

DESIGN AS REIFICATION, COMMODIFICATION, AND IDEOLOGY: A CRITICAL VIEW OF IS DESIGN SCIENCE

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Abstract:

The discourse on design science in information systems purports to offer an alternative to the currently dominant discourse on behavioural science. It suggests that information systems are concerned with the social and organisational use of technological artefacts. While research on the social side of these is well established, the understanding of their technical development is less advanced. In this paper I suggest a very different reading of the design science discourse by applying some ideas of critical theory to the discourse. From the critical perspective one can interpret the design science discourse as an attempt to create legitimacy for a particular view of information systems. Such purposive discourses are not problematic per se but they can be detrimental to the main aim of critical research, namely emancipation. A concentration on design can lead to the reification and commodification of information systems. It can contribute to and reproduce ideologies which entrench advantages for some groups to the detriment of others. The paper argues that this critical view of design can contribute to a better understanding of current debates, which is arguably desirable for the successful development of design science research in IS.

Key words: design science research, behaviour science research, critical theory, ideology, commodification, reification

1 INTRODUCTION

Design sciences are gaining currency as an appropriate approach to information systems (IS). It is not always clear, however what exactly IS or design science research stand for. The discipline of information systems (IS) has been likened to a 'fragmented adhocracy' (Landry & Banville, 1992 p. 82). There is little agreement on what constitutes an information system or valid research on information systems. The field has emerged from a number of diverse 'reference disciplines' (Lee, 1991; Lyytinen & King, 2004; Hirschheim & Klein, 2003) whose understanding of research, truth and practice share little common ground. To some degree this may be a good thing because it ensures that debates in IS continue to be lively. On the other hand, there is a certain amount of confusion among IS practitioners and academics as to what they are supposed and allowed to do. One consequence of this is a continuous struggle about criteria for the evaluation of research output as evidenced by the debate on rigour and relevance in IS in the Communications of the AIS.

The debate surrounding design sciences as a suitable contribution to IS needs to be understood in this context. Information systems as the organisational use of information and communication technology (ICT) always have some sort of link to design on a trivial level in the sense that all ICT has undergone some sort of design. Whether and in what way a design science discourse can actually promote knowledge in the field of IS is a different matter. In this paper I will not recount design science discourses and engage in them directly. Rather, I will take a somewhat orthogonal approach and undertake a critical analysis of the design science discourse.

For this purpose I will start out with a definition of the critical approach, which will concentrate on some classical critical concepts. After contextualising critical research in current IS debates, I will describe my understanding of design science discourses in IS. This will lead to the application of critical concepts to design science. I will argue that speaking of design sciences in IS can be interpreted as an attempt to change the shared understanding and create legitimacy for certain approaches, notably ones that emphasise production and practice. While this is not problematic as such, I will continue to argue that it can have problematic consequences. Attempts to promote a particular understanding of the role of design in IS can have the consequence of disregarding other aspects, notably ethical ones. Drawing on critical theory, I will argue that alternative conceptions of design are possible and that a view of design that moves away from the business-oriented mainstream is desirable.

The aim of this paper is to shine a different light on the design science discourse in IS. It will develop a conceptual approach that allows for an evaluation of design science that takes into account aspects that are usually neglected. The paper should not be misunderstood as a general attack on the idea of design in IS. Design is arguably an integral part of many human activities and it has a central part in IS practice and theory. However, the concept of design can be used to promote hidden agendas, to gain advantages for particular views or groups and to shape organisational and societal discourses in ways that are problematic. I concede that the opposite is just as true. Design can be empowering and emancipating, it can disrupt taken-for-granted practices and views. In its current form, however, design-related discourses tend to be implicitly managerial and conservative, a position that needs to be analysed and questioned, which is what this paper sets out to do.

2 CRITICAL THEORY AND CRITICAL RESEARCH IN INFORMATION SYSTEMS

Critical theory (or critical social theory) stands for a range of theoretical approaches that take their historical starting point from Marx's critique of capitalism.¹ It is most strongly associated with the Frankfurt School of social research (Horkheimer, Adorno, Marcuse et al. in the first generation, Habermas, Apel et al. in the second generation and Honneth et al. as a current member). Other theoretical influences often associated with critical theory are postmodernism, poststructuralism, postcolonialism and related approaches (How, 2003). The main distinguishing feature of critical theory, which results from its scepticism of capitalism, is its intention to promote emancipation (Horkheimer, 1937 p. 263). The will to further emancipation leads to attention to certain topics, notably an attention to the pathologies of capitalism.

Critical theory has been reflected in IS, where there is a stream of research often called Critical Research in IS (CRIS), which is loosely based on critical theory. IS literature often defines this as a third "paradigm", an alternative to positivism and interpretivism (Chua, 1986; Orlikowski & Baroudi, 1991). CRIS scholars tend to share the critical intention to change reality and support emancipation (Hirschheim & Klein, 1994; Klecun & Cornford, 2005; Klein & Myers, 1999, Ngunyama & Lee, 1997, Walsham, 2005).

In this paper I wish to develop some of the topics of the older critical theory that have not yet led to a visible body of knowledge in CRIS, despite their potential of illuminating some of the phenomena in information systems. The concepts in question are those of commodification, reification, and ideology. A critical term that captures all of these is "fetish". Fetish, as I will use the term here, goes back to Marx's *Capital* (1998), to his description of economic exchange during the development of capitalism. Marx distinguishes between the exchange value and the use value of items. In capitalism, due to the strong standing of private property, things become commodities, which means that their value is measured in money. Exchange value and use value consequentially become independent of one another. The originally social nature of the exchange of goods turns into a de-personalised process, which is facilitated by commodities. People desire commodities despite the fact that they have little use for them. All aspects of society are increasingly commodified, including the most intimate personal characteristics, such as the employee's working power. Commodities acquire the status held by fetishes in indigenous cultures because they represent powers and are accepted by individuals without regard to their actual usefulness.

This concept of fetishism is closely linked to the concepts of reification and ideology. Reification is the process whereby social structures become solid, become things (*res* = Latin, thing), which then cease to be subject of social negotiation (Feenberg, 1991). Reification is one aspect of ideology, which is often understood to be the collection of generally accepted but one-sided beliefs. Ideology in the critical tradition stands for the way power relations influence beliefs and perceptions in such a way as to promote particular interests and stabilise one-sided and alienating relationships (Freedman, 2003; Hawkes, 2003; McLellan, 1995). That does not mean that ideologies are simply wrong. Ideologies cannot be wrong because they form the basis of our understanding of reality. Indeed, they tend to be empirically supported (Gouldner, 1976). This leads us to the last concept of importance here, namely rationality. Commodity fetishism and the related ideology and reification are a direct result of a particular way of viewing the world, which is based on a specific type of rationality. This is the objectifying view that reality is objectively given, can be correctly described and manipulated for our purposes. It is the scientific rationality that strongly relies on quantification

¹ Harvey (2000) argues that the Marxist roots of critical theory are typical of a European tradition of the term, whereas American critical research seems to be founded on the philosophical tradition of pragmatism. The current paper makes extensive use of the Marxist tradition from which central concepts such as "fetish", "ideology" or "commodification" are adopted. Readers who follow Harvey's reasoning are free to add the attribute "continental European" to every mentioning of the term "critical".

and abstract formal models of reality. Since this type of rationality is inextricably bound to science, technology but also modern economics, the argument has been put forward that science and technology are actually forms of ideology (Habermas, 1969). Table 3 summarises these central concepts of critical theory.

Critical Concept	Explanation
Reification	A social object becomes a thing, separate of its social contexts and history.
Commodification	The entity in question becomes a good that can be traded like any other commodity.
Ideology	A particular worldview that privileges certain interests and hides this fact by making the current state of affairs appear natural.
Fetishism	The social object acquires the status of an independent entity that interacts with humans of its own accord.

Table 1: *Critical Concepts*

3 DESIGN AS IDEOLOGY

In this section I will first define the concept of design, emphasising the difference between design science and behavioural research. This will then lead to a discussion of why the debate surrounding design sciences has gained currency in IS. The next step will be an attempt to map the above critical concepts to the design science debate.

3.1 Behavioural and Design Science Research

A widely used logic to systematize IS research paradigms is the differentiation between behavioural science and design science research (Niehaves & Stahl, 2006, further reading: Davis & Olson 1985; for instance, Hevner et al. 2004; March & Smith 1995). While behavioural science research (BSR) is primarily focused on development and justification of theories on human-computer-interaction, design science research (DSR) seeks to create IT artefacts intended to solve organisational problems. The former is called a “problem understanding paradigm”, the latter is titled as “problem solving paradigm” (see Table 1).

	Behavioral Science Research (BSR)	Design Science Research (DSR)
Origin	natural science	engineering, sciences of the artificial
Paradigm	problem understanding paradigm	problem solving paradigm
Objective	to develop and justify theories which explain or predict organisational human phenomena surrounding the analysis, design, implementation, management, and use of information systems	to create innovations that define ideas, practices, technical capabilities, and product through the analysis, design, implementation, management, and use of information systems
Object	Human-Computer-Interaction	IT artifact design

Table 2: *Behavioral vs. Design Science Research (cf. Hevner et al. 2004; March & Smith 1995)*

Behavioural science research and design science research can be seen as two complementary parts of the IS research cycle (Hevner et al. 2004; March & Smith 1995). Acquiring knowledge about information systems employed in an organisational context requires the application of both research paradigms: Starting from pre-scientific observation of IS and information technology (IT) usage in practice, theories about IS-related issues are developed. These theories are supposed to primarily explain and predict human behaviour, information system function, and issues interrelated with both of these aspects. By the process of justification, these theories are considered to be true or valid. Thus, they provide a basic understanding of the (real world) problem situation described in

the first instance. This understanding presents the basis for the design of one or more IT artefacts which address a given problem situation. By actually applying them, IT artefacts are supposed to become useful in terms of problem solving. Thus, they change present IS usage in practice and, for that reason, provide new impulse for theory development. March & Smith (1995) provide several reasons why such a 'cross-paradigmatic collaboration' is essential:

- "Design science provides substantive tests of the claims of natural science research." (March & Smith 1995, p. 254)
- "How [...] are we to determine if theoretical claims are true? This validation problem is overcome in part by the effectiveness of theories in practical applications." (March & Smith 1995, p. 254)
- "Well-informed actions (i.e., those based on true beliefs) are more likely to achieve desired ends. Information is valuable insofar as it helps individuals form true beliefs which, in turn, promote effective, goal achieving action" (March & Smith 1995, p. 251)
- "Design Science creates artefacts, giving rise to phenomena that can be the targets of natural science research" (March & Smith 1995, p. 254)

As a consequence, information systems research is a process which includes both behavioural science as well as design science research. Regarding the interrelationship analysis of the two elements of this set of paradigms, these two 'paradigms' are calling for each other.

The above brief characterisation of design science research is problematic. It is rather superficial and probably raises more questions than it answers. A central question, one to which I will return below, is what sets apart design science in information systems from established approaches that aim to design technical artefacts, such as computer sciences or software engineering. If design science research is just about the development of artefacts in a theoretically sound manner, then DSR in IS is likely to be a re-invention of the wheel. DSR is thus presumably about something different. In the current DSR debate there seems to be a conflation of at least three different aspects:

- Design science as an academic discipline
- Design practice as an organisational reality
- The design artefact.

All of these raise question in their own right. If DSR is about a theoretical activity, then this begs the question what the contribution of IS can be. Design has been around for a long time and computing and information system can probably be described as a fields of application. If DSR revolves around the organisational reality in corporations that develop information systems either for their own use or for sale, then the question remains why this is worthy of a specific debate. Finally, there is the issue of the design artefact, which further blurs the definition of DSR. The simple view here would be that the design artefact would be a piece of software or hardware. However, the literature on IS DSR is quite clear that the artefact in question must be defined more widely, including theories, models, or approaches. If this is the case, then the very activity of undertaking BSR would include a considerable DSR aspect. Indeed, it is hard to see why writing a text such as this should not be conceived as a design activity, which leads to a blurring of the boundaries of DSR to the point of its becoming indistinguishable from BSR.

3.2 Justification of the Choice of DSR

The above discussion of DSR and BSR seems to indicate that they are no more than two sides of the same coin. This would suggest that it is a legitimate decision of an IS researcher to choose either one or the other and it is a matter of personal preference rather than anything else. In fact, the distinction appears to be a bit more complex. Looking at IS research over the last 20 or 30 years, there is a clear dominance of BSR. The fact that IS has to do with the development and use of technological artefacts seems to be a background assumption for some research. This would still justify DSR as the forgotten half of the research cycle. However, one could also interpret the IS

discourse as being fundamentally interested in social side of technology and much less so in the artefact. If this is the case, then DSR is a mere appendix to IS.

Such a view is problematic to some degree because, by removing the artefact from the focus of attention, the field of IS becomes difficult to define. It then becomes some sort of social science but one which is not at home in social science departments and which lacks a shared topic of interest, which technological artefacts might provide. This explains why even strongly sociologically influenced IS scholars can call for a return to the artefact (Orlikowski & Iacono, 2001). However, one can probably legitimately say that there is little attention to technological artefacts in the field of IS.

DSR can thus be understood as the attempt to give focus to the field. But there are also alternative explanations for the rise of DSR. This should be seen as an opener for the following critical discussion. Part of the critical agenda is to disengage from ongoing discourses and attempt to take a different viewpoint on them. This allows a different appreciation of discursive interventions which can help contextualise discourses and thereby indicate where they lead to alienation, oppression, and disempowerment.

3.3 Critical Views of the DSR Discourse

Critical research with its emphasis on emancipation has to do with power. Criticalists recognise that power relationships are pervasive and will not be overcome. It is nevertheless desirable to understand the underlying assumptions and beliefs and see how they can contribute to the reproduction of power relationships. All academic discourses are part of the construction of power because they define legitimate knowledge and truth. In Foucauldian terms, academia is part of the construction of regimes of truth, which posit what can count as legitimate but also which questions can be asked on which grounds. In this section I will collect some critical thoughts on DSR in order to question the DSR discourse and point to issues that should be included or highlighted.

3.3.1 The Concept of the Technological Artefact

A first observation refers to the very distinction between BSR and DSR. As indicated, this can be seen as an attempt to create legitimacy for technological research in IS. At the same time, however, it perpetuates the distinction between the technical and the social which has been questioned for some time. Fields of enquiry such as Science and Technology Studies (STS) and their underlying research approaches such as the Social Construction of Technology (SCOT) or the Social Shaping of Technology (SST) have long pointed out that this distinction is not tenable. These debates have been applied in IS (Howcroft, Mitev & Wilson, 2004; Mitev, 2005) and the attempt to re-introduce the distinction would have no reference to the debate. Sawyer & Annabi (2006), when developing the socio-technical approach, drawing on SST, state that an explanation of the success or failure of a technology needs to take into account the technical and the social simultaneously. Technology should be seen as a process rather than an artefact. The artefact, while relevant, cannot be viewed in isolation. They go on to state that, according to the SST perspective, "material characteristics and actions of any technology are shaped by the social actions of the designers, the specific uses of that technology, and the evolving patterns of use over time" (p. 399).

3.3.2 Assumptions of Mainstream IS Research

Design discourses that aim to demonstrate an affinity to current IS mainstream research may also fall in the trap of becoming uncritical of mainstream assumptions and thus turning into means of reproducing ideology by reifying problematic assumptions. In mainstream IS these include the legitimacy of managerial control, a rationalistic view of humans but also of IT, as in the case of artificial intelligence (Feenberg, 1991). Much has been written in the field of critical management studies about the shortcomings of current mainstream management literature and teaching. Where IS are seen unproblematically as tools for a generally justified management process, issues of

domination and oppression are rendered invisible. Taking the current status quo for granted leads to a perpetuation of current practices and assumptions, which may not be desirable. In such a situation DSR discourses can stabilise current social systems and thereby become deeply conservative. They can also lead to the unwarranted emphasis on some aspects of the design work (e.g. efficiency, user satisfaction) to the detriment of other aspects, which may be even more important (e.g. equitability, justice, working conditions). The distinction between BSR and DSR may also lead to a reliance on BSR to provide an ever-growing amount of information, which can then be designed into the artefact. This approach may misunderstand the relationship between design and data collection, leading to what Stewart & Williams (2005) have termed design paradoxes.

The current design discourses can without a doubt be classified as a management fashion in Abrahamson's (1996) terms. Such fashions are not necessarily bad and they can be seen as mechanisms that allow researchers and practitioners to focus their attention on important issues. The description of DSR as a fashion allows at the same time to contextualise its overall relevance. It also allows the description of DSR in comparison with other fashions, which have been described in some depth in the management and IS literature (Pozzebon, Titah & Pinsonneault, 2006). Some of these fashions, such as business process reengineering have proven to be highly problematic. In other cases the value of ongoing fashions cannot be assessed yet. With regards to DSR it can be observed, however, that the ostensible emphasis on the artefact carries with it the danger of taking fashions too seriously and using fashion statements as factual grounds for technology design and development. Divorcing the critical and social aspect from the artefact therefore carries the danger of fashions becoming self-sustaining.

A related problem of the perpetuation of extant ideology can occur with regards to the role of the designer. In mainstream business research, managers are often described as heroes. Etymologically, the verb "to manage" (originally probably derived from the Latin *manus*, the hand) comes from the Italian *maneggiare* to handle, to be able to use skilfully and originally referred to the handling of horses. Today it means "to conduct, carry on, supervise, or control" (OED 2004). While "management" thus has a wide meaning compatible with different styles of solving problems, it often aims to convey a more specific meaning, which might be termed "heroic management" (Gosling & Minzberg, 2003). Heroic management stands for the type of management often taught in many business schools and propagated by management magazines. It depicts the manager as the individual who is personally responsible for success or failure of organisational activities. Heroic management is based on a particular view of an appropriate rationality, which, following Max Weber, is often called purposive rationality. This heroic rationality is not confined to management and can be found in other professions such as engineering (Adam, 2001). The DSR discourse has often picked up this topic of heroicism and rationality and projected it onto the designer. This "heroic view" of design:

"is heroic in the sense that designs are portrayed as finished products inscribing particular views of the user, user activities and priorities into the artefact. The 'design problem' is then conceived in terms of the failings of design practitioners — through ignorance of users (their purposes and contexts) or their commitment to different priorities — embedding the wrong values/specification of user requirements in design, with imputed serious negative consequence for the usability and use of those artefacts for particular purposes and by particular groups." (Stewart & Williams, 2005 p. 197)

One of the reasons why this heroic conceptualisation is problematic is that it has difficulties with addressing ethical issues. This observation will form the guiding thought of the next subsection of my critique of DSR discourses.

3.3.3 *Ethics and Design*

One aspect of critical research not yet discussed is its relationship to ethics. I have argued elsewhere (Stahl, 2008a/b) that there is a close connection between ethics and critical research. The critical intention to emancipate requires an ethical grounding. Critical topics are typically of ethical

relevance and some critical theories, such as Habermas's Theory of Communicative Action are directly related to ethical assumptions. At the same time, critical scholarship has always been acutely aware of the potential of unreflected morality to promote alienation and domination.

The concentration on design science research in IS has the potential to affect such ethical considerations. The process of design is based on ethical assumptions about what is permissible and what is not. This refers to the way data is collected and design is implemented as well as to the eventual outcome of design. Most of the moral assumptions informing design are not made explicit but they can have consequences whose moral importance are hard to deny. Take child labour as an example. Where child labour is deemed legitimate, tools and apparatuses must be designed in such a way that children can use them. Such design then betrays moral assumptions of the designers (i.e. that child labour is legitimate) but they also perpetuate them because the tools or apparatuses require children to be employed. A change in ethical evaluation of child labour can still lead to a replacement of such tools but their mere existence poses an obstacle to such change. I have chosen child labour because it is an example that is easy to visualise. The same idea still holds true for design in information systems. Information flows, reports, controls etc. can reify extant control structures and they will often do this without explicit consideration of their legitimacy. Design can therefore be deeply conservative. This is why Feenberg (1999 p. 173) can say that "design has normative implications and is not simply a matter of efficiency".

While design can thus have morally problematic consequences, the opposite can be just as true. Design can be used to implement and reify liberating and emancipatory ideas. A different conceptualisation will lead to different designs, which will provide different affordances. There are prominent examples of emancipatory design, e.g. in the area of e-government and e-democracy where the communication-enhancing properties of ICT are used to promote collaboration and self-determination (Heng & de Moor, 2003).

One should at the same time not overestimate the importance of design in this respect. Technology often is Janus-faced (Arnold, 2003). Lessig (2001) argues convincingly that the design of the Internet contributed to the freedom, even anarchy of the early Net. Nevertheless, its architecture was not fixed and is constantly subject to change, be it technical or societal. An emancipatory technology may be misused, just like an oppressive one may be circumvented. However, technology design can integrate affordances and there is a case to be made that some affordances are more likely to lead to emancipatory outcomes, whereas others are more amenable to oppression. The view of design as ethically relevant and influencing emancipation does not mean that one can simply design ethics into or out of design artefacts. There are considerable conceptual problems arising from the question of how to address the ethical issues of design. I cannot recapture this debate here but would like to point the reader to a promising approach, namely disclosive ethics. The idea behind disclosive ethics is to disclose decisions, views, and consequences of design decisions. This can lead to an awareness of their implications and to a more reflected use technologies and their affordances (Introna, 2007)

The recognition of such emancipatory qualities in design and of their ethical relevance poses a challenge to design scholars who are aware of them and want to promote them. There are fundamental problems of emancipation, which critical theorists have been grappling with for a long time. Even if one agrees that emancipation is desirable one does not yet know what exactly it means to be emancipated. Emancipation is dependent on the individual in question but also on the social context. The same individual will perceive a certain technology as oppressive in one context but as supportive in another. A criticalist who aims to implement critical ideas in design is thus faced with the dilemma of how to find out what emancipation means and what to do about it. In order to avoid the dilemma of emancipation becoming just another form of oppression (Stahl, 2006), a way has to be found to allow the users of the technology to voice their opinion. An established procedural way of doing this, which was conscious of its ethical relevance, was put forward by Enid Mumford and her ETHICS methodology (Mumford & Beekman, 1994; Mumford 2003, 1995).

The summary of this discussion seems to be that design is of high relevance for ethical considerations in technology (Devon, 2004) but that only a procedural design approach based on

participation can raise a valid claim to the necessary ethical sensitivity required to come to a successful conclusion.

3.4 Critical Concepts and Design

The brief discussion above indicates that there are several ways in which the DSR in IS can lead to potentially alienating or oppressive results. I will now try to link this argument to the critical concepts introduced above (table 1). The most obvious link between DSR and these concepts is the idea of reification. The emphasis on the artefact that carries much of design discourses suggests that the artefact is of central importance. It arguably carries an intrinsic indication that the artefact is objective and neutral. This points towards the tool view of technology and leads in the direction of technological determinism. Design leads to the creation of artefacts which have clearly defined properties which, in turn, lead to predictable outcomes. The main problem with this reification of design is that it renders invisible social influences and non-technical considerations. The thing, the *res*, becomes independent of social concerns.

This reification also promotes commodification. There is nothing fundamentally wrong with building a technological artefact for the purpose of trading it. Again, it is the issue of invisible decisions, questions, and debates, which renders commodification a potential problem. One aspect of this has to do with the social importance of the artefact. Some software artefacts, for example, have managed to achieve an outstanding social importance, which renders their existence as commodities questionable. A good example of this is the search engine Google. Google not only has huge market share and therefore immense financial value as a company. It has such a dominant position that its name has become a commonly used verb. Google algorithms and policies have the power to decide about visibility of web sites. The social impact of Google thus goes beyond what one would normally expect from an information and service provider. It can thus be asked whether this type of technology should be treated as a mere commodity, something to be bought and sold.

Another aspect of commodification is that the social assumptions of the design artefact are bought and sold with the artefact, independent of the customer's agreement with them. Technology can contribute to the shaping of organisational cultures and such influences should be made explicit. A typical example here would be the standard business software SAP. SAP is built on certain assumptions about the way organisations should be run and its use requires a certain amount of compliance with what SAP considers best practice in the respective industry or sector. Apart from the fact that this seems to turn the relationship of business and technology on its head, there is also an aspect of hidden ideology entering an organisation via reified social beliefs in a design object.

This leads to the issue of ideology. Reification and commodification are both aspects of rendering invisible certain potentially contentious issues. Whether a technology supports hierarchical structures or free exchange is something that may have considerable influence on individuals' emancipation and quality of life. Through the design process such issues may become invisible and thereby support certain groups to the detriment of others. Current debate on ideology does not suppose that ideology can be overcome or eradicated. Tacit beliefs favouring some will always be present and a critic of this paper could hold that this argument is as much supported by ideological beliefs as any other. I would have to concede this but would reply that this is not problematic for critical research. The intention is to render ideologies visible and open them to debate, not to finally overcome them. Such opening of discursive closures containing ideologies can be severely hampered by the reification of the ideologies in technology.

4 CONCLUSION

In this paper I have collected arguments from a critical perspective and applied them to the current debate on design sciences. There are numerous ways in which this argument could be developed or improved. I have briefly touched on the issue of the definition of design and design sciences. At this stage there seems to be little agreement on these concepts and there may be scope for an empirical

investigation into what design practitioners understand by such terms as "design" or "design sciences". The paper as furthermore concentrated on some of the mainstream views of DSR in IS and not been able to reflect a fuller understanding of the term. One could argue, for example that there are research fields in the intersection of DSR and CSR, such as those based on the language-action perspective or on organisational semiotics, which give a better understanding of their relationship (see, for example, the CACM May 2006 special issue on LAP). The critical analysis could also be furthered by empirical studies of design practice or by a more extensive review of the DSR literature. However, I believe that the argument as just presented should be viewed as a logical argument and needs to be recognised as a fundamental critique of current mainstream DSR work in IS.

This collection of critical remarks should nevertheless not be seen as a general argument against design sciences. I am not at all against the inclusion of explicit design considerations in IS research. What I have tried to argue is that the focus on design in IS discourses can be used to camouflage particular interests and agendas. DSR discourses are in danger of becoming divorced from greater social and ethical concerns and to turn into ends in themselves. Design can then become a fetish, something desired for its own sake, without social context. All I am saying is that the attempt to establish the design paradigm may again be legitimate but it may also be problematic. What I have tried to do is raise awareness of possible issues.

Any social system using technological artefacts will need to make decisions concerning these artefacts. My main argument here is that these decisions hold implications that may go far beyond the immediate use of the technology and the purposes it is designed for. Technology can have considerable social and ethical implications. What I have argued in this paper is that these need to be considered throughout the design process and should be made explicit and available to potential users. There is no reason why design cannot do this and, indeed, there are good examples of designers in IS consciously doing this, as for example people working in the socio-technical tradition. The danger I see is that DSR discourses are used to gain academic legitimacy for very technology-centred work. Such legitimacy could then be used to evade the questions raised here. By raising awareness of this danger, I hope that the current paper has taken a step in addressing it.

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