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Knowledge society discourse and higher education

Jussi Välimaa · David Hoffman

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Abstract The growing importance of knowledge, research and innovation are changing the social role of universities in the globalized world. One of the most popular concepts used to approach these changes in post-industrial and post-modern societies is the concept of 'Knowledge Society'. In this paper, we will analyse the roles higher education is expected to play with regard to various knowledge society discourses. We will begin with analyzing the uses of knowledge society as an intellectual device and continue by reflecting on how changes in higher education are related to knowledge society discourses in national, regional and global levels. In the final section we will reflect on current challenges and expectations generated within these discourses for higher education and the implications these expectations have for higher education research.

Keywords Higher education · Knowledge production · Information society · Learning society · Zeitdiagnose

Introduction

The growing importance of knowledge, research, innovation and evolving perspectives on expertise are changing the social role of universities in the globalized world. One of the most popular concepts used to approach these changes is the *Knowledge Society* together with a number of other conceptualizations (like *Knowledge Economy*, *Information Society*, *Learning Society*) aiming to illuminate the nature of societal change. As Peters (2007, p. 17) states "Concepts have histories. They also have homes." The Knowledge Society has been developed by sociologists, Knowledge Economy by economists and Learning Society by educators. These concepts—or their developers—do not, however, normally communicate much with each other in the academic world. The communication—and confrontation—takes

J. Välimaa (✉) · D. Hoffman
Institute for Educational Research, University of Jyväskylä, Jyvaskyla, Finland
e-mail: jussi.valimaa@ktl.jyu.fi

D. Hoffman
e-mail: david.hoffman@ktl.jyu.fi

place in public policy where conceptualisations operate like *performative ideologies* rather than academic theories as Peters (2007) notes. This insight is fruitful, especially for higher education research, because this speciality frequently relates to public policy. Our study aims, therefore, to identify and analyse the origins of the central concepts surrounding Knowledge Society and their uses in various public policy arenas. Our argument is that we need both critical analyses of concepts as intellectual devices and their uses in different public policy arenas in order to ascertain the relationship between the changes taking place in higher education institutions, higher education policies and societies.

Knowledge society provides an example of a concept which has created its own images, expectations and narratives (Marginson personal communication). A useful starting point for understanding the variety of connotations is to characterise the knowledge society as an imaginary space, a discourse which is based on intellectual assumptions about the most fruitful focal points for analyses of modern societies. In knowledge society discourse everything related to knowledge and knowledge production can be included and interconnected, regardless of whether it concerns individuals, organisations or entire societies. Knowledge society discourse also describes the current situation in which the knowledge society is both the objective of policies and debates and an agent promoting policies and debates concerning its' potentials (see Latour 1988).

Knowledge society discourse occurs in the context of globalisation debates which assume "the widening, deepening and speeding up of world wide interconnectedness" as Held et al. (1999) contend. Knowledge society discourse also is rooted in the fact that higher education institutions are more important than ever as mediums in global knowledge economies. In the age of globalization, higher education institutions are integral to the continuous flows of people, knowledge, information, technologies, products and financial capital (Marginson 2006).

In this paper, we will analyse the roles higher education is expected to play with regard to various knowledge society discourses. This aim, in turn, calls for understanding how the knowledge society has been developed as an intellectual device and defined as a social phenomenon. After having discussed these dimensions of knowledge society we will reflect on how changes in higher education are related to knowledge society discourses in national, regional and global levels. In the final section we will reflect on current challenges and expectations generated within these discourses for higher education and the implications these expectations have for higher education research.

The knowledge society as a social phenomenon and as an intellectual device

The notion of the knowledge society is a multi-dimensional and debated topic in a post-industrial and post-modern world. It is often understood as emerging from the "simultaneous growth of the internet, mobile telephony and digital technologies with the Third Industrial Revolution—which, at first in the developed countries, has seen much of the working population migrate to the service sector—has revolutionized the role of knowledge in our societies" (see UNESCO 2005, p. 18). Furthermore, knowledge society as a notion is and has been used globally in the media and in academic research as a term which needs neither introduction, nor explanation. Politically, knowledge society has been defined as an objective towards which both, nation states, regions (e.g. the EU) and the global community (as defined by UNESCO) should aim.

The role and importance of knowledge in the development of economies and societies has emerged over time. Daniel Bell was among the first to note that between 1909 and

1949 non-agricultural sectors, skills contributed more to economic growth than labour and capital. According to Bell (1973, p. 212) post-industrial society can be characterized as a knowledge society in a double sense: "first, the sources of innovation are increasingly derivative 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." The same ideas have been advanced by Castells when analysing key differences between previous modes of development with the societal dynamics of the digital world. According to Castells (1996, p. 17) "in the new, informational mode of development the source of productivity lies in the technology of knowledge generation, information processing, and symbol communication."[1]

As a concept, knowledge society, in turn, has its own history. According to Nico Stehr[2] the term *Knowledge Society* was first used by Lane (1966), whose concept of *Knowledgeable Society* reflects the "great optimism of the early 1960s which suggests that science would somehow allow for the possibility of a society in which common sense would be replaced by scientific reasoning" (Stehr 1994, p. 5). Drucker (1969, in Stehr 1994, p. 5), in turn, saw that knowledge was central to society "as the foundation of economy and social action". The use of the term 'Knowledge Society' began to expand with the studies of researchers like Robin Mansell and Stehr in the 1990s (UNESCO 2005). While Mansell and When (1998) focused attention mainly on Information and communication technology (ICT) as a driving force of the *Knowledge Society* or *Information society*[3] in a *source book* of the knowledge society; the aim of Stehr was, to create social theory based on the notion of the knowledge society. This was because theory focused primarily on the relationships between labour and property (capital) no longer provided the intellectual insight necessary to describe, understand and explain modern societies. According to Stehr (1994, viii): "as labour and property (capital) gradually give way to new constitutive factor, namely knowledge, older struggles and contests, centered for instance on ownership of the means of production, also make room for rising sentiments of disaffection with beliefs and values once firmly associated with labour and property and ultimately result in very different moral, political and economic debates and conflicts."

Stehr does not argue labour and capital dynamics disappeared. He also points out that previous social structures are not eliminated with this extension or enlargement. However, his assertion is that societal relationships cannot be explained without integrating the primacy of dynamics related to knowledge. In creating his own theory of modernization, Stehr suggests that modernization is not as deterministic as Marxism would suggest, rather "modernization essentially involves multiple and necessarily unilinear processes of 'extension' and 'enlargement" (Stehr 1994, pp. 29–32). The sociological question is: does the nature of knowledge production change societies, cultures and economics? The popularity of the term *Knowledge Society* is evidence in and of itself

[1] According to Bell (1973) knowledge is "a set of organized statements of facts or ideas, presenting a reasoned judgement or an experimental result, which is transmitted to others through some communication medium in some systematic form".

[2] See Stehr (1994) for the comprehensive discussion on the origins of the concept *Knowledge Society*.

[3] Mansell refers to Machlup (1962) and Porat (1984) when he writes that "for three decades or more, people have been discussing the major transformations that are possible through harnessing electronic information processing technologies to the social and economic priorities of industrial societies. These new technologies are vitally important for 'information economies' or information societies" (Mansell and When 1998, p. 12).

that understanding modern society as knowledge-based indicates that traditional understandings within societies are changing.[4]

Knowledge itself and the uses of knowledge are nothing new for mankind which understands itself through languages which are themselves symbolic systems for cultivating and transferring knowledge. In fact, it could be said that the capacity to gather, analyse and use knowledge has been a crucial element throughout the history of mankind (McNeill and McNeill 2006). What makes the idea of the knowledge society exceptional is the quantity of knowledge (and information) produced daily and the use of ICT in data-intensive processes. It may well be as Stehr notes (1994, pp. 27–29) that classical sociological theories of society are limited by zombie categories which now obscure as much as they originally clarified (Beck 1992). However, it can be argued that the modernization processes within the knowledge society are processes of extension rather than social transformation that define a fundamentally new era of human existence. This type of assertion can be seen in the reactions to topics associated with globalization noted by Held et al. (1999). Specifically their classification essentially divides actors who perceive forms of (positive and negative) *hyper-globalization*; *sceptics*, who see nothing that new in current discussions which cannot be explained by resorting to existing theory, and *transformationalists*, who perceive social transformation. As Held et al. (1999) note, the complexity of analyzing phenomena associated with globalization, like the knowledge society, is exacerbated by the fact that the typology they developed does not neatly map onto many paradigmatic approaches to social research.

The idea of social change based on extension and enlargement is also familiar to higher education researchers. Martin Trow's assumption that the social role of higher education changes with the expansion of student body has been accepted as an insightful conceptualisation of mass higher education (Trow 1974). Through this conceptualisation it is evident that mass higher education is the social form of higher education in the knowledge society. A similar trend has been noted by Clark (1983) who maintains that the main source of social dynamics in higher education is the expansion of knowledge. Following the reasoning of Clark, the expansion of knowledge leads to new research fields creating a demand for new chairs and professorships to be established for emerging fields of research and disciplines. It also creates the need to establish new training programmes and new higher education institutions. To put it shortly, the logic of expansion both in research-based knowledge, the number of students, staff and higher education institution is creating a situation where this expansion changes the social dynamics of the higher education institutions, national systems of higher education and relationships between national higher education systems. This expansion has taken and is taking place simultaneously with the development of modern knowledge societies. Stehr's interpretations indicate that the emergence of the knowledge societies and the expansion of higher education have a causal relationship. This is because knowledge production in and of itself supports growth in industrial production and creates new business activities in knowledge societies. However, knowledge society discourses themselves highlight the fact that Clark's *Durkheimian* explanation for this may prove somewhat problematic. The assertion that higher education systems are driven by differentiation which in turn creates a need for balancing social forces of integration through state, academic oligarchy and markets presupposes a need for balance, which may not exist.

[4] Internet search through Google (in October 2006) gave about 81 700,000 entries for the concept *Knowledge Society*. In social sciences of ERIC database there could be found around 600 academic books and articles on the topic of the *Knowledge Society* in 2006.

In short, as an intellectual device, the knowledge society aims to describe a new situation in which knowledge, information and knowledge production are defining features of relationships within and among societies, organisations, industrial production and human lives. Furthermore, the social theory of knowledge society aims to explain the fundamental role knowledge plays in economics, culture and the politics of modern societies. In addition to being a social theory, knowledge society is a concept that has been used widely in different domains of societies including economics, politics, popular media and culture—and academic research.

Associated concepts

Alongside the knowledge society, a number of related concepts now reference potential relationships between knowledge and change in society. The most important of these are *Learning Society* and *Knowledge Economy*. The discussion on *Learning Societies* and *Lifelong education for all* coincide with the expansion of the Knowledge Society (UNESCO 2005). These educational terms are interrelated in their attempt to prescribe points of departure as well as the need to use and learn from knowledge in all spheres of societies. Originally the concept of learning society referred to a new kind of society in which the old distinctions between formal and non-formal education were no longer valid (Hutchins 1968; Husén 1974). In this new context, lifelong learning becomes indispensable because there is a need to change workplaces and often professions and update knowledge during one's career. The crucial new skill in a learning society is the ability to *learn how to learn*. Furthermore, learning is no longer the privilege of an elite or one age cohort, rather these notions cover the entire communities and individual lifespans (UNESCO 2005).

Economic theories emphasizing the importance of knowledge in societies have their own history.[5] According to Peters (2007) the tradition of *Knowledge Economy* begun with the work of Hayek (1937) who emphasized the importance of knowledge for economic growth. In his critique against socialism and state planning he asserted the best way to organize modern society was market logic. The central element in his vision of liberal democracy envisioned science and markets as self-organizing systems. The price system communicates information because "prices can act to co-ordinate the separate actions of different people in the same way as subjective values help the individual to co-ordinate the parts of his plan" (Hayek 1945). According to Peters (2007) the second wave of (what is now known as) neoliberal thinking paid attention to formalization of economics, developing information theory and the economics of information. The third wave was influenced by the Chicago school, and Milton Friedman. According to Peters "concurrent third waves might include Machlup's groundbreaking work on the production and distribution of knowledge in the US economy, and Becker's (1964) human capital theory, although these research traditions proceed from different assumptions and use different methodologies."

[5] The discourse about the *Information Society* began in the 1960s. However, according to a number of writers this concept gives a more limited and technically-oriented description of the challenges in a modern society, because *Information Society* focuses attention to the 'production, processing, and transmission of a very large amount of data about all sorts of matter—individual and national, social and commercial, economic and military (Schiller 1981, p. 25 in Stehr 1994, p. 12). The main sociological critique against this (limited) economic perspective to changes in societies acknowledges the fact that knowledge always has a social function which is rooted in the production, distribution and reproduction of knowledge. The nature of these issues is political, not technical, because the quality of information and knowledge are related to social structures and the use of power in society.

According to Marginson (1993) human capital theory, as advanced by the Chicago school is based on two hypotheses: "First, education and training increase individual cognitive capacity and therefore augment productivity. Second, increased productivity leads to increased individual earnings, and these increased earnings are a measure of the value of human capital."

The reason for introducing these schools of thought is to draw attention to the fact that Knowledge Society as a sociological theory and Knowledge Economy as an economical theory often confront each other in the field of higher education policy making. However, the importance of knowledge and knowledge production is recognised as crucial for the development of societies even though there are different underlying assumptions concerning knowledge in various theoretical approaches.

Knowledge as a private and a public good

The debate on private and public goods in higher education is a relevant example of knowledge society discourse in the public policy intersection of the knowledge society and knowledge economy. Marginson (2006) discusses the nature of knowledge when he criticises the problems of traditional liberal distinctions (see Samuelsson 1954) between private and public (goods) in higher education[6]: "For example, language and discourse, and knowledge as 'know-how', as distinct from knowledge expressed in particular artefacts such as texts, are about as close to natural public goods as we can get. The mathematical theorem retains its value no matter how many people use it. Nor are its benefits confined to individuals for long: knowledge can only ever be a temporary private good" (Marginson 2006, p. 50). Marginson's assertion that questions the ownership of knowledge needs to be taken seriously in global knowledge societies where intellectual property rights are one of the issues at stake. Furthermore, the commodification of knowledge is crucial not only in research but also in teaching as Naidoo and Jamieson (2005) assert. They argue that "attempts at the commodification of information are probably less problematic than attempts to commodify knowledge, pedagogy and assessment" (Naidoo and Jamieson 2005, p. 45).

There are two interrelated issues here. The first concerns the ownership of innovation(s). In a number of countries, the problem has been addressed through legislation which regulates the intellectual property rights of academics and universities. The first such act was the 1980 Bayh-Dole Act in the United States which gave ownership of intellectual property, arising from federally funded research, to universities (Etzkowitz et al. 2000). However, the idea of intellectual property rights is challenged by the ethical basis of the open (source) development process, which envisions information and communication technologies as public goods, in which anyone is welcome to participate and all are invited to benefit. The second issue is related to student tuition fees. The question of *who benefits* from higher education is often translated into the question *who should pay* for education. When these questions are combined with budget reductions in higher education they easily tend to produce debates on the problems of public higher education institutions, which has been the case especially in the Anglo-American cultural sphere (Naidoo and Jamieson 2005). Whether this is a crucial European topic or not, is not perhaps an essential question as the discourse of public and private goods has been developed in those countries, but is now becoming prominent—and viewed as problematic—in continental European higher

[6] Classically, economists define public goods as goods whose consumption by one consumer does not diminish its' value or potential use by another. Literally, no one, even non-users can not be excluded from the benefits of production (Samuelsson 1954 in Marginson 2006).

education discourse. An example of this argumentation, fuelled by neo-liberal reasoning, would be the demands for *world class universities* and the emerging use of league tables in national higher education debates (Dill 2006; ASHE panel 2006).

The transformation of universities and research: Zeitdiagnose versus empirical analyses

The discourses of the knowledge society are supported by a number of abstract or theoretical assumptions concerning the changing role of higher education in society. Tuunainen (2005) provides a useful analysis of the differences between two main perspectives concerning the recent debate on the transformation of science and the university.

The first asserts that a radical metamorphosis is taking place in the relationship between knowledge production and university, as an institution. Authors like Gibbons et al. (1994), Nowotny et al. (2001) and Etzkowitz et al. (2000) propose that governments have promoted national prosperity by supporting new lucrative technologies together with the universities which become *engines* of their regions. Gibbons et al. (1994) argue that a new form of knowledge production *Mode 2* is replacing the traditional one, *Mode 1*. Mode 1 knowledge has been produced within autonomous disciplinary contexts governed mainly by academic interests of a specific community, whereas Mode 2 knowledge is produced within the context of its application. Mode 2 knowledge is transdisciplinary research, characterized by heterogeneity and more socially accountable and reflexive than Mode 1 knowledge. In addition, the proponents of the concept argue that universities are losing the monopoly of knowledge production, because knowledge may be produced in a variety of organizations and institutions.

The other variant of the metamorphosis thesis is the "Triple Helix" thesis which states that the university can play an enhanced role in innovation in increasingly knowledge-based societies. Etzkowitz and Leydesdorff (2000) assert that the previously isolated institutional social spheres of university, government and industry have become increasingly intertwined. This has brought academic, economic and wider networks of social actors together in new constellations comprising triple helix knowledge dynamics. Based on systems theory, Etzkowitz et al. (2000, p. 4) assert that four processes describe the major changes in the production, exchange and use of knowledge in the triple helix model. These are internal transformation in each of the helices (academia, state and industry) followed by the influence of one institutional sphere on another. The third process is the creation of a new combination of trilateral linkages, networks, and organizations among the three helices, while the fourth describes the effect of these inter-institutional networks both on their originating spheres and society, as a whole.

Mode 2 knowledge production has been perhaps one of the most influential conceptualisations of change in modern societies. However, the main limitation of this characterization of knowledge production dynamics and changing universities involves being "one-eyed and reductionist", focusing on "relatively small—albeit significant and dramatically changing—domain of the diverse landscape of science in society" (Elzinga 2002). It has also been argued that the dichotomy of Modes 1 and 2 presents two discrete ideal types that probably never existed in the real world (Muller 2000). In addition, Weingart (1997) and Häyrinen-Alestalo (1999), among others, have both pointed out the ideological connection between this discourse and political neo-liberalism (Tuunainen 2005).

The same type of critique has been levelled at the concept of "triple helix of university–industry–government relations" introduced by Etzkowitz (1998 in Tuunainen 2004) as a metaphor representing a close relationship between and interaction between previously

separated spheres of the university, industry and government. In this vision the university is a hybrid organization incorporating economic development together with scientific research and education. The problem with this assumption is, however, the leap of abstraction that infers 21st century universities are 'entrepreneurial universities' is an irresistible, unavoidable development (Etzkowitz 2002 in Tuunainen 2005, pp. 278–279).

A second, more moderate view of the changing nature of knowledge production and universities holds that academic capitalism is challenging the traditional values found in higher education institutions, where an attempt is underway to substitute neoliberal values and management practices. Universities become fertile ground for entrepreneurial universities and academics (Slaughter and Leslie 1997; Slaughter and Rhoades 2004; Marginson and Considine 2000).

These different theoretical assumptions characterise higher education institutions such as "hybrid organizations" (Slaughter and Leslie 1997), "Mode-2 institutions" (Nowotny et al. 2001) or "entrepreneurial universities" (Etzkowitz 2003a, b). The term *Entrepreneurial university* introduced by Clark (1998) was transformed, however, rapidly into a normative model. According to Clark (1998) entrepreneurial universities capitalize on genuine connections to the academic heartland or central missions of the university, that is, teaching, research and service. The problem in wider generalizations this notion, for example, is that the semantic field of *mission* does not necessarily correspond to the academic heartland of other national higher education systems. In Finland, for example the word *mission* is regarded as management jargon, while the meanings of service are open to active and ongoing discussions (Bernhard et al. 2005; Kankaala et al. 2004).

While these types of ideas offer a basis for analysis, they are neither social theory, nor can they be universally established by empirical research. What these various notion have in common is that they are all attempts to characterize defining features of the era in which we now live. Noro (2000) characterises this "third type of sociological theory" as the sociologically driven need to seek answers to existential questions, like *who we are? and what is the nature of our epoch?* (Giddens 1997). According to Tuunainen, these *Zeitdiagnose*, "usually combine familiar materials in a novel way, are normative in nature and pursue a topical insight." For this reason they may be used as conceptual devices and points of departure for policy making (see Tuunainen 2005, p. 283) as was illustrated by the use of Mode 2 knowledge in South African policy making context (see Kraak 2000). Owing to the nature of *Zeitdiagnose* these abstractions do not only imply that higher education has changed, but that society is changing. A fruitful approach to consider *Zeitdiagnose* is empirical research, which can be used to test these assertions in theoretical terms (Brennan 2002).

According to an empirical study by Marginson and Considine (2000) it is indeed evident that there is a general pattern of modelling universities along the lines of enterprises. This new form of *Enterprise University* may be described as follows: "it has a strategically centralised leadership highly responsive to the external setting, the wide use of corporate and business forms, the 'emptying out' of academic governance and weakening of disciplinary identity" (Marginson 2006). However, Marginson and Considine do not proclaim that Mode 2 or triple helix dynamics constitute global trends, because knowledge production plays out differently in distinct types of universities. Older, established universities with strong academic and disciplinary cultures possess more field-specific power (Bourdieu 1988, 2004) and are able to resist, even generate change, while other types of higher education institutions are more vulnerable to neoliberal management ideas (Marginson and Considine 2000, in Tuunainen 2004).

On the basis of his empirical findings Tuunainen (2004, p. 292) argues that "commercialization of the academic research through spin-off companies turned out to be in

conflict with the other university activities, most apparently, with publicly-funded research and university teaching." Furthermore, it has been noted that universities increasingly emphasize the importance of scientific quality in the pressures of market–orientation and commodification of research outcomes (Alestalo-Häyrinen and Peltola 2006). These findings, as Tuunainen indicates, suggest that there is a "need for seeing scientific work and universities as complex and, occasionally, contradictory entities whose developmental trajectories are shaped by multiple historical, political and cultural characteristics" (Tuunainen 2004, p. 293).

One of the main aims of theorists who chronicle the transformation of higher education is to highlight the changing social role of higher education, and how this change is connected to changes in knowledge production in universities. Furthermore, the aim is to argue (on the basis of the study conducted by Tuunainen) that empirical analysis of this topic challenges the picture painted by Zeitdiagnose. Situations in universities are complex, conflicted and routinely elude many theoretical abstractions.

The knowledge society as a political goal

The Knowledge Society is continually used as a slogan in a number of political contexts. While not all combinations and situations can be addressed, we will focus on three interconnected political levels: national, regional (EU) and global, to convey a wide picture of the different political dimensions of knowledge society discourse.

Nation states

At the level of nation states the Knowledge Society can be seen to have taken on distinct forms. Castells and Himanen (2001) assert three alternative routes to the Knowledge Society. These are: (1) Silicon Valley—a market driven, open society (USA), (2) Singapore—an authoritarian model of the knowledge society and (3) The Finnish model—which describes an open, welfare-state-based knowledge society. This typology highlights the variety of possible ways in which the notion can be defined, approached and used with respect to social organization. A fruitful suggestion made by Castells and Himanen is their assumption that the social structure of the informational age is based on networks. According to Castells (1996, pp. 470–471) "Networks are open structures, able to expand without limits, integrating new nodes as long as they are able to communicate with the network, namely as long as they share the same communication codes (for example values or performance goals). A network-based social system is a highly dynamic, open system, susceptible to innovation without threatening its balance."

Illustrative case: the Finnish model

For the purposes of illustration, we will shortly elabourate the Finnish model to underline the significance of analysis of knowledge society discourse at the national level.[7] Finland

[7] The idea of Knowledge Society has been taken seriously in Finland. The Finnish Ministry of Education set up an expert committee to prepare a national strategy for education, training and research in the Information Society (or rather Knowledge Society, because the words *information* and *knowledge* are synonymous in Finnish) in 1994. It set the objectives for the national development plan which was implemented in January 1995 (see: National Strategy 1995).

also provides a Nordic example of the creation of a national innovation strategy to promote cooperation between private companies and public authorities. Castells and Himanen analyse the Finnish path towards the knowledge society historically, philosophically and sociologically. This is because distinct forms of knowledge society do not appear overnight; rather they emerge in particular historical contexts. The distinctive feature of the Finnish welfare state version of the knowledge society is the strong expectation that the state should play a key role between society and the market. The State acts as regulator via legislation, making it a flexible organiser of the development activities needed to reach the goals of a knowledge society. The strong role played by the state is rooted in four forms of legitimacy developed historically from the 19th century. *Political legitimacy* comes from the democratic political system, *social legitimacy* is gained through the social policies and wealth distribution of the welfare state, *cultural legitimacy* developed during the national project when Finland emerged as an independent nation state (Välimaa 2001) and *economic legitimacy* is gained because state supports the development of the market and aims to develop its informational infrastructure.

Networking as the social organisation of knowledge society

When applying network analysis to the Finnish model, Castells and Himanen (2002) further develop the argument that the knowledge society is organised in and through networks. By using the example of NOKIA they argue that successful companies use networking as a model to organise their industrial production, research and development activities and cooperation with other partners (including universities). They assert that networks illuminate the way power is organised in general, in Finland. The nation state plays a significant role through various social actors which bring researchers and business companies together in order to focus resources on problems deemed to be of economically strategic importance. These are either development agencies which support cooperation between business and research[8] or public organisations which promote cooperation between the world of business and academe.[9] Politically it is also significant that the National Technology Council, chaired by the Prime Minister, defines national strategies for technology and innovation. It is in this context where the role of higher education policy becomes important. In Finland, universities are seen and defined as part of the national innovation system aiming to increase the capacities of Finnish enterprises and the nation state in general with regard to the international market (Miettinen 2002).

The open (source) development process and technological innovation

Another important aspect of the *Finnish knowledge society success story* related by Castells and Himanen (2002) is the consideration accorded to the ethical basis underlying technological innovation. Castells and Himanen (2002) argue that it is not surprising that the Linux operating system was invented in Finland. The ethical basis of the *open source development process*, sometimes called *hacker ethics* is what enabled (then) University of

[8] TEKES, the Finnish Funding Agency for Technology and Innovation is the main public financing organisation for research and technological development in Finland. Tekes finances industrial R&D projects as well as projects in universities and research institutes (see: http://www.tekes.fi/eng/tekes/).

[9] SITRA is the Finnish National Fund for Research and Development under the supervision of the Finnish Parliament. Sitra's aim is to be a partner in building a knowledgeable and innovative society (see: http://www.sitra.fi/en/).

Helsinki student, Linus Torvalds, to achieve what Moody (1997, p. 1) describes as "the ultimate hack". Specifically, launching a computer operating system that binds a global community of ICT personalities whose participation in the LINUX community is conditional on the acceptance of an alternative, emancipatory vision of ICT. Cutting-edge thought and action in the LINUX community is based on a vision of ICT as a public good, in which anyone is welcome to participate and all are invited to benefit. The success of an alternative ethical point of departure can be observed in within major ICT firms who increasingly must dedicate resources to the Linux movement, lest they become sidelined by actors (and competitors) who do (Hamm 2005). The high quality university system (including technical universities and institutes) in Finland combined with the fact that highly subsidized students have the opportunity to spend time around universities free of charge is integral to open source logic (Castells and Himanen 2002).

Learning Society in the UK

Knowledge society discourse is known to other European countries as well. It should be mentioned that the purposes of universities in the *Learning Society* has been defined in the UK according to the Dearing Report (1997). According to Laurillard (2002) the aims of the report describe the importance of higher education to the personal development of the individual in contrast to short-term employment and education provided by corporate training programmes. Secondly, it emphasises the functions of teaching and research in the development of and dissemination of knowledge and furthermore expresses the economic value of both of these activities. Finally, this political report aimed at setting goals for the development of British higher education, also pays specific attention to the cultural and political value of higher education in maintaining and developing civil society.

The regional dimension: "The most competitive and dynamic knowledge-based economy in the world"

In addition to European nation states, knowledge society discourse has opened up an imaginary social space in the European Union itself. This argument is emphasized on the European Commission's Knowledge Society-homepage, which begins with the central objective of the Lisbon strategy: "to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion." (Strategic goal for 2010 articulated at the Lisbon European Council—March 2000, see http://ec.europa.eu/employment_social/knowledge_society/index_en.htm).

This citation, in and of itself, indicates the importance of the topic for the European Union. In order to reach this objective "Europe's education and training systems need to adapt both to the demands of the knowledge society and to the need for an improved level and quality of employment". The European Commission is confident of the potential this type of society offers for its' citizens. According to the cited webpage, the knowledge society means: "new employment possibilities, more fulfilling jobs, new tools for education and training, easier access to public services, increased inclusion of disadvantaged people or regions." http://ec.europa.eu/employment_social/knowledge_society/index_en.htm).

These EU web pages indicate both the objectives and the Commission's definitions and understandings of the Knowledge Society. Knowledge Society, Information Society and Knowledge-based Economy are used interchangeably in these documents. This indicates

either a lack of need to define the concepts accurately, a lack of understanding regarding their differences or both. European employment strategy is foregrounded in these documents, topping the hierarchy of topics in the knowledge society web pages, the main emphasis focusing on how policy on the knowledge-based economy can promote employment in Europe. Quite naturally, education and training are prominent. It is more interesting to note that innovation and research—as topics—are more hidden in the documents. During the Finnish presidency of the European Union the lack of support for Europe's innovative capacity was defined as a problem. References to the Lisbon Strategy provoke increasingly frustrated reactions as it is becoming evident these ambitious goals will not be reached by 2010. As a reflection of this problem the European Commission has begun to formulate policy to promote innovation. According to this web site, on September 2006:

> Today, the European Commission has tabled a 10 point programme for action at national and European levels to foster innovation as a main asset of the EU economy. This will form the basis for the discussion by European leaders at the informal Summit due to take place in Lahti, Finland on 20 October 2006. The programme points the way forward to accompany industry-led innovation with public policies at all levels as a core element of the renewed Lisbon strategy for growth and jobs. ...The Commission calls upon Member States to make the structural reforms necessary to deliver the results required. The Commission underlines that Europe does not need new commitments from Member States but political leadership and decisive action.

The Bologna Process

In European higher education, one of the most interesting processes related to knowledge society discourse is the Bologna Process. This is because the Bologna Process provides an empirical window into the globalization of higher education, as it is playing out in Europe. The Bologna Process has been a hot topic at all levels of the national higher education systems and it has been analysed in a number of studies (see Tomusk 2006). The importance of the Bologna Process is the fact that it simultaneously is influenced—and influences—multiple levels of European higher education. National higher education policy makers aim to implement the reform at the system level, higher education institutions are developing institutional policies to implement the Bologna Process and individual academics are occupied with the requirements of adapting curricula changes which can accommodate the idea of two cycles of degrees. From the perspective of research, it is not only interesting to analyse the changes taking place in a national higher education system but also theoretically challenging to analyse how international pressures manifest in local contexts (Hoffman et al. in press). In addition, it is challenging to analyse how the Bologna Process has been defined in the national higher education policy field and identify the central elements of the implementation strategy adopted by the European nation states and the European Union.

For the community of higher education researchers, the Bologna Process has provided a good opportunity to reflect on the processes of change in which some of us have become entangled as academics. This challenges us not only methodologically (how to conduct research projects on a rapidly changing context) but also politically (what is our relationship to these changes) and theoretically (what intellectual devices could be used in the analysis).

A global information society?

In the global context, the use of ICT, the access to knowledge resources and the political aspects of knowledge society are key issues (UNESCO 2005; Mansell and When 1998). It is in this perspective that a 'global information society' emerges as one of the main challenges for development, because it is evident that the global information society is a political goal which is far from being reached. Specifically, as we begin the 21st century, only 11% of the world's population has access to the internet. Ninety percent of these connections are in leading industrialised economies in North America (30%), Europe (30%) and in the Asia-Pacific region (30%). In addition, 82% of the world's population account only for 10% of internet connections in the world (UNESCO 2005, p. 29). This disparity has been called the *digital divide* and cuts across the globe, following the contours of social and economic capital distribution (Castells 1996). The problem is not only the proximity to electricity grids but also the fact that interactive computers and internet connections are unaffordable luxuries for the majority of mankind. Popular media, on the other hand is more affordable, profitable and more easy to manipulate, as communication only flows from sender to receiver. This form of exclusion unites urban slum dwellers and the homeless, remote villagers in developing countries and persons caught up in conflict zones.

We will not go into the details with the problems related to the *digital divide* because our focus is on European higher education. One should not forget, however, that knowledge society discourse is dominated by the conditions of the relatively young, well educated working age citizens geographically located in the urban areas of a few rich countries (UNESCO 2005; Castells and Himanen 2002).

Social responsibilities of higher education in global information societies

The role of higher education is, however, seen crucial in the development of global information societies. The UNESCO World Conference on Higher Education emphasised that the relevance of higher education means: (1) being politically responsive, (2) being responsive to the world of work, (3) being responsive to other levels of the education system, (4) being responsive to culture and cultures, (5) being responsive to all, (6) being responsive everywhere and all the time, (7) being responsive to students and teachers. As a conclusion the declaration says: "In these circumstances, higher education can truly help to underwrite the generalized spread of knowledge within industrialized societies and in developing countries." (UNESCO 2005, p. 97)

This impressive list of social responsibilities expected from higher education clearly indicates that world communities have high hopes regarding higher education. It also indicates that the social role of higher education in the global information society is seen crucial for the development of societies. Furthermore, the list of expectations highlights the central roles universities as producers of knowledge and educated experts in knowledge societies. However, looking these goals with a critical eye, it can immediately be seen that these multiple expectations describe higher education from the outside, looking in. There are no operational arguments saying how societies should develop their higher education to realize these comprehensive, multifaceted challenges. Furthermore, there is no indication that the limitations of universities and other educational establishments are understood. Accounting for the potential of the impact of expanding information technologies and on research, teaching and service presents considerable challenges to both present structures and ways that work actually is accomplished in higher education. The last point makes this

quite clear when defining the being responsive to students and teachers as follows: "institutions of higher education should be conceived and managed not as mere training establishments but as educational facilities, implying better management of teaching careers and the active participation of students not only in teaching activities, but also in the management and life of institutions of higher education" (UNESCO 2005, p. 97).

According to UNESCO (2005, p. 87) higher education institutions "are destined to play a fundamental role in knowledge societies, based on radical changes in the traditional patterns of knowledge production, diffusion and application." If that assertion is taken seriously, the privatization of higher education and the opening up of universities to forms of market-like organization and the wholesale commercialization of educational services are issues which can, and are being contested and resisted (Currie and Newson 1998; Bourdieu 2004; Marginson 2006).

Higher education and the needs of the knowledge society

Having described various types of knowledge society discourse and contexts, we now change our focus, to key recent topics which highlight society, from the perspective of higher education. These topics were selected as the key challenges presented by ICT, knowledge production, the training of professionals and development of civic society.

Information and communication technology

One of the challenges for the internal development of higher education institutions (whether speaking about teaching, research, service or the administration of these functions) is created by the implementation of rapidly changing information technologies. Higher education institutions are not only producing and supporting technological innovations but are at the same time intensive users and subject to the limitations of ICT. The ICT revolution is already having significant impacts on students' learning processes (e.g. through the availability of virtual learning environments and new sources of information) challenging both students and teachers to re-assess their conceptions about learning and instruction (Hasenbegovic et al. 2006). Therefore, the challenges related to the use of ICT are not only technical but are also related to pedagogical thinking and organisational structures (Laurillard 2004). New technologies require new professionals not only to maintain and upgrade ICT support, but also to work in teaching development units and centres which address the pedagogical (re)training of professors (Rhoades 1998). ICT is restructuring the institutional fabric of higher education and influencing the academic work done by university teachers, as much as it is changing the nature of support functions accomplished by staff administrative personnel.

Knowledge production

This theme has been approached above from the perspective of knowledge society in the discussion on the changing role of universities in the knowledge production. Looking at the challenges from the perspective of higher education institutions the main challenges may be defined as follows:

- Mitigating the increasing pervasiveness of academic capitalism encouraging on the traditional tasks of the university. When saying this we would like to emphasize

(following Slaughter and Rhoades 2004; Bourdieu 2004; Ylijoki 2003; Marginson 2006) that academic capitalism is not something any person or group *does to us* as much as *it* is something *we do to ourselves*. With reference to academic cultures (Becher and Trowler 2001) there are significant differences between disciplines in the academic world as regards their relationship with society, e.g. humanities, social science, ICT, sciences, economics (Slaughter and Rhoades 2004). There is considerable room for a more robust critique of reform trends in higher education (Bourdieu 2004; Marginson 2006).

- How to appraise and organise internal administrative procedures in higher education institutions as they increasingly adopt the ethos and methods of New Public Management. These methods aim to emphasize efficiency and reduction of costs.
- In addition, the topic of knowledge production is related to knowledge transfer. According to Teichler (2004) major modes of knowledge transfer include: (1) knowledge media (books, films, letters, e-mail messages, artefacts, etc.), (2) physical mobility of scholars and students, (3) collabourative research and joint teaching/learning project, and (4) trans-national education.

Higher education and working life

The notion of the Learning Society reveals many aspects of the Knowledge Society. Both emphasising the centrality of knowledge production and lifelong learning of the labour force and because the imperative of this ethos can be summed up by the phrase: *learning how to learn*. Furthermore, *human capital theory* seems to explain much of the empirical data gathered about the European labour market (Machin 2005), because improving the educational level and the qualifications of the labour force has positive impact on GDP, even though it is difficult to measure the impact of educational investments (Asplund 2005).

The human capital aspect is seen essential in the European Union where knowledge society discourse strongly emphasizes employment-related topics and themes. However, inside higher education institutions the discourse of the knowledge society challenges universities to develop and to adopt new collabourative teaching practices in the training of professionals. It has been noted the development of expertise often takes place both in formal training (in higher education institutions) and in work places. This cooperation between the world of work and academia challenges higher education institutions to develop both their traditional structures and also their pedagogical practices (see Tynjälä et al. 2003).

There is extensive empirical and theoretical literature on the relationship between higher education and work (see Teichler 1998). However, Rhoades and Slaughter (2006, pp. 19–25) have elabourated five assumptions concerning the relationship between higher education and working life which cannot be supported by empirical research. According to them it is quite problematic to assume that *work equals private sector employment*, because it does not reflect the empirical realities of employment in many parts of the US and globally. It has also been assumed that *work equals employment in large companies.* Even though this equation maps very nicely onto the pattern of academic capitalism and the new economy, it does not reflect the realities of employment in the private sector in the US. Thirdly, it is assumed that *education for work equals fitting in and assimilating to existing workplaces*, even though "working life is changing dramatically, and it is a worthwhile question whether the sole function of higher education is to adapt to those changes."

According to the fourth assumption, *preparing for work equals developing new job skills*. "Yet it reflects a particular theoretical perspective about education and employment that has been empirically called into question". Finally, according to Rhoades and Slaughter (2006, pp. 24–25), it is assumed that *work equals paid employment*, even though this assumption "overlooks the realities of demographic patterns and public policy challenges in most countries, particularly in the North/West".

Higher education and the changing idea of the state

The idea of a network-based society reflects the changing idea of the state in the knowledge society discourse. In the Brave New (Nation) States of the knowledge society two crucial questions arise: What is the role of the state? Who should the state serve? In traditional welfare states the aim of the state was to provide universal education, health and security (all public goods) at no cost to its citizens and permanent residents. This idea of the state has been challenged by neoliberal ideas about society. The role and position of higher education institutions in this changing ideological landscape is crucial for the state in two regards. First, as producers of innovations and new knowledge, higher education institutions are seen as crucially important for the competitive capacities of nation states, however their role as trainers of experts is easily defined in terms as private goods of for individuals, and therefore, payable goods. Empirically, the question *Who benefits*? is harsh on most ideological claims about the current and future role of the university.

Higher education institutions in civic society

What are the main roles of higher education in civic society? As noted in the Dearing Report (1997) and the UNESCO World Conference, many of the social responsibilities of higher education emphasise the cultivation of civic virtues "shaping a democratic and civilized society". In addition higher education institutions are expected to contribute to culture and cultural development of societies. In short, this implies higher education institutions are expected to initiate and maintain critical discussion within societies. This is one of the traditional objectives of public intellectuals (Jacoby 1987) but it has also been defined as one of the goals of university researchers and professors in Finland (Välimaa 2004). The list of social responsibilities can be also approached from the perspective of analysing those groups who meditate between *knowledge workers* and the general population of a society. Traditionally these people were spiritual leaders and more recently scholars with social interests. They assume the critical role of intellectuals (Sadri 1992). For higher education, one of the obvious challenges, following Bourdieu (1988; 2004), is the analysis of the processes through which and by whom knowledge is mediated in civil societies.

Challenges for higher education research

We began with a short overview of the knowledge society as an intellectual device. The essential point we underline is that these conceptualisations aim to describe how today's society differs from previous societies. For the purposes of this paper it is also important to understand what these different conceptualisations mean, in order to provide a basis for communication within the higher education research community. Creating a common ground for communication is important also because these concepts are widely used in policy-making and several other public spheres of modern knowledge societies.

In this discussion we are purposefully challenging ourselves to reflect on possible future research themes or topics in higher education research even though it is evident that this type of discussion serves only as a starting point.

A tentative list of research topics and themes

1. *Empirical analysis of* '*Zeitdiagnose*'. Higher education researchers and policy makers are often seduced by Zeitdiagnose, because they are elegant, intuitive and appear to be easily adopted or adapted, whether or not there is an empirical or theoretical basis for the juxtaposition of an idea from one context onto (or into) another. In the knowledge society discourse, these abstractions (re)define the role of knowledge, science and universities in society. However, realities in higher education institutions are more complex and conflicted than many of these banners suggest. There is continuous need for theoretically-based empirical studies in and on higher education.
2. *Knowledge transmission*. One of the challenges for higher education research is the analysis of processes through which, by who and for who knowledge is mediated in civil societies. Possible insights to this could be illuminated by studies of (national or European) intellectuals and their changing relationship with society and higher education.
3. *Empirical research of current topics*. One of the challenges of higher education research is to conduct studies on current and important topics like the Bologna Process. These topics provide good examples of change in which we are entangled as academics. These topics challenge us not only methodologically (how to conduct research projects on on-going processes) but also politically (what is our relationship to it) and theoretically (what intellectual devices can be used in the analysis).
4. *Higher education and working life*. This is one of the major topics and well-grounded in empirical research in higher education. In spite of its popularity it does not diminish its central value in higher education research because training of experts and professionals is one of the main channels of interaction between higher education institutions and society. For example; if the ageing of many European societies is considered, longitudinal designs focused on different (national or regional) manifestations connected to life-long-learning becomes interesting.
5. *Studies on networking in higher education*. One of the problems with the empirical studies of networks is defining where a network begins or ends. Therefore, an analytically sound solution to this problem of empirical research problem is to *follow the actors* (see Latour 1988) or try to approximate points where networks become visible. However, despite the problems of empirical research to analyse networks, it is evident that networking and networks describe social realities of human beings in the age of information. Studies utilizing social network analysis may also illuminate interesting perspectives to institutional level studies. The networking of higher education institutions based on notions of learning societies which may be losing their national character, being assimilated or, alternatively, transforming themselves into trans-national networks or international organizations provides one possible perspective to this type of research.
6. *Curiosity-driven studies on emerging issues.* "Research on higher education does not have to be driven by public concerns. Higher education researchers could anticipate changing issues and make the key actors aware of the salient issues they are likely to face in the near future. We could give greater attention to issues which are looming but have not been analyzed in the public debate." (Schwarz and Teichler 2000, p. 23) While this quote is as self-explanatory as it is self-evident, we would be remiss by not

pointing out that the higher education research community is better equipped than most to identify, analyze and raise issues which are off the radar screen of policy-discussion, public and general academic debate. A research agenda which does not contemplate issues just over the horizon can be perceived as limited.

Reflecting on the role and goals of higher education research

The principle task before higher education researchers regarding the knowledge society, is the critical evaluation of a situation in which our methodological gaze has become as meaningful when turned inward—to higher education itself—as when we purport to study contexts and phenomena *outside* our walls (Bourdieu 2004). While this has always been an interesting exercise, the exigencies of the present situation have been pointed out from all points on the globe in the form of critiques of *academic capitalism*, as Leslie and Slaughter had formulated, *knowledge capitalism* (May 2005), *neo-liberal managerialism* (Rhoades and Slaughter 2004), a *lack of political engagement* (Torres 2006) and a looming, global impression of the universities as nothing more than "engines for economic productivity and competitiveness" (Currie and Newson 1998, p. 3). However, as Marginson (2006) points out, the real weakness in many descriptions and interpretations of our present situation lies in a lack of theorisation of the dynamics on which the very essence of the knowledge society rests. It is precisely this lack of theoretical explanation which signals the conditions in which the most critical hypothesis which can be formulated about the university is identical to the critical hypothesises which our field of study indicates we pose about society (Bourdieu 2004).

This type of situation indicates empirical investigation of the fundamental interests of an institution capable of influencing both social reproduction and transformation (Brennan 2002). Systematically probing the *high-profile* and profitable scientific frontiers which need to be crossed necessarily involves the illumination of *no-profile* questions which characterizes the situation we—and our societies—now find ourselves. The erosion of the nature of higher education as a public good has indeed been raised from many quarters and in many contexts, but, as (Marginson 2006, p. 46) points out, the real question is: 'Why are the universities and faculty complicit in this?"

The only thing more interesting than rigorous analysis of empirical data about this question, would be the illumination of issues which are *not* raised or detected. We assert—following Marginson (2006) and Bourdieu (2004)—that theoretically-driven explanation based on rigorous analysis of empirical data within robust conceptual frameworks will frequently illuminate both knowledge voids and the theoretical mirror images of the most popular policy fads and fashions. Specifically: policy topics we systematically avoid. Our point here is to underline the value of seeking the explanations of the driving forces behind scientific investigation and science policy in today's knowledge society. Empirical research of this type will not only point out the urgent and the obvious; the altruistic and the self-interested. It will also cast a theoretical shadow on the unanticipated and unintended; and "the games of individual bad faith (which) are only possible in a profound complicity with a group of scientists" (Bourdieu 2004, p. 23).

References

Alestalo-Häyrinen, M., & Peltola, U. (2006). The problem of a market-oriented university. *Higher Education, 52*, 251–281.

Asplund, R. (2005). 'Koulutuksen kannattavuus yksilöiden ja yhteiskunnan näkökulmasta', Talk for Seminar on the Economics of Education. Helsinki, 21 September.

Becher T., & Trowler, P. R. (2001). *Academic tribes and territories: Intellectual enquiry and the culture of disciplines* (2nd ed.). Buckingham: SRHE and Open University Press.
Beck, U. (1992). *Risk society: Torwards a new modernity*. London: Sage.
Becker, G. S. (1964). *Human capital*. New York: Columbia University Press.
Bell, D. (1973). *The coming of post-industrial society: A venture in social forecasting*. New York: Basic Books.
Bernhard, A., Cai, Y., et al. (2005). Higher education planning, budgeting and finance meet the sociological imagination: A study on national steering and financing mechanisms. In T. Ojanperä (Ed.), *Näkökulmia aktiviseen kansalaisuuteen*. Helsinki: Viikki Teacher Training School Publications.
Bourdieu, P. (1988). *Homo academicus*. Cambridge: Polity Press.
Bourdieu, P. (2004). *The science of science and reflexivity*. Cambridge: Polity Press.
Brennan, J. (2002). Transformation or reproduction? In J. Enders & O. Fulton (Eds.), *Higher education in a globalising world* (pp. 73–86). Dordrecht: Kluwer Academic Publishers.
Castells, M. (1996). *The information age: Economy, society and culture. Volume I: The rise of the network society*. Oxford: Blackwell.
Castells, M., & Himanen, P. (2001). *Suomen Tietoyhteiskuntamalli: Suomentanut Jukka Kemppinen* (p. 242). Vantaa: WSOY, Sitran julkaisusarja.
Castells, M., & Himanen, P. (2002). *The information society and the welfare state: The Finnish model*. Oxford: Oxford University Press.
Clark, B. R. (1983). *The higher education system*. Berkeley: University of California.
Clark, B. R. (1998). *Creating entrepreneurial universities: Organizational pathways of transformation*. Oxford, New York: Published for the IAU Press by Pergamon Press.
Currie, J. & Newson, J. A. (Eds.) (1998). *Universities and globalization: Critical perspectives*. Thousand Oaks: Sage Publications.
Dearing Report (1997). Higher education in the learning society. Norwich: HMSO.
Dill, D. (2006). Convergence and diversity: The role and influence of university rankings. In CHER 19th annual conference "Systems Convergence and Institutional Diversity?". Kassel, 7–9 September 2006.
Drucker, P. (1969). *The age of discontinuity. Guidelines to our changing societies*. New York: Harper and Row.
Elzinga, A. (2002). New production of reductionism in models relating to research policy. In Paper to the nobel symposium, science and industry in the 20th Century. Royal Swedish Academy of Sciences, Stockholm, 21–23 November.
Etzkowitz, H. (1998). The norms of entrepreneurial science: Cognitive effects of the new university-industry linkages. *Research Policy, 27*(8), 823–833.
Etzkowitz, H. (2002). *MIT and the rise of entrepreneurial science*. London: Routledge.
Etzkowitz, H. (2003a). The norms of entrepreneurial science: Cognitive effects of the new university-industry linkages. *Research Policy, 27*(8), 823–833.
Etzkowitz, H. (2003b). Research groups as 'Quasi firms': The invention of the entrepreneurial university. *Research Policy, 32*(1), 109–121.
Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: From national systems and 'Mode 2' to a Triple Helix of university-industry-government relations. *Research Policy, 29*(2), 109–123.
Etzkowitz, H., Webster, A., Gebhardt, C., & Cantisano Terra, B. R. (2000). The future of the university and the university of the future: Evolution of ivory tower to entrepreneurial paradigm. *Research Policy, 29*, 313–330.
Giddens, A. (1997). *The constitution of society*. Cambridge: Polity Press.
Gibbons, M., Limogenes, C., Nowotny, H., Schwartzman, S., Scot, P., & Trow, M. (1994). *The new production of knowledge: The dynamics of science and research in contemporary societies*. London: Sage.
Hamm, S. (2005). Linux Inc. *BusinessWeek online 2006*. http://www.businessweek.com/magazine/content/05_05/b3918001_mz001.htm. Retrieved 14 November 2006.
Hasenbegovic, J., Gruber, H., Rehrl, M., & Bauer, J. (2006). The two-fold role of epistemological beliefs in higher education: A review of research about innovations in universities. In P. Tynjälä, J. Välimaa, & G. Boulton-Lewis (Eds.), *Higher education and working life-collabourations, confrontations and challenges* (pp. 163–176). Amsterdam: Elsevier.
Hayek, F. (1937). Economics and knowledge. *Economica IV*, 33–54. http://www.virtualschool.edu/mon/Economics/HayekEconomicsAndKnowledge.html. Accessed on December 2007.
Hayek, F. (1945). The use of knowledge in society. *American Economic Review 4*, 519–530. http://www.virtualschool.edu/mon./Economics/HayekEconomicsAndKnowledge.html. Accessed on December 2007.
Held, D., McGrew, A., Goldblatt, D., & Perraton, J. (1999). *Global transformations: Politics, economics and culture*. Stanford, CA: Stanford University Press.

Hoffman, D., Välimaa, J., & Huusko, M. (2008). The Bologna Process in academic basic units: Finnish universities and competitive horizons. In J. Välimaa & O.-H. Ylijoki (Eds.), *Cultural perpectives on higher education* (pp. 221–237). Dordrecht: Springer.

Häyrinen-Alestalo, M. (1999). The university under pressure of innovation policy—Reflecting on European and Finnish experiences. *Science Studies, 12*(1), 44–69.

Husén, T. (1974). *The learning society*. London: Methuen.

Hutchins, R. (1968). *The learning society*. London: Penguin.

Jacoby, R. (1987). *The last intellectuals: American culture in the age of academe*. New York: The Noonday Press.

Kankaala, K., Kaukonen, E., Kutinlahti, P., Lemola, T., Nieminen, M., & Välimaa, J. (2004). *Yliopistojen Kolmas Tehtävä?* (*The University's third task?*). Helsinki: Edita.

Kraak, A. (2000). *Changing modes: New knowledge production and its implications for higher education in South Africa*. Pretoria: Human Sciences Research Council.

Lane, R. E. (1966). The decline of politics and ideology in a knowledgeable society. *American Sociological Review, 31*, 649–662.

Latour, B. (1988). *The pasteurization of France*. Translated by Alan Sheridan and John Law. Cambridge, MA and London: Harvard University Press.

Laurillard, D. (2002). Rethinking teaching for the knowledge society. *Educause Review, 37*(1), 16–25.

Laurillard, D. (2004). E-learning in the knowledge economy: The right context for innovation. In Colston Colloquium. Bristol, UK, 23–24 March 2004.

Machin, S. (2005). Education and the labour market. In Talk for Seminar on the Economics of Education. Helsinki, 21 September.

Machlup, F. (1962). *The production and distribution of knowledge in the United States*. Princeton, NJ: Princeton University Press.

Mansell, R., & When, U. (1998). *Knowledge societies: Information technology for sustainable development*. New York: UN Commission on Science and Technology for Development; Oxford University Press.

Marginson, S. (1993). *Education and public policy in Australia*. Cambridge: Cambridge University Press.

Marginson, S. (2006). Putting 'public' back into the public universities. *Thesis Eleven 84*, 44–59.

Marginson, S., & Considine, M. (2000). *The Enterprise University*. Cambridge: Cambridge University Press.

McNeill, J. R., & McNeill, W. H. (2006). *Verkottunut ihmiskunta. Yleiskatsaus maailmanhistoriaan*. Translated by Natasha Vilokkinen. The human web. A bird's-eye view of world history. Tampere: Vastapaino.

Miettinen, R. (2002). *National innovation systems: Scientific concept or political rhetoric*. Helsinki: Edita.

Moody, G. (1997). The Greatest OS That (N)ever Was, Wired Magazine. 2006. http://www.wired.com/wired/5.08/linux_pr.html. Retrieved 14 November 2006.

Muller, J. (2000). *Reclaiming knowledge: Social theory, curriculum and education policy*. London: RoutledgeFalmer.

Naidoo, R., & Jamieson, I. (2005). Knowledge in the marketplace: The global commodification of teaching, learning in higher education. In P. Ninnes & M. Hellstén (Eds.), *Internationalizing higher education: Critical explorations of pedagogy and policy* (pp. 37–52). Dordrecht: Springer.

National Strategy (1995). *Education, training and research in the information society. A National Strategy*. Helsinki: Ministry of Education.

Noro, A. (2000). Aikalaisdiagnoosi sosiologisen teorian kolmantena lajityyppinä. *Sosiologia, 37*(4), 321–329.

Nowotny, H., Scott, P., & Gibbons, M. (2001). *Re-thinking science: Knowledge and the public in an age of uncertainty*. Cambridge: Polity Press.

Peters, M. A. (2007). *Knowledge economy, development and the future of higher education*. Rotterdam and Taipei: Sense Publishers.

Porat, M. (1984). *The information economy: definition and measurement*. Washington, DC: Department of Commerce.

Rhoades, G. (1998). *Managed professionals: Unionized faculty and restructuring academic labour*. Albany, NJ: State University of New York Press.

Rhoades, G., & Slaughter, S. (2004). *Academic capitalism and the new economy: Markets, state and higher education*. Baltimore: Johns Hopkins University Press.

Rhoades, G., & Slaughter, S. (2006). Mode 3, academic capitalism and the new economy: Making higher education work for whom? In P. Tynjälä, J. Välimaa, & G. Boulton-Lewis (Eds.), *Higher education and working life—Collaborations, confrontations and challenges* (pp. 9–33). Amsterdam: Elsevier.

Sadri, A. (1992). *Max Weber's sociology of intellectuals*. Oxford: Oxford University Press.

Samuelsson, P. (1954). The pure theory of public expenditure. *Review of Economics and Statistics, 36*(4), 387–389.
Schwarz, S., & Teichler, U. (2000). Comparing the institutional basis of higher education research. In S. Schwarz & U. Teichler (Eds.), *The institutional basis of higher education research* (pp. 1–9). Dordrecht: Kluwer Academic Publishers.
Slaughter, S., & Leslie, L. L. (1997). *Academic capitalism—Politics, policies and the entrepreneurial university*. Baltimore and London: Johns Hopkins University Press.
Slaughter, S., & Rhoades, G. (2004). *Academic capitalism and the new economy: Markets, state and higher education*. Baltimore and London: Johns Hopkins University Press.
Stehr, N. (1994). *Knowledge societies*. London: Sage.
Teichler, U. (1998). *Higher education and the world of work: Changing conditions and challenges*. Paris: UNESCO.
Teichler, U. (2004). The changing debate on internationalisation of higher education. *Higher Education, 48*(1), 5–26.
Tomusk V. (Ed.) (2006). *Creating the European area of higher education: Voices from the periphery*. Dordrecht: Springer.
Torres, A. (2006). Globalizations and higher education: Ethical and political tensions. In Keynote address, International Forum, Annual conference of the association for the study of higher education. Anaheim, California.
Trow, M. (1974). Problems in the transition from elite to mass higher education. In *OECD Policies for Higher Education. General report on the conference on future structures of post-secondary education*, Paris, pp. 55–101.
Tuunainen, J. (2004). Hybrid practices? The dynamics of university research and emergence of a biotechnology company. Doctoral Dissertation, Department of Sociology, University of Helsinki, Helsinki.
Tuunainen, J. (2005). Hybrid practices? Contribution to the debate on the mutation of science and university. *Higher Education, 50*, 275–298.
Tynjälä, P., Välimaa, J., & Sarja, A. (2003). Pedagogical perspectives on the relationship between higher education and working life. *Higher Education, 46*, 147–166.
UNESCO (2005). Toward knowledge societies. UNESCO world report. http://www.unesco.org/publications. Accessed on December 2007.
Välimaa, J. (2001). A historical introduction to Finnish higher education. In J. Välimaa (Ed.), *Finnish higher education in transition: Perspectives on massification and globalisation* (pp. 13–54). Jyväskylä: Institute for Educational Research.
Välimaa, J. (2004). Kolmas tehtävä korkeakoulutuksessa: tavoitteena joustavuus ja yhteistyö. In K. Kankaala, E. Kaukonen, P. Kutinlahti, T. Lemola, M. Nieminen, & J. Välimaa (Eds.), *Yliopistojen kolmas tehtävä?* (pp. 43–68). Sitran julkaisusarja 264. Helsinki: Edita.
Weingart, P. (1997). 'From finalization' to 'Mode 2': Old wine in new bottles? *Social Sciences Information, 36*(4), 591–613.
Ylijoki, O. H. (2003). Entangled in academic capitalism? A case-study on changing ideas and practices of university research. *Higher Education, 45*(3), 307–335.