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Effectiveness of control mechanisms in mobile platform ecosystem

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ABSTRACT

Mobile Internet services are offered by complex ecosystems, which are difficult to control. While control theory has been applied to traditional forms of interorganisational software development, it is yet unclear how input, behavioural and output control should be used to manage complex ecosystems. This paper analyses the impact of a portfolio of ecosystem control mechanisms on a set of performance criteria through a survey. We find that ecosystem leaders manage dependencies among partners through a combination of outcome and behavioural control. In contrast, access to complementary resources is achieved through input and behavioural control. The ecosystem leaders also safeguard customer relationships from other partners through a combination of outcome and behavioural controls. The study extends traditional control theory towards the emerging realm of platform-based mobile service development.

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1. Introduction

Mobile Internet services are being offered in increasingly complex platform-based ecosystems of app developers, content providers, device players and telecom operators (De Reuver, 2011; Peppard and Rylander, 2006; Basole and Karla, 2011). Typically, such ecosystems emerge around a shared platform, such as an operating system, which is used by a range of firms to offer a range of mobile services. Only few actors manage to lead such an ecosystem in sustainable manner, as for instance 7 out of 50 mobile platforms hold 97% of the total mobile market (Basole and Karla, 2011) leaving very little role for others. Governing such ecosystem is challenging as ecosystem leaders have to balance various issues (Darking et al., 2008), relating to their own interests (e.g., maintaining customer ownership) as well as the ecosystem health and interests (e.g., managing interdependencies and assuring access to resources).

Control theory deals with the issue on how a powerful actor manages relationships with others. Although multiple dimensions of control exist, typically three core dimensions of control are discerned: input, output and behavioural control (Ouchi, 1979; Snell, 1992). Control theory has been applied to various domains, such as retail salespeople (Eisenhardt, 1985), marketing executives (Jaworski and MacInnis, 1989) and information systems projects (Beath, 1987; Kirsch, 1996, 1997; Kirsch et al., 2002). Regarding in-house software development, research has been done on choice and application of specific control types in IT projects within the organisation (Kirsch, 1996, 2004; Kirsch et al., 2002; Nidumolu and Subramani, 2003)

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and the effects of formal control on innovation and team performance (Cardinal, 2001; Henderson and Lee, 1992). Regarding outsourced and offshore software projects, extensive research has been done on the design, evolution and performance impact of portfolios of control (Choudhury and Sabherwal, 2003; Gregory et al., 2013; Rustagi et al., 2008; Srivastava and Teo, 2012; Tiwana and Keil, 2007, 2009).

However, software development in ecosystems organised around platforms is fundamentally different from traditional modes. Ecosystem leaders typically do not have formal authority over application developers or other partners, but rather work with them in a loose fashion (Tiwana et al., 2010; Goldbach and Kemper, 2014). The generativity of platforms allows unprecedented amounts of actors to work together, thus creating a large and complex network of partners; the ecosystem leader should somehow control. While the importance of maintaining control over a software platform has been acknowledged (Tilson et al., 2010), few studies have examined control mechanisms empirically.

The objective of this paper is to address the above gaps. We examine how input, behavioural and output control impact a platform ecosystem leader's multiple objectives in the context of multi-organisational collaboration in a platform based ecosystems. We do so by analysing the results of a survey among mobile ecosystem participants.

The remaining part of this paper is structured as follows. In the next section (Section 2) we discuss the underlying theoretical foundation of the research focusing on ecosystems and organisational control, upon which we develop hypotheses. Section 3 describes the research methodology in detail. Results of our quantitative analysis are provided in Section 4. In Section 5, we discuss results, implication, limitations and suggestions for further research.

2. Background

2.1. Control theory

The dominant model of organisational control theory is developed by Ouchi (1977, 1979) and later expanded by many researchers (Eisenhardt, 1985; Snell, 1992; Govindarajan and Fisher, 1990; Choudhury and Sabherwal, 2003). As per definition of Fisher (1995) "control is used to create conditions that motivate the organisation to achieve desirable or predetermined outcomes" (p. 25). Three main types of control can be distinguished: behavioural, input and outcome control (Ouchi, 1979; Eisenhardt, 1985; Snell, 1992; Kirsch, 1996, 1997; Kirsch et al., 2002; Johnson, 2011). While other types of informal and formal control exist, the above subdivision provides a 'parsimonious framework' and other specific manifestations of control like social and clan control can be explained by these three control types (Johnson, 2011).

2.1.1. Behavioural control

When a desirable behaviour necessary for a task is identified and can be observed, behavioural controls are recommended (Govindarajan and Fisher, 1990). Behavioural control is mostly implemented by explicitly specifying the appropriate behaviour (e.g. development methodology, internal testing guideline) that can be observed and evaluated by the dominant partner (Kirsch, 1997). Behavioural controls need more supervision, effort and time, as well as a better understanding of the underlying processes. Sometimes, behaviour controls are assumed to have a negative impact on creativity and innovation (Adler and Borys, 1996). In mobile ecosystems, behavioural control would for instance concern imposing procedures on how applications should be developed and offered to end-users.

2.1.2. Outcome control

In an outcome control scenario, the focus is limited to understanding, evaluating and monitoring the results. Partners are free to decide how they will achieve the desired outcome. Although outcome control focuses mostly on outcome-based incentives, there may be elements of punishment for failure to achieve the goals (Merchant, 1985). One of the drawbacks of this control mechanism is that, often, the controller focuses on outcomes that are easy to measure on the expenses of more important yet difficult to measure objectives (Kerr, 1975; Merchant, 1985). In mobile ecosystems, the most important outcome controls are division of roles and differentiated revenue share agreement with partners.

2.1.3. Input control

Input control is used to acquire specific skills and experiences (Snell, 1992; Cardinal, 2001). Partners are selected and admitted because they can provide desired resources. Input control helps in building trust among partners as the overall cultural and belief systems of the network is better managed (Johnson, 2011). In mobile ecosystems, input control would for instance be related to selection criteria on which actors are allowed to enter the ecosystem and offer applications to users.

Earlier work on control in platform-based ecosystems is scarce. Ghazawneh and Henfridsson (2013) propose that boundary resources can be used to control platform and its ecosystems in the context of third party software development. They find that boundary resources can resolve the paradox of the simultaneous control and generativity. However, an important issue is that boundary resources can lead to the platform being taken over by other parties, thus the ecosystem leader losing its position. Eaton et al. (2015) build on the boundary resource construct and propose a process model explaining the emergence and evolution of boundary resources. Goldbach and Kemper (2014) analyse how different control modes in software based platform affect developers' intention to stay with a particular platform. None of the earlier studies relates different types of control to a multitude of objectives of an ecosystem leader.

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