Decision Based Project Memory for Design Projects of Innovative Products

Barthélémy Longueville\textsuperscript{*}(\textsuperscript{**}), Julie Stal Le Cardinal\textsuperscript{*}, Jean-Claude Bocquet\textsuperscript{*}

\textsuperscript{**}PSA Peugeot Citroën, 18, rue des Fauvelles, 92259 La Garenne-Colombes, France.
E-mail: barth@pl.ecp.fr, stalj@pl.ecp.fr, bill@pl.ecp.fr

1. Introduction and objectives

Our approach is developed within the framework of knowledge management systems for design projects of innovative products. We observe that if there could be organisational KM Systems for innovative and creative design like expert networks, there are few KM tools to support those activities especially for project processes. The primary objective of our research is to set an overall framework intended to specify KM tools for such projects. This communication presents a decision-making process model that aim to help to specify a project memory by analysis of decision flows. Our model is validated on case study from PSA Peugeot Citroën Automotive Research and Innovation Department.

2. Our approach

Innovative projects are specific organisations that use various resources. On the one hand, actors of these projects use tacit knowledge, or know-how which is not specific to innovation and is pre-existent in the enterprise. This knowledge is relevant to routine design and must be covered by KM systems for routine design. On the other hand, in addition to product development such project lead to knowledge acquisition related to the new technologies and materials used by the project. We observe that this knowledge is unsanctioned and not stabilised due to dynamical aspects (1) of innovation.

Since most knowledge used in design tasks is not specific to innovative projects, and since knowledge creation highly depends on orientations taken in the projects, we assume that the key factors in terms of knowledge creation are relative to decision. Owing to the decision making process, the product developed will or not get value for the consumer. This means that decision-making process determines the success of this kind of projects. According to these hypotheses, we propose to focus our research on project memories that aim to support the decision-making process of projects. There are two main purpose of those memories. On the one hand project memory should support the project by the reuse of any knowledge capitalised relative to the project or other projects. On the other hand, as opposed to approach seeking to capitalize knowledge without perturbing actors, we propose to use project memories as an activity support system. At first it should help actors to understand more clearly their decision space, their goals, their objectives, their role by the activity of formalisation. Consequently the decision making process is not capitalised at first for the future but for an instant use.

3. A model of decision flows

We assume that design projects of innovative products get organised in complex systems. To dread this complexity we propose to use Jean-Louis Le Moigne’s Systemic Theory (2). According to the Decision-Information-Operation System model, a complex system can be decomposed in three subsys-
tems containing processors linked with interactions. In this communication we consider decision making as a process of information transformation. This process is collective and can be considered as a release mechanism of operational activities. The decision making process is materialised by a network of processors (actors, groups of actors, . . .) linked by decision flows. A decision flow is the informational flow from the decision processor to the operational processor that leads to the answer. A Decision flow is characterised by its source and its target along with the nature of the flow itself.

We propose to structure the decision making process by a model based on 2 view. The first view is organisational and leads to the identification and characterisation of decision processors. The second view characterises the decision flows. We use UML (Unified Modeling Language) object oriented language to structure the models. We propose to describe :

- The object of the decision, if it deals with product definition, project processes or organisation and the element of the decision space focused by the decision (alternative choice, evaluation method choice, solution choice, . . .)
- The status of the decision within the overall decision-making process represented by the Decision Time Line model (4) and the links with the design rationale (3)
- The value of the information transmitted by the decision flow.
- The consequences, the impact of the decision on other decisions.
- The links with external elements, strategical objectives, context . . .

4. Conclusion and perspective

Results about this model application in the PSA will be exposed in future papers but we can already draw out how the models can be used and articulated and how they can lead to general recommendations. The type of KM system to be developed highly depends from de decision activities of the project analysed. To begin with, organisational view should help to identify the main processors in the different levels. This shall lead to various conclusion. For instance, this determines if the project depends of decision making process of other projects. This identifies if there is the need for a project memory dedicated to the project or several PM. Thereafter, helped with meeting minutes, and available documents, the main types of decision flows handled by the project must be characterised with the decision flows function and nature view. This reveals what are the main activities of the projects, for instance, if there is more decisions about functional alternatives on the product than decision about the definition of criteria to evaluate technologies. This view shows what the KM system must be applied to, this means capitalisation of criteria, alternatives, constraints, ? This will also show what must be capitalised at first, by identifying what decision are critical by using what we called consequence of the decision identified.

References