Design of Product Service Systems supported by Conceptual Models.



An example of OMILAB Design Tools

- Prof. Xavier Boucher
- <u>xavier.boucher@mines-stetienne.fr</u>
- Mines Saint-Etienne/FAYOL Institute : Sustainable Industrialization of Territorial Ecosystems





WHAT are Product-Service-Systems in the industry ?



Product Service System (PSS) : Product-Service is a value proposition that consists of a mix of tangible product and intangible service designed and combined so that they jointly are capable of fulfilling final customers' needs (Tukker et al., 2006).



Increasing servitisation

PSS : a strategic components of industry 4.0

PSS induce a strong internal transition in industrial companies



All dimensions of the BM are affected by the transition



- Change of innovation and managerial paradigm
 - Transition of client-relationship model
 - ✓ Transformation of economic model & impacting factors
 - ✓ Transition through Digital Technologies
 - ✓ Change of sustainability management
 - ✓ Organisational and process changes
 - ✓ Cultural transformation



Transformation of sytem design capabilities and methods



When designing a PSS what do we design ?

Design Value Creation Processes

- Specification of the value offer, configuration of the value creation network
- Identify/analyse the key value creation factors
- Configure and manage distinct business models depending on each contextual situation

Design Economic Models (costs/revenues)

- Availability or performance sale ?
- Share the added-value amongst all partners of the value creation network
- Impacts of obsolescence, Impacts of service contracts on cash flows (mid and long term)....

Design Usages

- Ability to anticipate and analyse user behaviours
- Anticipate resistances et constraints from consumers ?

Design and manage life-cycles

- Information System, PLM, traçeability ?
- •Environnemental performance?
- •Interdependence between product life-cycles et service life-cycles ...
- Transform usage specifications into adapted service packages? Rapid prototyping of Services ?
 - ... 'intelligent' productnew organisationsCollaborative Ecosystems ...Interoperable information systems

How to cope with the design of 'Product-Service-Systems' ?

WWW.C



Design Integration= to integrate 3 dimensions !



The key point of PSS design = To design a value system





Supporting the design of PSS value proposition with conceptual modeling



Value Scenarios : alternative PSS Offers (Product-oriented, Use-oriented, Result-oriented) which could be delivered on the market – Distinct actors, processes, economic models)

ADOxx meta-modelling platform



Structured modelling procedure



Utility of the modelling tool



Qualitative models, to capture and structure key pieces of information

Cognitive support to make explicit all pieces of information required for offer enginering and help interactions among all design actors



Overall structure



9 Views

PSS STRUCTURE

Structural dimension of the PSS required to formalise the PSS offer architecture and its value creation network.

PSS DYNAMICS

Behavioural dimension of the PSS. Market behaviours linked to the offer and performances factors associated to organisational capabilities. Requirement Product Service Activity Organization Demand

Performance

Scenario

Offer

Example : STRUCTURE - « Requirement view »



DIGIFOF



Example : DYNAMICS- « offer view »





Example : DYNAMICS- « Scenario view »





PS3M Modelling Tool to support BM creation





Gassmann, Frankenberger, and Csik (2014)

PS3M Modelling tools to enrich design thinking approach by concrete and operational knowledge management solution

From PS3M to PSS quantitative decisionmaking



PSS Decision-Making : a direct link between PS3M qualitative modelling and a quantitative simulation platform to assess the alternative value creation scenarios.

