

# Exploring the Limits of the Possible

## A Response to Iivari

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*"Some people see things as they are and say why? I dream things that never were and ask why not?" Robert F Kennedy*

## 1 Introduction

The continuous reflection on the state of the Information Systems field is a sign of both steady development of a discipline as well as the fragmentation, contradictions and deep angst that paradoxically accompany the road to maturity. Juhani Iivari's thought-provoking essay is an excellent example of such a reflective exercise. The essay has much to offer, as it sketches and embodies at the same time fragmentations and contradictions not only within the essay but also when read in conjunction with Iivari's earlier reflective work. As befits one of the leading thinkers of the field as well as a prolific writer, he has imaginatively and creatively tackled heads on a crucial issue that while current, has remained the centre of debate. The issue, as we interpret it, is the role of design science in IS. Simultaneously, Iivari delves into the existentialist realm of IS (who are we?) as well as the methodological realm (how should we do

research?). Much can be learned by reading the essay and mulling over it. We certainly did. As we read through the essay, and revisited it several times over, we found ourselves not only agreeing with many of his contentions, but also applauding some of his stances. We are generally in accordance with the twelve theses that Iivari lists for design research, especially the conceptualization of IS as an applied discipline and the emphasis on the artefact. Much of our current ongoing work is based on these premises. It is in this spirit that we respond to Iivari's essay.

While the main thrust of our response is to clarify what we perceive to be a misreading of a paper we co-wrote with Robert Cole (Cole et al., 2005), we will take this opportunity to comment on and critique some vital aspects of Iivari's perspectives on the relationship between Action Research (AR) and Design Science (or Design Research (DR) which we use interchangeably here). Specifically, we would like to raise some issues about the somewhat old fashioned style of staying in the methodological and epistemological 'trenches' and throwing arguments against other approaches from there. We will conclude by offering a way forward for design research that engages in the IS practice.

## **2 What We Really Said in Cole et al.**

In reading Cole et al., Iivari correctly surmises that we associated AR and DR based on their common proactive stance, i.e., intervening in the world to change it. However he challenges our conclusion that DR and AR share important ontological and epistemological assumptions. According to Iivari, the two approaches are "historically, practically, ontologically, epistemologically and methodically quite different". To counter Cole et al., Iivari points out that DR is realistic in ontology and positivistic in epistemology. Such is not the case with AR which is anti-positivistic in its very essence since it treats each organizational context as unique. He therefore takes the position that AR and DR should be conceptually kept separate.

If we are to confine our analysis to the historical and traditional perspectives of the two approaches—"what has been"—it is hard to argue with Iivari's stance. We readily concede that DR has been concerned with the building of artefacts and that AR has focused on "treating social illnesses" in organizations. What is interesting to note is that Iivari tellingly goes back to the roots of DR in engineering and medicine in making this argument. One can legitimately ask whether Information Systems as a discipline is comparable to these disciplines using, for example, the same lens that Iivari uses, namely

Popper's conceptualization of the "three worlds". Is the knowledge interest of the researcher the same in these three areas? Do we study in IS design artefacts only in the World 1 and World 2 context? Our answer, not surprisingly, is a resounding no. For us, the knowledge interest of the IS researcher ought to be rooted in producing what is referred to as "Mode 2 knowledge" (Gibbons et al., 1994). A detailed discussion of this paradigm is beyond the scope of this piece. Instead, we refer the reader to an excellent discussion of Mode 2 knowledge production in IS by Figueiredo and Cunha (2007, pp. 63-64) from which we present below a brief précis. We reproduce some of their text verbatim and paraphrase the rest.

Mode 2 knowledge production is solution focused and takes place in the context of economic and social applications.

This is in contrast to Mode 1 knowledge production where:

the research agendas are largely governed by the academic interests of a disciplinary community

and focus on the kinds of research questions that are central to the advancement of the discipline, and application of appropriate research methods. In Mode 2, the research agenda is determined by the common interests of different stakeholders including academics and practitioners. Continuous mutual informing occurs between:

the fundamental and the applied and the theoretical and the practical ... *In general, knowledge is built in the contexts where it is put to use, and its products and results, as they materialize, contribute to further theoretical advances* (our emphasis). Although some of the quality control criteria of Mode 1, like peer reviewing, still hold in Mode 2, additional criteria, of social, economic and political nature, are called up through the context of application. Quality control is more context and use dependent, as well as more concerned with social accountability because the complexity of the problems at hand cannot generally be faced just in scientific and technical terms.

Mode 2 success is defined not just in the traditional dimension of scientific excellence, as judged by disciplinary peers, but also efficiency, usefulness, and the ability to fulfil the expectations of multiple stakeholders.

Thus, for Mode 2 success, scientific:

*rigor without relevance becomes meaningless* (emphasis in the original)

The essential aspect for us in the above is that knowledge is built in the same context that it is used. Thus, for the IS design researcher, design of an artefact is meaningful when done in the use context, i.e., in specific organizations. The key role of the context is based on more than the teleological mission of the designer—to achieve the intended result—but also to make design efficacious.

Designing an artefact is an emergent process and the context plays a vital role here. To make our argument, we reproduce the following:

Many “artefacts” are only partly the work of a designer. They may exhibit emergent features as an outcome of numerous local actions (e.g. use, interpretation, negotiation and redesign), but these emergent features cannot be anticipated by reference to any a priori design. The WWW is an excellent example of this kind of system. At a more theoretical level, the literature in the social construction of technology (Bijker et al. 1989; Bijker and Law 1992) discussed this emergent aspect of many artefacts.

The quote is from “The IS Core – VII: Towards Information Systems as a Science of Meta-Artifacts” and the writer is Juhani Iivari (Iivari 2002, p. 570).

In Cole et al., we made a conscious decision to limit the scope of our treatment of design science to information systems in an organizational context as correctly inferred by Iivari. It was explicitly stated in our paper.

One other area where Iivari critiques Cole et al. is that we join other ‘proponents of design science’ in suggesting that the method is associated with pragmatism as a philosophical orientation. He warns against this, stating that design science does not “... necessarily imply the notion of truth from pragmatism as practical utility.” According to this view, without theory artefacts have no truth value. While this is debatable, the aspect of utility is crucial in the constructivist paradigm especially adopted in IS. If a system is not being actually used in an organization, and used as intended, what success criteria can an IS researcher claim? It is merely that an artefact has been constructed embodying some theory and that’s it? This is the traditional view of design science.

Our goal was to steer away from a computer science based design science and towards a more practically oriented approach that is informed both by the relative rigor of design research and the pragmatist goals of action research. At the same time, we do not embrace organizational science based design science. Our effort was towards building a science of action and design that is appropriate to the IS discipline, based upon the relevant aspects of both traditions. The fact that comparable artefacts have differing ontological and epistemological assumptions does not deny the pragmatism argument. It simply demonstrates equifinality in action. As is appropriate for an applied discipline, IS researchers must in some way or another fulfil the dual mission of advancing theory while producing knowledge to support IS practitioners in solving current and anticipated problems.

To be fair, Iivari does not advocate that AR and DR be kept separate in practice. He proposes that once an artefact has been designed and tested in the laboratory, it can be evaluated through an AR project by implementing it in an

organization and learning from the process. This was also one of our recommendations in Cole et al. However, this is hardly combining or integrating the two approaches. It is simply using two approaches separately in a related project. Using Iivari's line of reasoning, one can, for example, evaluate the artefact after implementation on benefit realisation using some tool like balanced scorecard, and conclude that now DR is being 'combined' with economics.

Limiting the cross-fertilization of AR and DR to complementary approaches such as Iivari's fails to incorporate the emergent aspect of designing an artefact. An artefact takes shape through constant feedback from the environment which in this context is the real organization. In order to study this, we need to explore possibilities of a more intertwined integration between AR and DR. Cole et al. was such an exploration. We did not claim that AR equates to DR. Neither was our intention to show that they came from the same ontological and epistemological roots. Our objective was simply to demonstrate that they are *not incommensurate*. Our conclusion was that while they have differences, they are not incompatible and do not have philosophical stances that are in conflict, at least in the context of developing artefacts in a real organizational setting. They may not be the best of friends, but they are effective and compatible colleagues. It is worth noting that recently, IS scholars have gone beyond our cautious steps and even proclaimed that DR and AR are two faces of the same coin (Järvinen 2007; Figueiredo and Cunha 2007). These are attempts towards a tighter coupling of AR and DR.

### 3 A Way Forward

How do we achieve this coupling in practice? Paradigmatically, Figueiredo and Cunha (2007) adopt constructivism to find a common home for an integrated AR-DR approach. They look at positivism vs. constructivism not as categories that are apart but as a continuum. Cole et al. propose three different ways of cross-fertilization—adding an AR cycle at the end of a DR cycle, enhancing each by borrowing stages and processes from the other, and by developing an integrated research approach combining the two. This can be seen as a real trans-disciplinary approach, where in the future more of IS research will be based upon a common theoretical understanding accompanied by a mutual appreciation or interpretation of epistemologies as advocated by Gibbons for mode 2 knowledge construction (Gibbons et al. 1994; Figueiredo and Cunha 2007).

Iivari opines that the “prescriptive level is interested in how things could be” and produces methods to achieve certain utilitarian ends. We not only agree but applaud this stance. In Cole et al., we attempted to do precisely that. Practicing what we preached, we dared to design by looking at what was possible, not the status quo.

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