).

Europe lags behind the United States, where the number of IPOs is ten times larger and the time from start-up to IPO estate drops from ten years in Europe to four in USA (businessangels.com, 2000). Also the money canalized in investment fonds to Internet companies is more than three times as much in the U.S. (US$14,400 million to US$ 4,400 million in Europe) (CCS, 2000).

The first Internet company to reach the stock market was Netscape, in 1995. Since then a kind of 'gold rush feeling' broke out. Many try to make the quick buck and few survive. This is a natural phenomenon of a technical revolution. Once science has opened new horizons, people start dreaming about the possibilities. That is also why the notorious 'speculative bubbles' get created in stock markets around this time. Entrepreneurs start to rush, trying to pick up the 'money laying on the streets'. A kind of evolutionary Darwinism has to start selecting. "The survival of the fittest."

99% of the 5000 railroad companies which once existed in the United States are no longer around and out of 2000 US car firms there are three left. The same phenomena can be observed today. This is due to the seemingly low barriers of entry. What we already know is that roughly one out of a thousand Internet companies usually obtains $5 million in financing and one out of 10,000 reach the stock market. Looking at this numbers, we can see the dynamics of the 'creatively destructive Internet Darwinism'.

3.7.2 Survival, development and growth?

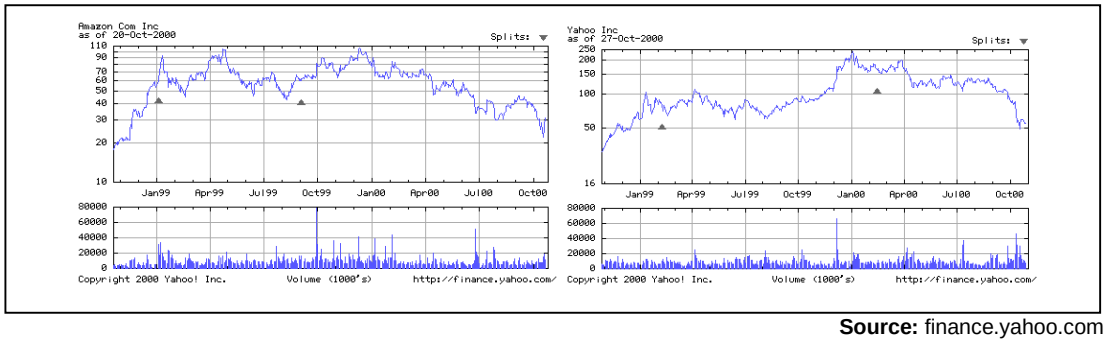
Let us continue with how Internet companies **develop** in general.

News like that for the nine months ended 9/30/00, the net loss of Amazon.com totaled $866.1 million, up from $396.8 million (finance.yahoo.com, 2000); the loss of Elsitio, Starmedia and QuePasa.com totaled up to US$73MM already (CCS, 2000); net loss of eToys.Inc applicable to Common totaled $59.5 million, up from $20.8 million for the three months ended 06/30/00 and the loss of TRAVELnet.com totaled C$6.2 million, up from C$768 (the list goes on...) are no longer shocking to us anymore thousand (finance.yahoo.com, 2000).

[105] In the case of an IPO the venture capital contributor is considered an insider and will receive stock in the company. In the case of a merger or acquisition, the venture firm will receive stock or cash from the acquiring company. The overall return to the venture capital market has been around 15% since its inception, with expansion and mezzanine stage funds returning slightly more (20.2%) than seed and early stage funds (17.8%) and balanced diversified funds (13.8%). (NVCA)

On the other hand, we recently heard that the net income of Lycos[106] totaled $21 million vs. a loss of $52.1 million for the fiscal year ended 07/00, and that for the nine months ended 9/30/00 net income of Yahoo!Inc. totaled $168.6 million, up from $10 million! A brief look on the stock market charts does not really help us:

Figure 22
CHARTS: AMAZON.COM, YAHOO!



Source: finance.yahoo.com

If investors do not get impressed by these numbers, we should take a look on how these numbers are justified:

The higher loss of Amazon reflects "higher marketing expenses and goodwill amortization charges". Expenses on marketing and promotion accounted for over two thirds (U.S. Department of Commerce, 1998). Besides the bad news, revenues increased 86% to $1.79 billion for the nine months ended 9/30/00, which reflect "growth in electronics due to great prices and deep selection and increased customer accounts". eToys.Inc net sales totaled $24.9 million, up from $8 million for the three months ended 06/30/00. "Revenues reflect an increase in units sold due to growth of the customer base and repeat purchases. Higher loss reflects increased personnel, advertising and goodwill expenditures." TRAVELnet.com reports that for the fiscal year ended 12/99, revenues totaled C$2.7 million, up from C$498 thousand. "Results reflect increased membership sales and the inclusion of membership dues; offset by the inclusions of commission and condominium rental expenses, and increased wages" (finance.yahoo.com, 2000).

On balance we can see that the major problem for these companies is obviously to increase and stabilize their circle of influence. As already specified in the chapter about the barriers of entry, one of the main obstacles a virtual company needs to overcome, is to make itself a name in the 'endless vastness of cyberspace'. It is very costly to get and to maintain integrated in the Inter-Net-Works. A company which is focusing on selling, needs the trust of the clients as well.

Looking on Yahoo! and Lycos[107], which are mainly focusing on attracting and guiding people, through this 'vastness', acting like a 'funnel', we can see where this advertising money goes. Revenues of Lycos.Inc totaled for the fiscal year ended 7/00, $291 million, up from $138.5 million. "Revenues reflect growth in the number of advertisers and the addition of new electronic commerce customers. Earnings reflect a $270.2 million gain on the sale of investments." For the nine months ended 9/30/00, revenues of Yahoo! totaled $799.3 million, up from $388.6 million. "Results reflect an increased number of advertisers purchasing space, growth in average page views per day, a reduction in acquisition costs and increased investment income." (finance.yahoo.com, 2000)

[106] Lycos, Inc. is a network of globally branded media properties and aggregated content distributed primarily through the World Wide Web.

[107] The Company seeks to draw a large number of viewers to its web sites by providing a one-stop destination for information, communication and shopping services on the Web. The Company generates revenues primarily through selling advertising and sponsorships... (finance.yahoo.com, 2000)
The same accounts for Yahoo! Inc., which offers a "branded network of services to millions of users daily".

Of course these are only very few numbers, but they clearly confirm what we already found out in previous chapters.

Regarding the long-term value of online operating firms one has to be aware that in the past, growth depended on the optimization of physical, labor and financial capital. Living in the Knowledge Society, intellectual, creative, and innovative capital brings in the same, sometimes even more weight. This makes it so difficult to assess the value of investments, meaning the value of the company. Nevertheless, there does not seem to be a lack of investment capital. Many even claim that most of the companies are highly overestimated in value.

This is just showing again what we already stated in the introduction. Internet Economics is not yet established. It is the mutual immaturity on the sides of demand and supply, which is making the growth process so inscrutable and difficult. Digital Economics are still in a very early stage of development. The supply -in the from of the companies which try to operate in, and to deal with the problems of virtual markets-, as well as the demand -in form of the insecure and hesitating consumers- still stand on very shaky legs. But the trust of the investors, as well as our reason, is leading to the conclusion that e-commerce is bringing so many advantages that it will eventually succeed.

3.8 Legal tactics

"We should not assume, for example, that the regulatory frameworks established over the past sixty years (...) fit the Internet." (The White House; "A Framework for Global Electronic Commerce"; 1997)

3.8.1 Model law on electronic data interchange

Internationally, the United Nations Commission on International Trade Law (UNCITRAL) has completed work on a model law[108] that supports the commercial use of international contracts in electronic commerce. This model law establishes rules and norms that validate and recognize contracts formed through electronic means, sets default rules for contract formation and governance of electronic contract performance, defines the characteristics of a valid electronic writing and an original document, provides for the acceptability of electronic signatures for legal and commercial purposes, and supports the admission of computer evidence in courts and arbitration proceedings (The White House, 1997). But, of course this is only a very broadly and widely kept Model Law. The real regulations need to be taken by the governments themselves. Hardly a state would, for example be able or willing to respond to the crucial question of digital signature just in the context of international trade alone.

The main problem governments are facing regarding economics, is to find a critical balance between free information flow, and the protection of the producer (e.g. property rights) and the consumer (e.g. privacy). Let us take a brief look at some main fields in question.

"In general, parties should be able to do business with each other on the Internet under whatever terms and conditions they agree upon." (The White House, 1997)

Traditionally there are three different ways to conclude a contract through the Internet: directly through the Web, through electronic mail or on EDI agreements. The framework in which it

[108] Press Release L/TR/229; 3 July 1996 (UN Information Service) – "(...) The new Model Law on Electronic Data Interchange, (...) provides definitions, principles and proposed rules to help avoid discrimination against commercial messages that are communicated electronically. (...) A key provision of the Model Law states that "information shall not be denied legal effect, validity or enforceability solely on the grounds that it is in the form of a data message". (...) While previous United Nations trade law work was aimed at removing or reducing legal obstacles to the flow of international trade, the action on electronic data interchange provided an opportunity to prevent disharmony in an area in which no legislation existed." (UN Information Service, 1996a)
Press Release GA/L/3000 3rd Meeting (PM) 23 September 1996; The "aim (of the Model Law is) to provide legal solutions for specific problems without in any way preventing a State from extending the scope of the law." (UN Information Service, 1996b)

is made possible to conclude a contract needs to provide *security, privacy, property protection* and a certain degree of *standardization*.

3.8.2 Security

A secure and reliable "Global Information Infrastructure (GII)" (The White House) is the basis for e-commerce. Much of the literature regarding the security of electronic communication refers to four critical security assurances that, similar to the paper-based world, must be provided in the electronic world:

First the *authenticity* of the communication must be assured to all parties. That is the guarantee that data have indeed been transmitted. Second, a secure GII has to be able to offer proof that the contents of the message have not been altered, either deliberately or accidentally, during transmission (*integrity*). The later denying of the transmission of a message has to be prevented by *non-repudiation,* while *confidentiality* should provide evidence that the contents of a message have not been disclosed to third parties (VanDam, 1999; Feldman and Meranus, 2000).

According to the White House a secure GII requires: "secure and reliable telecommunications networks; effective means for protecting the information systems attached to those networks; effective means for authenticating and ensuring confidentiality of electronic information to protect data from unauthorized use; and well trained GII users who understand how to protect their systems and their data." The gist of the discussion lies in technological possibilities. The key to accomplishing a secure and reliable GII might be the successful combination of a range of technologies (encryption, authentication, password controls, random codes, firewalls, etc.).

Personally I think we should take the steam out of the security discussion. While still one of the major concerns of customers today, I do not see the issue as a real obstacle, in the long run. Paradoxically, consumers are accustomed to give credit card information over the telephone or to a waiter in a restaurant. But many are reluctant to give it online for fear that it will be stolen or misused. Of course the first alternative is a lot more susceptible for misuse. Furthermore, most e-commerce companies take full responsibility for financial transactions[109]. And technology is advancing. During the Technology Fair in New Orleans in April 2000, for example, a company called 'Sense Technology' introduced a device, similar to a mouse, which can be connected to the computer. This gadget is 'reading' the fingerprint of the user, transmitting and assuring the identity of the user in real-time[110]. Once techniques like these will reach maturity, it is easy to see that online trading will be more secure than walking into a store with cash in your pocket.

3.8.3 Privacy

No doubt, all of the advantages new models like One-to-One Marketing, CRM or generally all of the on-line profiling, --where you browse, what you buy and even what you think-- is a growing concern for those who care about 'e-privacy.' The principal of Privacy is a generally deeply rooted in the basic constitutional law of many countries. Some countries have enacted laws, implemented industry self-regulation, or instituted administrative solutions designed to safeguard their citizens' privacy. Here we can clearly see how the "brave new world" is fighting with the protection of the individual and the attempt not to disrupt transborder data flows (The White House, 1997). For example, the European Union (EU) has adopted a Directive that prohibits the transfer of personal data to countries that, in its view, do not extend adequate privacy protection to EU citizens.

[109] Amazon.com: "The Amazon.com Safe Shopping Guarantee protects you while you shop at Amazon.com, so that you never have to worry about credit card safety. Period.
We guarantee that every transaction you make at Amazon.com will be 100% safe. This means you pay nothing if unauthorized charges are made to your card as a result of shopping at Amazon.com. (...)
Still don't want to use your credit card on the Internet?
No problem. Just fill out our order form online. Enter only your card's last five digits and its expiration date. Once you have fully submitted your order, you will be prompted with a phone number that you can use to call in the rest of your card number."

[110] Dore Perler (President of Sense Technology): "The sensor does not act like a scanner of the fingerprint. It rather captures the electronic static of the finger and is transmitting it in form of a unique digital image." (www.senseme.com)

This way to "impede the flow of data on the Internet" is of course seen critical by the United States (The White House, 1997).

OECD's "Guidelines governing the Protection of Privacy and Transborder Data Flow of Personal Data" and various national Privacy Principles, are based mainly on the fundamental precepts of awareness and choice:

@ Data-gathers should inform consumers what information they are collecting, and how they intend to use such data; and

@ Data-gathers should provide consumers with a meaningful way to limit use and re-use of personal information.

Privacy is, and will continue to be one of the major issues of the cyber world. More than three-quarters of Internet users say they would use the Web more if privacy were guaranteed (Green, 1998). On the one hand "big brother is watching you"[111], on the other hand there is a huge threat imposed by online criminality, emerging black markets, terrorism and illegal organizations, obscene information like pornographic and violent material, hate speech, and so forth...

3.8.4 Intellectual property

The question about what is mine and what is yours is the very first basic issue one has to clarify when taking about economics from a legal point of view. Everything will build up on this definition. Living in the Knowledge Society and its giving input factor information, commerce on the Internet often involves the sale and licensing of intellectual property. Thinking traditionally, to promote this commerce, sellers must know that their intellectual property will not be stolen and buyers must know that they are obtaining authentic products (The White House, 1997). Thinking Network, the appropiability issue is adding insult to injury in this case. The worldwide brainstorming did already evoke an endless flood of property rights' law cases. Some people call for abandoning patent systems for intellectual property in its entirety[112]. The uncertainty and its consequent helplessness about how to deal with the input factor information in the Knowledge society is still paramount. The White House, for example, is calling for "increased public education about intellectual property in the information age..." (The White House, 1997).

The discussion will go on for a long time. Until we learn how do deal with the non-excludability and non-rivalry of information in a morally and ethically correct way, we will not be able to reach a fair agreement in this issue. Conscience about intellectual property will undoubtedly have to change while the Knowledge Society matures.

3.8.5 Standards

Standards are critical to the long-term commercial success of the Internet as they can allow products and services from different vendors to work together. Like always when dealing with norms and standards there is the risk of 'locking in' outdated techniques through premature standardization, or of 'locking out' potential trading partners when a standard acts de facto like a non-tariff trade barrier. The United States, in its tradition to promote industry self-regulation, considers it "unwise and unnecessary for governments to mandate standards for electronic commerce" and rather urges "industry driven multilateral fora to consider technical standards" (The White House, 1997).

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111 Aldous Huxley; "Brave New World"; 1932..

112 A typical line of argument for this, would be that patents do not serve their progress supporting purpose anymore, in a knowledge-based economy. They are as hindering as if somebody would have patented the fact that his symphony is played by four musicians... Considering "the positive loop of knowledge creation" all knowledge is basing on other knowledge. Patenting intellectual property is like laying a minefield in the knowledge-based economy. The brainworker always has to watch out not to step on a "patent-mine". Which is getting increasingly difficult...

Nevertheless, following the general discussion, it seems inevitable to reduce the following areas to a common denominator:

@ electronic payments;

@ security (confidentiality, authentication, data integrity, access control, non-reputation);

@ security services infrastructure (e.g., public key certificate authorities);

@ electronic copyright management systems;

@ video and data-conferencing;

@ high-speed network technologies (e.g. Asynchronous Transfer Mode, Synchronous Digital Hierarchy);

@ digital object and data interchange.

Some governments and chambers of commerce made an effort to promote certificates, which are supposed to assure security and authenticity of different trading parties[113]. Once these kind of 'brandings' get more generally accepted, they could provide a solid bases for standardizing different issues.

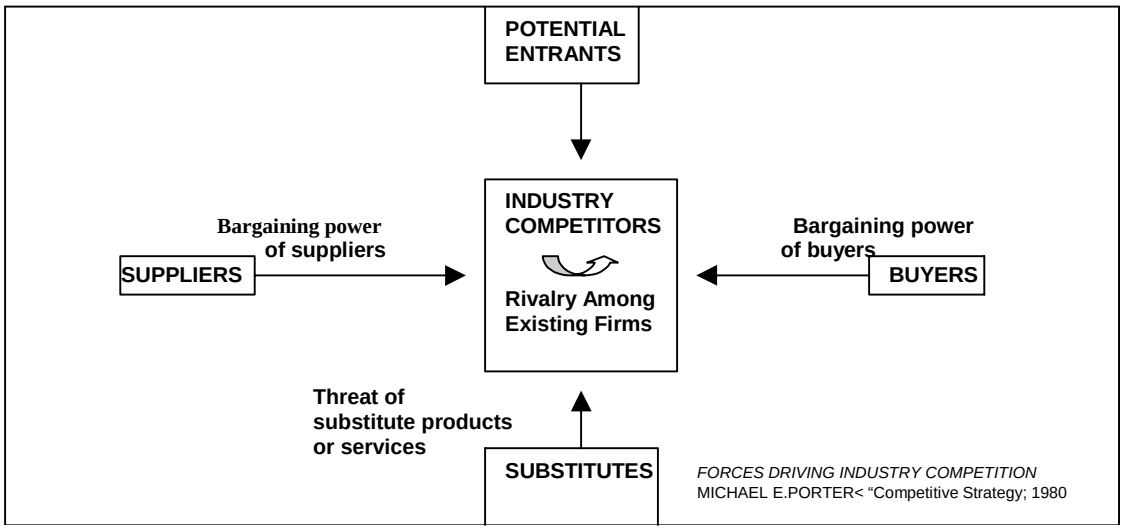
4. Competitive strategy in the digital economy

To conclude, I would like to come back to one of the most interesting questions, concerning Digital Economics. In the Introduction we asked if modern Information Technologies finally realize the textbook model of perfect competition, which assumes abundant information and high transparency, many buyers and sellers, zero transaction costs and no barriers to entry? After our Structure-Conduct-Performance analysis of the "Transition from Industrial to Digital Economics", we should be able to deal with this complex question. To do so, let us consider the popular and suitable industry structure analysis of Harvard Business School professor Michael Porter: The "Five Forces affecting competitive strategy".

Figure 23

[113] Like e-cert (Cámara de Comercio Santiago); or ONCE (Cámera de Comercio Nacional de Chile).

FIVE FORCES AFFECTING COMPETITIVE STRATEGY



Source: Michael Porter; "Competitive Strategy".

Porter starts his analysis by analyzing the threat of entry:

*"The **threat of entry** into an industry depends on the barriers to entry that are present, coupled with the reaction from existing competitors that the entrant can expect."("Competitive Strategy", p.7)*

We specified that the threat of entry depends very much on the industry and on the final goal of the business. Setting up and presenting a virtual business is not very costly. Furthermore we have seen that capital markets are more willing then ever to support new, visionary, but also risky start-ups. From this point of view it is easier as never before to 'enter' the market. On the other hands, the vast majority of these new entrants are facing extremely high barriers when they are aim to compete the yet established online operating companies. It is costly to make oneself a name in the 'endless vastness of cyberspace', network effects and trust issues are extremely difficult to overcome, and if the company is trying to entering a industry based on digital goods, the indefinitely seeming realization of economies of scale are favoring the position of the yet established companies. Furthermore we specified the importance of economies of scope and their common use in Internet Economics. They are often leading to a situation where a big company is 'cross-entering' a new market. While in the days of the old economy it would have been pretty unexpected if a car retailer would have suddenly started to offer information processing tools, it is not as far-fetched to go to Microsoft's page to look for a car, a travel package or something for your pet. Economies of scope --which are often based on economies of reputation--, make big companies a potential entrant for almost every market.

Looking a bit further afield, we can see that once search engines become more commonly used, when the 'opaque' cyberspace clears up, and once innovation is running on "Internet Time", product cycles get so small that patent protections and 'natural' monopolies become obsolete. Also, once consumers get used to this speed, and have confidence in online practices, once the switching costs of consumer lower, due to the fact that moving around in cyberspace becomes a matter of habit for the shopper: then these extremely high barriers, which for now are protecting the "giants", might lower tremendously…

*"**Rivalry among existing competitors** takes the familiar form of jockeying for position -- using tactics like price competition, advertising battles, product introductions, and increased customer service warranties". ("Competitive Strategy", p.17)*

Customer loyalty is fleeting, as customers are just one click away from switching to competitors. Price competition has become intensified, due to the transparency 'ShopBots' brought into a virtual shopping mall. Price discrimination became extremely difficult. "Gentleman-like" rivalry is difficult to maintain, in markets where it is tempting to place one's product efficiently into the spotlight by cutting the price for the entire industry. The 'unconditional consumer focus' is forcing companies to do everything possible in order to satisfy their clients. If trust is broken once, it is extremely difficult to reestablish. Quality inducing advertisement became extremely important. The death of distance rendered geographical competitive advantages obsolete...

On the other hand, there are the consumer's economies of scale. The consumer is profiting from sticking to one company, which already knows him quite well. The high mutual knowledge between buyer and seller is in favor of not switching between competitors.

*"All firms in an industry are competing, in a broad sense, with industries producing **substitute products**.(...) Identifying substitute products is a matter of searching for other products that can perform the same function as the product of the industry." ("Competitive Strategy", p.23)*

We analyzed the extreme dynamic in this area especially in the chapter about Digital vs. Non-Digital goods. It is an old story that a new invention does suddenly substitute often products, which feel very secure in their position. We know what happened to the fortune of the multi-millionaire who in his will assigned all his money to the Cable-Car industry (because there will "always be need for transportation in cities") and we know about the adjustments the petroleum industry had to deal with over the decades. Examples like this are often used to describe this issue. The danger of product substitution is always in reach, but never in history did it reach such dimensions as it has in the recent five years. Every information-based industry is highly endangered. The post- and music industries already gave up the fight against the high-speed creative destruction of innovation, and are refocusing their business strategies. Also the banking sector and many intermediary functions are redefining their core-work-processes. The 'high-speed spinning loop of knowledge creation' is solving many problems a lot better, and is therefore substituting a wide range of products, by providing an improved performance.

*"**Buyers** compete with the industry by forcing down prices, **bargain**ing for higher quality or more services, and playing competitors against each other -- all at the expense of industry profitability." ("Competitive Strategy", p.24)*

The bargaining power of buyers is of course getting reflected in the unconditional consumer focus of Internet Economics. We analyzed how the one-to-one customer focus is generically penetrating all stages of the value chain. The streamlined business process, Customer Relationship Management, built-to-order techniques, the product personalization, and all the cross-selling strategies are all adjusted to the conventional wisdom "the customer is king". Furthermore: "with full information, the buyer is in a greater position to insure that it receives the most favorable prices offered to others and can counter suppliers' claim that their viability is threatened ." ("Competitive Strategy"; p26) We saw the far reaching effects of this in the sections about Transparency and Pricing. Also the high sequencing of innovation is "at the expense of industry profitability". We said that there is no complete quality anymore- a product is never good, cheap, complete or innovative enough. Making use of the temporary monopoly of a new product, is getting rapidly difficult, as cycle times decline. Skimming off extra profit from bargaining as well, considering that the accelerated speed is rendering 'the newest and latest' obsolete very quickly.

*"**Suppliers** can exert **bargaining power** over participants in an industry by threatening to raise prices or reduce the quality of purchased goods and services." ("Competitive Strategy", p.27)*

We identified a great tendency towards a co-operational relationship between all the firms in the value chain. The extreme pressure exposed by the consumers, created the urgent need of joining vertically forces on the business side, in many industries. On the one hand, trust between the supplier and the company is still very important. On the other hand infomediaries are trying to replace these traditional ties. Also the high transparency introduced by B2B practices is striking at the heart of some long established network relationships that link manufactures with their preferred suppliers and retailers. Suppliers bargaining power is decreasing. This comes naturally, considering that the producer is, from this point of view, customer. Now he is able to enjoy the benefits of the unconditional consumer focus of his suppliers.

"We usually think of suppliers as other firms, but labor must be recognized as a supplier as well, and one that exerts great power in many industries. There is substantial empirical evidence that scarce, highly skilled employees and/or tightly unionized labor can bargain away a significant fraction of potential profits in an industry." ("Competitive Strategy", p.28) This aspect is already leading us to the next part of this paper, where we will have a look at the labor market among other interesting macroeconomic developments.

As we can see, the complexity and fast development of the emerging Digital Economy is making it very difficult to give concrete, simple and clear explanations to all of the features discussed in the paper. Concerning the "textbook model of perfect competition" we saw that for sure the competitive pressure in virtual markets is a lot higher than in markets of the old 'bricks and mortar' industries. But many of the tools, the Internet is providing are not yet implemented, and therefore we often have to speculate about where the process is leading us. But this is nothing surprising, considering that we are in the middle of a very lively "*transition*".

III. Macro

Following the analytical paradigm of the first two chapters, I would like to point out some other fields of interest I think should additionally or complementarily be researched in the field of the DIGITAL ECONOMY:

Here I will refer more to Digital Economics as a whole, not specifically to Internet Economics. This section is more generally about the changes Information and Communication Technologies (ICT) is bringing with it. Unlike the second part of this paper, most of the changes in the third part are less conceptual. Rather than dealing with re-defining or re-focusing, this part deals with the plain description of the macro economic spillovers of the progress. In the following part we will deal with issues about:

@ By whom and how is the transition to a digital economy being moderated?

@ What are the effects on growth and productivity?

@ Is the Internet the Big Equalizer or the Big Divider?

@ How are Labor Markets influenced?

In order not to fall behind, it is essential for every country to deal with these issues.

1. Role of organizations

1.1 Government

1.1.1. The private sector should lead

Nearly all parties agree that the Internet and e-commerce in specific should be led by the private sector, with government playing a minimalist role. The dynamism of the e-markets would strongly support this view. Nonetheless, it is important to recall that government has played, and continues to play, a critical role in the competition of free markets and also in the development of new technologies, which might influence commerce. Most of the new ICT has been the result of government-funded research or government programs. Therefore some people claim that governments should continue to be highly proactive and in no way neutral, regarding the development and use of Internet. Others, like the U.S. government --the same governmental institution which profoundly facilitated the initial development of the Internet-- are encouraging "industry self-regulation wherever appropriate" (The White House, 1997)[114].

Because societies express their common will through laws, we are inevitably also talking about jurisprudence here, as the written public consensus. Like always there is a juridical frame, which is local and one which is international in scope. The United Nations Commission on International Trade Law (**UNCITRAL)** formulated a model law that supports the commercial use of international contracts in electronic commerce (see: Legal Tactics). The model is kept very broad, leaving a lot of room for interpretation, even though it is currently only accepted by very few States[115].

Pushed by policies of the United States, it is meanwhile generally accepted that there should be as little governmental intervention as possible; firstly, to keep the original idea of the World-Wide-Web (world wide unrestricted forum for everybody, every time) and secondly, because often it is just impossible to restrict self-intelligence of the new cyber world.

In order to cut a long story short and not to drift off into legal jungles, we could conclude that the mainstream claims for **industry self-regulation with government oversight**. The government is setting the goals, but industry will have to provide solutions.

Like always when taking about public policy we cannot generalize, because the action taken depends on the precondition society brings with it. On the whole, the task of the state's power is to find a consensus between the claims of various interest groups fighting for their rights (academic, public, capitalistic... claims) and to provide general freedom and equality in regards to the cyber world. There are certain traditional roles that government has to fulfill, like identity document custodian and public recordkeeper. The economic role of the government is to address **market failures**.

1.1.2 Market failures

In brief this is the old debate about government intervention. It is about how much the market needs to be completed and the question of how much competition is needed to achieve desirable economic performance. It is generally accepted that the main function of economic policy is (next to the maintenance of employment and price stability) "to *remedy shortcomings* of the competitive system which would even exist under perfect competition" and "to *provide services* whose very nature is such that the whole community benefits by them collectively" (Scitovsky, 1952).

[114] "Though government played a role in financing the initial development of the Internet, its expansion has been driven primarily by the private sector. For electronic commerce to flourish, the private sector must continue to lead." (The White House; "A Framework for Global Electronic Commerce", 1997).

[115] Republic of Korea, Singapor, Illinois...- in Latin America, only by Colombia and to some degree by Argentina and Mexico...

"How government deliver on its obligations must continually evolve. A recent revolutionary change is the need for government to support and promote an electronic means of communicating and interacting with citizens and companies…" (pkisc, 1999)[116]. It is on this challenge; the role as a *maintainer* and the part assigned to government as a proactive *promoter* of the process that I should endeavor to focus now.

1.1.2.1 The maintaining task of the government

One of the **shortcomings** of the competitive system would be that perfect competition does not ensure perfect efficiency if there were differences between social and private marginal product. To give a concrete example, it would be the role of the state to design rules and regulations to keep one person's consumption from interfering with other people's welfare. The anarchy Napster brought into the music industry is visualizing the problem. Many people feel run over by the dynamic of change, which is getting introduced. Nevertheless, the work in this field needs to be very visionary and often courageous, in order not to hinder the incessant process of creative destruction. Like we already specified in the Inter-Net-Working chapter, we may need to adjust our attitude regarding to 'which is mine and which is ours' (the "differences between social and private marginal product"). Sticking to the example of the music industry shows us how we will sometimes need to change our way of thinking about how my "private marginal product" will be rewarded. In a wider sense, all laws (since they are fulfilling individual freedom in an equal society) belong in this category. Of course the advent of the New Economy does not render the realization of the republican comprehension of freedom obsolete!

I shall endeavor to proceed to a somewhat more detailed discussion of the policies that are designed to eliminate or offset the particular shortcomings due to the imperfectly competitive nature of an economy, because of the immediate nature of the problem. One commonly known measure would be to combat **monopoly** and try to remove the conditions that make for monopoly and restricted competition (Scitovsky, 1952). The most obvious and best known measure is antitrust legislation (in North America) or competition policy (in Europe). This aims primarily at preventing the formation of outright monopoly and the conclusion of respective agreements. As we have seen in recent years, this problem is more present-day than ever. The first mover advantage, combined with network externalities, and the uncertainty and ignorance between ICT user, is extremely favoring the creation of monopoly power in the emerging Digital Economy (Microsoft, AOL, Deutsche Telekom, Amazon.com, Yahoo!...). The most famous example in this field would be U.S. vs. Microsoft[117]. Of course the main question of this case is not whether Microsoft is possessing a monopoly or not, but --like so often in the New Economy-- about the basics. Why were the anti-trust or competition policies established? What is their purpose? Are monopolies like Microsoft's preferable? Competition policies are supposed to motivate competition, in order to favor innovation. Do we have to be afraid that with a monopoly like the one Microsoft is possessing, innovation will slow down? Will these kinds of monopolies survive? Do the new dynamics of the markets regulate monopoly power better? Or do we need immediate government intervention? It would go too far to analyze these questions profoundly at this point and would not serve the purpose of this paper. We just have to keep in mind that our changing understanding of the terms intellectual property, innovation, and how to make money out of it, are issues that many people are worried about. Therefore governments will have to moderate this progress. The final issue is now how courageous and visionary governments are in doing so.

1.1.2.2 The promoting task of the government

[116] Public Key Infrastructure Steering Committee, "Access with Trust"; http://www.gits-sec.treas.gov/access/access_with_trust_contents.htm; United States government

[117] For more information about this case (in point), see for example: http://raven.stern.nyu.edu/networks/ms/top.html

As regards to the **promoting role of government** ("to provide services whose very nature is such that the whole community benefits by them collectively"), some nations are taking a variety of actions to support infant industry development.

Like traditional commerce, electronic commerce requires a substantial infrastructure. Therefore it is definitely the urgent task of all governments to develop a stable 'e-frastructure' (see: Digital Divide and the Catch Up). This is first of all reflected in the geographical distribution of access. As we will see in a later section, there are some very successful best practices where governments worked together with the industry in order to accomplish a broad geographical access distribution. Furthermore it is reflected in the constant modernization of techniques and trends invading and changing use of Internet (broadband DSL, ISDN, Cable, Satellite, Wireless UMTS...) (see Digital Divide and the Catch Up). Of course all of this is regulated by the principle of subsidiarity. In Europe, for example the European Commission began processing an ordinance in February 2000, which then was used by many governments in Europe to motivate State actions as to regards to their responsibilities.

On the other hand it is the task of erasing the computer illiteracy in society, including awareness and competence in using the new techniques. In a wider sense this is coming down to the challenges we are facing as regards to the educational system, due to the advent of the Knowledge Society.

Education

I decided to spend one section of this paper on education, due to its paramount importance to the knowledge-based economy. Of course I will not go into it too deeply, because this would detour us from the New Economy, to what we could call "New Education"[118]. But, come to think of it, this high-speed evolution is actually not a technical one, but an educational one. Education is the foundation stone in the Knowledge Society. Education is becoming omnipresent in the organizational structure of any company which is operating in a knowledge-based economy. There are different types of education. Of course we can not compare children's education with business education, but maybe we will have to change our way of thinking about education in general[119].

In recent years, the main discussion in the field of education was about how much more money needed to be allocated in this sector in order to bring it up to the required level. Nowadays, when talking about improving the educational system, we are talking rather about setting the right focus. Spending millions of dollars in the creation of buildings and libraries, and educating an elite number of students which will pass all the exams with the highest scores, does not help in a world where the high speed spinning loop of knowledge creation will render a big part of this knowledge obsolete, shortly after the graduation. The question is not about how much money should be invested, but rather where the focus of education should be set.

A significant part of any education involves information creation, communication, and interpretation. The Internet, as the Network of Networks is a potent tool for these basic activities[120] (see: The Knowledge Society).

Most education programs work under the assumption that people can be educated via in-class sessions concentrated in a couple of years of school or study programs. This concentrated programmatic model of education is insufficient in an era of open information represented by the digital economy, of product/business revisions in the digital economy, the continuous modification of information, and the expansion of new information media. All have the cumulative effect of

[118] For more information about the progress of education see for example: http://www.insead.fr/Encyclopedia/Education/Advances/

[119] Facing the fact that the three richest Americans are university dropouts (William Gates (Microsoft), L.J.Ellison (Oracle), P.G.Allen (Microsoft)), in other words, did not consider it necessary to learn about what traditional textbooks have to teach, one might easily get tempted to question the traditional educational system.

[120] Like already mentioned before, they represent the same degree of change that the printing press represented at its time of invention. Obviously the printing press has turned education up side down. So should the modern Information Technology, as we expect.

making information obsolete very rapidly. Business persons must continually update their knowledge base to remain effective.

Education must become a continuous learning process. The process may get initiated in a formal program, but cannot end with the program. **Life-long learning** requires special intellectual and technical skills that must become part of education. The real message behind basic education should be that a person will never stop learning. This inner attitude needs to be internalized. It is like an intellectual skill, which is to be implemented with the very beginning of education. Life-long-learning requires changing our comprehension about what education is. There is no apprenticeship-time and a working-time anymore. In the high-speed spinning loop of knowledge creation we are all apprentices, all the time. This implies that there is also an urgent need to build a bridge between classroom learning and a practical experiential sense. Learners must have opportunity for **learning-by-doing**, of learning to improvise as they must in practice, of learning in teams, of creating organizational learning systems[121].

That implies that every step of the production process, every element of the organization of a company and therefore of course every "knowledgeable worker" is accompanied by "learning", like a shadow-- with every move he is making.

There are many different suggestions made on how this could be achieved. Modern ICT is also bringing us new tools, which can be used, --like Internet based online distance education[122]. In the classrooms the prospective 'knowledgeable worker' can get introduced to this attitude by Internet based educational computer mediated communication, or in companies there are Web-based Training programs which can help to facilitate the incessant process of learning[123].

I shall endeavor to show the challenges many countries are facing, by giving one little example: In the United States there is a project called NetSchools (www.netschools.com).

"NetSchools believes that one-to-one, Internet-based computing has the power to transform the learning process for all involved" (netschools.com, 2000). Every NetSchools student has a laptop computer, with an infrared wireless connection to the school's computer network, the teacher's laptop and the Internet. The laptop travels with him or her throughout the school day and home in the evening. It is proven that students enjoy extended learning opportunities after school and on weekends. It is a individual contact, one-to-one[124]. Teachers direct their students throughout the day to pre-selected Websites on specific curriculum topics.

Learning how to work in the network of networks on the outermost forefront of knowledge, right from the start, does of course not only have tremendous effects on the quality of the subject matter. It is also improving the students ability to research and to synthesize different points of view. The student is learning how to deal with the information deluge we live in. The student is learning how to network (as the key ability in an Internet dependent economy) and is experiencing the high-speed process of information circulation, every day. At this point we would be coming back to the money issue. It will not be necessary anymore for a State to spend millions of dollars to

[121] "You learn while you earn" (selfpromotion of the Distance Education and Training Councils 1996).

[122] For example "virtual universities" like: http://.fernuni-hagen.de; also interesting examples for online education are the University of South Africa (http://www.unisa.ac.za/) on the African continent and in Europe, the "Open University" in London (http://www.open.ac.uk/OU/).
Some authors go as far as to talk about the "disappearing of universities in cyberspace". Universities, with their traditional role as a spreader of knowledge, is getting increasing competition by the Network of Networks. (For example: Krempl, Stefan (1999) "The Virtual University: Education in the Cross Light between Economy, Politics, and Society"; http: //viadrina.euv-frankfurt-o.de/~sk/Virtual-College/ZukUni1.html)

[123] See for example: http://www.esocrates.com

[124] When students come to class and open their computers, their homework is collected by way of infrared network Ceiling Access Points (CAPs) and stored in the students' electronic folders on the school's central server. In addition, any assignments the teacher has sent for the next day are instantly transmitted to each student's laptop. Infrared CAPs can also be built into ceilings in the study hall, hallways and cafeteria, so students can work from any location within the school building.

create hundreds of different libraries, if a student can access one central, well-equipped library with one single mouseclick.

It is often a problem of wrong focus setting, why some countries are lacking behind as much in their educational level. This steams from a lack of understanding about, what the Knowledge Society and the New Economy is all about. But ill-equipped educational systems are extremely dangerous in a knowledge-based economy.

Extra Efforts

In order to make e-commerce nationally and internationally competitive many governments established some Macro regulations to promote the use of electronic business. These are some commendable **extra efforts**, which should be closer investigated in order to show some best practices.

The *United States* became something like a natural leader and the driving force in the development of IT, due to their space, academic and defense activities. The Clinton Administration allocated $850 million for research and development for the "Large Scale Networking and High-end Computing and Computation Research and Development program" (U.S. Department of Commerce, 1998). It supports initiatives like the Next Generation Internet (NGI) or networking projects like Internet2[125] (see also: Catch Up and the Digital Divide). Another, very controversial issue is the US's HR 1054. It provides tax-exemption for e-commerce until 2004 to US companies. Like this the American government wants to subsidize the 'infant industry' of e-commerce. On an international scale, which is paramount for 'born-global' Internet companies, this is assuring that U.S. online operating firms have a decisive competitive advantage.

Also the way the US government is cooperating with the private sector deserves to get mentioned. Government and business have begun a number of joint initiatives to help increase the supply of ICT workers, for example. The US government is maintaining partnerships with Cisco, Microsoft, Novell, and IBM between others. This attitude turned out to be very successful and has been adopted by various countries (e.g.: Initiative of German government and Deutsche Telekom in 02/2000 to get all schools online until 2001).

Another example would be *Canada*'s plan to become the "world's most connected country". It includes six programs: Canada online, Intelligent Communities, online content, electronic commerce, Government online and Canada connected to the world. The proposed goals are: access equality for all Canadians, rapid creation of a computer literate society, economical and social development of the communities, faster technical transmission, a more sensibly acting government and global Canadian leadership.

The "intelligent island" of *Singapore* is of course the classic example: To make a long story short, when Singapore started its strategy in 1980, 850 professionals were working in ICT on the island and the industry practically did not exist. Due to the launching of the program 'Intelligent Island' (which covers seven areas of ICT: Promotion of the industry, applications, personal, cultural, infrastructure of communication and information, favorable climate for creativity and business initiatives and finally the coordination and collaboration). Singapore counted in 1996 with 21,000 qualified professionals, a hardware industry selling $ 11,000 million, and an access penetration of 36% for homes and 90% for businesses. The country came in fifth in terms of GDP per capita, passing all G-7 countries, except Japan, and was placed second in the worldwide competitive ranking (CCS, 2000).

[125] Internet2 has originally been a collaborative effort by more than 100 U.S. research universities to create and sustain a leading edge network for developing network engineering and management tools and broadband applications for advanced research and education. Recently this network started to collaborate globally. (internet2.edu, 2000)

Also *Japan* started in 2000 a large extra effort in order to overtake the U.S. in the next five years. The entire island is supposed to get connected to a 'high-speed-net' (30-100Mbps). Prime Minister Yoshiro Mori established a commission for ICT-strategy, is chaired by Sony CEO Idei (also other CEOs –from Toyota, NTT, NEC and different scientists belong to this work group). Also immigration policy is being revised, given that Japan lacks around 200,000 Information Technology experts (spiegel.de, 2000).

In the later section on Labour, we will have a look at the challenges stemming from immigration laws enacted by many states, in order to satisfy their lack of skilled workers[126].

To conclude this section on the role of governments, we can clearly see that demand is still very high, and moderation and promotion of the process is absolutely necessary. Private sector leadership in the Digital Economy does not render governments actions obsolete. We specified market failures, which are calling for new legal codes of conduct, (which does not mean that these legal codes of conduct have to be restricting, they just have to be adjusted to the New Economy). In the chapter about 'Legal Tactics' we already specified further areas, calling for legal guidance. Also governments are still in charge of providing a well-equipped infrastructure, educational system and promoting development. Due to the unprecedented speed of the process, the confusion its causes and the loopholes it creates, --in short-- in periods of profound structural change like this, governments are especially needed.

1.1.3 Supranational moderation

Due to the global character of the world-wide-web, the role of supranational organizations is paramount. The Internet does not consider national borders and therefore international cooperation and collaboration is unavoidable. As the effected issues are wide ranging in nature and are at different stages of negotiation, not all of them can or should be discussed in a single forum. Traditionally there are several forums where government representatives meet. Further negotiations could build on the expertise accumulated in certain forums on particular issues.

The WTO appears to be the appropriate body for many of the issues concerning existing as well as potential barriers to trade.

The OECD, representing the major industrialized nations, is a useful forum for discussion and economic analysis. The OECD did some ground-breaking work on an international level, regarding industrialized countries[127].

UNCITRAL carried out some useful work concerning legal codes of conduct (such as electronic signature...).

The ITU (International Telecommunication Union/ UN), which is primarily concerned with technical issues and allocation of scarce resources is providing a source of technical expertise to coordinate global telecom networks and services. The ITU is planning to host a "The World Summit on the Information society" in 2003 (http://www.itu.int/wsis/brochure.htm).

Also the European Union founded an Information Society Promotion Office(ISPO)[128].

Moreover, the emergence of a global knowledge-based economy, based on ICT, made the fundamental mission of educational, scientific and cultural organizations more topical than ever. K. Matsuura, Director-General of the UNESCO, stated that his organization was mandated to promote the "free exchange of ideas and knowledge" and to "maintain, increase and diffuse knowledge" (ECOSOC, 2000). Given our new knowledge-based, global economy, organizations like UNESCO are demanded to offer an essential contribution to the high-speed evolution.

[126] US: H-1B, non-immigrating visas; Germany: government gives time-restricted "green-cards" to 20,000 foreign ICT-specialist.
[127] http://www.oecd.org/subject/e_commerce/
[128] http://europa.eu.int/ISPO/Welcome.html

1.2. Non-governmental guidance

The Internet is inherently a non-hierarchical communications medium, which cannot effectively be controlled by a single organization or government. Not even a supranational organization would be able to do so. In accordance with the common consensus on private sector leadership in this high-speed-revolution, business has been active in drawing up codes of conduct for many aspects of electronic commerce, thus in many cases eliminating the need for regulation. A huge amount of business initiative 'mushroomed up' in recent years, leaving us with a wide-ranging variety of different platforms. Let us take a look at some of these initiatives:

Several **traditional organizations** are highly demanded in this period of great structural change. Foundations like the International Federation for Information processing (www.ifip.or.at), the Center for Strategic and International Studies (www.CSIS.org), the Transatlantic Business Dialogue (www.TABD.com)[129] and the like are called for urgently. Also many traditional chambers of commerce started regional initiatives to support and to moderate the process.

Additionally, a lot of regional associations, chambers, institutes and societies have been founded in recent years, specifically aimed at providing guidance during this turbulent period[130]. They provide information about the ICT industry, its issues, association programs, publications, meetings, seminars, etc.

The **World Information Technology and Services Alliance** (www.WITSA.org) is a consortium of 41 of those IT industry associations from economies around the world. WITSA members represent over 97 percent of the world IT market. WITSA is seeing its mission in: advocating policies that advance the industry's growth and development; facilitating international trade and investment in IT products and services; strengthening WITSA's national industry associations through the sharing of knowledge, experience, and critical information; providing members with a vast network of contacts in nearly every geographic region of the world; and WITSA also hosted a "World Congress on IT"[131] in Taipei in 2000.

The **Global Internet Project** (www.GIP.org) is an international group of senior executives committed to fostering continued growth of the Internet. Members come from leading Internet-centric companies representing the telecommunications, software, financial services, and content sectors[132].

The GIP is contributing to the moderation of the process by developing and distributing policy papers, holding workshops and conferences on identified issues, and is conducting timely consultations with decision-makers around the world.

Also legal advise is provided from organizations dedicated to the non-governmental guidance of the process. The **Internet Law and Policy Forum** (www.ILPF.org) is a US-based organization made up of internet centric corporations. In addition to their yearly conferences, the main work of

[129] This cooperation is an informal process whereby European and American companies and business associations develop joint EU-US trade policy recommendations, working together with the European Commission and US Administration.

[130] For example:
*U.S.: Information Technology Association of America (ITAA): http://www.itaa.org/
*Australian Information Industry Association (AIIA); http://www.aiia.com.au/;
*Brazil: Sociedade de Usuários de Informática e Telecomunicações : http://www.sucesusp.com.br/
*China: Information Service Industry Association of China, Taipei (CISA): http://www.cisanet.org.tw/english/index.html
*Germany: Bundesverband Informationstechnologien (BVITeV): http://www.bvit.de/home-eng.htm
*Mexico: Asociación Mexicana de la Industria de Tecnologías de Información (AMITI): http://www.amiti.org.mx/
*Venezuelan Chamber of IT Companies (Cavedatos): http://www.cavedatos.org/
Also metropolitanian institutes like the Electronic Commerce Institute (www.institut.qc.ca.htm)

[131] http://www.worldcongress2000.org/

[132] Dr. James Clark, former chairman of Netscape Communications Corporation, founded the group. John Patrick, Vice President for Internet Technology at IBM, is the current chairman of the GIP.

the ILPF takes place in expert working groups, in such areas as digital signature, authentication, self regulation and content protection. They are also able to provide consultative legal and research services for short-term assignments through the assembly of Rapid Assessment Teams (RATS).

Another participant is the **Global Information Infrastructure Commission** (www.GIIC.org). The GIIC was officially inaugurated in July, 1995 at a meeting hosted by The World Bank. Similar to the others, it is an independent, non-governmental initiative involving communications-related industry leaders from developing as well as industrialized countries. "The GIIC has been established to respond to the recognition that traditional institutions and regulatory frameworks can no longer meet the increasingly complex challenges and opportunities of globalized information." The initiative is a project under the Center for Strategic and International Studies (CSIS). The official focuses of the GIIC are set on ICT development, e-commerce and education[133]. More than 50 CEO's and presidents of major international corporations, policymakers and academics from around the world are members of the GIIC, forming a network of influential individuals from different countries and organizations.

An initiative of the former EU-commissioner for Telecommunication (Martin Bangemann) resolved itself into the "**Global Business Dialogue on electronic commerce**" (www.GBDe.org). The basic idea of the project has been to bring all the international efforts together and, following the model of the UN-declaration of human rights, to elaborate a "Global Communication Charta", which shall present a set of guidelines. At the first 'world-conference' of the GBDe, 500 leading business- and 100 government representatives came together in September 1999 in Paris[134]. At this conference a "GBDe Policy Paper" was presented, which consisted of 100 recommendations. The two basic messages of the paper are for one thing that governments shall trust in industry self regulation and free markets. For another thing the importance of consumers' trust is highlighted.

As we can see, there are currently many different forces at work. Sometimes their agendas are even at odds with each other. But as pointed out before, the anarchical character of the Internet, does not allow the control and supervision of one single organization. At the end, all of the efforts mentioned above (and many more[135]) are helping to better understand the Internet's role in the global economy and to bring some minimum degree of order and predictability to the situation.

2. Growth

Studies dating back to the 1950s have been discussing the relation between labor force, capital (human and stock, ROI) and what is generally known as 'the residual' of growth, and their impact on growth and productivity[136]. While the advent of the New Economy, due to its all-

[133] The GIIC is pursuing the following goals: Strengthen the leadership role of the private sector in the development of a diverse, affordable and accessible information infrastructure; promote involvement of developing countries in the building and utilization of truly global and open information infrastructure; Facilitate activities and identify policy options which foster effective applications of telecommunications, broadcasting and information technologies and services.

[134] "The business leaders envision as a possible part of this process, a series of business-led and organized meetings, working groups, and conferences. The purpose is to develop and present a global business consensus to governments and international organizations for further actions and cooperation".
To the Board of the GBDe belong 29 CEOs from America, Europe and the asia-pazific region. (among others: Thomas Middelhoff, CEO of Bertelsmann AG (chairman of GBDe), CEOs of Time Warner (Gerald Levin), Fujitsu (Michio Naruto), IBM (Louis Gerstner), AOL (Steve Case), Electronic Data Systems/EDS (Richard Brown), Walt Disney Company (Michael Eisner), Hewlett Packard (Lew Platt), Vivendi (Jean Marie Messier), Nokia (Jorma Ollila), etc.)

[135] See for example: The World Wide Web Consortium (www.w3.org); The Internet Architecture Board (www.iab.org); The Internet Engineering Task Force (www.ietf.org); The Institute of Electronical and Electronics Engineers, Inc. (www.ieee.org).

[136] $$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + k\frac{\dot{K}}{K} + n\frac{\dot{N}}{N}$$

penetrating character, does have effects on all three variables, the focus of this analysis should surely be set on the residual of growth.

In advance, just to maintain some historical perspective, we should keep some things in mind: First, we have to remember that ICT is not the only important source of technological improvement effecting 'the residual'. ICT may have become an important and indispensable supporting tool for every science, but also other sciences (like Biology/ =Biotech...) advanced tremendously lately. This might be linked to the new possibilities and the accelerated speed of development (see: The Knowledge Society/ The Positive Loop Effect Of Knowledge Creation), but we cannot only credit ICT for this progress. We should consider this when working with endogenous growth models. Second, improvements in Information and Communication Technology are nothing new. We are not discovering boiling water here. There is a long chain of inventions that ended with what we consider the Internet today. This does not necessarily mean that the newest step of this chain is the most effective. No modern ICT innovation has until now, come close to the gain induced by the laying of the transatlantic cable in 1866, which reduced the time it took to send a message from New York to London from about a week to a few minutes.

2.1 The productivity paradox

Modern Information and Communication Technology has been widely faulted for having failed to generate broad-based multifactor productivity (MFP) improvement. Between economists of the United States there has been a discussion going on for several years now, about what is known as the **'productivity paradox'**. It started with the observation that productivity (Labor- as well as Multifactor Productivity[137]) mysteriously slowed down around 1973 --just about the time when computers got on the scene-- and has remained sluggish ever since. In 1982 TIME magazine declared the computer "person of the year" and in 1987 Robert Solow started the discussion with his famous quip: "We can see the computer age everywhere except in the productivity statistics" (NY Times, 1987).

Right now the discussion reached the point of whether the advent and use of Internet in business has rendered this productivity slowdown obsolete[138].

Where: ΔY=Growth; ΔA=change of 'the residual'; ΔK=change in capital; ΔN=change in labor input
See e.g.: Robert M. Solow, "Technical Change and the Aggregate Production Function," Review of Economics and Statistics (1957), pp.312-320;
Edward F. Denison, "The Sources of Growth in the United Stades and the Alternatives before Us" (New York: Committee for Economic Development),1962.

137 There are two measures of productivity. Labor Productivity measures output per hour worked. Multifactor Productivity measures output combined unit of inputs, where inputs are broadly defined to include capital and labor inputs and intermediate goods and services.

138 Some economists claim that Internet did do so. Internet provided the "interconnectivity" high-speed computer needed before they could really boost productivity, and now we will see the fruits (Blinder, Alan S. (2000), "Internet and the New Economy"; Jan2000).
Paul David of Standford emphasizes, in his diffusion hypothesis that several decades needed to pass, but once the technology spread and people learned how to use it, things really took off ("The Dynamo and the Computer: An historical Perspective on the Modern Productivity Paradox"; Am.Ec.Rev., May90, pp.355-61).
Dale Jorgenson (Harvard) and Kevin Stiroh (NY Fed) conclude that heavy investment in computers and faster productivity growth in the computer industry have substantially boosted labor-productivity growth, but doubt that although TFP growth outside the computer sector has increased. Some sectors which have invested most in IT have generally seen smaller productivity gains. (measurement problems?)
Others like Robert Gordon argue that the entire acceleration of productivity growth, is surely not coming from using computers, but from manufacturing them. ("Has the New Economy Rendered the Productivity Slowdown Obsolete?"; NBER, June14,1999), this would be a simple increase in K, not in A. (statistic: Brent R. Moulton;" GDP and the Digital Economy: Keeping up with the Changes", p5). He furthermore reckons that the entire increase in TFP outside the computer sector is due to the economic cycle.
Furthermore:
*Krugman Paul (1997): "Requiem for the New Economy", http://web.mit.edu/people/krugman/
*Blinder, Alan S. and Richard E. Quandt: "Waiting for Godot: Information Technology and the Productivity Miracle?" Princeton , May 1997
*David, Paul A.: "Digital Technology and the Productivity Paradox".
* For further papers, see: http://www.stern.nyu.edu/~nroubini/NewEconomy.html

There is much evidence that the U.S. experienced an acceleration in growth of productivity since the introduction of Internet (4th quarter 1996: 0,9% per annum; 3rd quarter 1999: 2,7% per annum).

In a testimony to the U.S. Congress, Federal Reserve Board Chairman Alan Greenspan pointed out that the U.S. "has been experiencing a higher growth rate of productivity -output per hour- worked in recent years. The dramatic improvements in computing power and communication and information technology appear to have been a major force behind this beneficial trend."(Greenspan, 02/1998). Two years later, on the White House Conference on the New Economy, Greenspan came to the conclusion: "It is becoming increasingly difficult to deny that something profoundly different than the postwar business cycle has emerged in recent years." (Greenspan, 04/2000)

Whether or not the Interment is the driving force of productivity growth will be a matter for economic historians to sort out some years from now. What we can observe until now is that ICT is influencing all variables of growth. What we know until now is that the recent advances in ICT make more information available, faster and cheaper. We know that in the 'Knowledge Society' information and therefore the creation of new knowledge (see: The Knowledge Society) is seen as the crucial "input factor". At a basic level, we could simply claim that due to the increased flow of information (interconnectivity), we could obtain this input factor a lot easier and cheaper. Diagrammatically this would result in a push of the aggregate supply curve (an economy's productive potential) out to the right, in exactly the same way as every invention, progress or innovation[139] does and did in the past. Assuming no change in aggregate demand, the equilibrium level of production (normally named as Q) rises, and real price (P) would be falling.

Furthermore, we know that this has benefits for customer and business. We also know that the benefits offered to the customer through Internet retailing will not directly be counted in GDP and therefore will be difficult to show in productivity statistics. We know many examples of companies like IBM, Ford and Cisco, among others, where we have strong evidence that B2B e-commerce leads to great cost savings. Such savings would be captured in the productivity statistics.

2.2 Real cost reduction

At this point we can show effects. "The residual" (A) of the growth process is generally accepted to be technical progress, TFP improvement or **real cost reduction**[140]. This last expression is very useful in order to underlie the impact of the Digital Economy with some broad numbers:

Let us take a broad look on how heterogeneously and how profoundly modern ICT cut into different sectors. In order to keep the frame of the paper, I will only be able to give some general ideas, by showing some examples which effect this "real cost reduction".

Due to the fact that the great bulk of action associated with the growth process takes place at the level of the firm, let us start with taking a look at how business-to-business e-commerce (B2B) is affected.

As already specified in the chapter about the Net-Working between firms, very roughly and generally calculated a company could save on average up to 20 percent in product purchase and between 10 to 25 percent in process rationalization using B2B techniques (CCS, 2000). Moreover the accelerated speed of Internet Economics is as important to productivity as monetary savings. Firms report about cutting the time needed to process purchase orders by 50 to 96 percent (OECD, 2000).

Furthermore there are savings made by lowering distribution costs:

[139] Technical Progress (or innovations) are also known as 'the residual of growth'.
[140] A.Harberger, "A vision of the growth process"; The American Economic Review, March 1998

Table 5
DISTRIBUTION COSTS ONLINE SAVINGS
E-COMMERCE IMPACT ON VARIOUS DISTRIBUTION COSTS
(US$ per transaction)

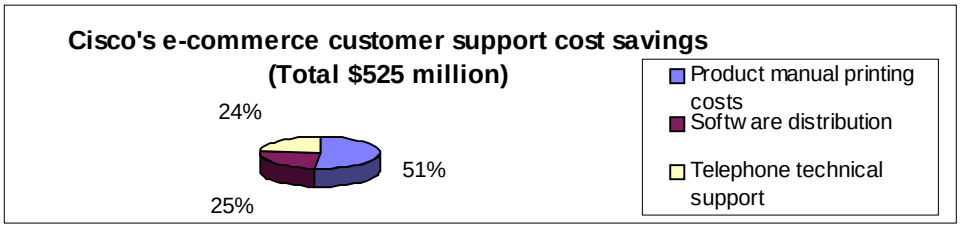
	Airline tickets	Banking	Bill payment	Term life insurance policy	Software distribution
Traditional system	8.0	1.08	2.22 to 3.32	400-700	15.00
Telephone based		0.54			5.0
Internet based	1.0	0.13	0.65 to 1.10	200-350	0.20 to 0.50
SAVINGS (%)	87	89	71 to 67	50	97 to 99

Source: OECD, 2000.

Cisco reports that since it switched from phone and fax ordering to an online order system, it was able to save $500m simply due to the lower error rate.

British Telecom claims that buying goods and services online reduces the cost of processing a transaction by 90% and cuts the direct costs of goods and services it buys by 11%.

Figure 24
CISCO'S E-COMMERCE CUSTOMER SUPPORT SAVINGS



Source: Meeker 1997.

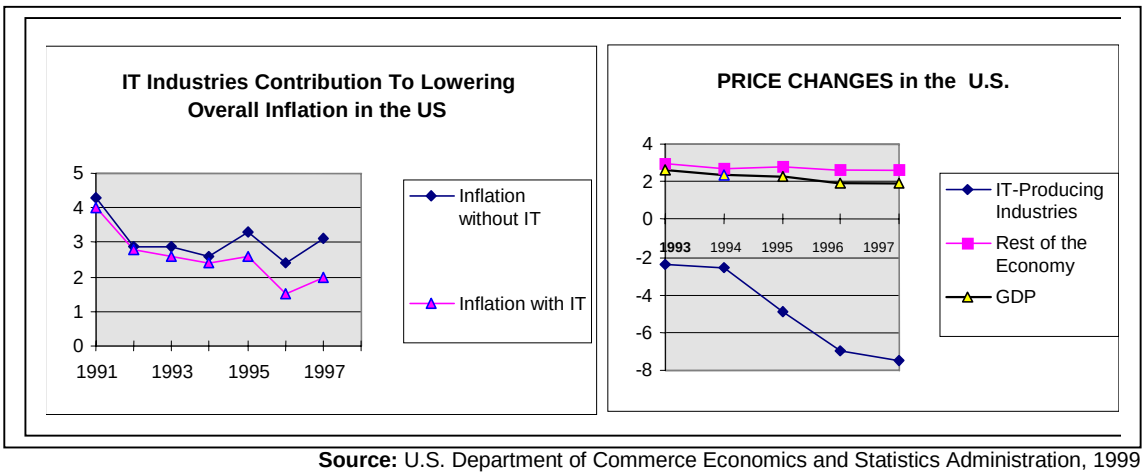
The partial equilibrium resulting from these changes in costs leads to a reduction in aggregate distribution costs of about 5 percent (U.S.: -5,2; Japan: -5,3; Germany: -5,9; France: -4,2; UK: -4,5) and in total economy-wide costs by about one-half to two-thirds of a percentage point (U.S.: -0,7; Japan: -0,7; Germany: -0,6; France: -0,5; UK: -0,6). While small, these are still considerable gains (OECD; 2000).

Here we can see very clearly how several forces within 'the residual' (A) are pushing growth.

2.3 Direct effects of IT-growth

We also can show that **IT industry itself** is having a major direct impact on growth and inflation. This kind of growth would fall under the increase of stock capital (K) *ceteris paribus*. In other words, unit capital costs are going down[141]. Without a doubt the accelerated demand for IT-products has been a mayor driving force in many economies since 1994.

Figure 25
DIRECT EFFECTS OF IT-GROWTH



Source: U.S. Department of Commerce Economics and Statistics Administration, 1999

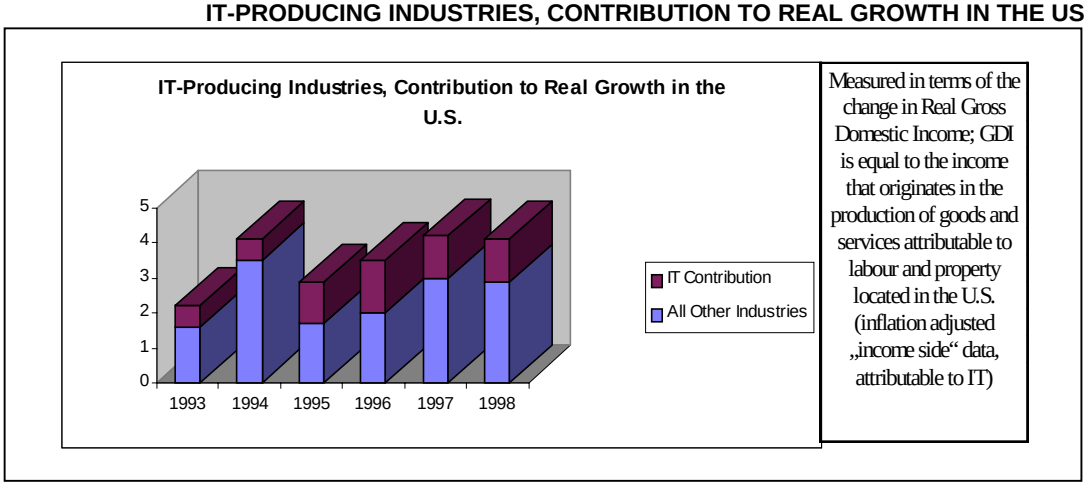
Remarkable is the fact that IT prices, adjusted for quality improvements, have been falling while prices in the rest of the economy have been rising[142]. This has been allowing a non-inflationary growth, (US: 2% instead of 3,1%), which again, of course, provokes further positive economic effects.

While the share of the economy attributable to IT-producing industries has in many countries (US: 1/3 of growth of PIB; Costa Rica: over ½ of growth of PIB...) been growing in current dollar terms, this increase understates the importance of these industries due to their falling prices mentioned above. A better way to gauge the importance of IT-producing industries is to look at their contribution to real growth.

[141] There should be 'capital deepening' as a consequence. Faster growth shall also apply for lower unemployment (in the sector). We will have a look on the changes in the structure of labor force in the later chapter on Labor Markets.

[142] For the history of the "computer price problem", which was resolved through an exceptional collaboration between an US government agency (BEA) and industry (researchers from IBM), see: Cole, Chen, Barquin-Stolleman, Dulberger, Helvacian, Hodge (1986): "Quality-Adjusted Price Indexes for Computer Processors and Selected Peripheral Equipment"; Survey of Current Business, Vol.66, pp. 41-50

Figure 26
IT-PRODUCING INDUSTRIES, CONTRIBUTION TO REAL GROWTH IN THE US



Source: U.S. Department of Commerce Economics and Statistics Administration, 1999

Nevertheless, like we already specified in the section about IT-classification, we should keep in mind that due to its all-penetrating character, we have several problems with identifying the ICT industry. The direct effects of ICT on growth, is one of the main arguments of the defenders of the productivity paradox theory (see above: Gordon…).

2.4 Indirect effects of IT-growth

The New Economy also **influences indirectly**. It does have a major impact on human capital (K) for example, and also on the quality of an economy's workforce (see Labor market), income increase and so forth.

Other indirect contributions are described by several organizations with telecommuting programs. They report an increase in productivity through increased morale and commitment to the company, showed by faster completion of assignments, fewer sick or absent days and better time management. They also benefit from reduced office space needs and associated costs, an enhanced ability to attract and retain quality employees, and improved customer service (US Dept. of Trans., 1997), which is hard to measure.

All of this considered, the modern Information and Communication Technologies should eventually lead to a permanent increase in productivity[143], just like every other innovation which decreased input costs. What matters now is how much and when it will increase. We are also talking about the notorious 'bubbles' here. It is a very common process that people tend to start dreaming about the tremendous possibilities that show up on the horizon, when a new promising innovation gets introduced. That is why stock market overestimation is nothing unusual in times like this. Keeping that in mind, the "turbulence" on the worldwide high-tech stockmarkets during 2000 should not have surprised us.[144] Still seen skeptical by some (see Revolution, Evolution or Hype?), others have suggested that these advances will create a "long boom" (Schwatz, Leyden, 1997) that will take the economy to new highs over the next quarter century.

[143] Meaning a steaper increase until the diffusion rate gets exhausted. Then it will return to a rate with a similar ascent, but "parallel moved upwards".

[144] To justify the Price/Earnings ratio before the "turbulence" (which has been, roughly estimated at about 40; normally around 20 (see Shiller, Robert: Price Earnings-ratio 1880-2000, http://aida.econ.yale.edu/~shiller/)), the Real Cost Reduction (= the 'residual'; in other words: TFP) would need to double by constant prices, in order to obtain a profit margin 100% bigger. This seemed unrealistic to many economists long before the "crash".

3. Digital divide and the catch up

The "death of distance"[145] that is intrinsic to the information network, is at first glance supposed to bring our world closer and closer together. But in order to make this reality, both for individual citizens and for businesses, affordable access to the information network's infrastructure (what I refer to as e-frastructre) has become a necessity for effective participation in a knowledge-based economy and society.

There is unarguably a huge gap --a digital divide-- between those with access to digital technologies and those without. This gap is having tremendous effects **inside a society**, as well as **between different societies**.

3.1 A natural "sideeffect" of development?

To explain why this occurs we have to consider theories which investigate the effect of economic development on inequality. The traditional relationship here is the "Kuznets curve," named after Nobel laureate Simon Kuznets. The curve describes an inverted U-shaped relationship between inequality and growth: inequality first increases and later decreases in the process of economic development. Kuznets explained this in terms of a shift from the rural/agricultural sector of the economy to an urban/industrial sector. This paper here is dealing with the shift from Industrial Economics to Digital Economics and therefore it is not surprising that we can make use of the "Kuznets curve".

Why is the "digital divide problem" so important economically? Is it not a natural, very commonly known process that we have a 'S-shaped' diffusion curve with every introduction of something new --be it a product invention, new knowledge, new techniques or any kind of 'revolution'? Economic growth is basically not growing gradually, equally distributed --like a balloon, being filled up with air or like 'yeast'. Economies are more likely to grow like 'mushrooms', having the habit of popping up, almost overnight, in a fashion that is not easy to predict (Harberger, 1998). This stems from the fact that the 'residual of growth' (also known as 'technical progress'), is driven by an unequally distributed 'creative destruction'. Therefore it is normal that some people are benefiting from the advances before others, due to the fact that they figuratively 'live closer' to where one of this 'mushrooms of innovation' (see: Innovation) popped up. The importance here is the ubiquity of Internet, its all-penetrating character and the velocity with which it is driving development. Given that Internet Economy propagates the 'First Come-First Serve' rule, time is running and leads can be built which seem impossible to catch up, for the one who once lagged behind. By the same reasoning we could claim that the catch up is easier once you are in.

Let us take a look at the business-to-business e-commerce (B2B) example from the previous section, in order to demonstrate the importance with some broad numbers. We said that roughly calculated a company could save up to 20 percent in product purchase and between 10 to 25 percent in process rationalization using B2B techniques (CCS, 2000). The United Stades is typically credited with about 70 percent of worldwide e-commerce activity (OECD, 2000). Forrester Research (1998) estimates that U.S. online business trade will soar to $1.3 Trillion by 2003. Given

[145] In 1995, Francis Cairncross, a journalist with the Economist, wrote an interesting article entitled "The Death of Distance". It dealt with the impact the advances in telecommunications and the Internet were having on distance. The article has been very influential and started vehement discussions between economists.
(for an opposition see for example: Salomon, "Telecommunications and the 'Death of Distance': Some Implications for Transport and Urban Areas," Hebrew University, Israel, http://www.bts.gov/tmip/papers/tmip/udes/salomon.htm)
In 1997 Cairncross published her book: "The Death of Distance : How the Communications Revolution Will Change Our Lives", (Harvard Business School Press). It start like this: "*The death of distance as a determinant of the cost of communications will probably be the single most important economic force shaping society in the first half of the next century. It will alter, in ways that are only dimly imaginable, decisions about where people live and work; concepts of national borders; patterns of international trade.*" (Cairncross, 1997)

the size of these numbers one can easily figure out how easily U.S. companies could increase their relative market lead almost over night, in comparison with companies which do not yet implement these new tools into their business strategy. Also considered the free market nature and the incredible speed in which all these changes take place, the effect of the digital divide on economic coherence and development is of outstanding importance. It is the task of governments and international institutions to find policies, which help shift the 'S-shaped' dispersion curve to the left as quick as possible.

In order to take concrete steps to redress the digital gap, one needs to clarify who is favored and who gets neglected by the advent of the digital age. But Internet usage is difficult to measure. Is Internet access already given, if a household possesses a computer and a telephone line? A person might have access to Internet but not use it, or only use basic applications like e-mail, which is distorting analyses about e-commerce. A person might have multiple Internet accounts -e.g. at home and at work or school. How do we count users who enter the net through 'public access', in universities, libraries or cyber cafés and how many household members are accessing the net through one single home account? Leading us to the distinction between access and computer literacy.

Like traditional commerce, electronic commerce requires a substantial **infrastructure**. Therefore another field falling into the concern of this chapter is the technical way of providing access. The spread of the new techniques is inseparable tied to technical development. There are several ways to obtain access to the cyber world. Some of the major end-use Internet access technologies to built out the e-frastructure would include: Telecommunications (POTS-Plain Old Telephone Service; ISDN-Integrated Services Digital Network; DSL-Digital Subscriber Line; Modems...), Satellite, Cable (TV), Wireless (WAP, UMTS…), Electronic Utilities (fiber cable). They all have different bandwidth[146] and cost structures.

The U.S. Department of Commerce estimates that within the next five to ten years, the vast majority of Americans should be able to interact with the Internet from their television sets, watch television on their PCs, and make telephone calls from both devices. These combined services will be brought to homes by satellite, wireless, microwave, television cable and telephone lines, all interconnected in one overall system (US. Dept. of Com., 1998). People will also access the Internet while being on the road. The development of UMTS and similar portable access possibilities are getting more sophisticated and are invading the market very quickly. To meet the increased demand in e-frastucture, consumer electronic companies, media giants, phone companies, computer companies, software firms, satellite builders, cell phone business, Internet service providers (ISP), television cable companies and, in a few cases, electronic utilities, are aggressively investing to build out the Internet, in some countries subsidized by government programs.

Generally speaking, throughout the world, on national and on international levels, regions with lower income show lower rates of Internet access when compared with higher income regions. Let us first start with having a look at the **international appearance** of the digital divide:

3.2 International divide

"The goal must be for information technology to deliver revolutionary breakthroughs in terms of giving the world's poor access to global economy". —Mark Malloch Brown, Administrator UN Development Program

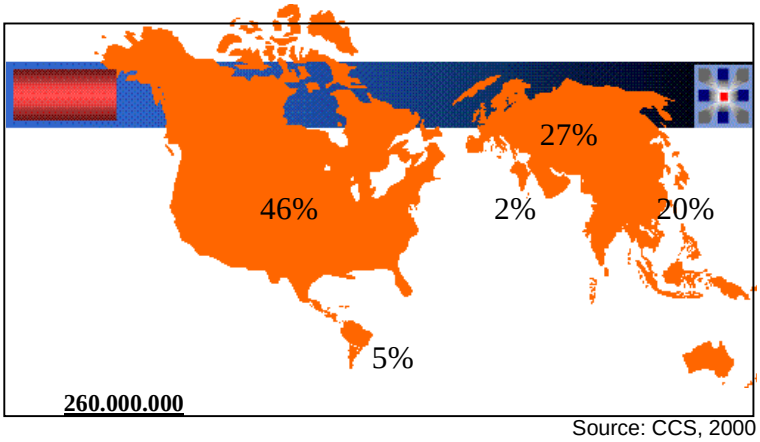
Access to telecommunications networks, as the raw material of the New Economy, is distinctly unequal on an international level. OECD countries accounted for 69.2 percent of the 741

[146] Bandwidth, measured in terms of bits per second, determines the speed at which data can flow through the computer and communications systems without interference. A bit (binary digit) is the smallest indivisible unit of digital information- either a one or a zero. One byte = 8 bits. Kbps=kilobites per second=1000bps; mbps=megabits per second=1,000,000bps; gbps=gigabites per second=1,000,000,000 bps. We talk about BROADBAND, if the data flow is higher than 256 Kbit/s.

million main telephone access lines in 1996 (ITU.int, 2000). While tele-densities ranged from 45-65 per 100 population in the developed countries, the average was 5.2 in the major non-OECD economies and only 4.5 in China and 1.5 in India (OECD, 2000). Visions about a global, knowledge-based New Economy and universal electronic commerce are hard to implement in a world where as much as half of its inhabitants have never made a telephone call, where a city like New York has more telephones than all of rural Asia or where you can find more Internet accounts in a town like London than in all of Africa (WRI, 2000).

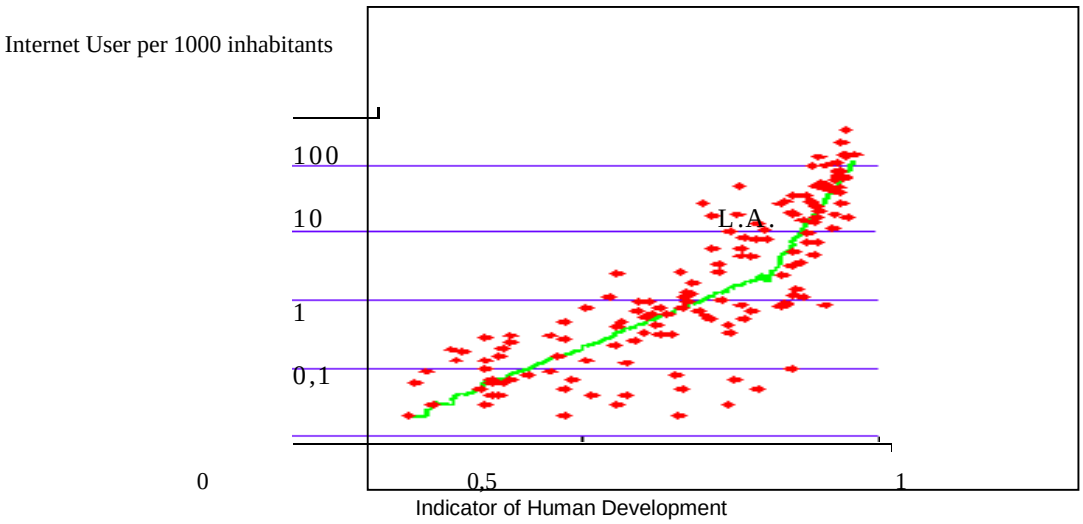
Numbers about the distribution of Internet access on an international basis seem pretty unequivocal:

Figure 27
INTERNET POPULATION 2000



Source: CCS, 2000

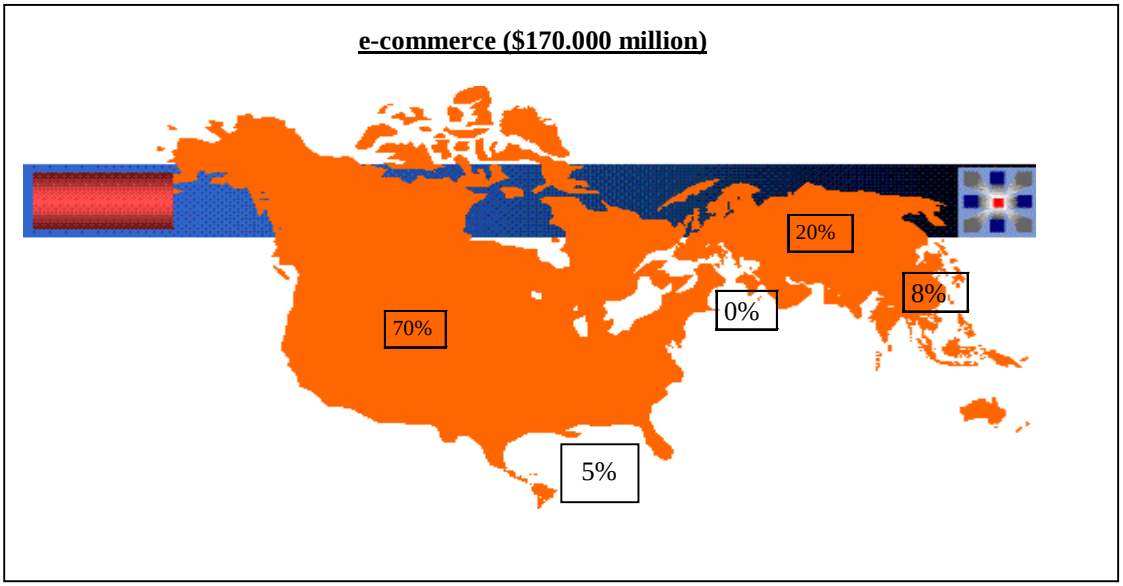
Figure 28
HUMAN DEVELOPMENT AND INTERNET DIFFUSION



Source: CCS, 2000

Logically, as the 'Global Information Infrastructure' is the raw material for electronic commerce, the access to the Network and the ability to trade on it, are clearly positively related.

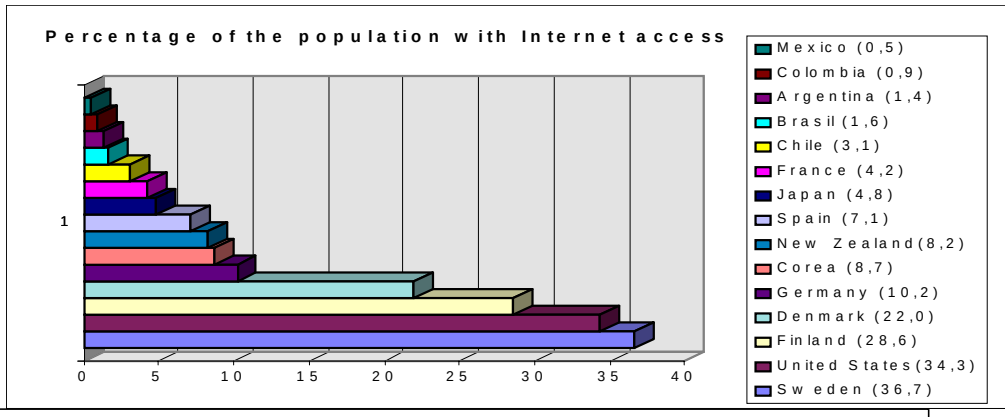
Figure 29
WORLDWIDE E-COMMERCE



Source: CCS, 2000

Of course network effects, consumer habits, inertia of consumer preferences and computer literacy are blurring and often multiplying the relation.

Figure 30
INTERNET ACCESS 1999



	Net Hosts per 10,000	PC's per 1,000	Mobile Phones per 1,000	Phone Lines per 1,000	GNP/Capita in $
Sub-Saharan Africa	2.0	8	5	14	1440
South Asia	0.2	3	1	19	1940
East Asia and the Pacific	2.0	14	25	70	3280
Middle East and North Africa	0.4	10	8	81	4630
Europe and Central Asia	15.0	34	23	200	5510
Latin America and Caribbean	15.0	34	45	123	6340
United States	1,509.0	459	256	661	20314
European Union	608.0	311	230	514	20440

Source: Camera de Commercio, Santiago,2000; Global Information Infrastructure Commission, 2000

On average, about 17 percent of the population in developed countries do have access to Internet, while in developing countries this comes down to 0.4 percent.

On the other hand we are used to seeing statistics about inequalities like this. This does not mean that we should accept it. Not only for the benefit of the poor, but also to encourage the global economy as a whole. The economy as a whole benefits a lot from what is generally known as network externalities. This is the exponential increase of benefits for every party, which is taking part in the process, resulting form the mutual, exponentially increasing possibility to interact[147].

Naturally, countries where the cost of access is low are generally heavier Internet users (and the other way around):

Table 6
ACCESS COST

Country	Internet hosts/1000	Average cost of 20h internet-use (1995-2000; in US$)
U.S.A.	160	35
Finland	123	34
Netherlands	52	52
Germany	20	69
Japan	10	89

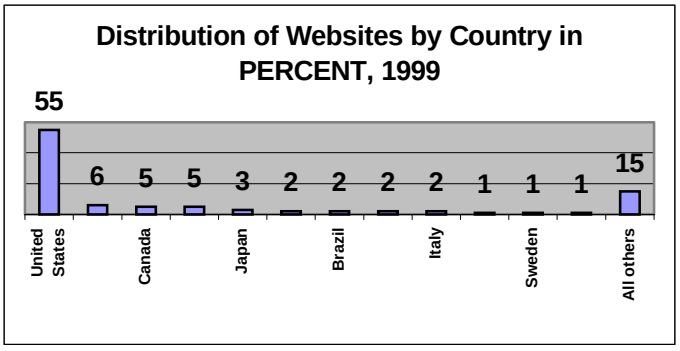
Source: OECD, 2000

Developing countries users pay on average three times more than rich country users to access the net (Woodall, 2000). According to an UNCTAD study, 20 hours of access a month in 1999 cost $90 in Mexico, equivalent to 15% of average income, compared with only $25 in the US, a mere 1% of average income. In Africa, average access charges top $200 a month.

These differences in 'hardware-distribution' have a multiplicative affect on whose voices are loudest heard in cyberspace.

Figure 31
WEBSITES DISTRIBUTION

Worldwide Distribution of Cone (.com, .org, .net, .edu) and CC Domains by Country, 1999)		
COUNTRY	**Number**	**% of Total**
US	3,001,150	54.60%
Germany de	375,464	06.80
UK uk	358,706	06.50
Canada ca	259,355	04.70
France fr	118,636	02.20
Netherlands nl	94,838	01.70
Denmark dk	90,178	01.60
Italy it	89,276	01.60
Japan jp	83,660	01.50
Switzerland ch	80,042	01.50
Sweden se	78,651	01.40
Brazil br	70,053	01.30
Argentina ar	66,880	01.20
Australia au	59,730	01.10
Spain es	49,700	00.90
Austria at	43,180	00.80
S Korea kr	42,096	00.80
China cn	39,003	00.70
S Africa za	33,408	00.60
Norway no	32,660	00.60
World Total	**5,491,696**	**100%**



Source: eMarketer.com, 2000

While some countries are already heavily investing on research, investigations and the final integration of the new economic features into their societies, in order to benefit from it the most possible, others have to fight with providing basic access to the knowledge-based economy. In this respect the gap is widening and the

[147] Network externalities arise for a product for which the utility that a user derives from consumption of the good increases with the number of other agents consuming the good (Katz and Shapiro, "Network Externalities, Competition and Compatibility,"; American Economic Review, 1985, 424-40). Suppose I already have one million people connected in a country and connect two million more. This advance will not only be beneficial to the second two millions, but due to network effects, also to the first two million (see: Measuring the Digital Economy).

Anglo-Saxon influence also has a clear effect on the material available on the network of networks. Only 20 percent of Internet content is in a language other than English (Helm, 1999). As measured by the distribution of the most commonly visited URLs in the .com, .org, .net, and .edu ("CONE") categories, the worldwide web is also weighted heavily toward the US. More than half of these URLs are located in the US, with most of the rest in Western European countries. Countries like China and Brazil have only a small portion of these addresses.

3.3 The catch up

Essentially in this connection, are thoughts about the **catch up** of all the nations following the United States into the digital age. The catch up process is nothing new. Given Harberger's 'economy of mushrooms', some kind of catch up comes naturally with any sort of technological change (convergence theories...). Considering that 90 percent of all technical advances are made in OECD countries, usually the developing countries are the ones to follow. Over the last decades we were able to observe a wide selection of efforts, focused on trying to keep up with technological and therefore productivity progress (reaching from Japanese product imitation to adventurous spy-stories during times of the cold war). The essential question now is, if due to the basic changes the introduction of the knowledge-based network society is bringing with it, the progress of the catch up will appear in a different light.

Basing on the generally accepted assumptions of the Knowledge Society and the Inter-Net-Working, I shall have a look on the interesting question if the Internet is acting as the "**Big Equalizer**" or the "**Big Divider**", in order to underline the challenges and chances many economies are facing. Some people see the Internet as the "Big Divider". This argumentation is based on the fact that most of what the Knowledge Society is concerned with, is taking place in cyberspace. Once you do not have access to this network of networks, you do not have a chance to keep up with general development. Others claim the Internet to be the "Big Equalizer". Comparing with the obstacles we have faced before, it has never been easier to bring everybody up to the same level.

3.3.1The big divider

In favor of the 'Big Divider' alternative would be the importance of the 'first-mover-advantage', which is helping to establish a dominant position. This seems to fit the reality until now:

Of the world's 50 biggest ICT companies by revenue, 36 are American, nine Japanese and four European (Woodall, 2000). Not to be connected to cyberspace, or not to be able to proactively use the possibilities of modern Information and Communication Technologies for one's own benefit, could mean a dangerous setback in many fields, since communication and information are the source of almost everything, including culture, health, politics, education, technology and business.

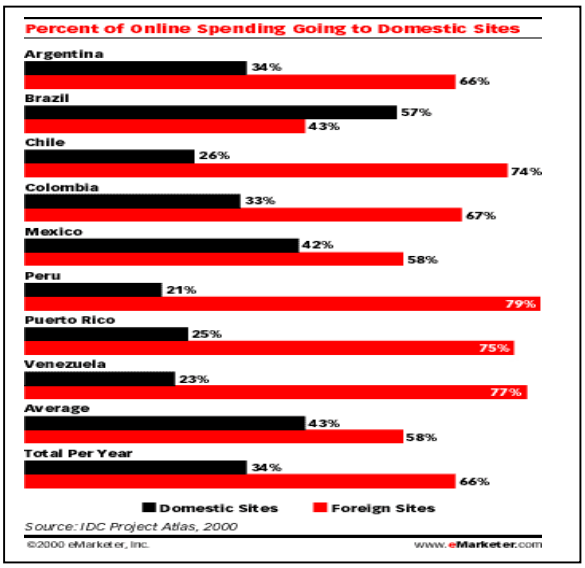
One of the issues of greatest concern is the "brain drain" which we can clearly see, due to missing ICT-experts in industrialized countries. It is not a new phenomena that qualified labor from developing countries seeks to find work in developed countries.

But a minimum degree of well-equipped labor force would be fundamental for the developing world, in order not to fall too far behind in a knowledge-based economy. If developed countries are to grow rapid in this field, to some extent this is going to take place through "attracting" brains from low developed countries.

Focusing on e-commerce, it is for example interesting that today in Chile 74% of the on-line shoppers buy through the net because they are looking for goods, which are not available inside the country (emarketer.com, 2000). That implies that the shift in power from sellers to buyers that the Internet inevitably entails, favors of the countries which the richest product selection and will therefore harm less developed countries.

This is almost like a customer becoming a member of another economy. Assuming the worst scenario this could end up in a kind of '**voluntary imperialism**', given that the members of poorer economies are neglecting the long term prosperity of their own economies, by handing themselves over to a tempting, but dangerous dependence. Such dependency could emerge in almost every aspect of life (think of culture or education[148]).

Figure 32
ONLINE SPENDING GOING TO FOREIGN SITES



Source: eMarketer.com, 2000

3.3.2 The big equalizer

Economies are increasingly based on knowledge. As already mentioned in the introduction, the generation, processing and distribution of knowledge and information are the fundamental source of productivity, power and prosperity. While in the past much of the growth depended on the optimization of physical, labor and financial capital, nowadays information and communication (networking in the network of networks), are definitely the main source of long term growth.

Economists have a problem with knowledge because it seems to defy the basic economic law of scarcity. It is non-rival, meaning that it cannot be used up and it is very difficult to exclude somebody from its use. As we already specified in the introduction, it is not even the idea of networking to exclude somebody (see Innovation: Networking and therefore the First-mover-advantage as one of the most important ways to skim off profit in the New Economy).

Herein lies the difference between the digital 'catch up' and all the 'catch up' processes we have seen before. In the past the leading country did profit from patenting and selling the new inventions and products to their followers. Given the physical appearance of most inventions it was common practice to patent, to control the spread and to materialize its scarcity. Due to the high flow of the crucial input factor information and the central importance of networking (in the "network-economy"), the converging force seems to be stronger to many people. The argument is that it is in the interest of those countries that possess the technologies to transfer them. This is due to network

[148] We can think of the "dependency" on the movie-industry of the United States, which "hollywood-anized" the world. This also turned out to be a great influence in many cultures.

externalities. After obtaining access, the non-rivalry and "non-excludability"[149] of the decisive input factor in a knowledge-based society, will accelerate convergence.

To limit the spread of knowledge would be as, if this Japanese supermarket owner had tried to control and to sell his discovery of Just-In-Time mechanisms and its benefits. And often --like we can clearly see from the J-I-T example—it does not pay to keep new ideas to oneself, due to network economics (also think of C2C, B2C, B2B…). It would not be very useful for me to be just-in-time, if nobody else is. We could say that there is some kind of economies of scale in using and a need for collective action.

For example the major issue for the economies in Latin America, in order to close the productivity gap between them and economies operating on the technological frontier, was in recent years not so much *what* to produce anymore, but *how* to produce it[150]. Here we have to keep in mind that there is a difference between knowledge and information (see: The Knowledge Society). Contrary to information, 'know-how' is not digitalizable. It is the result of a learning experience (covered by the term *knowledge*, but not by *information*), but nevertheless it is a non-rival good, whose benefits are not solely limited to those who undertake the costs of developing it. It is characterized by uncontrollable spillovers and externalities. The ways to it are multiple and imprecise. New technology, for example, can be acquired by "research and investigation, by reverse engineering and imitation, by visiting and seeing" (Ramos, 2000). This last mentioned way of acquiring knowledge can be digitalized. One is able to observe, communicate and understand new techniques theoretically, through the virtual world. The death of distance can help to replace the physical- with an online- 'visiting and seeing'. Engineers do not need to mount a plane in order to have a conference with oversees colleagues and to get a better insight into modern production processes. Regarding globally born 'companies.com' and e-business, physical visiting and seeing is often becoming unnecessary, due non-physical appearance of these types of negotiations.

Of course surfing in the Web and accumulating theoretical information does not replace the course of the learning curve[151]. The implementation of the new ideas will be left to the developing countries themselves.

The all-penetrating and 'everything-changing' character of the process is also bringing a big risk of uncertainty for the pioneers. As so often in a time of great structural change, the latecomers can cherry-pick the best bits and avoid the mistakes already made[152]. It is claimed that this includes the chance to "**leapfrog**" into the development mainstream, for example by skipping old technologies (slowly transmitting intermediate stages[153]…) or by omitting economic models that already became obsolete. The process of adopting and imitating is a also lot cheaper than trail-blazing, not only because cutting-edge innovations like B2B- or B2G-commerce can be copied in a very elaborate and professional way right from the start. Also thanks to falling prices in ICT. Developing countries were able to obtain the same level of computer processing power in 1999, for about 10 percent of the investments that U.S. firms made in 1993, for example.

Moreover, the Internet allows developing countries keep abreast more easily on the academic progress of the sciences. The transparency of knowledge can be used by the creation of virtual

[149] Of course we should not forget the appropiability and intellectual property issue here.

[150] Joseph Ramos; in "Policy Directions for the New Economic Model in Latin America", 2000: "...the basic reason why we are still but semi-developed economies is not because of a productive structure disproportionately centered in less technologically sophisticated activities. Rather it is because virtually all of our productive sectors operate well below the technological frontier, with productivity levels typically of the order of 1/3 of international best practice, and that this is not only the case of Smells but of almost all but a handful of firms..." (Ramos, 2000).

[151] Like I already mentioned in the Introduction, I am also convinced that virtual contact will never be able to completely substitute human contact.

[152] Paul Saffo / California's Institute for the Future: "The early bird may catch the worm, but it is always the second mouse that gets the cheese".

[153] Such as copper wires and analogue telephones. By directly stepping into the age of the wireless Internet access, a lot of geographical obstacles can be overcome right away.

classrooms[154], or the access to the world's top libraries through a single Internet connection. There we also have to keep in mind the negative effects of these practices, like the standardization of knowledge. The moving frontiers between tradable and non-tradable goods (see Digital vs. Non-Digital Goods), together with the falling costs of worldwide communication is also helping to execute the international divide of labor more efficiently. Many goods and services, formally considered as non-tradable, have been outsourced to developing countries. As this trend progresses, it should help poorer countries to attract even more foreign direct investments.

Developing countries also often have advantages regarding flexibility in adopting the new technologies. For example, strict employment-protection laws block the swift reallocation of workers from old to new industries in Europe and in Japan. A study made by the OECD shows clearly that economies with the most flexible arrangements have adopted ICT more swiftly, and have also seen a better performance in TFP growth in the 1990s. Structural rigidities, which get in the way of e-commerce,[155] will have to be overcome in the old continent and Japan. Here the much greater political and jurisprudential flexibility of many developing countries can favor the pace of their catch up.

Here we can clearly see that the introduction of modern ICT is not an all-curing panacea. Also in a world 'without' information asymmetry, there is nothing automatic about the process of economic catch-up. Developing countries need to put in place other policies as well: opening markets to foreign trade and investment, liberalizing telecommunications, setting a solid legal bases, like protecting property rights and ensuring an effective legal system, providing efficient financial markets, a proper infrastructure and education, education, education!

Latin America, for example, is well behind in its educational standards, even though education is the foundation of a knowledge-based economy. East Asian economies are a little bit more advanced in this respect. A regional comprehension and awareness of the new economic coherence is as important for developing countries as the plain access to the network-economy. They need to make their stand in the emerging Digital Economy in order to best take advantage of the given chances and to avoid a threatening economic set back, by maneuvering themselves once again into a dangerous dependency.

All of this is leaving developing countries tremendous challenges, but even greater chances.

3.4 Domestic divide

Equal access to the decisive import factor information on a **national basis,** has to be analyzed in two different aspects.

We should differentiate between the integration of Interment as regards to the households for one side, and as regards to firms, for the other side. Furthermore we should consider that the digital divide always deals with *connectivity* first of all, but also with the degree of *skills and computer literacy*. These might be closely connected, but are not to be confused.

As demonstrated in many countries, the role of the governments in this aspect should be highly proactive and by no means neutral. There are some best practices (Canada, Scandinavian countries...). We already had a brief look at some of them in the section on government.

3.4.1 Households

[154] The African Virtual University, which is partly financed by the World Bank, uses satellites to broadcast televised courses to students in 15 African countries, who communicate with teachers by e-mail, fax and telephone.

[155] Such as a German law that forbids shops from discounting prices by more than 3% below the manufacturer's recommended price, or the Japanese *keiretsu* system, a network of shareholding relationships that links manufacturers with their preferred suppliers and retailers. National restrictions on shop-opening hours, strict rules on pricing and promotion, etc. are getting in the way of the cyber age.

Here we can identify different features characterizing the divide. The Global Information Infrastructure Commission, for example, is highlighting three characteristics: regional (areas or States inside a country…), local (neighborhoods, towns, schools…) and individual (race, region, class, sex age educational level…). The National Telecommunication and Information Administration (NTIA) have profoundly researched the digital divide as regards to the **households** in the U.S. (ntia, 2000). In their regularly updated report "Falling Through the Net: Defining the Digital Divide" they examine which American households have access to telephones, computers, and the Interment, and which do not. They look at how people are connected to the Internet; where people access the Internet outside the home (such as at work, school, a library, or a community center); how Americans choose to spend their time online; and why some people are not connected. As a result they find that certain people are more likely to have Internet access than others.

EXERPTS of "FALLING THROUGH THE NET: DEFINING THE DIGITAL DIVIDE":

Table 7
DOMESTIC DIGITAL DIVIDE IN THE U.S.
THE GROWING DIGITAL DIVIDES BY INCOME AND EDUCATION: 1997-1998
INTERNET ACCESS

Digital Divide by Income*				
	1997 Divide (Compared to $75,000+)	1998 Divide (Compared to $75,000+)	Change from 1997-1998 (1998 Divide-1997 Divide)	% Change from 1997-1998
Under $5,000	42	52.2	10.2	24.3%
5,000-9,999	45.3	54.2	8.9	19.6%
10,000-14,999	44.3	52.9	8.6	19.4%
15,000-19,999	42.2	50.5	8.3	19.7%
20,000-24,999	40.2	48.2	8.0	19.9%
25,000-34,999	35.3	41.2	5.9	16.7%
35,000-49,999	28.4	30.8	2.4	8.5%
50,000-74,999	16.8	16.4	-0.4	-2.4%

*The Table examines the changing digital divide with regard to income for Internet access. The "1997 divide" and "1998 divide" are the difference between the Internet access rate for a given income bracket and the Internet access rate for the $75,000+ bracket (the standard used here) for both years. The "Change from 1997-1998" represents the change in the gaps between the two years, and is also represented as a percentage increase or decrease from 1997.

Source: *ntia (2000)*

Table 8
DIGITAL DIVIDE BY EDUCATION

Digital Divide by Education*				
	1997 Divide (Compared to B.A. or more)	1998 Divide (Compared to B.A. or more)	Change from 1997-1998 (1998 Divide-1997 Divide)	% Change from 1997-1998
Elementary: 0-8 years	36.6	45.8	9.2	25.1%
Some H.S.: no Diploma	35.3	42.6	7.3	20.7%
H.S. Diploma/GED	28.8	32.6	3.8	13.2%
Some College	16.5	18.7	2.2	13.3%

*The Table examines the changing digital divide with regard to education for Internet access. The "1997 divide" and "1998 divide" are the difference between the Internet access rate for a given education level and the Internet access rate for those with a bachelors degree or higher (the standard used here) for both years. The "Change from 1997-1998" represents the change in the gaps between the two years, and is also represented as a percentage increase or decrease from 1997.

Source: *ntia (2000)*

Figure 33
Falling through the Net

Chart I-21: Percent of U.S. Households Using the Internet By Income
By U.S., Rural, Urban, and Central City Areas1998

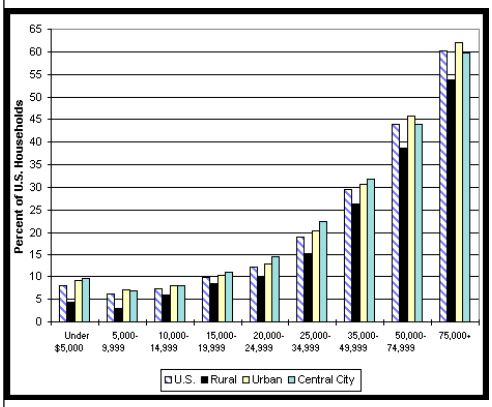


Chart I-26: Percent of U.S. Households Using the Internet: By Household Type1998

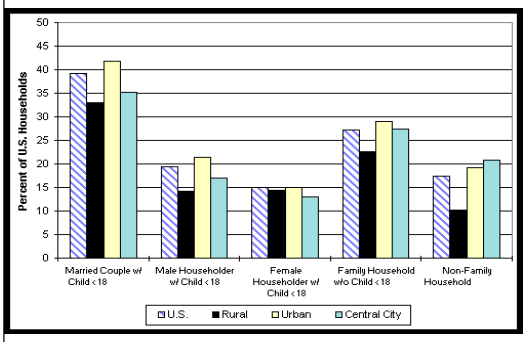


Chart I-25: Percent of U.S. Households Using the Internet: By Education and By U.S., Rural, Urban, and Central City Areas 1998

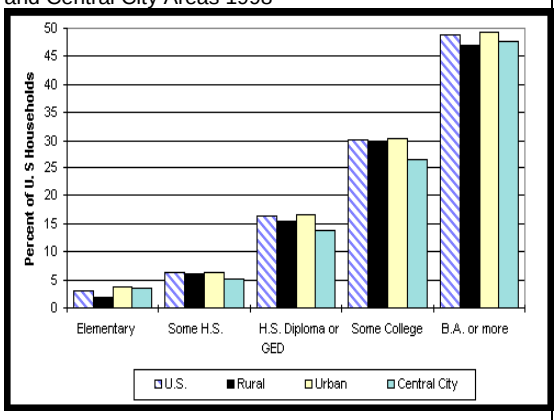
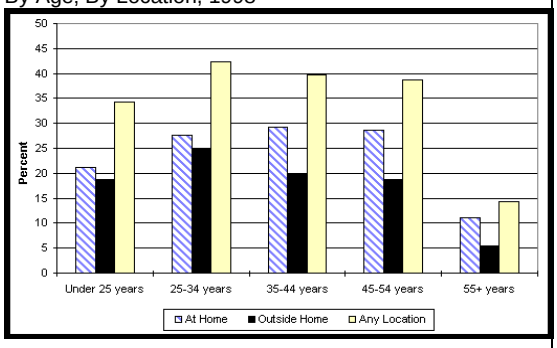


Chart II-12: Percent of U.S. Persons Using the Internet By Age; By Location, 1998



The 1998 data reveal significant disparities, including the following:

- Urban households with incomes of $75,000 and higher are more than twenty times more likely to have access to the Internet than rural households at the lowest income levels, and more than nine times as likely to have a computer at home.
- Whites are more likely to have access to the Internet from home than Blacks or Hispanics have from any location.
- Black and Hispanic households are approximately one-third as likely to have home Internet access as households of Asian/Pacific Islander descent, and roughly two-fifths as likely as White households.
- Regardless of income level, Americans living in rural areas are lagging behind in Internet access. Indeed, at the lowest income levels, those in urban areas are more than twice as likely to have Internet access than those earning the same income in rural areas.

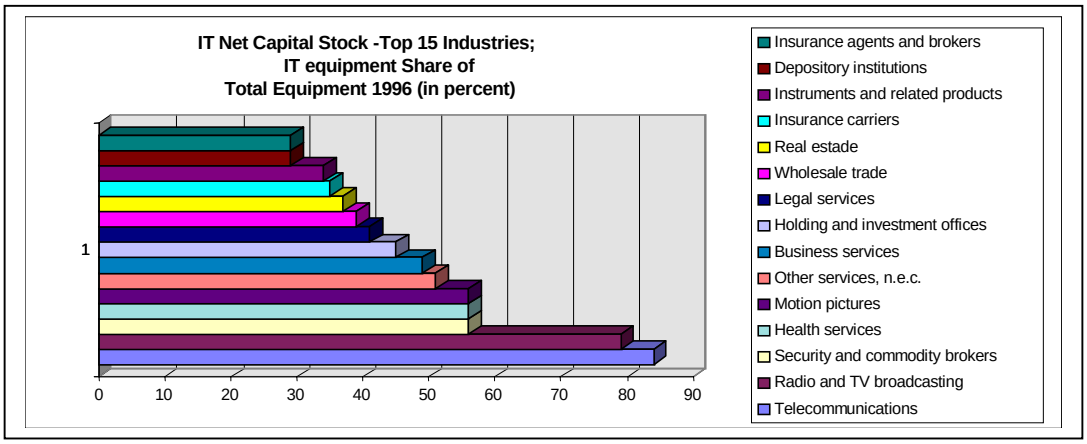
Source: ntia (2000)

It is very difficult to generalize the national digital divide between households. But I think it safe to claim that education, youthfulness and income are highly positively related to Internet usage.

3.4.2 Business

Moreover we should also examine the equalizer or divider role of the Internet as regards to **companies**. Obviously some industries are taking better advantage of the new technology than others are and some industries cannot take a lot of advantage of it.

Figure: 34
IT-SHARE OF TOTAL EQUIPMENT



Source: U.S. Department of Commerce, 1998.

Looking at it from this point of view, we could turn the question of the 'Digital Divide' around, and claim that the divide is stemming from the fact that the highly ICT-affected industries are less important in developing countries. Also part of the digital divide is the question whether the Internet narrows or widens the gap between big and small companies (see: Big is Beautiful?).

As conclusion, we should keep in mind that at the end, the digital divide is a very natural phenomenon. We should furthermore keep in mind that due to certain circumstances the New Economy is bringing with it (like the non-excludible information as the most important input factor, the falling prices of IT...) the Internet could turn out to be the 'Big Equalizer' in the long run. What needs to be done is lay the foundation stone and facilitate the process as best we can[156].

4. Labour markets

To assess the impact of the digital economy, it is essential to understand the changes in employment demand, geographical assumptions, wage structure, and what the overall needs are in terms of skills.

There are also many factors which effect the labor market *indirect*ly, like organizational change or market competition, already examined in the second part of the paper. The general impact of the New Economy on the job market is thus the result of a complex balance with many factors influencing. It is fairly difficult to make some generalizations about employment development, since the labor market is of course strongly connected with Internet development and the implementation of these new possibilities. This differs of course between countries. Important, especially for developing countries, is to consider, for example, that growth in demand for IT-products will partly be met by increased imports. Therefore, the most dynamic industry in terms of employment growth in OECD countries, which is software (OECD, 2000), is likely to have a minimum effect of employment structures in low developed countries. I will therefore just try to

[156] One of many ways of doing so would be to write papers, like I am doing it in this very moment.

highlight some observable trends in some specific countries, --like always in this paper-- leaving the detailed investigation up to further research.

Table 9
IT-RELATED OCCUPATIONS

Engineering, science and computer system managers	Computer programmers
Electrical and electronics engineers	Data processing equipment repairers
Electrical powerline installers and repairers	Electromechanical equipment assemblers,precision
Electrical and electronics technicians	Data entry keyers, composing
Broadcast technicians	Electronical and electronic equipment assemblers, prec.
Computer equipment operators	Duplicating, mail and office machine operators
Electronic semiconductor processors	Billing, posting and calculating machine operators
Communications equipment operators	Electronics repairers, commercial and industrial equip.
Telephone and Cable TV installers and repairs	Central office and PBX installers and repairers
Computer engineers , scientists, and system analysts	

Source: U.S. Departmet of Commerce; "The Emerging Digital Economy 2", June 1999, p.40.

The U.S. Bureau of Labor Statistics is predicting that in the U.S. almost half (49 percent) of the private work force will be employed in IT-related jobs, by 2006.

4.1 Employment demand

To begin with let us take a look at shifts in employment demand. The overall effect of the digital economy on employment will be the balance of direct new jobs, indirect jobs created by increased demand and productivity, and job losses. This "churning effect" (U.S. Department of Commerce, 1998) occurs as demand increases even as technology renders some processes and equipment obsolete, as technology is directly substituted for labor, or as technology complements labor, allowing fewer workers to maintain the same level of output. Here we have to consider that the long-term effect could be totally different from what is shown by analyses right now. We also have to consider, in order to conceptualize relative demand shifts that these originate from two types of changes: those that occur within industries (including pure skill-biased technological change, changes in the relative prices or supplies of non-labor inputs and changes in outpouring activity) and those that occur between industries (due to sectoral differences in productivity growth and shifts in product demand caused by changes of domestic or international trade) (Katz L., 1999).

Let us have a brief look at some affected industries:

@Multimedia: Some online services in this industry are relatively new and are predicted to grow. Others are replacing existing ones. For example, the move towards digital goods and online services will reduce employment for physical delivery systems and stand-alone media, such as printed text and CD-ROMs. However, network-based distribution of content is expected to increase demand for technical, creative, managerial/administrative staff and direct marketing positions (OECD, 2000). One report on electronic publishing (European Commission, 1997d), estimates that one million jobs will be created in electronic publishing in Europe in the next ten years for example. These job gains will have to be balanced against job declines in the print media industry. The traditional U.S. publishing industry, is projected to see its overall employment share drop from 1.26 percent (1996) to 1.08 percent (2006) (OECD, 2000).

@Postal and Delivery Services: This industry is the classical example, usually used to visualize the impact of the Digital Economy on employment. Without a doubt we can already see the most obvious changes here. It is easy to see that, since e-mail messaging is growing fast, traditional mailing activities are getting replaced. Also online information services, relief the mailman from daily newspaper delivery. This is getting intensified as the trend towards the

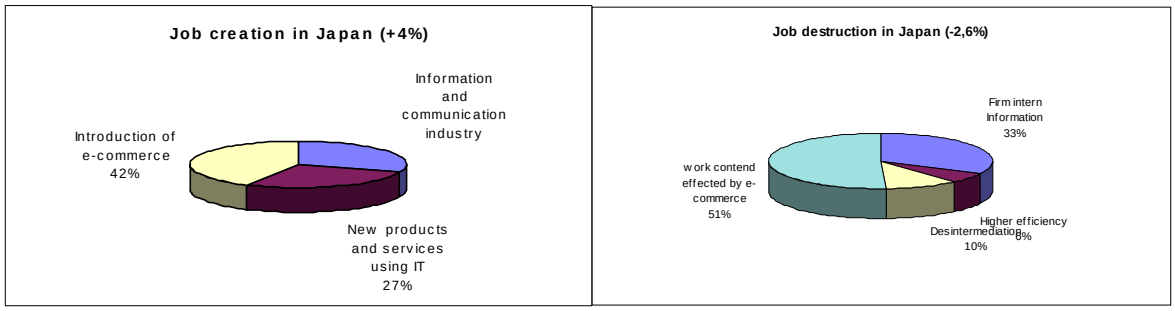
digitalization of goods is proceeding. Looking on the other hand on non-digital retailing, the demand on delivery service is increasing, due to the fact that the buyer does not walk into the 'bookstore' anymore, but gets its 'book' delivered. This is shifting the focus increase demand for Post Office delivery services and actors such as DHL, Federal Express and United Parcel Service (see: Digital vs. Non-Digital Goods).

@Retailing: Another industry expected to be majorly affected by electronic commerce is traditional retailing. While e-commerce may lead to expanded employment in the near term, as retailers maintain a presence in both physical and cyber channels, disintermediation and the changes in the value-added chain, discussed in the second part of the paper, are expected to have a negative impact on employment in this sector. In particular, by looking on the restructuring and reorganization of (online and off-line) retail activities, direct job losses should be weighed against potential indirect job gains due to efficiency gains and increased demand at the economy level.

@Banking Sector: Due to the profound integration of Internet into this sector, it is also likely to be significantly affected by electronic commerce. Preliminary results from the Canadian Survey of Innovation (1996) reveal that 82 percent (representing 99 percent of the total sample revenues) of the banks (chartered banks, other banking intermediaries, and trust companies) are using the Internet, and that 19 percent (representing 86 percent of the total sample revenues) use it to sell goods and services (OECD, 2000). In moving banking out of branches and onto networks, Finland, a leader in the use of electronic payments, has seen a 3.5 percent annual decline in bank employment, resulting in a cut of more than a third of the jobs between 1984 and 1996 (OECD, 2000). For the banking sector, one of the major keys might be lying not in simply dismissing brokers, but by redefining brokers' functions.

@Travel agents: Travel agents have on one hand, been one of the typical victims of disintermediation. Airlines are increasingly dealing directly with customers via Internet. On the other hand, virtual travel agencies, which combine price advantages with ready access to a server available 24 hours a day, are emerging. Real evidence of noticeable net job creation in online trade is lacking or varies -depending on the sources. Often it depends on the extent to which there will be substitution between off-line and online products. All in all, most studies made on employment effects find a positive relationship between technology adoption and employment at firm level. Investigations in Japan claim that the introduction of ICT will create jobs at a magnitude of 4 percent of their working force between 2000 and 2004 and as counterpart, will destroy 2.6 percent. In the US employment in ICT producing industries grew by 2.4 percent annually between 1989 and 1997, compared with a 1.7 percent annual rate of growth for all private industries (U.S. Department of Commerce,1998).

Figure 35
CHURNING EFFECT



Source: Foreign Ministry of Industry and Commerce Japan, Anderson Consulting.

4.2 Skill requirements

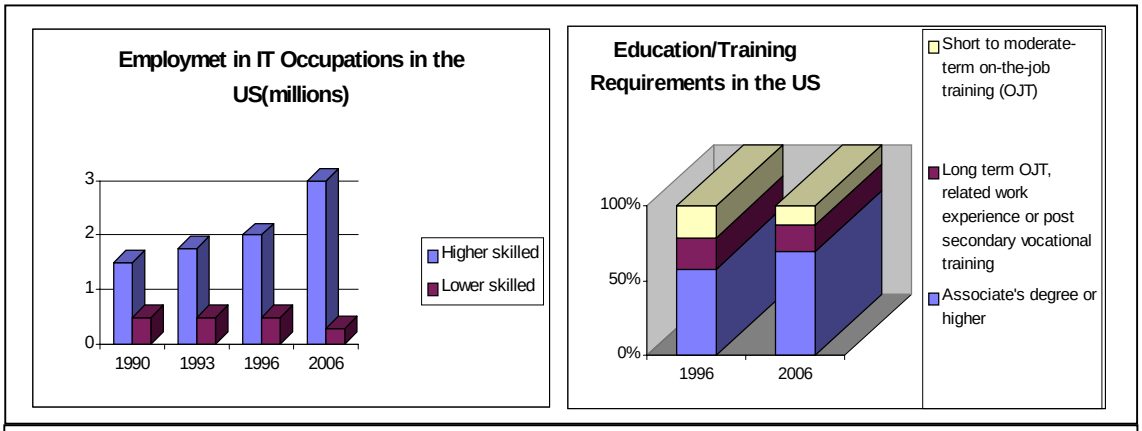
Additionally to this positive impact on employment quantity, there is an undeniable upward trend in quality of jobs, related to higher skill requirements. According to some research on development within-industry, there exist strong positive correlation between industry-**level** indicators of technological change (computer investments, the growth of employee computer use, R&D expenditures, utilization of scientists and engineers, changes in capital intensity measures) and the within-industry growth in the relative employment of more-skilled workers (Allen, 1997; Autor, Katz, Krueger, 1998; Berman, Bound, Griliches, 1994; Machin, Van Reenen, 1998; Wolff, 1996). This leads us to our second focus of the changes in labor markets:

When talking about shifts in **skill requirements** of labor, one will inevitably end up discussion about changing the educational system. But in order to get there, one needs to analyze what are the new requirements.

Mechanization in the nineteenth century associated with the movement from artesanal production (intensive in skilled craft workers) to factory production (intensive in unskilled labor) appears to have been largely de-skilling (Goldin, Katz L., 1998).

In times of the New Economy there is an accelerating and yet existing up-skilling trend. The demand for higher skilled ICT jobs is growing dramatically in the U.S., while the demand for lesser-skilled jobs is expected to decline. Future employment demands absolutely favor highly educated ICT workers.

Figure 36
SKILL REQUIREMENTS



Demand Should Grow for Highly skilled IT Workers, Lower Skilled Jobs Decline. Higher skilled IT workers include electric and computer engineers, scientists, programmers, and systems analysts. Lower skilled IT workers would include computer and office machine operators.

Source: U.S. Department of Commerce, 1998

On the one hand ICT specialists are needed. On the other hand workers in a variety of non-ICT occupations find themselves using computers and computerized devices to perform their jobs. United Parcel Service (UPS) executives note that just 10 years ago, no one would have thought their truck drivers would have to pass a computer proficiency test in addition to a driving test (Kelly, 1998). A certain computer literacy is becoming an essential component of every job.

There is something like a natural progress of job requirements towards ICT-related duties. Mathematicians, statisticians, economists and operations research analysts find themselves thrown into ICT jobs. This progress is natural to the effect that modern ICT is all embracing, omniscient and therefore all penetrating.

However, there are instances where ICT has lowered skill requirements or “de-skilled” workers. For example, workers at retail establishments use scanners for inventory-control and

checkout services. However, empirical research suggests that overall, ICT is driving more skills upgrading than "de-skilling".

In the Introduction we already mentioned the need for a "**knowledgeable worker"**: "'Life-long learning' and 'training-on-the-job' require a different attitude of the worker towards his profession. (...) He will need to make a constant effort in order not to loose track of current development, regarding his art." (see: The Knowledge Society) This need for a flexible and open-minded worker is not only required with regards to maintaining a job, but also in a sense that fluctuation between different jobs is increasing. Countries with a very rigid tradition in this respect (like Germany) will have to undergo fundamental changes. Retraining of labor force will shift into the center of attention in the coming years. Policies to cope with skill mismatches are already one of the major concerns of many governments in OECD countries. According to A.Greenspan, today more than one-fourth of all undergraduates in the U.S. is over thirty years old and of those over thirty, one-fifth are enrolled in full-time programs (Greenspan, 1999).

This already brings us back to the **educational system**, an issue of great importance in a knowledge-based economy. With respect to the labor market in particular, we can see a two-track development. Positions demanding ICT-skills typically require at least some kind of university degree. But due to the speed of the process, the urgent demands on the market and the self explaining nature of most of the Information and Communication Technologies (technical intelligence), we can observe some amazing phenomenon with respect to self education[157]. Very often there are very young teenagers who know better how to handle a computer than many of their adult counterparts with university degrees.

It is essential to stay very open-minded when thinking about how the future work force will look like. As the worker has to adapt to the new tools, and will have to learn how to get by in the Knowledge Society and a New Economy, these new tools can easily come around and change the whole structure of the society.

"Who could have foreseen in Michael Faraday's time, that electricity would eventually release women to go out to work, transforming the shape of the family,...?" (Cairncross, 1997)

Nowadays we are in a similar situation. We talk about a '24-7 business world'. The Internet is making the worldwide economy to a single 24-hours stockmarket, which is open 7 days a week. And we know that "on the stockmarket money never sleeps." We cannot yet foresee how this development will effect labor markets and our societies[158].

4.3 Geographical requirements

What is already a little bit more obvious is how the 'death of distance' is stirring up the domestic and the international labor market.

The digital age is shaking the **domestic** job market through its omnipresence and its innovational spirit. We know about workers who do not need to 'go to work' every morning anymore, because they are working out of their homes. This kind of flexibility will come paramount, as the question will not be about where the worker has his desk or his office, but if he has one. The worker's ability to work without being tied to a desk or an office is shifting into the

[157] Remember the example of the Philippines.

[158] Garry McGovern; "The Caring Economy"; 2000: "Those of us over 30 were born and reared in the industrial age. We ate, slept and drank its philosophical tenets. They were in front of us every day, in our homes, in our workplaces, in the newspapers, in our conversations, in our classrooms and playgrounds. In our social and economic structures. We understood terms, such as the 'working class', the 'five-day week', '9-to-5' and 'lifetime employment'.
Our children will imbue a digital age philosophy in a natural day to day manner, but we of the older generations must work much harder. We need to shed much of the skin of our industrial age philosophy and thinking, and then learn to wear the philosophy and thinking of the digital age. We need to understand new terms, such as cyberspace, e-commerce, globalization, teleworking and virtual organizations"(McGovern, 2000).

center of attention, as virtual offices --easily applicable to a company situated in cyberspace-- will become more common. Also the wireless access technologies are bringing a tremendous dynamic into working habits. We were able to observe in recent years, how the working habits of many business people became more flexible due to the common use of cellular phones. It is easy to figure out that the introduction of a portable access to the Network of networks will turn the business world upside down in the years to come.

Closely related to this dynamics is the net impact of electronic commerce on working and leisure time and its broader effects on the economy. Some claim that for all their power, all their potential, all their promise, computers and Internet have not delivered 'the leisure society'. Quite the opposite. Those who have jobs today work harder and longer than they ever did[159]. In particular, it will be interesting to observe in coming years, whether reduced or additionally-created leisure time retards or spurs the demand for new information-based products and services, and under what conditions.

Other issues in discussion are if distance is really dying[160]. Employment in respect to geographic distribution of production and employment opportunities among large cities, smaller cities, suburban areas, and rural areas will undergo changes. But how and to what extent, is --of course very different as regards to the different countries, and also in general-- not yet foreseeable.

A major part of the discussion about the "death of distance" is, for me, missing a major point. One kind of distance is the distance between Santiago and Berlin. The other is the 'distance' that a person needs to cover to find the information he is looking for. We should be aware that there is something like a 'new geography', which is becoming important. It could be categorized as the geography of cyberspace, in allusion to the geography of the physical world. Also the geography of cyberspace does have hills and valleys, they just cannot be overcome by plane!

What already does have a major impact on domestic labor markets are so-called 'job sites'[161]. These are intermediaries which are networking between job seeker and worker seeking companies. This method could be characterized under the "allocative efficiency" of Internet Economics (see: Production and Allocative Efficiency).

As Internet and globalism go hand in hand, there are also new opportunities and serious challenges faced on the **international** labor market. The signals transmitted over the Internet do not recognize national borders by definition (www). Work on the same project can be done in several places or several countries without workers having to physically relocate. This is naturally favoring the international division of labor, with all its positive and negative effects. The challenges can be seen by the immigration laws enacted by many states, especially to satisfy their lack of skilled workers. [162] The other way around, it can also easily happen that high-skilled, high-paying jobs migrate to countries that can supply the needed talent (e.g.: Costa Rica & Intel). Or that single tasks, often labor intensive activities (such as data launching, accounting, etc.) are sent to countries with low salaries.

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[159] Garry McGovern; "The Caring Economy"; 2000: „If the computer industry has not delivered the leisure society, what has it delivered? Perhaps it has delivered the adrenaline society; the society that never sleeps, the society that is constantly bringing out new versions of itself, that never lets its products (or its people) get old."

[160] See for example:
F Cairncross, "The Death of Distance : How the Communications Revolution Will Change Our Lives"; Harvard Business School Press; 1997;
Gaspar,J.;Glaeser,E.; "Information Technology and the Future of Cities" ;Journal of Urban Economics43; 133-56; 1998 ;
Kolko, Jed. "The Death of Cities? The Death of Distance? Evidence from Geography of Commercial Internet Usage", unpublished, Harvard, 1999
I Salomon, "Telecommunications and the 'Death of Distance': Some Implications for Transport and Urban Areas," Hebrew University, Israel, http://www.bts.gov/tmip/papers/tmip/udes/salomon.htm

[161] e.g.: laborum.com

[162] US: H-1B, non-immigrating visas; Germany: governments gives time restricted "green-cards" to 20,000 foreign ICT specialist

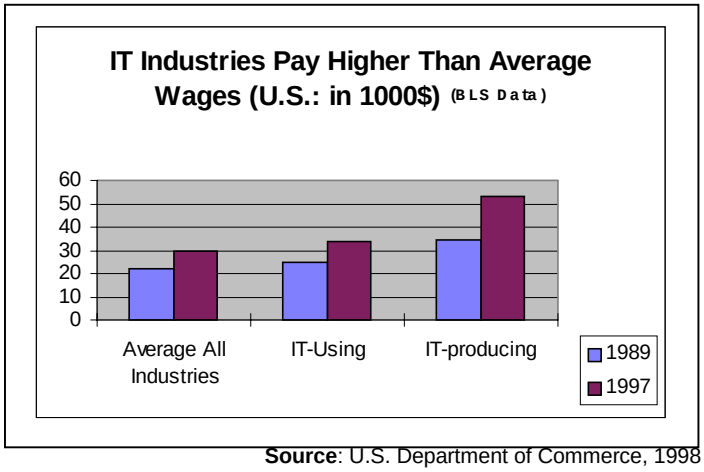
This is bringing us to one of the hottest topics in present day policy making of many governments. The 'skill matches.' Nowadays 40% of all computer students in U.S. colleges are foreign born (D'Amico, 1999). Focusing on the developing countries, we have to deal with the problem that the majority of skilled workers emigrate. Governments of developed countries have to justify policies to attract foreign workers, (like handling out working visas), to their own people, due to the often high rate of unemployment in their own countries. For developing countries the so-called "brain-drain" is one of the greatest threats.

4.4 Wage differentials

Sizeable and somewhat accelerated demand shifts, favoring more-skilled workers, a reduction in the rate of growth of the relative supply of more-educated workers and institutional changes all appear to have contributed to the large increase in wage inequality and educational **wage** differentials over the past two decades in many developed countries (Autor, Katz, 1999).[163]

The idea that wage differentials arise when a transition is taking place has a long history in economic thought.

Figure 37
WAGES IN IT-INDUSTRIES



Source: U.S. Department of Commerce, 1998

Starting in the 50s, economists have been taking this in account to explain the transition from the "traditional-" to the "modern" sector[164]. Wages in the modern sector are supposed to be higher, in order to motivate the fluctuation of labor force towards them. It should therefore not surprise that --parallel to the higher requirements in ICT-related jobs-- also the wages rise.

This is not only coming naturally because the demand for workers in this industry is very high, but also because the wage structure is directly linked to skill level or educational attainment, as it is generally supposed.

Concerning the long term effect of the Internet to pay structures, two different trends can be seen:

One is claiming that Internet will help to create a uniform market for skills and reduce pay variations within occupations, just like the 'virtualization' of the bookmarket has caused a move towards uniform book pricing (Woodall, 2000). The second alternative scenario is basing on the 'winner-takes-all' principle. This claims that those, who are slightly ahead of the pack, get paid over

[163] In contrast, in France, Germany and the Netherlands for example, where the supply of educated workers has grown rapidly, wage differentials have not increased over the past two decades. (Katz; 1999)

[164] $w = (W_M/W_T) > 1$; (Agosin; 2000; Ch.3)

the odds. Given the global scale and transparence of the New Economy, the premiums for superstar talents seem to have increased (Rosen, 1981).

All of this considered we have seen that the advent of the New Economy profoundly stirred up the national, as well as the international labor markets. Due to the high interdependence between international labor markets, and the deep cutting changes on national requirements, a lot of research is needed, in order to moderate the progress.

IV. Final remarks

As *"An Introduction to the Transition"* this paper is focused on creating a basic consciousness about the new economic coherence, which have been provoked by the introduction of modern Information Technologies. By basing on methods of traditional Industrial Economics, we saw that the old models are providing us with a stable framework when analyzing the New Age Economy. But we also saw the need of questioning almost every definition and proportion of economic coherence which have been valid in the 'brick and mortar' industry. To quote J.A.Schumpeter (in last work: "History Of Economic Analyses"; Ch.1,II: Why do we study the History of Economics?, 1954): "It is certainly better to scrap outworn modes of thought than to stick to them indefinitely. Nevertheless, we stand to profit from visits to the lumber room provided we do not stay there too long." Much of the literature about the New Economy is lacking direction, structure and system. Authors often cause confusion with the presentation of 'brand-new' economic models, which in the end is just the redefinition of something every Industrial Economist is already acquainted with. Of course there is often the need of refocusing. Some of the features which are now moving to the center of attention today, have been exceptional, rarely used models before, and other considerations, which have been paramount in the 'old economy' are pushed to the side, while the transition "from bricks to clicks" is evolutionizing. What needs to be done is to "*digitalize the economy*". Taking this phrase literally, we know that digitalization means the decomposition of something into the smallest, indivisible parts of its consistence. Then these "bits" are getting transformed to a new destination. Here is where the work of economists is situated. The very basic definitions need to be questioned and analyzed (decomposed):

What is an economy? What is meant by knowledge-based economy? How is a production process composed? What determines value? Where does commerce take place? What are the basic conditions of the new platform of trade? What is meant by network-economy? How do we measure economic output? What is characterizing a good? What is effective? What is good performance? Is big beautiful? What is a competing group? What determines barriers of entry? What about money? What is property? How can I make profit out of my property? What is determining a price? When do I network and when do I compete? What are frictions in markets? What determines a sales-strategy? How do supply and demand adjust? How do companies get financed and what are the conditions for a company to grow? When is governmental interference needed? What is determining growth? What is a worker? Does the leader or the strategic follower profit more...??? This paper gave a brief introduction to all of these --and many more questions of this kind.

Then all these little bits need to be put together in place, in order to show the whole picture again. Of course, also the new picture is still consisting of the same basic particles (bits). But as this paper already has shown, the focus is changing. Coherences appear "in a different light". The New Economy is nothing mystic, it just needs to be untangled. This became absolutely necessary, because we should not forget that the New Economy and the transition to the Knowledge Society is a profound and fundamental change. Unfortunately we often tend to overestimate the short term impact of changes and forget to consider the long term effects. The New Economy is not really reflected in the daily rise and fall of the Nasdaq. In allusion to the great Immanuel Kant (1724-1804), we could say that in the long run our "Formen sinnlicher Anschauung" (Kant, 1787)[165] are getting influenced –since the two principles of "Formen sinnlicher Anschauung" are time and space. The effects of what we can already see today are very far reaching. Therefore, a profound scientific base needs to be laid, in order to moderate and facilitate the ***transition*** we are in.

[165] Kant, Immanuel, "The Critique of Pure Reason", translation into English by J.M.D.Meiklejohn: online: http://www.wmelchior.com/wis/philo/kant/works/kdrv.txt

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