Chapter 1

History of Exploring the Information Market

1.1 Knowledge Workers in the Knowledge Economy

Information–understood as knowledge set in motion (as in a patent document, for instance)–and knowledge itself (e.g. the concrete content of the patented invention) first became the focus of economic studies around 1960. However, this does not mean that information had become an economic good all of a sudden. From the beginning of the modern era, especially pointedly in Francis Bacon's "knowledge is power" at the beginning of the 17th century (Stock, 2007, 26 et seq.), through Enlightenment and particularly in the course of the industrial revolution, the significance of information has been steadily on the rise (Ortner, 2006). Peter F. Drucker (1959) and Fritz Machlup (1962) in the U.S.A., as well as Tadao Umesao (1963) and Yujiro Hayashi (1969) in Japan (Duff et al., 1996) were the first to have pointed out this significance of knowledge for society and economics. In the period following, the terms

- Knowledge Industry / Information Industry,
- Knowledge Economy / Information Economy,
- Knowledge Society / Information Society

were coined, which are, respectively, viewed as more or less quasi-synonymous or as part-whole relations. Added to them were the terms

- Knowledge Worker / Information Worker.

With the advent of services and the foreseeable loss of jobs in the industry, Peter F. Drucker (1959, 91) "discovered" the "**knowledge workers**", who do little manual but a lot of intellectual work:

> Productive work, in today's society and economy, is work that applies vision, knowledge and concepts–work that is based on the mind rather than the hand.

This was accompanied with a new form of organizing enterprises (Drucker, 1959, 50 et seq.):

> The principles and concepts which automation applies to mechanical production-work have earlier been developed for non-mechanical work in the business enterprise. They are fast becoming the rule for the work of all those who are not 'workers' in the traditional usage of the word, but who work productively as technicians, professionals and managers.

Drucker was less concerned with knowledge itself than with the management of the companies that employ knowledge workers. Knowledge work is accomplished in teams, and knowledge workers are either (as a rule) directly integrated into the company or at the very least closely tied to it. Joseph (2005, 249) observes that

> knowledge is not treated explicitly and it is the organization that is in control. Knowledge workers do not have a real definition if they are not associated with an organization.

The publication "The Production and Distribution of Knowledge in the United States" (1962) by the Austrian-born Fritz Machlup was seminal for the economic exploration of the information market. Machlup was one of the first to formulate knowledge as static and information as dynamic. Knowledge is not transmitted; only information is subject to being sent and received (Stock, 2007, Ch. 3). Machlup (1962, 15) defines:

> to *inform* is an activity by which knowledge is conveyed; to *know* may be the result of having been informed. „Information" as the act of informing is designed to produce a state of knowing in someone's mind. „Information" as that which is being communicated becomes identical with „knowledge" in the sense of which is known. Thus, the difference lies not in the nouns when they refer to *what* one knows or is informed about; it lies in the nouns only when they are to refer to the *act* of informing and the *state* of knowing, respectively.

Knowledge–as in knowledge representation (Stock & Stock, 2008, 20 et seq.)–is defined very broadly, comprising "knowing how" and "knowing that", implicit and explicit, subjective and objective as well as scientific and every-day knowledge. Machlup (1962, 19) inclines to agree with Hayek (1945), who introduced knowledge in terms of a critique of Neoclassical Theory. While this theory (falsely, according to Hayek) assumes the prevalence of perfective information (consumers about prices, companies about production technologies etc.), Hayek stresses that information is never simply "a given" for an entire economy, but are dis-

tributed entirely unevenly, depending on the economic agent. Benoît Godin (2008a, 9-10) emphasizes:

> In Hayek's hands, the concept of knowledge was used as a criticism of perfect information in economic theory. … In real life, no one has perfect information, but they have the capacity and skill to find information.

Machlup (1962, 21 et seq.) classifies knowledge into five types:

- practical knowledge,
  - professional knowledge,
  - business knowledge,
  - knowledge of the worker,
  - political knowledge,
  - knowledge in the household,
  - other practical knowledge,
- intellectual knowledge,
- small-talk knowledge,
- spiritual knowledge,
- unwanted, superfluous knowledge.

It is a matter of both the production of said knowledge and its distribution via information. Godin (2008a, 12) summarizes Machlup's conception of knowledge:

> Defining knowledge as composed of all kinds of knowledge … was the first aspect of Machlup's definition of knowledge. The second was defining knowledge as both its production and distribution. To Machlup, information is knowledge only if it is communicated and used.

Machlup also regards the labor market of knowledge producers (1962, 393), but centre stage is taken by the knowledge economy's contribution toward the total valuation of a national economy (Webster, 1995, 11). According to Machlup, the following industries come under Knowledge Economy in the total economic account:

- education (domestic education, schools, universities, job training, education in church and the military, libraries),
- research and development (basic research, applied research and development),
- communication media (print products, photography, stage and cinema, broadcast and television, advertising, telecommunication media such as telephony and mail),
- "information machines" (printing machines, music instruments, film projectors, telephones, signaling systems, measuring instruments, typewriters, electronic computers, other office machines and their parts),

- "information services" (professional services: law, engineering, accounts, medicine, financial services, wholesalers, other business services, government).

In data acquisition, Machlup uses diverse sources outside official statistics, such as figures by the National Science Foundation, and also makes informed estimates. Machlup presents figures for every single industry of the Knowledge Economy, as well as aggregates for the industry level, which at the very least come close to measuring its valuation. Godin (2008a, 20) regards this as the essentials of Machlup's approach:

> Machlup then arrived at his famous estimate: the knowledge economy was worth $136.4 million, or 29% of GNP in 1958, had grown at a rate of 8.8% per year over the period 1947-58, and occupied people representing 26.9% of the national income.

In summary, Machlup discusses the effects of the further development of the Knowledge Industry on the labor market. His result points into two directions: (1.) The labor market for knowledge workers is getting larger (Machlup, 1962, 396-397):

> (W)hile the ascendary of knowledge-producing occupations has been an uninterrupted process, there has been a succession of occupations leading this movement, first clerical, then administrative and managerial, and now professional and technical personnel. Thus, the changing employment pattern indicates a continuing movement from manual to mental, and from less to more highly trained labor.

The last sentence of this quote already hints at the second trend. (2.) The labor market for untrained labor shrinks (Machlup, 1962, 397):

> If employment opportunities continue to improve for high-level-knowledge-producing labor and to worsen for unskilled manual labor, the danger of increasing unemployment among the latter becomes more serious.

Roughly ten years after Machlup's "Knowledge Economy", Daniel Bell (1973) called the goal of this development the "postindustrial society" and, a further six years later, the "information society" (Bell, 1979). The characteristics of such a postindustrial society are the prevalence of services on the labor market, at which point we have to critically parenthesize that not all services are automatically information services (Webster, 1995, 40). Alvin Toffler's "Third Wave" (1980) also describes–after agriculture (first wave) and industry (second wave)–his third wave as a postindustrial society.

1.2 Information Economy as Fourth Sector

A nine-volume work by Marc Uri Porat, dating from 1977, refines Machlup's approach and provides detailed statistical data of the United States' Information Economy. He thus lays the foundation for regarding information as an independent fourth economic sector, and acknowledging that this sector dominates the economy as a whole. Porat (1977, 2) defines "information" very broadly:

> Information is not a homogeneous good or service such as milk or iron ore. It is a collection or a bundle of many heterogeneous goods and services that together comprise an *activity* in the U.S. economy. For example, the informational requirements of organizing a firm include such diverse activities as research and development, managerial decision making, writing letters, filing invoices, data processing, telephone communication, and producing a host of memos, forms, reports, and control mechanisms. …
>
> Information is data that have been organized and communicated. The information activity includes all the resources consumed in producing, processing and distributing information goods and services.

Mainly, there are two fundamental differences to Machlup's approach (Porat, 1977, 44). Porat draws data and definitions for economic branches from official statistics and divides the Information Economy into two areas, the primary and the secondary information market. The **primary information sector** summarizes all branches that produce information machines or sell information services on (established) markets (Porat, 1977, 15). Information services have two central aspects: they are sold on markets and their utilization installs knowledge in the buyer (Porat, 1977, 22).

> The end product of all information service markets is knowledge. An information market enables the consumer to know something that was not known beforehand.

The **secondary information sector** comprises all sorts of bureaucracy, company administration as well as government agencies (Porat, 1977, 15 et seq.):

> It includes the costs of organizing firms, maintaining markets, developing and transmitting prices, regulating markets, monitoring the firm's behavior and making and enforcing rules.

These services of the secondary information sector are not offered on the market but performed internally in companies or the apparatus of state.

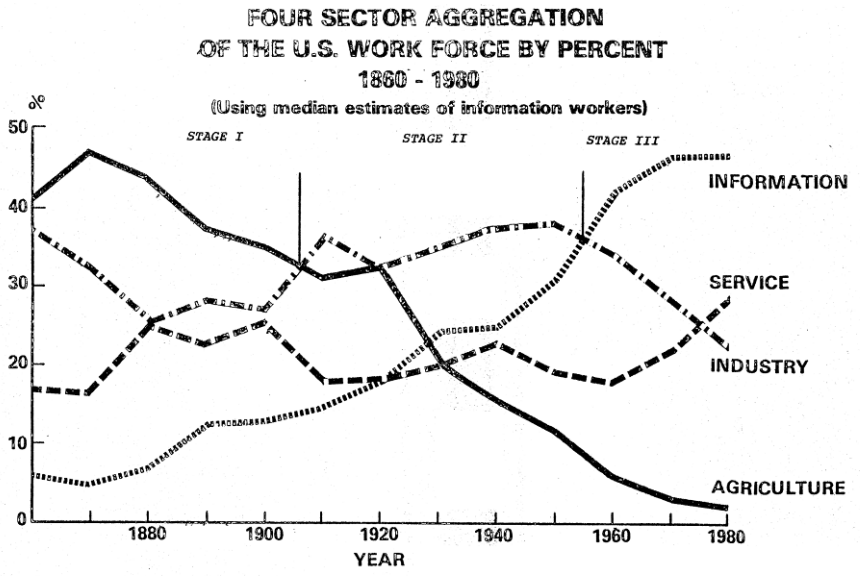

Figure 1.1: Development of the U.S. work force in the four sectors after Porat. Source: Porat, 1977, 121.

Porat, too, calculates figures that express the information market's contribution to the overall economy, but most influential were his estimates concerning the labor market. The "information workers" (Porat, 1977, 105) are employed in three areas (Porat, 1977, 107):

- in organizations that offer their products on information markets ("markets for information"); among them knowledge producers (scientists, lawyers, architects etc.) as well as knowledge distributors (mainly teachers and librarians),
- in organizations corresponding to the secondary information market ("information in markets"); among them accountants, insurance agents, salesmen as well as managers,
- in organizations that produce or operate information infrastructure, i.e. those that work with computers, telecommunication and non-electronic information machines (e.g. printing presses).

Porat translates the manpower into the sum of information workers' income and arrives at the following figures for the year 1967 (Porat, 1977, 107):

Markets for Information	
Knowledge Producers	$47m
Knowledge Distributers	$28m

Information in Markets	
Market Search & Coordination Specialists	$93m
Information Processors	$61m
Information Infrastructure	
Information Machine Workers	$13m

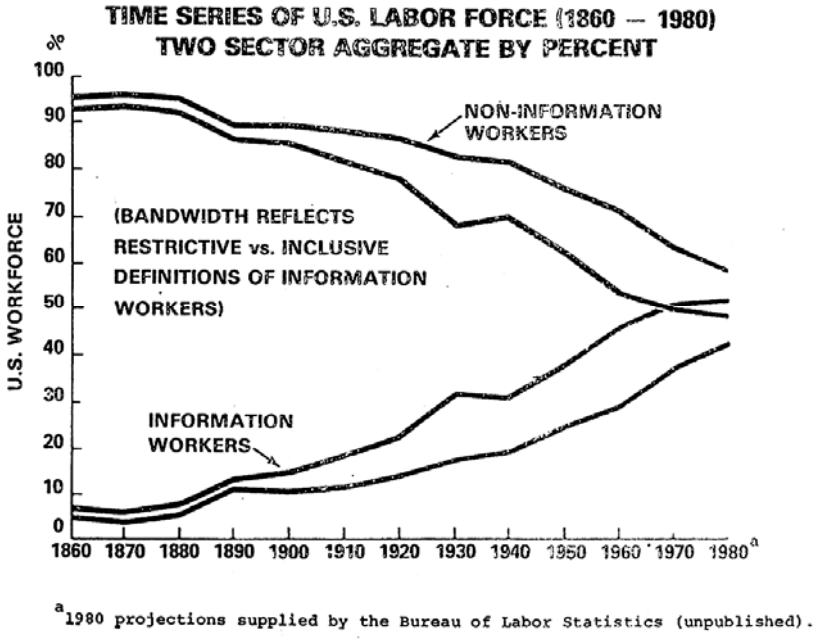

Figure 1.2: Development of the U.S. work force by information workers and non-information workers. Source: Porat, 1977, 120.

This corresponds to an overall volume of $242m for the information market, or 53.2% of the United States' entire earned income. The rest of the labor market is made up by agriculture, industry and other services (Porat, 1977, 117 et seq.). The first phase ("Stage I") is dominated by agriculture, whereas the labor market in Stage II belongs mainly to industry. Today, in Stage III, information work is dominant. In an aggregation of this data into only two sectors (information workers / others), we see a convergence, starting approx. in the middle of the 1960s, of both labor markets' volumes to around 50%. In the face of such a description, it seems natural to believe in the existence of an information society (at least in the U.S.A.). Frank Webster (1995, 12) comments on this:

> The quantification of the economic significance of information is an impressive achievement. It is not surprising that those convinced of the emergence of an 'information society' have routinely returned to Machlup and especially Porat as authoritative demonstrations of a rising curve of information activity, one set to lead the way to a new age.

However, diverse problems hide in Machlup's and Porat's deliberations (Robinson, 1986; Schement, 1990). Delimiting information activities from all others is highly arbitrary. Neither theory gives appropriate space to all the services not belonging to the information market. All people who do not obviously and exclusively work "with their hands", are information workers per definitionem. A clear distinction between "thinking" and "doing" is impossible, particularly for the secondary information sector, which means that all secretarial and accounting activities are not regarded as services but as information work. Webster (1995, 16) is very skeptical:

> Librarian, for example, can encompass someone spending much of the day issuing books for loan and reshelving, as well as someone routinely involved in advising academics on the best sources of information for progressing state-of-the-art research. Is it really sensible to lump together such diversity?

1.3 "Information Superhighways"

From the late 1970s through to the 1990s, the information society has become the subject of national and international political programs. The point is the *creation* of the information society–with a view also to strengthening national economies and labor markets via political measures, as there is a continuing discussion on the effects of technological progress on the job situation. One side holds that the rationalizing component of technological progress will lead to redundancies, and as a consequence, to underemployment and technological unemployment. The other side sees technological progress as the precondition for economic growth, with production growth, in turn, the precondition for employment (Stock, 1997).

With regard to the information society, there is a fundamental difference to the earlier discussion (Stock, 1997). There has always been technological progress locally, in the sense that it has led to innovations in a particular technology or economic sector. If there have been redundancies, in the end progress still led to new jobs being created elsewhere, and all in all the job situation more or less stayed the same. **Information-technical progress**, however, works on a global scale; it has consequences for all economic sectors and industries. This could lead to a loss of jobs in agriculture, industry and services. The opposite could also happen: the information society will manage, despite all rationalization effects, to achieve positive labor market aspects.

The negative scenario is invoked by Jeremy Rifkin (1995), for example, who sees us heading for "The End of Work". The positive scenario is mainly the product of the political programs for building the information society. Jobs in the information society are created by the providers of information (e.g. in the industry for computer manufacturing or entertainment electronics as well as by service providers in software and content production) as well as its users (e.g. in public administration or management). In the sense of a "Big Bang" (Pelton, 1994, 182), the new jobs of the information society clash, creating entirely new employment structures.

An early expert testimony on the government's role in creating the information society was submitted by Simon Nora and Alain Minc (1978). They coined the neologism "**telematics**", in the sense of a connection between telecommunication and informatics, thus endorsing the coalescence of both areas. Nora and Minc observe that the government cannot effect the change toward the information society by itself; however, it can so shape the underlying conditions that the hoped-for development is allowed to occur in the first place. The advancing computerization is proving to be one of the driving forces (Weygand, 2004).

The greatest influence on the development of the information society is wielded by the American programs for creating the information infrastructure, toward the implementation of which then-U.S. Vice President Al Gore contributed significantly. In one of the first programs (Information Infrastructure Task Force, 1993), relating exclusively to the **U.S.A.**, the **National Information Infrastructure** (NII) is sketched, which would later find its popular appellation in "Information Superhighways". The NII is

> a seamless web of communications' networks, computers, databases, and consumer electronics that will put vast amounts of information at users' fingertips.

The international expansion of the NII is the **Global Information Infrastructure** (GII) (Information Infrastructure Task Force, 1995). Al Gore (1996, 2) motivated the GII by stressing the international component, which is vital for the information society:

> We will not enjoy all of the benefits of the National Information Infrastructure („NII") unless it is linked to a global network of networks, a GII, linking every country, every town, every village, providing not just telephone service, but high-speed data and video as well. Such a global network would enable Americans to communicate across national boundaries and continental distances as easily as we communicate across state separations today. Time zones, not cost, will be the biggest barrier to keeping in touch with family, friends, and co-workers, no matter where they are.

According to Gore (1996, 3), five principles governed the construction of the NII and the GII: private investment, competition, universal service, free market access and flexible regulations.

Also at the beginning of the 1990s, the **European Union** discussed its path toward the information society (Stock, 1995; Stock, 1996a; Stock, 1996b). The fundamental planning paper is the "White Paper" from 1993, written under Jacques Delors' guidance, which introduces the information society as "the centrepiece of the twenty-first century's development model"–"Europe hinges upon it" (European Commission, 1993, 14). Expectations in the information society are very high (European Commission, 1993, 110):

> The community's policy for creating a common information area intensifies competition and increases Europe's competitiveness. It creates new jobs and should go hand in hand with special measures facilitating change in both economy and society, allowing every citizen to gain employment according to his or her qualifications.

The White Paper's statements are made more concrete by a working group led by Martin Bangemann (1994). As in the White Paper, the **Bangemann Group's report** puts the building blocks of the information society on top of each other, in a layer model. The bottom layer is made up of the networks and the technical facilities of data compression. The second layer contains the basic services (such as e-mail). In the last layer are the applications; paradigmatically, ten layers are worked out in which pioneer work is meant to be accomplished for the creation of the information society. Rather neglected in the White Paper as in the Bangemann Report, information contents are given due consideration in the European Commission's action plan "Europe's Way to the Information Society". The layer model is thus complemented by another layer and closed. For the EU Commission, there are two large groups of content; firstly audiovisual programs (films, TV productions and other multimedia applications), and secondly "high-quality information resources" (European Commission, 1994, 18). In the program "Info 2000" (European Commission, 1995), information contents take center stage. Here the market for content is split into three segments: print publications (newspapers, books, magazines etc.), electronic publications (online databases, teletext services etc.) as well as audiovisual content (television, video, radio, audio and cinema).

The programs for creating Information Superhighways prove successful, as long as the underlying technological infrastructure of the information market is being tackled. Around the same time (early 1990s), the World Wide Web appeared as the basic internet service; first search engines like Yahoo! and AltaVista counteract the chaos of the non-trawlable mass of digital content.

1.4 "New Economy"

With the advent and quick success of the WWW, several authors asked themselves whether the new "internet age" would also give rise to a "new economy", formed in such a way that it would override the previously known economic regularities and replace them with new ones. Looking back, we have to state, for business formations–and, particularly, the valuations of these businesses–that the history of the "New Economy" is the story of an error.

Picot and Scheuble (2000, 22) use the term "intellectual capital" to denote the knowledge of a company, and they (negatively) define this term as follows:

> Highly simplified, and abstracting from valuation problems as well as from market psychology, intellectual capital in listed companies corresponds to the difference between the market and the book value of an enterprise.

The market value is calculated via the product, consisting of market rate and number of shares, and the book value is noted in the balance sheet, representing the company's assets. In New Economy enterprises, this difference between market and book value proved to be gigantic. Following Picot and Scheuble, these companies thus had to have a fortune in intellectual capital. However, as investors had to find out when the New Economy collapsed, the difference turned out not to be "intellectual capital" but merely a bubble of "hot air", caused by feelings of euphoria; they were thus not the expression of new economic regularities, but instead of market-psychological circumstances (from which our authors abstracted–falsely, as we know today). Such market-psychological effects, observed in the New Economy, are in no way a new phenomenon. Such behaviors could already be seen during the Netherlands' "tulip mania" of 1636/37 (Baddeley & McCombie, 2001). The price for tulip bulbs rose sky-high (one single bulb commanded prices that rose to several times the annual income of a craftsman), only to take a drastic fall shortly after, alighting on a more realistic price range. This cost some tulip dealers their livelihood; the flowers themselves, however, are still blooming in Holland.

What, then, is the realistic economic core of this economy, previously deemed new by some? Kevin Kelly (1997; 1998) goes the furthest; he is actually convinced that the New Economy has features not even hinted at until today. Far more cautious are J. Bradford DeLong and A. Michael Froomkin with their "Next Economics" (2000), as well as probably the New Economy's most influential theoreticians, Carl Shapiro and Hal R. Varian (1998; 2003) with their conception of the "Network Economy", or "Information Economy", respectively. The authors agree that the information market displays all features of a **Network Economy**. Networks have, in fact, always existed (we need only think of railways or electricity grids), yet they command a dominant position in the information society in two respects: real networks are the information society's central infrastructures. The

(information) goods traded on information markets may themselves represent networks, of the virtual kind. Such networks display so-called **network effects**, meaning that their value increases the more participants they have (direct network effect) and the larger the offer of complementary products is (indirect network effects). The consequence of this "the-bigger-the-better" phenomenon is that standards often take shape which dominate a market. Users–end customers and companies both–are "trapped" within a standard, as the costs of switching (from one office software to another within a company, for example) may get very high; no network is possible without standards, and if a standard has reached critical mass, positive feedback will create a situation where the "winning" standard generally asserts itself. This last aspect quickly clashes with conventional antitrust legislation (Shapiro & Varian, 2003, 61). These laws protect the market by requiring several competing companies within any one industry, whereas network economy prognosticates the market dominance of a single standard (which may even be coupled with a single company). The second particularity of the information market is in the **business good of "digital information"** (Shapiro & Varian, 2003, 49 et seq.). Such goods are costly to produce but extremely cheap to reproduce; the legal protection of these goods is very difficult to survey and implement, so that some providers distribute certain information products for free ("follow the free!"; Kelly, 1997), generating their profits elsewhere. Commercially distributed information is never a search good, as its quality can under no circumstances be adequately assessed prior to purchasing them; lastly, information markets (as ad-financed television did before) use attention as their currency, which also generates profit. Hence, the "core" of the New Economy turns out to be the meeting of networks and digital content, where economic particularities can definitely be encountered.

1.5 Digital Information Services

What kinds of information are offered digitally, via networks? Whereas the "broad" approach of the information market, originating from Machlup and Porat, declares all non-bodily activities to be information work, the "narrow" approach starts with digital information goods. Some early market surveys were published by the **"Information Market Observatory"** (IMO) of the European Union's Commission. The IMO analyses the submarkets of online databases (IMO, 1989a), CD-ROM (IMO, 1991), teletext services (IMO, 1989c) and audiotext services (IMO, 1991). Even summarizing studies–e.g. on the European market (Casey, 1991; Schwuchow & Stroetmann, 1991; Bredemeier & Stock, 2000) hardly go beyond this small area of focus. Commercially distributed content is at the center of attention (Bredemeier & Stock, 2000, 228):

> We define "electronic information services" as electronic products that are distributed either online, via specific data nets (such as X.25 or the internet, or via teletext), or offline (as CD-ROM or Floppy Disks), and

> in which the information content (knowledge) takes center stage; in other words, they are the totality of products offered by the information economy's industry… on the market, with commercial purposes.

With the success of the internet and of the information offered for free on the World Wide Web, the IMO broadened its observation radius to include the internet (IMO, 1994). The restricted perspective on priced content is opened up, and content is now understood to comprise all sorts of knowledge (IMO, 1995, 9 et seq.):

> Originally, the IMO… concentrated on the relatively restricted area of electronic information services–the co-called traditional online ASCII database services, teletext and CD-ROM services as well as audiotext and fax-based services. In 1993/94, the perspective was broadened with regard to the now more extensive environment of the information service industry. This is meant to accommodate the phenomenon of convergence, which can be observed in a whole series of information-based sectors. The hardware and software industry, the telecommunication industry, the cable and satellite industry, all areas dealing with information content, such as film, television, music and print media, and of course the area of electronic information services display a tendency to converge in their striving toward markets and their technological development.

Relating to content, two approaches exist side by side. The goal of the "narrow" information market is to sell content, the goal of the New Economy's broad information market is to distribute information contents for free and charging customers' attention. For Rainer Kuhlen (1995), there is an additional third market, which is strictly non-profit-oriented and which he calls the "information forum". Here, predominantly scientific information is exchanged.

The **OECD** has developed a "guide" for recording indicators for the information society (OECD, 2005; Godin, 2008b, 54-61). As in the IMO (1995), here too the overall focus is on information and communication technology *and* information contents. Information contents become the subject of the information society in their digital online form exclusively (OECD, 2005, 58):

> According to this definition, digitised products include both:
>
> Products (such as reports, movies, music and software) which can be delivered over the Internet in digitised form and have a physical analogue (such as CD or DVD). For those products, the analogy with the physically delivered product is direct (*e.g.* a downloaded movie file and a DVD of that movie, an MP3 file and a CD); and other digitised products where the analogy with a physical product is less direct, for in-

> stance, new kinds of Web-based products which are accessed on line. They include online news, information or financial services and online games (…).

Why does the OECD thus place digital online content at the center of its considerations (OECD, 2005, 60)?

> It is clear that digital content–and digital delivery of content–are increasing in significance, driven by enhanced technological capabilities, a rapid uptake of broadband technologies and improved performance of hardware and software.

In the North American industry classification **NAICS** (2002), the information industry is at the first hierarchy level of the system–i.e. on the same level as, for instance, wholesaling, education or industry (Stock & Stock, 2008, 218). Sector 51 (Information) is classified into seven groups:

511 Publishing industries (except Internet), containing 5112: Software publishers,
512 Motion picture and sound recording industries,
515 Broadcasting (except Internet),
516 Internet publishing and broadcasting,
517 Telecommunications,
518 Internet service providers, Web search portals, and data processing services,
519 Other information services.

Manuel **Castells** (1996) devises a layer model of the internet industry, which is provider-oriented and considers four layers:

- Layer 1: Companies providing internet infrastructures (telecommunication companies, internet providers, manufacturers of network supplies etc.),
- Layer 2: Companies providing applications for internet infrastructures (particularly internet software and related consulting services),
- Layer 3: Companies providing free internet services and generating their income via advertising or commissions (content providers such as news portals, search engines, auction sites and the like),
- Layer 4: Companies transacting their business (exclusively or in addition to more common distribution paths) on a Web basis (E-Commerce).

1.6 M-Commerce

A new line of research comes about via the connection of the online world with mobile telephony: "mobile trade", or M-Commerce. Not the entire spectrum of M-Commerce (which, after all, additionally comprises the distribution of physical goods or electronic payment options) is relevant for our context, but exclusively the M-Commerce of digital information goods. M-Commerce is distinguished by the fact that at least one of the participants is not location-bound in his actions, being mobile. Balasubramanian, Peterson and Jarvenpaa (2002, 353) distinguish between three scenarios:

- Applications are dependent on location,
- Applications are dependent on time,
- Applications are dependent on the technology being used (by the sender or the receiver, e.g. when using a cell phone).

The precondition for this sector of the information market is broad usage of internet-capable mobile telephones or small computers with corresponding software for the operating system on the customer side. Another central concern should be the offer of application software and content tailored to the needs of M-Commerce (so-called "Apps"). On the one hand, we can observe application scenarios that are already known–so far, in respectively different contexts (telephony, SMS, e-mail, search engines, playback of music or navigation)–and can now be accessed mobilely from a single device, and on the other hand new services are created that presuppose a genuinely mobile application. Information to be requested mobilely by the receiver are, for instance, location-dependent navigation questions ("How do I get from here to X?"), time-dependent aspects for the observation of stock portfolios ("How are my shares currently doing?") or location and time-dependent requests such as information on traffic jams or delay messages for public transportation. Messages to be registered mobilely by the provider are, for example, location and time-critical problem reports by customers and their forwarding (the message "Car by Manufacturer X is stuck at location L" is sent to the nearest possible service point run by X), the offer of mobilely compiled (e.g. via satellite) data (e.g. for use in agriculture) or a service allowing the virtual participation in an auction (in which the provider acts via a mobile end device) (all examples taken from Balasubramanian et al., 2002). A sweeping success of M-Commerce is yet to make itself be felt (Godoe & Hansen, 2009).

1.7 Information Market–Today: Digital Online Information *and* Network Economy

At this point, the information market's demarcation as posited in this book has been located. Our subject matter concerns the digital information goods from NAICS 51, which are distributed via networks (chiefly the internet) and thus display significant network effects. It should be emphasized that the entire internet economy (Layers 2 through 4 in Castells) belongs to the information market, but only

insofar as information (in Machlup's broad sense) is offered there, either for sale or for free. Formulated negatively: we are not dealing with the E-Commerce of non-digital goods, but exclusively with I-Commerce, i.e. trade with information itself. M-Commerce with information goods is subsumed within this definition.

	Information	**Network**
Machlup, Porat	broad definition: "no manual labor"	---
IMO	digital information	---
Information Superhighways	not specified further	build-up of infrastructure
New Economy	digital information (misleading: "intellectual capital")	Network Ecomony
OECD	digital online information	Internet
NAICS	digital information	Internet
Information Market	digital online information	Network Ecomony (Internet)

Table 1.1: Approaches to Capturing the Information Market (I-Commerce).

In Table 1.1, the development toward the information market as we find it in today's scientific debate (and delimit it in this book) is sketched in a very simplified manner.

1.8 Conclusion

Only available in the printed version.

1.9 Bibliography

Baddeley, M., & McCombie, J. (2001). An historical perspective on speculative bubbles and financial crisis. Tulipmania and the South Sea Bubble. In Arestis, P., Baddeley, M., & McCombie, J. (eds.), What Global Economic Crisis? (pp. 219-243). Basingstoke. Palgrave.

Balasubramanian, S., Peterson, R.A., & Jarvenpaa, S.L. (2002). Exploring the implications of m-commerce for markets and marketing. Journal of the Academy of Marketing Science, 30(4), 348-361.

Bangemann, M. et al. (1994). Europe and the Global Information Society. Recommendations to the European Council. Brüssel.

Bell, D. (1973). The Coming of the Post-Industrial Society. A Venture in Social Forecasting. New York, NY: Basic Books.

Bell, D. (1979). The social framework of the information society. In Dertouzos, M.L., & Moss, J. (eds.), The Computer Age: A Twenty-Year View (pp. 163-211). Cambridge, MA: Harvard University Press.

Bredemeier, W. (1993). Herausforderungen und Chancen für eine Wachstumsbranche in der Rezession. 2. Jahresbericht zur Lage der deutschen Informationswirtschaft 1992/1993. Hattingen: Institute for Information Economics.

Bredemeier, W., & Stock, W.G. (2000). Informationskompetenz europäischer Volkswirtschaften. In Knorz, G., & Kuhlen, R. (eds.), Informationskompetenz–Basiskompetenz in der Informationsgesellschaft (pp. 227-242). Konstanz: UVK.

Casey, M. (1991). The electronic information industry in Europe. Journal of Librarianship and Information Science, 23(1), 21-36.

Castells, M. (1996). Rise of the Network Society. Oxford: Blackwell.

Debons, A., King, D.W., Mansfield, U., & Shirley, D.L. (1981). The Information Profession: Survey of an Emerging Field. New York, NY: Marcel Dekker.

DeLong, J.B., & Froomkin, A.M. (2000). Speculative microeconomics for tomorrow's economy. First Monday, 5(2).

Drucker, P.F. (1959). The Landmarks of Tomorrow. London: Heinemann.

Duff, A.S., Craig, D., & McNeill, D.A. (1996). A note on the origins of the 'information society'. Journal of Information Science, 22(2), 117-122.

European Commission (1993). White Paper on Growth, Competitiveness and Employment: The Challenges and Ways forward into the 21st Century. Luxembourg. (Bulletin of the European Communities, Supplement 6/93).

European Commission (1994). Europe's Way to the Information Society - an Action Plan. Communication from the Commission to the Council and the European Parliament and to the Economic and Social Committee and the Committee of Regions, COM (94) 347.

European Commission (1995). Proposal for a COUNCIL DECISION adopting a multi-annual Community programme to stimulate the development of a European multimedia content industry and to encourage the use of multimedia con-

tent in the emerging information society (INFO 2000), COM/95/149 final - CNS 95/0156. (Official Journal C 250, 26/09/1995, 0004).

Godin, B. (2008a). The Knowledge Economy: Fritz Machlup's Construction of a Synthetic Concept. Montreal, Quebec: Project on the History and Sociology of S&T Statistics. (Working Paper; 37).

Godin, B. (2008b). The Information Economy: The History of a Concept Through its Measurements, 1949-2005. Montreal, Quebec: Project on the History and Sociology of S&T Statistics. (Working Paper; 38).

Godoe, H., & Hansen, T.B. (2009). Technological regimes in m-commerce: Convergence as a barrier to diffusion and entrepreneurship? Telecommunications Policy, 33, 19-28.

Gore, A. (1995). Bringing information to the world: The global information infrastructure. Harvard Journal of Law & Technology, 9(1), 1-9.

Hayashi, Y. (1969). Johoka Shakai [The Information Society; in Japanese]. Tokyo: Kodansha Gendai Shinso.

Hayek, F.A. (1945). The use of knowledge in society. American Economic Review, 35(4), 519-530.

IMO (1989a). Production and Availability of Online Databases in 1987. Luxembourg: Information Market Observatory. (IMO Report 89/3).

IMO (1989b). Production of Databases on CD-ROM in 1988. Luxembourg: Information Market Observatory. (IMO Report 89/4).

IMO (1989c). The Impact of Videotex on the Online Market. Luxembourg: Information Market Observatory. (IMO Report 89/7).

IMO (1991). Overview of the Audiotex Market in 1989 and 1990. Luxembourg: Information Market Observatory. (IMO Working Paper 91/1).

IMO (1994). The Internet and the European Information Industry. Luxembourg: Information Market Observatory. (IMO Working Paper 94/3).

IMO (1995). Report on the Main Events and Developments in the Information Market in 1993/1994. Luxembourg: Information Market Observatory.

Information Infrastructure Task Force (1993). National Information Infrastructure: Agenda for Action. Washington, DC.

Information Infrastructure Task Force (1995). Global Information Infrastructure: Agenda for Cooperation. Washington, DC.

Joseph, R. (2005). The knowledge worker: A metaphor in search of a meaning? In Rooney, D., Hearn, G., & Ninan, A. (eds.), Handbook on the Knowledge Economy (pp. 245-254). Cheltenham, Northampton, MA: Edward Elgar.

Kelly, K. (1997). New rules for the New Economy. Wired, 5(9), 140-144, 186, 188, 190, 192, 194, 196-197.

Kelly, K. (1998). New Rules for the New Economy. Ten Ways the Network Economy is Changing Everything. London: Fourth Estate.

Kuhlen, R. (1995). Informationsmarkt. Chancen und Risiken der Kommerzialisierung von Wissen. Konstanz: UVK.

Machlup, F. (1962). The Production and Distribution of Knowledge in the United States. Princeton, NJ: Princeton University Press.

NAICS (2002). North American Industry Classification System. United States. Washington, DC: U.S. Census Bureau.

Nora, S., & Minc, A. (1978). L'Informatisation de la Société. La Documentation Française.

OECD (2005). Guide to Measuring the Information Society / Working Party on Indicators for the Information Society (DSTI/ICCP/IIS(2005)6/FINAL). Paris: Organisation for Economic Co-operation and Development.

Ortner, H. (2006). The origin of the „Knowledge Economy". Journal of European Economic History, 35(2), 427-461.

Pelton, J.N. (1994). The public versus private objectives for the US National Information Infrastructure initiative. Telematics and Informatics, 11, 179-191.

Picot, A., Scheuble, S. (2000). Die Rolle des Wissensmanagements in erfolgreichen Unternehmen. In Mandl, H., & Reinmann-Rothmeier, G. (eds.), Wissensmanagement. Informationszuwachs–Wissensschwund? Die strategische Bedeutung des Wissensmanagements (pp. 19-37). München, Wien: Oldenbourg.

Porat, M.U. (1977). Information Economy. Vol. 1: Definition and Measurement. Washington, DC: Office of Telecommunications. (OT Special Publication 77-12[1]).

Rifkin, J. (1995). The End of Work. New York, NY: G. P. Putnam's Sons.

Robinson, S. (1986). Analyzing the information economy: Tools and techniques. Information Processing & Management, 22(3), 183-202.

Schement, J.R. (1990). Porat, Bell, and the information society reconsidered: The growth of information work in the early twentieth century. Information Processing & Management, 26(4), 449-465.

Schwuchow, W., & Stroetmann, K.A. (1991). Der Europäische Markt für elektronische Informationdienste. Entwicklungstrends und Perspektiven. In Killenberg, H., Kuhlen, R., & Manecke, H.J. (eds.), Wissensbasierte Informationssysteme und Informationsmanagement (pp. 450-471). Konstanz: Universitätsverlag.

Shapiro, C., & Varian, H.R. (1998). Information Rules. A Strategic Guide to the Network Economy. Cambridge, MA: Harvard Business School.

Shapiro, C., & Varian, H.R. (2003). The information economy. In Hand, J.R.M. (ed.), Intangible Assets. Values, Measures, and Risks (pp. 48-62). Oxford: Oxford Univ. Press.

Stock, W.G. (1993). Der Markt für elektronische Informationsdienstleistungen. ifo Schnelldienst, N° 14, 22-31.

Stock, W.G. (1995). Europas Weg in die Informationsgesellschaft. ifo Schnelldienst, N° 6, 15-28.

Stock, W.G. (1996a). Die Informationspolitik der Europäischen Union. ABI-Technik, 16(2), 111-132.

Stock, W.G. (1996b). Informationsgesellschaft und Telekommunikationsnetze in der europäischen Informationspolitik. In Zippel, W. (ed.), Transeuropäische Netze (pp. 77-105). Baden-Baden: Nomos.

Stock, W.G. (1997). Die Informationsgesellschaft: Neue Berufe, mehr Beschäftigung? In Mantwill, G.J. (ed.), Informationswirtschaft und Standort Deutschland (pp. 141-171). Baden-Baden: Nomos.

Stock, W.G. (2007). Information Retrieval. Informationen suchen und finden. München; Wien: Oldenbourg.

Stock, W.G., & Stock, M. (2008). Wissensrepräsentation. Informationen auswerten und bereitstellen. München: Oldenbourg.

Toffler, A. (1980). The Third Wave. New York, NY: Morrow.

Umesao, T. (1963). Joho sangyo ron [On the Information Industry; in Japanese]. Hoso Asahi, (January), 4-17.

Webster, F. (1995). Theories of the Information Society. London, New York, NY: Routledge.

Weygand, F. (2004). The state and "the Information Society": 25 years of experts' reports. Communications & Strategies, 53(1), 147-157.