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Technology, capabilities and critical perspectives: what can critical theory contribute to Sen's capability approach?

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Abstract This paper explores what insights can be drawn from critical theory to enrich and strengthen Sen's capability approach in relation to technology and human development. The two theories share some important commonalities: both are concerned with the pursuit of "a good life"; both are normative theories rooted in ethics and meant to make a difference, and both are interested in democracy. The paper provides a brief overview of both schools of thought and their applications to technology and human development. Three areas are identified where critical theory can make a contribution to the capability approach: conceptually, by providing a critical account of individual agency and enriching the concept of technology beyond the simplistic notion of commodities; methodologically, by sensitising towards reification and hegemony of scientific tools, and, finally, by emphasising reflexivity of researchers.

Keywords Sen's capability approach · Critical theory · Capabilities · Technology

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Introduction

Amatya Sen's capability approach (CA) is based on the critique of opulence-focused approaches (focused on income, commodity command) or utilitarian approaches (focused on happiness, desire-fulfilment) which are typically found in traditional welfare economics (Sen 1985a). The word "capability" as used by Sen differs from its everyday sense which usually refers to trained potentials, including skills, abilities and aptitudes. Rather, "capability" in Sen's approach reflects the real opportunities (environmental opportunities and individual abilities) that a person has to lead a life he or she values (Gasper 2007). Deneulin (2006) summarises three "cornerstones" that Sen's CA is built upon: First, its concern with "the expansion of freedom … both as the primary end and as the principle means of development" (Sen 1999, p. xii). Second, the centrality of "individual agency" in addressing human deprivation. Third, its emphasis on participation.

Sen's capability approach (CA) has made major contributions in the research on and practices of human development in areas like poverty alleviation, gender equality, and democracy. In recently years, the CA starts to be adopted to investigate the implication of design and adoption of information and communication technology (ICT) in society. Concepts and principles of the CA are drawn upon to discuss the means and ends of ICT for development (Garai and Shadrach 2006), evaluation of ICT projects (Madon 2004), empowerment (Johnstone 2007; Gigler 2004), the global digital divide (Wresch 2009), social inclusion (Zheng and Walsham 2008), and theoretical exploration on applying the CA on ICT and human development (Zheng 2009; Kleine 2009).

From a CA perspective of ICT technology is typically seen as embedded in the process of human development

This means that its purpose is to enhance the capabilities of individuals to lead a life in ways that they have reasons to value. Technology is not seen as an end in itself (Zheng 2009). Moreover, the central role of "agency" in Sen's capability approach allows us to challenge the perception of potential users of ICT as passive receivers of innovations, especially when technologies are transferred to the third world from more advanced economies (Walsham 2001), and when technologies are imposed on local users under the claims that these particular technologies are "good for them" (Bailur 2007). Applying Sen's CA to ICT for development, the agency of ICT users is emphasised, thus highlighting the needs and aspirations of the people whose interests are affected by the innovations. Zheng (2009) suggests incorporating individual agency in studying ICT for development (ICTD) has two consequences. The first relates to the need for public discussions, participation, and social inclusion in the process of ICT adoption and diffusion. The second relates to the evaluation of ICT adoption in terms of the extent to which it meets the needs and expectations of users (Madon 2004), rather than the rate of diffusion, the extent to which it fulfils the intentions of the designers, or economic outcomes.

On the whole the literature applying Sen's capability approach to ICTD is at an early stage, and there is plenty of space for such work to develop conceptually, theoretically and methodologically. In this paper we explore two conceptual issues. Firstly, almost all of the work that incorporates ICT into the CA framework has an implicit perception of technologies as goods and resources, which are independent of values and beliefs. For example, Zheng (2009) proposes a view of seeing ICT as commodities. This view is meaningful in light of ICT's contribution to the users' capability set, i.e. the real opportunities that the individual has to lead a life he or she considers valuable. Such a view implies that technology is neutral and can be readily drawn upon to serve the purposes of human development. While this may be valid at some level—and is useful to steer the discourse away from the perception that technological innovation is a valuable end in its own right—the neutrality assumption could be overly simplistic and problematic at other levels. Scholars of science and technology studies and information systems are very likely to protest against it. It is therefore appropriate to ask whether there is space for a more sophisticated and critical view of technology.

Another aspect to be mentioned here is the notion of individual agency, which Sen considers essential to addressing deprivations of capabilities. Sen defines agency as the freedom to set and pursue one's own goals and interests, which underlines his concept of development: "[d]evelopment consists of the removal of various types of unfreedoms that leave people with little choice and little opportunity of exercising their reasoned agency (Sen 1999, xii)." While it is recognised that individual agency is embedded in specific socio-cultural environment (Sen 1990a, 2006), and that there is still space for the agency to be evaluated and appraised (Sen 1985b), Sen is reluctant to theorise how individual agency is restricted and what this means for operationalising the CA. This seems to be one of the areas of the CA that have been left "incomplete" (Robeyns 2006). As Deneulin (2006) points out,

> If the capability approach is a theory guiding and assessing development policies according to the capabilities people have reason to choose and value, given the structures of inequality within which people express their 'good reasons' to value certain capabilities, it seems that the approach crucially requires a critical account of the 'good reasons' people may have to value certain capabilities (ibid., p. 32).

To address these issues we propose to draw upon critical theory (CT) and see whether there are elements from this school of thought that can shed light on a more critical account of both technology and individual agency when applying the capability approach to ICTD. The reason we choose critical theory is that it is similar to the capability approach in many respects. They both constitute schools of thought that are meant to make a difference—to improve individual and social lives; both are normative theories rooted in ethics; they share an interest in democracy, and both are concerned with the pursuit of "a good life". They develop different streams of ideas to support freedom, empowerment and emancipation. It is thus a reasonable question to ask whether and in what ways these two approaches can learn from each other. In this paper we focus on what the CA can learn from CT.

Both approaches defy simple definitions. Sen's CA was intentionally left incomplete (Robeyns 2006), and has been extended, enriched and applied by various scholars from several disciplines. CT is used as a label for a rich body of theories which encompass diverse critical approaches and methodologies. Bearing the diversity and complexity in mind, for the purpose of simplicity of this paper, we will refer to them as though they were singular theories, but will elaborate on internal differences where necessary.

The rest of the paper starts by reviewing the capability approach and ICT, followed by an introduction to critical work in information systems and technology. The subsequent section explores in detail aspects of critical theory in terms of their contribution to applying Sen's capability approach to technological innovations, including conception of technology, agency and methodological issues. The paper concludes by pointing towards ways in which the cross-fertilisation of CT and CA can lead to tangible results that further both research agendas.

Capability approach, critical theory, and technology

This section provides the theoretical background of the main thesis of the paper. It outlines the key characteristics of CA and CT in relation to the role of technology. It is regrettable that we are not able to go into great details to introduce both theories due to space limit—interested readers are encouraged to follow the references.

Sen's capability approach

Sen's capability approach was developed and refined over three decades, after the Tanner lecture in 1979, in a number of books and journal articles across disciplines (e.g. Sen 1980, 1982, 1993, 1999). As most of Sen's work addresses the field of economics, it is not easily accessible to a wider audience. His writings on the topic have been synthesised by various authors including Alkire (2002) and Robeyns (2002). The major constituents of the capability approach are "functionings" and "capabilities". Functionings are the "beings and doings" of a person, whereas a person's capability is "the various combinations of functionings that a person can achieve. Capability is thus a set of vectors of functionings, reflecting the person's freedom to lead one type of life or another" (Sen 1992, p. 40). The two concepts are interrelated but have distinct meanings:

> A functioning is an achievement, whereas a capability is the ability to achieve. Functionings are, in a sense, more directly related to living conditions, since they are different aspects of living conditions. Capabilities, in contrast, are notions of freedom, in the positive sense: what real opportunities you have regarding the life you may lead (Sen 1987, p. 36)

In other words, functionings are considered constitutive of well-being, and refer to realised achievements and fulfilled expectations; whereas the notion of capabilities "represents a person's *freedom to achieve well-being*" (ibid. p. 49, original italics), and refers to effective possibilities of realising achievements and fulfilling expectations. Thus, the CA is not only concerned with the functioning levels of people, but more importantly with their capabilities.

Based on the distinction between functionings and capabilities, the CA is different from other economic approaches to poverty, inequality and justice by distinguishing "means to achieve" (what one values), "freedom to achieve", and "actual achievement" (Sen 1990b, 1992). While approaches that focus on commodity demand or level of income only address the means of achievement, the CA puts the "freedom to achieve" at the central stage of assessment. It is on this basis that Zheng (2009) conceptualises ICT to be a type of commodity that serves as "means to achieve", distinguishing it from the "the

freedom to achieve", namely, the capability set of the individuals that enable them to take advantage of goods and resources towards furthering their valued goals in life. The actual achievement of functionings is a result of personal choice, subject to personal preferences and other factors of decision-making mechanisms, from the capabilities available. It is recognised that the extent to which people can generate capabilities from goods and services are influenced by three sets of conversion factors—personal, social, and environmental characteristics (Sen 1992, pp. 79–87).

The consideration of interpersonal variations among human beings differentiates the capability approach from other theories in that it explicitly distinguishes different spaces of equality. Equality in one space to lead a valuable life, e.g. income, does not necessarily mean equality in life opportunities to achieve it, e.g. access to quality healthcare (Sen 1985a). This has great significance in assessing inequality, hence the question "equality of what?", which Sen argues is "truly central to understanding the distinction between different ethical approaches to social arrangements" (Sen 1992, p. 130). The capability approach thus proposes a different "evaluative space" (Sen 1993, p. 33), i.e. the plurality of functionings and capabilities, as opposed to income, utility or desire-fulfilment in traditional approaches. From this perspective, poverty should be seen as "the deprivation of basic capabilities rather than merely as lowness of incomes (Sen 1999, p. 87)", which is only of instrumental importance. One example Sen often uses is that African Americans in the United States, though richer than people in the third world, have "absolutely" lower chance to reach mature age than people in, say, China, Sri Lanka or parts of India (Sen 1999).

The concept of agency is fundamental in seeing Sen's focus on substantive individual freedom—what the person is free to do and achieve in pursuit of whatever goals or values he or she regards as important (Sen 1985b, p. 203). In other words, an individual is an "agent", as opposed to a "patient" whose well-being or the absence of well-being is the only concern (Robeyns 2005). There are two aspects of "substantive individual freedom": "well-being freedom" and "agency freedom" (Sen 1992, p. 57). The former is one's freedom to achieve things that are constitutive of one's well-being, while the latter is one's freedom to "bring about the achievements one values and which one attempts to produce" (ibid.), which may include furthering the well-being of others, respecting social and moral norms, or acting upon personal commitments and the pursuit of a variety of values. The centrality of agency in Sen's capability approach critically differentiates it from Nussbaum (2000)'s capability approach, which defines a concrete list of basic capabilities. Instead, Sen insists that
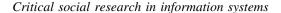
the list and weighting of valued capabilities should be defined by individuals themselves. We will explore Sen's concept of agency further in the next section.

Capabilities studies have thrived in the last decade and progress has been made in applying the CA in empirical studies (see e.g. Clark 2006; Robeyns 2006; Gasper 2007 for more detailed discussions). In general, the capability approach has provided an invaluable analytical and philosophical foundation to be built on (Evans 2002), and a conceptual basis upon which many critical issues and embedded relationships are sensitised for investigation. Therefore the CA is not only applicable in empirical studies, but also can be drawn upon for purposes of analytical reasoning or as a critical lens.

The capability approach is relatively new to the social studies of ICT. One of the earlier applications is shown by Madon (2004) who adopts the capability approach to go beyond traditional evaluation criteria on e-governance initiatives in the state of Kerala, India. Rather than measuring only expenditure, infrastructure, access and skills, she argues that we should also look at what people can or cannot do with the ICT applications offered, and how effectively people benefit from them. Johnstone (2007) seeks to broaden the research agenda of computer ethics by drawing insights from the CA. More recently, Zheng and Walsham (2008) apply concepts of the CA to examine how social exclusion in the e-society can manifest as inequalities in many different "spaces". A more systematic investigation of the CA in the IS field is provided by Zheng (2009) who presents an overview of the CA for ICT researchers and explores different ways of applying a CA perspective to studying the role of ICT in socio-economic development. Kleine (2009) presents the Choice Framework as a way to operationalise the Capability Approach to development. Overall, the application of the CA in IS research is at an early stage and is in need of further exploration and development.

Critical theory of ICT

Critical theory has a rich history and spans a large number of approaches to research. In this paper we are predominantly interested in critical theory as it pertains to and has been applied to ICT and information systems. There are two clearly recognisable critical discourses in ICT, namely critical research in information systems, a discourse predominantly among information systems scholars, and critical theory of technology, which is supported by philosophers of technology. This section will review both discourses and synthesise them under the heading of "critical theory of ICT".

Critical social research in information systems

Information systems (IS) is a field of practice but also of academic inquiry. It is often defined by the interrelation of technical and social aspects. The critical approach to information systems is often presented in terms of a "research paradigm" (Orlikowski and Baroudi 1991) as distinct from interpretivist and positivist IS research. While there has been some activity in critical research in IS since the 1980s, the level of activity and visibility has recently picked up with the publication of several dedicated volumes (Howcroft and Trauth 2005; Stahl 2008a; Brooke 2009) and special journal issues. Topics range from the perspectives of post-colonial influences (Mayasandra et al. 2006), gender (Howcroft and Trauth 2008), to discourses and power relationships (Jackson et al. 2006).

Stahl (2008b) suggests that the critical intention is core to CSISR. It is based on the perception that social reality can be improved and that research has the task to engage in this. Cecez-Kecmanovic (2005, p. 19) puts it as follows: "*Critical IS researchers produce knowledge with the aim of revealing and explaining how information systems are (mis)used to enhance control, domination and oppression, and thereby to inform and inspire transformative social practices that realise the liberating and emancipatory potential of information systems.*" This introduces the core concept behind the critical intention, namely that of emancipation. Critical IS scholars tend to acknowledge that emancipation is a core concern of the critical approach, although this raises issues such as the definition of emancipation, what counts as domination or alienation, who is to identify this, as well as the role of the critical scholar in identifying and addressing problems of emancipation (Stahl 2006).

It should be noted that critical theory, even in a relatively clearly circumscribed field such as CSISR, can better be understood as an umbrella label covering different theoretical approaches. According to Harvey (1990), aspects of critical theory can be traced back to Antiquity. However, a typical meaning of the term is that it is theory that has been inspired by Marxist critique of capitalism. More specifically, the term critical theory is often linked to work related to the Frankfurt School of social research (Falconer 2008). However, there has been some reaction to the dominance of Frankfurt School work, and particularly the dominance of work inspired by Habermas in CSISR (Brooke 2002). In current CSISR discourses one can therefore find references to a wider body of theories. Work inspired by Michel Foucault has a strong presence and further theoretical references to a wide range of work, such as critical management studies, postcolonial theory and others can be found.

Critical theory of technology

In addition to CSISR there is another discourse on critical work in relation to technology, which draws on similar sources and shares similar concerns, but appears to be largely separate from the CSISR discourses. We refer to this body of work as the critical theory of technology (CTT). A central figure of CTT is Feenberg (1993, 1999, 2004, 2008a, b), a student of Marcuse's, who has built much of his work on early Frankfurt School work. However, the strong initial influence of the Frankfurt School has been supplemented by work of Heidegger and Ellul as well as postmodernists, constructivists and others (Radder 2008).

CTT seems to be more closely linked to philosophy as a reference discipline than CSISR, which has a stronger affinity to a sociological background. Not surprisingly, CTT thus covers philosophical topics such as the conceptual basis and the ontological nature of technology. The nature of technology is a core concern of CTT. Technology is generally recognised as being socially shaped and constructed. The eventual shape that a technology takes is dependent on the fit between devices and interest and beliefs of social groups (Feenberg 1999). Technology is not neutral but includes values and preferences.

An important aspect of this non-neutrality of technology is its relation to power. Technology represents power and can be more powerful than political power. Technology can be used to delegate power. This view reflects Marcuse's (2002 [1964], p. xlvi) observation that "Technology serves to institute new, more effective, and more pleasant forms of social control and social cohesion." CTT emphasises the ambiguity of technology, the fact that it can be used for rationalising power structures as well as instituting empowerment. The way in which these affordances are realised is strongly influenced by the socio-economic environment in which technologies are developed and used. CTT therefore has an interest in the way in which capitalist structures facilitate or obstruct the achievement of potentials.

Commonalities of the critical approaches: CTICT

A more in-depth comparison of the two discourses in CSISR and CTT would be desirable as a contribution to an overall critical theory of technology but this would lead beyond the confines of the present paper. For the purposes of the current paper it will suffice to extract some features they share, in particular with regards to ICT. We will call this amalgamation of CTT and CSISR the critical theory of ICT (CTICT).

CTICT stands for the recognition that ICT has the potential to improve social reality and promote emancipation but often has opposite effects. Critical research aims to address this by epistemological means (e.g. exploring the nature and consequences of ICT) but aims to go beyond this. The awareness of the socially constructed nature of technology, the ability to describe interpretive flexibility lead to a sensitivity of the relationship between technology and power. Social and economic structures influence the values on which technologies are built and thereby the affordances they offer to users. These insights have both theoretical and practical relevance and would be able to inform our design and use of technology in order to contribute to the development of a better society.

This shared ethical goal of CTICT simultaneously raises important questions. What is the role of research and the researcher in the process of emancipation? How can we determine states of emancipation? How can different views on such questions be reconciled? How can research make a practical difference and simultaneously avoid turning into the dictatorship of the intellectual? These are fundamental questions arising from the nature of CTICT. In this paper we argue that the capability approach can provide tentative answers to some of them.

What CA can learn from CT

Having briefly introduced the two theoretical approaches to be discussed in this paper, we can now proceed to the discussion of the way in which the capability approach can learn from critical theory. They are both ethical theories in the sense that they provide concepts to understand and describe shortcomings of current social arrangements. They both aim to contribute to a better world. Neither of them provide strong moral guidance on what should be done or how but a theoretical and procedural way of understanding the world. Meanwhile, the two have very different repertoire of concepts and vocabulary which may inform each other. While this discussion is based on general and philosophical considerations, we emphasise the specific relevance of CA and CT in the area of ICT.

Agency, ideology and hegemony

The ultimate goal of development, according to the capability approach, is the expansion of individual freedom, that is, for individuals to lead a life that they consider valuable. The aspect of "agency freedom", which is a core feature of the CA, was not very well developed partly because it is particularly difficult to operationalise (Gasper 2007). Most development approaches have concentrated on the well-being aspect, such as income, education, and healthcare. Even in the Human Development Reports

which adopt the capability approach as a conceptual framework, the focus has been on the well-being aspect of human development and the agency aspect has been much less appreciated. In response to the neglect of agency freedom and agency achievement in political discourses and interpretation of Sen's work, Crocker (2008) proposes the label of the "the agency-focused capability approach" or "an agent-oriented approach".

The emphasis on individual agency gives rise to the critique of Sen's work as being overly individualistic, and paying insufficient attention to groups and social structures (e.g. Corbridge 2002; Devereux 2001; Navarro 2000; Deneulin et al. 2006). In fact, Sen explicitly takes into account social environment, societal structures, and culture by distinguishing between the concepts of functionings and capabilities, and by recognising the conversion factors from resources to functionings (Robeyns 2005). For example, on the topic of identity and violence, Sen (2006) expresses concern with deprivation of the freedom to think and the freedom of choice due to singular identification with a particular ethnic group, religion, or way of living. While such restrictive views of identity are often historical legacies, they are also partly results of social policies. In his research on gender inequality in India, Sen (1990a) argues that the fact that married women tend to value their contribution to the household as lower than their bread-winner husband is based on general social perceptions of market evaluations of work, and hence the gender contri-butions to social goods. Such a tendency is further com-pounded by their already low bargaining power in the family, thus resulting in their resignation to fate. As Sen eloquently puts it,

> The most blatant forms of inequalities and exploita-tions survive in the world through making allies out of the deprived and the exploited. The underdog learns to bear the burden so well that he or she overlooks the burden itself. Discontent is replaced by acceptance, hopeless rebellion by conformist quiet, and—most relevantly in the present context—suf-fering and anger by cheerful endurance. As people learn to adjust to the existing horrors by the sheer necessity of uneventful survival, the horrors look less terrible in the metric of utilities (Sen 1984).

Sen thus has an implicit concern with power relations and unjust social structures, yet does not provide a full account and theorisation of societal structures and constraints on personal choices. This is one of the areas that CA remains open and needs to be complemented by other theories. Robeyns (2008) points out that one could use the capability approach with theories of choice and personal responsibil-ity that do not acknowledge societal structures and constraints, which will have ultimately far reaching consequences for evaluative exercises.

In complimentary to this "weakness" of the capability approach, critical theory focuses on the structural condi-tions of individual agency. Of primary importance among those conditions is the economic constitution of society, or, to put it differently, the way in which capitalist systems structure agents' options. Critical scholars tend to point to the importance of historical backgrounds in understanding social situations. They tend to underline the importance of social structures in enabling or denying emancipation, that is, the ideological character of social structures which limit personal freedoms.

Critical theory provides a rich theoretical repertoire in relation to the constraints and boundedness of human agency. Two central concepts in this vocabulary of CT are ideology and hegemony. Ideologies are particular and dominant worldviews that advantage some and disadvan-tage others (Freeden 2003; Hawkes 2003; McLellan 1995). Ideologies are not simply falsehoods. Rather, they consti-tute central parts of the shared worldview of a society or group (Stewart and Gosain 2006). As such they can often even be supported by empirical evidence (Gouldner 1976). They are accepted by that group or society as correct descriptions of reality. However, from a critical perspective they can be seen as partial and alienating. Good examples of ideologies are the stereotypes linked to race and gender. Such stereotypes, if generally accepted, structure the actions available to members of a particular race or gender, which can be oppressive.

Addressing ideology is not a simple solution but an ongoing process which pervades critical research. Ideolo-gies can only persist if they evade critical questioning and analysis. They must blend into the background in order to remain stable. The mechanism by which this is achieved is sometimes called hegemony. Hegemony renders ideology invisible, often by rending it natural and beyond discus-sion. The concept of hegemony is closely linked to Gramsci's work whose main question was why people acquiesced to the oppression they were subjected to (Kincheloe and McLaren 2005). Foucault (1977, 1980) also famously argues that inequalities and power relations operate not solely through direct forms of repression but often through less visible strategies of normalisation, as in the panopticon metaphor.

Deneulin (2006) draws upon Ricoeur's ethical vision to improve Sen's notion of individual agency to that of *social–historical agency*, which refers to what human beings can really do or be given the particular socio-historical structures in which they are living. We propose the concept of *situated agency* to express the idea that individual agency is not only a product of specific

socio-historical settings, but also situated in a sometimes invisible or taken-for-granted network of ideology, and participate in the production and reproduction of these socio-historical structures and ideological tenets. Such a concept has important implications for ICT and social development, as it gives rise to a sensitivity towards deepseated power structure and rationalities. For example, an participatory approach to development, which Sen himself strongly advocates and which is popular in most development projects, may disguise or even strengthen incipient articulation of power embedded in social and cultural practices, hence the "tyranny of participation" (Cooke and Kothari 2001). It is possible that participatory methodologies may reify existing inequalities and affirm the agenda of elites and other more powerful actors (Kothari 2001). In studies of ICT and development, social conditions and cultural values are often perceived as merely contexts of ICT adoption, or sometimes as barriers (Walsham 2001). A critical capability approach that conceptually and methodologically incorporates *situated agency* as a key element would allow us to critically evaluate the design of social arrangement and of the basis of cultural norms as part of the assessment of well-being and agency freedom.

Technology, capabilities and critical perspectives

The Critical Theory of ICT can be used in addition to the capability approach in the assessment of motivations for adoption and social consequences of ICT in modern life. One of the concerns of CTICT is how technology can be subjected to democratic control. Again, this takes up a theme formulated by scholars of the Frankfurt School such as Habermas or Marcuse and tries to find present solutions to it. This requires a better understanding of the nature of technology and overcoming determinist positions such as those of Heidegger and Ellul. It raises practical issues concerning the design and regulation of technology. Importantly, it explicitly covers political questions of how democratic ideals can be brought to bear on modern sociotechnical systems. This may point to participative development approaches but even introduce an element of Luddism (Schot and Rip 1996, p. 264) into political debates surrounding technology, where Luddism is understood as an approach to "create and maintain space for sociotechnical criticism".

Work in CTICT is also strong in pointing out areas and issues of alienation and oppression and the different roles that technology can play in this. Typical topics of interest are those that affect emancipation or its potential. Prime among them are power-related issues, in particular those where power is related to technology. Examples are control and surveillance technologies. Brey (2008) posits that a

critical (political) theory of technology has to provide answers to the following four questions:

- The theoretical question: how can technology play a role in the distribution and exercise of power?
- The factual question: what is the role of technology in the distribution and exercise of power in contemporary society?
- The normative question: what role should technology have in the distribution and exercise of power in society?
- The practical question: what steps can be taken to move closer to this ideal?

CTICT therefore explicitly and directly addresses the issue of technology and distribution of power, which is exactly what is lacking in the capability approach. Another contribution of CTICT is revealing technology's ideological qualities and hegemonic functions. Ideologies may be socially accepted views such as the legitimacy of hierarchical management or of the imperative of profit maximisation. Ideologies are part of all collective constructions of reality and therefore a necessary consequence of a social constructivist worldview. They may even have positive consequences when they allow for the development of positive views of experiences (McAulay et al. 2002). Technology can then serve as hegemonic means by supporting and rendering invisible such ideologies (Saravanamuthu 2002; Feenberg 1999). At the same time, technology itself can have an ideological status, for example when technology is equated with progress and progress is assumed to be unquestionably desirable; when technology represents "expert knowledge" that exercises "disciplinary power" (Foucault 1980); or when technology embodies contested social regulations, for example through digital rights management. Hegemonic means to uphold the ideological quality of technology can then be drawn from the environment in the form of customs, agreements, or the law.

A heightened sensitivity towards the interpretive flexibility of technology, the hegemonic potential of ICT and its role in (re)configuring distribution of power may be able to help address the lack of recognition of technological agency and power relations when applying the CA on technological changes and social development.

Methodological issues

A further area where critical theory may be able to make a contribution to the operationalisation of the capability approach lies with methodology. There are numerous attempts to operationalise CA, which has led to the development of a considerable literature. When talking

about methodologies of applying the CA the literature usually refers to the accumulated quantitative and qualitative methods of identifying and measuring capabilities (Anand et al. 2007). For example, Alkire's (2002) book *Valuing Freedom* takes Sen's capability approach forward to develop a framework for specifying valuable capabilities, applied to cases studies of non-governmental organisation activities of poverty reduction. In terms of policy application, the capability approach has provided the foundations of the human development approach adopted by the United Nations Development Program as reflected by the Human Development Index.

However this is certainly not the only way the CA can be applied. Robeyns (2006) categorises ten types of existing capability applications: general assessment of human development of a country; assessment of small scale development projects; identification of the poor in developing countries; poverty and well-being assessments in advanced economies; an analysis of deprivation of disabled people; the assessment of gender inequalities; theoretical and empirical analyses of policies; critiques on social norms, practices and discourses; and finally, the use of functionings and capabilities as concepts in non-normative research.

CTICT does not have a clearly established methodology, which can be seen as regrettable (McGrath 2005) but it is arguably a consequence of the very idea of critical theory, namely to question assumptions and beliefs including the reflexive questioning of beliefs of the researcher. Indeed, the core principles of critical research have important methodological implications in the design of theoretical and empirical social research of ICT. As Feldman (2010) rightly points out, "to avoid the pitfalls of institutionalising capabilities in ways that limit it to a technical assessment or measurement tool, it is crucial to remain attentive to the power and political interests that help to constitute its meanings and practices."

To retain a critical consciousness in operationalising the capability approach, it may be useful to refer to the six criteria that suggest that a piece of research must fulfil in order to count as critical (Klein 2009; Basden 2002):

1. Being concerned with the conditions of human existence that facilitate the realisation of human needs and potentials;
2. Supporting a process of critical self-reflection and associated self-transformation;
3. Being sensitive to a broader set of institutional issues relating particularly to social justice, due process and human freedom;
4. Incorporating explicit principles of evidence given (or an explicit truth theory) for the evaluation of claims made throughout the research process;
5. Incorporating principles of fallibility and self-correction (growth of knowledge through criticism, i.e. the principle of fallibilism);
6. Being suggestive of how the critique of social conditions or practices could be met (as a safeguard against unrealistic and destructive negativism).

Based on these principles, the first question that researchers need to ask concerns the status of empirical data. If capabilities research is normative, i.e. wants to change the world, then one has to determine what role empirical research can play. From a critical perspective, knowledge of social realities and perceptions is important to identify where emancipation can be promoted. Such knowledge cannot necessarily determine, however, how emancipation can be promoted. Where methodologies are seen in the positivist tradition as means of ensuring a positive outcome of research they can easily turn into ideologies themselves (Wastell 1996).

The methodologies typically employed with critical theory can be helpful in dealing with ICT. Critical work that looks at the linguistic construction of technology is important to unpack black boxes that determine affordances and mediations of technology. This type of work is closely aligned with some of the work currently done in ethics and ICT, such as disclosive ethics (Brey 2000; Introna 2005). An understanding of how language is used to portray particular technologies and projected developments can also be conducive to better design of technologies, such as suggested by value-sensitive design (van den Hoven 2008).

CA-based methods seem to be uniquely suited to describing technologies and evaluating different options. Many ICTs have potentially far-ranging consequences and design decisions that aim to be conducive to justice and emancipation have to rely on some sort of measure that will allow comparisons of different options or outcomes. Examples of this could include design decisions in technology development such as ambient intelligence applications or action choices in technically relevant social action. Such work could be supported and underpinned by critical perspectives, for example by questioning participants' or experts' opinions or conducting ideology critiques of capability measures.

A further point of interest is that of reflexivity. Reflexivity is often described as a core characteristic of the critical approach (Kvasny and Richardson 2006; Richardson and Robinson 2007; Doolin and McLeod 2005). This is based on the recognition that ideologies, hegemonies, prejudices, reifications etc. cannot be overcome. Reflexivity allows critical scholars to engage in discourses without falling prey to the same problems that they diagnose in non-critical work. Being open to question one's own

assumptions means that one has the ability to recognise where these assumptions have ideological and alienating qualities and thus prevent emancipation. It also means that alternative concepts and views can be developed which overcome these problems.

This explicit reflection on ideology and hegemony and many of the related factors that allow ideologies to persist might benefit capabilities scholars. An essentialist take of the capability approach or a simplistic and mechanistic application of the CA as a measurement tool could potentially lead to the reification of beliefs and assumptions about human development and thereby take on a hegemonic role. The contribution to this problem from the viewpoint of CT can be to provide a model of how reflexivity as the continuous attempt to question the basis of the research can be embedded into research projects. It would probably require critical questioning of the CA by the individuals involved in it. This continuous reflexivity should lead to discourses that allow exposing and addressing issues such as ideology, hegemony, reification, false consciousness etc. This will not solve them and make them go away but will ensure that they are recognised and considered. In addition to thinking about what human capabilities are and how they can be observed, it will require asking which assumptions the answer to these questions are based on. By introducing such an explicit critical reflection as a standard component of CA-related work, the danger of this approach being perceived as a simple tool and of becoming reified in its own right could be avoided.

Conclusion

This paper argues that what we refer to as *critical theory of ICT* can be a good supplement to the capability approach in addressing issues related to technology and human development. The CA and CT are similar in several aspects, most notably in their attempt to contribute to a better world. Both theories have advantages and weak points. The capability approach is more clearly grounded in ethical theory through its link to concepts of justice and has found different ways to be empirically applied and measureable. Critical theory, on the other hand, builds on a long tradition of determining the obstacles to emancipation, be they social or individual, and having developed an important repertoire of concepts that scholars can build on.

If this description of CA and CT as being similar in substance and intent is correct, then it stands to reason that both could learn from taking the other into account. This is not to suggest that we need a unified theory to replace either CA or CT, but rather that there are ways of overcoming blind spots that all theories naturally have. We have argued that bringing perspectives from the critical theory of ICT to the CA without combining the two theories already generates valuable insights to the application of the capability approach on ICT and development.

In this paper we have discussed three areas where critical theory can make a contribution to the capability approach. Firstly, CT provides a critical account of individual agency—we propose the concept of *situated agency* to signify individual agency not only as a product of specific socio-historical settings, but also subjected to hegemony of ideologies (e.g. values, beliefs, knowledge systems), and involved in the production and reproduction of these socio-historical structures and ideological tenets. Secondly, CT provides a more sophisticated and critical account of technology beyond the simplistic notion of goods and resources; highlighting the interpretive flexibility and hegemonic potential of technology and its entanglement in power relationships. Thirdly, CT generates some methodological implications that can reduce the risk of the CA being applied as a simplistic measurement tool by sensitising it towards reification and hegemonic potential of scientific methods, and emphasising the reflexivity of researchers.

Table 1 summarises the topics covered in this paper where critical theory or CTICT can contribute to the application of the capability approach on technology and development.

Meanwhile, critical scholars could benefit from the CA's insight into real freedoms and use this insight to move towards more constructive forms of critique. Giving more weight to the positive side of technology might allow for a more balanced view. In many cases CTICT tries to debunk positive myths by showing that there are alternative stories to be told, for example by Cukier et al. (2009) who show the one-sidedness of media coverage of e-teaching or by Greenhill and Wilson (2006) who argue that the positive depiction of telework is misleading. While these interventions from the critical perspective are important and valuable, they may run the risk of being one-sided in the other direction. This is not a fundamental problem for critical scholars who would generally be sceptical of claims to objective description, but it may run the risk of alienating individuals who enjoy and benefit from particular ICTs. Critical scholars need to recognise that positive appreciations of technology or the socio-economic background they come from are not necessarily expressions of false consciousness but may be genuine and deserving of respect (as Thrift (2005) argues for capitalism). By seeing ICT as means to development and asking questions about what conversion factors need to be in place to facilitate the achievement of potential freedom that technology provides, the CA may point to a constructive way of engaging in such discourses.

Table 1 Contribution of critical theory to the capability approach

	Sen's capability approach	Critical theory
Comparative vision of human development	Development as freedom, or removal of unfreedoms that restrict individuals from exercising their reasoned agency	Emancipation, or removal of injustice, alienation and domination
Individual Agency	Central to the capability approach, the basis of addressing deprivation; embedded in socio-cultural conditions	Emphasis on the effect of social structures on individual agency, especially through hegemony of ideology
Technology	In ICTD studies usually regarded as commodities, i.e. goods and resources; implicitly perceived to be neutral	CTICT highlights ideological qualities and hegemonic functions of technology; sensitive to interpretive flexibility of technology and its role in distribution of power
Methodology	Can be applied in many different ways; the more practical application is to be used as development measurement or evaluative tool	Sensitive to power and political issues; emphasis on reflexivity of researchers; sensitive to reification and hegemonic potential of knowledge and methodologies

The next step will be to engage in empirical research that uses the conceptual argument put forward in the present paper. As both CA and CT aim to be applied and practical, such empirical research will be the natural way of finding out whether the complementarity of the two approaches truly lends itself to improving practical outcomes. An important topic is to evaluate the impact of technology on development from a critical capabilities perspective. Other research topics include the socio-economic basis of technology for development, in particular issues surrounding the capitalist structure of societies and organisations employing information systems. This includes classical topics such as gender, race, class but also managerialism or digital divides and the discourses on ICT adoption and social development. We hope that the present paper provides some conceptual guidance that will be conducive to both work building on CA and CT in social studies of ICT and beyond.

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