IDOLS OF THE ICT4D THEATER. PART 2: THE ACTORS

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Abstract: A search was done on selected author frequencies in 45 academic journals that focus on development. The theories of fourteen of the most prominent of these authors are briefly overviewed and classified in superclasses, based on semantic network theory and reported in this paper, Part 2 of a paper set. In Part 1 of this paper set, frequencies of theoretical themes were reported. Results indicate different emphases between development journals in general (ranked order: Weber, Sen, Freire, Marx, Bourdieu), and ICT4D journals (ranked order: Castells, Bourdieu, Escobar, Foucault, Freire). Philosophers or theoreticians of technology or communication hardly feature, despite the term *ICT4D* containing reference to technology and communication. Socio-politics and socio-economics seem to be the conceptual foundation of research in ICT4D.

Keywords: ICT4D, Manuel Castells, Pierre Bourdieu, Arturo Escobar, Amartya Sen.

There is a companion website that includes data and other relevant information not fitting into the space of this paper: https://steyn.pro/ict4dtheatre/

This paper is an unpublished follow-up on the paper:
Steyn J (2015). Idols of the ICT4D theatre. The stage.
in Nielsen, P (ed). 13th International Conference on Social Implications of Computers in Developing Countries,
IFIP9.4 Conference Proceedings, 613-621. ISBN 978-82-7368-465-3

1. INTRODUCTION

The title of this paper set borrows from Francis Bacon's *idols of the theatre*, from his book *Novum Organum Scientiarum* (in English: *New Instrument of Science*), first published in 1620. As explained in Part 1 of this paper set, Bacon (1561–1626) proposed logical induction as a tool to obtain knowledge and used theatre as a metaphor of traps or phantoms (usually translated as *idols* as transliteration of the Greek *eidolon*) that need to be avoided in our search for knowledge. These traps are: of the tribe (biological bias), of the cave (cultural bias), of communication (the market place) and conceptual frameworks (the theatre). This paper, Part 2 of the paper set, investigates the dominant authors (metaphorically the actors) of the dominant conceptual frameworks in ICT4D narratives. Dominant theoretical themes are reported in Part 1 - the stage on which their plays are performed.

The impetus of the research reported in this paper set arose from being puzzled by the apparent absence of philosophy and theory of technology and of communication in ICT4D literature. Of course they do feature, but compared to authors with a strong bias and stance toward sociology, economics and politics, they hardly feature at all. As mentioned in Part 1, the term *ICT4D* consists of the semantic components *information technology, communication technology* and *development*. So we would expect that theoreticians or philosophers of these themes would dominate. They don't.

The actors (Part 2) and stage (Part 1) should be read together as the dominant themes, or scripts, of Part 1 are written by specific authors. Understanding the main conceptual contributions of the dominant authors gives insight into the dominant theoretical themes in development journals. In the methodology of the paper set there was some circularity, as the dominant theories determined which authors needed to be considered while the dominant authors determined which themes needed to be considered.

2. METHODOLOGY

The methodology for Part 1 was more complex than for Part 2. In order to classify theoretical themes analyzed in Part 1 simplistically, a semantic network analysis was done, and superclasses constructed. In this paper, Part 2, the analysis was more quantitative, by counting the frequencies of author names in development journals. A distinction was made between development "proper" journals, and journals focusing on ICT4D. A total of 45 academic development journals were analyzed using internal journal search functions as well as Google Scholar searches. Some journals do not have internal search functions, so the abstracts of the most recent issues were consulted. More details about methodology are presented in Part 1.

A perhaps too ambitious attempt was made to summarize the main thoughts of the dominant thinkers, focusing on how those thoughts relate to development of ICT4D. Justice cannot be done to the complexities of their thought in such brief descriptions. The summaries should rather be seen as an attempt to figure out why certain authors dominate, and why others one would expect hardly feature in ICT4D literature.

Background and supportive details are on the companion website, during the reviewer cycle available at http://www.sabookings.info/ict4dtheatre/.

3. PHILOSOPHICAL FRAMEWORKS

An analysis was made of the conceptual frameworks of theoretical thinkers who are regularly cited in development journals (excluding rational economic authors). Summaries of selected authors' philosophical frameworks are given below. Not all possible authors are discussed. The list is limited to the authors mentioned in the Call for Papers. Many other authors could also be considered for this kind of analysis: Durkheim, Parsons, Honneth, Marcuse, Derrida, Latouche, and authors from the discipline of economics (e.g. Robert Jensen, who wrote about ICT4D, particularly about the use of mobile phones), or theorists from other disciplines (e.g. from anthropology). For practical reasons the scope was restricted to the limited set.

Table 1 ranks authors by the number of citations, based on the data collected by the present author. Generally, development journals focus particularly on economic development and consequently economic theorists should focus more prominently, but featuring them would be beyond the scope of this paper. Figures 1 and 2 illustrate the top 13 positions in ICT4D journals, and by comparison how those same authors rank in development journals. As this paper is more interested in ICT4D, the exercised was an attempt to determine how popular authors in ICT4D feature in development journals in general. Thus only authors who feature well in ICT4D journals are ranked in the development journals column.

	ICT4D journals	**Development journals**
1	Manuel Castells	Max Weber
2	Pierre Bourdieu	Amartya Sen
3	Arturo Escobar	Paolo Freire
4	Michel Foucault	Karl Marx
5	Paolo Freire	Pierre Bourdieu
6	Anthony Giddens	Antonio Gramsci
7	Antonio Gramsci	Martin Heidegger
8	Jürgen Habermas	Anthony Giddens
9	Martin Heidegger	Arturo Escobar
10	Bruno Latour	Michel Foucault

11	Karl Marx	Jürgen Habermas
12	Amartya Sen	Bruno Latour
13	Max Weber	Manuel Castells

Table 1. Top 13 ICT4D cited authors, compared with citations in development journals

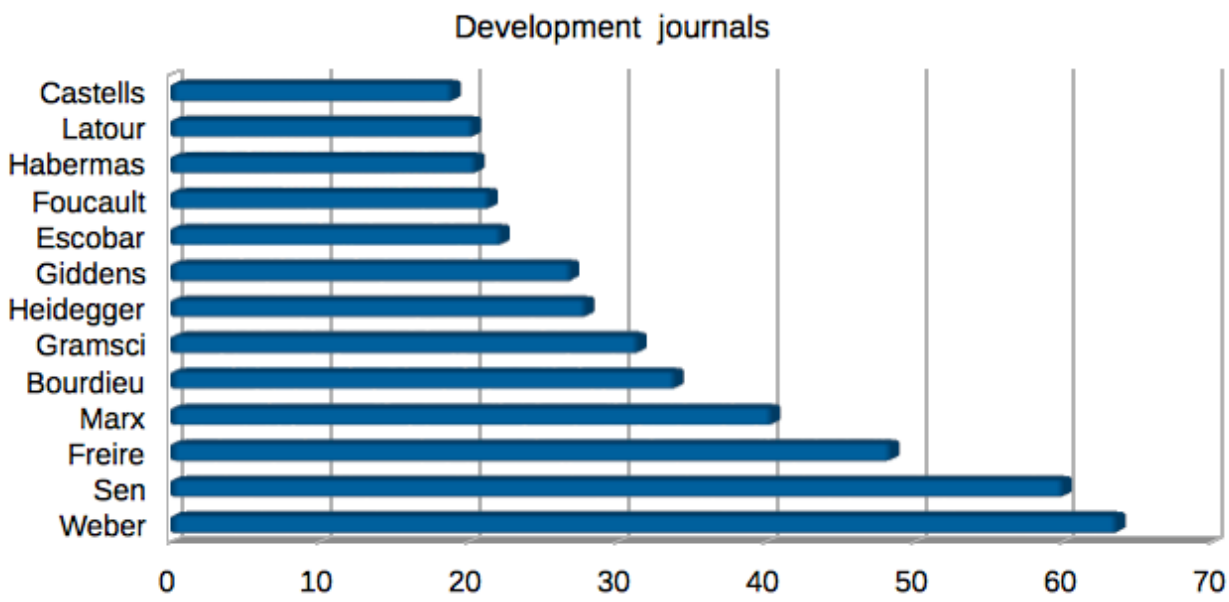

Figure 1. Theoretical authors cited in development journals.

Unsurprisingly, Manuel Castells is the most cited author in ICT4D journals, but perhaps surprisingly ranks only 13th in development journals. It is interesting that among the listed authors, the classic sociology of Max Weber dominates in development journals. It is also interesting that apart from Castells, the thinker Bruno Latour who wrote most extensively about technology occupies only the 10th spot in ICT4D journals. Amartya Sen who takes the 2nd spot in development journals features only at spot 12 in ICT4D journals. One wonders why Freire (educationalist) and Gramsci (political studies) feature in spots 5 an 7 in ICT4D journals above Latour. Sociologists such as Bourdieu, Escobar and Foucault, have a strong interest in power (thus politics), so it is fair to conclude that politics and sociology feature strongly in ICT4D journals. Not a single communication theorist (e.g. Daniel Bell, Marshall McLuhan, Neil Postman) features anywhere near the top 10 positions. Important philosophers of technology, Thorstein Veblen, Lewis Mumford, Daniel Chandler, Andrew Feenberg, Jacques Ellul (1954), Don Ihde (2004) and others hardly feature in ICT4D literature. ICT4D journals are dominated by sociologists, with a few political thinkers thrown into the mix, while economists dominate in development journals, with some political thinkers and sociologists thrown into the mix. Chomsky is a technological determinist (Chomsky 2014) who believes in the neutrality of technology (Veletsianos 2014), which is a notion not taken seriously by most serious thinkers, and hardly features in development or ICT4D journals, so his views are not presented in this paper.

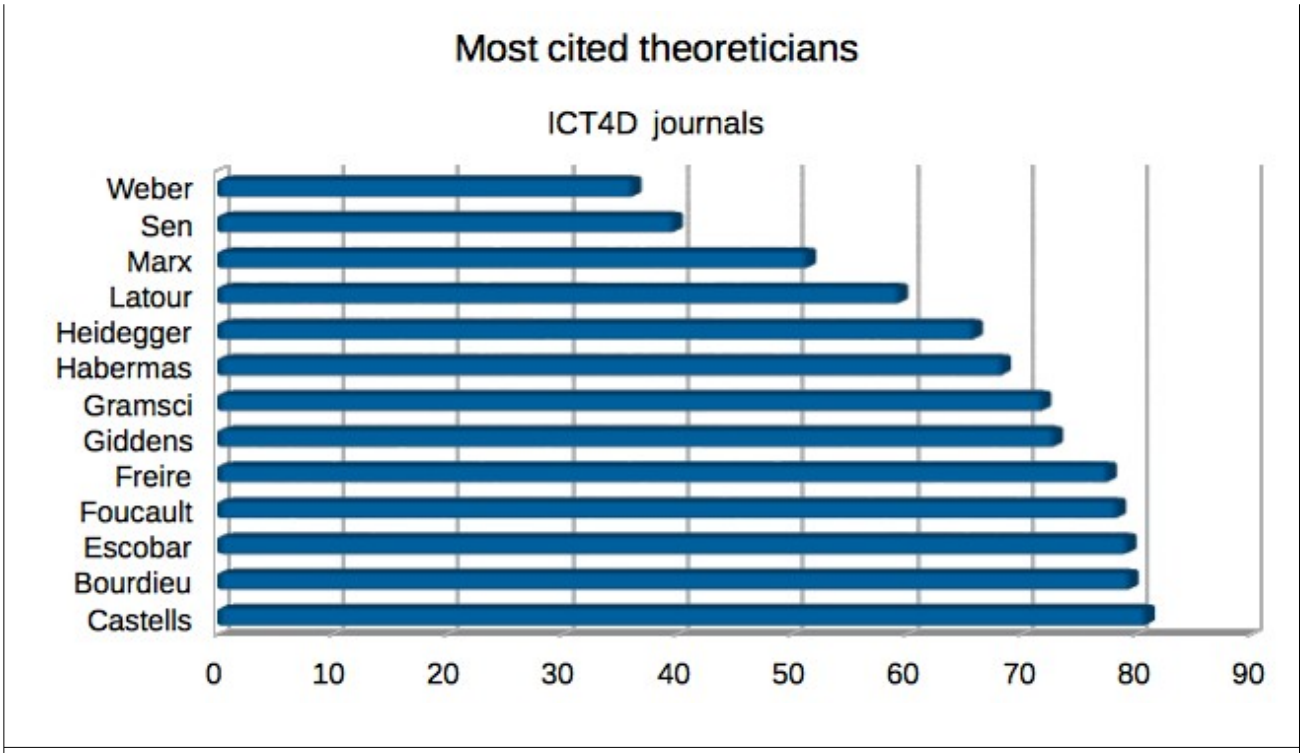

Figure 2. Theoretical authors cited in ICT4D journals.

What follows is a very brief discussion of the main theoreticians' views that informed the particular superclasses selected for the purpose of this paper. They are presented in the ranked order of popularity in ICT4D journals.

3.1. Manuel Castells

Manuel Castells (1996, 2009, 2012, 2013) is the most most cited author in ICT4D journals, but seemingly not very popular with development authors, where he ranks a distant thirteenth.

Castells writes about the *informational* society, and is critical of the prophets who hold up technology as the savior of socio-political problems. Yet, he takes technology seriously and locates it in the social context in which it is used. He says: "Of course, technology does not determine society. Nor does society script the course of technological change, since many factors, including individual inventiveness and entrepreneurialism, intervene in the process of scientific discovery, technological innovation, and social applications, so that the final outcome depends on a complex pattern of interaction." (1996: 6); and "Technology does not determine society: it embodies it. But nor does society determine technological innovation: it uses it. This dialectical interaction between society and technology is present in the works of the best historians, such as Fernand Braudel." (1996: footnote page 6).

He argues against technological determinism: "Indeed, the dilemma of technological determinism is probably a false problem, since technology is society, and society cannot be understood or represented without its technological tools" (1996: 6), yet "... we could say that while technology *per se* does not determine historical evolution and social change, technology (or the lack of it) embodies the capacity of societies to transform themselves, as well as the uses to which societies, always in a conflictive process, decide to put their technological potential." (1996: 8). Some critics regard Castells as a technological determinist, but I agree with Glass (2005) that such views oversimplify Castells thinking.

Castells distinguishes between *modes of production* (capitalism, statism) and *modes of development* (industrialism, informationalism - footnote, page 23). He argues that a new social

structure is emerging, shaped by a new mode of development, namely informationalism. He also distinguishes between an information society and an informational society. In an information society information is emphasized. According to him medieval scholastic Europe was an information society. Here he overgeneralizes the sub-culture of that era's educated elite, and fails to account for the majority of Europeans who were agriculturalists and illiterate. His informational society is one in which the main form of production centers around information and changes social organization. In his language, developing regions whose social organization is mainly agricultural or industrial are not informational societies.

According to Castells, information as a new production method has five attributes: information is the new raw material; IT is pervasive; ICT is convergent; systems are networked; information and systems are flexible. These attributes constitute an *informational* society, and the term is used analogous to the previous era's term *industrial* society. Although a sociologist, his emphasis on connected information as production suggests that the foundation of his theory is based on the new economy.

Castells addresses power as an important concept in human relations, as well as production and labour, topics which have been discussed by sociologists since Marx. His argument that in the network society power lies with the network has not been bought by especially communication theorist. It has been pointed out that communication networks have driven economic activities since ancient days (e.g. the Silk Route). Archaeological evidence of natural objects found long distances from their origin indicates that trade networks have existed since time immemorial, and such networks depend on communication and information. As among others, Glass (2005) and Van Dijk (2001) point out, Castells does not argue the case for his claim that we live in an information society, but merely accepts popular views that we indeed live in such an context. Fuller (2004) presents a handy very brief overview of Castells and some short-comings of his thoughts.

Castells also wrote about the supposed impact of social media on social activism (2012), but as, among others Fuchs points out, he "overestimates the role of the Internet in society and neglects or downplays the importance of other dimensions of society." (Fuchs 2012). Also see Fuller (2004) for a review of Castells' books.

Manuel Castells might be a sociologist, but his trilogy about the networked society is based on the foundation of information as a new production method, while production is typically related to economic activity. A great deal of his argumentation is about economic globalization, international trade and investment. In fact, critics of Castells point out that his position that the networked society is advantaged by the opening up of connections blindly accepts the neoliberal capitalist ideology. Along this line of argument, Fuller (2004) regards Castells not as a critical thinker, but as one supporting the status quo of the neoliberal paradigm.

This is paradoxical. In ICT4D, technology acts as change agent. ICTs are supposed to bring about socio-economic change, which has radical implications. Yet, the most quoted ICT4D author, Manuel Castells, seems to perpetuate the status quo, particularly a specific economic ideology.

Castells approaches development from a sociological point of view, and he has a strong technological approach to his conceptual framework. The foundation of his theory is neoliberal economics, so his work can be classified with the semantic superclass *socio-economics*.

3.2. **Pierre Bourdieu**

Bourdieu's writing emphasizes power, struggle, and inequality, but not much about technology, yet surprisingly takes the 2nd position of most cited authors in ICT4D journals. To Bourdieu technologies are social practices (echoing Max Weber), or "crystallizations" of socially organized

action. Sterne (2003) argues that Bourdieu's notion of embodied experience suits an interpretation of technology very well. That would not be Bourdieu's direct voice, but his thoughts as voiced by Sterne, as he acknowledges "Though Bourdieu rarely wrote about technology per se, his work is 'friendly' to technological scholars." (2003: 369). The notions of Bourdieu applied to technology would be *rupture* (i.e. epistemological break): to break free of pre-notions about technology. In this sense it is not Bourdieu's philosophy that is useful, but his rational methodology, which is applied to technological thinking. In ICT4D Krauss (2013) uses Bourdieu concepts (such as *habitus*) for his ICT4D research.

Pierre Bourdieu wrote about economic anthropology and the internationalization of the economy. According Swedberg, the reason why his article's title is about Bourdieu's economic sociologies in the plural, is that "...Bourdieu's work on the economy is very rich." (2010: 1). Swedberg uses *economic sociology* for Bourdieu's *social anthropology* and *economic anthropology* as he argues that Bourdieu's program is an attempt to insert cultural thinking into economics. The semantic superclass *socio-economics* thus labels Bourdieu's thinking adequately.

3.3. Arturo Escobar

Arturo Escobar is critical of development, and his views fit in with the *de-growth* trend in narratives about development (Escobar 1996, 2012; Latouche 2007). In Latin America the notion of *buen vivir* (good life) drives the search for an alternative view to development away from the materialistic approach of the extraction of natural resources. It is about well-being which is not economically driven but has empathy with the environment. Regarding technology, it should not dominate local culture, but be appropriated within cultural structures. Escobar ranks third after Castells and Bourdieu in ICT4D journals, and ninth in development journals. He acknowledges the importance of technology. He is interested in political-economic perspectives in biological anthropology. He is critical of the economic bias of development, and favors what he calls ecological development, which might be labeled as a s*ocio-economic* perspective with a good dose of ecological sensitivity.

3.4. Michel Foucault

Foucault surprisingly takes the 4th spot in ICT4D journals. It is surprising as he used the terms *technology* and *technique* in a non-standard sense, and also slightly changing meanings throughout his lifetime. According to Behrent (2013), in his earlier work he wrote about technologies of power (1972), but later it changed to technologies of the self. Gerrie (2003) argues that Foucault was a philosopher of technology, yet his peculiar meaning of technology does not refer to machines or tools, but to methods and procedures, and specifically control of humans (Behrent 2013). He is thus concerned with social artifacts, and not so much with physical artifacts or material objects. Foucault's view reflects a societal approach, and focuses particularly on power relations in society - which is perhaps why he is so popular among feminists. Foucault's reflections on power applies to technology as power over nature. Technology is not neutral, but as a set of structured forms of action, exerts power over humans too. Gerrie explains that Foucault's view of power and technology is not only about control of the strong over the weak, but also control over ourselves by using technology as technology leads to organized behavior. Foucault is not so much concerned with the traditional view of power of the individual, but with power in the habits of daily living. Foucault's philosophy may be regarded as a critique of the view of technological neutrality, as proposed by many in the past, and more recently by Chomsky (2014, and Veletsianos 2014).

Michel Foucault attempted to do an "archaeological" (his peculiar term, in keeping with the tradition of French thinkers' use of metaphors) analysis of the history of economic thinking. Kologlugil (2010) wishes to use Foucault's conceptual tools to understand the difference between the modern and post-modern worlds. Foucault argued that mercantile economic thought confused

the notions *money* and *wealth*, by equating the latter with the former, yet did not relate this to production - which only came to the fore during the industrial era, but reached its pinnacle only by the turn of the 19th century. For the mercantilists money is power. His approach to economics is thus political.

Foucault's thinking fits in with the semantic superclasses *sociology* and *politics* (thus a *socio-political* view), rather than technology. His archaeological analysis of economics also allows us to box his thought with the semantic superclass *economics*. I will use the labels *socio-economic* and *socio-politics* as semantic superclasses for this thoughts.

3.5. Paolo Freire

Paulo Freire is an educationalist and wrote about oppressors and the oppressed, i.e. socially, economically and politically oppressed. The oppressed are freed by recognizing they are oppressed, and education is the means to change their state from being oppressed. In his ideal education system educators and student co-create knowledge. As the developing world is often regarded as having suffered under colonialism, and thus oppressed, Freire's philosophy resonates with activists-minded participants in the theatre of development. This notion of co-create has spilled over into ICT4D in the idea that projects should be co-created to avoid situations where developing communities are treated as the oppressed. Freire's view could be used as an argument against top-down approaches. The dipole of oppressor and the oppressed is about power relations, thus *politics*, which seems to be the most appropriate semantic superclass label to describe his work. For summaries and some critique of Freire's ideas, see Ohliger (1995), Simpson and McMillan (2008), and Smith (2002). Freire's philosophy might be labeled a *socio-economic* or *socio-political* position on *education*.

3.6. Anthony Giddens

Traditionally social systems could be viewed either from the point of view of subjective human behavior, or as objective institutions, which I will here paraphrase as the debate about the primacy of the individual or the group. Giddens (e.g. 1979, 1982, 1984) objected to this dichotomization, and introduced the concept of Structuration as a neutral concept, indicating that both aspects are equally important. There is an interplay between action and structure. Shaping is not one-way. We shape technology, but simultaneously technology shapes us. Giddens' approach is more holistic and moves away from the either/or stances that have reigned for such a long time in western thinking.

According to King (1999), Giddens' theory is not a critical theory, but an apology for the *status quo*. He says: "He [Giddens] clearly means that post-Fordist, multinational capitalism is the only viable economic system currently possible, which necessarily includes the neoliberal regulative regime." (1999: 71). Rose (1988) assesses the contribution of Structuration Theory (an interpretivist approach) to Information Systems, which was traditionally very positivistic. He complains about the absence of a theory of technology in Giddens' approach for any applied science.

King thinks that underlying Giddens' thought is the assumption of the individual operating in a free market system in which choice and consumption feature strongly. Giddens reintroduced the individual agent which was neglected by Parsons and Levi-Strauss, who overemphasized objective factors. Structuration theory is a social ontology and an attempt to explain how social relations could stretch over time and space "... to reproduce the social system through meaningful individual action." (King 1999: 62). King argues that in the mid-1970s, attributed in part to the oil crisis, Fordism and Keynesianism no longer made sense while states began to loose their power in favor of multinationals. State involvement decreased due to deregulation and privatization. The rise of the multinationals gave birth to the notion of globalization, and Giddens plays a part on this stage

by proposing that relations move from local settings across time and space barriers. Modernity is characterized by a radical social reform, which embraces non-traditionalism.

On a higher level of analysis, Giddens' theory of Structuration is about relations between properties, such as structural principles, structural sets, institutions, interaction, etc. (e.g. Turner 1986). Explained as diagrams, and regarding structure as rules and resources, Structuration seems to be a variation of structuralism. While Structuration separates structure from agency, Giddens (as well as Bourdieu) attempts to combine the concepts, hence Structuration. The mere choice of this terms suggests a relationship with structuralism. Of course, for Giddens structure is not a supra-historical entity, but more a process that is in continuous flow. Yet, he is not concerned with history, and in that sense his structure is in closer affinity with the structuralist movement than the historical constructivist movement.

Of relevance to ICT4D, Giddens distinguishes between traditional (pre-modern) culture and post-traditional (modern) culture. In traditional cultures choices of action are predetermined by tradition and customs, while in modern cultures actors or agents are much freer to act, and have more choices, which might be related to Sen's choice theory. Giddens thus resonates well with the argument that is often made that ICT as enabler offers more choices to the underprivileged. To me, what is not commonly addressed in ICT4D literature is the question whether ICT proponents have the right to change traditional cultures by imposing tools that offer more choices. This is an ethical question that requires a much needed debate.

Giddens is the 6th most popular theoretician in ICT4D journals, and takes the 8th spot in general development journals. Politically Giddens is a social democratic theorist, advocating cooperation between left and right, the so-called Third Way. Giddens' theory is about society, driven by economics, with technology as one component of society. As with most sociologists, the foundation of his sociology is economics, while his theory is not about technology. His conceptual framework can be classified with the label *socio-economics* as semantic superclass.

3.7. Antonio Gramsci

Gramsci is generally regarded as a Marxist thinker, although he was critical of some Marxist notions. For example, he is not as deterministic as Marx, and opposed the metaphysical materialism of Engels and Lenin. He argued for the independence of culture and ideology from economic determinism. According to Jones, Gramsci's view is that "...culture, politics and the economy are organised in a relationship of mutual exchange with one another, a constantly circulating and shifting network of influence." Jones (2006).

Gramsci's concepts are used to interpret powerful multinationals and international institutions such as the World Bank and IMF, both of which are very active in the sphere of development. Such organisations, as *historic blocs*, in the language of Gramsci, are in some spheres more powerful than traditional state governments. For our purposes, Gramsci's theories could be labeled with the semantic superclasses *politics* and *economics*, as it is concerned with power and economics. The Marxist Internet Archive contains several of Gramsci's texts (Gramsci in MIA).

3.8. Jürgen Habermas

Habermas (2003), who is mainly a linguistic philosopher basing his theoretical framework on Speech Act theory, views technology as a method to outsource our human tasks. Some interactions are purpose-driven, some are culturally driven. It is not technology per se which is problematic, but which part we emphasize. Technology is such an integral part of our lives that there is no alternate world without technology, except to turn the clock back many hundreds of thousands of years, a view shared by Hodder (2012). We develop technologies to solve problems, and to extend our natural capabilities. Technology is more about reducing effort than about Marcuse's power.

Habermas does not accept Marcuse's claim that technology is always repressive. Technology as tools to reduce effort is an instrumentalist approach. One fundamental problem with Habermas is that Speech Act theory is based on hypo-linguistic categories, which are theoretical categories that are not evident in linguistic utterances, but are constructed by arm-chair theorists without any reference to any real linguistic data (or Saussure's *parole*) or to any neurological evidence. Speech Act theory is restricted to abstract hypo-linguistic categories, and neglects the dialogical nature of communication, and the fact that a listener creates meaning. His notion of communicative rationality is thus flawed. His view of technology extending human capabilities is a powerful one, and relevant for ICT4D, and fortunately not dependent on Speech Act theory.

Habermas regards himself as the last Marxist, but reforming that ideology. To him the interventionist welfare state is important for capitalist economy. However, he regards the economy as a supra-historical entity, criticized by constructivists. In the words of Sitton, Habermas views "...the capitalist economy as a self-steered subsystem that is substantially independent of lifeworld requirements." (1998: 62).

As philosopher, Habermas tackled many themes, such as politics and law, but for ICT4D purposes his conceptual framework could be labeled *socio-economics* as semantic superclass. He is the 8th most popular theorist in ICT4D journals, and 11th in development journals.

3.9. **Martin Heidegger**

Heidegger regards humans as slaves to technology, which contaminates humans' authentic sense of being, and is a technological determinist. Being a phenomenologist, he commits the error of etymologization, which means that older meanings of words are regarded as the authentic, true meanings of words. Such analysis skews observations and philosophy by interpreting the contemporary through the filters of the past. Heidegger objects to the instrumentalist view of technology - i.e. regarding technology as means to an end - as it leads to *hubris* (self-confidence), and distracts from the essence of technology - essence again an ancient concept, and based on etymologization. His etymological approach lead him to view technology as a "revealing" phenomenon. In keeping with the inspiration of the ancients, Heidegger uses some Greek words as constructs to talk about technology. But he does not only appeal to the ancient words. He also rebrands them with his own idiosyncratic meanings. The Greek *techne* now suddenly relates semantically to *poieis* (his *bringing forth*, but which in Classical Greek meant *making*) and *episteme* (in his vocabulary *truth*, but which in Classical Greek meant *knowledge*), all of which *aletheia* (*reveals*) true knowledge. So according to him *techne* has nothing to do with making, but takes on a mystical quality. With such fancy semantic footwork he rewrote the meanings of commonly used words, by extracting them from common contemporary contexts. Luckily phenomenology is not as popular today as it used to be half a century ago, so I will leave Heidegger with his fanciful idiosyncratic word games. Technological determinism has been effectively demolished by several authors discussed in this paper, so it is very surprising that Heidegger is still popular: 9th spot in ICT4D journals, and 7th spot in development journals. His views can be described with the semantic superclass *philosophy*, but somewhat outdated.

3.10. Bruno Latour

Bruno Latour (e.g. 1987, 1991, 1993, 1996, 2005) often wrote about technology and networks. In *Technology is society made durable* (1991), he attempts to introduce a solution for the technology/society divide. He argues against the power approach, which according to him is just one variable within a set of variables, which constitute a network of variables. His solution is characterized by the dominant variables of association and substitution. Latour reminds his readers that sociology has for a long time been concerned with power relations - the socio-political approach. He argues that the problem of domination does not lie with social relations, but that non-human actants need to be considered too. It might be that these non-human actants hold

society together. To demonstrates his approach, he appeals to the history of technology, and more specifically, the history of the Kodak camera. Latour, for one, at least has read theory of technology - for example, he refers to the work of Bijker, an STS thinker. References to STS literature is missing in the works of many other thinkers.

Given his interest in technology, it is surprising that Latour ranks only 10th in ICT4D journals. He ranks 12th in development journals. His approach can be described with the semantic superclass *socio-technology*. As technology supposedly plays an important role in ICT4D, it is really strange that he does not feature closer to the top among cited scholars.

3.11. Karl Marx

The conceptual framework of Karl Marx (1867/2007) might be described as an attempt of sociological understanding of human behavior, but could also be labelled with the semantic superclasses *economics* as the crux of his argument is that economics is the base of society. *Politics*, defined as human power relations, is also a main component of his philosophy. His argument is that the social class struggle, which in industrial societies is economically driven, can only be resolved through revolution, which will lead to a shift in power.

In development journals, Marx is the fourth most cited author after Weber and Sen. In ICT4D journals he takes the 11th spot, surprisingly above Sen and Weber, perhaps due to the activist stance taken by many ICT4D participants. The Marxist Internet Archive contains several of Marx's texts (see *Marx in MIA* in the References). Perhaps one reason for the presence of Marx in development is his critical position toward the economic and political structures of his day, and his promotion of an aggressive ideology to introduce change. Developing regions have typically suffered from the evils of colonization, and Marx thus offers some hope to the oppressed. As both a political and economic ideology, Marxism has been a failed experiment. So his popularity among development authors in the early 21st century is surprising. Karl Marx was certainly concerned with economics and its social implications, but his reference point was the early industrial period, which has long passed. The semantic superclasses of *socio-economics* and *socio-politics* apply to his thinking.

3.12. Amartya Sen

Amartya Sen (1975, 1987, 1992, 2001, 2002; Srinivasan 2007; Stillman and Denison 2014) is the second most cited author in development journals, yet he takes only the 12th spot in ICT4D journals. This is perhaps not surprising as he does not address technology at all in hi writings. His philosophy is critical of an economic approach to development, proposing a different angle to the debate on well-being and welfare. Sen is critical of classic welfare economics, and of mechanical utilitarianism, of the latter because of its neglect of agency. Agents have choice, and as Sen argues that agency cannot be left out of the equation, his choice theory is fundamental to his philosophy. He is critical of social choice theory as the individual agent is at the core of his theory. His philosophy thus emphasizes the individual as opposed to the social.

Being fascinated with measurement, his interest is an attempt to find methods of measuring well-being. His position might be called ethical consequentialism. Originally Sen started off with wealth (defined with reference to economics) as the determinant of advantage, but through the years the progression of his thoughts lead through other determinants: functioning, capability, voice and eventually critical voice. His view of well-being is multifaceted, while well-being is not necessarily economical. A positive well-being might be to have a critical voice. Among his determinants, in development journals it is his capability approach (also promoted by Nussbaum), that receives most attention.

Sen's capability approach is about a space for opportunities that needs to be in place for individuals to function within in order to pursue their potential functionalities. His argument implies that before we can talk about economic development, the space of opportunities needs to be in place. Although Sen's philosophy is focused on practical living, the main challenge has been to translate this theory into practice. For example, the space is not defined, so although designed as a tool to measure individual well-being, the criteria and their weightings are fuzzy and vague.

From an ICT4D perspective, Sen's capability approach says nothing about technology. His *Employment, technology and development* (1975) is about inter-relationship between institutions, technology, employment and how institutional factors affect policy-making, and not so much about material objects. Relatively recently Sen received more exposure in ICT4D literature from attempts to translate the relevance of his approach to ICTs for development projects. Perhaps the most practical work translating Sen's choice framework into ICT and development is Kleine's choice model (2013). These attempts rely on some or other interpretation of Sen, and endeavor to determine how ICT could enable the creation of a space of opportunities. Apart from Kleine, no other model has been suggested, and it remains to be seen to what extent Sen's philosophy relates to the role of technology. The danger exists that technology might be assumed to be a determinant for creating the space of opportunities.

From a semantic network theory perspective, Sen's work might be classified as an economic approach, as he is concerned with economic welfare. He approaches economics from a social choice theory perspective, so his economics is socially sensitive, yet individualistic. His philosophy thus does not fit into the "pure" economics box, but is perhaps best described with the semantic superclass *socio-economics*, with good dose of individualism.

3.13. Max Weber

Max Weber (1905/1950) is the doyen of classic sociology and the most frequently cited author in development journals, but takes only the 13th spot in ICT4D journals, despite having written extensively about technology. He uses the term *technology* as a generic word for the means to an outcome. His technology is not restricted to material machines, but includes human actions such as methods of meditation, and in religion, methods of salvation. His notion of technology is thus *method-based*. Technology as a method is applied to reach some goal. Machines are of course regarded as technologies, as they are the methods or tools used by humans to achieve certain outcomes. Reason, expressed through science and technology (intellectualization) enabled humans to master nature. Reason also enabled the creation of social institutions, such as industrial capitalism, bureaucratic administration, and legal formalism. Weber's view of technology of method is thus a type of instrumentalism concerned with economic output.

Max Weber was certainly concerned with economics and its social implications. He was fascinated by the American economy when he visited that country, and which inspired his argument about the Protestant ethic as foundation of a successful economy. The semantic superclass *socio-economics* describes his work well.

4. CONCLUSION

From the above data it is evident that actors on the ICT4D stage have diverse interests. Manuel Castells argues for a tight integration between society and technology. Not surprisingly, he occupies the top slot in ICT4D literature, while in development journals he occupies the thirteenth spot outranked by the classic theorists Marx and Weber. Despite his apparent interest in technology, the foundation of his theory is *socio-economics*. Of the top 13 cited authors in ICT4D journals, except for Heidegger (philosophy), Latour (socio-technology) and Gramsci (politics and economics), all are concerned with socio-economics. In addition to socio-economics, Escobar is also concerned with ecology, Foucault, Marx and Gramsci with politics, and Freire with education.

Read along with Part 1 of the paper set, it seems that thoughts on development are biased toward s*ocio-economics* and *socio-politics*, while there is not much interest in *socio-technology*, *theory of technology* and *philosophy of technology.* Although not discussed above, perhaps Hodder's theory of entanglement (2012) might be a good starting point for future discussion and debate among ICT4D players.

I conclude here by repeating the last paragraph of Part 1:

> The ICT4D theater is full of actors. But the script seems a bit mingled up - perhaps even lost. And as the character Jaques said in Shakespeare's *As you like it*: "All the world's a stage..." (Shakespeare *ca* 1599).

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