Standardization Strategies and Their Impact on Partners’ Relationships in Complex Product and Systems: Cases in the Space Sector

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ABSTRACT

In this contribution, the authors investigate the way partners involved in Complex Products and Systems (CoPS) development manage local standards. In particular, this paper analyses how this management impacts the relations between partners through their roles of leader and complementor within platforms. The results are based on a qualitative case study in the launch vehicle segment of the space sector, especially the development of the Ariane 5 and Vega European space launchers. First, the authors find that standards management reveals the firm’s position in a platform as a leader or a complementor. Second, it is shown that standards can be a way for complementors to build new system skills by collaborating with platform leaders. Along with skill building, they allow a firm to challenge the dominant position of the platform leader. Third, the authors show that firms use local standards combined with alliance strategies to manage competitive tensions. Then, the paper discusses literature on standards in CoPS and on leader and complementor’s positions within platforms.

Keywords: Complementor, Complex Products and Systems, Management of Standards, Platform Leader, Space Launchers, Strategy

1. INTRODUCTION

Complex Products and systems (CoPS) are defined as high cost, highly customized, engineering-intensive products, systems, networks and constructs which often require several producers to work together simultaneously (Hobday, 1998). In this specific context, standards, and more specifically “local standards”, are considered a solution to coordinate the different partners of the project (Steinmuller, 2003). The leader of the project defines and selects a set of specifications, potentially derived from industrial standards to achieve coordination and to ensure complementarity between the components of the complex system. To contribute to the project, the different participants are requested to conform to these standards. To some extent, standards shape the relationships.

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between partners. In this contribution, we aim at exploring this strategic perspective on standards. We refer to Cusumano (2002)’s description of the platform leader and complementor’s positions. Cusumano (2002) exposes the strategies from complementors to become leaders or from leaders to maintain their leadership. We explore how standards definition, selection and implementation (De Vries, 1999) can leverage these hierarchical positions. We particularly review the platform leader’s management of standards and question whether these standards are used to reinforce its leadership or not. Then, we adopt the complementor’s viewpoint and question whether standards adoption and implementation constitute a vehicle for skills acquisition. In other words, does standard adoption facilitate capability building for a supplier or a complementor? How far these capabilities contribute in the development of new markets or contesting an installed leadership?

Our contribution is based on Complex Products and Systems (CoPS) cases analysis from the space sector. We specifically review space launch development and production activities. The space sector requires converging technologies (between civil and military in the propulsion domain for instance). In such converging ecosystems, Hacklin et al (2013) have described strategic profiles such as technology pioneer, market attacker, ecosystem aggregator or business remodeler. We adopt this typology to refine the role of standards in the description of the strategic profile of platform leaders and complementors.

The first part exposes the literature on complex products and systems and shows the specific role of standards in coordination, negotiation and firm memory (Steinmueller, 2003). We expose the different strategic profiles a firm adopts in a high technological converging context and link these profiles to the positions of platform leader and complementor. Then, we explore the decisions made upon standard definition, selection and implementation for platform leaders and complementors. The second part exposes the method. The third part presents the results that will be discussed in the fourth part.

2. LITERATURE REVIEW

2.1. Complex Products and Systems (CoPS)

Complex products and systems literature has been focused in the past two decades on the innovation dynamics through different perspectives. Hobday and al. (2000) highlighted that scholars studied the creation of new complex systems and products through firm corporate strategy (Tidd and Trewella, 1997), capability building (Davies and Brady, 1998 ; Prencipe and Paoli, 1999), management practices (Barlow, 2000), organizational forms (Hobday, 2000; Roberston and Langlois, 1999), product life cycles (Bonacorei and Giuri, 2000), government policies (Walker, 2000) and measurements and conceptual frameworks (Hobday and Brady, 2000; Davies and Brady, 1998) to better understand the characteristics of those innovation dynamics and learn about their differences with traditional innovative consumer goods. Typically, CoPS projects are embedded within production networks where alliances are formally developed to structure and coordinate innovation. CoPS tend to be individually developed, tailored and produced in projects or made in small batches for particular customers. Transactions are infrequent, large in value and long in duration. Because high quality requires continuous feedback from users, project management, systems engineering and design involve long-lasting close interactions between buyers and sellers.

CoPS success relies on specific integration capabilities. This feature underlies many of the problems facing production of CoPS such as how a firm achieves “economies of repetition” in order to provide a growing number of similar projects at lower cost and greater effectiveness (Davies and Brady, 1998). However, much of this capability building relies on the knowledge retained for the system integration process. One particular source of knowledge considered in the literature is technical interface standards used as “a collection of explicit rules that permit components and sub-systems to be assembled.
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