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Towards Critical Design Science Research

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Completed Research Paper

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Abstract

We argue for combining the forces of Design Science Research (DSR) and the critical research traditions. In Information Systems (IS) research, design science research (DSR) has gained momentum during the past decade, while critical research has characterized IS research thorough the years, in the margins at least. However, critical DSR remains a blind-spot in IS research. Critical research provides invaluable insights into and critiques of power, politics, oppression, and domination in IS development and use as well as advocates the empowerment of the oppressed, while critical DSR could distinctively contribute to the critical agenda through design and technology. Inspired by the developments in Human Computer Interaction research, we introduce critical DSR into the IS discourse. We show there is more diversity to DSR than currently acknowledged and identify various fascinating – and critical – DSR approaches. A categorization showing this variety is proposed and a research agenda for critical DSR outlined.

Keywords: Design science research, critical research, critical design

Introduction

In this paper we respond to the editorial by Rai and colleagues (2017) calling for diversity in design science research (DSR) in Information Systems (IS) by suggesting a novel topic for IS research: critical DSR. We show that actually there could be interesting paths along which more diversity could be introduced, and these paths also closely connected to new forms of relevance that have been called for in IS research right now – relevance interpreted as empowerment of the stakeholders (Mohajeri & Leidner 2017).

This study attempts to open a dialogue between two IS research approaches that have thus far not had much in common: critical research and DSR. Critical research has been acknowledged in IS research for long time, but it still remains quite marginal despite a continuous interest in it (see, e.g., Cecez-Kecmanovic 2005; Cecez-Kecmanovic et al. 2008; Kvasny & Richardson 2006; McGrath 2005; Myers & Klein 2011; Richardson & Robinson 2007). Critical research, generally, can be characterized by “*an intention to change the status quo, overcome injustice and alienation, and promote emancipation*” (Stahl 2008: 9). As for critical management research, Alvesson and Deetz (2000) argue that there are three significant tasks: generating rich insights, providing critiques of the status quo, and transformatively redefining of the current situation. Orlikowski and Baroudi (1991, following Chua 1986) characterize critical research the following way: it aims to critique the status quo and to emancipate and liberate those studied from oppression and false consciousness. Critical researchers should not merely offer interpretations; they should also criticize the status quo and emancipate within whatever theoretical framework is selected. Furthermore, the critical approach highlights the idea of totality: phenomena are not to be studied in isolation, but rather, the institutional, national, political, economic, social, historical, etc., context should always be considered (Orlikowski & Baroudi 1991). Overall, critical researchers should aim at changing how

things are in the world; emancipatory interests should always characterize critical research (Denzin & Lincoln 2000; Lincoln & Guba 2000; Stahl 2008; Stahl et al. 2011).

DSR is a recent research approach that has succeeded very well in legitimizing its position during the past decade and has aroused notable interest among IS scholars. As for DSR, early work such as March and Smith (1995) and more recent contributions such as Hevner's (e.g., Hevner 2007; Hevner et al. 2004), Gregor's (Gregor & Jones 2007; Gregor & Hevner 2013), and others' (e.g., Peffers et al. 2006; Iivari 2007; Sein et al. 2011; Rai 2017), have addressed its benefits as well as legitimized the practice of integrating practical design work and building of Information Technology (IT) artifacts as part of IS research in addition to pure theorizing. DSR is argued to contribute to one of the great challenges of IS research: lack of relevance. DSR is expected to serve two masters: to generate valuable knowledge for the scientific community and to serve a particular practitioner community by solving or alleviating a practical problem of theirs (Hevner et al. 2004). Further work has extended and modified the DSR framework, for example, with action design research that brings in, among other things, more emphasis on the organizational context, socio-technical aspects, and the emergence that is necessarily involved (Sein et al. 2011). Here DSR is enriched by action research¹ that emphasizes the organizational context and intervention and collaborative action, in addition to mere building of IT artifacts (Sein et al. 2011). Following this work, participatory action design research has also been proposed (Bilandzic & Venable 2011; Haj-Bolouri et al. 2016), inspired by participatory action research and participatory design. However, one can argue that the DSR community is almost void of critical research. The participatory action design research studies can be loosely connected with the critical research tradition because participatory action research and participatory design strongly argue for study participants' participation and empowerment in the research and design processes; however, these studies do not acknowledge critical tradition in any more depth. Otherwise, very few DSR articles could be found that address critical research. Drechsler (2015) and Stahl (2009) argue for the relevance of critical and postmodernist research in DSR, and they, as well as Deng and colleagues (2016), argue for ethical considerations in DSR. Along these lines, we take a step further and outline a research agenda for critical DSR – showing a variety of ways DSR could make contributions to the critical research agenda.

In one sense, one can argue that IS as a discipline, especially in Europe and more particularly in Scandinavia, has been characterized by critical tradition from the very early years. Scandinavian trade unionist tradition (see, e.g., Bjercknes & Bratteteig 1995; Ehn 1993; Kyng 1998) and the more mainstream work inspired by this work (see, e.g., Hirschheim & Klein 1989) rely strongly on critical research. Also, there is currently a distinct research community in IS inspired by critical research (see, e.g., Cecez-Kecmanovic et al. 2008; Kvasny & Richardson 2006; Myers & Klein 2011; Richardson & Robinson 2007). However, critical research has remained relatively marginal in IS research thorough the years and even more so in DSR. Even if there is acknowledged diversity in DSR (Rai 2017), none of the various types of DSR discussed include critical tradition. However, empowerment of the oppressed could be the goal of DSR, too. DSR could offer a valuable contribution to critical IS research, which is usually carried out using the social sciences model of research. Within such research, valuable insights into and critiques of how power, politics, oppression, and domination are enacted in IS development and use have been provided, the sensitive, reflexive and personal nature of research has been emphasized, and liberation and empowerment of the power-weak have been advanced; however, the very concrete action needed for the empowerment of

¹ Action research could also be focused upon in this paper, but we decided to address DSR only as it is specific with its focus on building IT artefacts. Critical action research is a concern of a multitude of disciplines. Even if action research is also strongly emphasizing making a change in people's (practitioners) lives, DSR is specific in aiming at making such change through technology that we will scrutinize in this paper in more depth. We acknowledge that action research actually includes a critical variant with emancipatory interests (see e.g. Tripp 1990, Kemmis 2001), but it has not been utilized much in IS research. In IS research, action research and DSR studies both seem to share a knowledge interest (cf. Bansler 1989) to harness IT in organizations for economic and business purposes, aiming at profit maximization and work rationalization, although action research has also been used for advocating alternative knowledge interests such as socio-technical ideals including job satisfaction and participation (e.g. in Avison et al. 1999, Checkland & Holwell 1998, Mumford 2001).

the oppressed may be left to others, even if it is acknowledged that critical research always aims at making a change – combining theory and practice in the pursuit of social change (Kvasny & Richardson 2006).

We argue for the usefulness of combining the forces of DSR and the critical research tradition. This way, the strengths of DSR – its present-day popularity as well as the concrete yet theory-inspired design outcomes – could be harnessed to serve the goal of the empowerment of the oppressed, which is the main goal of research from the perspective of the critical research tradition (e.g., Denzin & Lincoln 2000; Lincoln & Guba 2000; Myers & Klein 2011). We see critical DSR as uniquely positioned to make a change through design and technology – critical DSR is equipped to build IT artifacts that aim at the empowerment of the oppressed. The DSR community should be interested in this opportunity, as empowerment has been argued as the form of relevance at which IS research should generally be aiming (Mohajeri & Leidner 2017). We argue that critical DSR is particularly suited for achieving this type of relevance.

To move DSR research towards acknowledging this option, as well as to broaden the spectrum of design-oriented IS research more generally, recent developments in design research and Human Computer Interaction (HCI) research communities will be reviewed – they offer interesting and novel insights for DSR as well as for critical DSR. In HCI research community, as in the IS community, significant attention has been devoted to how to combine design with research in recent years. For this, HCI research has strongly relied on the Design Research tradition. Along these lines, various research approaches have been identified and numerous categorizations provided (see, e.g., Bardzell et al. 2015; Koskinen et al. 2011): research on design, research through design, and constructive design research have been discussed – interestingly, without any engagement with the DSR community within IS research. Among these approaches, an approach called Critical Design has also emerged. Koskinen and colleagues in their recent overview on Design Research (Koskinen et al. 2011) suggest that Critical Design has been the most influential program of what they call the “Showroom” approach to Design Research, and in her mapping of emerging trends in Design Research, Sanders recognizes Critical Design as one of the four main themes identified, located in the outermost “expert-mindset and design-led” corner of her map (Sanders 2008). During recent years, a lot of reflective discussion has emerged around Critical Design in HCI and Design Research (Bardzell & Bardzell 2013; Bardzell et al. 2014; Bardzell et al. 2012; Khovanskaja et al. 2013; Pierce et al. 2015). Moreover, other approaches representing critical design have also emerged (e.g., DiSalvo 2012; Korn & Volda 2015; Light 2011). We introduce the discussion around these approaches to the IS community in order to enable the IS community to broaden its spectrum of approaches to DSR and possibly to develop their own critical variant of DSR.

The argument of the paper is as follows. DSR and its interest in purposeful artifact development is currently a highly popular research approach in IS. IS research, moreover, has been fascinated with the critical research tradition for decades and has strongly integrated the critical lens into studies on systems development and use. However, critical IS research is quite weak in the actual design practice – very few studies can be found that actually carry out design or build IT artifacts for the purpose of the empowerment of the oppressed. Critical design approaches within the HCI research community, on the other hand, are stronger in the design practice, while they might be limited in integrating research or critical research into their work. We argue that combining the forces of these critical and design research traditions could be a valuable step forward. A categorization showing diversity in DSR is developed, a research agenda for critical DSR is proposed, and numerous paths for future work are identified.

The paper is structured as follows. Section two reviews research representing the critical tradition in IS, while section three reviews HCI and Design Research literature that, in addition to enabling the development of a research agenda for critical DSR, also enables seeing even more variety in DSR than is currently the case. In section four, a framework for seeing and mapping diversity in DSR is proposed, and in section five, the research agenda is proposed. The last section concludes the paper by discussing implications for IS research and practice, limitations, and numerous inspiring paths for future work.

Critical Tradition in Information Systems Research

Even though critical research is not mainstream in IS research, one can argue that IS research has nevertheless been influenced by the critical research tradition through the years. As early as the 1960s, the Scandinavian trade unionist tradition focused on systems design methods that emphasize workplace democracy and union involvement in the development of computer systems. IT was seen as devaluing

workers' skills, and for that reason, workers (and their trade unions) needed to participate in the decision-making related to systems design. The tradition represents a very critical and management-hostile approach to systems design. The tradition had a strong Marxist flavor, and it relied on the notion of conflict between capital and labor (Bjerknes & Bratteteig 1995; Ehn 1993; Kyng 1998). Inspired by this work, also in more mainstream IS research not only the paradigms of functionalism and social relativism but also those of radical structuralism and neo-humanism were identified as underlying systems design and associated methodologies (Hirschheim & Klein 1989, relying on Burrell & Morgan 1989). Within the paradigm of functionalism, functionally correct and efficient systems are to be built and designers are to act as neutral experts who obtain the objective facts needed for rational decision-making, with managers outlining the development objectives. Within social relativism, on the other hand, reality is seen as socially constructed, and designers are to act as change agents or facilitators, whose cooperation and meaning making with users is necessary. Radical structuralism and neo-humanism, in contrast, are critical, contrasting the management goals of systems design with the goals of the workers and advocating for empowerment of the workers. The designers are to act as warriors, partisans, emancipators, or social therapists (Hirschheim & Klein 1989).

For DSR oriented IS researchers, such paradigms could act as frames of reference when developing new systems development methodologies as well as novel systems. Particular critical theories associated with these paradigms could act as the kernel theories guiding the design work. These critical paradigms have, however, not been utilized much to guide DSR; one can hardly find examples of the paradigms of radical structuralism or neo-humanism underlying any recent systems development methodologies or IT artifacts developed within the DSR research community. However, more recent cooperative and participatory design research traditions have tried to embrace the ideas of the trade unionist tradition and have highlighted in the participatory design methodologies the importance of empowering users (Greenbaum & Kyng 1991; Schuler & Namioka 1993), but these traditions have also been criticized as quite limited in addressing the critical and emancipatory aspects (e.g., Beck 2002; Bjerknes & Bratteteig 1995; Iivari & Lyytinen 1998). One can still argue that the critical lens has survived throughout the years in the participatory design research community: debates regarding the place of politics and democracy in participatory design research have continued (see, e.g., the *Scandinavian Journal of Information Systems* 6(1), 14(1), 15), and it can even be argued that it has revitalized interest in the advocacy of democracy, which now has been interpreted to include varied kinds of publics and innovation very broadly (see the recent works in the participatory design research community, e.g., Björgvinsson et al. 2012; DiSalvo et al. 2012; Simonsen & Robertson 2012).

Another relevant stream of research in IS is the one examining IS development or use through the critical lens. The state of the art of such research has been addressed in several articles over the years (e.g., Brooke 2002; Kvasny & Richardson 2006; Myers & Klein 2011; Orlikowski & Baroudi 1991; Richardson & Robinson 2007). In this stream of research, the legitimacy largely rests on Marxism and critical theory, the Frankfurt school, and, particularly, the writings of Habermas as a popular example (see, e.g., Brooke 2002; Myers & Klein 2011; Stahl 2004). One can say that Habermas and Foucault are the two most widely utilized scholars in critical IS research, while Bourdieu is also brought up as influential (e.g., in Myers & Klein 2011, giving Kvasny & Keil 2006 as an example). However, there is a lot of variety in critical research: various traditions and theories, such as feminist or postmodern theories, may underlie critical IS research.

Of the most widely utilized traditions, one can say that the Habermasian tradition may be better suited for guiding DSR than the Foucauldian one. Foucauldian tradition is suitable for the critical examination of the formation of objects and “truths,” revealing hidden and tacit assumptions, whereas the Habermasian tradition additionally lends itself to “normative explication of the validity and acceptability of discourses” through the construct of the “ideal speech situation,” which can be used to identify the shortcomings of real speech situations (Stahl 2004: 4331). Foucault-inspired IS researchers have discussed how various discourses, power, and knowledge are embedded in systems development and use – pointing out oppressing conditions of the status quo and considering how the oppressed could be empowered (e.g., Alvarez 2002; Doolin 1999; Hekkala et al. 2014; Iivari et al. 2015; Jackson et al. 2006; Kreps 2009; Sayer & Harvey 1997; Stahl 2008; Stahl et al. 2011). Yet, Foucauldian studies are not particularly strong in empowering the oppressed; they tend to be stronger in offering rich insight and critique. Foucauldian researchers actually need to see empowerment as highly contested, as power is to be seen as embedded in the very system of which we are all a part, “*we all are prisoners of the prevailing discourses of power,*” and thus, “*empowerment in the sense of freedom from power effects is not possible*” (Hardy & Leiba-O’Sullivan 1998: 462). It can be argued that Habermasian IS researchers are a bit better prepared to make a change in the

sense of empowerment of the oppressed. Indeed, Habermasian notions have been used to guide systems evaluation and design (Cecez-Kecmanovic & Marjanovic 2015; Hansen et al. 2009; Hansson & Ekenberg 2014; Kanungo 2004; Schuff et al. 2010; Shaw & Stahl 2011; Stahl 2008; Yetim 2011); Habermas-inspired researchers have developed prototypes (Hanson & Ekenberg 2014; Schuff et al. 2010) as well as systems development methodologies (Päivärinta 2001; Päivärinta et al. 2010) integrating Habermasian ideals.

However, in more recent IS research very few studies can be found in which emancipatory systems or systems development methodologies have been the target of design work. Most of the critical IS research focuses on understanding and criticizing the current situation, offering rich insights and critique of the status quo. Critical IS research has provided valuable insights into how power, politics, oppression, and domination picture in IS development and use, it has opened our eyes to see the oppressing conditions of the status quo, it has embraced the sensitive, reflexive and personal nature of our research, it has inspired us to question the assumptions that are taken for granted and shown us alternatives, and it has pursued the empowerment of the oppressed. As for the empowerment of the oppressed, action has been taken. Some researchers have already been engaged in the development of empowering systems or systems development methodologies, as mentioned. Moreover, researchers utilizing the critical lens have succeed in giving voice to marginalized groups in IS development or use (e.g., Kvasny 2006; Kvasny et al. 2005; Trauth & Howcroft 2006), they have contemplated on how their research process or results have contributed to the empowerment of the informants (e.g., Stahl et al. 2011; Hekkala et al. 2014; Iivari et al. 2015) as well as outlined public policy or organizational implications for making a change (e.g., Kvasny 2006; Kvasny & Keil 2006). However, one can still say that critical IS research is limited in the actual design practice and in transforming the world in the sense of building IT artifacts and changing the world with them. Even if we see rich insight, analysis, and questioning of the status quo as valuable outcomes of research, as indeed they are, we also think that we are potentially capable of even more concretely making a change in the world. Defining better methodologies or systems that advocate empowerment of the oppressed should be seen as a shared goal of critical and DSR research in IS. We see critical DSR as excellently positioned to introduce changes into the world through building of IT artifacts – even if we acknowledge that making such a change is definitely not easy. We admit that such an endeavor can be considered utopian or arrogant, but we think it is worth pursuing – even with partial outcomes (in line with Cecez-Kecmanovic 2005).

Critical Design in Design Research and HCI

The HCI and Design Research communities have also been influenced by critical research, but from a different angle than IS research (see also Iivari & Kuutti 2017). While critical IS research is quite limited in design and making a change in this way, HCI and Design Research with their Critical Design movement are very strong in design and making a change, but quite limited in integrating the tenets of critical tradition.

The origins of the Critical Design movement are in Goldsmiths College, University of London. The movement was started by Anthony Dunne and Fiona Raby with Dunne's PhD thesis *Herzian Tales* (Dunne 2006) and the book *Design Noir* (Dunne & Raby 2001), which they wrote together. Many projects that have been inspired by Critical Design have also come from Goldsmiths (see, e.g., Gaver & Bowers 2012; Gaver et al. 2004). Critical Design clearly expresses its critical agenda:

Design can be described as falling into two very broad categories: affirmative design and critical design. The former reinforces how things are now, it conforms to cultural, social, technical and economic expectation. Most design falls into this category. The latter rejects how things are now as being the only possibility, it provides a critique of the prevailing situation through designs that embody alternative social, cultural, technical or economic values. (Dunne & Raby 2001: 58)

The most important elements of this approach are: going beyond optimization to explore critical and aesthetic roles for electronic products; using estrangement to open the space between people and electronic products to discussion and criticism; designing alternative functions to draw attention to legal, cultural, and social rules; exploiting the unique narrative possibilities offered by electronic products; raising awareness of the electromagnetic qualities of our environment; and developing forms of engagement that avoid being didactic and utopian. (Dunne 2006: 147)

The ideas of Critical Design have recently received notable interest in Design Research and HCI. In Critical Design the critique is directed at affirmative design that is seen to aim at preserving the status quo as well as at optimization. However, one can actually identify several schools behind this affirmative design towards which, it can be argued, Critical Design is hostile. Divergent ideologies of design have evolved

within the Design Research tradition during the previous century. One can pinpoint two very influential traditions whose influence is still very visible. The first one is the modernistic tradition in design that has emerged in connection with the Bauhaus school of design in Germany (1919–1933). The Bauhaus school of design advocated the idea of developing a new aesthetics for industrial products. Bauhausian ideas have been highly influential, and they still strongly characterize design education. The second very influential, commercially oriented tradition developed around the same time in the United States. It emphasizes styling and consumer appeal for the purpose of selling more products. While the Bauhausian school emphasized aesthetics and functionality, the consumer appeal tradition was less concerned with functionality and instead considered the variety of meanings that could be associated with products, not all of which were related to functionality, such as social status, sexual attractiveness, or trendiness. The commercial focus led to considering the purchase decisions and factors shaping it. The design aimed, with the help of marketing, to appeal to customers by associating suitable meanings with the products.

One can also identify a third critical tradition in industrial design that is significant from the perspective of this paper. This tradition is in stark contrast not only to the openly commercial customer appeal tradition but also to the elitist modern/postmodern design. Victor Papanek was a most visible representative of this tradition, and his book (1973) can be considered to be the origin of socially responsible design and more recent sustainable design (e.g., Blevis 2007) and such ideas can now also be seen in the design activism (e.g., Fuad-Luke 2009) movement of today (see also Iivari & Kuutti 2017).

The more recent Critical Design is, in a sense, in line with Papanek's tradition. Critical Design strongly opposes mainstream design, or affirmative design, which most design approaches are seen to represent. However, Critical Design, as discussed not only by its originators (Dunne 2006; Dunne & Raby 2001) but also recently within HCI (Bardzell & Bardzell 2013; Bardzell et al. 2014; Bardzell et al. 2012), is not actually very critical in the sense of the critical research tradition in social sciences (see also Pierce et al. 2015, Iivari & Kuutti 2017). Although critical theory is explicitly referred to in the texts characterizing Critical Design, the aspect of empowerment of the oppressed is not addressed within this design approach at all. Instead, Critical Design seems to be aiming at pushing the envelope, provoking and violating established cultural norms and values – it is about questioning the status quo and about cultural critique – it could be labelled as design *avant garde* (Pierce et al. 2015; Iivari & Kuutti 2017).

Although the original criticality of Critical Design is thus somewhat doubtful, it has fueled further interest in the HCI research community in a more critical sense, and there are currently a number of design approaches that aim at challenging the status quo and liberation of the oppressed. Although these developments do not yet represent a well-developed line of inquiry, they indicate that in the HCI community, there is increasing interest around combining critical research with design. Examples representing this recent development include adversarial design (DiSalvo 2012), design against status quo (Harmon et al. 2016), contestational design, such as utilizing disruption or friction as a design strategy (Korn & Volda 2015), and design for troubling and queering (Light 2011). Those rely on and gain inspiration from, for instance, political (DiSalvo 2012) or feminist and queer (Light 2011) theories for design.

Political theory-guided adversarial design sees its task as doing the work of agonism – agonism here referring to “*a condition of disagreement and confrontation – a condition of contestation and dissensus*” (DiSalvo 2012: 5) aimed at by the means of design. The agonistic approach to democracy sees contestation as an on-going, fundamental element of democracy. Political is seen “*as a condition of life – a condition of on-going contest between forces or ideals*” (DiSalvo 2012: 8). Adversarial design is political in this sense: it reveals, questions, and challenges as well as opens spaces for contestation and dissensus (DiSalvo 2012). Political theory has also inspired developments in the context of civic engagement, where design may aim at consensus and convenience, but also at contestation and critique, such as in disruption and friction design strategies. In those, citizens are to be offered means to reveal, address, reflect on, and question the status quo – either during privileged moments (disruption strategy) or embedded within the everyday life of citizens (friction strategy) (Korn & Volda 2015). Queering, inspired by queer theory, can also be used as a design method, which involves, for instance, treating obliquely, crossing, going in adverse or opposite directions, problematizing, mischieving, clowning, making trouble, and designing, for example, for forgetting, obscuring, cheating, or eluding (Light 2011). Within this literature, plenty of examples of IT artifacts are also given. For example, various kinds of solutions supporting and augmenting e-democracy, civic engagement, protest, and civic disobedience (Korn & Volda 2015) are described as well as information design and visualization tools that can be used for revealing inequalities and criticizing the status quo

(DiSalvo 2012). Creation of Turkopticon has also been linked with adversarial design: “a design practice of generating agonistic political encounters,” as the authors put it (Irani & Silberman 2014: 34).

Diversity in DSR

One can identify a lot of diversity in DSR, a lot of which has not yet been acknowledged by the DSR community. Especially neglected is the critical research tradition and its potential contribution. Some of the diversity not yet acknowledged can be quite nicely illustrated by a framework introduced by Deetz (1996) for categorizing organization studies. Figure 1 illustrates potential diversity in DSR by relying on this framework. In addition, Figure 1 identifies two paths that may be taken to increase the diversity, especially regarding critical DSR as well as some predecessors for such work identifiable in the IS community.

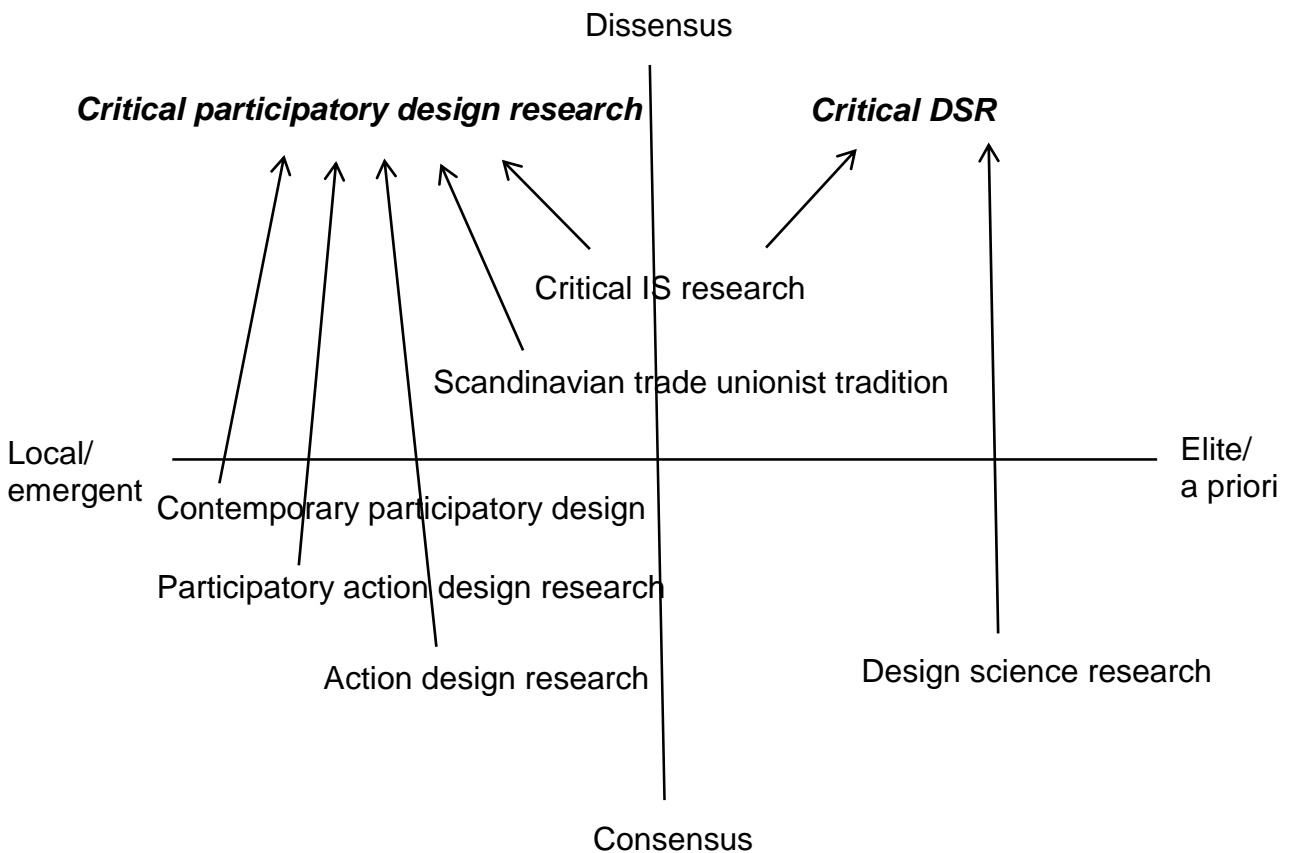


Figure 1. Toward more diversity in DSR

Deetz offers a rethinking of Burrell’s and Morgan’s categorization of paradigms in social theory and suggests the dimensions of local/emergent versus elite/a priori and consensus versus dissensus as useful distinctions that characterize ways researchers orient to organizations, constitute people and events in them, and report on them (Deetz 1996). These dimensions are next applied in our context.

The distinction between local/emergent and elite/a priori highlights the origins of the research concepts and problem statements: whether they emerge locally or are defined by researchers a priori (Deetz 1996). In the context of DSR, this can be used to distinguish different sources of design ideas/requirements and

evaluation. DSR proper clearly represents the elite/a priori end: theories should dictate what to build and the emergence of requirements or feedback is not supported or expected. In DSR proper, it seems uncommon to allow the practitioners to have much power to negotiate and establish the solution space. Action design research, in contrast, seems to advocate the local/emergent end in its emphasis on the local organizational context and intervention, within which reciprocal shaping and emergence of ensemble artifacts is taking place, involving both researchers' building activities and users' on-going shaping and refining in context (e.g., Sein et al. 2011). The participatory design research tradition also represents a truly local/emergent end, with its highly participatory if not actually user driven approach (e.g., Simonsen & Robertson 2012). The recent participatory action design research methods in IS can also be seen to represent this end (Bilandzic & Venable 2011; Haj-Bolouri et al. 2016). In Critical Design, in contrast, it is the authoritative, elitist researcher-designer who creates and critiques (Koskinen et al. 2011; Sanders 2008) – she is able to acknowledge the oppressing conditions of the status quo and also help the ignorant masses to acknowledge them by means of design.

According to Deetz, the distinction between consensus and dissensus concerns the relation of research to the existing social order. Research may rely on “*a dominant set of structurings of knowledge*” within organizations, a research community, or society (consensus), while it may also “*work to disrupt these structurings*” (dissensus), in which case the researcher aims at challenging the maintenance of order and the domination of people (Deetz 1996: 195). This distinction can also be quite directly applied to DSR: the researcher either works within “*a dominant set of structurings of knowledge*” or tries to “*to disrupt these structurings*” by the means of designing and building IT artifacts. DSR proper does not seem to have any interest in challenging the domination of people or to disrupt the existing structurings. Action design research or participatory action design research do not seem to have this as an explicit aim either. The recent participatory design research tradition has also been criticized as neglecting the original critical aims. However, the earlier Scandinavian trade unionist tradition in IS did argue for the development of systems and systems development methodologies that would challenge the maintenance of order and the domination of people (see, e.g., Bjercknes & Bratteteig 1995; Greenbaum & Kyng 1991; Schuler & Namioka 1993). From HCI research, one can also point out Critical Design, adversarial design, contestational design, and design for troubling and queering as having such aims.

However, the consensus/dissensus distinction needs to be enriched by certain notions, as it neglects the more active role of making a change that critical research can and should have. Critical research does involve critiquing, for instance, in critical research one should deconstruct discourses' inscriptions that always emphasize and serve some groups and individuals while neglecting or exploiting others (Alvesson & Deetz 2000), but critical research should not only critique the status quo but also emancipate and liberate those studied from oppression (e.g., Alvesson & Deetz 2000; O'Connor 1995; Orlikowski & Baroudi 1991); hence, emancipatory interests should always characterize critical research (Denzin & Lincoln 2000; Lincoln & Guba 2000; Stahl 2008; Stahl et al. 2011). Therefore, emancipation, liberation, and empowerment of the power-weak should be among the main goals in any critical endeavor. Variety can also be identified with regard to these concepts. For example, a mainstream view on empowerment of the power-weak may see it merely as a management tool for motivating employees to strive toward goals set by management by giving them some power of decision (Hardy & Leiba-O'Sullivan 1998; Howcroft & Wilson 2003; O'Connor 1995), whereas critical tradition emphasizes that empowerment can never happen through those having power giving some to others, but on the contrary, empowerment involves the oppressed combating the oppressors and achieving power to affect or make decision this way (Hardy & Leiba-O'Sullivan 1998; Howcroft & Wilson 2003; O'Connor 1995). Applied in our context, one can say that the Critical Design tradition includes critique (e.g., Bardzell & Bardzell 2013; Bardzell et al. 2014; Bardzell et al. 2012), but it does not seem to be very strong in advocating empowerment of the oppressed. On the other hand, the Scandinavian trade unionist tradition is strong in this respect (e.g., Bjercknes & Bratteteig 1995; Greenbaum & Kyng 1991; Schuler & Namioka 1993), and the more recent approaches of adversarial design and contestational design may well be utilized to such ends, too. DSR proper, action design research, or participatory action design research, as mentioned, do not place any emphasis on critiquing the status quo nor on empowering the oppressed.

The notion of the ethics of research (Iivari 1991; Orlikowski & Baroudi 1991, originally in Chua 1986) helps to further highlight the diversity in DSR. The ethics of research refers to the role and value of research (Iivari 1991, following Chua 1986). Applied to our context, the role of DSR can be means-ends oriented, interpretive, or critical. In the means-ends oriented approach, research “*aim at providing means*

knowledge for achieving certain ends without questioning the legitimacy of the ends” (Iivari 1991: 258), while the interpretive approach aims at *“enriching people’s understanding of their action and of how social order is produced and reproduced”*; meanwhile, the critical approach views it as having a *“critical imperative: the identification and removal of domination and ideological practice”* (Chua 1986: 615, 622). The value of the research refers to the issue of whose interests the research serves (Iivari 1991). Applied to DSR, this means that DSR may be interpreted to serve the needs of academia, business/management, or the oppressed/labor.

DSR proper seems to aim at offering means knowledge for achieving certain ends without questioning the legitimacy of the ends from a critical perspective. DSR proper has concentrated on serving the needs of academia as well as those of business/management (cf. the importance of rigor and relevance as well as the emphasis on organizational, managerial, business and optimization problems, see, e.g., Hevner et al. 2004; Rai 2017), while totally neglecting empowerment of the oppressed. One can even connect the ideology of managerialism with DSR proper: managers and the business needs of an organization are heavily emphasized – it seems that DSR is to be harnessed to help the managers and organizations in the pursuit of excellence (cf. Czarniawska-Joerges 1992; Hevner et al. 2004). Action design research, in contrast, can be interpreted to potentially also represent the interpretive approach, i.e. to aim at *“enriching people’s understanding of their action and of how social order is produced and reproduced”* (Chua 1986: 615). The Scandinavian trade unionist tradition as well as the critical design approaches representing HCI research, that is, Critical Design, adversarial design (DiSalvo 2012), and contestational design (Korn & Volda 2015) emphasize the critical imperative of *“the identification and removal of domination and ideological practice”* (Chua 1986: 615), even if they have clear differences in how this is expected to be achieved.

Based on these distinctions, we have developed a framework for revealing and mapping diversity in DSR. We argue that DSR can rely on either local/emergent or elitist/a priori design ideas/evaluation and represent either a consensus or dissensus approach to the existing social order, acknowledging within the dissensus approach both critique and empowerment. Within the consensus approach, DSR may be aiming at serving academia and/or business/management, whereas within the dissensus approach, serving the oppressed is essential. Overall, Figure 1 communicates to the IS community that there is potentially much more variety in DSR than is currently acknowledged. The contribution from HCI to making this diversity visible should be seen as inspirational. Next, based on the ideas presented in Figure 1, a research agenda for critical DSR is proposed.

Research agenda for critical DSR

We have argued in this paper that so far IS research has neglected the critical tradition in DSR while embracing the critical tradition otherwise in research – in the margins at least. We argue for combining the forces of DSR and critical research. This way, the strengths of DSR – huge present-day popularity as well as concrete yet theory-inspired design outcomes – can be combined with the strengths of critical research that offers valuable insights into and critique on how power, politics, oppression, and domination function in IS development and use, further advocating for the empowerment of the oppressed, which should also feature among the goals of DSR. Empowerment has been argued to be a form of relevance that IS research should generally be aiming at (Mohajeri & Leidner 2017). We see that critical DSR would be excellently positioned to make a change in the empowerment of the oppressed through design and technology. However, we have also pointed out that there are vast differences in the forms DSR can take, including critical DSR. Next, in line with Figure 1, two exciting paths for future critical DSR are discussed: 1) critical DSR, and 2) critical participatory design research.

As for critical DSR, we again highlight that IS research already has a strong tradition in the empowerment of the oppressed. Early work in Scandinavia, which developed systems and systems development methodologies that relied on the critical research tradition, is famous. The early Scandinavian work expected trade unions to act as significant partners in systems development and emphasized workplace democracy and worker empowerment as goals. This type of goals and theoretical background could be considered in the DSR of today, too. For example, Foucauldian, Habermasian, or feminist theoretical insights could be used to guide critical DSR and the development of empowering systems or systems development methodologies, fitting the contexts of contemporary systems development and use.

Adversarial design, contestational design, design for queering, and Critical Design advocated within the HCI research community can also be argued to represent this quadrant in Figure 1 (i.e., elite/a priori and

dissensus orientation), within which the designer-researcher is assumed to know best and to be able to critically scrutinize the current situation, identify false consciousness, open up taken-for-granted assumptions, and provoke the audience to adopt a more critical stance and see alternatives. Authority is given to the expert designer-researcher who is able, has a duty even, to enlighten the masses. This work may be strongly theory-guided, even if the examples from the HCI research community are not necessarily so. Design for queering (Light 2011) derives inspiration from queer theory, adversarial design (DiSalvo 2012), and contestational design (Korn and Volda 2015) from different kinds of political theories. These approaches to critical DSR can be utilized by elite designer-researchers for deconstruction, provocation, critique, or the empowerment of the oppressed. Critical Design and adversarial design as discussed in the literature seem to heavily emphasize deconstruction, provocation, and critique by means of design. The designer-researcher aims to provoke the audience with, for instance, odd, hostile, aggressive, or perverse designs in order to open up taken-for-granted assumptions and enable the audience to see alternatives (for examples, see, e.g., Bardzell et al. 2015; Bardzell et al. 2014; DiSalvo 2012). However, as mentioned, not only are deconstruction, provocation, and critique important in critical DSR, but also empowering people and combating those in power. Adversarial design and contestational design offer interesting insights for this type of critical DSR, too. Adversarial design can be used to create spaces for contestation for people (DiSalvo 2012). Contestational design is specifically targeted at arousing civic engagement, relying either on disruption or friction as a design strategy. The latter focuses on specialized moments and tools for contestational civic engagement while the latter emphasizes embedding and appreciating the moments and tools within the everyday life of citizens. In both cases, the goal is to support contestation, for instance, in the form of protest and civic disobedience (Korn & Volda 2015).

Overall, critical DSR – relying on, among others, political, feminist, Foucauldian, Habermasian, or queer theory – provides a vista not previously trodden by IS researchers. Within this type of critical DSR, design and research could be harnessed for the empowerment of the oppressed, while they may also be approached as forms of cultural critique – an angle poorly addressed within current IS research.

However, we also wish to point out that critical participatory design research offers other fascinating paths to be taken by IS researchers. Within this line of thought, we emphasize that empowerment should not be seen as the powerful ones giving some power of decision to the power-weak; rather, the power-weak battle the powerful ones and in this way gain more power of decision. Again, the early work in Scandinavia, with workplace democracy and worker empowerment as goals, can be mentioned as well as the more recent participatory design research tradition that has, in a more conciliatory tone, advocated for user participation and empowerment in systems design. Within a related line of thought, calls for integrating informants more strongly into the research process emerged in interpretive research a long time ago and have also emerged lately in IS research (e.g., Bygstad & Munkvold 2011). Based on these calls, one may wonder to what extent it should be possible to invite the masses or the oppressed into the DSR process, too. For such critical participatory design research, the recent participatory action design research methods in IS (Bilandzic & Venable 2011; Haj-Bolouri et al. 2016) as well as the recent development in HCI; adversarial design (DiSalvo 2012) and contestational design, especially when using friction as a design strategy (Korn & Volda 2015) can act as inspiration for collaboration with the oppressed.

Interestingly, there are some HCI studies that indicate that critical design can and actually is accomplished by the masses, too: for instance, graffiti artists and various kinds of activists in grassroots movements have been reported to realize critical design in a sense: they are developing or modifying existing tools for empowering people and for critiquing, provoking, and deconstructing the notions that are taken for granted (DiSalvo 2012; Korn & Volda 2015; Kuznetsov et al. 2011; Kuznetsov et al. 2010; Ames et al. 2014; Bardzell 2007). One can also find recent studies addressing these issues in the context of communities (Björgvinsson et al. 2010; DiSalvo et al. 2012; Simonsen & Robertson 2012): studies on design activism, community activism, community design, and community informatics show cases where local people and grassroots groups have been designing their futures and technologies within, gaining authority and agency in and through the design process. Also, this could act as future inspiration for critical participatory design research in IS – these studies indicate that amateur actors have managed to acquire agency in the design process and to create and make without the guidance of an expert designer or researcher. This indicates that they could well be invited as important participants into critical DSR, including inviting them as important participants into the research process, too.

Conclusions

This paper aimed at introducing critical DSR into IS discourse. The critical research tradition, which has characterized IS research from its early years, has been the starting point, but inspiration has also been derived from a variety of critical design research approaches in HCI. This paper pointed out a blind spot in IS research: so far, there is a lack of critical IS research that utilizes design and technology in making a change with regard to empowerment of the oppressed. While DSR has already generated significant interest in the IS community, it so far has remained negligent of critical research. We argue that the strengths of these traditions could be integrated and used to fertilize each other.

This paper argues that by combining the forces of different critical and design research traditions, a variety of fascinating – and critical – DSR approaches can be developed. Hence, we have proposed a categorization of DSR approaches and laid out numerous interesting paths for future work. The categorization shows that DSR may rely on either local/emergent or elitist/a priori dimension and may represent either a consensus or dissensus approach. DSR may continue to aim at serving academia and business/management, but it could well be aiming at serving the oppressed, too. We also emphasized that critical DSR may be generating cultural critiques or advocating for the forceful empowerment of the oppressed, which sees mere critique as not enough. The categorization can be used to map existing DSR approaches as well as to identify alternative approaches. We also argue that all the DSR approaches may be extended and developed further. The IS community can now begin to consider how to integrate the critical component of change-making into DSR in a more serious manner. It may involve developing empowering systems development methodologies or empowering systems. It may be executed by an expert designer-researcher with her theoretical back bag, or it may be driven on the masses, or by local grassroots organizations. It may be critical in a more subtle sense of cultural critique or it may involve a more violent and overt fight against oppressors. Critical DSR would, overall, enable more relevant IS research in the sense of empowerment of the power-weak (Mohajeri & Leidner 2017).

Related to critical DSR, one may also pose the question of whether this represents something old-fashioned or outdated overall. As mentioned, criticism has been expressed on the neglect of power and politics in the participatory design research tradition, and the Scandinavian trade unionist tradition is definitely old – this might be interpreted that time has driven past this type of DSR. Our answer, nevertheless, is: definitely not. There are also recent uptakes on power and politics in the participatory design research community that we consider as offering insights for critical DSR along the lines of community and civic participation and empowerment (Björgvinsson et al. 2010; DiSalvo et al. 2012; Simonsen & Robertson 2012), and in IS research there is a continuous stream of critical research still alive (e.g., Cecez-Kecmanovic et al. 2008; Kvasny & Richardson 2006; Myers & Klein 2011; Richardson & Robinson 2007). Even in DSR community there is a growing interest in the issues of participation, power, politics, and ethics (Bilandzic & Venable 2011; Deng et al. 2016; Drechsler 2015; Haj-Bolouri et al. 2016; Stahl 2009), all indicating that critical research is not dying away anytime soon.

However, this papers reports an academic exercise, and no actual DSR has been carried out. Naturally, this is a limitation of a paper arguing for critical DSR. In the future, critical DSR will definitely be carried out in practice by the authors, and other IS researchers are also warmly welcomed to join in the critical movement and practice. Another limitation of the paper is that there was no clear set of keywords with which to locate the relevant studies. There may well be more critical IS studies, including critical DSR, that were neglected in this analysis. If such studies can be identified, it will be a pleasant surprise as well as a further indication of the importance of critical DSR for the IS community.

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