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EVOLUTION OF B2B PLATFORM ECOSYSTEMS: WHAT CAN BE LEARNED FROM SALESFORCE?

Research Paper

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Abstract

Platform ecosystems are complex ecologies of firms with individual competencies and collective objectives. The sustainable evolution of platform ecosystems is thereby contingent on taking advantage of the individual competencies of the ecosystem's actors toward obtaining collective objectives. To learn more about platform ecosystem evolution and dynamics, we study Salesforce, a leading and thriving B2B platform ecosystem. We find that the ecosystem's evolution was closely defined not only by the platform owner's orchestrating initiatives, but also by its complementors' and customers' competencies and particularities. Specifically, we derive three distinct dimensions of evolution, namely the extension of the platform core technology, the extension of the platform's functional scope, and the industry-specific specialization of the platform. We further identify three cross-dimension levers, namely proprietary developments, acquisitions, as well as partnerships and alliances, which were employed by the platform owner to drive its platform ecosystem's evolution.

Keywords: Platform Ecosystem, Digital Platform, Evolution, Enterprise Software.

1 Introduction

Platform ecosystems are becoming the new organizing logic of many industries as exemplified in telecommunications (e.g., iOS, Android), video games (e.g., PlayStation, Xbox), and enterprise software (e.g., Salesforce, SAP) (de Reuver et al., 2018; Yoo et al., 2010). Each platform ecosystem is marked by a digital platform as a technological foundation that offers a core functionality shared by the modules that interoperate with the respective platform (Baldwin and Woodard, 2009; Tiwana et al., 2010). Beyond the technical aspect, platform ecosystems are socio-technical phenomena as each digital platform functions as the nexus of its ecosystem of peripheral firms or individuals that produce extensions complementary to the given platform (Jacobides et al., 2018). Therefore, as a new way of organizing interdependent innovation activities (Cennamo and Santaló, 2019; Yoo et al., 2012), a platform ecosystem is orchestrated by a *platform owner* to leverage the competencies of a plethora of *complementors* to co-create and offer specialized products and services to *customers* (Ghazawneh and Henfridsson, 2013; Haki et al., 2019; Blaschke et al., 2019). As such, the evolution of a platform ecosystem is characterized as a co-evolutionary process with complex interactions between the technical (related to the digital platform's technology and functionalities) and the social (related to the activities and contributions of the ecosystem actors) aspects (e.g., Selander et al., 2013).

Platform ecosystems need to constantly evolve to maintain and/or improve their competitive position in an ever-changing environment. From a platform owner's perspective, this not only requires

continuously developing the platform's technology and functionalities, but also constantly aligning the diverse interests and competencies of the ecosystems' heterogeneous actors to ensure the ecosystem's sustainable evolution (Tiwana et al., 2010). There is a widespread consensus in existing research that successfully managing a platform ecosystem is an inherently dynamic process that requires substantial resources and coordination (Gawer, 2014). Nonetheless, there is little evidence on how platform ecosystems develop and thrive over time indicated by a limited number of studies focusing on platform ecosystem dynamics and evolution (Rietveld and Schilling, forthcoming; de Reuver et al., 2018). Further, essential contributions of all the ecosystems' heterogeneous actors significantly delineate the platform ecosystem's evolution (Yoo et al., 2010; Selander et al., 2013). Nevertheless, extant research predominantly investigates digital platforms and platform ecosystems from the platform owner's perspective due to its orchestrator role in the ecosystem (Selander et al., 2013; de Reuver et al., 2018). Therefore, studying the long-term evolution of platform ecosystems from the perspective of all ecosystem actors (i.e., platform owner, complementors, and customers) is of considerable value for both research and practice to better understand the long-term implications of technology-related and ecosystem's actors-related design decisions.

To bridge this void, this study aims to illustrate how a platform ecosystem evolves in a co-evolutionary process through which the technology and functionalities of the digital platform (the technical aspect) and the diverse activities and contributions of the network of ecosystem actors (the social aspect) mutually influence one another. While a considerable portion of existing platform research is centered around consumer-focused or trading platform ecosystems (e.g., Apple's iOS, Google's Android, Amazon.com), our focus is on B2B platform ecosystems. Several of the particularities of B2B ecosystems make it particularly suitable for studying platform ecosystem evolution from a co-evolutionary perspective. For example, the high dependency of a platform owner on complementors and customers (e.g., Ceccagnoli et al., 2012; Foerderer et al., 2019). Therefore, we specify the following research question: *How does a B2B platform ecosystem evolve in a co-evolutionary process with respect to its technical (related to the digital platform's technology and functionalities) and social (related to the activities and contributions of the network of ecosystem actors) aspects?*

To answer the research question, we conduct an exploratory study on the case of Salesforce, a leader in the global CRM market and an evolving B2B platform ecosystem that has considerably thrived over the last years. Our study provides process theory-based insights into Salesforce's main evolution steps and specifies these steps in three overarching dimensions of evolution, namely the *extension of the platform core technology*, *extension of the platform's functional scope*, and *industry-specific specialization of the platform*. We further reveal that Salesforce as the platform owner employed some cross-dimension levers (i.e., *proprietary developments*, *acquisitions*, and *partnerships and alliances*) to drive the evolution of the ecosystem.

2 Research Background

In this section, we introduce our conceptualization of platform ecosystems, the main discourses on platform ecosystem evolution, and the particularities of B2B platform ecosystems.

2.1 Platform Ecosystems

As the nexus of platform ecosystems, digital platforms are software-based technological foundations upon which peripheral business actors produce their own products and services (Tiwana et al., 2010; Gawer, 2009). Although digital platforms as IT artefacts have an essentially technical basis, they do not exist in isolation (Bonina et al., forthcoming; de Reuver et al., 2018). As socio-technical systems, the technology and functionalities of the digital platform are surrounded by complex ecologies of firms with individual and collective, intertwined interests (Cennamo and Santaló, 2019; Jacobides et al., 2018; Bonina et al., forthcoming). In such complex ecologies of firms, while the platform owner offers the platform core, *complementors* extend the core through their complementary add-ons (Jacobides et al., 2018). Since connecting to the platform enables complementors to gain access to the

platform's customers (Cennamo and Santaló, 2019), they have a common interest in the prosperity of the central platform for materializing their own products or services (Selander et al., 2013). Ultimately, *customers* derive certain values from the offerings jointly provided by the platform owner and complementors. The platform owner in its role as an orchestrator of the entire ecosystem simultaneously needs to improve the technological core while constantly aligning the interests and competencies of all actors involved in the ecosystem (Tiwana et al., 2010). The resulting co-evolution of technical and social aspects creates self-reinforcing feedback loops that may affect the ecosystem in turning participants both into collaborators and competitors (Moore, 1993; Walley, 2007; Selander et al., 2013).

2.2 Platform Ecosystem Evolution

Following a static approach has been somewhat dominant in the existing digital platforms and platform ecosystems research (de Reuver et al., 2018) resulting in only a limited number of studies on platform ecosystem evolution (Rietveld and Schilling, forthcoming; Gawer, 2014; Staykova and Damsgaard, 2017). Nevertheless, providing thorough insights into the sustainability and success of platform ecosystems requires a close investigation of the journey and the evolution path along which platform ecosystems develop and thrive over time. Thus, recent work has already begun to acknowledge that platform ecosystems are dynamic and consider them as evolving phenomena. In doing so, existing research particularly focuses on specific technical or social aspects in theorizing platform ecosystem evolution. From a technical perspective, existing research, for instance, discusses the continuous addition of new features to the platform (e.g., Eisenmann et al., 2011) or the ongoing modification of application programming interfaces (APIs) to alter platform access (e.g., Um and Yoo, 2016). From a social standpoint, the focus of research is specifically on the platform owner due to its role in orchestrating the ecosystem. Further, current studies also examine the evolving relationships and mutual influences between distinct groups of ecosystem actors, such as the platform owner and complementors (e.g., Lindgren et al., 2015), complementors and customers (e.g., Song et al., 2018), or customers with one another (e.g., Spagnoletti et al., 2015).

Acknowledging the importance and necessity of the provided insights by existing research into specific aspects of platform ecosystem evolution, we complement the existing research by following a co-evolutionary and multi-faceted approach to the study of platform ecosystem evolution. On the one hand, we posit platform ecosystem evolution as a co-evolutionary process between the technical (the technology and functionalities of the digital platform) and the social (the activities and contributions of the engaged ecosystem actors) aspects. On the other hand, such a co-evolutionary process can be more thoroughly comprehended when platform ecosystem evolution is studied from the perspective of all ecosystem's actors, i.e., platform owner, complementors, and customers. We do so in the understudied context of B2B platform ecosystems (e.g., Hein et al., 2019) due to their particularities in revealing the dynamics of relation between all the ecosystem's actors.

2.3 B2B Platform Ecosystems

Similar to consumer-focused platform ecosystems, B2B platform ecosystems employ adaptations of the innovative mechanisms for organizing complementor and customer transactions (e.g., app stores, rating systems). However, with respect to our objective to study evolution from a multi-actor perspective, B2B platform ecosystems are specifically relevant due to their particularities that put complementors and customers more to the fore front of the ecosystem. Some of these particularities are as follows: the provision of highly complex and industry specific services to customers that requires much more diligent integration of the ecosystem's complementary resources contributed by heterogeneous actors; the broader spectrum of complementary resources provided by the external actors (e.g., development, implementation, consultancy, or training); the negligible power distance between the ecosystem actors as the platform owner (e.g., Salesforce), complementor firms (e.g., Accenture), and customers (e.g., ABB) are often all big players in their respective industry; the higher complexity of customer requirements that need to be solved through a flexible integration of resources

provided by both the platform owner and complementors (Ceccagnoli et al., 2012; Foerderer et al., 2019; Schreieck et al., 2017; Hein et al., 2019; Riemensperger and Falk, 2020; Blaschke et al., 2018).

3 Methodology

The investigation of platform ecosystem evolution requires an in-depth study of a platform ecosystem (Rietveld and Schilling, forthcoming; Staykova and Damsgaard, 2017) considering the digital platform itself as well as all engaged actors in the ecosystem (de Reuver et al., 2018; Tilson et al., 2010). Therefore, we opt for a single-case study approach for two reasons. First, the comprehensive study of a platform ecosystem entails the need for inclusion of all ecosystem's actor groups. Therefore, we investigate one platform ecosystem with all of its actor groups to account for an in-depth investigation of the given ecosystem. Second, due to our longitudinal perspective, a single-case study approach is suitable to study the same case at different points in time. We also adopt an exploratory perspective in our research owing to the study's objective in unfolding the underpinning co-evolutionary process in the longitudinal development of a platform ecosystem.

3.1 Case Selection and Description

We opt for Salesforce, a prime example of a thriving B2B platform ecosystem in the enterprise software industry. Our inquiry includes Salesforce's evolution over the course of the last 15 years, starting in 2005 when Salesforce launched its marketplace for enterprise software and began facilitating an ecosystem of external actors. Due to its long history as a platform ecosystem as well as the large number of complementors and customers in the ecosystem, the study of Salesforce specifically enables us to investigate the long-term evolution of B2B platform ecosystems from the perspectives of the different actors involved.

Salesforce's main products are advertised as a *Customer 360* with different modules related to sales, customer service, marketing, and e-commerce. All customer data can be aggregated across the different modules to create innovative cross-channel customer experiences through the combination of functionalities from different modules. When launching a commercial marketplace (*AppExchange*) in 2005, which enables complementors to sell complementary applications to Salesforce customers, Salesforce also created a developer environment (*Force.com*) upon which third-party software developers can build their applications. Until today, Salesforce has attracted more than one million registered developers on *Force.com* and more than 3'500 applications are currently offered on the *AppExchange*. Further, Salesforce initiated several collaborations with partners external to its ecosystem to integrate their offerings into the Salesforce platform ecosystem (e.g., with Microsoft to integrate its calendar). Moreover, Salesforce also relies on registered implementation consultancy providers, who support customers with respect to complex implementation projects.

With these offerings provided by the platform owner and complementors, Salesforce has attracted more than 150'000 customers, ranging from small businesses to multinational large enterprises. Customers can buy licenses for different modules on a pay-per-use basis and have the possibility to extend these modules with the applications provided by complementors. In addition, Salesforce offers several tools (e.g., a proprietary programming language) to customers to customize their modules.

In the interplay of different actors, Salesforce as platform owner plays the role of orchestrator of the platform ecosystem. However, as Salesforce strongly relies on the offerings provided by complementors and the specific requirements of a plethora of customers, the evolution of the ecosystem as a whole is defined by all actors together.

3.2 Data Collection

We collected data from July until October 2020 by means of semi-structured interviews to get first-hand insights from informants in the Salesforce ecosystem. We conducted 15 interviews with an average duration of 63 minutes per interview.

Due to the exploratory nature of our research, we derived interview questions based on the roles, interests, concerns, and competencies of the ecosystem's actors to explore their contribution as well as their perspectives to the evolution of the whole ecosystem. More specifically, we intended to collect data on the following points: How does each of the actors (i.e., platform owner, complementors, and customers) understand the ecosystem (e.g., the core and side offerings); What is each actor's role in the ecosystem and in relation to the other actors; What were the major developments in the ecosystem that considerably impacted the roles of actors and the values that they derive from the ecosystem; What were the major changes that considerably impacted the evolution of the ecosystem as a whole. In addition, in each interview we collected data about the temporal sequence of the major changes in the ecosystem to later elaborate on their relations in provoking one another.

Ecosystem Actors	Organization (or pseudonym); Interviewee (Position / Unit / Experience ¹)
Platform owner (Salesforce)	Platform owner (Salesforce)
	- Program Architect Director / Customer Success Group / 20, 5 (PO-1)
	- Senior Director, Product Management / Community Cloud / 16, 5 (PO-2)
	- Vice President, Product Management / Developer Platform / 19, 10 (PO-3)
	- Senior Director, Solution Engineering / Solution Consulting / 30, 12 (PO-4)
	- Business Architect Director / Customer Service Group / 32, 5 (PO-5)
	- Senior Executive, Global Professional Services / Customer Success Group / 29, 12 (PO-6)
	- Program Architect Director / Customer Service Group / 20, 6 (PO-7)
	- Senior Executive, AppExchange & ISV Enablement / AppExchange / 19, 16 (PO-8)
Complementors	Complementor #1 (Developer): A USA-based provider of an end to end DevOps solution with more than 100 employees and offices in North America and Europe. - Chief Technology Officer / Product Development / 19, 7 (CO-1)
	Complementor #2 (Developer): A USA-based provider of industry-specific cloud and mobile software with more than 500 employees and offices in North America, Europe, Asia, and Latin America. - Chief Digital Transformation Officer / Customer Success & Strategy / 25, 2 (CO-2)
	Complementor #3 (Developer): A USA-based provider of integration software for applications, data, and devices with more than 2'000 employees and offices in North America, Europe, and Latin America. - Senior Customer Success Architect / Customer Success / 23, 10 (CO-3)
	Complementor #4 (Implementation consultant): A Spain-based provider of Salesforce consultancy services with more than 120 employees, offices in two countries. - Chief Executive Officer / 21, 12 (CO-4)
Customers	Customer #1: A Germany-based producer of building materials and construction systems with more than 35'000 employees and offices in more than 85 countries. - Senior Manager, Sales Excellence / Group Marketing / 6, 6 (CU-1)
	Customer #2: An Ireland-based industrial gases and engineering firm with almost 80'000 employees in more than 100 countries. - Director, Applications / IT / 20, 15 (CU-2)
	Customer #3: A Kenya-based non-for-profit organization that has developed several funding programs to support education and to fight famine. - Founder & Sponsor Development / 30, 8 (CU-3)

Table 1. Organizations and Profile of the Interviewees.

In the following, we describe the steps that we conducted (1) before, (2) during, (3) and after the interviews to ensure a consistent data collection in line with our research objective: (1) To get a comprehensive view of the different perspectives in the ecosystem, we opted for collecting data from all three actor groups involved in the ecosystem: the platform owner (Salesforce), complementors (e.g., software developers, implementation consultancy service providers), and customers. Since Salesforce is the orchestrator of the ecosystem, we decided to conduct a large portion of the interviews with Salesforce employees in different roles. For identifying potential interviewees, requirements were

¹ Years of professional experience, years of experience in current firm.

business and/or technology roles in relation to Salesforce as well as in-depth familiarity with Salesforce and its ecosystem. Table 1 provides an overview of our interviewees and their organizations. To ensure consistency of the data collection procedure, we also developed a comprehensive interview guideline comprising interview questions and an introduction to the project team and objectives. Further, in accordance to our ecosystem view in data collection, we adapted the interview guideline and its constituent questions with the role of each interviewee's organization in the Salesforce ecosystem (owner, complementor, or customer). In the case of interviews with Salesforce employees, we also adapted the interview guideline depending on their functional area inside Salesforce. Prior to each single interview, we shared the interview guideline several days in advance with interviewees along with an interviewee factsheet (to collect interviewee's demographic data such as position, department, location, and years of experience). Besides the primary data collected through interviews, we also gathered secondary data including publicly available documents (e.g., business reports, news articles). The secondary data was only employed to enhance our understanding of the case, specifically on the details of the major changes in the studied platform ecosystem. (2) The majority of interviews were conducted by two researchers. We recorded all the interviews with the consent of the interviewees and later transcribed them verbatim, except for one interview for which we created notes during the interview session. (3) Next to the transcribed interviews that we used as the basis for data analysis, the researchers involved in each interview reflected on and documented the major insights that they gained from each particular interview immediately after the corresponding interview. In addition, after every few interviews, the research team had a discussion on new directions that emerged during the so far conducted interviews that we previously did not consider. The latter discussion sessions stimulated the parallel conduction of data collection and analysis steps and the results of these discussions were documented in the form of notes and visualizations.

3.3 Data Analysis

Next to our parallel conduction of data collection and analysis steps, we employed process theory to analyze the longitudinal process of platform ecosystem evolution at Salesforce. Similar to our research objective, process theory is frequently employed to examine how organizational phenomena evolve over time (Markus and Robey, 1988; Mohr, 1982; Pettigrew, 1997; Van de Ven and Huber, 1990). Process studies analyze three main components, namely antecedents, events, and outcomes. *Antecedents*, which trigger an *event*, consist of external (e.g., the technological and business environments) and internal (e.g., mechanisms imposed by the platform owner) contextual factors. In turn, *outcomes* are the results of each *event*. As such, a *process* represents a sequence of collective events unfolding over time to give meaning to a phenomenon's status-quo (Pettigrew, 1997). In the context of our study, each event corresponds to a major change in Salesforce's platform ecosystem that can be considered as a turning point in the way the platform ecosystem evolves and emerges over time. After coding for the main events and their corresponding antecedents and outcomes, we coded the relation between events with respect to, for instance, the engaged platform ecosystem actors in the respective event. This approach enabled us to classify these major events according to their impact on the platform and the ecosystem. For example, initially we identified several different outcomes of events from a technical perspective (e.g., improved technology, higher integration capabilities, new programming language), but also from the perspectives of the involved complementors (e.g., lower transaction fees, better enablement services, new business plan assessment) and customers (e.g., improved documentation, voting for new features, improved customer community). We then categorized the codes into higher level meta-codes as part of an exploratory process in step-by-step coding of the data (Eisenhardt, 1989). While we applied process theory to analyze the data in a structured way, the goal was not to merely derive episodes of change or to explain the antecedents and outcomes of each event, but to identify patterns that describe how the ecosystem has evolved over time. After conducting this procedure in an iterative fashion, our coding endeavor resulted in exploring three distinct *dimensions* of platform ecosystem evolution that specify in which directions, why, and how the Salesforce platform ecosystem evolved over time. Besides the distinctive platform ecosystem

evolution dimensions, our coding endeavor revealed that Salesforce employed three cross-dimension *levers* in each and every of the platform ecosystem evolution dimensions that illustrate how Salesforce as platform owner makes progress in the respective evolution dimension.

4 Dimensions and Levers of Platform Ecosystem Evolution at Salesforce

In this section, we present the results of our analysis on the evolution of the Salesforce platform ecosystem. While in Salesforce's early stages, its primary value proposition was a sales-related software module (today known as *Sales Cloud*), until today Salesforce has evolved into an integrated CRM offering with a diverse set of available modules and features.

By studying this evolution process, we identify three overarching *dimensions* of platform ecosystem evolution through which Salesforce has evolved over time:

1. Extension of the platform core technology: Refers to the addition of new or the considerable improvement of existing platform core technology elements, such as the development environment, integration capabilities, or software development processes.
2. Extension of the platform's functional scope: Refers to the addition of new or the considerable improvement of existing platform modules or features that serve a *generic* purpose and are relevant for all customers.
3. Industry-specific specialization of the platform: Refers to the addition of new or the considerable improvement of existing platform modules or features that serve an *industry-specific* purpose and are relevant for customers from a particular industry.

Salesforce's platform ecosystem has been developed in the first two evolution dimensions in parallel and as of its outset. Nevertheless, evolution in the third dimension has manifested itself over the last five years. The evolution of the Salesforce ecosystem along each of these three dimensions can be observed through the most significant events that specify evolution steps. While the three dimensions spell out the distinct evolution directions in the Salesforce platform ecosystem, we identified that Salesforce employed three cross-dimension *levers* in all the evolution dimensions for their realization:

- a. Proprietary developments: Refer to the addition of a new or the considerable improvement of an existing platform technology, module, or feature through a proprietary development by the platform owner itself.
- b. Acquisitions: Refer to the addition of a new or the considerable improvement of an existing platform technology, module, or feature through the platform owner's acquisition of complementors.
- c. Partnerships and alliances: Refer to the addition of a new or the considerable improvement of an existing platform technology, module, or feature through the platform owner's initiation of a strategic alliance or partnership with complementors or competitors.

In the following we describe each of the three main evolutionary dimensions with reference to the three levers in each dimension as well as the engaged actors (see Table 2).

4.1 Extension of the Platform Core Technology

To enable complementors to produce their own applications, Salesforce first launched a development environment called *Force.com*. The *Force.com* typically receives three releases each year and the applications can be built using an object-oriented programming language called *Apex*.

To give more flexibility and further options to complementors in their application development endeavors, Salesforce acquired a development environment called *Heroku* that enabled complementors to use various open source programming languages to build their applications. *Heroku*, Salesforce's first major acquisition, also enabled customers to more flexibly customize their applications. As such, both the inhouse (*Force.com*) and the acquired (*Heroku*) development environments were two important steps in the evolution of Salesforce's core technology, as they

created and significantly extended the possibilities for both complementors and customers to develop applications, as was described by a Salesforce customer:

“You can also write applications outside the Force.com platform. You can use Heroku and you can run whatever, Heroku is just an environment to run Python or [...] other development platforms. And they will run on Salesforce modules. [...] You can write applications that are connected to Salesforce. Everything is possible.” (Director Applications, Customer, CU-2)

Due to the modular architecture of platforms and the necessity of seamless integration among platforms’ modules and with external IT systems, the development and improvement of an integration technology was the other fundamental initiative for the Salesforce core technology. In providing the latter technology, Salesforce acquired *MuleSoft*, a leading integration platform with their own marketplace for APIs called *Anypoint Exchange*. Due to its ability to connect any two IT systems both inside and outside of the Salesforce ecosystem, *MuleSoft* significantly extended Salesforce’s integration capabilities. This particularly supported external contributors in connecting their applications to the Salesforce core platform. Since acquisition is one of the crucial levers for Salesforce platform ecosystem evolution, the newly embedded integration technology thanks to *MuleSoft* also streamlined the integration of existing and prospective acquisitions with Salesforce’s existing offerings. With respect to customers, *MuleSoft* was particularly useful for large organizations with a complex IT infrastructure (e.g., on-premise software that needs to be connected to Salesforce modules). A Senior Director at Salesforce explains the strategic relevance of integration capabilities as follows:

“We’re moving into an area where very few organizations, no organizations actually, have a homogeneous technology environment. They have solutions from multiple vendors and data has to be shared amongst those different environments. So, having an integration layer ourselves was fundamental both for sharing data amongst our own platforms [...] and other vendor environments as well.” (Senior Director, Solution Engineering, Platform owner, PO-4)

After acquiring *MuleSoft*, Salesforce further developed the *MuleSoft* integration capabilities and turned them to a proprietary development called *Integration Cloud*, an integral part of Salesforce’s CRM core modules. *Integration Cloud* provides an overview of all integration possibilities, such as API basics, reusable integration templates, and security requirements. While *Integration Cloud* uses several features that were previously known from *MuleSoft*, Salesforce still uses the brand *MuleSoft* due to its popularity among the Salesforce customers.

Digital infrastructure is another essential element of the platform core upon which the whole platform operates. Initially Salesforce’s major CRM modules operated on the core Salesforce infrastructure. Nevertheless, the exponential extension of the platform core over time led Salesforce to initiate strategic alliances with global infrastructure providers such as Amazon (Amazon Web Services), Microsoft (Azure), and Alibaba (in China). This led Salesforce to take advantage of cutting-edge infrastructure technology from other providers and more focus on its own competencies. Further, Salesforce started several technology partnerships with smaller businesses in the Salesforce ecosystem that improve software development processes in development environments. These firms are usually registered as independent software vendors (ISVs) in the Salesforce ecosystem and benefit from extensive support services from different Salesforce enablement teams. One example of such a partner is *Copado*, a provider of a DevOps solution for Salesforce.

4.2 Extension of the Platform’s Functional Scope

When Salesforce was founded, the main offering was a sales module, today known as *Sales Cloud*. The latter helped companies manage their sales activities with features for contact management, opportunity management, and forecasting. However, Salesforce continuously and considerably extended the platform’s functional scope over the course of last years.

The first major step was the launch of a commercial marketplace for enterprise software applications called *AppExchange*. As a proprietary development, *AppExchange* enabled complementors to sell their own applications to Salesforce customers. *AppExchange* was introduced in 2005, notably before

Apple's App Store (2008) or Google Play for Android (2012). Until today, *AppExchange* has become the largest enterprise cloud marketplace, with the number of ISVs evolving over the years from 250 (2006), 450 (2007), and 2'000 (2013) to more than 3'500 as of today. *AppExchange* is greatly used by customers, as illustrated by the probability of around 90% that a published application gets purchased at least once. To manage how third-party actors interact on the *AppExchange*, Salesforce as the platform owner puts certain rules and standards in place, for instance, for pricing or to ensure quality standards. While in the *AppExchange*'s early stages Salesforce did not generate any financial return, transaction fees on revenue generated by external parties through the marketplace are introduced over the past years. To ensure quality standards, ISVs must go through a well-structured onboarding process, for both technical and business enablement, to be able to sell their developed applications through the *AppExchange*. The technical part includes a compliance check, signing a distribution agreement, and a security review. Salesforce also offers business enablement services, for example to discuss a complementor's business plan or upcoming changes in the Salesforce product roadmap.

To further extend the platform's functional scope, Salesforce continuously added new CRM core modules, namely a customer service module (*Service Cloud*), a digital marketing module (*Marketing Cloud*), an e-commerce module (*Commerce Cloud*), and an analytics module (*Analytics Cloud*). While the *Service Cloud* was purely a proprietary development by Salesforce itself from the outset, the other three clouds resulted from or further developed by Salesforce's several acquisitions. To build the *Commerce Cloud*, Salesforce acquired *Demandware*, a provider of a cloud-based e-commerce solution, and completely integrated it as is to build its new CRM core module. In other words, *Commerce Cloud* was only a rebranding of *Demandware*. In the other two clouds (i.e., *Marketing Cloud* and *Analytics Cloud*), the respective modules were already developed and launched by Salesforce itself but later significantly boosted through acquisitions. Salesforce launched its *Marketing Cloud* one year before they acquired *ExactTarget*, a provider of online marketing solutions. Nonetheless, as *ExactTarget* was able to serve both B2B and B2C clients, Salesforce was then able to transform its *Marketing Cloud* into a full-service digital marketing offering. Similarly, *Analytics Cloud* was launched a few years before the acquisition of *Tableau*, a leading provider of analytics software, but was later significantly boosted through *Tableau*'s existing offerings. Similar to the case of *MuleSoft*, Salesforce today still uses the *Tableau* brand due to its global popularity.

Besides the afore-mentioned CRM core modules, Salesforce did several acquisitions in AI area that made the foundation to build *Einstein*. The latter is an AI technology that is deeply integrated into Salesforce's CRM core and can be accessed by customers in different modules and features. While *Tableau* helps to connect large data volumes from different Salesforce systems, *Einstein* is optimized towards empowering people to make predictions and drive immediate actions.

Customer interface is one of the basic features of any digital system, which concerns the other Salesforce initiative to extend the platform's functional scope and features. As a proprietary development, Salesforce introduced *Lightning*, a completely new CRM experience to replace the previous version *Classic* that was used since 1999. While *Classic* and *Lightning* can both be used for sales, service, and marketing, the modernized framework of *Lightning* comes with a higher customer friendliness, improved layouts, and a more efficient navigation to facilitate customer's productivity.

Salesforce's next efforts to extend the platform's functional scope were to increase the number of customer interactions through two proprietary development initiatives. *Trailblazer*, an online voting system allowed customers to contribute new feature ideas for future releases. As some promising ideas remained unexplored for several years with no specific action, Salesforce decided to use free market research to identify the most important customer needs and to adjust their product roadmap accordingly. In addition, as the platform offerings continuously grew over the past years, it became much more difficult for customers and complementors in the Salesforce ecosystem to keep track of all the diverse offerings. This resulted in the second proprietary development called *Trailhead*, an online learning system with online courses and certificates:

"We recognized that we weren't reaching enough people to allow them to learn about Salesforce and our products. *Trailhead* came as a result of our desire to grow our footprint and knowledge in the wider business and technology communities. So, now you will see a lot of people that made

their first experience at Salesforce [...] via Trailhead". (Senior Director, Solution Engineering, Platform owner, PO-4)

Next to the features directly concerning customers, the other extension of the platform's functional scope concerned complementors. As a proprietary development, Salesforce developed a program called *Developer Experience (DX)*, which supported developers with improved technical and business enablement services:

"That was a big turn for our community [...]. For a very long time, we had focused on the end user configuring, but we had not done a lot of investment in developer tooling, sort of professional developer tooling to help them build around Salesforce implementations. [...] What we did, we went through a big program, worked a lot with our partners around the types of developer tooling that they would need to really kind of take a professional developer lens on how to improve support for our platform. [...] For years and years, we've been getting asked to build more declarative tools and services." (Vice President, Product Management, Platform owner, PO-3)

Finally, to extend its platform with the features of enterprise software providers outside of its ecosystem, Salesforce started several strategic alliances to leverage integration of cross-platform offerings. For instance, Salesforce integrated Microsoft's calendar into its own platform to increase customers' productivity.

4.3 Industry-specific Specialization of the Platform

The initiation of Salesforce specializing in industries was indeed triggered by some complementors once they successfully delivered industry-specific applications to customers. The need for industry-specific solutions was emerged because the value of Salesforce's offerings is perceived differently in different industries. For example, in a pharmaceutical company or a bank, compliance and quality may be more important than speed, while in a high-tech company, speed is the top priority. Salesforce has subsequently reinforced this trend by partnering with some of these complementors. Examples include partnership with firms such as *Veeva*, a CRM for the pharmaceutical industry, or *nCino*, a CRM for the financial industry. Similar to technology partnerships, industry partners also benefit from additional enablement services from Salesforce. For instance, in the case of *Veeva*, the company benefits from several agreements with Salesforce to facilitate integration between their offerings and various Salesforce core modules.

The next major step was a proprietary development by Salesforce itself to include an industry-specific module to the CRM core called *Industry Cloud*, with focus on manufacturing, education, and non-for-profit industries. The Chief Executive Officer of a leading complementor described Salesforce's approach as follows:

"They're starting to build on top of their own product, a customization that covers a higher percentage of what the customers need, which actually means potentially less work for us to do on the one hand. [...] On the other it means more customers jumping on the solution and every customer will always need our services, but it makes Salesforce a more compelling proposition. Now, most are focused on a few verticals. We work with every vertical, but there's a few verticals here we have a very powerful story." (Chief Executive Officer & Founder, Complementor, CO-4)

Industry Cloud was later significantly boosted by the acquisition of *Vlocity*, a leading provider of Salesforce solutions for different industries. *Vlocity* was already an industry partner of Salesforce and its solutions were natively built on the Salesforce platform. A Senior Vice President at Salesforce explained some of the reasons why Salesforce decided to acquire *Vlocity*:

"Salesforce has for the last [...] five years now, been really investing heavily into industries. That's from our go-to-market strategy of how we organize our sales teams and our marketing, but also in building products. There are so many business processes that a manufacturer expects and a financial services company expects. Salesforce has built a portfolio of industry solutions over the last five plus years, but if you go back in time when we partnered with Vlocity, basically we didn't have any, [...] so we needed a multiple pass to get into the industry markets that we were not in yet." (Senior Executive, AppExchange & ISV Enablement, Platform owner, PO-8)

Evolution Dimensions	Evolution Levers	Manifestations	Engaged Platform Components or Ecosystem Actors
Extension of the platform core technology	Proprietary developments	Launching a development environment upon which complementors build their applications	Force.com
		Developing an integration module (<i>a CRM core module</i>) based on the integration technology of an acquired complementor (<i>MuleSoft</i>)	Integration Cloud
	Acquisitions	Including a more flexible development environment enabling complementors to access open source development languages	Heroku
		Including an integration technology and features such as a marketplace for APIs and interface builder	MuleSoft
	Partnerships and alliances	Extending and empowering the digital infrastructure	e.g., Amazon, Alibaba
		Improving software development processes in development environments	e.g., Copado
Extension of the platform's functional scope	Proprietary developments	Launching a marketplace for sharing and selling applications developed by complementors	AppExchange
		Developing a customer service module (<i>a CRM core module</i>)	Service Cloud
		Developing an online marketing module (<i>a CRM core module</i>)	Marketing Cloud
		Developing an e-commerce module (<i>a CRM core module</i>) based on the e-commerce technology of an acquired complementor (<i>Demandware</i>)	Commerce Cloud
		Developing an analytics module (<i>a CRM core module</i>)	Analytics Cloud
		Launch of an online learning system enabling customers and complementors to learn about Salesforce and achieve certifications	Trailhead
		Launch of a voting system enabling customers to suggest and vote for new product features	Trailblazer
		Launch of a new customer interface enabling customers to achieve a higher productivity through efficient navigation and better layouts	Lightning Experience
		Developing an AI technology based on the AI technologies of several acquired small complementors	Einstein
		Launching a developer experience program to improve technical and business enablement services for complementors	Developer Experience (DX)
	Acquisitions	Including an e-commerce technology to build <i>Commerce Cloud</i> (<i>a CRM core module</i>)	Demandware
		Adding additional analytics features to extend <i>Analytics Cloud</i> (<i>a CRM core module</i>)	Tableau
		Adding additional online marketing features to extend <i>Marketing Cloud</i> (<i>a CRM core module</i>)	ExactTarget
	Partnerships and alliances	Including features of leading enterprise software providers	e.g., Microsoft
Industry-specific specialization of the platform	Proprietary developments	Developing an industry-specific module (<i>a CRM core module</i>)	Industry Cloud
	Acquisitions	Adding additional industry-specific features to extend <i>Industry Cloud</i> (<i>a CRM core module</i>)	Vlocity
	Partnerships and alliances	Initiating specialization in some specific areas through providing industry-specific features	e.g., Veeva, nCino

Table 2. Dimensions and Levers of Evolution in Salesforce Platform Ecosystem.

Due to *Vlocity*'s relevance to Salesforce's intentions to specialize its offerings in industries, the integration of *Vlocity* with Salesforce's existing offerings became a top priority. To this end, the development team of *Vlocity* started superseding Salesforce's industry teams and strongly benefitted from Salesforce internal resources:

"Now their product team is part of our product and engineering teams. They're in-house, everyone's internal, everyone's in house. So that one was very differentiated as once that officially closed, my team stopped engaging with them because they didn't need any more technical enablement from me as a partner. [...] They get all their technical enablement benefits of being an employee of Salesforce and they can go tap into all the different experts internally [...]. But yeah, when we make that acquisition, they become internal product teams." (Senior Executive, AppExchange & ISV Enablement, Platform owner, PO-8)

5 Discussion and Conclusion

Platform ecosystems have gained significant interest in research and practice due to their transformative power across industries. One considerable gap in existing research is the lack of research on platform ecosystem evolution (Rietveld and Schilling, forthcoming; de Reuver et al., 2018), particularly from a perspective that considers both technical (related to the digital platform's technology and functionalities) and social (related to the activities and contributions of the network of ecosystem actors) aspects. In this study we posit that a better understanding of a platform ecosystem's long-term evolution from the perspectives of all actors (i.e., platform owner, complementors, and customers) would support research and practice in delineating appropriate design decisions for the management of platform ecosystems. By conducting an in-depth study on Salesforce, we derived three distinct dimensions of evolution, namely *extension of the platform core technology*, *extension of the platform's functional scope*, and *industry-specific specialization of the platform*, that explain in which directions Salesforce has evolved to eventually become a leading platform ecosystem in the enterprise software industry. Further, we identified three cross-dimension levers, namely *proprietary developments*, *acquisitions*, and *partnerships and alliances*, that Salesforce as the platform owner employed to operate and advance in each of the three dimensions of evolution. While each of the dimensions represent distinct directions of evolution, the three cross-dimension levers manifested themselves along all of the three dimensions of evolution. In the following, we discuss the results of our study and elaborate on their limitations and boundary conditions.

First, we demonstrate the particular dynamics of a B2B platform ecosystem, thereby illustrating that its evolution is closely delineated by all actors involved in the ecosystem (i.e., platform owner, complementors, and customers). Unlike the predominantly studied consumer-focused or trading platforms in existing research such as Apple's iOS, Google's Android, or Amazon.com (e.g., Oh et al., 2015; Karhu et al., 2018; Cennamo et al., 2018), in the B2B context complementors are not just an army of application developers that use the platform; they rather considerably delineate the platform's technical core, scope, and functionalities, and thereby impact the dynamics of the entire ecosystem. The latter is evident in empirical data from Salesforce, such that the evolution of the ecosystem was closely laid out by essential contributions from various groups of complementors. The impact of customers is also much higher in the B2B context as they are often large firms in their industry and strongly engaged in defining the digital platform's scope and value proposition. This is specifically manifested in the industry-specific requirements of customers that delineated a new direction of evolution to the Salesforce ecosystem. In other words, while technological improvements of the platform have considerable impacts on all ecosystem actors, the digital platform's evolution is also closely defined by all actors. Ultimately, in a co-evolutionary process, the platform owner not only develops the technology and the functionalities of the digital platform (the technical aspect), but also includes the competences and interests of all ecosystem's actors (the social aspect) into the platform.

The latter brings us to the second point. That is, we provide more insights into the owner's role as the cornerstone and orchestrator of the ecosystem to align the interests and to take advantage of the competencies of all stakeholders involved in the ecosystem (e.g., Iansiti and Levien, 2004; Selander et

al., 2013). In this regard, we specifically identify three important aspects: (a) The platform owner continuously developed the platform core technology. Interestingly, even in this aspect, complementors are actively engaged by the owner. For example, in several cases Salesforce incentivized complementor partnerships to extend the platform technology (e.g., software development processes) and shaped alliances with partners external to the ecosystem (e.g., infrastructure partnerships). (b) The platform owner in several cases strongly embedded the value proposition of complementors into the platform's core and functionalities (e.g., Baldwin and Woodard, 2009; Tiwana et al., 2010). Our case material shows that the platform owner goes even further and sometimes created a new core module of the digital platform that was initially developed by complementors without the platform owner's engagement at the first place. In addition, on the non-technical aspect, Salesforce has strongly embedded a strategic developer enablement program in its complementor onboarding process (e.g., through assessing complementors' business plan with regard to the Salesforce product roadmap) in order for complementors to focus on additional features to extend the core modules that are strategically relevant for the platform owner. (c) While the first two aspects mainly referred to the platform technology and its core functionalities for *generic* customer problems, Salesforce further developed specialized use cases of the digital platform in close collaboration with complementors to meet *specific* problems of particular customer groups.

Third, in all the afore-mentioned actions executed by the platform owner, which to some extent resemble our derived evolutionary *dimensions*, we observe the dynamics and dyadic interplays of the employed *levers* by Salesforce as the platform owner. Specifically, acquisitions turned out as being intertwined with other levers in three ways (see also Table 2): (a) Two of the major acquisitions made by Salesforce were subsequently turned into the Salesforce's CRM core modules (*MuleSoft* into *Integration Cloud* and *Demandware* into *Commerce Cloud*). (b) Several of the CRM core modules, which were initially developed by Salesforce itself, were subsequently and significantly powered by acquisitions (*Marketing Cloud* by *ExactTarget*, *Analytics Cloud* by *Tableau*, and *Industry Cloud* by *Vlocity*). (c) Besides the CRM core modules, our empirical data shows that acquisitions were also employed to build additional functionalities that are not directly related to the CRM core modules but significantly extend the digital platform's capabilities (e.g., several acquisitions to build *Einstein* as an AI feature).

Our study also provides several recommendations for practitioners. First, the main results of our study provide guidance for the design and management of B2B platform ecosystems in a constantly changing environment. Specifically, the derived evolutionary dimensions in this study cater a strategic roadmap to designers and managers, based on learnings accumulated from a leader like Salesforce, to specify the main directions of evolution and advancement in platform ecosystems. Further, the derived levers and the observed inter-lever dynamics particularly highlight how platform managers can engage complementors into their proprietary developments or turn complementors' competencies into one of the platform's integral parts. Second, our insights bring to the fore the role of acquisitions in leveraging and sustainably managing the evolution of B2B platform ecosystems. Our study specifically provides empirical data on a platform owner's motivation to conduct acquisitions as well as on the impact of acquisitions on the other actors involved in the ecosystem.

Finally, we acknowledge that the resulted insights have some boundary conditions and limitations. In this study, data was only collected from a retrospective view. While this may be of minor impact as far as the platform owner is concerned, it may be more problematic regarding the lack of data on former complementors. In addition, we posit that the context of a B2B platform ecosystem is well-suited to study platform ecosystem evolution due to the crucial role of all ecosystem actors. Nevertheless, the resulted insights and guidance may be of bounded application to other types of platform ecosystems.

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