

# Coordinating Platform-Based Multi-Sourcing: Introducing the Theory of Conventions

*Research-in-Progress*

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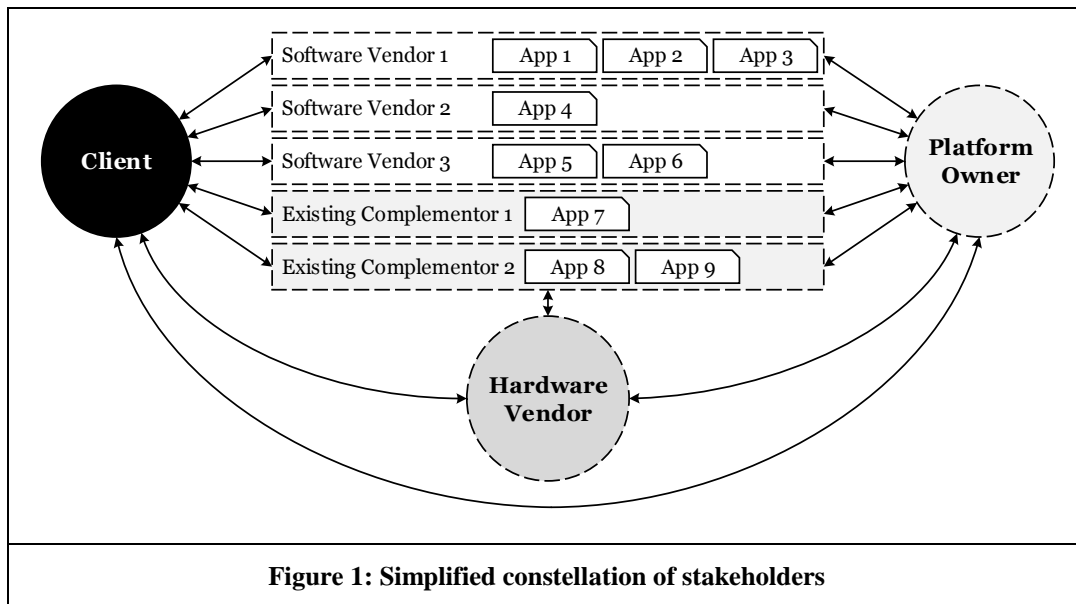
## Abstract

*Spurred by the consumer market, companies increasingly deploy smartphones or tablet computers in their operations. However, unlike private users, companies typically struggle to cover their needs with existing applications, and therefore expand mobile software platforms through customized applications from multiple software vendors. Companies thereby combine the concepts of multi-sourcing and software platform ecosystems in a novel platform-based multi-sourcing setting. This implies, however, the clash of two different approaches towards the coordination of the underlying one-to-many inter-organizational relationships. So far, however, little is known about impacts of merging coordination approaches. Relying on convention theory, we address this gap by analyzing a platform-based multi-sourcing project between a client and six software vendors, that develop twenty-three custom-made applications on a common platform (Android). In doing so, we aim to understand how unequal coordination approaches merge, and whether and for what reason particular coordination mechanisms, design decisions, or practices disappear, while new ones emerge.*

**Keywords:** Multi-sourcing, Platform ecosystem, Theory of Conventions, Coordination, Interdependency

## Introduction

Within the last decade, smartphones and tablet computers, together with app-based mobile software platforms and complementing modular applications, successfully conquered the consumer world (Boudreau 2012; Tiwana 2013). Simultaneously, this conquest began to redefine the way employees consume, markets offer, as well as companies deploy and maintain IT (Harris et al. 2012). However, to meet the needs of business that exceed basic administrative tasks, companies rarely rely on standardized, ready-to-use applications in app stores. Instead, they complement mobile software platform ecosystems with specifically commissioned applications. Procter & Gamble, for instance, equipped its workforce with Apple iPads and a portfolio of more than 50 custom-made apps (Apple Inc. 2011). By this means, companies merge two known inter-organizational forms of cooperation. On the one hand, they rely on mobile software platform ecosystems. Mobile software platform ecosystems define the relationships between one platform owner (Jarillo 1988; Messerschmitt and Szyperski 2003) and a virtually unlimited number of independent software complementors (Tiwana et al. 2010), that are coordinated through standardized interfaces, general agreements, modularity, or predefined design rules (Kude et al. 2012; Tiwana et al. 2010; Vitharana 2003). On the other hand, companies enlarge these ecosystems through custom applications, and attempt to benefit from its unique governance setting in order to mitigate the development risks through multi-sourcing (Bapna et al. 2010; Cohen and Young 2006; Levina and Su 2008; Su and Levina 2011; Wiener and Saunders 2014). Accordingly, companies engage in a novel platform-based multi-sourcing setting, visualized in Figure 1.



Despite its desirable benefits, platform-based multi-sourcing implies a clash of two different coordination approaches towards the underlying one-to-many relationships. Mobile software platform ecosystems, on the one hand, rely on generalities (Kude et al. 2012). Specified by a platform owner, these generalities determine the identical terms for every associated complementor (Tiwana et al. 2010). Multi-sourcing settings, on the other hand, rely on bilateralism between a client and each assigned software vendor, combined with only few generalities (Bapna et al. 2010). Thus, in order to benefit from the advantages promised by platform-based multi-sourcing, clients need to merge the coordination approaches of mobile software platform ecosystems and multi-sourcing.

Coordination approaches are characterized by macro-level organizational design decisions and coordination mechanisms (cf. Crowston 1997; March and Simon 1958; Thompson 1967), as well as micro level coordination practices, describing how design decisions and coordination mechanisms are executed (cf. Faraj and Xiao 2006; Okhuysen and Bechky 2009). While literature analyzed both aspects in much

detail, there is a lack of understanding about how such coordination approaches merge, and whether and for what reason particular mechanisms, design decisions, or practices might disappear over time, while new ones emerge. To shed light on the question, we chose to apply the theory of conventions.

The theory of conventions lends itself to understand how individuals coordinate through conventions (Diaz-Bone 2011). In the context of our study, conventions refer to individual interpretations of overarching values and the actions involved (Latsis et al. 2010). The theory recognizes the duality of conventions in that they both shape and are formed through the actions and interpretations of the involved actors (Boltanski and Thévenot 1991; Boltanski and Thévenot 2006; Denis et al. 2007; Diaz-Bone 2011). In terms of clashing coordination approaches, the theory of conventions provides therefore an excellent tool to explore how they merge, and whether and for what reason particular mechanisms, design propositions, or practices might disappear over time, while new ones emerge. Simultaneously, the theory of conventions enables a more explicit focus on the impacts of particular mechanisms and design decisions on coordination practices and vice versa.

To analyze such merging coordination approaches, we build on a revelatory, explorative single case study about a complex, platform-based multi-sourcing project. The investigated case involves one client, one mobile software platform owner, one hardware vendor and twenty-three custom-made applications that were simultaneously developed by the internal IT department and six software vendors. Characterized by both the aspects of a mobile software platforms and multi-sourcing, the case is ideal to explore the underlying research question of this study through the lens of the theory of conventions:

*How do existing coordination approaches from multi-sourcing and mobile software platform ecosystems merge, and affect the coordination in a platform-based multi-sourcing setting?*

This paper is organized as follows. First, we lay out the broad theoretical framework of the study beginning with a short overview about the aspect of coordination, before we lead over and introduce the theory of conventions. Thereafter the analyzed case, its selection and the study's research design are described. Ultimately, we outline expected contributions, and limitations.

## **Theoretical Foundations**

In this section, we introduce our understanding about the literature on coordination, before we discuss the theory of conventions, as one promising, yet barely applied, framework for analyzing how clashing coordination approaches behave in a novel inter-organizational context.

### ***Coordination***

Simplified, coordination derives from the division of labor into multiple subtasks that presupposes a specialization of individuals or groups, which then need to coordinate their actions for creating an interdependent outcome (Heath and Staudenmayer 2000). In this regard, coordination represents an immemorial and continuous challenge within groups of human beings. This is particularly true for organizations and their need for orchestrating various tasks towards a shared outcome. On this account, it is not surprising that coordination represents one major aspect within organization theory (Crowston 1997; Gkeredakis 2014; Heath and Staudenmayer 2000). Summarizing the corresponding literature, we may distinguish two broad periods with different research foci. First, research focused on coordination as an organizational design problem, solvable through coordination mechanisms. In the second period, coordination was conceptualized as an activity of individuals or groups in conjunction with the underlying coordinating mechanisms and design decisions (Okhuysen and Bechky 2009):

Originally, the issue of coordination was taken into consideration a century ago in early management literature by Frederik Winslow Taylor (1911) or Henri Fayol (1917). Fayol (1917), for instance, described coordination as the harmonization between all the acts of an organization in order to facilitate efficiency and success. At the same time, he deemed coordination as one of the five critical functions in management (Smith et al. 1995). March and Simon (1958), then introduced the notion of interdependencies as one explanation for why organizations need to coordinate. In their view, interdependencies arise through the specialization of individuals and groups, evoked by a division of labor that presupposes in turn the coordination through feedback and by plan. Thompson (1967) advanced these suggestions and identified three particular interdependencies, – pooled, sequential, or reciprocal – aligned on a Guttman scale (i.e.

the interdependencies are classified in a specific order of precedence, where higher ordered interdependencies include each lower interdependencies), and specified corresponding coordination mechanisms. Over the years, research in this tradition extended these suggestions with further coordination mechanisms: *plans and rules, objects and representations, roles, routines, ad proximity* (Okhuysen and Bechky 2009).

In recent years, however, research on coordination went over towards understanding the coordination practices, thus, how these design propositions and coordination mechanisms are executed (Okhuysen and Bechky 2009). Thereby, previous literature on coordination remains uncontested, but broadened through the understanding about the coordination practices of the concerned individuals and organizations. As a consequence, recent management, organization, or information systems literature, focused on what individuals actually do for coordinating (Gkeredakis 2014). Faraj and Xiao (2006), for instance, analyzed expertise and dialogic coordination practices in a medical trauma center, Majchrzak et al. (2007) introduced transactive memory systems theory for the coordination in emergent response groups in the aftermath of catastrophic events, and Jarzabkowski et al. (2012) applied a practice perspective and consider coordinating as a dynamic activity.

This shift indicates that each coordinative task maybe characterized by its own coordination approach, composed of coordination mechanisms and practices. In situation of clashing coordination approaches, however, there is a lack of understanding about how they merge towards new combinations, but also, whether and for what reason old mechanisms or practices might disappear, and new ones emerge. To shed light on this uncertainty and to understand how such modified preconditions affect the issue of coordination, but also to remain amendable to multiple coordination mechanisms and practices, we chose to apply the theory of conventions.

### **Theory of Conventions**

The theory, or more precisely the economy of conventions (EC), consulted in this article, builds on the French convention school and the consolidation of two, so far independently treated issues: On the one hand, it incorporates the characterization of agents and their reasons for acting. EC pursues therefore the objective of gaining an understanding about how actors achieve cooperation despite potentially divergent values (Boltanski and Thévenot 1991; Boltanski and Thévenot 2006; Denis et al. 2007; Diaz-Bone 2011). On the other hand, EC introduces the aspect of normative value frameworks in the interactions between individuals (Denis et al. 2007; Thévenot et al. 2005). Referring to this, literature on EC distinguishes between six non-exhaustive value frameworks, denominated as metaphysical worlds: *market, industrial, domestic, opinion, civic, and inspired*:

The *market* world refers to the price as mode of evaluation. Monetary information are central to this world. The *industrial* world accentuates measurable objectives, such as productivity, efficiency, or standardization. The *domestic* world relies on traditions ruled by esteem, reputation, or loyalty due to assigned roles, duties, or status. The world of *opinion* derives from the public recognition or fame. In doing so, judgements about actors are critical. The *civic* world refers to a collective interest that is capable of suppressing particular interests in the pursuit of a common good. Ultimately, the *inspired* world describes the legitimacy of spontaneous visions, imaginations, and the creativity of actors, which largely obviates the reliance on the recognition by others (Boltanski and Thévenot 1991; Boltanski and Thévenot 1999; Boltanski and Thévenot 2006).

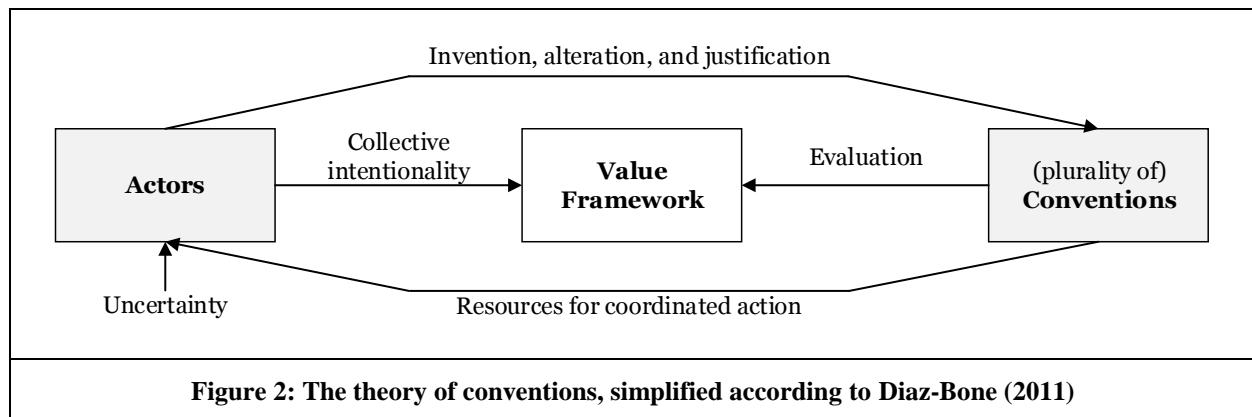
Yet, in the majority of cases, classifying actions in these six value frameworks is impossible. Instead, EC envisages that actions rely on their combination (Denis et al. 2007). These combinations – referred to as conventions – define shared inter-personal logics about how to coordinate and evaluate actions, individuals, and objects in situations that are marked by uncertainty (Diaz-Bone 2011; Eymard-Duvernay 1989; Levy 2002; Salais 1989; Thévenot 1989).

Existing conventions support therefore actors as heuristics for justifying their actions in a first place (Diaz-Bone 2011). An employee who is uncertain about the expectations of his new employer, for instance, necessarily relies on the value frameworks known to him. On this account, he might rely on the domestic world, as he gets a new haircut, grooms his beard, and gives his shoes a shine. Yet, he might also rely on domestic information of his new colleagues about when to begin work, where to eat lunch, or when to go back home. Thus, the new employee consciously or unconsciously relies on various valid conventions within

his socially accountable group, or set of groups. The same may be true for platform-based multi-sourcing: Thus, entering this novel setting, the individual actors might rely on conventions known either from previous multi-sourcing projects or from the development of applications for mobile devices.

However, conventions are not necessarily carved in stone, but can be criticized in society and organizations (Denis et al. 2007). For instance, actors might contest existing conventions, as they feel that some fundamental value frameworks are not, or only to an unsatisfactory degree, respected (Boltanski and Chiapello 1999). Moreover, changes in the environment may even alter the legitimacy of one or multiple worlds (Denis et al. 2007). In turn, actors might challenge known conventions to comply with these new value frameworks. According to Boltanski and Thévenot (1991; 2006), actors may consequently try to restore normative legitimacy of conventions in two ways: Actors might either become involved in short-term local and superficial compromises, or attempt to negotiate durable agreements that respect the competing worlds in a more integrated way (Denis et al. 2007).

Concisely, we may view the EC as a cyclical model between conventions and actors. Conventions, on the one hand, represent compromises between various value frameworks. Actors, on the other hand, employ these conventions in situations of uncertainty and therefore consciously or unconsciously coordinate their actions with others. Yet, the environment as well as the actors might challenge these conventions. Figure 2 visualizes a version of the theory of conventions according the suggestions of Diaz-Bone (2011).



### ***Explaining Coordination through Convention Theory***

The theory of conventions lends itself to understand how different logics about coordination affect the way actors behave, but also how these actors challenge these logics (Latsis et al. 2010). Therefore applying the EC in the novel context of platform-based multi-sourcing is due to multiple reasons appealing:

First, the EC considers the importance of existing conventions, each representing the combinations of aspects from overarching value frameworks, in situations of initial uncertainty (Boltanski and Thévenot 1991; Boltanski and Thévenot 2006; Diaz-Bone 2011). In platform based-multi-sourcing, this might imply that actors initially rely on known conventions from either multi-sourcing projects or application developments for the consumer world.

Second, EC explicitly assumes that conventions might coexist and actors consequently judge about their appropriateness. Accordingly, actors might switch between conventions or seek for compromises (Diaz-Bone 2011). In other words, the coordination approaches of multi-sourcing and mobile software platform ecosystems merge and actors proceed by cherry picking and adapting selected conventions, while dropping others, and creating new ones.

Third, EC assumes the environment might change conventions (Denis et al. 2007). Thus merging the multi-sourcing approach with the concept of platform ecosystems might alter existing conventions, known from previous experiences of the actors in both areas. For instance, developing on a platform of a dominant platform owner might augment the importance of the world of opinion, while traditions of the domestic

world within the client firm might eclipse. This maybe related with recent developments in coordination theory, which has increasingly focused on change in coordination, triggered through changes in the environment (cf. Cardinal et al. 2004; Choudhury and Sabherwal 2003; Gregory et al. 2013; Kirsch 2004).

Ultimately, EC hypothesizes that actors might consistently test current conventions pertaining to their accordance with the value frameworks (Denis et al. 2007; Latsis et al. 2010). In the development of applications, actors might test, for instance, conventions after each sub-step. This might already be true for traditional development procedures, but especially in agile development.

While the traditional understanding about coordination suggest specific coordination mechanisms, and research that is more recent focused on coordination practices, the theory of conventions provides a promising tool for understanding how coordination approaches merge, coordination mechanisms and practices disappear, or emerge.

## **Design and Methods**

### ***Case Selection and Empirical Context***

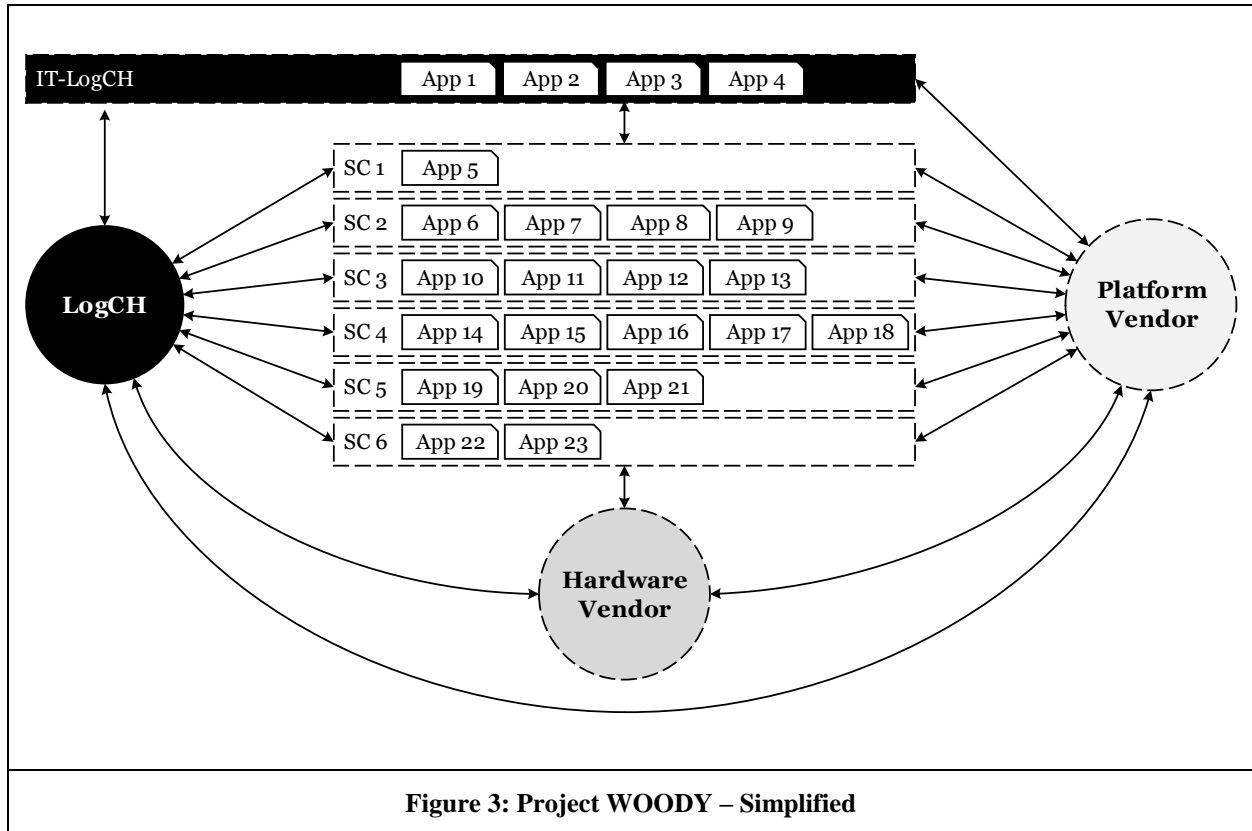
Platform-based multi-sourcing settings are a novel, yet rapidly spreading phenomenon. However, reported cases remain scarce. Due to this recentness and the phenomenon's previous inaccessibility to inquiry, we chose to conduct an in-depth revelatory single case as appropriate approach (Yin 2009). For this purpose, we selected WOODY, a complex platform-based multi-sourcing project of particular importance for the internationally operating logistics service provider LogCH. WOODY represents thereby an exemplary project, as it merges the idea of employing a standard mobile software platform with the desire of various custom-developed applications from multiple software vendors.

Initial position for project WOODY was the urgent need to replace the mobile devices that supports the logistics staff in their daily tasks. So far, LogCH utilized a classic professional product that was developed specifically for the needs of logistic companies. These devices, however, were confronted with four challenges: First, the guaranteed support for the monolithic Microsoft CE 5.0 software platform ended in the fourth quarter of 2014. A further operation of the system in the daily business was therefore rather negligent. In addition, knowledge about the used programming language became scarce. This resulted in the developers' resistance to change anything in the actual code. In turn, needed extensions became, if at all, hardly realizable. Second, the inseparable bond between the hardware and the monolithic software maneuvered LogCH into a dependency relationship. Hence, it was impossible to solely upgrade or replace any of the components. Third, the hardware vendor had decided to stop the production of hardware components, such that spare parts would not be available in the near future. Fourth, the device solely supported the outdated GSM mobile transmission standard. This standard has become, however, too slow for modern and data intensive business applications such as directions or encrypted payments. Moreover, national mobile communications providers indicated the near end of this technology for 2016. To overcome these problems, LogCH subsequently initiated project "WOODY".

The prime task of the WOODY project team was two-sided. On the one hand, it had to avert the four challenges of the current device with a new solution. On the other hand, they were instructed to prevent similar challenges in the future. To this end, they began to contest the inseparable bond between the hardware and the monolithic software, as well as the fussiness of expanding the portfolio of functionalities. For them, only a strict independence between the mobile device, the mobile software platform, and the required functionalities for the departments "mail", "logistics", and "point of sale" would guarantee the longevity of the next solution. Comparable with smartphones and tablet computers of the consumer world, this independence promised a simplification for updating and replacing particular components. At the same time, it enabled LogCH to commission custom-developed applications from multiple internal developers and external software vendors. Combined with the chosen agile scrum-based development approach, LogCH expected to cut development time and costs accordingly.

The chosen procedure for a new solution was tripartite. In a first step, LogCH evaluated well-known mobile software platforms from the consumer world (i.e. Apple's iOS, Google's Android and Microsoft's Windows). Due to the stipulation of a strict interdependence between the components, LogCH eventually selected Google's Android operation system. In a second step, LogCH assigned six software vendors in a standardized World Trade Organization (WTO) bidding procedure and defined 18 applications. Each of the

six software vendors was then assigned to a first individual application. Thereafter, they had to tender for each additional one. Additionally, LogCH assigned the internal IT department (IT-LogCH) as a seventh software vendor, entrusted with the development of core applications and the seamless integration into the existing IT infrastructure. At present, these seven development teams completed 23 applications. Ultimately, LogCH selected the hardware. Figure 3 provides a simplified overview about the involved stakeholders of the project, together with the developed applications.



### Data Collection and Analysis

We chose an explorative and retrospective case study approach to conduct an in-depth longitudinal investigation of a complex platform-based multi-sourcing project (Yin 2009). In doing so, and for triangulation reasons (Eisenhardt 1989; Yin 2009), we focused on three types of qualitative data: semi-structured interviews and informal discussions, document analysis, and observations.

In November 2014, the authors were able to conduct a first informational interview with the project leader of WOODY. The actual data collection through semi-structured interviews only began in April 2015, after the approval of proposed research project by LogCH, and is ongoing. Every interview is conducted in accordance with Myers and Newman’s (2007) recommendations for qualitative interviews. Interview partners were either selected through purposive sampling or snowball sampling (Yin 2011). For this purpose, the authors initially identified and contacted the important target parties of the project (e.g. the project team, the software vendors, the internal IT department, or the clients) as well as distinct roles (e.g. scrum masters, business analysts, product owners, architects, and developers). In a second step, the authors asked the respective interview partners about recommendations for further interview partners. In the period of April 2015 to August 2015, the authors conducted 24 semi-structured interviews with an average duration of 1.5 hours and a range from 55 minutes to 2 hours and 15 minutes. In the following months, we expect to increase this count by approximately 20 more interviews. So far, every interview was conducted on site, with one exception via Skype, in German or Swiss German language. Each interview is tape recorded

and transcribed immediately after the respective interview in German language. Once transcribed and reviewed, the interviews are sent to the respective interview partner for revision and approval. In addition to the transcripts we established contact summaries according to Miles et al. (2013).

Simultaneously, we supplement the interview data with two types of archival data. On the one hand, project documentation provides us with insights into the overall project, the initial requirements, or certain involved key personnel. On the other hand, contracts, guidelines, or plans provide us with insights into the constellation of the involved actors, or the terms and conditions these parties have/had to conform. Along with the interviews, we may better understand why contracts, guidelines or plans specify certain issues, while they elide other aspects. Ultimately, the first author attended one scrum meeting with the remaining software vendor to get an impression about the collaboration between the various parties.

So far, data analysis is ongoing and not yet exploitable. In the current data analysis we follow Pentland's (1999) and Pettigrew's (1990) suggestion for an iterative process of data analysis and theory building (Miles et al. 2013). In a first step, we coded data by means of prevailing and comprehensive theoretical considerations about coordination. On this account, we primarily rely on the framework of Okhuysen and Bechky (2009). In a second step, we chronologically grade the data to reconstruct changes that occurred during the project and their relationships with other events. Ultimately, we aspire to find general patterns that are capable of explaining how existing coordination approaches from multi-sourcing and mobile software platform ecosystems merge, and whether and for what reason particular mechanisms, design decisions, or practices might disappear over time, while new ones emerge. During this three-step coding and analysis process, we continuously rely on NVivo 10.

## **Discussion**

This study pursues the goal to understand how coordination approaches of two distinct inter-organizational one-to-many relationships – i.e. software platform ecosystems and multi-sourcing software development – merge, and whether and for what reason particular coordination mechanisms or practices disappear over time, while new ones emerge. We address by this means a gap in coordination literature. So far, literature on coordination focused either on organizational design propositions and coordination mechanisms, or on coordination practices. However, there is a lack of understanding about the combination of these two foci in terms of coordination approaches, and about how such coordination approaches might change due to external shocks. With our study, we attempt to address this gap as we aim to understand the change process in consequence of merging inter-organizational one-to-many relationships. In doing so, we investigate a complex, platform-based multi-sourcing project between one client, represented by three organizational divisions, its internal IT-department, six software vendors, as well as one hardware vendor and one software platform owner. Even though further analysis are required, we provide in the next two sections the expected contributions and limitations of our study.

### ***Expected Contributions***

With our study, we expect to contribute to both theory and managerial practice in multiple ways.

First, we try to understand coordination in platform-based multi-sourcing. In respect thereof, we introduce a novel inter-organizational setting, which has not yet received any attention. Consequently, we expect our study to be revelatory.

Second, we expect to contribute to the infant literature on the dynamics of control, coordination, and governance (cf. Cardinal et al. 2004; Choudhury and Sabherwal 2003; Gregory et al. 2013; Kirsch 2004). Here we shed light on the role of higher-level coordination approaches for explaining change. Hence, we analyze how different coordination approaches merge, and whether and for what reason particular mechanisms or practices disappear over time, while new ones emerge.

Third, we should try to integrate two research streams within the general literature about coordination, introduced in the background section. On the one hand, we appreciate the research stream that dealt with coordination as an organizational design problem, which are seen solvable through coordination mechanisms (cf. March and Simon 1958; Thompson 1967). In our opinion, these organizational design decisions and coordination mechanisms remain essential for the coordination of interdependent tasks. On the other hand, we find it crucial to consider the actual coordination practices that describe how design



decisions and coordination mechanisms are executed (cf. Faraj and Xiao 2006; Okhuysen and Bechky 2009).

Fourth, we expect to contribute to the nascent literature on coordination in multi-sourcing software development projects. So far, the guardian vendor or modularization of tasks have been proposed as interesting avenues for further research (Bapna et al. 2010). This study contributes to this literature in two regards: First, our study integrates both the guardian vendor as well as the modularization suggestions. Second, our study enlarges the aspect of coordination in such projects through further coordination mechanisms such as representations through an agile, scrum-based development approach, or the enforced proximity through shared office spaces provided by the client.

Fifth, we introduce the theory of conventions as a novel and rarely considered approach in current management, organizational, and information system literature (see Denis et al. 2007; Gkeredakis 2014 as rare examples), that has the potential to explain how existing coordination approaches from multi-sourcing and mobile software platform ecosystems merge.

Ultimately, we anticipate providing decision makers with insights into a novel form of inter-organizational cooperation, which integrates the fundamental ideas of mobile software platform ecosystems with the customizability due to multi-sourcing. In addition, we expect to provide insights about how to cope with merging coordination approaches that might otherwise remain overlooked by decision makers.

### ***Limitations***

As a concluding reflection, we point the limitations of our study. First, our study exclusively relies on information from shared and discretionary documents, semi-structured interviews, as well as from informal meetings and observations. Moreover, most of our data rely on retrospective interviews. Thus, even though this reduced the risk of data overload, and while we took triangulation measures to ascertain the validity of our findings, respondents might still have had the opportunity to conceal valuable information. Second, our study relies on a – what certain interviewees called it – a “once in a lifetime” project. Consequently, the anticipated results might not be applicable for other, smaller, or less prestigious projects. In addition, we relied on a revelatory single case study within one country. Thus, it would be favorable for future research to investigate these issues in further, less prestigious projects and different culture areas.

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