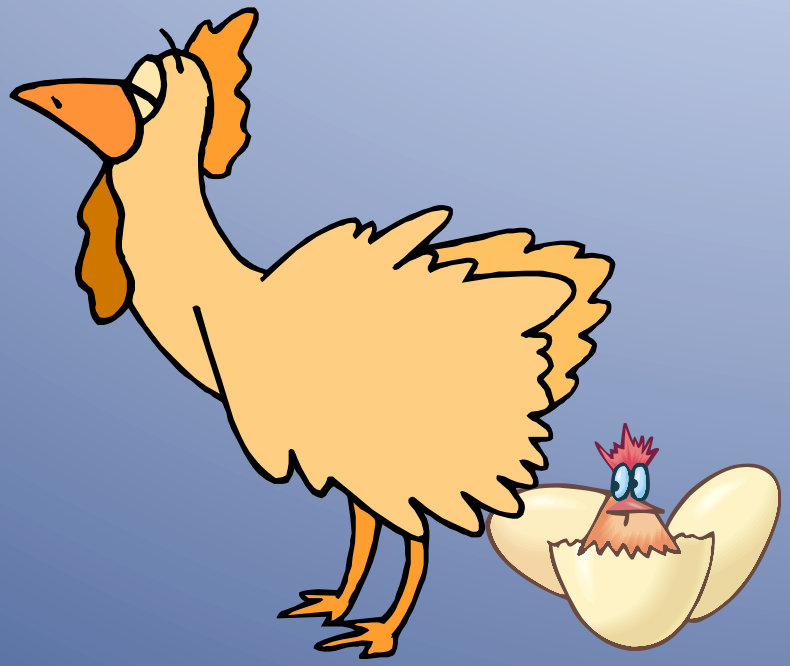


Are Artefacts the Means or Ends in Design Science Research?

Panelists:

Richard Baskerville, Georgia State University, USA (Panel Chair)

Jörg Becker, Westfälische Wilhelms-Universität Münster, Germany

Samir Chatterjee, Claremont Graduate University, California, USA

Jan Pries-Heje, Roskilde University, Denmark

Natural Versus Artificial World

"The central task of a natural science is to make the wonderful commonplace: to show that complexity, correctly viewed, is only a mask for simplicity; to find a pattern hidden in apparent chaos. ... The world we live in today is much more a man-made, or artificial world than it is a natural world. ... Things we call artifacts are not apart from nature. They have no dispensation to ignore or violate natural law. ... They are adapted to human goals and purposes [for example, in order] to satisfy our desire to fly or to eat well." (Simon, 1996 pp. 1-3)

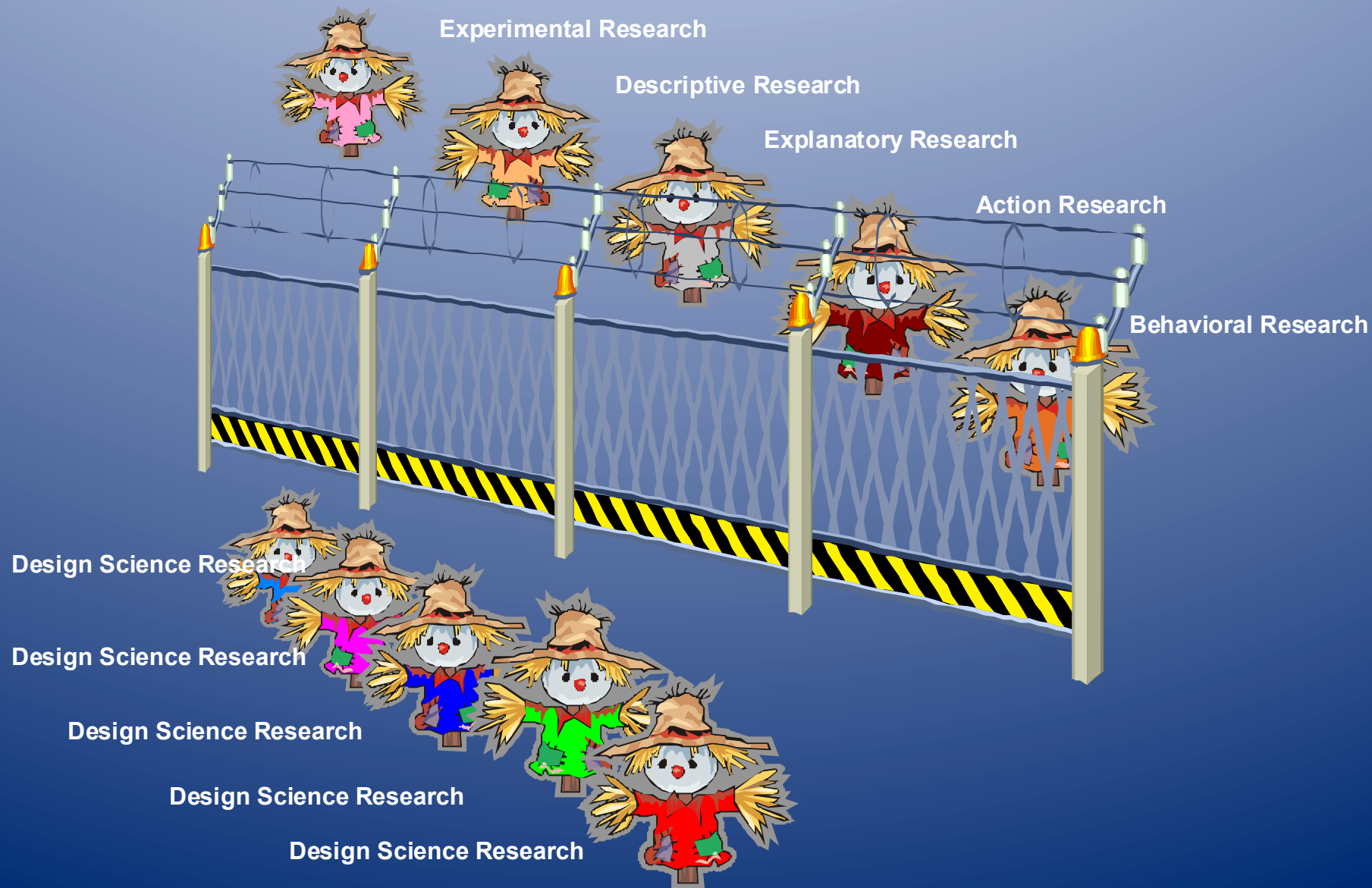
The Science of Design

"The proper study of those who are concerned with the artificial is the way in which that adaptation of means to environments is brought about--and central to that is the process of design itself." (p. 113)

Means to an End

"Problem-solving systems and design procedures in the real world do not merely assemble problem solutions from components but must search for appropriate assemblies." (P. 124)

Separating the Straw Men



It’s the Peak not the Valleys

The Design Science Research Center?

"A Generative Mode of Discovery"

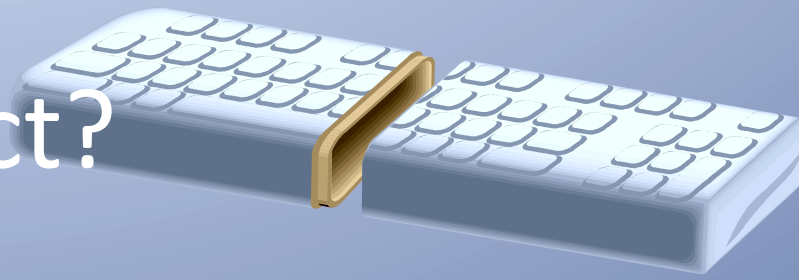
Charles Eastman, Desrist 2008

How design scientists learn: They study settings, design and build artifacts to introduce into these settings, and then reflect on the outcomes.

What makes it science?

The validity and generality of its design theories.

IT Artefact?



"...those bundles of material and cultural properties packaged in some socially recognizable form such as hardware and/or software ..." Orlikowski & Iacono (2001), p. 121

"... design science research outputs or artifacts: constructs, models, methods, and instantiations." March & Smith (1995), p. 256

March, S. T., & Smith, G. F. (1995). Design and natural science research on information technology. *Decision Support Systems, 15(4), 251-266.*

Orlikowski, W. J., & Iacono, C. S. (2001). Research commentary: Desperately seeking "IT" in IT research - A call to theorizing the IT artifact. *Information Systems Research, 12(2), 121-134.*

Levels of IS Design Science Research

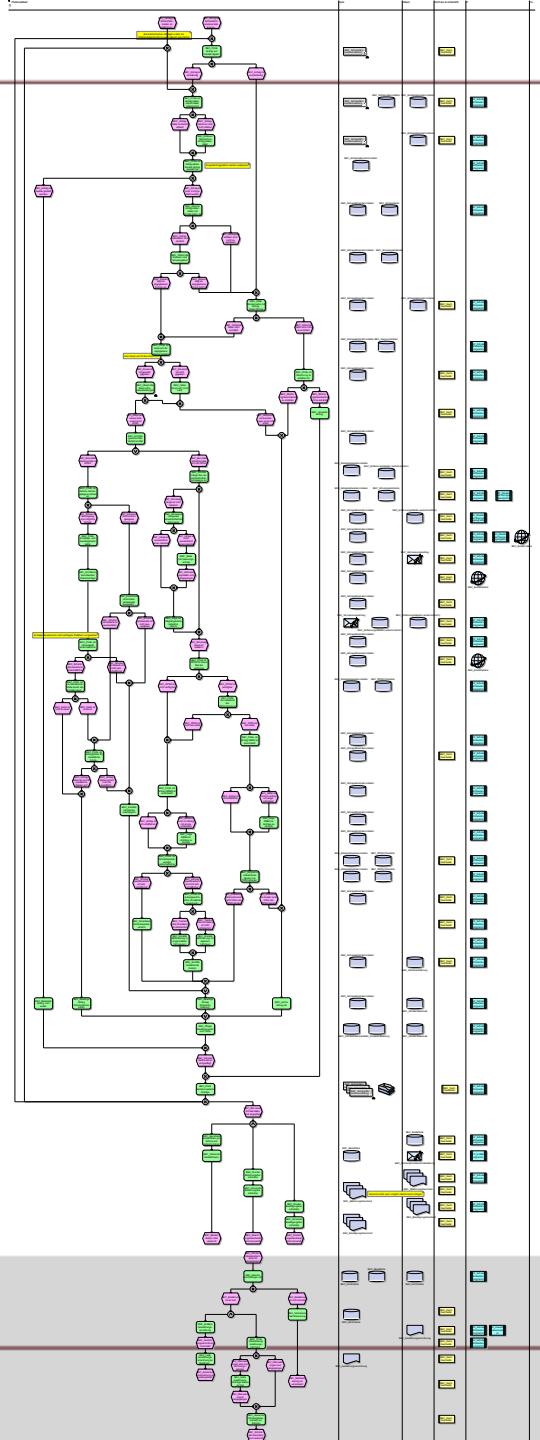
The Design Science Research Family

	Three-Level Design Framework		
	Level 1 Designing with Research	**Level 2 Research Into Design**	**Level 3 Design as Research Methodology**
Research Domain	Design Domain	Design Process	Usually Design Domain
Purpose	Produce good designs	Understand design activity	Understand research domain
Primary Knowledge Goal	Functional Domain Knowledge	Procedural Knowledge	Theoretical Domain Knowledge
Role of Artefact	Mostly an End?	Mostly a Means?	A Means and An End?

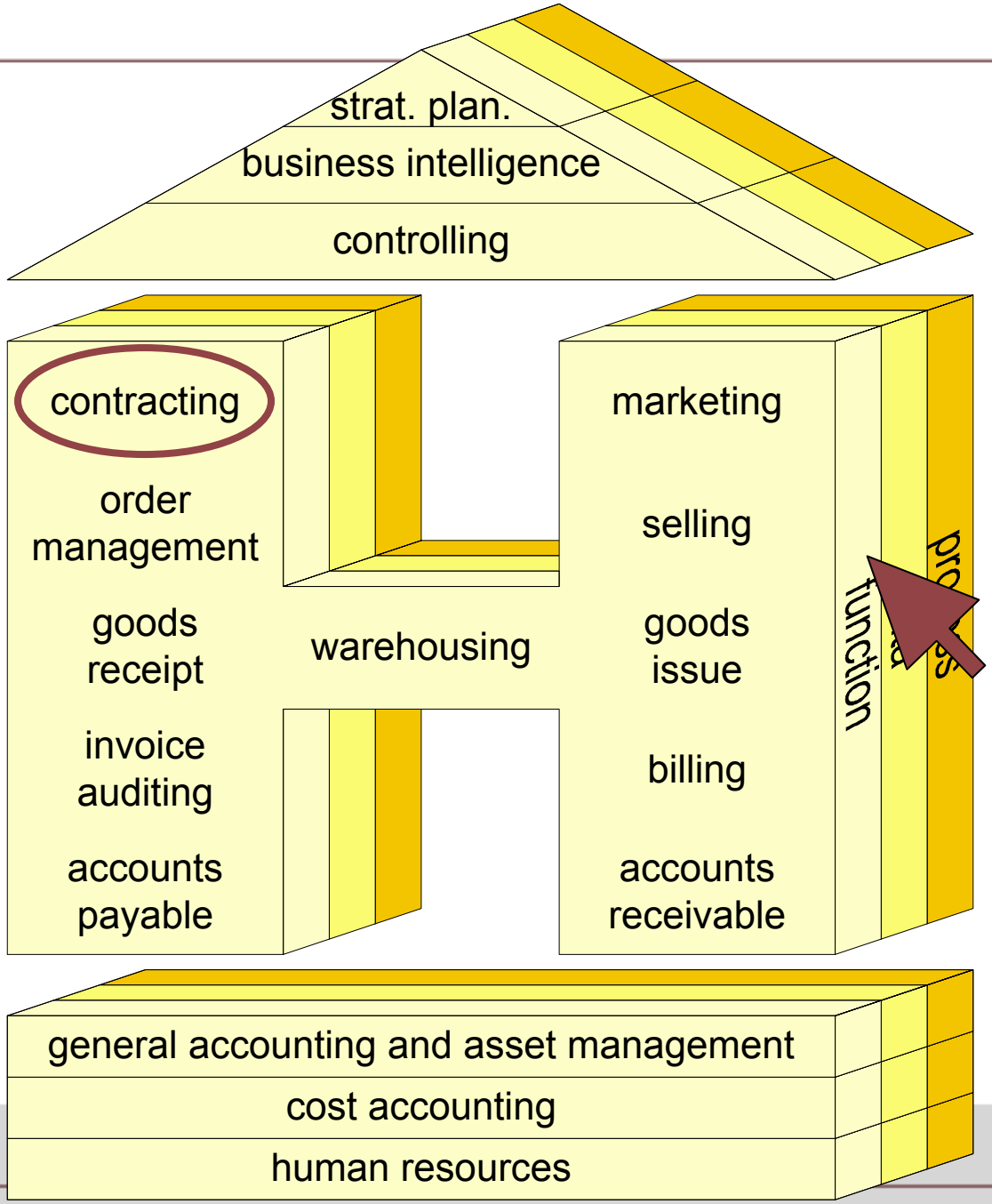
An Example: Reference Modelling

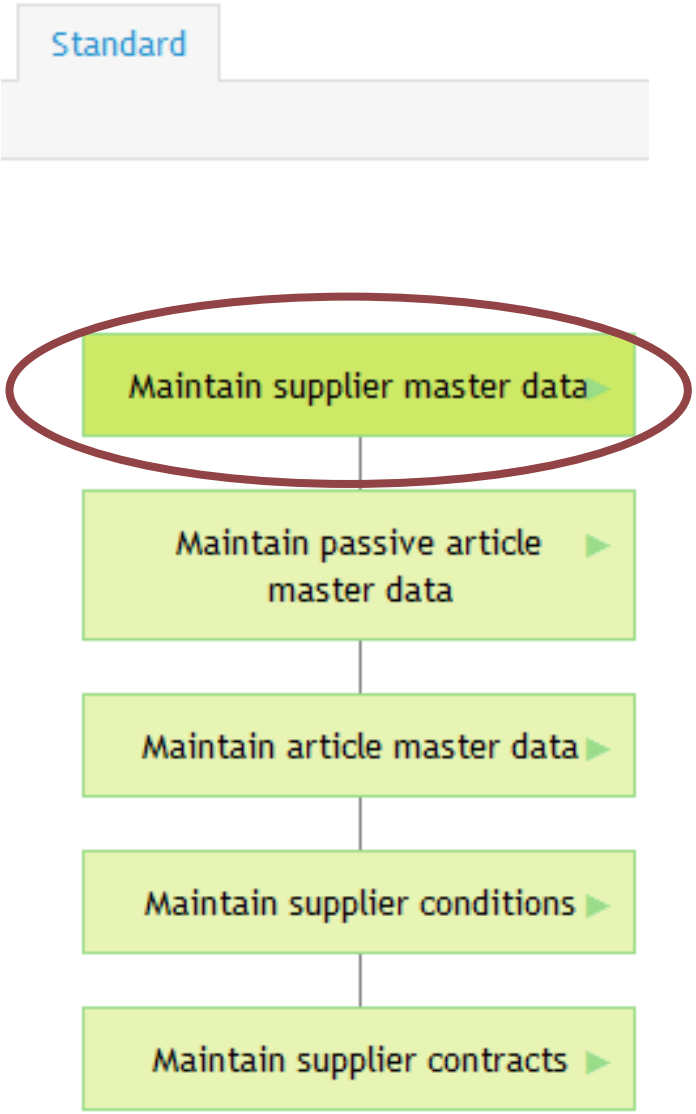
Jörg Becker, Westfälische Wilhelms-Universität Münster, Germany

Detailed Processes

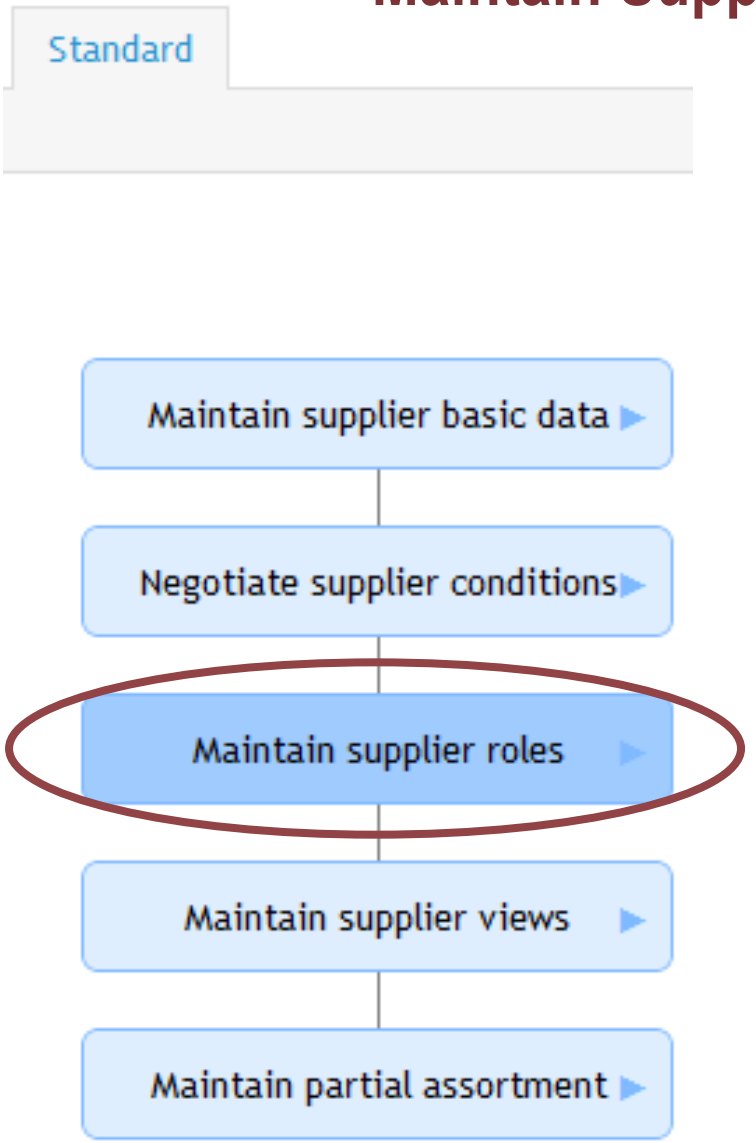


ERCIS


strat. plan.
business intelligence
controlling
contracting
order management
goods receipt
invoice auditing
accounts payable
warehousing
marketing
selling
goods issue
billing
accounts receivable
function
general accounting and asset management
cost accounting
human resources


Standard
Maintain supplier master data
Maintain passive article master data
Maintain article master data
Maintain supplier conditions
Maintain supplier contracts

Maintain Supplier Master Data



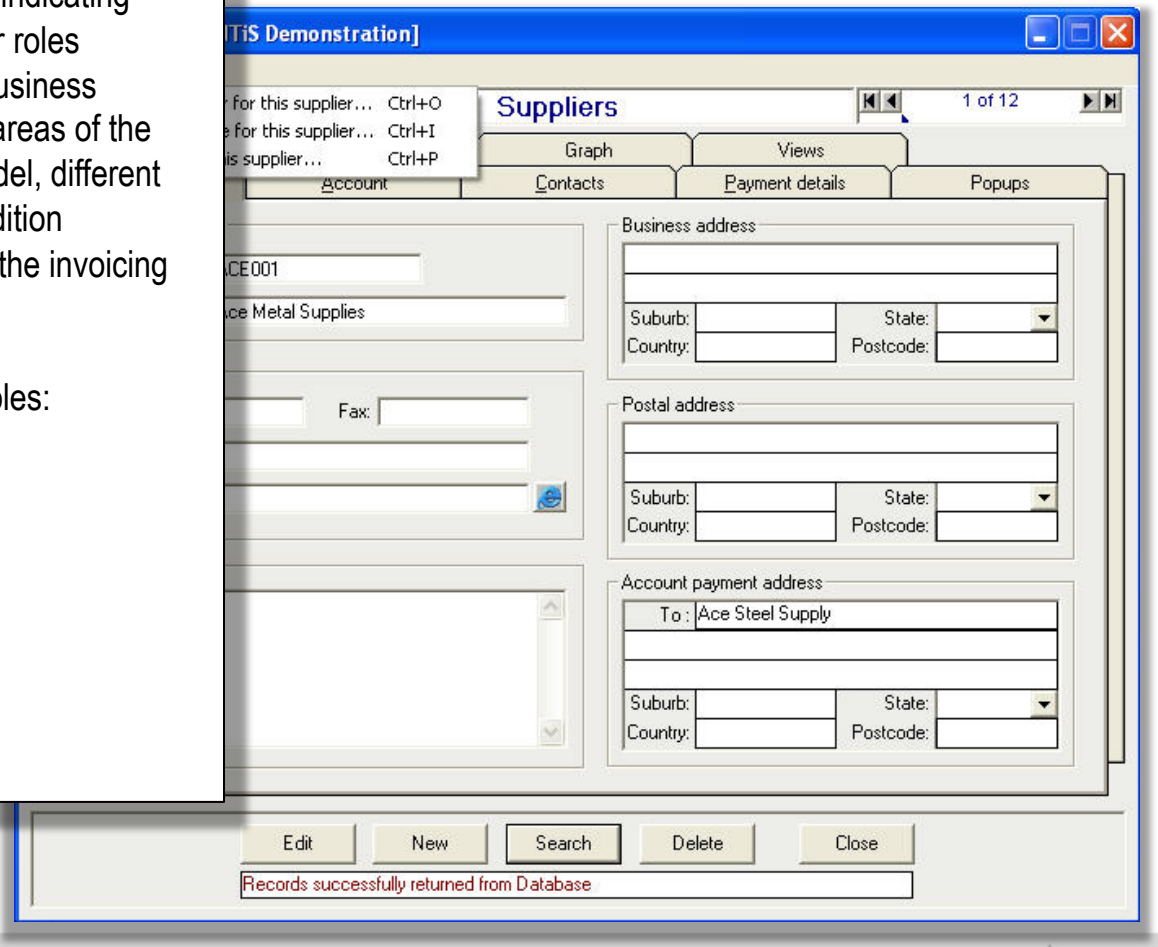
Maintain Supplier Roles

Maintain supplier roles

In different processes, a suppliercan take on different roles. Therefore a statement is required, indicating which roles a supplier can have. Supplier roles determine the operational role within a business transaction. In analogy to the functional areas of the procurement process of the Retail-H-model, different suppliers can be responsible for the condition agreement, order, the delivery of goods, the invoicing and the payment.

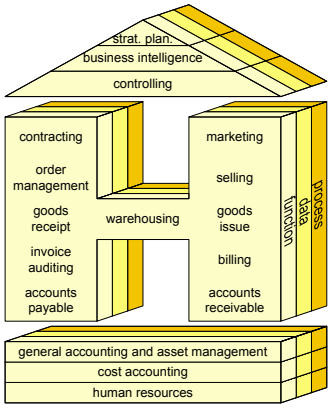
This results in i.a. the following vendor roles:

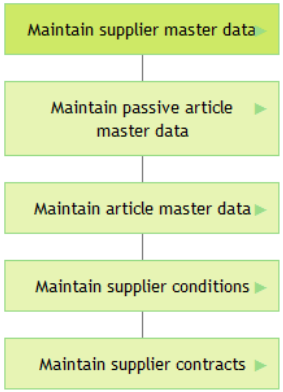
- Condition granter
- Order receiver
- Goods supplier
- Manufacturer
- Payee
- Return Receiver

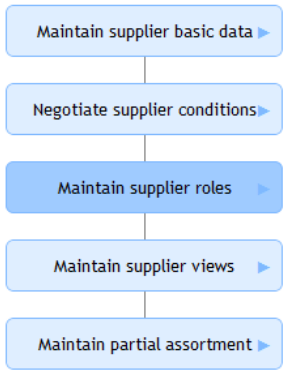


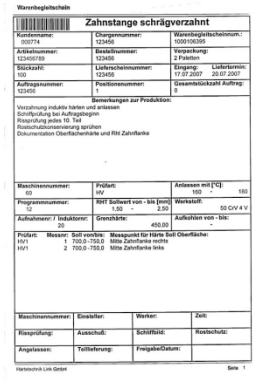
ERCIS

- Strictly defined modeling layer
- Generally linear processes



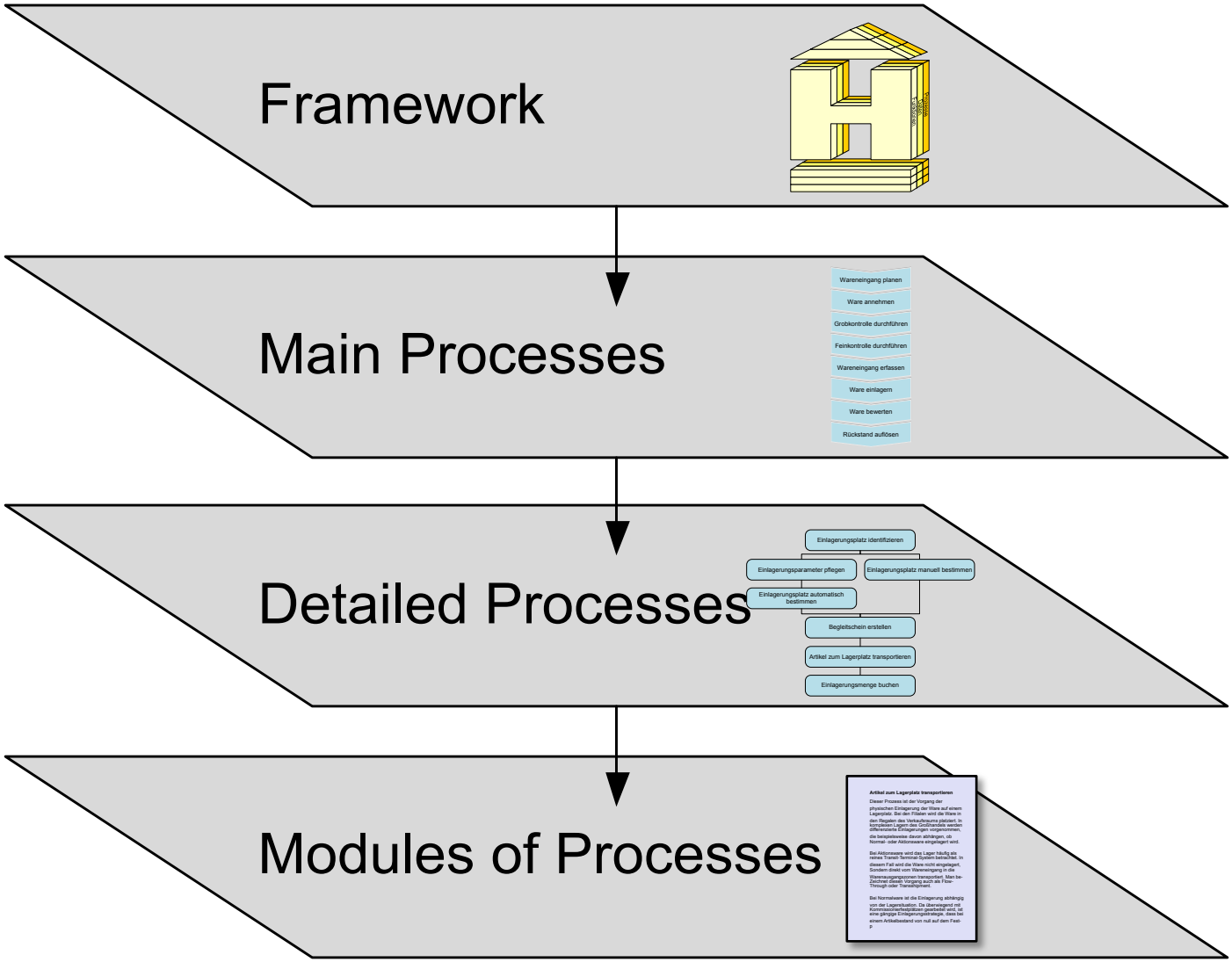






ERCIS

4 Layer Architecture



Guidelines of Modeling (GoM)

- Correctness
- Relevance
- Economic efficiency
- Clarity
- Comparability
- Systematic design

Design Science Research – Let's Focus on Innovation & IT Artefact?

Dr. Samir Chatterjee
School of IS&T
Claremont Graduate University

ECIS 2011, Helsinki, Finland

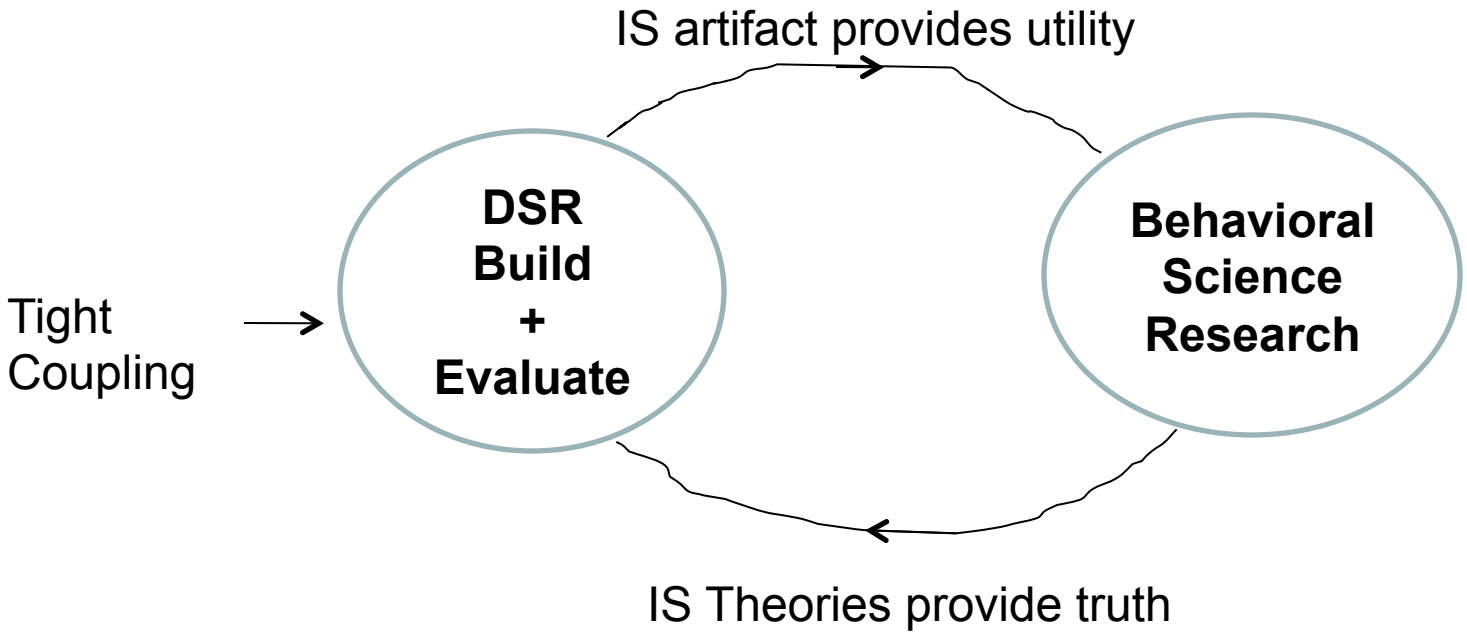
Alan Hevner & Samir Chatterjee. Design Research in Information Systems: Theory and Practice, Springer 2010.

What is Design Science Research?

It is a thing or process by which a designer answers questions relevant to human problems, thereby contributing new knowledge to add to body of scientific evidence and new knowledge creation. The artifact is both useful and fundamental in understanding that problem.

We hereby lay down the first principle of DSR:
The fundamental principle of design-science research is that knowledge and understanding of a design problem and its solution are acquired in the building and application of an artifact.

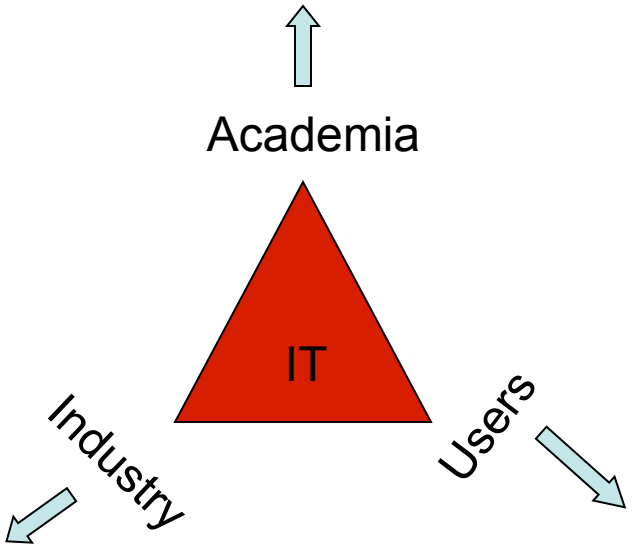
Artifact means to an endless possibility



Consider the Web:
Concept, models, protocols, instantiation → continues to endless possibilities

Tim Berners Lee could not have made generalized claims about his invention. Today (after 20 years), it is giving rise to network theory, social theory, ecommerce theory etc etc

Research and new knowledge creation
Rigor: explaining theories of why a design worked
Scholars addressing specific and general class of problems

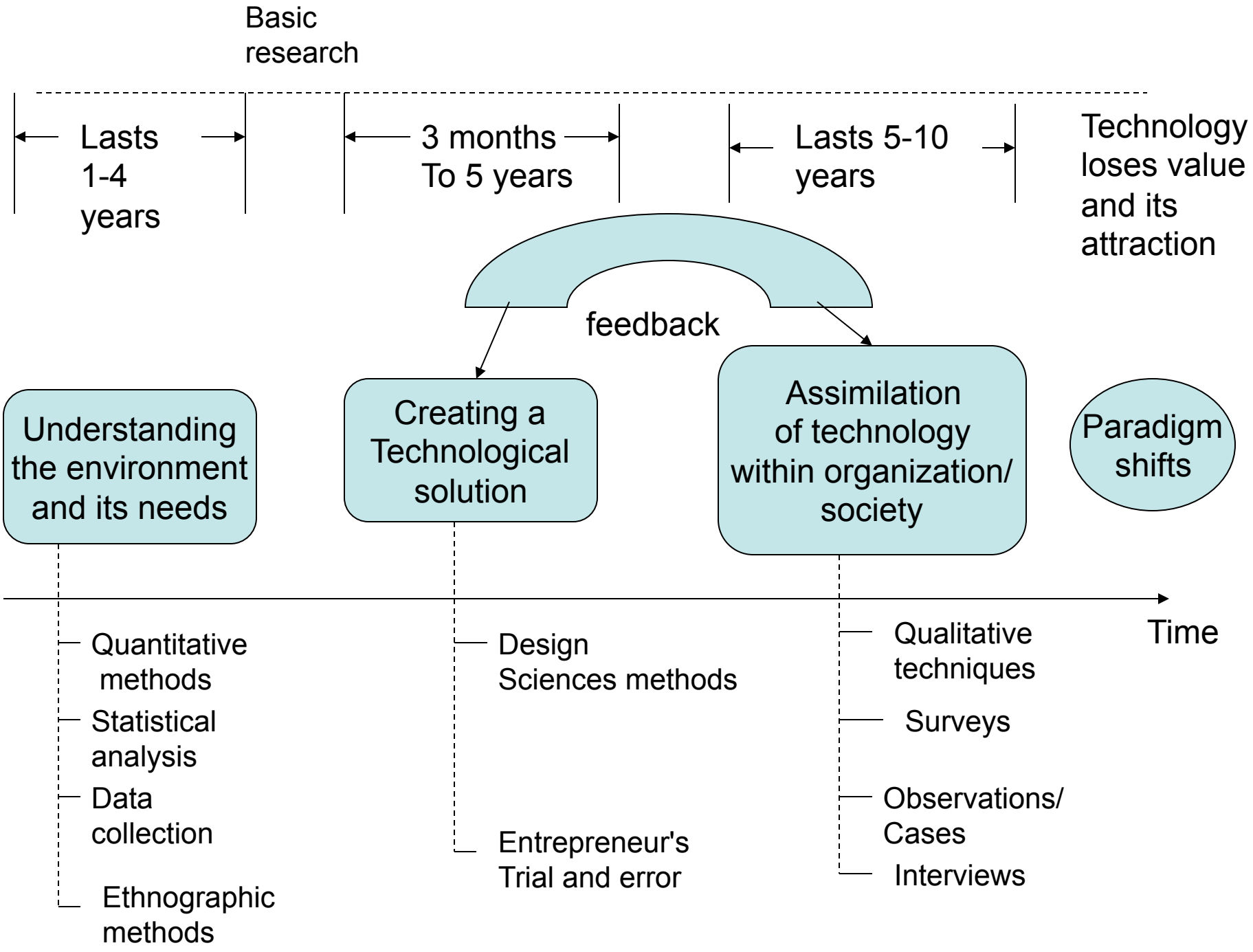


R&D, innovation hubs
Push the boundaries in design innovation
Delving in novel experiments
Figure out business models & profitability

Application developers create disruption
“It works” principle
Applications drives infrastructure
Social networks are creating havoc

DSR in IS Field

- In 1980's, early 90's, few researchers publishing in sporadic places
- In 2004 Hevner et al article in MISQ gave it legitimacy.
- Since then momentum is building up, DESRIST, several special issues, journals now more accepting.
- In the beginning reviewers took the 7 guidelines to heart.
- Now they have loosened up to the point that papers without any artifact whatsover is also DSR???
- Too much talking going on, not much real building and true understanding.
- Reflection is good and necessary but we have to advance the field.


Basic research
Lasts 1-4 years
3 months To 5 years
Lasts 5-10 years
Technology loses value and its attraction
feedback
Understanding the environment and its needs
Creating a Technological solution
Assimilation of technology within organization/ society
Paradigm shifts
Time
Quantitative methods
Statistical analysis
Data collection
Ethnographic methods
Design Sciences methods
Entrepreneur's Trial and error
Qualitative techniques
Surveys
Observations/ Cases
Interviews

Future is bright

- Design research is the seed for innovation and creativity
- Our field lacks impact. We will not be judged by number of publications or how many faculty we have tenured.
- What societal impact have we had?
- Future grand challenges are exciting and fertile problem domains.
- Lets roll our sleeves, get to our labs and create the next break through.

Show me the artifact. Is it better, faster, more efficient? Is it novel?

The Scandinavian tradition of participative design and user involvement

Jan Pries-Heje, Roskilde University, Denmark

Reasons for user participation in design (Bjørn-Andersen & Hedberg 1977):

- It reduces resistance to change
- Can be used to obtain and improve the knowledge upon which we design (systems)
- It enables people to develop realistic expectations
- It may increase workplace democracy by giving workers the right to participate in decisions that are likely to affect their work.

Different Ends and Means

- In Participatory Design (PD) the improvement and understanding of the human, social and technical activity of design constitutes the central goal, or “ends”
- *Both* the process of research and any artefacts produced are the “means”

The Scandinavian Trade Union Projects

- 1971-73: Project with the Norwegian Iron and Metal Workers' Union (NJMF)
- 1975-79: The Swedish DEMOS project (DEMOkratiske Styrinssystemer)
- 1977-1980: The Danish DUE project (Demokrati, Udvikling og Edb)

- Building on basic struggle between Capital and Labour

- Democratic research and development processes were the Aim

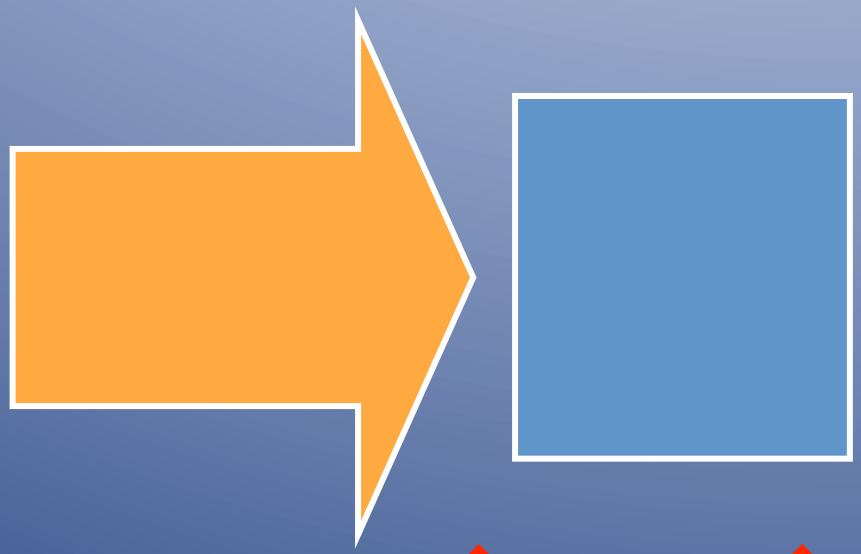
Participatory Design

- Let users participate – better than ”just” relying on designers knowledge
- Move users into design – as opposed to moving design out to users
- Do not study users – Involve them and give them responsibility
- Never right first time -> Iterative

Artefact less important?

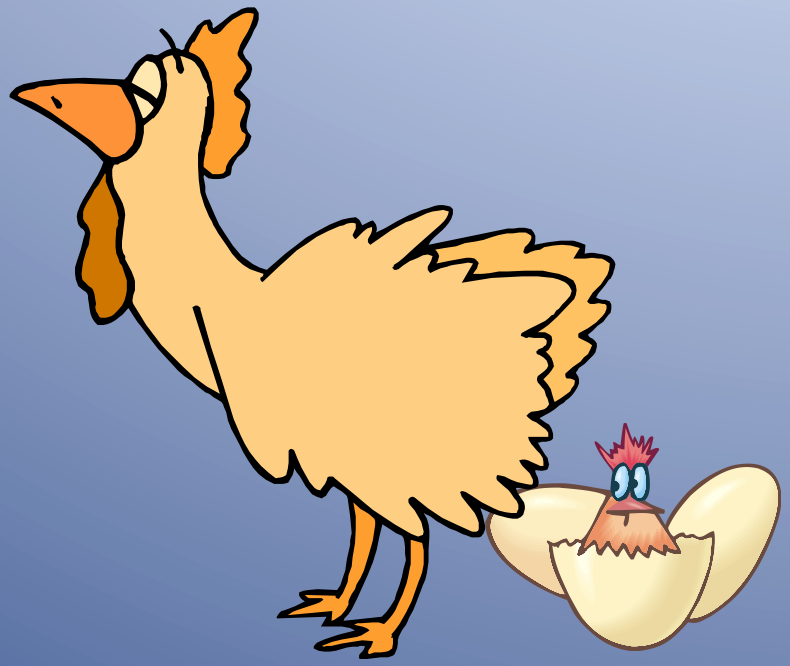
- The research activity and its resulting artefact are of less importance than the execution of, and our learning about, the process of designing artefacts
- The artefact is not the signal outcome for research, rather it provides a venue for the design activity that itself provides the subject for research

Effect-driven IT innovation



~~Req. Spec.~~

Wished-for Effect



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