

*Higher Education* **38:** 49–69, 1999.



# Contours of the emergent knowledge society: Theoretical debate and implications for higher education research

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**Abstract.** The idea of the knowledge society is becoming increasingly dominant in various public and scholarly writings. Several governments have reacted by advocating a further expansion of higher education in order to provide a highly skilled workforce. This seems at odds with views regarding the underutilisation of skills of employed graduates. This paper sketches some major characteristics of the emergent knowledge society from sociological, epistemological and economic viewpoints. Next, it discusses current research on the incidence of overeducation. It is pointed out that measures on overeducation are inaccurate and do not take into account changes in the emergent knowledge societies. The paper concludes with implications for future research on the nature and change of knowledge-based occupations.

## Introduction

It is generally contended that we are living in the knowledge society and that knowledge plays a central role in all spheres of social and economic life. Although the idea of knowledge societies dates back to the late 1960s, it seems that only in the last few years the term has become fashionable in different political settings and is increasingly becoming an important target for many governments. Several studies (OECD 1996) point to a common trend towards a knowledge-based economy across the entire OECD area as the consequence of new technologies, globalisation and intensified international competition. There is a consensus on the whole political spectrum which considers education as the key to future economic prosperity. The competitive advantage of nations is redefined in terms of the quality of national education and training systems are judged according to international standards. Also among national governments it is a current issue, and policies have been launched which aim at anticipating the development of the knowledge society. In the Netherlands a national debate on knowledge was held in 1996/97 which aimed at exploring what role knowledge will be playing in society in the coming years. The view has been advanced that knowledge can play a dominant

role, for example regarding the economic competitiveness of nations or the social and cultural position in Europe and the world.

There is much rhetoric in the debate on knowledge societies. Less clarity exists about the type of knowledge that is involved and the role of higher education institutions in conveying this knowledge. A common reaction in national policies is the promotion of expansion of higher education in terms of student numbers. This is most notable in the UK when the 1997 general election brought the labour Government with a strong election commitment to '*Education, education, education*'. Similarly, the Dearing Committee sees the widening access to higher level study as the fundamental theme in the learning society, with a participation rate which should increase up to 45% in the coming year.

In France the slogan '*formez vous, tout ira bien*' has met unanimous support in the political scene. This has been translated in a policy of a systematic elevation in the attainment of diplomas, namely the objective of 80% of a generation attaining the educational level of the Bac, which will produce a buoyant demand for third-level places. Also the European Commission pursues the highest possible level of knowledge for all citizens which is understood as a broad accessibility to and attainment in (higher) education, as well as a permanent updating of knowledge through lifelong learning. Generally, the expansion of participation rates is justified on the grounds that technological and economic changes require higher skill levels within the work force.

In addition to this policy, there is a tendency to formulate competencies for human capital creation considered conducive to the success of national industrial strategies. The attempt to develop a 'common canon' of knowledge which all students should master and which should be laid down in a set of (nationally or internationally) vocational qualifications and standards or a singular ensemble of occupational competencies can be considered in this context.

In the discussion on the expansion of higher education as a vehicle for human capital formation, two more or less opposing views among higher education researchers stand out, namely the human capital and the credentialist view. According to the human capital approach, the promotion of the highest level of knowledge corresponds to a general increase of demands for higher qualified people in various occupational positions.

The second view considers the pressure for more education and prolonged years of schooling as independent of the actual labour market needs. Adherents of this view argue that the steady rise in educational attainment is not reflected in corresponding increases in intrinsic job content and skill requirements. The rise in educational levels has exceeded the level required

in occupational practice, with subsequent problems of rising unemployment rates, overeducation and emerging substitution processes, that is, graduates taking over jobs previously held by those with lower educational qualifications. This latter view is strongly supported by the 'credentialist' theory according to which higher education serves as a screening device for employers to identify the most able workers. This exerts an upward pressure for individuals to attain ever higher levels of schooling in order to obtain an optimal relative position in the selection process for jobs. In this way, the expansion of higher education will be preserved.

This paper addresses these opposing viewpoints. In a way it embroiders on themes at earlier CHER-conferences, particularly at London (Brennan et al. 1996) and several works by Ulrich Teichler (see especially Teichler 1991, 1997). The angle from which this paper approaches the theme is the debate on knowledge societies. The question is whether such an exercise may yield new insights and operationalisations regarding the further expansion of higher education and the incidence of overeducation.

The debate on knowledge societies is very scattered. In the sociology of knowledge, different approaches can be found. Furthermore, social epistemology, as a field of enquiry, deals with the question of how the pursuit of knowledge should be organised. Finally, the notions of knowledge-oriented economies and knowledge-based companies have increasingly been adopted in the vocabulary of many studies. All these perspectives do not necessarily coincide, and the following discussion attempts to bring different strands together in a perspective from which to consider the Trowian road to European mass higher education. The purpose of this paper is not to draw final conclusions as to whether a further expansion is desirable or not, but rather to reflect critically on the available material.

The organisation of this paper is as follows. First, the debate on knowledge societies will be analysed from sociological, epistemological and economic viewpoints. Next, measures of the incidence of overeducation will be discussed. Finally, the expansion of higher education graduates will be considered from the perspective of knowledge societies in order to designate future research tasks.

## Views on knowledge

It can be questioned whether the idea of a knowledge society is new since knowledge has always played a role in all human activities and knowledge acquisition and knowledge transfer are among the most distinctive characteristics of mankind. Various ancient societies could be described as knowledge societies. As Stehr notes, ancient Israel was a society structured by its reli-

gious law-like Tora-knowledge and in ancient Egypt, religious, astronomical and agrarian knowledge served as the organising principle and the basis of authority (Stehr 1994, p. 9). However, the essentially new elements of the contemporary discussion on knowledge societies are tied up with the quantity of knowledge, the acceleration of knowledge production and the extent to which it permeates in all spheres of life. The explosive growth in scientific and technological knowledge, as well as the widening scope and impact of information and communication technologies are dominant features. Another key feature is that knowledge is becoming an increasingly important factor in economic organisations. Knowledge is conceived as a production factor and a commodity that can be bought and sold. Knowledge is not only power, as it is always argued, but it is also wealth. This is becoming apparent in the growing interest for the knowledge-based economy.

Although the importance of knowledge is stressed almost everywhere, there is little clarity about its meaning. Is knowledge conceived as originating from the research front in science and technology, and, as such, is set apart from other, more ordinary forms of knowledge? Does knowledge flow in a manner which leaves it untouched and unaffected by the knowledge-based economy? Or is scientific knowledge fundamentally different from the kind of knowledge utilised in the context of the knowledge-based economy? Do we speak about the same kind of knowledge?

Knowledge can have various meanings. There is common sense or ordinary knowledge which anybody may have, and there are practically-oriented, and technical and scientific types of knowledge. Common distinctions are made between universal and local knowledge, between explicit or codified and tacit, experiential or reflective knowledge. Each time defines its own type of knowledge: what used to be Homer is now mathematics, what once was the understanding of a fine German text, is now English conversation. Given a variety of meanings, the term knowledge can be used opportunistically (Kogan 1996), or in a generous way as that which any individual cares to consider to be knowledge. Others define knowledge as that which is acknowledged only within specific scientific paradigmas or academic communities.

In contemporary social science discourse, distinctions between forms of knowledge have been subjects of much argument. Where studies in the Mertonian tradition of the sociology of science treat knowledge as a black box with very little attention to the cognitive content of science, the approach dominant today focuses on explaining the content of science. Adherents of this approach, commonly referred to as 'social constructivism', adopt a relativistic position and deny the importance of nature as an objective external, which influences the content of scientific knowledge. Rather, the

social behaviour of the scientists becomes the most important part of the content of science and determines how the laws of nature are defined.

A similar line of thought can be found among postmodernists such as Lyotard and Rorty who no longer consider knowledge a transcendent narrative but stress the contingent, fragmentary and relative character of knowledge. Rorty's essential message is that we must renounce the partition between 'objective' facts and 'subjective' interpretation. Data and facts are not 'mirrors of nature', independent of their subject. For Rorty, the development of knowledge is a social affair between persons and the principal danger to knowledge comes from tendencies to block the flow of conversation by insisting upon some fictive 'canonical vocabulary for discussion of a given topic' (Rorty 1979, p. 386).

Without elaborating too much on these philosophical disputes here, it is important to realise how these conceptions of knowledge parallel today's debate on the renewal of teaching and instruction in mass higher education. Constructivist values play an increasingly important role in this debate which focuses on models of 'learning to learn' and the advancement of independent learning processes in the context of lifelong learning. Constructivism starts with the view that knowledge must be constructed within the cognitive structure of every individual, so that it is fundamentally personal, while being dependent on experiences in the learning environment and on social interactions. In contrast, the 'objectivist' view conceives knowledge as an external entity with an absolute value which can therefore be transferred from teacher to student (see for a discussion, Bostock 1998). In the latter case knowledge is objectified in a canon or a catalogue of facts, where students are like 'vessels' which can be filled with knowledge. In the contextual approach, on the other hand, students are encouraged to be actively involved in the learning process through group work, computer-based media, flexible course patterns, problem-oriented and work-based learning. These forms aim to acquire learning skills which enable students to amass knowledge in an independent way, a learning attitude which becomes increasingly important in the context of lifelong learning.

Knowledge can be understood in different contexts and the same can be argued regarding knowledge in the broader societal context. There is a variety of claims to knowledge which are conterminous with what is accepted by the scientific establishment, although there is a tendency to embrace the cognitive authority of science. For example, Lindblom and Cohen (1979) describe the typical organisational researcher as aiming to produce "authoritative knowledge" and present a number of reasons why such knowledge is not likely to be produced. Researchers attempting to be useful to organisations therefore must seek to have their finding utilised even when they are not judged airtight

by their more academic colleagues. Organisations do not run on science but, rather, on informed judgement.

## Sociological conceptions of knowledge societies

The increased significance of science in modern society has brought social theorists in the 1970s such as Peter Drucker, Daniel Bell and Alain Touraine to the conclusion that knowledge has become the constituting principle of modern societies. They argued to abandon the labels of classical social theory and to move beyond dichotomous notions such as tradition and modernity and designate contemporary societies as 'knowledge societies'. The constitutive mechanism of modern society is increasingly driven by 'knowledge'. Drucker points out that throughout the nineteenth century, industry was largely experience-based rather than knowledge-based, and he defines knowledge as 'systematic, purposeful, organised information'. According to Drucker, knowledge has become the central economic resource. "The systematic acquisition of knowledge, that is, organised formal education, has replaced experience – acquired traditionally through apprenticeship – as the foundation for productive capacity and performance" (Drucker 1969, p. 70).

One of the first systematic social analyses of knowledge societies can be found in Daniel Bell's classic discussion of the emergence of post-industrial society. Basic characteristics are the increasing 'knowledge-intensity' of all forms of economic activity and the growth of large-scale public and private bureaucracies, especially in the services sector of the economy.

Bell uses the term post-industrial society interchangeably with the concept of knowledge society for two major reasons (Bell 1968, p. 198). First, the sources of innovation are increasingly derived from research and development and more directly, there is a new relation between science and technology because of the centrality of theoretical knowledge. Second, the weight of the society – measured by a larger proportion of Gross National Product and a larger share of employment – is increasingly in the knowledge field. Through the concept of knowledge society, Bell wants to emphasise how theoretical or academic knowledge, that is the primacy of theory over empiricism and the codification of knowledge in abstract systems, has become the 'fundamental resource' of modern society. For Bell, every society lives by innovation and growth, and sources of innovation are increasingly derived from theoretical knowledge.

The conception of knowledge employed by Bell reflects the optimistic view that science would somehow realise a society in which common sense would be replaced by scientific reasoning. Characteristic of a post-industrial society is that the advances in a field become increasingly dependent on the

primacy of theoretical work. Theoretical knowledge increasingly becomes the strategic resource, the 'axial principle' of society. And universities, research organisations and intellectual institutions, where theoretical knowledge is codified and enriched, become the axial structures of the emergent society (Bell 1973, p. 26).

Nowadays the views on the primacy of theoretical knowledge and the claim that this is conveyed through universities are more differentiated. Contemporary sociological theories of knowledge reject a social structure in which there is a causal line of inference and do not assign 'objective knowledge' such a decisive position as Bell does. From different perspectives it is argued that there is no strict linearity in knowledge production and that the distinction between conceptions of academic knowledge and other forms of knowledge are becoming increasingly fuzzy.

The notion of knowledge societies has been canvassed most thoroughly by Nico Stehr (1994). One of his central arguments is that the development of knowledge societies is connected to basic transformations in the structure of economic activities. Stehr's criticism of Bell and others is that they treat knowledge too 'narrowly' as technical-scientific or formal knowledge and not in more pragmatic terms. Stehr defines knowledge as 'a capacity for action', a definition that enables one to stress one-sided but multifaceted consequences of knowledge for action. Knowledge, as a capacity for action signals that knowledge may be left unused or may be employed for irrational ends or it may enable one to set something into motion. It does not signal that specific knowledge claims always carry a kind of constant and fixed 'value' enabling actors to employ them for the identical purposes and for similar outcomes. The implementation of knowledge is dependent on and embedded within the context of specific social, economic and intellectual conditions (Stehr 1994, pp. 92–121). From this, Stehr acknowledges the contestability of knowledge, social power relationships and new forms of inequality in knowledge societies. Intellectual workers add value to the economy by producing 'action knowledge', that is, data and theories (Ibid, p. 102). As manufacture and services become increasingly dependent on knowledge, the economy and social relations become linked through a form of intellectual capital.

An important element in Stehr's theory is that he does not conceive knowledge as limited to formal science. The localisation of knowledge in the context of the changing economic structure implies that the argument on the transformation of society does not turn on the relative percentage of persons employed in scientific rather than manufacturing occupations. The restriction to professionals commonly associated with a post-industrial society – science and engineering technicians, and computer specialists – which comprise only a few percentages of the entire labour force, is a too narrow view on the role of

higher education in contemporary society. According to Stehr, manufacturing itself, which in most modern economies retains its relative size, has internally changed through the expansion of administrative, technical and clerical employees. In other words, manufacture does not dramatically shrink, but it just becomes more white collar. There is a much broader and richer spectrum of knowledge-based occupations found in all sectors of the economy, not merely the tertiary sector, but on all socio-economic levels.

In a more pronounced way, Helmut Willke argues that the emergent knowledge society refers to qualitative changes which are based on a new value system, economic significance and political steering of knowledge and expertise:

> A knowledge society or knowledge-based society exists if knowledge-dependent operations pervade the structures and symbolic reproduction of a society to such an extent that the handling of information, symbolic analysis and expert systems have primacy over other reproduction factors (Willke 1998, p. 162).

Willke goes on to say that the concept of a knowledge society is only meaningful when a qualitatively new form of knowledge base and symbolism permeates all societal domains and context-specific expertise in all domains of the society are generated. In comparison with land, capital and industrial work which constitute the industrial society, the knowledge society rests on "embedded intelligence" in the sense that its infrastructure deals with built-in, context-sensitive expertise and its governance regimes have been organised with the ability to learn in knowledge-based activities. Moreover, the mode of operation connects its own logic step by step with expertise and risk. Willke considers "organised knowledge work" as the core of the transformation of industrial society towards the knowledge society. Organised knowledge work is less focused on the construction of knowledge in the work place and the application of technology, but rather on the continuous production and revision of expertise in the context of the intelligent organisation.

This idea of the knowledge society rejects a linear view from the construction of knowledge towards its subsequent application. Also, the long-standing view that the education, the assessment, the canonisation and revision of the production of knowledge are the exclusive domain of higher education, comes increasingly under attack.

## Transformations in the production of knowledge

Under the influence of postmodernist thought as well as notions on globalisation processes, perspectives have emerged which provide a picture of the

fundamental changes taking place in knowledge production (Gibbons et al. 1994; Beck 1986; Beck et al. 1994; Delanty 1998; Scott 1995). It is not the purpose here to give a detailed account of these perspectives, but to draw in a few broad strokes some of the issues which are important for our discussion.

A common argument in this debate is that knowledge has ceased to be the exclusive domain of universities. The centre of knowledge production has shifted and new forms of organisation are emerging which are taking shape outside of existing academic disciplines and outside of the insularity of the traditional university. Two main streams of thought can be identified.

First, the notion of the new production of knowledge. This refers to the idea that knowledge production is no longer the exclusive domain of the vested sciences in well-defined institutions with their clear-cut methods and quality standards. This production is shifting away from the university to a whole range of non-university locations, such as industrial laboratories, research centres, think-tanks, consultancies (Gibbons et al. 1994, p. 6). Apart from the institutional contexts, this form of knowledge production can be characterised by 'discovery in the context of application' and transdisciplinarity. Contributions of knowledge ensuing from different disciplines, but also from other forms of knowledge and skills are becoming increasingly integrated, whereby the outcomes are not reducible to the distinctive disciplines of the participants in the team. The new developed knowledge is passed on to new application contexts rather than through disciplinary communication.

An important impetus behind this development, according to Gibbons et al. is the extensive expansion of highly educated workers engaged in tackling complex problems on divergent areas of application. In all organisations and employment sectors, graduates are employed who are able to adopt and understand scientific knowledge, focusing on specific problems defined by multiple actors and diverse interests in specific contexts of application.

The second stream of thought emphasises the emergence of new links between knowledge producers and society. Knowledge is no longer an exclusive privilege of a small group, but has been democratised in the sense that it has become more accessible and available to larger segments of the population than ever before. The general public is today much better informed about all sorts of issues such as food, health, lifestyles, economy, politics, environmental matters. Grassroots pressure groups and public and local communities are oriented towards the utilisation of knowledge. However, as Delanty notes, knowledge has become a major site of contestation: 'more and more social actors are involved in the definition of problems and the application of the solutions (...) there has been a shift from the politics of production to the politics of application of knowledge' (Delanty 1998, p. 5).

The availability of knowledge has been further explored by theorists of late modernity who examine globalisation in terms of 'reflexive modernisation' and risk society. Reflexivity involves a process of constant questioning, of constant evaluation of where we are and what we are doing. According to Beck (1986), late modernity is a 'risk society' in which organisations and individuals are at risk as they struggle to cope with and survive in a rapidly changing and unstable environment. Knowledge gains a political significance in a society afflicted by risk which leads to the centrality of learning as a structural phenomenon in all spheres of social life. Not surprisingly, such a society breeds a new attitude towards the role of science and the belief in scientific and technological progress. The phenomenon of reflexivity is considered to be a result of the fact that the university is rapidly losing its traditional legitimation (see also Barnett and Griffin 1997).

Both streams of thought have been subjects of extensive debate on knowledge societies. Particularly the distinction Gibbons et al. make between the two forms of knowledge production (termed as mode 1 and mode 2 knowledge production respectively) meets much criticism. The distinctions made between theoretical and practically oriented knowledge has not yet been fully tackled, and others have contended that there is nothing new in the argument of the 'new' production of knowledge. In natural, medical and technical sciences, academic research has always had a context of application and has been differentiated according to the practical domains on which this research focuses. Many examples from the history of science indicate how new knowledge has been the outcome of problem-solving, rather than the linear sequence from theory to practice. As Van Der Meulen notes, within the technical sciences there always have been professors from industry who were operating within engineering communities and co-producing technical knowledge together with researchers and designers in industry, technological institutes and universities. In the determination of the quality of this work, the 'applicability' has always constituted an important criterion (Meulen 1996).

Nonetheless, the boundaries between higher education and other societal sectors have become much less demarcated. The growing importance of contract-research for the survival of research groups is apparent as is the increased involvement of university personnel in consultancy and evaluation. Another trend is the changing role between the state and educational institutions. The traditional bond between institutions and the nation-state in the field of education, research and culture is subject to erosion and a reassessment (De Vijlder 1996). One tendency that can be observed from this concerns the retreat of the state as the primary financier of knowledge. This is apparent in the way in which governments are promoting the expansion of

higher education, while on the other hand higher education in most European countries is facing budget cuts.

What conclusions can be drawn from these developments? Obviously, certain conceptions of knowledge are changing and new ones emerge instead. Some speak about the crisis higher education faces today: that knowledge, as academics have known it, is coming to an end (Barnett and Griffin 1997; Delanty 1998). Delanty takes for granted that the shift to the new production of knowledge points to 'the end of knowledge' and advocates a debate on the autonomy of the university as an institution. Such a debate, with its normative overtones about traditional functions of the university, is not a fruitful approach in higher education research. A more crucial question that arises is what exactly is the role of higher education in an era in which knowledge plays an increasingly significant role and in an economy that intensifies the role of knowledge as a production factor. Such a question could be explored by looking more closely at the conceptions of knowledge which are developed in the knowledge-based economy and the qualifications of graduates. Is there a lack of connections between knowledge as acquired through formal education and knowledge as derived from settings where this will be used and embodied in the professional classes located in the workplace? If so, are these compatible?

## Knowledge-based companies

In many companies, knowledge is considered to be the fourth production factor and increasingly as the most important one. The capability to add new knowledge is an important factor in order to stand out as a firm. Several companies have established their own 'knowledge centres' based upon a combination of research and knowledge transfer. The concept of 'knowledge management' is immensely popular, and the business literature on the topic has expanded enormously. It is becoming a hype and several knowledge gurus are appearing on the front. Although the language in the field is punctuated with many hollow-sounding words, it is worth going briefly into some of this material.

Broadly speaking three main streams can be identified. First, those who equate knowledge with information, coupled with a strong capacity for instant data analysis and communication technology. Information is then merely replaced by knowledge and coupled with the company's knowledge network. Secondly, there are those who consider knowledge management as a theory of how to design the structure, culture and management style of an organisation in order to realise the intended strategy. Thirdly, some people actually distinguish knowledge from information and argue that knowledge is in the

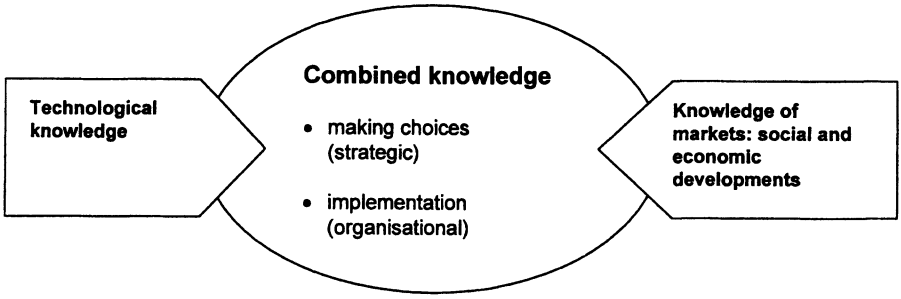


*Figure 1.* The most important forms of knowledge to be combined for successful innovative strategies (source: Jacobs 1996, p. 35).

'heads of people'. Here knowledge management is primarily 'human talent management'. The latter two approaches appear to be the most accepted ones. The mapping of knowledge and the subsequent determination of what knowledge and skills are needed for is very narrow. Knowledge is a competence to tackle new, unusual problems and should not be confused with information. In a study of several knowledge management projects in companies, Davenport et al. (1998) identified the establishment of an environment that encourages and stimulates people to create, share, and use knowledge as one of the factors that characterise successful projects. For companies it is crucial to determine what can be done to stimulate employees to acquire new knowledge and what learning environments and processes are needed in developing new knowledge.

Inspired by the work of Nonaka and Takeuchi (1995), a widely acknowledged difference is between implicit or tacit knowledge and explicit knowledge. Tacit knowledge is closer to competencies, developed in practice and context-bounded. Contrary to explicit or codified knowledge, which in the context of globalisation is available without respect to space and time, tacit knowledge is not specified, not easily expressed and communicated. It is hard to explain how and why something is effective, especially in the developmental phase. The different kinds of experiences, knowledge and skills can, if mobilised and brought together properly, be experimentally combined in search of new combinations. Activities involved are considered more important for companies, making them increasingly 'knowledge-companies'. Figure 1 figure illustrates those forms of knowledge that have to be combined in order to achieve successful strategies of the company.

The basic notion in this figure is that knowledge about technological possibilities have to be tuned to (prospective) market demands. This occurs through strategic positioning of the company, product range as well as the implementation. In order for company strategies to be successful, the most

important challenges are how to organise the accessibility to these forms of knowledge and how to accomplish the most fruitful combinations. Jacobs distinguishes four broad categories of knowledge which have to be combined in a successful innovative strategy (Jacobs 1999, pp. 36/37):

- technological knowledge: knowledge about new technological processes, new materials, technical organisation procedures, ecological issues, user-friendly design, and about quality control.
- market knowledge: knowledge about public trends such as demography, life-style, values, consumer behaviour, about partial markets both nationally and internationally and other information for further product development.
- organisational knowledge: knowledge about how to encourage teams to collaborate, to work constructively with external partners; how to have parts of the organisation operate autonomously and simultaneously bring about synergy on a higher level, how to organise learning processes.
- personal and social skills: communication, entrepreneurial skills and leadership.

Without giving a detailed account of these categories which can further be subdivided in detailed levels of knowledge (Jacobs 1996), it is noticeable that only one category consists of technical (science) knowledge as a kind of technology push. What is interesting about this approach is the addition of categories that derive from a much broader spectrum of knowledge fields, including the social sciences and the humanities. The importance of separate specialities is diminishing. More important is that functions are not considered to be distinctive entities, but to be related to each other in a reciprocal way.

Much research on higher education graduates and the changing requirements in the workplace can be understood in the context of these changes, with continuous emphasis on teamwork, social skills and transdisciplinary skills. Regarding work processes, several authors have described this process as a transition from the traditional 'Fordist' approach where the production process moves sequentially from phase to phase towards flexible specialisation which entails continuous interaction among multidisciplinary teams drawn from all stages of the product development process. Harvey coins the term 'flexible accumulation' which refers to the emphasis on multiple tasks, elimination of job demarcation, on-the-job learning, worker's co-responsibility and personal payment (Harvey 1990, p. 177). This is in sharp contradiction to the traditional Fordist production which emphasises, respectively, single task performance by workers, job specialisation, little on-the-job training, diminishing workers' responsibility, and payment by rate.

In a survey among employers regarding required qualifications on the job, it turned out that employers are inclined to recruit more people with a higher degree. The complexity and intensity of tasks has increased, making functions increasingly fuzzy: the content changes continuously and the definition of someone's job responsibilities becomes less demarcated. This means that graduates have to deal with issues that go beyond the knowledge and skills conveyed through a specific subject area (De Weert 1996).

What questions arise from this discussion? First of all, there is the question of whether the prevailing conceptions of the links between higher education and the employment sector are still appropriate. The shift from the traditional division between manual and mental work and the segmentation of research & development and managerial and production functions towards greater integration of knowledge functions requires a highly skilled workforce with high value-added qualifications. What are the implications for higher education provision? Secondly, on first thought the ideas of an emergent knowledge society, the importance of knowledge in all social domains as well as knowledge-based companies seem to be at odds with views on overeducation. Several studies indicate that the growth in the supply of graduates exceeds the growth in demand with the effect that graduates are doing work that does not match their level of education. A closer look at the measurement of overeducation can be directive for further research on higher education and the knowledge society.

## Research on overeducation

There is much confusion about the incidence of overeducation and different, sometimes contradictory, figures are spread around. This is to a large extent due to the fact that there is no single accepted measure of overeducation. Various methods of measuring overeducation have been developed by economists and social scientists and can broadly be divided into three types: two objective measurements and a subjective one (Halaby 1994; Alpin et al. 1998; Velden et al. 1997). I shall examine each of these in turn.

(1) A common objective measurement of overeducation is based on a classification of occupations in terms of the educational level required, such as the Dictionary of Occupational Titles (USA) and the Standard Occupational Classifications as applied in various European countries. In the Netherlands, a seven-point scale is used, ranging from unskilled work to specialised work at an academic level. Overeducated workers are those whose attained educational level exceeds the skill level required for average performance in their occupation. A variance of this measure has been

used by Alpin et al. who, on the basis of the UK's Standard Occupational Classification, separates occupations into those which require a degree and others 'typically not requiring graduate qualifications' (Alpin et al. 1998). The percentage of degree holders working in occupations which do not require a degree are defined as overeducated.

(2) The second objective method takes the average number of years of education of those employed in a particular occupation, that is the intra-occupational distribution of education attained, as the basis for gauging overeducation and occupational mismatch. For example, Verdugo and Verdugo (1989) determine for each occupation (on 3-digits level) the average number of years of schooling. Workers are overeducated if their educational attainments exceed the mean for the specific occupation by more than one standard deviation (and the opposite for undereducated workers).

(3) Subjective measures of overeducation are based on the self-assessment of workers who are asked the extent to which their educational qualifications match those required on the job. In graduate questionnaires, various questions have been utilised to find an indication for overeducation, such as whether or not the degree was required or helpful for getting the job, and whether the predecessor had a higher education degree.

Each of these measures of overeducation has its strengths and weaknesses, along with the allied problems of validity. The reliability of subjective measures has often been questioned, as workers may have a biased view of the level of education required for a given job. Some researchers have questioned the appropriateness of self-assessment as an indicator for the quality of the match between education and work, as factors in the sphere of work satisfaction and motivation may influence the outcome.

Actually, the same kind of criticism may apply to the first measure of overeducation, as a subjective element creeps in when educational requirements for jobs are determined by job analysts. This assessment is often done on the basis of descriptions of the tasks and the required level of knowledge and skills. As Alpin (1998, p. 23) notes, analysts may have incomplete knowledge of job requirements, and stated requirements may become outdated if the natural requirements change overtime. Another objection is that this measure assumes a fixed, average level of required education in an occupation, rather than a distribution of required education across jobs, thereby ignoring variation in the mean years of required education across jobs within an occupation (Halaby 1994). However, as the variation within a given occupation with regard to educational requirements can be considerable, not all workers with more than the standard required amount of education have to be considered overeducated. Particularly when job levels are described by the

minimum number of years of education required for the job, this problem becomes manifest.

The second objective method of measuring overeducation, based on average years of education within occupations, also ignores the variation in educational requirements within an occupation. Particularly if jobs requiring different educational levels are lumped together under one occupational category, the measurement appears rather crude and arbitrary. The underlying assumption is that occupations which are accessible to workers who have the same educational attainments can be put together. If this is not the case and an occupation is accessible for workers with different educational levels, it is difficult to arrive at a measurement of overeducation. On the other hand, it can be questioned whether workers with the same occupational title are necessarily doing work at the same level. Some titles are very broad, encompassing a wide variety of different types of work. Furthermore, the method appears to be very sensitive to changes in labour market conditions. In times of excessive supply, employers may tend to recruit personnel with higher educational levels than actually is required. As a consequence, overeducation will be underestimated, while the opposite occurs in case of excessive demand. Because of this sensitivity, Van der Velden et al. (1997) argue that the method based on realised matches between education and occupational levels is considered the least adequate one for determining overeducation.

There is a substantial body of research which suggests that overeducation exists. For example, Alpin et al. (1998) found, on the basis of the Standard Occupational Classification measure, that 27% of all employees educated to at least degree level were working in occupations which did not require degree qualifications. Other studies reveal both higher and lower percentages. This fact is more striking when studies include the dynamic factor by determining whether the incidence of overeducation has increased over time. Groot et al. (1995) conclude on the basis of subjective measurement that the incidence of overeducation during the last decade in the Netherlands has hardly increased. In 1982, nearly 22% of all employees were overeducated, compared to 24% in 1995. Other studies, however, end up with quite different outcomes.

These different estimates of overeducation are not surprising given the different measurement techniques that are employed and the different data sets. For example, Cohn and Khan (1995) found that the incidence of overeducation according to the subjective definition amounts to 33%, whereas this is only 13% as measured to the average years of education (second method). Velden et al. (1997) examined the criterion validity of the job-analysts and self-assessment method. They concluded that the level of overeducation according to the job-analyst method is severely overestimated, whereas the

level of overeducation according to the self-assessment method is not underestimated. In other words, the self-assessment method yields a considerably more accurate estimate of the level of education required than the job-analysts method.

A provoking contribution to the debate on overeducation can be found in studies which focus on changes in the educational attainment of the workforce compared to the occupational structure. In France, Béduwé and Espinasse (1995) investigated whether the growth of higher education graduates in France have dispersed proportionally over all occupations or whether this growth has concentrated in specific occupations. If the latter occurs, the growth in graduates can be interpreted as ensuing from the various technological developments within occupations and therefore it is a response to an actual demand for higher competencies. On the basis of a shift-share analysis of two points of time, the authors calculated the variation of the structure of occupational competencies not explained by the evolution of educational supply. It appears that between 1982 and 1990 occupations hardly differed in the extent to which they utilised the growing number of graduates. The competence structure tends to be reproduced proportionally to the supply of graduates of each generation. The surplus of graduates is not concentrated in specific occupational categories such as engineers and technical workers as a response to technological developments. Béduwé and Espinasse consider it unlikely that the intensity of technological changes or the modifications of the competence structure would have affected all occupations in an equal way. According to the authors, these findings support the credentialist view on mass higher education and refute the predictions of the human capital theory regarding the actual economic demand for higher educational levels.

On the basis of UK data, Robinson et al. arrive at similar conclusions. Their hypothesis is that, if foreign competition and technological developments are driving changes in the demand for labour, this process will be uneven across occupations. The data, however, suggest that the average qualification level of staff in almost all industries has risen. For the authors this finding indicates that employers are simply increasing the educational requirements of jobs in response to changes in the supply of skilled labour (see Dolton and Vignoles 1998).

## The knowledge worker: A new research area

There are fundamental difficulties in interpreting the findings of the studies just mentioned. The problematic character of objective measures of overeducation has already been mentioned. In addition to this, several studies presuppose a one-to-one relationship between education and job where

educational types are considered as boxes that fit into occupational boxes. It is very questionable whether this still holds true, as the relationship tends to be quite elusive in a knowledge society in which jobs are less clearly defined and structured. Moreover, the classifications of occupational categories as well as the separation between graduate and non-graduate occupations appear somewhat arbitrary. For example, managerial and administrative occupations are subsumed under one category, and this may give a very distorted view.

An important criticism is that these models start from the assumption that occupations have remained unchanged over time regarding the level on which the function has to be performed. Although a classification of occupational levels that takes account of the changes in the skills and knowledge required for an occupation is not available, the assumption is highly debatable. The definition of overeducation as workers who have more schooling than is historically typical for their occupations is very narrow. In the Dutch Knowledge Debate, several critics have pointed out how job-specific knowledge is increasing: even those in intellectually less demanding occupations experience a steady increase in the amount of knowledge specific to and necessary to carry out their work. Sylvia Tóth, a leading business woman, argues that the titles of occupations are changing as well as their content, and more importantly, many occupations are being completely transformed within a decade (Tóth 1996, p. 90). Simultaneously, new occupations and job tasks are emerging which do not easily fit into prevailing categories. As Dolton and Vignoles (1998) state, current occupational classification systems are not sophisticated enough to identify precisely what kind of work is done by each graduate.

The conception of knowledge societies challenges researchers to fundamentally reconsider the connection between higher education provision and graduate work. The aforementioned studies in France and the UK which indicate that the increase in educational attainments have not taken place among technical and engineering occupations, but have been evenly distributed across occupations can be reinterpreted from the perspective of the knowledge worker. Referring to our discussion on the four broad categories of knowledge which have to be combined in knowledge-based companies, it appears that only one of these consists of technical (science) knowledge as a kind of a technology push. This means that functions are less considered as separate entities, but entail a much broader area.

Similarly, Stehr (1994) observes that knowledge-based occupations are not restricted to science and engineering technicians and computer-specialists, but encompass a much broader category of 'knowledge-workers', people who are expert at configuring knowledge relevant to a wide range of contexts. In particular, he sights a stratum of experts, counsellors and

advisors, as 'knowledge-bearing occupations' as the fastest growing segment of the labour force in modern society (see also Willke 1998, p. 167ff). Particularly these profiles currently attract most student applications.

There is another perspective that sheds light on the issue of occupational transformations. Some have argued that a fast rise of the educational credentials of the work force and a much smaller upgrading of the job structure do not necessarily lead to the conclusion that worker's human capital is being underutilised. Wielers and Glebbeek (1995) state that the productivity increases as the education of the work increases, because productivity depends primarily on the productive capacities of the workers. In other words, an adaptation takes place of the job content and an upgrading of the job structure to the surplus of knowledge and skills. This increase is accompanied by the impressive growth in the number of managerial jobs, and what is above termed knowledge-bearing occupations. Higher education graduates are increasing their penetration rates in most occupations and spreading more across the occupational spectrum. This occurs particularly in the new employment areas where the employer cannot completely control the work process and productivity and has to rely on the insights and decisions made by knowledge workers.

In a similar vein, Drucker suggests that the increased absorption of higher education graduates on the labour market has less to do with more difficult and complex job skills. For Drucker, the reason for the growth in job skills and knowledge is linked to the 'immense increase in the working life span of individuals' (Drucker 1969, p. 278). It is not so much the demand for labour and particular skills, but the *supply* of highly skilled labour that causes the transformation of society into a knowledge society. The arrival of the knowledge worker has changed the nature and character of many jobs. As modern society has to employ people who expect and demand knowledge work, knowledge jobs have to be created.

To date, the claims regarding the upgrading of the job structure and productivity gains attributed to highly qualified workers are not well researched. Rather than exploring these claims in general terms, it is more fruitful to examine their manifestations at lower aggregated levels. In order to realise this, each occupation should be conceived as a distinct case. In-depth studies on specific occupational and professional areas and recruitment policies, combining quantitative and qualitative research methods are a promising field, with focus on both the employees as well as the specific views of employers. Comparative research should, step by step, disentangle what the main components of knowledge workers are and focus on how graduates 'mould' their jobs and transform these over time into a graduate level job. Such research may provide interesting perspectives to the challenging ques-

tion of what is meant by a graduate job on the eve of the third millennium, described as the age of knowledge and information.

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