INTEGRATION OF NEW DIMENSIONS IN DESIGN PROCESS
Application to the environmental dimension

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Abstract: Clarifying the integration phenomenon applied to the industrial world is the aim of this article. Three attempts of integration of the environmental dimension in product design are analysed. The first one rests on an instrumental change (the addition of a specialized evaluation tool for the environmental actor). The second attempt concerns an organizational and methodological change (the integration of an ecodesign method shared by the design team). The last one deals with a change of governing values and learning schemes to be created within a company (a support for a learning organization). The confrontation of these three attempts allows us to present a "complete" integration process of a new dimension in the design process. This approach (to be experimented) might serve as a guide to integrate other dimensions (ergonomics or aesthetics), new tools or methods (functional analysis, TRIZ method, trends analysis) or new materials or technologies (rapid prototyping, information technology).

Keywords: Sustainable development, environment, ecodesign, innovation, organizational change

1. INTRODUCTION

Product Policy, Factor X, Environmentally Conscious Design and Manufacture [1-2]. The scientific and technical literature has been abounding for 20 years in the field of the DFE (Design For the Environment). The question which appears then is: why not observe a global improvement of the environmental performance of companies?

The reason is that a company wishing to contribute to the Sustainable Development is confronted with a double paralyzing complexity: «how to introduce the fuzzy environmental dimension in the already hyper-constrained universe of the product design process».

In order to avoid this paralysis our problem vision has to be enlarged. The objective is not to modify locally and punctually the industrial activity by the introduction of some environmental tools but "to master" a progressive transformation of the company up to an environmental level. This new vision leads us to postulate the necessity of clarifying the integration process of the environmental dimension in product design; in other words, it is necessary to wonder above all "how" to integrate and not only "what" to integrate.

Our article would like to answer this problematic, by contributing to a better understanding of the integration phenomenon; to do so we shall base ourselves on a second reading of more than 10 years of research aiming at integrating the environmental dimension into the design process (with French companies in the automotive sector). We shall present briefly, in the third, fourth and fifth paragraph of our article, three attempts of integration based on three different vectors of integration.

The three attempts of integration will allow to underline in an independent way, the various facets of an integration project; the reality is however more complex and requires a combination of these three vectors. We shall propose also in the last paragraph of this article, a "complete" integration process of the environmental dimension in company, which articulates in a relevant manner these three vectors.

2. THE DIFFICULTIES TO INTEGRATE A “FUZZY” DIMENSION IN PRODUCT DESIGN

The introduction of a new dimension in the design process is particularly difficult for two reasons. On one hand the place of integration (the design process) is complex and already hyper-constrained:
- It brings in more and more actors, so internal as external to the company,
- It is established by a chain of more and more varied tasks,
- It has to respect more and more constraints (quality, cost and delay).