

Properties and characteristics of Product-Service-Systems

background

„Ecodesign is concerned with the ecological impacts of products during their physical life cycle. Products are usually encountered in combination with services. Right now, there is no established methodology for designing ‚Product Service Systems‘ (PSS) in a single, integrated process. Neither is there a way to judge ecological impacts of PSS. There are, however

- A) a large number of theories, prescriptive models and methods for generating and evaluating components of PSS (namely products and services) and
- B) practical experiences within companies about generating and providing combined Product and Service offers.“

problem statement

In Industry, PSS are developed through trial-and-error, with little to no regard for environmental impacts.

goal

provide support for PSS design in order to enable consideration of customer and ecological requirements

Research approach (general): use existing PSS case studies and existing design theory and methods; determine commonalities and differences

[Q]: How can PSS structure, behaviour and ecological impact be described at a generic level?

[A]: In design, the concepts of characteristics and properties are fundamental to a generic description of artefacts, allowing for a comparison of variants and evaluation of their relative merits.

hypotheses

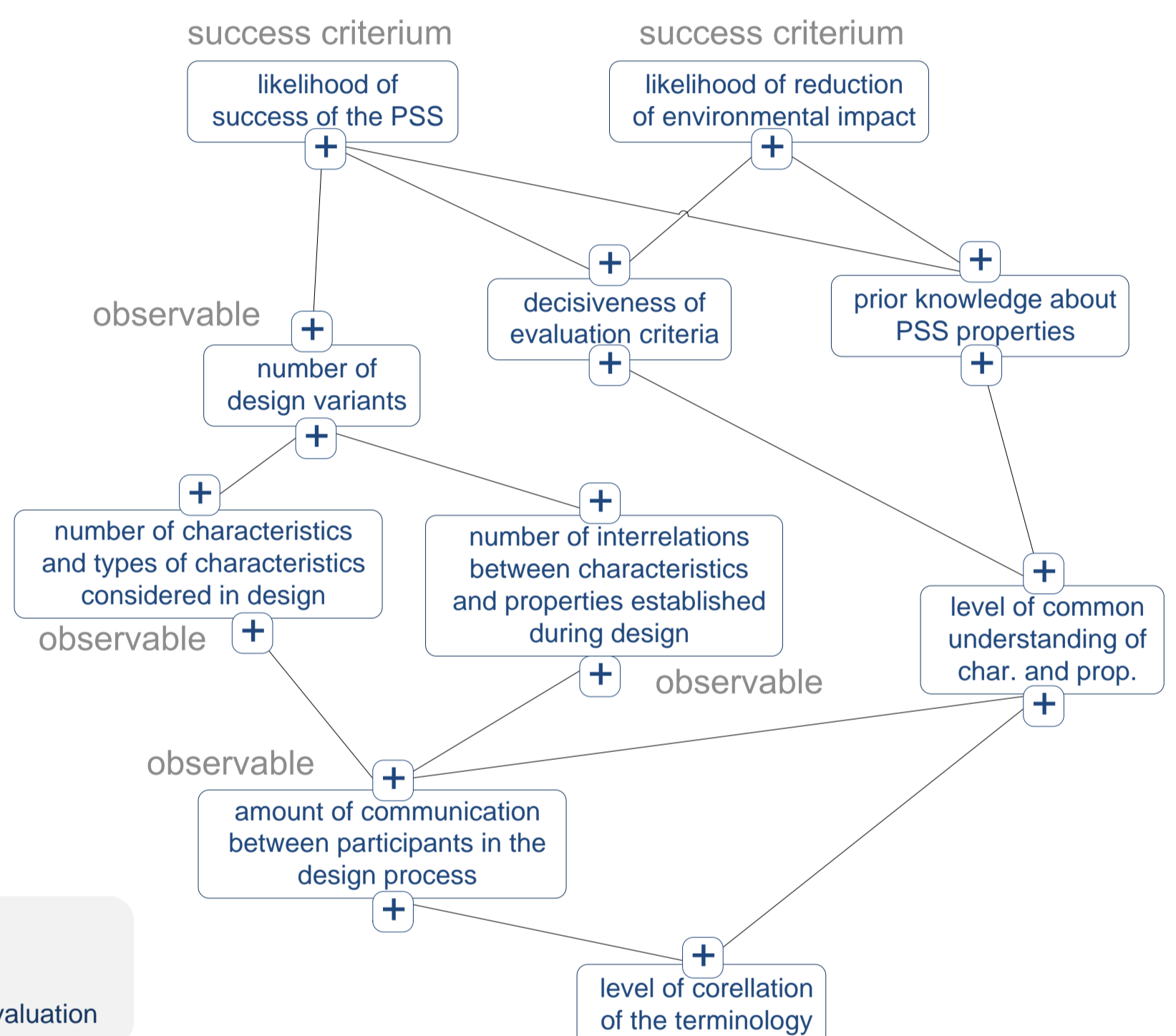
PSS have distinct properties and characteristics, like products, which may be subjected to „designing“. These are:

- the products properties
- the services properties
- additional properties resulting from the interrelation of both

The more properties, characteristics and interrelations between them are considered during design, the better the chance of a successful and ecologically sound PSS*

The more consistent and generic a set of characteristics and properties is, the higher the chance of formulating concise evaluation criteria for variants

*it is even more important to consider the right chars and props at the right time during the design process, but in the current situation (no consideration in a structured way at all), this seems like a decent first attempt



theoretical foundation

design science

- structural models of artefacts
 - characteristics and properties
- process models of product use (use phase)
- evaluation methods
- variant generation methods

ecodesign

- use phase
- ecological evaluation

human behaviour in design

- communication

systems theory

- analytical methods

economic sciences

- service engineering
- service marketing
 - target properties

psychology

- user influence on product use
- user perception of properties

„Design science provides diverse perspectives on the objects and processes of designing. Examples: Designing as problem solving; Designing as an informational process; Designing as a process of narrowing down ‚design space‘. In this context, the process of mapping characteristics of the design object (the PSS) onto properties is relevant. The task in reviewing the theoretical foundation is: determining the contribution of the fields and concepts mentioned to the left to the understanding of PSS characteristics and properties. Since properties only become observable in use processes, this includes a number of fields related to the interaction of users with technical systems (aspects of psychology, economy)“


research approach (refined)

Research approach (refined):

- analyse case studies regarding chars and props of PSS, scope and terminology; determine commonalities and differences
- conduct workshops with members of other disciplines involved in PSS design; use concept mapping to establish a common terminology and information on PSS features
- compile characteristics and properties of PSS; adapt use phase and process models to include those
- apply in PSS design process

expected results

PSS model(s) describing structure of and activities within Product Service Systems

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