

# DESIGN MANAGEMENT IN A DESIGN OFFICE: DEVELOPMENT OF THE MODEL FOR 'TO-BE'

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## 1 BACKGROUND AND IDENTIFICATION OF PROBLEM /KNOWLEDGE GAP

Within the first paper, problems were addressed and the conclusion was drawn that the design management of the case company is too simplistic. In the second paper, we addressed the literature from the perspective of productive science (techne) to develop the theoretical knowledge base. The problems, the nature of the case study design organization and the knowledge base served this work as requirements and the source for developing a generic and practical new process and design management models. However, we must note that this work reports the first cycle of design science research.

## 2 RESEARCH AIM AND METHODOLOGY

Within this research, the design science research methodology is used. Within this last paper, in the series of three, first, a new theory based design process and management model (“to be”) for systematically managing three complementary dimensions in a case study organization is developed, which is used then for embodiment in design organization.

## 3 DESIGN SCIENCE RESEARCH

### 3.1 Root Cause of Problems

Based on the problems in article one and new theoretical based in article two, we outline here the root causes for problems together with countermeasures inside the brackets: Oversimplified conceptualization of design task (proto-theory of design and design rhetoric for explaining the design process and thinking); assumption that the customer and users know what they need and want, and poor and unsystematic specification of customer/user needs and requirements (design rhetoric, design briefing, quality function deployment, level of development and customer/user involvement); no systematic investigation of design alternatives (morphological charts, choosing-by-advantages, building information modelling and A3-s for reporting and documentation); poor design process management (Last Planner System<sup>®</sup>, design structure matrix, dialogue matrix and the rolling wave concept); design production control as thermostatic model (pull planning and make ready process on phase, lookahead, weekly and daily (huddle meetings) levels, design process metrics and Plan-Do-Check-Act cycle and A3-s for reporting and documentation); and poor design quality management (unit control/testing, checklists; BIM based design coordination for integration and coordination; prototypes, simulations, design of experiments, Taguchi methods and life-cycle optimization for verification; and customer design reviews and briefing for validation; A3 for problem-solving).

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### 3.2 Theoretical Solution Concept for Process Model Development

Based on the proto-theory of design as well as design rhetoric and inspired by the "Vee" model (Forsberg et al., 2005) from systems engineering, first a theoretical high level process model was developed (shown in Figure 1).

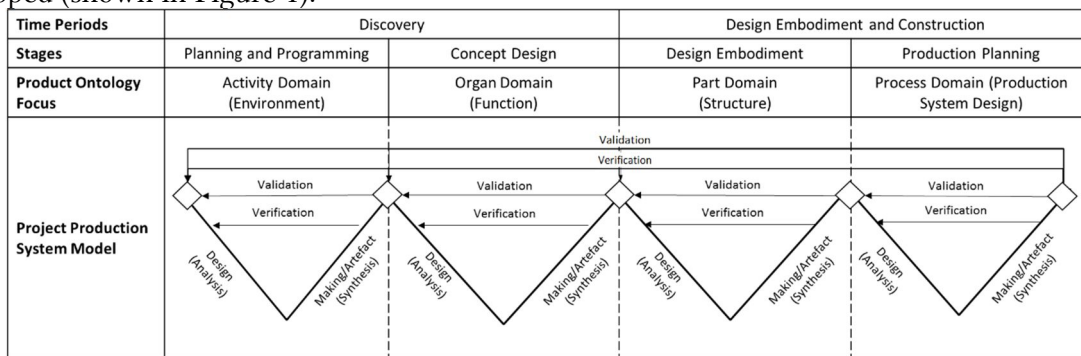


Figure 1. Design project delivery model based on the interpretation of proto-theory of design and rhetoric in design.

In Figure 2, the content of each "Vee" model with steps, reasoning modes and types of activities of design are represented. Rhetoric is concerned with the 'outer' (users, goals, resources etc.) and proto-theory with the 'inner' (function, behavior and structure) environment.

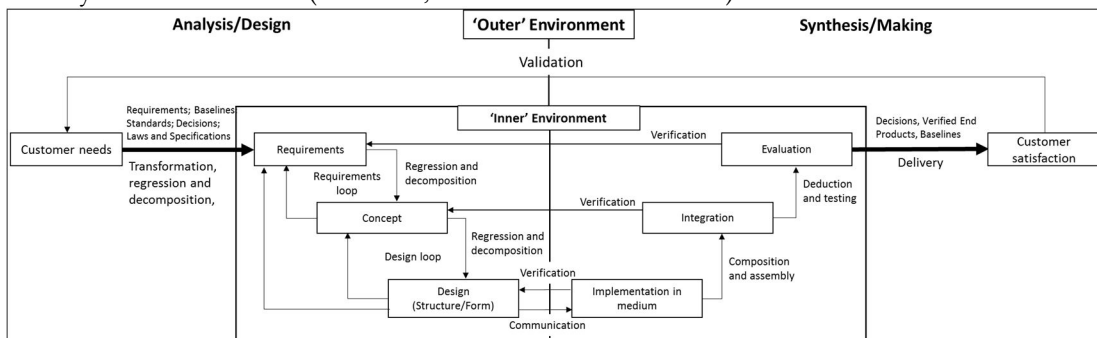


Figure 2. Design synthesis process with reasoning modes (partially adapted from Kapurch (2010)).

### 3.3 Design Embodiment and Evaluation

Within this stage, the researcher together with the members of the design office, designed first the high level process model and then the second level process model. After the process model was development, it was introduced to the whole organization by respective participants from the model development meeting. After several weeks, semi-structured interviews with persons who participated in the new design model development were conducted.

## 4 CONCLUSIONS

Studying and developing a specific method or process model with the aid of a theory (proto-theory of design and rhetoric) is common in design research. In the given context it has allowed us to investigate the current situation and to devise a new theoretical and practical process and design management model for the case study design company. Despite it being the first cycle of design science research, the main conclusion was that the development of the model and its introduction to people in company helped to clarify the overall process and significantly changed the way designers, engineers and managers work.

