Chapter 6 How to Recognize an Immutable Mobile When You Find One: Translations on Innovation and Design

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ABSTRACT

Research involved with Actor-Network Theory (ANT) application in engineering domains often crosses through its fundamentals. In fact, exploring trends that envisage ANT as a paradigm that can prove valid in the engineering design field, researchers sometimes enrol in discussions that drive them to its roots. Obligatory Passage Points (OPP) and Immutable Mobiles (IM) are two of the fundamental concepts that need to be revisited. These concepts are critical to understanding innovation in Actor-Networks, especially for the part of IMs. In the pursuit of that understanding, the authors opt to entangle ANT and engineering design and explore a framework based on Programs of Action where actors are represented as taxonomies of competences. These actors are hybrids but, when human, they are mainly engineers engaged in the scope planning and resource management in engineering design projects or processes. This article exercises and develops a constructive process towards a methodology to approach innovation in engineering design. This research is useful for the first stages of the project design process and, in a broader way, to the full cycle of the engineering design process.

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INTRODUCTION

We are exploring ways to build practical methodological approaches to engineering design inspired in ANT. In particular we are concerned with the contribution of the concept of IM, (Latour, 1987) and other ANT constructs, namely OPPs and PAs (Latour et al., 1992), to support engineering design and innovation strategies. In this sense we intend to use ANT not only to describe behaviors, but also to support a new approach to engineering design.

To do that in a sound way we needed to build our research on theoretical ANT grounds which took us to review some of the central concepts in this "Theory". The title of this paper is the result of fresh discussions we entailed concerning the centrality of the concept of IM in innovation and/ or engineering design.

The aim of the paper can be divided in two main goals. The first one is to explore the meaning of some ANT constructs, namely the meaning of IM, an all present concept sometimes confusing and seldom addressed in a systematic way. Then we apply this research to propose a method to follow engineers "in the making" of design (Callon, 1987). This method is deeply supported and imbedded in the ANT fundamentals and is focused on an application to project scope management in engineering design approaches.

Describing innovation processes is not the same as providing explanations of innovation, (Latour, 1991a, 1996) and what we intend is to gain some understanding of the innovation process as a chain of translations. We undertook a review of the literature, a wide and scrupulously chosen sample, contextualized some engineering design processes, distilled some ANT basics, and tried a proposal for the development of a methodological approach to project scope management. Finally we illustrate the use of the methodological framework in a case study as a *thought description*, a "way of knowing" (Schneider & Ingram, 2007). We finally draw some conclusions.

ENGINEERING DESIGN

Ralph Ford and Chris Coulston (2007) defines the Engineering Design domain as a sequence of steps (with iterations) that can be grouped into a *process phase* (Problem Identification, Requirements Specification, and Concept Generation) and a *technological phase* (Detailed Design, Prototyping and Construction, System Integration, System Test, Delivery & Acceptance, and Maintenance & Upgrade), as we depict in Figure 1.

Project Management can be seen as an engineering process where managing and defining scope acquires special importance. Being sometimes poor listeners and too much confident in the possibilities of technology, we, engineers, need to be aware that it is from the quality of these first phases of project management/and engineering design processes that much is earned to the final quality of the product to be designed and developed.

The *process phase* (design) is critical to the definition of the scope of any engineering design project and the view that the design process is not only a technological endeavor but also a social one has already invaded even the most pure technological domains (Cagan et al., 2001). These authors propose a method that intending to manage the "fuzzy front end of product development" recognizes a socio-technical co-evolution of products and markets.

In this schema the transition from Analysis to Development is through translation, a concept that we can intend as "our" ANT basic operation. Our approach to scope management in engineering design projects is constructed trough looking at the design process as something that has to do with the assemblage of things: designers, users, different supports and artifacts, that is, actors. Engineers must assemble things, durable things, but in order to do it creatively they also need to disassemble things. Engineers should be aware of how translation can be a potent instrument to address social concerns as they build their technical systems. 13 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/recognize-immutable-mobile-when-you/65887

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