Role of designing in experimentations

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From research to product development

• The only way to fully exploit research results in product development is to be able to explain the meaning and consequences of the results

• Deployment of research results to product development must be systematic
  – Not dependent on communication skills of researchers

• Minimizing the risks of product development requires that research results gained from pre-product development are
  – reliable
  – justified
Reliable and justified research results

- **Reliable research results**
  - Reliability in research comes from correct application of solid methodology on verifying a focused hypothesis
  - Well-planned and executed experimentation is the key

- **Justified research results**
  - Research results are applicable in product development only if their rationale is known, i.e., they are justified
  - SSUR models carry the rationale from pre-product development to the product development process
Designing vs. experimentations

• Designing ensures that experimentation does not lose its focus
  • If constraints, preconditions and objectives from SSUR models are
    not taken into account, the experimentations are useless for the
    product development
• Experimentations ensure that product development converges
  • Incoherence and inconsistencies are detected early enough, before
    product development has gone badly wrong
SSUR models in designing and in experimentations

• The set of SSUR models generated by pre-product development is not consistent and contains contradictory and incompatible models
  • Even so, it is possible to choose a subset that allows for carrying out an experimentation
  • It is important to explicitly decide which models are considered on each experimentation round and which will be left out for time being.
• The set of SSUR models will never be complete or cover everything.
  • Even trying to create such a set of models will effectively suffocate product development.
Validity of an innovation prototype

- Without a well-designed experimentation, making a working prototype proves nothing
- Two faceted problem
  - Validity of experimentation
    - Using well-known research, data gathering and analysis methods ensures the validity of the experimentation
    - For example qualitative and quantitative methods set different requirements
  - Validity of the prototype as an enabler of the experimentation
    - Using well-known software and hardware design techniques ensures that the prototype works as assumed in experimentation design
    - Examples are design patterns and standards

- Compare to software product development
  - Fulfilling customer requirements
  - Software testing
  - These are completely different problems
Experimentations and designing

• Experimentations can prove only some crucial features of services
  • The role of systematic, analytical and methodologically sound designing is to keep the wholeness manageable
• Designing cannot proceed without reliable knowledge on crucial features of services
  • Experimentations provide the knowledge on the crucial features that have come up during the designing
• Researching design is not designing
• Designing is not as such research or science. It is e.g. how fancy things come to shops for consumers.
Designing an innovation prototype

1. Designing the experimentation
   – Deciding what is to be experimented

2. Designing what is to be implemented
   – Specifying the requirements and approach for implementation

3. Designing how to do the implementation
   – Choosing the way to implement
What a design of experimentation should contain? What is designed?

- Deciding what is to be experimented
  - Explicating research purpose for the experimentation
    - Hypothesis, research question
    - Research method, data to be collected, data analysis methods
    - Prototype as a means for instrumentation of the experimentation
  - Focus of experimentation
    - Explicating scope, restrictions, what is left for later stages

- SSUR models as means for planning and designing
  - Defining the assumed usage situations and enablers
  - Knowledge acquisition, analysis, trial runs and design
What is the design of an experimentation used for?

- **Reaching common understanding**
  - Brokering the viewpoints
  - Concreteness, consistency and coherency
  - Setting a common and fixed focus for the experimentation

- **Narrowing focus improves feasibility and reliability**
  - Focusing properly and focusing once more
  - Concreteness, consistency and coherency
  - Boundaries, what is left for later stages

- **Capturing and keeping in mind the objective**
  - Sticking to the relevant and avoiding all extra ingredients
  - Implementation must be based on the plan, planning cannot be driven by the implementation
What is gained by careful design of an experimentation?

- Designing to facilitate experimentation
  - Determines which factors are crucial for reliability of the experimentation
  - Without designing the experimentation the result ends up as a demonstration, i.e., proves nothing and lacks justification
- Coordination of a team and collaboration of teams
  - Brokering to match objectives, methods and implementations
- The success of next stages depends on this one
  - There is no certainty of validity of information gained from undesigned experimentation and the results cannot be used in product development
  - A prototype is not the primary objective, it is merely an enabler for doing experimentations
  - Without a well-designed experimentation, making a working prototype proves nothing
Contact information

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