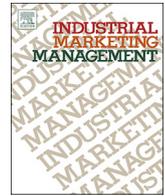




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Research paper

## Multi-sided platforms in B2B contexts: The role of affiliation costs and interdependencies in adoption decisions

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## ABSTRACT

Multi-sided platforms, enabling interactions between different user sides, hold an important place in the contemporary economy. Current literature, focusing on established and successful platforms, has neglected to study B2B multi-sided platform adoption mechanisms. In this article, we analyze these mechanisms by investigating the case of dematerialization platforms for B2B transactions between the multiple actors involved in public works contracts. Various qualitative materials, including 28 semi-structured interviews, were gathered over a thirty-month period. Adopting a business user perspective, this study contributes to the literature on multi-sided platforms in various ways. We show that platform adoption, in project-based B2B contexts, is mainly constrained by a high level of affiliation costs and the existence of tight-interdependencies between users' activities at project level. Thus, a consecutive adoption path would result in negative cross-group network externalities and undermine the platform's attractiveness. Conversely, a concurrent adoption path would activate positive network externalities and encourage platform adoption decisions.

## 1. Introduction

As early as 2006, Eisenmann, Parker and Van Alstyne pointed out that many of the products and services making up the modern economic environment share the characteristic of linking two or more distinct user groups. The trend then increased, with a growing number of industries organized around two-sided platform-based markets (Kang & Downing, 2015), especially “new economy” industries (Hagiu, 2009, p. 1) that relied on digitization. Researchers in industrial economics and management science have been interested in two-sided markets (or, more generally, multi-sided markets) (Rochet & Tirole, 2003, 2006) since the turn of the century. According to Sriram, Manchanda, Bravo, Chu, Ma, Song, Shriver and Subramanian (2015, p. 142), two-sided platforms “refer to intermediaries that facilitate economic interaction between two sets of agents wherein the decisions of one set of agents are likely to have an effect on the other via direct and/or indirect externalities.” Examples of two-sided platforms include credit cards and video game consoles. Platforms become multi-sided when they bring together more than two sides of users, such as social media platforms (users, advertisers and content developers), online marketplaces (sellers, buyers and

advertisers), and integrated ride-sharing and food delivery platforms (drivers, riders or customers and merchants).

The various sides of users are interdependent insofar as the advantages that one group gains from using the platform depend on the number of users that join the platform in the other groups (Armstrong, 2006; Rochet & Tirole, 2006). Therefore, the main challenge to successful adoption for multi-sided platforms is to get the two (or multiple) sides “on board” (Rochet & Tirole, 2006, p. 645). Previous research on multi-sided platform adoption dynamics suggests that an effective solution to this issue is first to attract one of the sides on the platform and then to leverage cross-group network effects to get the other sides on board (Hagiu, 2006; Hagiu & Wright, 2015; Muzellec, Ronteau, & Lambkin, 2015). Most studies focus on pricing structure as a key factor in platform adoption (Armstrong, 2006; Cabral, 2019; Hagiu, 2009; Liu, 2010; Rochet & Tirole, 2006). In particular, a suitable price discrimination strategy may be to subsidize one user segment while making a profit from the other sides (Sriram et al., 2015).

Three limitations can be identified in this literature. First, while authors agree that many markets are multi-sided (with several segments of interdependent end-users), the theoretical literature mainly focuses

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on two-sided markets for expositional simplicity. Researchers tend to consider that the insights obtained for two-sided platforms also apply more generally to multi-sided ones (Rochet & Tirole, 2006). In similar vein, most of the empirical literature investigates cases of two-sided platforms (Kumar, Lahiri, & Dogan, 2018; Muzellec et al., 2015; Sriram et al., 2015). However, multi-sided markets are “*more complex in that they serve a variety of distinct entities with diverse interests*” (Tan, Lu, Pan, & Huang, 2015, p. 250). Second, the examples that are most often given in research on multi-sided markets are C2C platforms (when a platform connects various individuals, such as platforms for exchanging services between individuals or online dating platforms) or B2C platforms (when a platform connects organizations with individuals, such as online search engines connecting firms that display adverts with individuals looking for information, or recruitment platforms that connect firms offering jobs with job seekers). Studies focusing on B2B platforms, where a platform connects organizations with other organizations, are far scarcer. Few cases have been studied to date, apart from the noteworthy exception of the research by Tan et al. (2015). Third, most papers based on formal modeling have focused on characteristics of established, successful platforms, and not on the launch of new platforms (Evans & Schmalensee, 2010), even though “*failure to launch*” is a critical issue (Cabral, 2019, p. 3). Similarly, most qualitative empirical research has investigated successful platforms (Muzellec et al., 2015; Tan et al., 2015). Conversely, platforms that have to deal with difficulties at launch have not received much attention, despite the fact that they illustrate the challenges inherent in successful adoption.

The present research attempts to fill these gaps by analysing platform adoption mechanisms in a B2B multi-sided context. To address this issue, we empirically investigated the perplexing case of dematerialization platforms in French public works contracts. By replacing paper documents with electronic ones from the call for tenders through to payment, these platforms should offer significant productivity gains to the different business participants involved in a contract. Yet, our empirical analysis shows that these platforms face important adoption issues, while providing insights into the underlying reasons. Most literature on multi-sided platforms tends to analyse the orchestration strategies that are (or should be) implemented by platforms, sometimes leading them to become platform leaders (Gawer & Cusumano, 2014; Helfat & Raubitschek, 2018), rather than the difficulties that potential users have to handle for adopting a specific platform. Examples of multi-sided platform leaders include Amazon, Alibaba and Google's Android operating system and store. Our approach is different as we report a case in which we thoroughly take the business users' point of view into consideration beyond the platforms' perspective. In addition, there was no clear platform leader in the sense that the users' perceptions and behaviors toward dematerialization platforms were not being driven and aligned in an integrative way by a strategizing architect.

Our study contributes to the literature on multi-sided platforms in various ways. First, we question the importance of pricing policy to drive platform adoption in the presence of high affiliation costs (Hagiu & Wright, 2015). Our findings allow to better understand why affiliation costs arise in a B2B context, and how they may undermine the adoption of a multi-sided platform. Second, we highlight the importance of additional interdependency issues in project-based B2B contexts beyond the number of users on each side of a platform, and explain how they may impact cross-group network effects. Third, we show that under tight interdependency constraints, failure to attract the various sides of users at the same time can make a multi-sided platform less and less attractive even as the user base grows. In complex project-based B2B contexts, getting one side on board before attracting the others may not be the best solution to stimulate platform adoption.

The paper is structured as follows. We begin with a brief literature review on the topics of two-sided and multi-sided platforms. The next section describes the methodology adopted and details the data collected. We then provide an in-depth analysis of the main findings, discuss the conceptual insights derived from them, and assess the

theoretical and managerial implications. Finally, limitations and further research avenues are identified.

## 2. Literature review

This section, dedicated to the theoretical framework of multi-sided platforms, is broken down into two parts. We first define multi-sided platforms and then present the main factors influencing the platforms adoption path.

### 2.1. Multi-sided platforms: definition and nature of the issue

The Economics and Management literature puts forward various more or less inclusive and more or less precise definitions of multi-sided platforms (Armstrong, 2006; Caillaud & Jullien, 2003; Evans & Schmalensee, 2008; Hagiu & Wright, 2015; Rochet & Tirole, 2006). However, three main characteristics stand out in particular.

The first characteristic is that multi-sided platforms enable direct interactions between two or more types of economic agents (i.e. two or more distinct sides) (Hagiu & Wright, 2015) that make all users better off (Evans & Schmalensee, 2013). From this perspective, they act as intermediaries (Eisenmann, Parker, & Van Alstyne, 2006), providing a common (real or virtual) meeting place for entities that “*need each other in some way*” (Evans & Schmalensee, 2008, p. 667). To illustrate this, Evans and Schmalensee (2008) propose examples of four different types of two-sided platforms (the simplest form of multi-sided platforms): exchanges for matching activities (e.g., dating services, employment services and e-commerce websites like Ebay), advertising-supported media (magazines, newspapers, free television...), software platforms (central in major industries like video games or personal computers) and transaction systems (e.g., payment methods such as credit cards). Dematerialization platforms belong to the latter category, as they provide infrastructure and services to facilitate interactions and exchanges between distinct groups of entities (Eisenmann, Parker, & Van Alstyne, 2009). The second characteristic is that each side is affiliated to the platform. This means that “*users on each side consciously make platform-specific investments that are necessary in order for them to be able to directly interact with each other*” (Hagiu & Wright, 2015, p. 163). The investment or affiliation costs could be a fixed access fee, but also resource-related expenditures (time and money needed to learn to use it) and opportunity costs. Management scholars have recently pointed out that a multi-sided platform can sometimes present the characteristics of an ecosystem defined as “*a set of actors with varying degrees of multilateral, nongeneric complementarities that are not fully hierarchically controlled*” (Jacobides, Cennamo, & Gawer, 2018, p. 2264). Nongeneric complementarities require platform participants to make specific investments that are not perfectly fungible in a context of strong interdependencies (Jacobides et al., 2018). Finally, most multi-sided platforms are also characterized by the presence of cross-group network effects or cross-group externalities between the two or more customer groups participating on the platform (e.g. Armstrong, 2006; Caillaud & Jullien, 2003). A cross-group network effect means that the utility to users in at least one group depends on the number of users in the other group that joins the platform (Rochet & Tirole, 2006; Roson, 2005).

At its early development stage, the theory of multi-sided markets (Armstrong, 2006; Caillaud & Jullien, 2003; Parker & Van Alstyne, 2005; Rochet & Tirole, 2003, 2006) was closely linked to the theories of network externalities initiated by Katz and Shapiro (1985, 1986). In most cases, cross-network externalities are positive. For instance, in the video game industry, greater involvement by video game developers materializes in more games, which increases a console's value for players (Lee, 2013). However, externalities may also be negative. According to previous studies, two main factors can generate negative network externalities: the quantity and the quality of other platform users (Akerlof, 1970; Evans, 2012; Rochet & Tirole, 2006). In the first case, a growing number of platform users can harm the platform's

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