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The openness buzz in the knowledge economy: Towards taxonomy

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Abstract

In the networked information and knowledge-based economy and society, the notions of ‘open’ and ‘openness’ are used in a variety of contexts; open source, open access, open economy, open government, open innovation – just to name a few. This paper aims at discussing openness and developing a taxonomy that may be used to analyse the concept of openness. Are there different qualities of openness? How are these qualities interrelated? What analytical tools may be used to understand openness? In this paper four qualities of openness recurrent in literature and debate are explored; accessibility, transparency, participation and sharing. To further analyse openness new institutional theory as interpreted by Williamson (2000) is used, encompassing four different institutional levels; cultural embeddedness, institutional environment, governance structure and resource allocations. At what institutional levels is openness supported and/or constrained? Accessibility as a quality of openness seems to have a particularly strong relation to the other qualities of openness, whereas the notions of sharing and collaborative economics seem to be the most complex and contested quality of openness in the knowledge-based economy. This research contributes to academia, policy and governance, as handling of challenges with regard to openness vs closure in different contexts, territorial, institutional and/ or organizational, demand not only a better understanding of the concept, but also tools for analysis.

Keywords

Knowledge-based economy, openness, institutional theory, policy, governance

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Conflicts of interest

The authors declare no conflicts of interest.

Introduction

‘The world is becoming increasingly interconnected and open. Radically open——manifesting itself in open borders, open culture, open-source, open data, open science, open world, open minds. With the loss of privacy that it implies, openness carries its own dangers. But it breeds transparency, authenticity, creativity and collaboration. All bets are off as to what openness and collaboration in an ultra-connected world will mean for human potential. Traditional top-down models of organization no longer reflect reality. Social capital and influence are becoming stronger currencies than hierarchy and formal power. New, collaborative ways of creating meaning and things are developing at fast pace. Only one thing appears certain: Secrecy is no longer bankable: impact is. The future will be built on great ideas, and for that, great ideas need to circulate freely, broadly and openly.’ (TED Global Conference on Radical Openness, 2012)

The notion of openness is found within different disciplines, each of them with their own metaphors and narratives; philosophical, political, economic, social, psychological, and each of them with a multitude of manifestations and applications; open source, open access, open economy, open government, open communication, open archives, open innovation, open education and so forth. Lately, open and openness have become buzzwords also in policy and strategy, not least with regard to business and innovation development. According to Oxford English Dictionary openness refers to ‘the quality or condition of being open’ (www.oed.com). Although the quality or condition of being open can be understood as a common denominator, the connotations, references and applications are of wide variety. Often used synonyms of openness are acceptance, broad-mindedness, impartiality, observance, receptivity, responsiveness, tolerance and understanding.

The basis for how we generally perceive openness today has roots in Enlightenment with a strong belief in knowledge and reason (Descartes, 1668) and in liberalism as expressed in theories of democracy, transparency and the open market (Locke, 1690 and Smith, 1776). These ideas were later further developed by Popper in *The Open society and its enemies* (1945) and Hayek (1944) among others at a time where they served as counter arguments to Nazism, communism and the development towards totalitarian states, and still today these ideas are very much prevalent in economic and political life of the Western world.

Also stemming from Enlightenment, is the relation of openness to science and scientific method, such as the importance of critique, the rejection of historicism, the methodology of falsifiability elaborated by Popper in 1934 and the CUDOS principles of communalism, universalism, disinterestedness, originality and skepticism elaborated by Merton in 1942 (Peters and Roberts, 2012). Historical roots of openness can also be traced back to philosophy of language where Ludwig Wittgenstein explored the relationship between language (discourses or ‘language games’) and culture (forms of life), and argued that there is no such thing as a logical syntax or systems of rules applicable to any natural language, but instead multiple shared constructions and interpretations. (Peters and Roberts, 2012).

Through the networked information and knowledge economy there has been a renewed interest in openness and the many applications of openness as new ways of creating, producing, distributing and consuming (Benkler, 2006; Chesbrough et al., 2006; Lessig, 2006; Peters and Roberts, 2012; Rifkin, 2014). Benkler (2006) outlined this change as

'A series of changes in the technologies, economic organization, and social practices of production in this environment has created new opportunities for how we make and exchange information, knowledge, and culture. These changes have increased the role of nonmarket and nonproprietary production, both by individuals alone and by corporative efforts in a wide range of loosely or tightly woven collaborations.' (Benkler, 2006, p.2)

In 'The virtues of openness: Education, science, and scholarship in the digital age' (2012), Peters and Roberts explore different notions of openness and its applications within the field of education, science and knowledge, expressed as open source, open access, open archiving and open publishing. What they found was not only a change in practice when dealing with sharing of information and knowledge, but also a more fundamental change taking place:

'... it is a change in philosophy and ethos, a set of interrelated and complex changes that transform, markets and the mode of production, ushering in a new collection of values based on openness – the ethic of participation and peer-to-peer collaboration.' (Peters and Roberts, 2012, p. 3). Also the historian. Bernstein (2013) who has explored media from the alphabet to the internet, support the thought of a relationship between accessibility, communication technologies and individual liberty that has transformative power and is shaping human history in the long run.

It thus seems like we are witnessing a dual change taking place, one visible on the surface where new applications, tools and practices based on new technology have permitted new ways of collaborating in the networked knowledge and information economy, and one more profound change that has to do with culture and values.

Aim, research questions and structure of paper

As noted above, the wording of openness is so frequently used in a variety of contexts that we might even call it a buzzword. The lexical definitions of both open and openness are very broad, making them easy targets for being both ambiguous and vague. When looking at descriptive definitions of openness, we find that they are highly context bound. As we have seen, the historical roots of openness can be traced back to the ideas from Enlightenment, however observations show that there has been a renewed interest and new interpretations of openness as a consequence of technological, economic, political and social development brought about by the knowledge and information society and the Internet serving as a vehicle for these new ways of interacting. Whereas some claim that what we are witnessing is a fundamental change that will affect our ways of creating, producing, trading and consuming in radical way (Benkler 2006, Lessig, 2006, Steele, 2012, Rifkin, 2014), others might argue that this is a change in degree rather than art(Klein, 2009). Despite difficulties in measuring the magnitude of this new phenomenon, we consider the observations being interesting enough to try to better understand the concept of openness. What does openness consist of? Can we talk about different kinds of openness? And how can we study openness?

The research questions we put forward and discuss in this paper are:

1. Are there different qualities of openness? Are these qualities related? How?
2. What analytical tools can be used to understand openness?
3. How can the concept of openness be classified into a taxonomy?

The intention of this paper is descriptive and analytical. In section 2 we discuss different understandings of the term openness, whether they share aspects or qualities and how these are

interrelated. In section 3 we turn to discuss different analytical tools for the analysis of openness, and in section 4 we present and discuss an attempt of a coherent scheme or classification system for future studies of openness. Section 5 contains some concluding remarks.

In today's buzz, one might ask if openness is a value laden concept and has even become a virtue, a moral excellence? Benkler (2006) takes an overtly liberal and normative standpoint, foreseeing that the future of the networked information economy may entangle not only economic development but also justice and human development. 'Although openness is not identified as one of the classical virtues, it is related to open-mindedness, a valued disposition for epistemic and intellectual virtues (Peters and Roberts, 2012).

The aim of this research is to contribute to the understanding of how openness is interpreted in today's knowledge and information society, and how it may be analyzed across different contexts and across different time frames. We expect the principal applicability to be within planning and policy, and in strategy development relating to institutional development at different territorial levels and/or within organizations.

Qualities of openness

In the introduction the many ways of using the term openness and the many contexts in which the notion of openness is found was outlined, but what does openness consist of? In this section we will look upon four different qualities of openness; accessibility, transparency, participation and collaboration. These four qualities seem to be of particular importance when discussing openness

in the context of today's networked knowledge and information economy, and are recurrent aspects of openness brought up in the literature explored.

The first quality of openness that is frequently referred to is the quality of *accessibility*.

Accessibility might be of different kinds; technical, physical, economic, legal, political, social or cultural conditions that define whether something is open (accessible) or not. Openness defined as accessibility to different kinds of resources is commonly used in planning, for example accessibility to public space and in policy making (Parkinson, 2013).

Benkler (2006) explore how accessibility to information technology has made it easier for more individuals to interact and to be part of the networked information and knowledge economy.

Although not in focus, Benkler recognizes institutional frameworks defining the degree of freedom of action and predictability of accessibility. Accessibility and the role of institutions are also highlighted when from a business perspective comparing countries' readiness for embracing ICT technology, and more recently taking on the 'Internet of things' and big data in their next step of digitization and development of corporate strategies (WEF, 2014). One type of institution having an impact on accessibility and which is generally regarded as having substantially contributed to the development of the Internet is the development of standards such as the open standard TCP/ IP protocol. As Lessig (2006) puts it '*Openness - not property or contract but free code and access – created the boom that gave birth to the Internet that we know.*' (p. 146)

Whereas Benkler (2006) focus on the technological development as driving force for more people to become part of the networked information economy, Lessig (2006) and Jakobsson (2012) claim more focus should be put on commerce and business development as driving forces in the

networked economy. In either case, accessibility to new technology and new ways of distributing knowledge, culture and information to larger groups and more individuals, is undisputed.

The realm and implications of this development is too early to be determined, even though some see large implications not only for business development, but also for the development of humanity (Benkler, 2006) and for a new economic system through the merging of the communications Internet, the energy Internet and the logistics Internet in a cohesive single operating system of Internet of things (Rifkin, 2014). The Open-Source Everything movement ‘... *is a cultural and philosophical concept that is essential to creating a prosperous world at peace, a world that works for one hundred percent of humanity.*’ (Steele, 2012, p 1), a view of anti-secrecy, anti-corruption and direct democracy that touches upon a second quality of openness, namely *transparency*.

Transparency refers to open information, open communication and accountability. The quality of transparency is also raised by Benkler (2006) who takes a normative standpoint claiming that the networked information economy will not only increase the autonomy and freedom of individuals (by being able to access information and participate in society) but also foster human development. The Internet breeds several advantages easy to be seen from a transparency perspective; more people can engage in the public debate, the watch-dog function is distributed and the filtration and accreditation of information is no longer reserved to be distributed by a few (as compared to mass media). However, these possibilities have also been questioned. One of the fears is expressed in the metaphor of Babel’s tower, claiming that so large quantities of information are being created that it is no longer possible for anyone to screen. This has been contested by the way the Internet itself has developed into self-created clusters and communities

of interest. Another fear is whether sticking to limited Internet-based communities would give rise to biased perspectives. Also this has been contested by the culture of sharing, linking information and a 'see for yourself culture'. A more recent debate has however pointed at the significance of search algorithms and the dominance of certain platforms reducing the content and information individual users are exposed to. The public request for open information, open communication and accountability nationally and internationally is also highlighted by the European Union and through global watch initiatives such as Transparency International.(Mörth, 2008, www.opengovernmentdata.org).

A third quality of openness, related to accessibility and transparency and recurrent in literature, is *participation*, which can be seen as a two sided coin; if accessibility and transparency are the extrinsic preconditions for participation, personal motivation for participation is an intrinsic precondition. Participation may refer to different parts of society; economic participation, political participation or participation in social or cultural life.

Participation is linked to the idea of transparency and access to information, not least in governance, open process and open procedures. As we have seen earlier, Benkler (2006) strongly claims that the networked information economy will increase individual's autonomy and freedom to participate in society. The shift from government and a principal agent implementation structure, to governance models with open structures and networks of mutually interdependent multiple stakeholders from public and private sector and deliberative decision making imply a larger degree of participation. Dryzek (2009) refers to this collaborative paradigm as new ways of understanding and acting, a more adaptive and intelligent policy system leading to a new sort of institution based on dialogue, intelligence, interaction, learning and adaptation. *'Politics and*

policymaking thus is not simply about finding solutions to pressing problems, it is as much about finding formats that generate trust among mutually independent actors. ' (Hajer and Wagenaar, 2003, p.12) From this perspective participation is strongly connected to and dependent on social capital building(Westlund, 2006).

Requests for transparency, accountability and legitimacy often have to do with governance and the process of decision-making. The notion of open governance has close relation to the qualities of both accessibility and transparency, and one of the hallmarks for democratic practice,,freedom of information, is an enabler for participation in the democratic society. The Open government declaration and the Open government partnership initiated in 2011 are examples of this request for transparency and good governance (www.opengovpartnership.org). One strand within the open governance field is aiming at opening up more public data to the public to be freely used, modified and shared by anyone for any purpose (opendefinition.org, www.opengovernmentdata.org).

A fourth quality of openness that seems most radically new in the networked information economy the past decades is the notion of *sharing*, also called collaborative economics or peer to peer collaboration. Sharing can be described as a socio-economic system built around the sharing of human and physical resources and include creation, production, distribution, trade and consumption. Sharing also refers to the sharing of knowledge, information and culture.

What we today call sharing or peer to peer collaboration started out with the free software movement in the middle of 1980 when a non-proprietary operating system (GNU) and the General Public License (GPL) were introduced and enabled owners of copyright to make their

software available to others as long as they made their contributions open and available. It was within this framework the operating system Linux was conceived. The free software movement was later contested by the open source concept relying on non-proprietary models instead of the licensing model of the free software movement, and the metaphor of ‘the cathedral and the bazaar’ coined by Eric Raymond in 1998, made this shift articulated in policy discussions. Along this journey of software and open source development, intense battles around the concept of open have been fought, one of the most frequently referred to is that between free software and open software where the issue of private property vs commodity come to a head. The phenomenon of open source code has since paved the way for a multitude of practices of sharing knowledge and information through the Internet aiming at sharing public information and involve citizens.

A good, a product or a service, can either be private, public, or what Ostrom calls a common pool resource (Ostrom, 2005). Within the public framework we find a variety of models; a good might be publicly owned and publicly exploited, or publicly owned but privately exploited, and often these categories of ownership are overlapping and increasingly blurred (Coe et al, 2012).

Characteristic for a common pool resource is that it is non rival, i.e. consumption by one does not make it less available to someone else. However common pool resources may be more or less accessible and more or less regulated (compare for instance air, accessible and less regulated, to water, less accessible and more regulated). Common pool is thus an institutional form to structure access, use and control of commodities or resources. The free software vs the open source discussion reflects this discussion of private property vs common pool resource with regard to information and the Internet.

Jakobsson (2012) finds that common pool resources in the Ostrom sense, open up for new business models and business opportunities – which Jakobsson call the openness industry. The institutional legal and governmental framework within which this development takes place is underlined by Jakobsson (2012) and also Lessig (2006) who claim that the main driving forces for this development has been a combination of code, i.e. technological development establishing standards and platforms, and technologies of commerce backed by rule of law. According to Lessig, the challenge ahead is to reconcile the technological development and commercial development, to struck a balance, and to that end we need a constitution in the sense of an architecture; *‘... not just a legal text but a way of life – that structures and sustains social and legal power, to the end of protecting fundamental values.* ‘ (Lessig, 2006, p. 146). To Lessig this is a much bigger issue than just finding good legislation that balances intellectual property, privacy and free speech, it is about values and more importantly, to be aware that these values are built into code. Peer production characterizes a number of commons-based production practices and refers to production systems that depend on individual action that is self-selected and decentralized rather than hierarchical. In the first phase the technological development was the driving force for the networked-based information economy, which in turn gave rise to many of the intellectual property rights related conflicts. In the second phase commercial and business development has been the driving forces for peer to peer production. Benkler (2006) who as we have seen is a strong advocate for individual autonomy and freedom, supports this development enabling more individuals to make use of this common pool resource enabled by the Internet and wireless communications, to create, produce and disseminate user generated or peer produced content. However this role of the commons, is not only recognized from a liberal perspective: *‘Contemporary forms of capitalist production and accumulation in fact, despite their continuing*

drive to privatize resources and wealth, paradoxically make possible and even require expansions of the common. ' (Hardt and Negri, 2001, p IX)

The sharing/commons vs intellectual property rights (IPR) discussion is also applicable to the field of knowledge production and innovation. In a condensed form the main conflict regarding innovation can be formulated as: do intellectual property rights support or hamper creativity and innovation? Following Benkler (2006) a tradeoff between static and dynamic efficiency has to be made, and he claims that there is little support for the thought that IPR support innovation except in specific product areas such as pharmaceuticals. Also Hardt and Negri follow this line of argumentation, seeing IPR rights as hampering the development of commons based production (Jakobsson, 2012). Chesborough et al. (2006) claim that equal importance should be given to external knowledge and internal knowledge and advocates an open innovation paradigm shift to take place: *'Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively.* ' (Chesbrough et al. 2006, p. 1)

In knowledge production and science, openness has a strong tradition, however also here Peters and Roberts (2012) points at the conflicts between knowledge as a global public good based on the ethics of sharing vs the characteristics of the market economy based on ownership, property rights and distribution: *'It is clear that the Free Software and 'open source' movements constitute a radical nonpropertarian alternative to traditional methods of text production and distribution. This alternative non-proprietary method of cultural exchange threatens traditional models and the legal and institutional means used to restrict creativity, innovation, and the free exchange of ideas.* ' (Peters and Roberts, 2012, p. 1-2)

The initial question raised in this paper was whether there are different qualities of openness.

Within the framework of the networked information and knowledge society, we have explored four qualities of openness; accessibility, transparency, participation and sharing, and studied how they cover different aspects of openness, see figure below.

OPENNESS			
Qualities of Openness			
<p><i>Accessibility</i></p> <p>may be of different kinds. Defines if something is accessible or not. Frequently used in planning and policy making aiming at accessibility to different kinds of resources. In the networked knowledge and information society accessibility to technology has strong implications to enable access to knowledge and information.</p>	<p><i>Transparency</i></p> <p>refers to open information, open communication and accountability - qualities of openness that has become more widely requested with the development of technology and instruments allowing for it.</p>	<p><i>Participation</i></p> <p>as a quality of openness refers to participation of individuals or groups in different parts of society; economic, political, social or cultural. Participation is strongly linked to accessibility and transparency.</p>	<p><i>Sharing or share ability</i></p> <p>seems to be the quality of openness that is most strongly linked to the recent emergence of the networked knowledge and information economy. A socioeconomic system built around the sharing of physical and human resources that includes goods, services knowledge, information and culture, and has thus challenged established property models. Sharing is strongly linked to accessibility.</p>

(Figure 1)

As we have seen these qualities of openness are often related to one another, most notably is accessibility closely related and sometimes even a precondition to the other qualities of transparency, participation and sharing.

What is furthermore interesting is that accessibility and transparency can be seen as conditions or enablers created by institutional frameworks allowing for or enabling participation and sharing to take place within the networked information and knowledge society. The four qualities may also be expressed as a supply and demand relation, where accessibility reflects the supply side whereas transparency, participation and sharing reflect the demand side. The viability of these theoretical hypotheses of internal relationship between the qualities need however be tested empirically, and thus, with this in mind, the four qualities of accessibility, transparency, participation and sharing are treated equally in the following.

Analytical tools for the study of openness

As was outlined in section 1, it seems that the notion of openness in the networked information and knowledge economy is not only a technologically driven practice, materialized in applications such as open source and open data, but also constitute a more profound change: *'There is a cultural shift based on the digitization and the logic of open systems that has the capacity to profoundly change all aspects of our existing systems of science, politics, culture, and economy, thereby leading to what others have alluded to as 'open cultures'.*' (Peters and Roberts, p. 31)

In the following we will look for analytical tools that take into account change at multiple layers.

One way of approaching the deeper and more profound change that has been claimed taking place, is by regarding openness as a *culture*. A culture consists of shared meanings and symbols

and is a result of social interaction(Alvesson, 2013; Anckar et al., 2011; Coe et al., 2008; Wigren, 2003). Culture in a general sense is understood as shared meanings, i.e. language, religion, customs, tradition, knowledge or ideas. Culture may be expressed in many ways; in material artefacts such as architecture, in the social world through stories or myths and in ways of life, values and norms. Cultures are not static, but change dynamically over time in ongoing processes, and construction of reality bformed by social interaction. Most people are part of different cultures; a national culture, perhaps a regional culture, a corporate culture and/or a neighborhood or family culture. With the terminology from Berger and Luckmann (1966), we may talk of cultures as a form of common sense or everyday knowledge within that particular culture. Related to the broader concept of culture, is the concept of *political culture*. A political culture can be understood as the sum of fundamental values, sentiments and knowledge that give form and content to political systems and processes(Anckar et al., 2011). Just as culture in general is dynamic and change over time, so do political cultures. However, political cultures that deal with the political system should not be confounded with political values that deal with the content and the goals of politics.

That *institutions* shape social, economic and political behavior through formal and informal rules is now widely accepted in economic literature (North 1990; Ostrom 2005; Williamson, 2000) and in social sciences in general (March and Olsen, 1989, Peters, 2005). Within new institutional theory, formal and informal institutions, i.e. norms, values and rules, are at focus to explain the way the economy performs and society evolves. Institutions as a concept is discussed within different scientific disciplines and transdisciplinary (www.sioe.org/, www.winir.org) and role of institutions has thus been covered from many different aspects, such as collaborative planning and institution building (Healey, 1998), the role of storylines for institutional change (Matthews,

2014), formal and informal institutions affecting institutional design (Evers, 2015) and the role of institutional entrepreneurs (Sotarauta and Mustikkamäki, 2014). Within Economics, institutions are understood as a set of rules within society, creating stability and increasing trust among economic and social actors. Institutions are in this way assumed to increase economic performance by reducing production costs and transaction costs. An important distinction is made between ‘institutions’, defined as a set of rules, and ‘organizations’, being the economic or social actors. However it should be noted that institutions and organizations are continuously influencing each other in both directions: *‘Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction. In consequence they structure incentives in human exchange, whether political, social, or economic. Institutional change shapes the way societies evolve through time and hence is the key to understanding historical change.’* (North, 1990, p. 3)

However it is new institutional theory as interpreted by Williamson (2000) that offers a framework that most eloquently brings in the notion of different layers, and how institutions evolve and affect human and organizational economic interaction over time. Williamson identifies four interrelated institutional levels:

Level 1 Embeddedness: This highest level refers to culture, including customs and traditions, religion and social norms. These basic institutional foundations adapt and change very slowly over time, according to Williamson as long as from 100 to 1000 years.

Level 2 Basic institutional environment: The second level of the hierarchy refers to what Williamson calls ‘the formal rules of the game’. At this level we find constitution, political system and basic legal and economic systems including property rights, human rights and the subsequently related political, legal and economic institutions and mechanisms for governance

and enforcement of these rules. Also on this second level institutions change rather slowly, however more rapidly than on the first level, 10 to 100 years.

Level 3 Institutions of governance: The third level Williamson describes as ‘the play of the game’. At this level the governance structure is highly dependent on institutions at lower levels.

Governance structure includes the basic features of how goods and services are being traded, how labor is defined, how business, financing and transactions are organized. The time frame change at this level is one to ten years.

Level 4 Short-term resource allocations: The fourth level is the daily operations of the economy within the framework of the other three levels. On this level, prices, wages, costs and employment levels are being determined and the time frame for adaptations or change is continuous. (Williamson, 2000; Joskow, 2008)

It is the difference between institutions and organizations and the interaction between them that shapes the direction of institutional change. However, changing institutions is far more difficult to observe than changing organizations, since institutions tend to change incrementally rather than discontinuously.

Applying Williamson’s framework on openness, is shown in figure 2 below.

Level 1: Embeddedness	Culture supporting/constraining openness
Level 2: Institutional environment	Institutional framework supporting/constraining openness
Level 3: Institutions of governance	Governance structure supporting/constraining openness
Level 4: Short-term resource allocation	Resource allocation supporting/constraining openness

In new institutional theory the question of how and why institutional change comes about is often explained by transaction costs as developed by Coase (1937). Transaction costs relate to inspection, negotiation, contract discussion, legal consultation and documentation of agreements - procedures that are not formalized and standardized and thus may hamper economic development. . Related to networks and their potential to change, is Westlund's (1999) model on interaction costs with similarities to Williamson's model framing different kinds of changes into a time perspective:

Factors generating interaction costs in and between networks grouped by potential for change				
Rapid			Very slow	
Technological- logistical	Political - administrative	Economic- structural	Cultural- historical	Geographical and biological

(Westlund, 1999, p 107)

(Figure 3)

Yet two other concepts related to institutional change that should be mentioned, are path dependence and theory of increasing returns. Just as Williamson (2000) and Westlund (1999) take notice of temporal aspects, so do path dependence and increasing returns. Whereas path dependence, frequently used in social sciences, usually refers to '*...causal relevance of preceding stages in a temporal sequence*' (Pierson, 2000, p 252), increasing returns, most frequently used in economics, is more narrow in referring to preceding steps in a particular direction enhancing further steps in that same direction. In increasing returns the sequencing is critical as earlier events matter more than later do. Increasing returns can also be described as self-reinforcing positive feedback processes and point at the cost of changing direction.

3 A coherent scheme for studying openness

From the previous section, it thus seems that the Williamson model of institutions offer an analytical tool to understand the concept of openness in the networked information and knowledge society. The model acknowledge the importance of culture, long term values and social norms, institutional rules and governmental settings and structures on long and medium term, yet at the same time bring in the current development and daily operations into the model. When putting together qualities for understanding the concept of openness with Williamson's model for understanding institutions and institutional change, we get a scheme where institutions on different levels can act to support or constrain the different qualities of openness.

Institutional levels	Accessibility	Transparency	Participation	Sharing
I. Cultural embeddedness: Customs, traditions, social norms				
II: Institutional environment: Constitution, political and economic system				
III: Insitutions of governance: Governance structure				
IV: Resource allocations: Daily operations				

(Figure 4)

In the following, support and constrain of the different qualities of openness are described at the different institutional levels.

The first institutional level in the model, cultural embeddedness refers to customs, traditions and social norms. As shown in literature (Benkler, 2006, Peters and Roberts, 2012) it seems there has been a shift in culture with regard to openness followed by the shift to a networked information and knowledge society. The existence of movements, such as the open source movement, the creative commons or the open source everything movement, involving social norms may indicate an ongoing change on this more profound level (Jakobsson, 2012). Major driving forces for this cultural shift are technological (Benkler, 2006, Lessig, 2006) but also economic driving forces play an important role (Lessig, 2006, Jakobsson, 2012). A cultural shift towards greater openness is seen in all four qualities of openness; accessibility, transparency, participation and sharing, whereas major development going in the opposite direction, counteracting openness, is more difficult to detect.

The second institutional level, which refers to constitution and the political and economic system, is perhaps the level that has been most elaborated in literature. Lessig (2006) focuses on code as open source code and code in the constitutional meaning and the interaction between the two. However, it is the issues of property and intellectual property rights (IPR) that most of the discussions on this institutional level have come to deal with. (Benkler, 2006, Chesbrough et al., 2006) This discussion is closely linked to the relation between private property and common pool resources (Ostrom, 2005, Jakobsson, 2012) discussed earlier, but also to the discussion about externalities and the role of knowledge spillovers with regard to social capital building in

clusters and innovation systems where the institutional environment may support the intra-firm and/or inter-firm emergence of new knowledge and collective learning (Saxenian, 1994, Westlund, 2006). Privacy and private property are concepts well rooted in western culture and institutional frameworks, and there are few signs that these concepts are being disputed in a general sense. However as we shall see, it is with regard to knowledge creation and innovation on the third and fourth institutional levels that the concepts of privacy and private property nevertheless are being challenged. On this second institutional level we can mainly detect driving forces to support openness when it comes to accessibility, transparency and participation. (Benkler, 2006; Lessig 2006; Mörtz, 2008; Peters and Roberts 2012), however when it comes to the quality of sharing, we can see forces working in both directions, supporting and constraining openness (Benkler 2006; Jakobsson 2012; Lessig, 2006).

The third institutional level that refers to governance structure and the fourth level that refers to resource allocations, day to day business and practice are intimately entangled. This is where organization and business development of the many applications and practices of the networked information and knowledge society appear. The development seems without doubt going in the direction towards greater openness with regard to accessibility, transparency, participation and sharing – which the mere existence of the many practices is an example of. Technological and economic development (Benkler, 2006 and Lessig, 2006) but also public request for greater openness (Mörtz, 2008; opendefinition.org; <http://opengovernmentdata.org/>) serve as strong driving forces towards openness on these levels. However when it comes to the quality of sharing the picture is somewhat more blurred. We do see a development towards greater openness, the trend and the potentials of open innovation is one example of this (Chesbrough et al., 2006) and the development towards making more government data and information public is expected to

allow for an increased peer-production (<https://okfn.org/>, PwC, 2014). Nevertheless it seems that the development towards greater openness is to some extent counteracted by the ongoing and unresolved discussions on the second institutional level regarding issues of intellectual property rights, ownership of peer-produced production and legislation regarding services based on sharing or collaborative economics..

Concluding remarks

In this paper we have explored the concept of openness within the framework of the networked information and knowledge society. Four qualities of openness have been investigated; accessibility, transparency, participation and sharing, and with help from Williamson's (2000) framework of institutions we have discussed openness on different institutional levels. In the literature we can see a trend towards greater openness with regard to all four qualities; accessibility, transparency, participation and sharing. Accessibility seems to have a particularly strong influence, affecting transparency, participation and sharing, however this should be tested further empirically. With regard to the quality of sharing the picture is more blurred and we see forces both supporting and constraining openness. Even though the broad picture is towards greater openness, this leads us to the discussion of open versus closed, and whether openness vs closure is a degree or a scale, rather than an either or? It also leads us to the question if open and closed are in fact in some cases a prerequisite to each other? (For example, open talks within closed doors, or private property created out of common pool information).

What we have presented here is a tentative taxonomy, a model for how we can understand and analyze openness in the networked information and knowledge society in which we have explored four qualities of openness at four institutional levels. In the next step we intend to apply the model in empirical studies of how openness is interpreted and discussed in metropolitan regions. Metropolitan regions often serve as hubs, not only economic hubs attracting investments and human capital, but also hubs for global information and communication flows offering attractive environments for creativity, innovation and entrepreneurship. Openness of different kinds can be assumed to play a role when visions, goals and long term developments of regions are being formulated. Future studies of interest are the interaction between institutional levels with regard to openness, to investigate the special role that accessibility seem to have and to further explore sharing, the quality of openness that seem to be most complex in today's society.

The objective of this paper has been to clarify how we can understand and analyze the phenomenon of openness in today's networked information and knowledge society and to contribute to a relevant taxonomy that may be used to analyze openness in different geographical or social contexts and allow for empirical comparative studies across geographies or organizations to further understand the phenomena of openness in different settings. A future application of the institutional model from a comparative temporal perspective, would be to explore the 'zeitgeist' with regard to openness. Whereas technological and economic development can be assumed to have a more linear development (as long as we are not dealing with technological leaps), it is within institutions we find norms, rules and framework for what we conceive as a 'zeitgeist'. An interesting comparison would be between 1985, i.e. before the fall of the iron curtain, 2000, a period of optimism before the economic crisis and 2016 when

Europe is challenged by large immigration, growing nationalist movements in many European countries and a new crisis for the EU caused by the British referendum ‘brexit’. Provided the taxonomy is not only relevant for academic purposes but also for policy and governance, to whom it may serve as a tool for a more informed and knowledge based discussion on what we mean by openness and how to handle the ongoing challenges with regard to openness on different institutional and territorial levels, as well as within organizations, the legacy of this research may be even wider.

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