Co-evolution in Digital Platform Ecosystems

Evolving Through Connection: APIs and the Digital Ecology

Master Thesis
in partial fulfilment of the requirements for the degree of

Master of Science in Management of Technology

by

Bas Coolen

Supervisory Committee
1st Supervisor: **Dr. Milad Kolagar**
2nd Supervisor: **Dr. Nikos Pachos-Fokialis**
Chair: **Dr. ing. Victor Scholten**

Faculty of Technology, Policy & Management
Delft University of Technology
Delft, The Netherlands
December 2025

TU Delft

Title Page

Co-evolution in Digital Platform Ecosystems
Evolving Through Connection: APIs and the Digital Ecology

Master Thesis
in partial fulfilment of the requirements for the degree of

Master of Science in Management of Technology

By

Bas Coolen
Student Number: **5849799**

Supervisory Committee
1st Supervisor: ***Dr. Milad Kolagar***
2nd Supervisor: ***Dr. Nikos Pachos-Fokialis***
Chair: ***Dr. ing. Victor Scholten***

Faculty of Technology, Policy & Management
Delft University of Technology
Delft, The Netherlands
December 2025

This page has been intentionally left blank

Voorwoord

Met het schrijven van deze thesis rond ik mijn master Management of Technology aan de TU Delft af. Terugkijkend op de afgelopen jaren zie ik vooral een uitdagende, maar vooral ook enorm leerrijke periode. Niet alleen inhoudelijk, met vakken en projecten die mij dwongen verder te kijken dan één discipline, maar ook persoonlijk: plannen, prioriteren, samenwerken en volhouden wanneer het soms even te veel leek. Juist die combinatie heeft deze master voor mij zo vormend gemaakt.

In het bijzonder wil ik mijn afstudeercommissie bedanken.
Dr. Milad Kolagar, bedankt voor uw scherpe vragen, inhoudelijke diepgang en uw voortdurende begeleiding: het kritisch doorvragen, de consequente feedback en het bewaken van tempo en deadlines hebben deze thesis merkbaar naar een hoger niveau gebracht.
Dr. Nikos Pachos-Fokialis, dank voor uw kritische blik en de waardevolle suggesties die hebben bijgedragen aan het aanscherpen van dit onderzoek.
Dr. ing. Victor Scholten, bedankt voor uw rol als voorzitter en voor uw betrokkenheid en reflecties tijdens het afstudeertraject.

Daarnaast ben ik dankbaar voor alle respondenten en betrokkenen uit de praktijk die tijd hebben vrijgemaakt voor interviews en gesprekken. Zonder hun openheid en concrete ervaringen was dit onderzoek niet mogelijk geweest. Ook vrienden, studiegenoten, collega's en familie wil ik bedanken voor de steun, afleiding op de juiste momenten en het meedenken tijdens de vele keuzes die deze periode met zich meebracht.

Met het afronden van deze thesis sluit ik een intensieve studieperiode af en kijk ik met veel plezier vooruit naar mijn verdere carrière. De inzichten en vaardigheden die ik tijdens deze master heb opgedaan, geven mij het vertrouwen en de nieuwsgierigheid om de volgende stap in het werkveld te zetten en daar verder te bouwen op wat hier is begonnen.

Deze thesis draag ik op aan mijn vader, die vlak voor de start van mijn master is overleden. Zijn vertrouwen, nuchterheid en voorbeeld zijn een belangrijke drijfveer geweest tijdens deze opleiding. Hoewel hij dit eindresultaat niet meer kan meemaken, voelt het afronden van deze studie voor mij als een eerbetoon aan wat hij mij heeft meegegeven.

's-Hertogenbosch, december 2025

Bas Coolen

Acknowledgement

With the writing of this thesis, I am completing my Master's degree in Management of Technology at TU Delft. Looking back on the past few years, I see a challenging but also enormously educational period. Not only in terms of content, with courses and projects that forced me to look beyond a single discipline, but also personally: planning, prioritising, collaborating and persevering when it sometimes seemed too much. It is precisely this combination that has made this Master's programme so formative for me.

I would particularly like to thank my graduation committee.

Dr Milad Kolagar, thank you for your sharp questions, substantive depth and continuous guidance: your critical questioning, consistent feedback and monitoring of pace and deadlines have noticeably raised this thesis to a higher level.

Dr Nikos Pachos-Fokialis, thank you for your critical eye and valuable suggestions, which helped to refine this research.

Dr Victor Scholten, thank you for your role as chair and for your involvement and reflections during the graduation process.

I am also grateful to all the respondents and practitioners who made time for interviews and conversations. Without their openness and concrete experiences, this research would not have been possible. I would also like to thank my friends, fellow students, colleagues and family for their support, distraction at the right moments and input during the many choices that this period entailed

With the completion of this thesis, I conclude an intensive period of study and look forward to my future career with great pleasure. The insights and skills I have gained during this master's programme give me the confidence and curiosity to take the next step in the professional field and build on what has been started here.

I dedicate this thesis to my father, who passed away shortly before I started my master's programme. His confidence, level-headedness and example have been an important motivator during this programme. Although he is no longer here to see the end result, completing this programme feels like a tribute to what he has given me.

's-Hertogenbosch, December 2025

Bas Coolen

This page has been intentionally left blank

Executive Summary

Digital platform ecosystems such as online marketplaces or app stores rely on third-party complementors (e.g. sellers, developers) to create and deliver value to end-users. However, much of the existing literature offers a one-sided, static "blueprint" for how a platform orchestrator should manage its ecosystem, which fails to reflect the dynamic, multi-actor evolution observed in practice. Platform orchestrators and their complementors continuously influence each other's development through iterative changes and feedback. This ongoing process of co-evolution wherein a new platform policy or feature triggers complementors' responses, prompting further platform adjustments is crucial for sustained ecosystem success. This study addresses the problem by investigating how a platform orchestrator and its diverse partners co-evolve over time, developing a new framework to explain their reciprocal adaptations and the resulting benefits for alignment, innovation, and resilience.

A clear gap in the literature motivated this research, prior studies have lacked a process-oriented, multi-actor view of platform ecosystem evolution, overlooking the reciprocal adaptations between the orchestrator and complementors over time. The objective of this thesis was to fill that gap by providing a dynamic account of how a platform and its complementors evolve together, rather than viewing ecosystem strategy as a static plan. Conceptually, the study builds on the established literature about digital platform ecosystems and governance, and it adopts co-evolutionary theory as the core explanatory framework. Co-evolutionary theory explicitly focuses on reciprocal, interdependent change – in this context, how one party's strategic change (for instance, a new API or policy by the platform) triggers adaptive responses in others, resulting in an ongoing cycle of mutual adaptation. By applying this lens, the research links traditional platform strategy concepts with the dynamic feedback loops characteristic of co-evolution.

Accordingly, the study asks a broad research question: *How do the platform orchestrator and its ecosystem complementors co-evolve within a digital platform ecosystem?* This main question is explored through three sub-questions that break down the co-evolutionary dynamics. (1) *How do the orchestrator's strategic initiatives and governance decisions influence the evolutionary trajectories of its complementors?* (2) *How do the complementors' adaptations, innovations, and strategic responses feed back to shape the orchestrator's evolution and platform strategy?* (3) *What outcomes emerge from the ongoing, multi-actor interactions between the orchestrator and complementors in terms of ecosystem alignment, innovation, and resilience?* Answering these questions allows for a comprehensive understanding of co-evolution in the platform context, covering the platform-to-partner influence, the partner-to-platform feedback, and the emergent results of their continuous interaction.

To investigate these questions, the research employed a qualitative single-case study design. The focal case, termed "AlphaPlatform," is a pseudonymous European B2C digital marketplace that orchestrates an ecosystem of roughly 150 complementor firms in various domains to support the sellers on the platform. Data were collected through 23 semi-structured interviews with both the platform's management (orchestrator perspective) and multiple types of complementors (including software integrators, data/analytics providers, digital agencies, and logistics partners). These interviews were supplemented by internal documents and archival records, providing rich, triangulated evidence of interactions. The analysis followed an inductive coding approach (Gioia methodology) and utilized temporal bracketing and process tracing to reconstruct how platform–complementor interactions unfolded over time. This multi-actor, process-based approach captured the fine-grained "action–reaction"

sequences that are rarely visible in single-firm studies, enabling the research to trace the back-and-forth evolutionary changes in the ecosystem and to identify key patterns and mechanisms of co-evolution.

Empirically, the case study revealed a complex co-evolutionary process structured around four interrelated dimensions. These dimensions represent the main areas in which the platform and its partners must continuously adapt: (1) the platform's technological infrastructure and data exchange mechanisms, (2) the organizational capabilities and routines of both the platform firm and complementors, (3) the platform's ecosystem governance and power dynamics in managing partners, and (4) the broader regulatory and societal context that can enable or constrain ecosystem changes. Based on these findings, the study developed a co-evolutionary framework conceptualized as a "double-loop" (infinity loop) model that links the platform orchestrator's actions on one side with the complementors' responses on the other. On the orchestrator side, AlphaPlatform continually adjusts its architecture, interfaces (APIs), and rules of engagement, the so-called boundary resources of the ecosystem, to support value creation and respond to emerging needs. On the complementor side, partners invest in new capabilities and adapt their offerings and behaviours to align with the platform's changes, while also feeding back requirements or innovations (especially those partners who multi-home across platforms and bring external insights). This ongoing interplay is driven by three key interaction mechanisms identified in the case: boundary resource tuning (the platform and complementors co-developing and refining APIs, tools, and standards to better integrate their services), strategic recalibration (the orchestrator adjusting policies or strategic directions in response to partner behaviour and performance, and partners in turn altering their strategies to align with platform goals), and joint experimentation (collaborating on pilot projects, beta releases, and other experiments to learn and innovate together). Through iterative cycles of action, feedback, and readjustment, these mechanisms link the platform's evolution with that of its complementors in a continuous co-evolutionary loop. Notably, the study found that this reciprocal process produces three important outcomes for the ecosystem as a whole: alignment (partners remain in sync with the platform's goals and standards through ongoing fine-tuning of rules and interfaces, which also helps lock-in key contributors), innovation (the back-and-forth interaction spurs new features and services co-created by the platform and its complementors), and resilience (the ecosystem as a collective becomes more capable of withstanding external shocks, such as market disruptions or regulatory changes – by virtue of its adaptive, co-operative evolution). These findings culminate in a holistic framework illustrating co-evolution in digital platform ecosystems as an ongoing, double-loop cycle of mutual adaptation that drives beneficial outcomes.

The research offers several theoretical contributions to our understanding of platform ecosystems and co-evolution. First, it bridges the platform ecosystem strategy literature with co-evolutionary theory to explain how orchestrators and complementors adapt reciprocally over time, moving beyond static models of platform management. In doing so, the study proposes a process-based model of continuous mutual adaptation that integrates traditional platform governance levers (e.g. setting APIs, standards, incentives) with iterative feedback and learning cycles from the ecosystem. Second, the study identifies specific mechanisms of interaction that underlie this co-evolution: it details how particular governance actions by the platform (for example, changing access policies or interface features) lead to predictable types of complementor responses, and vice versa. By pinpointing these mechanisms (such as boundary resource adjustments and policy enforcement loops), the research adds micro-level clarity on how platform moves translate into complementor behaviours in the ecosystem. Third, it highlights the contextual conditions that moderate the platform's balance between control

and openness in governance. Factors like the platform's maturity, the heterogeneity of complementor types, or external events (e.g. new regulations or competitor moves) can influence whether the orchestrator tightens control or grants more autonomy, thus shaping the co-evolutionary trajectory. Recognizing these contingencies addresses the classic governance dilemma (control vs. flexibility) in a dynamic way. Fourth, the study connects the iterative orchestrator–complementor interactions to broader system-level outcomes, namely, ecosystem alignment, innovation, and resilience, thereby enriching co-evolutionary theory with an understanding of how these dynamics ultimately shape the long-term evolution and health of a platform ecosystem. In sum, the thesis contributes a nuanced theoretical perspective that synthesizes process dynamics, mechanisms, and outcomes of co-evolution in digital platforms.

Beyond theory, the findings carry practical implications for managers of platforms and their partners. For platform orchestrators, the key lesson is to embrace an adaptive orchestration approach: keep feedback channels open with complementors, maintain flexible governance (continually update APIs, policies, and partnership programs based on input), and coordinate internally across product, policy, and partner management teams to respond swiftly to ecosystem needs. Changes to the platform, whether a new feature rollout or a rule change, should be introduced with careful pacing and sequencing to avoid surprising partners, and orchestrators should monitor the ecosystem for early warning signals of misalignment (such as waves of partner complaints, defections, or increased multi-homing to rival platforms) in order to intervene proactively. For complementor firms, the study underlines the importance of investing in dynamic capabilities so they can quickly adapt to platform changes (for example, upgrading technical skills or processes in response to new APIs). Complementors are encouraged to engage in joint pilots and beta programs early, as these collaborations not only help shape platform decisions but also give them a head start in leveraging new features. At the same time, complementors should manage their dependence on any single platform by maintaining some autonomy and alternative channels, ensuring they are not overly vulnerable to the platform's strategic shifts. Both sides, platform leaders and complementors, benefit from approaching their relationship as a continuous "sense–experiment–realign" cycle. By regularly sensing changes in the environment or feedback from partners, experimenting with adjustments or innovations, and then realigning their strategies, ecosystem participants can co-navigate change without undermining the overall coherence of the ecosystem. This adaptive co-evolutionary approach enables sustained innovation and a robust, mutually beneficial growth for both the platform and its partners over time.

However, it should be noted that this study's insights are bounded by its scope as a single-case analysis of one successful platform ecosystem (introducing potential recall bias and limiting generalizability); thus, future research should examine co-evolution in other contexts, including less successful or emerging platform ecosystems and those in different regions, and should employ longitudinal or quantitative designs to validate and extend the framework presented here.

Table of Contents

1 Introduction

The rise of the digital economy has profoundly reshaped how value is created, delivered, and captured across industries. Fuelled by rapid technological advancement, particularly in computing power, connectivity, and data analytics, businesses are increasingly shifting from traditional pipeline models to more dynamic, network-based configurations. This transformation is not merely about adopting digital tools; it reflects a structural change in how firms organize, innovate, and compete in markets shaped by ubiquitous information flows and real-time interactivity (McIntyre & Srinivasan, 2017; Yoo et al., 2010).

Within this broader shift, platform-based models have emerged as a dominant organisational form (Adner, 2017; Gawer, 2014; Hein et al., 2020). Digital platforms, such as online marketplaces, mobility apps, and social networks, connect vast networks of users and external providers, enabling value co-creation at an unprecedented scale (Hein et al., 2020). For example, Airbnb's accommodation platform hosts millions of providers, rivalling the scale of the largest hotel chains, while ride-hailing services like Uber link millions of drivers with passengers. These cases illustrate how platform ecosystems can outgrow and outperform more traditional enterprise models by orchestrating distributed innovation and participation (Hein et al., 2020).

This shift signals a broader change in competition: firms increasingly compete as parts of interdependent ecosystems rather than as isolated entities (Moore, 1993). Moore, J. (1993), who introduced the business ecosystem concept, argued that successful firms must co-evolve with a network of complementors, suppliers, and customers instead of operating alone. He observed that ecosystem participants co-evolve by collaborating and competing around shared ideas to achieve collective, system-level outcomes. Indeed, competition today is largely between ecosystems rather than between individual companies (Adner, 2017; Jacobides et al., 2018; Moore, 1993). Managers are therefore compelled to broaden their perspective beyond the boundaries of a single organisation and to view innovation networks as a critical unit of analysis.

Since the late 20th century, technological advancements have been a major force transforming how businesses create and deliver value. These developments have pushed many industries to move beyond selling standalone products toward offering integrated services and solutions tailored to evolving customer needs. This shift, often termed servitization, involves embedding services into products to enhance customer outcomes (Vandermerwe & Rada, 1988). This shift laid the groundwork for a more relational and collaborative approach to value creation.
Vargo and Lusch (2004) codified this change in their formulation of service-dominant logic (S-D logic), which holds that value is co-created through interactions rather than embedded in physical goods. In this view, intangible resources, dynamic capabilities, and ongoing engagement become the primary engines of innovation and competitive advantage. S-D logic reframes value creation as an interactive, multi-actor process focused on solutions rather than transactions.

As companies adopt this service- and solution-oriented mindset, they increasingly require organisational arrangements that support continuous collaboration, adaptation, and integration. This need has driven a parallel transformation in business structure: rather than operating in isolation, firms are embedding themselves within broader ecosystems of partners, suppliers,

and users. Within these ecosystems, participants collectively shape and deliver complex value propositions. Platform ecosystems, digital environments where a central orchestrator coordinates value co-creation among independent complementors, have emerged as a leading model to enable such distributed innovation. The co-creation logic at the heart of S-D logic aligns closely with how platform ecosystem's function: multiple autonomous actors contribute to a shared outcome that no single party could produce alone.

Digital platform ecosystems represent a distinct form of business ecosystem organised around a technological platform. At their core is a platform firm (the orchestrator) that provides infrastructure and governance, surrounded by a diverse network of complementors, independent third-party firms that contribute modular products, services, or innovations that enhance the platform's overall value proposition (Gawer, 2014; Jacobides et al., 2018). Together, these actors form an interdependent structure aimed at delivering unified outcomes to end users.

This structural interdependence has been described as an "alignment structure," wherein multiple partners must coordinate their activities for a shared value proposition to materialise (Adner, 2017). The ecosystem thus functions as an organised network of autonomous yet interconnected participants collaborating around a focal system-level objective. Jacobides et al. (2018) use the metaphor of a hub-and-spoke network to illustrate this architecture: a central orchestrator (the hub) linked to a periphery of innovative complementors.

Unlike vertically integrated supply chains, complementors in platform ecosystems often span industries and operate independently. Their success, however, is tightly coupled to the platform's trajectory through shared standards, interfaces, and reinforcing network effects (Gawer, 2014; Jacobides et al., 2018). To coordinate this distributed innovation, platform ecosystems rely on modular technical architecture supported by governance mechanisms. The orchestrator maintains a stable technological core, such as infrastructure, APIs, and standards, while simultaneously offering boundary resources (e.g., SDKs, guidelines, developer tools) that empower complementors to create add-ons (Gawer, 2014). This balance of stability and flexibility allows the platform to scale external innovation without losing coherence at the centre.

However, orchestrating such a dynamic and diverse ecosystem is inherently challenging. A central tension lies in governance: the orchestrator must simultaneously ensure coherence (via control and standardisation) and foster innovation (via openness and autonomy). Overly rigid governance may stifle complementor creativity or drive attrition; overly lax governance risks fragmentation, quality issues, or strategic drift (Wareham et al., 2013). This governance dilemma makes platform ecosystems distinct from more hierarchical or contract-bound collaborations. Instead, they function as semi-regulated environments where influence is exerted through interface design, incentives, and policy, not command-and-control (Jacobides et al., 2018).

The challenge is compounded by the ecosystem's dynamic nature. Participants evolve their strategies over time, and orchestrators must adjust accordingly. As Moore (1993) observed, an ecosystem's health depends on continual adaptation, not only to external market or technological shifts but also to internal feedback loops. Platform leaders face the dual task of leading innovation waves and responding to the emergent behaviours of complementors. For example, a platform's API update may unintentionally disrupt some complementors' offerings, prompting changes in their strategy, or even exit. Conversely, strategic innovations from

powerful complementors may pressure the orchestrator to recalibrate its governance approach. These mutual influences make ecosystem leadership an ongoing, co-evolutionary process rather than a static design problem (Adner, 2017; Gawer, 2014; Jacobides et al., 2018).

Considering these realities, scholars have called for deeper insight into how orchestrators and complementors co-evolve over time in platform ecosystems (Adner, 2017; Jacobides et al., 2018). The notion of co-evolution, borrowed from biology, refers to two or more entities evolving in response to each other in an interdependent cycle (Lewin & Volberda, 1999). In organisational terms, co-evolution means that changes in one actor (e.g., the orchestrator) influence and are influenced by changes in other actors (e.g., the complementors) over time. Co-evolutionary theory highlights reciprocal, multi-level, non-linear adaptation rather than one-way causality (Lewin & Volberda, 1999). Lewin and Volberda (1999) describe co-evolution as a multi-causal, multi-level process of mutual adaptation between organisations and their environment. This perspective suggests that understanding platform ecosystems requires examining how orchestrators and complementors adapt in tandem and shape each other's trajectories. Empirical studies outside the platform domain illustrate such dynamics. For example, in the cochlear implant industry, early technical breakthroughs spurred the creation of new institutions (standards, regulations, firms) that later became rigid and impeded further innovation, demonstrating how technology and its ecosystem can constrain each other (Van de Ven et al., 1994). More generally, evolution in a networked environment is rarely unilateral or predictable; instead, it emerges from ongoing interactions among multiple actors and levels (Lewin & Volberda, 1999; Van de Ven et al., 1994).

1.1 Problem Statement and Research Gap

Although prior research on platform ecosystems has established what these systems are and identified key governance levers available to orchestrators, such as modular architectures, boundary resources, standards, incentives, and rules (Gawer, 2014; Jacobides et al., 2018), this literature tends to be static and focal-firm-centric. It often describes the ecosystem's alignment structure at a specific moment in time and emphasizes the orchestrator's role in enabling value co-creation. However, this lens overlooks the dynamic and reciprocal nature of adaptation within ecosystems. We still know relatively little about how orchestrators and complementors shape and respond to one another's strategies over time.

First, there is a gap in understanding the mechanisms through which orchestrator decisions trigger complementor responses, and how those responses feed back into platform governance. For example, orchestrator-initiated changes such as API updates, pricing adjustments, or interface redesigns can prompt diverse reactions from complementors, ranging from innovation and increased commitment to multi-homing, resistance, or even exit. Yet these downstream responses are not passive; they can compel the orchestrator to recalibrate its governance approach. This mutual adjustment cycle remains poorly theorised in the platform literature. Existing work tends to list governance levers (Tiwana, 2013; Wareham et al., 2013) but stops short of tracing the iterative sequences that link orchestrator actions to complementor behaviour and back. This limits the ability to understand how platform ecosystems evolve. This gap motivates the first research question, which asks: *How do the orchestrator's strategic initiatives and governance decisions influence the evolutionary trajectories of its ecosystem complementors?*

Second, we lack clarity on the conditions under which the control–autonomy tension intensifies or relaxes in platform ecosystems. The dilemma between centralised control (for coherence and quality) and decentralised autonomy (for innovation and diversity) is well recognised (Wareham et al., 2013). Yet it is unclear how this tension shifts over time and what triggers those shifts. For instance, platform maturity, changes in market competition, or fluctuations in complementor composition may each influence the optimal governance balance. However, existing studies often treat governance as a static design choice rather than a variable shaped by evolving circumstances. We need a more contingent view that examines how contextual factors alter the governance needs of the ecosystem. This motivates the second research question: *How do the ecosystem complementors' adaptations, innovations, and strategic responses feed back to shape the orchestrator's evolution and platform strategy?*

Third, we lack insight into the ecosystem-level outcomes that result from sequences of orchestrator–complementor interaction. While individual adaptations are important, it is their cumulative effect that determines whether an ecosystem achieves alignment, sustains innovation, or builds resilience. Most research focuses on firm-level performance or single interaction episodes, offering limited perspective on the emergent properties of the ecosystem. Co-evolutionary theory (Lewin & Volberda, 1999) suggests that such outcomes are shaped by iterative and interdependent adaptation across actors. Yet empirical studies rarely trace these sequences longitudinally to assess their broader consequences. This motivates the third research question: *What outcomes emerge from the dynamic, multi-actor interactions between the orchestrator and complementors in terms of ecosystem alignment, innovation, and resilience?*

Empirically, these gaps persist because most studies are cross-sectional and oriented around the orchestrator, lacking a temporal or multi-actor lens. Conceptually, platform strategy and co-evolutionary theory remain under-integrated: although we understand governance levers and acknowledge reciprocal adaptation, we still do not know how the two interact over time. In summary, there is a need for an integrative, multi-actor explanation of how orchestrators and complementors co-evolve over time, through specific mechanisms, under shifting conditions, toward systemic outcomes.

1.2 Research Objective

Based on the above gap, this research aims to investigate the co-evolution between a platform ecosystem's orchestrator and its complementors over time. In particular, the study examines how the focal platform firm and its ecosystem of complementors mutually adapt and shape each other's trajectories. It seeks to uncover the orchestrators and complementors' strategic actions and reactions, the mechanisms that promote alignment or spark misalignment, and the implications of these dynamics for the ecosystem's success.

To achieve this objective, an in-depth qualitative case study is conducted on a leading digital platform (the focal orchestrator) and several of its prominent complementor firms. The chosen context is a mature B2C online marketplace platform, which provides a rich setting to observe multi-actor interactions. By tracing real-world orchestrator–complementor interactions over an extended period, the study derives empirically grounded insights into co-evolutionary processes. Ultimately, the research contributes to theory by bridging platform ecosystem literature with co-evolutionary perspectives, and it offers practical guidance by informing orchestrators and complementors on how to better navigate their joint evolution. The focus is

specifically on orchestrator–complementor dynamics (rather than interactions solely among complementors) within the platform's ecosystem.

1.3 Research Questions

To guide the inquiry toward the stated objective, one central research question is posed, accompanied by three sub-questions:

Main Research Question: How do the focal platform orchestrator and its ecosystem complementors co-evolve within a digital platform ecosystem?

This study addresses the following three sub-research questions, which collectively explore the co-evolutionary dynamics between a platform orchestrator and its complementors:

1. *How do the orchestrator's strategic initiatives and governance decisions influence the evolutionary trajectories of its ecosystem complementors?*

2. *How do the ecosystem complementors' adaptations, innovations, and strategic responses feed back to shape the orchestrator's evolution and platform strategy?*

3. *What outcomes emerge from the dynamic, multi-actor interactions between the orchestrator and complementors in terms of ecosystem alignment, innovation, and resilience?*

Together, these questions decompose the co-evolutionary process into three interrelated dimensions: orchestrator-driven influence, complementor-driven feedback, and the emergent results of these mutual adaptations. The first question investigates how the platform's governance actions, such as API changes, new rules, or partner programmes, affect the strategic behaviour of complementors. The second examines the reverse dynamic: how complementor responses and innovations shape subsequent platform adjustments. The third zooms out to the ecosystem level, assessing how these interaction cycles influence long-term coherence, innovation output, and the system's capacity to adapt. Addressing all three questions provides a process-oriented, multi-actor view of co-evolution within AlphaPlatform's ecosystem.

1.4 Research Contributions

This study offers several contributions to the literature, methodology, and practice by addressing the three research gaps and corresponding research questions outlined in 1.1–1.3. Specifically, it advances the understanding of co-evolution in digital platform ecosystems by clarifying how orchestrator–complementor dynamics unfold over time, through what mechanisms, under what conditions, and with what consequences.

Theoretical contributions. First, this research integrates platform ecosystem strategy with co-evolutionary theory to explain how orchestrators and complementors adapt reciprocally over time (RQ1, RQ2). It proposes a process-based model of co-evolution that bridges prior work on governance levers (e.g., APIs, standards, incentives) with feedback-oriented adaptation (Lewin & Volberda, 1999; Adner, 2017; Jacobides et al., 2018). Second, the study identifies specific mechanisms through which governance moves shape complementor responses, such as boundary resource recalibration, selective enforcement, and iterative tightening/loosening of standards (addressing Gap 1, RQ1). Third, it specifies the contextual conditions that moderate the governance dilemma between control and autonomy, such as platform maturity, complementor heterogeneity, and external shocks, thereby addressing Gap 2 and informing RQ2. Fourth, it links sequences of orchestrator–complementor interaction to systemic outcomes like alignment, innovation, and resilience (Gap 3, RQ3), thus offering a richer understanding of how co-evolutionary dynamics shape ecosystem trajectories.

Methodological contributions. This study employs a qualitative single-case design with a multi-actor perspective, using temporal bracketing and process-tracing methods. By triangulating data from both the orchestrator (AlphaPlatform) and multiple complementors, it recovers fine-grained action–reaction sequences that are rarely visible in single-firm studies. This methodological approach responds directly to the empirical limitations identified in Gap 1 and supports the processual investigation of co-evolution posited in all three research questions.

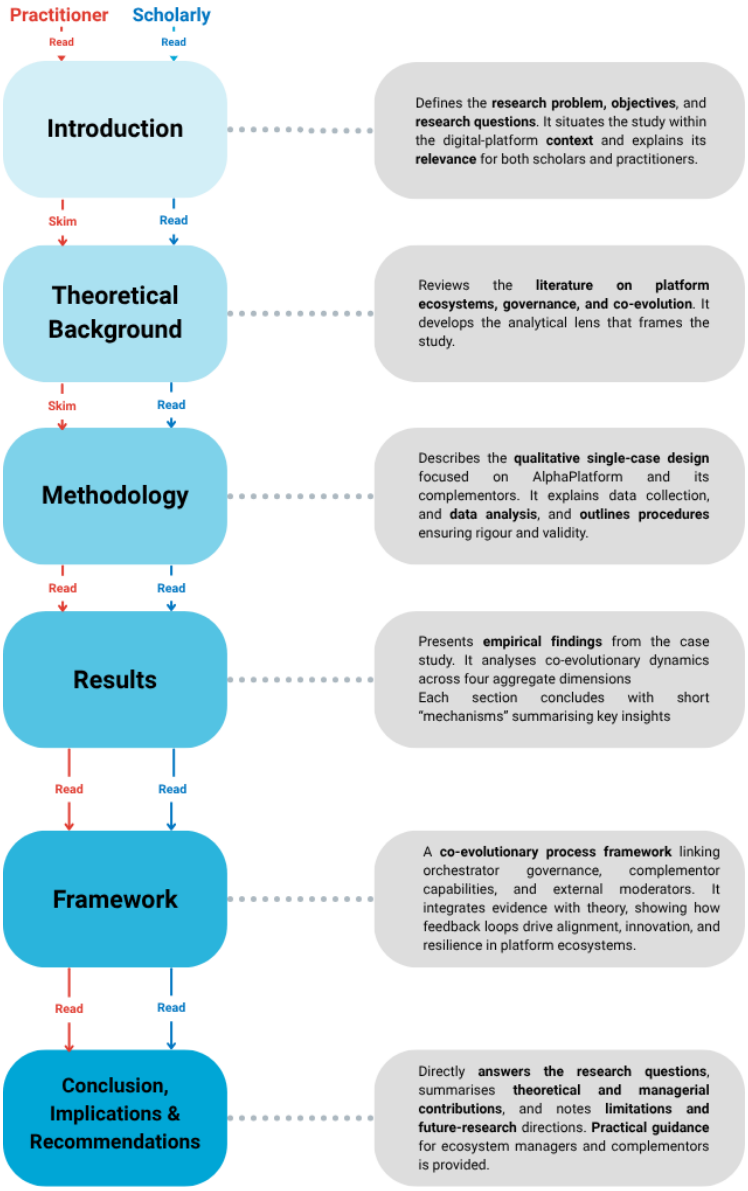
Practical contributions. For practitioners, the findings offer actionable insights into managing co-evolution in platform ecosystems. First, the study provides guidance on pacing and sequencing governance interventions, such as policy updates, incentive redesigns, or API modifications, to avoid misalignment traps and support sustained innovation by complementors (RQ1, RQ2). Second, it highlights early warning signals of ecosystem stress, such as complementor exit waves, API breakage patterns, complaint cascades, or surges in multi-homing, that can alert orchestrators to emerging misalignment before it becomes systemic (RQ3). Third, the study offers a practical "co-evolution playbook" centred on adaptive sense → experiment → realign cycles. This heuristic helps orchestrators and complementors jointly navigate continuous change without undermining coherence, promoting long-term ecosystem health and resilience.

These contributions form the basis for both theoretical elaboration (Chapter 5) and practical reflection (Chapter 6), reinforcing the study's relevance to scholars and ecosystem leaders alike.

1.5 Thesis Outline

The remainder of this thesis is structured as follows. Chapter 2, Theoretical Background defines key concepts (e.g., platform ecosystems, co-evolution) and reviews relevant literature on platform architecture, ecosystem governance, and co-evolutionary theory, forming the study's analytical foundation. Chapter 3, Methodology explains the research design, including the qualitative single-case study approach, describes the case setting (AlphaPlatform and its complementors), and outlines the data collection and analysis methods. Chapter 4, Case Study Results presents the empirical findings, describing the platform ecosystem's evolution and key episodes of interaction between the orchestrator and complementors (highlighting how each party's actions and reactions unfolded). Chapter 5 Framework interprets the results considering the theoretical framework, discussing how the observed co-evolutionary dynamics answer the research questions and what they imply for existing literature. Finally, Chapter 6, Conclusion directly answers the main research question, highlights the study's contributions to the literature and practice (for example, insights for ecosystem management), and addresses limitations and avenues for future research.

Figure 1.5 Reading Guide



2 Theoretical Background

Broadly Defined Ecosystems In the business context, an "ecosystem" refers to a network of interacting organizations (and sometimes individuals) that co-evolve their capabilities and rolls around a shared innovation, platform, or value proposition (Moore, 1993; Jacobides, Cennamo, & Gawer, 2018). Moore (1993) first introduced the business ecosystem concept to emphasise that no firm is an island, companies exist in communities of partners, suppliers, and customers, and their survival and success depend on mutual adaptation and co-innovation. Instead of acting in isolation or mere bilateral alliances, firms in an ecosystem collectively contribute to and benefit from a larger value-creating system (Adner, 2017). In essence, an ecosystem is an organised yet loosely coupled network: independent players collaborate (and often compete) to deliver a joint outcome that none could achieve alone (Jacobides et al., 2018). This structure is typically not hierarchically managed by authority, but orchestrated through shared rules, standards, and interfaces, enabling coordination without full vertical integration (Jacobides et al., 2018). The ecosystem thereby becomes a meta-organization: a "community" of firms unified by a common platform or goal, evolving together over time (Autio, 2022; Moore, 1993).

2.1 Drivers of Ecosystem Strategies

Firms adopt ecosystem strategies for several interrelated reasons, driven by both competitive pressures and innovation needs. Key motivations highlighted in the literature include:

Technological Complexity & Specialisation Modern products and services (e.g. smartphones, smart cities, biotech solutions) are so complex that no single firm possesses all the needed expertise. By engaging an ecosystem of specialised partners, firms can integrate diverse technologies and skills that lie beyond their internal capabilities. Ecosystems leverage modular architectures to allow distinct but interdependent contributors to co-create complex offerings without one firm having to own or know everything (Jacobides et al., 2018). In short, ecosystems let firms tap into a broad pool of complementary knowledge and assets (Granstrand & Holgersson, 2020), rather than "reinventing the wheel" in-house. This distributed approach is crucial when innovation requires combining hardware, software, services, and infrastructure from multiple domains.

Access to External Innovation Participating in an ecosystem enables a focal firm to harness the creativity and innovation capacity of many external contributors. Nambisan and Sawhney (2011) note that platform-centric ecosystems can achieve a scale and scope of innovation that no single firm could match on its own. Instead of relying solely on internal R&D, firms can spur open innovation by providing a platform or standards that hundreds of others innovate upon. This not only generates faster and more diverse innovation (as third parties' experiment with novel ideas) but also allows the orchestrating firm to capture emergent innovations it might never have developed internally (Cennamo, 2021). In effect, the ecosystem acts as an extended R&D network spanning firm boundary. Classic examples are technology platforms like smartphone operating systems: Apple's iOS and Google's Android prospered by enabling thousands of app developers to build complementary innovations, far exceeding what the platform firm alone could invent. The result is a richer collective offering, which attracts more users and further incentivises innovation, a positive feedback loop of innovation generation (Nambisan & Sawhney, 2011).

Scalability and Network Effects Ecosystems offer powerful mechanisms for growth and scalability, particularly through network effects. A firm orchestrating a platform ecosystem can achieve exponential growth by attracting a critical mass of complementary partners and users. As more complementors join and contribute value (e.g. a wider variety of apps or services), this in turn attracts more end-users; the inflow of users then lures yet more complementors, creating a self-reinforcing cycle (Parker, Van Alstyne, & Jiang, 2017). Such indirect network effects mean the ecosystem's value to any participant increases as the ecosystem expands, which can lead to winner-takes-all dynamics at the ecosystem level. In practical terms, an ecosystem strategy helps firms scale up more rapidly than a traditional linear supply chain model; by mobilising external partners, a platform can grow its offerings, market reach, and user base at a pace that would be impossible through internal growth alone. This scalability is crucial in winner-take-all markets, where firms are effectively competing as ecosystems versus ecosystems rather than as isolated entities (Adner, 2017). Indeed, scholars observe that competition has shifted from "firm vs. firm" to "Android vs. iOS" or platform vs. platform, reflecting the reality that success hinges on the comparative vibrancy of one's ecosystem (Adner, 2017).

Risk and Cost Sharing Engaging in an ecosystem also allows firms to spread the risks and costs of innovation among many partners. Developing new technologies or entering uncertain markets often requires significant investment with no guarantee of success. In an ecosystem, multiple stakeholders contribute resources to the joint endeavour (whether by co-developing technology, creating complementary products, or cultivating customer demand). This means no single firm bears the full cost of innovation, and the financial risk is shared. For example, in a biotech ecosystem, a startup might focus on R&D, a corporate partner provides funding and testing facilities, and a university lab contributes fundamental research, each investing in part of the puzzle rather than one firm doing it all. Moreover, ecosystem arrangements can reduce innovation adoption risk (Adner, 2006), since partners work in parallel to ensure all complementary pieces for a new solution are in place. In essence, an ecosystem buffers any one firm from total failure: if one partner's effort falters, others may fill the gap, and the overall innovation can still progress. This collaborative approach encourages firms to pursue bolder innovations than they might attempt alone, because the downside risk and uncertainty are mitigated by the presence of committed allies (Chesbrough, 2003). Additionally, by pooling competencies, ecosystem partners can tackle complex, systemic challenges, such as developing an electric vehicle infrastructure or a smart city initiative, that would be too risky and costly for a lone organization to undertake.

Flexibility and Adaptation Finally, ecosystem strategies offer greater flexibility in fast-changing environments. Rather than vertically integrating (which can be slow to change and capital intensive), firms orchestrating an ecosystem can rapidly reconfigure their network of partners in response to new technologies or market shifts. The loose coupling of ecosystem relationships allows for agility, new complementors can join as fresh ideas emerge, and obsolete approaches can be phased out by the community without the focal firm having to overhaul its own operations. This adaptability is especially valuable in high-tech sectors. Firms can experiment at the ecosystem's edge (through entrepreneurial complementors) while maintaining stability at the core. Successful innovations arising in the periphery can be scaled up, while failures are absorbed by the network with less direct impact on the orchestrator. In short, the ecosystem form combines the resilience of a network with the innovative vibrancy of a market, giving firms a way to navigate uncertainty through continuous partner-driven adaptation (Autio & Thomas, 2022).

Taken together, these drivers explain why firms today increasingly pursue ecosystem-oriented strategies in place of building everything internally or transacting purely via arm's-length contracts. Especially in the digital era, companies have discovered that by cultivating an ecosystem, they can do more, faster, and with less risk: they mobilise a multitude of external innovators to solve problems and create value, achieve rapid scale through networked growth, and flexibly respond to change, all while sharing costs and learning collectively. In sum, an ecosystem strategy offers a path to greater innovation and competitiveness by leveraging the power of the collective over the capabilities of any single organisation (Adner, 2017; Jacobides et al., 2018). Firms that master this approach, effectively orchestrating networks of partners, have come to dominate many industries, from tech and finance to manufacturing, as we shall see in the next sections.

2.2 Typologies of Ecosystems

The popularity of the ecosystem concept in management research has led to multiple typologies of ecosystems. Scholars use the "ecosystem" metaphor in varying contexts, resulting in terms like *business ecosystems, innovation ecosystems, platform ecosystems, industrial ecosystems, urban ecosystems, knowledge ecosystems,* and *entrepreneurial ecosystems*, among others (Autio & Thomas, 2021). Each of these has a distinct emphasis and scholarly lineage, although they overlap in some ways. To clarify how the present study's focus (digital platform ecosystems) fits into this broader landscape, this section compares several major ecosystem types. **Table 2.1** provides a summary of key ecosystem types, highlighting their core characteristics, typical examples, and representative authors.

Table 2.1. Comparison of Ecosystem Types

Ecosystem Type	Core Characteristics (Focus, Structure)	Examples / Applications	Key References
Business Ecosystem	Broad economic community of organisations (suppliers, distributors, partners, etc.) co-evolving around a core business or innovation. Loosely coupled network with no single leader; competition and collaboration occur in a shared arena. Emphasises overall ecosystem health (robustness, productivity, diversity) and collective value creation beyond a single industry's value chain.	Automotive ecosystem: automakers, parts suppliers, dealerships, tech firms, and regulators co-evolve automotive technology and services without one firm controlling the entire network. All actors both compete and collaborate as the market and technology evolve.	Moore (1993); Iansiti & Levien (2004); Rong et al. (2015).

Innovation Ecosystem	Network of actors centred on jointly developing and deploying a particular innovation. Often organised around a focal firm or project (the hub) and various complementors who contribute specialised components, knowledge, or services. High interdependence: the success of the focal innovation requires alignment of all complementary innovations (Adner & Kapoor, 2010). Emphasises coordinated R&D, integration of complementary technologies, and synchronisation of roadmaps among partners.	Electric vehicle ecosystem: an auto manufacturer (hub) collaborates with battery suppliers, charging station providers, software developers, and government agencies. All participants align their innovation activities (batteries, infrastructure, apps, incentives) to ensure the electric car concept succeeds.	Adner (2006); Adner & Kapoor (2010); Granstrand & Holgersson (2020).
Platform Ecosystem	Ecosystem organized around a platform, typically a modular technological architecture or marketplace, managed by an orchestrator (platform leader). Characterised by a hub-and-spoke structure: the platform owner provides core infrastructure (and rules/standards), while a diverse community of external complementors adds modular products or services on top. Strong network effects often present, and formal governance mechanisms (APIs, policies) are used to facilitate distributed innovation while maintaining coherence. Focuses on scaling a multi-sided network for mutual value creation, with the platform firm capturing part of the value.	Mobile app store ecosystems: Apple's iOS or Google's Android platforms link millions of app developers (complementors) with billions of users. The platform company curates the core OS and storefront, enforces standards (API rules, quality control), and benefits from third-party apps that enhance the platform's overall value.	Tiwana (2013); Gawer & Cusumano (2014); Jacobides et al. (2018); Cennamo & Santaló (2019).

Industrial Ecosystem	A network of industrial or manufacturing organizations co-located in a region, collaborating on material and energy flows to improve sustainability and efficiency. Often referred to in the context of industrial ecology or eco-industrial parks. Firms (manufacturers, utilities, recyclers) exchange waste streams, share utilities and logistics, and symbiotically reduce environmental impact. The structure is usually regional and facilitated by cooperative agreements or local governance.	Eco-industrial park: e.g. Kalundborg in Denmark, where a power plant, refinery, pharma company, and municipality exchange steam, waste heat, gas, and industrial by-products in a closed-loop system. One firm's waste becomes another's input, mimicking a natural ecosystem and cutting waste and costs.	Frosch & Gallopoulos (1989) – concept of industrial ecology; Chertow (2007) on industrial symbiosis; Lowe & Evans (1995).
Urban Ecosystem	The complex of organizations and infrastructure in a city that collectively deliver urban services (energy, transport, water, healthcare, etc.). Involves city governments, utilities, businesses, and community actors forming an integrated network to improve urban sustainability and quality of life. Tends to be location-specific and often associated with smart city initiatives, emphasising data-sharing, public-private partnerships, and citizen engagement.	Smart city program: a city government, telecom providers, transport agencies, and tech startups form an ecosystem to implement smart traffic management, IoT street lighting, and digital public services. All actors coordinate through a shared urban platform (e.g. data portal) to enhance liveability and resource efficiency in the city.	Hollands (2008) on smart cities; Nam & Pardo (2011) on urban innovation ecosystems; (various city case studies).

Knowledge Ecosystem	A collaborative network primarily aimed at knowledge creation and diffusion rather than immediate commercial output. Often centred around research institutions (universities, R&D labs, think tanks) along with corporations and government agencies. These ecosystems focus on generating new scientific knowledge or foundational technologies, which can later spawn innovations. They feature open sharing of knowledge, joint research projects, and often government or non-profit support.	Research consortium: a coalition of universities, public research institutes, and firms working on pre-competitive research (e.g. a national quantum technology consortium). Participants share findings and intellectual resources to advance fundamental knowledge, with the understanding that practical applications (and spin-off ventures) may emerge long-term.	Clarysse et al. (2014) on research partnerships; Autio & Thomas (2022) on knowledge/innovation ecosystems; Jackson (2011).
Entrepreneurial Ecosystem	A set of interdependent actors and factors that enable entrepreneurship in a particular region or industry. Key components include startup firms, investors (venture capital, angel investors), incubators/accelerators, universities, talent, mentors, and supporting services, all interacting in a community to foster new venture creation and growth. Often geographically bounded (e.g. a city or region). Emphasises an enabling environment: culture of innovation, availability of capital and knowledge, supportive networks and policies (Stam, 2015).	Startup hub (entrepreneurial ecosystem): e.g. Silicon Valley or Tech City London, comprising entrepreneurs, prominent VC firms, accelerators (Y Combinator), large anchor companies (Google, Facebook) that spin off talent, universities (Stanford, Imperial) providing research and skilled graduates, and a culture that tolerates risk and celebrates startups. These elements work together to continually produce new high-growth companies.	Isenberg (2010); Mason & Brown (2014); Stam (2015); Spigel (2017) on entrepreneurial ecosystems' elements and dynamics.

Differences and Overlaps

As Table 2.1 suggests, these ecosystem concepts vary in their central focus and unit of analysis. A business ecosystem (the broadest notion) looks at an entire network of firms co-evolving in a general market space, whereas an innovation ecosystem homes in on the successful delivery of a particular product or technology through multi-party collaboration (Adner & Kapoor, 2010). In an innovation ecosystem, there is often a focal integrator (e.g. a lead firm or platform), and the emphasis is on aligning complementary innovations (Adner & Kapoor, 2010). This makes innovation ecosystems somewhat more structured than generic business ecosystems, they are purpose-built around a defined value proposition. Platform ecosystems, in turn, can be seen as a specific subset of business ecosystems enabled by a modular technical platform that external innovators can plug into (Tiwana, 2013; Jacobides, Cennamo, & Gawer, 2018). A platform ecosystem usually does have an identifiable lead firm (the platform orchestrator) and exhibits unique features like direct network effects and the use of technical interfaces (APIs, SDKs) to facilitate contributions (Ghazawneh & Henfridsson, 2013). Unlike a generic business ecosystem which may lack formal governance, a platform ecosystem is deliberately governed by the platform owner (through policies, standards, and design architecture) to ensure the whole remains coherent (Tiwana, 2013). In short, all platform ecosystems are business ecosystems, but not all business ecosystems have a single platform core, some are more ad hoc communities without central orchestration.

Other ecosystem types are defined more by context (regional or domain) and by the primary outcomes they seek. Industrial and urban ecosystems extend the metaphor beyond high-tech innovation: they apply ecosystem thinking to sustainability and city management, respectively. An industrial ecosystem focuses on resource efficiencies and symbiotic processes among co-located firms, essentially treating an industrial district as an ecosystem that can recycle waste and share resources like an organism community would (Frosch & Gallopoulos, 1989). It overlaps with concepts of industrial clusters and supply chain networks, but with an ecological twist. An urban ecosystem is analogous but broader, encompassing the full range of urban service providers and infrastructure managers in a city. This concept parallels ideas from urban planning and "smart cities", stressing how diverse city actors (public and private) must coordinate as a system to deliver sustainable urban outcomes (Nam & Pardo, 2011). Both industrial and urban ecosystems are highly location-specific and often involve public-sector orchestration or facilitation (e.g. city councils, regional authorities), distinguishing them from the more firm-driven business and platform ecosystems.

Knowledge and entrepreneurial ecosystems are yet another variant, often discussed in economic development and innovation policy. A knowledge ecosystem typically refers to a research-driven network generating new knowledge without immediate commercialisation (Autio & Thomas, 2022). It can be seen as the upstream part of innovation, for instance, a biotech research network producing scientific breakthroughs that later feed into an innovation or business ecosystem for product development. In contrast, an entrepreneurial ecosystem is concerned with cultivating new companies and ventures (Stam, 2015). It's a holistic view of the conditions that foster entrepreneurship in a locale, including cultural attitudes, formal institutions, networks, and leadership (Isenberg, 2010). Entrepreneurial ecosystems overlap with innovation ecosystems in that startups often commercialise new innovations, and they rely on knowledge institutions for talent and ideas (hence entrepreneurial and knowledge ecosystems in a region can reinforce each other). However, the entrepreneurial ecosystem concept is distinct in focusing on ecosystem health measured by startup success (number of

new firms, growth, investment flow), whereas innovation ecosystems focus on the success of a particular innovation, and business ecosystems on the co-evolution of firms in a broader sense.

Despite their differences, these concepts share the fundamental idea of interdependence and co-evolution among heterogeneous actors. All ecosystems involve networks of participants whose fates are linked to some degree. For example, whether one calls a system of actors a "business" or "platform" ecosystem, in both cases the actors must align to create joint value, and changes by one actor can affect the others (though the mechanisms of alignment differ). Additionally, ecosystem types can intersect: A thriving entrepreneurial ecosystem (startups, funders, universities) can give rise to a new platform ecosystem if a startup grows into a platform leader; a knowledge ecosystem (research collaborations) might be the seed for an innovation ecosystem around a new technology. Scholars thus caution that these labels are not mutually exclusive silos but analytical lenses, each highlighting particular aspects. Autio and Thomas (2020) note that one can classify ecosystems by their primary output: business ecosystems output commercial value (business growth, market innovation), innovation ecosystems output a concrete innovation or product, knowledge ecosystems output new knowledge, and entrepreneurial ecosystems output new ventures (Autio & Thomas, 2020).
For the purposes of this thesis, it is important to situate the study within these typologies. The next subsection narrows the scope to digital platform ecosystems, explaining how this category differs from others and why it is the focus of the research.

2.3 Digital Platform Ecosystems

Given the various ecosystem forms described above, this study is delimited to digital platform ecosystems, a subset of ecosystems where a focal firm (or a few firms) operates a digital platform that connects and orchestrates a network of users and complementors. This choice of focus is both contextually driven (by the empirical setting of the research) and theoretically driven (by the unique dynamics that digital platforms exhibit, which align with the research questions). In this section, we clarify what digital platform ecosystems are, how they differ from other types, and why they are particularly relevant for investigating co-evolutionary processes.

Defining Digital Platform Ecosystems A platform ecosystem is an ecosystem organized around a platform, which is typically a modular technological base that facilitates interactions between multiple parties (e.g. buyers and sellers, app developers and end-users) (Gawer & Cusumano, 2014). It consists of one or a few platform orchestrators (the platform owners/leaders) and a multitude of external complementors who add complementary innovations, products, or services to the platform (Tiwana, 2013; Jacobides, Cennamo, & Gawer, 2018). For example, in the Android ecosystem, Google provides the core OS platform and governance, while thousands of developers (complementors) contribute apps, and device manufacturers produce hardware that runs the OS, together forming a vibrant ecosystem. Digital platform ecosystems are characterized by:

A Focal Orchestrator Unlike generic business ecosystems that may lack a single leader, a platform ecosystem usually has an identifiable orchestrator firm that provides the platform's infrastructure and rules and actively coordinates the ecosystem's direction (Tiwana, 2013; Gawer & Cusumano, 2014). The orchestrator (also called platform leader) owns and manages the core technology (e.g. the marketplace software, operating system, or digital infrastructure) and sets the standards and interfaces that others must use. It plays a deliberate governance role,

attracting participants, curating the platform content, monitoring quality, and sometimes sanctioning or rewarding participant behaviour (Autio, 2022; Tiwana, 2013). This is a key difference from some business or innovation ecosystems where control is more distributed or emergent. In platform ecosystems, the orchestrator's strategy profoundly shapes the ecosystem, akin to a "hub" in a hub-and-spoke network (Jacobides et al., 2018). For instance, Apple's role in the iOS ecosystem or Amazon's role in its Marketplace ecosystem is that of an active steward, without their guidance and infrastructure, the ecosystem wouldn't exist as it does.

Complementors and Open Participation Platform ecosystems invite open participation from third-party complementors. Often anyone who agrees to the platform's terms can join and contribute their innovations (Jacobides et al., 2018). This openness is a hallmark: an external developer or firm can create new value on the platform (e.g. a new app, plugin, or service) without the orchestrator having to formally integrate or contract with them in a traditional manner. These complementors are autonomous; they are not employees but independent actors who choose to align with the platform ecosystem to pursue their own opportunities (Ceccagnoli, Forman, Huang, & Wu, 2012). They benefit from the platform's user base and resources, while the platform benefits from their contributions. This mutual but non-hierarchical relationship is distinct from a supplier in a supply chain. Complementors "add extra value through their innovations," expanding the platform's overall value proposition. A crucial aspect is that complementors have partial alignment with the orchestrator; all want the ecosystem to thrive, but complementors also compete (with each other, and potentially with the orchestrator) and follow their own profit motives. This coopetitive dynamic (simultaneous cooperation and competition) is pronounced in platform ecosystems, creating inherent tensions in governance (Brandenburger & Nalebuff, 1996; Cennamo & Santaló, 2019). Nonetheless, the openness to many partners gives platform ecosystems their innovative vitality and scalability.

Technical Interfaces (Boundary Resources) Digital platform ecosystems rely on technical interfaces, often termed boundary resources, that enable third parties to plug into the platform and contribute complements (Ghazawneh & Henfridsson, 2013). These include APIs (application programming interfaces), software development kits (SDKs), tools, libraries, data feeds, and guidelines provided by the platform owner. Boundary resources serve a dual purpose: they make it easier for complementors to innovate on the platform (the resourcing function), while also allowing the orchestrator to control and align those innovations with the platform's requirements (the securing function). In effect, the platform sets the "rules of engagement" through these interfaces. For example, Facebook provides APIs for developers to integrate with its social graph but also enforces rules through those APIs (rate limits, data permissions) to maintain stability. The presence of rich, well-designed boundary resources can greatly enhance an ecosystem by attracting more developers and innovations, whereas overly restrictive or poorly supported interfaces can stifle participation (Ghazawneh & Henfridsson, 2013).

Network Effects and Multilateral Markets Platform ecosystems inherently involve multi-sided markets and network effects. The platform typically connects two or more distinct user groups (e.g. app makers and app users, or buyers and sellers, drivers and riders) and intermediates their interactions (Rochet & Tirole, 2003). The value of the platform to any given user or partner increases as the other side of the market grows, this is the indirect network effect (Katz & Shapiro, 1986). Thus, platform ecosystems often exhibit self-reinforcing growth: more complementors attract more users, and vice versa. Additionally, there may be direct network effects within each side (e.g. user-to-user interactions on a social platform). The outcome is that competition plays out at the ecosystem level (the aggregate of platform + its participants)

and tends to be "winner-take-most" in many digital markets (Parker, Van Alstyne, & Jiang, 2017). This dynamic of network effects is usually less prominent in other ecosystem types like innovation ecosystems (which might be one-off project focused) or industrial ecosystems (which are not multi-sided markets at all). It is a key reason why platform ecosystems can scale up so fast and dominate markets once they reach critical mass (McIntyre & Srinivasan, 2017). It also means ecosystem health in platform contexts is often measured by metrics like size of user base, third-party adoption, and engagement levels, in addition to the more traditional measures of innovation output.

Governance by Orchestrator In platform ecosystems, the orchestrator imposes a governance framework to manage the ecosystem's functioning. This includes technical protocols (as mentioned), but also rules, policies, and standards for participation. For example, Apple sets out guidelines for App Store submissions, and Amazon Marketplace has policies for third-party sellers. Governance balances openness with control: too little control, and the ecosystem may fragment or degrade in quality; too much control and complementors may be deterred. Other ecosystems (e.g. entrepreneurial ecosystems) lack this kind of single-point governance, they rely more on market forces or informal institutions. In platform ecosystems, by contrast, governance decisions by the orchestrator (pricing, access rules, IP rights, data usage policies, etc.) strongly influence the trajectory of the ecosystem. The orchestrator effectively acts as a central regulator and facilitator for the ecosystem, which is a unique structural feature does not present in a generic business ecosystem where no one entity has such authority (Tiwana, 2013; Wareham, Fox, & Giner, 2014). This governance role is one reason we often anthropomorphise platform ecosystems with the orchestrator's name (e.g. "Apple's ecosystem") the platform firm's strategy and the ecosystem's evolution are tightly interlinked.

In summary, digital platform ecosystems are distinguished by a core digital platform managed by a focal firm, extensive third-party participation enabled by modular architecture, and the presence of network effects and deliberate governance mechanisms. They represent a convergence of technology, strategy, and network economics. This type of ecosystem has risen to prominence over the past two decades as a dominant form of organising economic activity in the digital age. Indeed, many of today's largest and most influential companies, such as Alphabet (Google), Amazon, Apple, Microsoft, Alibaba, derive their power not just from standalone products, but from the vast ecosystems of complementors and users they orchestrate around their platforms (Cusumano, Gawer, & Yoffie, 2019; de Reuver, Sørensen, & Basole, 2018).

Study Context "AlphaPlatform" This thesis homes in on the dynamics within a digital platform ecosystem, specifically that of an online marketplace platform. For confidentiality, the focal firm is referred to by the pseudonym "AlphaPlatform." AlphaPlatform is a leading multi-sided digital platform that connects sellers and buyers in a B2C online marketplace (comparable to platforms like eBay or Amazon Marketplace). It has a large, mature ecosystem comprising the orchestrating firm (AlphaPlatform itself) and thousands of third-party merchants, service providers, and developers who operate on its platform. This empirical context is an archetypal digital platform ecosystem: it features a clear orchestrator (the platform company), a diverse set of complementors (independent sellers, software integrators, logistics partners), strong indirect network effects (buyers attract sellers and vice versa), and well-defined boundary resources (APIs, data feeds, seller tools) as well as governance policies (marketplace rules, fee structures, rating systems) set by the orchestrator. In other words, AlphaPlatform's ecosystem encapsulates the key attributes discussed above. Focusing on this type of ecosystem allows the research to delve into phenomena like third-party innovation, platform governance strategies,

and orchestrator-complementor interactions, aspects that are less pronounced or take different forms in other ecosystem types. Lessons from broader business or innovation ecosystems (for instance, general ideas of co-evolution or alignment) still inform the way of thinking, but the analysis here is rooted firmly in the platform ecosystem context. By narrowing the scope in this way, we ensure that the theoretical framework (next section) and subsequent analysis directly speak to the realities of digital platforms, where issues such as openness vs. control, standard-setting, network effect management, and multi-actor coordination are paramount. This delimitation sets the stage for applying a co-evolutionary lens to the platform environment, to examine how a platform orchestrator and its complementors adapt in tandem over time within AlphaPlatform's ecosystem.

2.4 Co-evolution Theory as Explanatory Framework

Having established the context of digital platform ecosystems, the chapter now introduces co-evolution theory as the analytical lens for the study. Co-evolutionary theory provides a dynamic perspective to understand how the platform orchestrator and complementors reciprocally influence each other's evolution over time. This section defines the co-evolution concept, discusses its relevance to platform ecosystems, and explains why it is a valuable framework for tracing long-term change and innovation in an ecosystem setting.

Definition of Co-evolution the term co-evolution originates from biology, where it describes a process in which two or more species mutually influence each other's evolutionary trajectory (e.g. predators and prey evolving in tandem). In organisational and strategy research, co-evolution has been adopted to describe situations of reciprocal adaptation between interdependent entities over time (Lewin & Volberda, 1999). Co-evolution, in essence, means that change is not one-directional or isolated: each party's changes prompt responses in the other, and those responses feedback to affect the first party, resulting in an ongoing cycle of adaptation. Lewin and Volberda (1999) emphasise that co-evolutionary change is multi-level and nonlinear, it can involve interactions between a firm and its environment, between multiple firms, or between different levels (e.g. organisational routines and industry structures), and it is not a simple cause-effect sequence but a complex intertwining of causes. Applied to the context, co-evolution implies that a platform orchestrator and its complementors evolve in a coupled manner: the strategic moves of the orchestrator influence complementor behaviours and success, while the innovations and responses of complementors in turn cause the orchestrator to adjust its strategy, architecture, or governance. Over time, these back-and-forth shapes the trajectory of the ecosystem (Lewin & Volberda, 1999; Volberda & Lewin, 2003).

In practical terms, a co-evolutionary view in platform ecosystems suggests we look at the interaction sequences. For example, an orchestrator might introduce a new API or change a policy (say, increasing fees or altering data access); complementor firms will react to this change, perhaps by modifying their products, voicing concerns, or even leaving the platform. The orchestrator then observes these reactions and may respond in turn, e.g. refining the API, offering incentives to stay, or tightening rules if there was abuse. This iterative loop of action and reaction constitutes co-evolution. Tiwana, Konsynski, and Bush (2010) describe how a platform's technical design and its governance mechanisms can co-evolve as the platform owner and app developers continually adjust to each other. Rietveld and Schilling (2021) similarly highlight that platform competition outcomes emerge from dynamic interactions between platform owners and ecosystem participants, not static strategy alone. In short, the fates of the orchestrator and complementors are interlinked through ongoing feedback processes. Co-evolution is therefore a particularly apt lens for phenomena where mutual

influence is strong, as is the case in digital ecosystems, where the platform cannot succeed without active complementors, and complementors depend on the platform's rules and health.

Relevance to Platform Ecosystem Research Recent literature on digital platforms has increasingly called for a co-evolutionary or process view to complement static analyses (Adner, 2017; Jacobides, Cennamo, & Gawer, 2018). Much of the early platform research focused on what might be called the "architecture and alignment" at a given point: defining ecosystem roles, governance levers, and how value is created at equilibrium. However, as Adner (2017) notes, this often overlooks the dynamics of how alignment is achieved and maintained over time. Platform ecosystems are inherently dynamic, technologies change, new complementors arrive, user preferences shift, and the orchestrator's strategic priorities evolve. A co-evolution perspective explicitly concentrates on these dynamics by asking how changes by one actor led to changes in others, and what patterns result from these reciprocal changes (Lewin & Volberda, 1999). Jacobides et al. (2018) argue that understanding when and why ecosystems emerge and succeed requires examining the enabling role of modularity and the ongoing management of complementarities, essentially pointing to a need to study ecosystem evolution, not just structure.

In line with that, the use of co-evolution theory is meant to capture the reciprocal, iterative nature of platform evolution: rather than view the orchestrator as the only active agent setting up an ecosystem and static "alignment", we consider how complementors' reactions and initiatives can alter the course of the ecosystem (sometimes in unanticipated ways), prompting the orchestrator to respond in an ongoing dance. This is supported by empirical observations in platform settings: for instance, Eaton, Elaluf-Calderwood, Sørensen, and Yoo (2015) documented how Apple's iOS platform governance evolved in response to unexpected uses of its APIs by app developers (the "jailbreaking" phenomenon) , Apple would tighten or adjust its boundary resources, developers would find new opportunities or workarounds, and this cycle repeated, illustrating co-evolution in action. Similarly, Wen and Zhu (2019) showed how Amazon's entry into its third-party sellers' product spaces (a unilateral orchestrator move) led to changes in seller behaviour and ecosystem trust, which then forced Amazon to calibrate its approach. These studies reinforce that a platform ecosystem cannot be understood fully by taking a single snapshot; one must examine the process of mutual adjustment over time.

By adopting co-evolution as the framework, we also align with a broader stream of management research that views strategy and innovation in an ecosystem as emergent and path dependent. Co-evolutionary theory provides concepts to discuss things like feedback loops, adaptation mechanisms, and emergent order. This is analytically valuable for tracing long-term ecosystem change. For example, it directs attention to questions such as: How do small initial differences in orchestrator, complementor interaction (e.g. a particularly open vs. closed policy in early stages) snowball into divergent ecosystem trajectories over years? Under what conditions do orchestrator and complementors reach a stable alignment versus a breakdown or realignment? Co-evolution gives us a language to hypothesise that outcomes like ecosystem alignment, innovation rate, or resilience are emergent properties of ongoing interactions, rather than just attributes fixed by design (Lewin & Volberda, 1999; Volberda & Lewin, 2003). For instance, an ecosystem's long-term innovative vitality might result from continuous back-and-forth adjustments that keep complementors motivated and coordinated, something a static view would miss. Adopting this lens helps us trace how governance mechanisms evolve (not just how they are set initially) and how power dynamics shift as both sides learn and react.

Importantly, co-evolution theory does not imply a perfectly harmonious or equilibrating process; it often involves tensions and temporary imbalances that get corrected (or over-corrected) in subsequent cycles. This resonates with the reality of platform ecosystems, which experience periodic conflicts (over APIs, revenue sharing, etc.) that then lead to new governance adjustments. By examining such sequences, we can uncover cause-effect patterns: e.g., "when the orchestrator imposes X change, it tends to trigger Y response from complementors after Z time, which then leads the orchestrator to do X2," and so on. These patterns, once identified, provide a richer understanding of how to manage ecosystems. They help answer the "how and why" questions behind ecosystem evolution, not just the "what."

Several recent studies exemplify the value of a co-evolutionary approach in platform settings. For instance, Rietveld et al. (2019) tracked how the portfolio of games in the Nintendo Wii ecosystem co-evolved with Nintendo's platform strategy over the console's life cycle, early third-party successes led Nintendo to alter support and licensing terms, which then affected subsequent third-party entry. Ceccagnoli et al. (2012) quantitatively showed that third-party developers' innovation decisions are influenced by the platform owner's IP policies and vice versa, indicating mutual adaptation. These studies, along with conceptual calls by scholars like Cennamo (2018) and Autio (2022), underscore that reciprocal causality is at the heart of platform ecosystems' evolution.

Analytical Value for This Study Using co-evolution theory as our framework is particularly suitable for the research aim, which is to trace the long-term evolutionary dynamics between one orchestrator (AlphaPlatform) and its diverse complementors. This theory guides us to look at the interplay over time, how certain orchestrator initiatives (e.g. a change in API or a new partner program) set in motion reactions among complementors, how those reactions then feed back (perhaps causing the orchestrator to pivot strategy or adjust rules), and what outcomes emerge from the cumulative process (e.g. greater ecosystem alignment, increased innovation, or conversely, partner attrition). Co-evolution explicitly highlights such feedback mechanisms. It prompts us to identify mechanisms of interaction (for example, "boundary resource tuning" as noted by Eaton et al., or "selective promotion/suppression of complements" as a strategic response) and to consider contingencies (e.g. does the co-evolutionary pattern change when the ecosystem is more mature or when external shocks occur?). In Chapter 1 we identified research gaps around understanding these mechanisms, conditions, and outcomes of orchestrator, complementor interplay. Co-evolutionary theory offers a conceptual foundation to address those gaps: it says, in effect, look at the system of actors holistically and examine how they jointly adapt over time. This holistic, dynamic viewpoint will enable us to build a process model in Chapter 5 that explains how and why the platform and its partners have evolved to their current state, rather than just describing what that state is.
In summary, co-evolutionary theory is a fitting and rich framework for analysing platform ecosystems because it captures the reciprocal, iterative, and long-term nature of change in these systems. It shifts the analysis from static governance or snapshot metrics to the evolutionary dance between the orchestrator and complementors. By doing so, it helps illuminate the temporal dynamics behind ecosystem success or failure, how early interactions set trajectories, how adaptation and misalignment cycles play out, and how ultimately an ecosystem might achieve a new equilibrium or spiral into decline. This perspective is analytically valuable for tracing how AlphaPlatform and its ecosystem partners have navigated changes over the years, and for deriving insights on managing such co-evolution proactively. In the next chapters, we will apply this framework to empirical findings, examining specific instances of orchestrator, complementor co-evolution in the case study, and drawing out generalizable lessons for theory and practice.

3 Methodology

This chapter outlines the research design and methodological framework for examining orchestrator, complementor co-evolution within a digital platform ecosystem. I utilise a qualitative, process-oriented single-case research design focused on the ecosystem of AlphaPlatform (pseudonym), a prominent digital platform orchestrator, incorporating numerous embedded units of analysis (the primary orchestrator business and chosen complementor firms). I elucidate the research design and the rationale for case selection, detail the data collection methods (23 semi-structured interviews and comprehensive secondary sources), and delineate the data analysis procedures (inductive coding adhering to the Gioia methodology, supplemented by temporal bracketing and process tracing). I outlined the measures implemented to guarantee the study's rigour and reliability, discuss ethical considerations, and recognise methodological limits. All organisational and individual names are anonymised with pseudonyms to ensure confidentiality. The methodology adheres to recognised qualitative research protocols to guarantee the validity and significance of the results, while facilitating theoretical understanding of platform ecosystem co-evolution.

3.1 Research Design

This research uses a qualitative, interpretive case study approach to investigate the co-evolutionary dynamics between a platform orchestrator and its complementors. A case study is appropriate because it allows an in-depth examination of a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and its context are not clearly defined (Yin, 2014). In context, the phenomenon is the dynamic, reciprocal interaction (co-evolution) between a digital platform orchestrator and its complementors, which cannot be meaningfully separated from the ecosystem context in which it occurs. A case study enables us to investigate how and why these interactions unfold over time, aligning with the exploratory nature of the research question (Lewin & Volberda, 1999; Yin, 2014).

A single-case design is employed, focusing on the AlphaPlatform ecosystem as the overarching case. Within this case, multiple embedded units of analysis are considered, namely, the focal platform organization (the orchestrator) and several of its complementor organizations (independent firms offering complementary products or services via the platform). An embedded single-case design involves more than one unit of analysis within the case, allowing a granular examination of sub-units while preserving a holistic view of the overall case (Yin, 2014). This design is justified because AlphaPlatform represents a revelatory, information-rich example of orchestrator, complementor co-evolution (Patton, 2015). AlphaPlatform is a leading digital platform with a large, mature ecosystem and a documented history of changes in platform strategy and complementor behaviour, providing a rich historical record of co-evolutionary events over time. Studying multiple actors within this one ecosystem also permits within-case comparisons and a form of replication logic across the embedded units, which strengthens the robustness of the findings (Yin, 2014). Examining both the orchestrator and diverse complementors enables the capture of co-evolutionary dynamics that span organisational boundaries, consistent with the view of platform ecosystems as meta-organisations, organisations, or, loosely coupled “organisations of organisations” (Kretschmer et al., 2022) that require coordination among independent but interdependent actors. This multi-actor perspective is important in platform research, as the ecosystem’s behaviour emerges from interactions among the focal firm and its complementors (Jacobides et al., 2018).

The study is explicitly process-oriented, focusing on the evolution of interactions over time rather than static relationships. No established hypotheses are tested; instead, an inductive understanding of the operational mechanisms of co-evolution in this context is developed (Lewin & Volberda, 1999). Because co-evolution implies reciprocal influence and iterative change, a process lens is essential: sequences of events and feedback loops across the life of the platform ecosystem are traced. Accordingly, retrospective data covering multiple time periods were collected (e.g., participants reflected on past changes and timelines, and archival documents were gathered to recreate historical events), and the analytical approaches of temporal bracketing and process tracing were employed (Langley, 1999). Adopting a process perspective enables the detection of evolving dynamics and reciprocal adjustments between the orchestrator and complementors across several stages.

The research is grounded in an interpretive paradigm, which acknowledges that organizational phenomena are socially constructed and are best understood by accessing the perceptions and experiences of those involved (Berger & Luckmann, 2011). Informants are approached as knowledgeable actors about their own background (Gioia et al., 2013), and their subjective insights into the evolution of the platform, complementor relationship are valued. Consistent with inductive theory-building (Eisenhardt, 1989), no rigid theoretical model was specified a priori; instead, insights, themes, and constructs were allowed to emerge from the data. The Gioia approach to qualitative research (Gioia et al., 2013) was used to guide inductive coding and concept formation (see Section 3.4.1). The inquiry was informed by overarching concepts from current literature (e.g., platform governance, ecosystem alignment, co-evolution), which served as a sensitizing backdrop rather than a prescriptive framework. The goal is to build or extend the literature from the case (through analytic rather than statistical generalization), producing a plausible and defensible explanation of orchestrator, complementor co-evolution that enriches existing platform ecosystem theory (Yin, 2014).

In line with qualitative inquiry norms, purposeful sampling was employed to select the case and respondents for their relevance to the research phenomenon (Patton, 2015). AlphaPlatform's ecosystem was deliberately chosen as the single case because it exemplifies the co-evolution of a platform with its complementors in a significant way and offers high learning potential. Within this case, multiple complementor firms were further selected as embedded units to obtain diverse perspectives on the phenomenon. The aim was to capture variation in experiences (for example, firms of different sizes, industries, and durations of partnership with AlphaPlatform) to observe a range of co-evolutionary patterns. This theoretical sampling approach (Glaser & Strauss, 2017) increases the richness of the data and the likelihood of identifying underlying mechanisms that are not unique to a specific type of actor. The specific criteria and rationale for choosing AlphaPlatform and the complementor firms are detailed in Section 3.2 (see Table 3.1 for a summary). By focusing intensively on this strategically selected case, Patton's (2015) guidance is followed that information-rich cases yield the most insight in qualitative research. The intent is not to generalize statistically to all platforms, but to develop theoretical insights that may be transferable to analogous settings (analytic generalization). Although the findings are context-specific, tying the insights to existing concepts and theory facilitates their potential relevance beyond the immediate case (Yin, 2014).

AlphaPlatform serves as the focal case of this study. It is a leading digital platform company, an online marketplace, that connects ecosystem partners (complementors) with thousands of third-party sellers to the end-users, the consumers. This context is well-suited for studying

platform ecosystem co-evolution because of the active, ongoing interactions between the platform orchestrator and a large population of independent complementor firms (B2B2C). The selection of AlphaPlatform was guided by several considerations (see Table 3.1 Case Selection Criteria). First, AlphaPlatform is a prominent and successful orchestrator in its domain, ensuring that the dynamics of its relationships with complementors are salient and theoretically relevant. Second, its ecosystem has a documented history of evolution: over roughly more than a decade, AlphaPlatform transitioned from a traditional retail model to an open platform model, introduced new governance mechanisms (e.g., API integrations, policy changes, partnership programs), and saw corresponding changes in complementor behaviors. This provides a rich historical record of co-evolutionary events and shifts over time for examination. Third, practical access to this case was available, contacts within AlphaPlatform and several complementor firms had been established, and the company agreed to participate under conditions of anonymity. Such access is crucial for obtaining high-quality data, as platform organizations can be guarded about internal strategies and relationships. Finally, AlphaPlatform can be considered an exemplary case of a relatively mature platform ecosystem (Adner, 2017). Studying a mature ecosystem allows observation not only of early growth dynamics but also of later-stage challenges (such as scaling issues, conflicts, or regulatory pressures) that test the co-evolution of the platform and its complementors. In sum, AlphaPlatform provides fertile ground to explore orchestrator–complementor co-evolution in depth, with lessons that may shed light on broader platform ecosystem phenomena (Gawer, 2014; Jacobides et al., 2018).

Criterion	Operationalisation for this study	Evidence base (fully anonymised)	Fit
Theoretical relevance	Platform–complementor co-evolution is observable when a marketplace exposes boundary resources (APIs), formal partner programs, and data-driven features that trigger iterative action–reaction cycles.	*Public Source A (Developer Documentation)* shows a comprehensive *Retailer API* and *Advertising API* enabling full automation of offers orders, shipments, and campaigns. *Public Source B (Governance Archive)* outlines structured change-management and communication routines for boundary-resource governance.	High
Ecosystem maturity	Large user base, extensive assortment, and long operating history indicating stable market leadership.	*Public Source C (Annual Overview)* reports millions of active customers and tens of thousands of partner sellers. *Public Source D (Trade Coverage)* confirms a gradual consolidation of active complementors, consistent with a mature ecosystem. *Public Source E (Press Briefing)* describes AlphaPlatform as a leading regional marketplace.	High
Data access and triangulation	Availability of open documentation and partner-facing communications enabling process and governance reconstruction.	*Public Source A (Developer Documentation)* includes functional API scopes and status feeds; *Public Source F (Incident Reports)* provides real-time service updates; *Public Source G (Partner Help Pages)* details automation guidance and lifecycle notes.	High
Multi-actor perspective	Presence of diverse certified complementor categories, integrators, agencies, data/insight providers, and logistics tools, allowing multi-party coordination.	*Public Source H (Ecosystem Directory)* lists formal partner tiers (A/B/C) across multiple categories. *Public Source I (Partner Platform Portal)* shows vetted third parties and badging criteria. Complementor records in the dataset (e.g., β-1, γ-1, ε-1) evidence long-term integrations and cross-category collaboration.	High
Exemplary / transferable nature	Represents a benchmark European marketplace with a well-developed complementor layer and mature governance; findings are analytically transferable to comparable ecosystems.	*Public Source E (Press Briefing)* and *Public Source J (Industry Analysis)* describe AlphaPlatform as the largest regional marketplace and benchmark case for multi-actor orchestration. Interview evidence from α-1 to ε-3 supports these characteristics.	High

Table 3.1 Case Selection Criteria

3.2 Data Collection

A multi-source data collection strategy was adopted, combining primary interview data with a broad range of secondary and archival sources. This triangulation was used to construct a comprehensive narrative of the platform ecosystem's evolution and to enhance the credibility of the findings through cross-verification (Yin, 2014). In total, the core dataset consists of 23 semi-structured interviews and numerous documents and records (internal and publicly available) that chronicle key events and context.

The primary source of insight was semi-structured interviews with individuals from AlphaPlatform and from each of the selected complementor firms. In total, **23** interviews were conducted. *Table 3.2* provides an overview of the interview sample (with anonymized codes for each interviewee).

Nr.	Company Code	Description	Industry / Role Type	Interviewee Code	Role
1	α (Alpha)	Marketplace platform operator	Orchestrator	α-1	Manager Ecosystem Partnerships
2	α (Alpha)	Marketplace platform operator	Orchestrator	α-2	Ecosystem Business Developer
3	α (Alpha)	Marketplace platform operator	Orchestrator	α-3	API Expert
4	α (Alpha)	Marketplace platform operator	Orchestrator	α-4	API Expert
5	β (Beta)	Product feed and marketplace integrator	Complementor – Integrator	β-1	CTO
6	β (Beta)	Product feed and marketplace integrator	Complementor – Integrator	β-2	CEO
7	γ (Gamma)	Analytics and advertising platform	Complementor – Data & Insights / Advertising	γ-1	Head of Partnerships
8	δ (Delta)	Marketplace connection software	Complementor – Integrator	δ-1	CEO
9	α (Alpha)	Marketplace platform operator	Orchestrator	α-5	Senior Product Manager
10	α (Alpha)	Marketplace platform operator	Orchestrator	α-6	API Expert

11	ε (Epsilon)	Marketplace integration software	Complementor – Integrator	ε-1	CEO
12	α (Alpha)	Marketplace platform operator	Orchestrator	α-7	API Expert
13	ζ (Zeta)	Marketplace analytics and optimization provider	Complementor – Data & Insights	ζ-1	CEO
14	η (Eta)	Global marketplace integrator	Complementor – Integrator	η-1	Global Partner Manager
15	η (Eta)	Global marketplace integrator	Complementor – Integrator	η-2	Product Manager
16	α (Alpha)	Marketplace platform operator	Orchestrator	α-8	Manager Account Development
17	θ (Theta)	Marketplace consultancy and agency	Complementor – Agency	θ-1	CEO
18	ι (Iota)	Marketplace agency for brands	Complementor – Agency	ι-1	Marketplace Director
19	κ (Kappa)	Marketplace marketing agency	Complementor – Agency	κ-1	Head of Marketplaces
20	λ (Lambda)	Marketplace optimization agency	Complementor – Agency	λ-1	Marketplace Specialist
21	μ (Mu)	Digital marketing agency with marketplace branch	Complementor – Agency	μ-1	Marketplace Specialist
22	α (Alpha)	Marketplace platform operator	Orchestrator	α-9	Ecosystem Business Developer
23	α (Alpha)	Marketplace platform operator	Orchestrator	α-10	Manager Ecosystem Partnerships

Table 3.3.1 Interview Overview (Sample Deviation Appendix B)

All interviews were conducted in a conversational, semi-structured manner following a protocol designed around the ecosystem cycle (value creation → delivery → retention → resilience and future). The interview guide (see Appendix A: Interview Protocol) was developed specifically for this study using a funnel logic that moves from the respondent's role and organisational context toward sequential phases of ecosystem interaction. Separate but equivalent versions were used for orchestrator-side (α-coded) and complementor-side (β- to ζ-coded) participants.

Each interview covered comparable domains: role and background, key historical milestones in the partnership, pivotal events or policy changes, and reflections on how collaboration evolved over time. On the orchestrator side, example questions included: "*How has AlphaPlatform's governance of ecosystem partners evolved since the introduction of the API and partner-tier programme*?" and "*Which platform decisions, such as policy updates, API changes, or fee adjustments, most affected how you work with complementors*?" Probing focused on concrete episodes (e.g., API rollouts, rule changes, incidents, or conflicts) and on the orchestrator's responses to complementor feedback during those moments.

On the complementor side, representative questions were: "When and why did your firm join AlphaPlatform's ecosystem, and what were your initial expectations?", "What platform changes most influenced your ability to create and deliver value?", and "Can you describe an instance where you had to adapt to an AlphaPlatform policy or technical update, what actions did you take and what followed?" Each interview also included a temporal-bracketing prompt asking respondents to identify three to five turning points in the period 2018–2024 and to recount what the platform did, what they did, and what occurred afterwards. This narrative structure was essential for reconstructing process sequences and co-evolutionary feedback loops.

Interviews were conducted in Dutch or the interviewee's preferred language. Most took place via secure video conferencing due to geographic dispersion, with several held in person when feasible. Sessions lasted approximately 45–90 minutes. With consent, all were audio-recorded and transcribed verbatim. Prior to each session, informed consent was obtained, including clarification of study purpose, voluntary participation, right to withdraw, and permission to record. Confidentiality and anonymity were guaranteed: participants were informed that quotations would appear only under pseudonyms. Accordingly, alphanumeric codes were applied (e.g., α-1 … α-10 for orchestrator staff; β-1 … ζ-13 for complementor organisations), and only these identifiers appear in transcripts, notes, and analysis.

Publicly accessible online materials were consulted alongside interviews to corroborate facts, clarify timelines at a high level, and situate the case in its broader context. To preserve anonymity and avoid revealing the focal organization, (i) only generic source categories were reported, (ii) outlet names, URLs, and article titles were not cited in the thesis body, and (iii) relative time references were used (e.g., "early," "subsequent," "later phase") when greater precision could be identifying. No proprietary or confidential documents and no third-party case studies were used.

Source categories

Platform-facing materials publicly available policy/help pages, developer/partner guidance, release or update notes, and other open web communications intended for ecosystem participants. When useful, archived snapshots were consulted to observe versioned changes in formal rules over time.

General business and trade reporting publicly available news or trade coverage relevant to marketplace governance changes, ecosystem developments, or external regulatory context.

Public community discourse (context only) open discussion threads where ecosystem participants exchange experiences. These materials were not formally coded as data; they served to surface commonly voiced concerns and to sensitize interview prompts.

Use and documentation

Public materials were saved and organized in a secure project repository. Rather than reproducing identifiable items, non-identifying evidence notes were created (e.g., "public policy page, fee update; archived version indicates revision in later period"). Cross-checks against at least two independent public items were sought for claims central to the narrative. All sources are tracked internally with anonymized IDs to maintain an auditable chain of evidence, while the thesis reports only aggregated, de-identified references to avoid disclosing the platform's identity. Processing steps (from raw public items and transcripts to codes and themes) are documented in the audit trail and summarized in Section 3.5 on rigor.

Data source category	Description of material (anonymised)	Count / Volume	Purpose and use in analysis
Primary interviews – orchestrator side (α-coded)	Semi-structured interviews with AlphaPlatform staff (partnership managers, API experts, product leads).	10 interviews (~9 h recorded)	Captured orchestrator perspective on governance, API evolution, partner management, and feedback routines.
Primary interviews – complementor side (β–ζ-coded)	Semi-structured interviews with complementor firms (integrators, agencies, analytics, advertising, logistics).	13 interviews (~13 h recorded)	Captured complementor perspectives on adaptation, innovation, and perceived governance influence.
Total interview data	Verbatim transcripts (Dutch/English)	≈ 260 pages transcribed text	Basis for Gioia coding and temporal bracketing.

Table 3.3.3 Primary Data

3.3 Data Analysis

Data analysis followed a multi-step, iterative process aimed at building an inductive explanation of the co-evolution process. Qualitative coding, informed by the Gioia methodology, was employed to surface first-order informant terms and aggregate these into second-order themes and higher-level dimensions, thereby preserving linkages from raw accounts to emergent constructs (Gioia, Corley, & Hamilton, 2013). The primary objective was

two-fold: (1) to identify key concepts and themes arising from the data (including types of strategic actions, responses, or mechanisms of alignment/conflict), and (2) to synthesise these concepts into a chronological sequence and coherent narrative clarifying the reasons and processes behind the changes that transpired. This section details the analysis procedures in four parts: building the coding structure (Section 3.4.1), performing temporal bracketing of events (3.4.2), conducting process tracing for causal insight (3.4.3), and synthesising the findings into a conceptual framework (3.4.4).

The initial step involved inductive coding of the qualitative data to refine the raw evidence into analytical categories. The methodology proposed by Gioia, Corley, and Hamilton (2013) for rigorous inductive coding was followed, entailing a methodical transition from informant-centric codes to researcher-generated themes and aggregate dimensions.

First-order coding (open coding)

In the initial coding cycle, all interview transcripts were read, and descriptive codes were assigned to segments of data, staying as close as possible to participants' own words and terms. At this stage, informants' phrases were treated as first-order concepts without forcing them into existing theoretical labels (Gioia et al., 2013). For example, when a complementor interviewee said, "*When AlphaPlatform updated the API endpoints, we had to rework our pricing automation within weeks*," a first-order code such as "API update → complementor repricing adjustment" was created. Each meaningful piece of information, an action, a reaction, a perception, received a code capturing what was expressed. This process yielded a large set of granular codes. In total, on the order of 165+ first-order codes were generated, reflecting a wide variety of happenings (e.g., specific platform actions, complementor responses, experienced consequences) and viewpoints mentioned by informants. A codebook was maintained to keep definitions clear as new codes were added. Table 3.5 provides an excerpt of the codebook, illustrating selected first-order codes with example data excerpts (with α-, β-, … ζ-identifiers).

Second-order coding

As the number of first-order codes grew, constant comparison was employed to identify similarities, differences, and potential patterns among them (Glaser & Strauss, 2017). A second round of coding then sought more abstract second-order themes that could explain or subsume many of the first-order codes. In practice, this involved asking: "*What concept does this group of similar codes indicate?"* and "*Why might these specific events or responses be happening, what broader phenomenon do they represent?*" Here, theoretical sensitivity and insight played a role (Strauss & Corbin, 2003). For example, several first-order codes described complementors making significant changes to their operations in response to platform moves, including "*repricing rules adjusted after API change,*" "*expanded assortment after new category opening,*" and "*invested in automation following endpoint release.*" These were interpreted collectively as instances of a higher-level concept and labelled the theme "*Complementor Adaptive Responses.*" Likewise, multiple codes captured actions taken by AlphaPlatform to influence or support complementors, such as "*introduced stricter quality rules*," "*launched co-development/pilot with partners*," and "*provided new analytics interfaces*", which were grouped under "*Orchestrator Strategic Initiatives.*" During this phase, iteration between the emerging themes and relevant literature refined theme labels and ensured conceptual clarity. Particular attention was paid to themes reflecting the dynamic interplay between the platform and complementors; for instance, "*Feedback Loop Triggers*" represented

incidents where an action by one party triggered a notable counter-response by the other (e.g., collective complementor voice leading to a policy adjustment). Inductive grouping continued until a manageable set of robust second-order themes captured the essence of the first-order findings.

Aggregate dimensions

Second-order themes were then examined for higher-level aggregation. Rather than a generic triad, themes were clustered to align with the study's final data structure and reporting in Chapter 4: *Technological Infrastructure & Data Exchange, Ecosystem Governance & Power Dynamics, Organisational Capabilities & Operating Routines, and Regulatory & Societal Context*. These aggregate dimensions represent the highest level of abstraction in the inductive coding structure and speak directly to the dynamic of co-evolution between orchestrator (α-coded) and complementors (β–ζ-coded). The outcome of this coding process is visualised as a Gioia data structure (Gioia et al., 2013), depicting how the many first-order concepts roll up into second-order themes and then into the aggregate dimensions. *Figure 3.1* illustrates this data structure, providing transparency in the progression from raw data to theoretical insights. In essence, it presents a "map" of the analysis, showing how informant terms and narratives (first-order) were systematically abstracted into researcher-constructed themes and dimensions, thereby demonstrating rigour in the inductive approach.
Throughout the coding, procedures appropriate for a single-researcher qualitative design were implemented to promote reliability and transparency. An initial subset of transcripts was coded and later revisited to assess consistency and refine inclusion and exclusion rules. A detailed codebook was maintained throughout the process, containing code definitions and illustrative quotations (see Table 3.5 for an excerpt). As the coding structure stabilised, earlier transcripts were periodically reviewed to ensure that similar meanings were coded consistently and that the emerging framework remained coherent across the full dataset. A clear record of coding versions and analytical decisions was retained to provide traceability and confirm the dependability of the final data structure.

Data collection and coding continued until theoretical saturation

Data collection and analysis continued until no substantively new first-order concepts emerged. Empirically, after approximately the first 21 interviews, most core concepts had appeared, while subsequent interviews primarily elaborated or confirmed existing categories rather than introducing novel insights. By the final interviews, participants were largely reinforcing previously identified patterns, indicating thematic saturation (Guest et al., 2006). Table 3.5 (Section 3.5) summarises this saturation trajectory, showing the gradual tapering of new concept emergence over time. Completing all twenty-three planned interviews ensured adequate depth and variation in perspectives, supporting the completeness and robustness of the data. The resulting inductive coding structure captured the main themes and dimensions of the co-evolutionary process, after which the analysis focused on the temporal sequencing of events to explain how and when changes unfolded.

Aggregate Dimension	Second-Order Theme	Illustrative First-Order Concept / Informant Term	Example Data Excerpt (Anonymized Quotation)
Technological Infrastructure & Data Exchange	API Governance & Integration Stability	"Everything goes through our API."	"We realised that partners must connect only through the official API, it gives stability and traceability for everyone." (α-3)
		Transition from scraping to API usage	"At first we scraped data because the API didn't cover everything, but now everything is unified in the Retailer API." (β-1)
	Building Data Capabilities for Insights	Data-driven decision making and analytics integration	"Our dashboard combines performance data with ad spend so sellers can see their real ROI." (γ-1)
Organisational Capabilities & Operating Routines	Continuous Learning and Adaptation	Learning by doing and iterative experimentation	"Each change from the platform forces us to adjust, we test, learn, and redeploy fast." (ζ-2)
	Complementor Capability Building	Investing in automation and technical expertise	"We trained our team to manage API changes without waiting for support; it's now part of our routine." (ε-2)
Ecosystem Governance & Power Dynamics	Managing Partner Relationships & Tiering	Structured partner programme (Tier A/B/C)	"We rank partners because it clarifies expectations, Tier A partners are closest to our roadmap." (α-2)
	Feedback and Voice Mechanisms	Formal and informal feedback channels	"Sometimes we raise issues in partner meetings; other times we email the API team directly, they do listen." (γ-2)
	Managing Power Imbalance and Trust	Transparency and fair communication	"AlphaPlatform is big and we're small, but they are still fair when we have a problem, they explain their decisions." (β-3)
Regulatory & Societal Context	Navigating Regulation & Compliance	Adapting to EU requirements (e.g., product information, safety marks)	"The new EU rules meant we had to add economic-operator data, AlphaPlatform quickly built the API for that." (ε-1)
	Responding to Market Competition	Adjusting strategy to new entrants	"Competitors are faster with tech, so AlphaPlatform tightened its API rules to keep quality high." (α-4)

Table 3.5 Excerpt of Codebook and Example Data Excerpts

The co-evolutionary process was analysed by constructing a source-triangulated chronology of orchestrator–complementor interactions and dividing this sequence into analytically significant periods through temporal bracketing. Temporal bracketing-imposed structure on process data by grouping contiguous events into phases, allowing for comparison and theorisation while maintaining the significance of temporal order and proximity (Langley, 1999). Event entries integrated interview and archival time markers, succinct descriptions, and key actors, and were connected to inductively derived first- and second-order concepts to ensure traceability from raw incidents to emerging theoretical categories (Gioia, Corley, & Hamilton, 2013).

Phase boundaries were identified inductively based on observable discontinuities in governance actions and complementor responses, rather than through predetermined intervals. The resulting periodisation consists of an Emergence phase defined by rapid scaling under permissive governance, a Regulation phase characterised by the introduction and enforcement of formal rules, and a Maturation phase where routines and collaborative mechanisms stabilise interaction patterns. The labels serve as descriptive heuristics, extracted from the data to aid in the comparative analysis of how ending conditions in one period may have influenced or limited trajectories in the subsequent period (Langley, 1999).

Recurrent action–reaction motifs were analysed as potential mechanisms within each temporal bracket. Common patterns involved orchestrator initiatives that altered boundary conditions, succeeded by complementor adaptations that included capability investment, compliance, and intentions to voice or exit. The cross-phase comparison evaluated whether unresolved issues at the end of one period likely triggered governance recalibration in the following period. This aligns with co-evolutionary reasoning, which highlights reciprocal, path-dependent adjustments instead of unilateral causality (Lewin & Volberda, 1999).

Process tracing was utilised on specific transitions to analyse proposed causal chains. The analysis for each episode reconstructed micro-sequences that connected triggers, intervening actions, and outcomes, while seeking diagnostic evidence and considering alternative explanations. Illustrative chains involved collective complementor voice in response to monetisation or quality interventions, followed by partial policy revision and the institutionalisation of advisory channels. Conversely, opportunity-enhancing boundary resource changes were observed to elicit complementor innovation and deepen platform-specific investment (Gioia et al., 2013; Langley, 1999).

This phased, mechanism-seeking design enhances internal coherence by making a complex timeline comparable across segments and emphasising feedback processes central to co-evolution theory, where each side's actions alter the conditions for subsequent actions by the other over successive periods (Lewin & Volberda, 1999). Analysing each phase as a small comparative case enhanced the ability to infer how conditions and actions within a period influence subsequent outcomes, including alignment, innovation, or resilience at the ecosystem level. An event-to-code schema enhances the narrative by demonstrating the connection between raw events, conceptual categories, and relevant evidence sources (Gioia et al., 2013; Langley, 1999).

A recurring mechanism involves complementor feedback leading to orchestrator adaptation. Episodes displaying this pattern demonstrated a sequence involving an orchestrator intervention that modified exchange conditions, a collective or coordinated complementor voice, and a subsequent adjustment of governance or boundary resources by the orchestrator. Confidence in the mechanism was bolstered when various data sources aligned on the same

sequencing and when stakeholders clearly expressed the connection between complementor responses and subsequent policy revisions, thereby reinforcing the assertion that feedback effects were active rather than incidental (Beach & Pedersen, 2013; Lewin & Volberda, 1999). A secondary mechanism involved changes in orchestrator strategies that prompted the development of complementor capabilities. The observed sequences initiated with the introduction of new technical standards or boundary resources, succeeded by complementor investments in complementary assets and routines, and concluded with enhanced platform-specific embeddedness. These chains correspond with discussions on platform governance and boundary resource design as mechanisms that influence the trajectory and intensity of ecosystem evolution by establishing incentives and viable action sets for third parties (Ghazawneh & Henfridsson, 2013; Tiwana, 2015; Thomas, Autio, & Gann, 2014).

External shocks were examined as exogenous disturbances that could alter the activation of mechanisms. In episodes involving market entry by a major competitor or regulatory changes, the analysis examined orchestrator and complementor adjustments for indications of coordinated or mutually reinforcing responses. Evidence of synchronised shifts in governance emphasis and complementor portfolio strategies was interpreted as indicative of a coordinated adjustment mechanism, subjected to plausibility checks against competing explanations, including secular performance trends or unrelated policy cycles (Langley, 1999; Lewin & Volberda, 1999).

A mini-case was developed for each potential mechanism, featuring a chronologically organised narrative and an evidence ledger that recorded source type, timing, and probative value. Credibility assessments employed standard process-tracing methods by examining absent connections, evaluating temporal consistency, and seeking disconfirming evidence that could contest the proposed sequence (Beach & Pedersen, 2013). Convergent acknowledgements from both orchestrator and complementor informants, along with documentary confirmation of timing, were deemed to strengthen the validity of causal inference. The emergent mechanisms were consistently involved in abductive dialogue with established theories regarding platform ecosystems and co-evolution. The analysis examined whether the observed patterns indicated new configurations or reflected established theories, including the perspective that more participatory governance structures might mitigate conflictual adjustments by institutionalising voice and deliberation (Selander, Henfridsson, & Svahn, 3 2013; Tiwana, 2015). The integration of a Gioia-style coding architecture ensured that mechanism narratives were grounded in first-order informant terms and second-order themes. Furthermore, temporal bracketing provided the comparative framework essential for assessing how dynamics within each phase affected conditions for subsequent phases (Gioia, Corley, & Hamilton, 2013; Langley, 1999). This mixed analytic strategy collectively supports a coherent explanatory model in which feedback, adaptation, and recalibration function as interconnected mechanisms of orchestrator–complementor co-evolution.

The concept of thematic saturation refers to the point in qualitative research when additional data collection no longer yields new insights or codes. Saturation occurs once no further themes emerge from subsequent interviews, and later data mainly replicate previously identified ideas (Guest, Bunce, & Johnson, 2006; Fusch & Ness, 2015). Achieving saturation signals that the dataset is sufficiently comprehensive to represent the phenomenon under study and strengthens the credibility and completeness of qualitative findings (Saunders et al., 2018).

In this study, thematic saturation was monitored systematically by tracing the emergence of new first-order concepts across the 23 semi-structured interviews. Each transcript, pseudonymised with the codes α-1 to μ-1, was compared against a predefined codebook of first-order concepts to determine whether any novel ideas appeared. A tracking table was maintained to visualise when interviews ceased to generate new concepts (Guest, Namey, & Chen, 2020).

Table 3.5 shows the chronological interview order and whether each interview introduced new first-order concepts. Early and mid-stage interviews (e.g., α-1 to α-7 and β-1 to η-1) produced most of the core ideas, whereas later sessions primarily elaborated or confirmed existing categories. Empirically, no substantively new first-order concepts emerged after interview μ-1 (the 21st interview). The final two interviews (α-9 and α-10) reinforced prior patterns without adding novel insights, confirming that saturation had been achieved by that point (Guest et al., 2006).

Interview Code	New Theme Introduced?
α-1 (1st)	Yes – new themes present
α-2 (2nd)	Yes – new themes present
α-3 (3rd)	Yes – new themes present
α-4 (4th)	Yes – new themes present
β-1 (5th)	Yes – new themes present
β-2 (6th)	Yes – new themes present
γ-1 (7th)	Yes – new themes present
δ-1 (8th)	Yes – new themes present
α-5 (9th)	Yes – new themes present
α-6 (10th)	Yes – new themes present
ε-1 (11th)	Yes – new themes present
α-7 (12th)	Yes – new themes present
ζ-1 (13th)	Yes – new themes present
η-1 (14th)	Yes – new themes present
η-2 (15th)	Yes – new themes present
α-8 (16th)	Yes – new themes present
θ-1 (17th)	Yes – new themes present
ι-1 (18th)	Yes – new themes present
κ-1 (19th)	Yes – new themes present
λ-1 (20th)	Yes – new themes present
μ-1 (21st)	No– new themes present
α-9 (22nd)	No– new themes present
α-10 (23rd)	No– new themes present

Table 3.5 Interview Order and Introduction of New Themes

Saturation was evaluated across both participant roles. The orchestrator interviews (α-series) reached saturation slightly earlier, after approximately eight interviews, while the complementor interviews (β through μ) displayed the same plateau by the twenty-first discussion. Completing all 23 planned interviews nonetheless enhanced the robustness and variation of perspectives, ensuring the final dataset captured the full thematic range of the co-evolutionary process.

The final analytical step involved assembling an inductive theoretical model of orchestrator–complementor co-evolution, which is presented in Chapter 5.

In summary, systematic monitoring of theme emergence demonstrated that thematic saturation was reached by the twenty-first interview. Continuing to interview beyond that stage produced only confirmatory evidence. Consequently, the sample size was deemed adequate for analytic depth and theoretical completeness (Francis et al., 2010).

3.4 Rigor and Trustworthiness

Rigour and reliability were addressed through established criteria for qualitative research**,** credibility, transferability, dependability, and confirmability**,** supplemented by standard quality logic for case studies concerning construct validity, internal validity, external validity, and reliability. These criteria guided design choices and reporting practices and functioned as complementary rather than substitute safeguards within an interpretive framework (Lincoln & Guba, 1985; Merriam, 1998; Yin, 2014).

Credibility was established through triangulation of evidence from multiple sources, including orchestrator and complementor interviews as well as publicly available archival materials. Convergent and divergent accounts were systematically compared, and event descriptions were cross-checked against independent information to ensure factual accuracy (Denzin, 1978; Yin, 2014). Credibility was further strengthened through limited member validation, where factual clarifications and contextual corrections were invited from selected participants. No substantial discrepancies emerged, suggesting that the case report reliably reflects participant perspectives while allowing for interpretive diversity (Lincoln & Guba, 1985). Peer discussions with the academic supervisor served as an external review mechanism, helping to scrutinise assumptions and alternative explanations.

Transferability was enhanced through a rich description of the research context, ecosystem actors, and evolutionary processes, enabling readers to assess similarities with other settings and judge the potential for analytical generalisation (Geertz, 1973; Yin, 2014). Findings were explicitly linked to established constructs in platform governance and co-evolution, serving as conceptual anchors for reasoning about their applicability to comparable ecosystems at similar maturity stages (Adner, 2017; Jacobides et al., 2018).

Dependability (reliability) was promoted by maintaining a structured record of data, coding iterations, and analytical decisions. The case-study protocol standardised interview design and documentation procedures, reducing variation in data collection (Yin, 2014). Earlier transcripts were periodically revisited to confirm consistent use of codes and definitions, demonstrating stability in the final analytical structure and internal coherence of interpretation (Gioia et al., 2013).

Confirmability was achieved by ensuring that each key finding was traceable to multiple, verifiable sources and by deliberately examining negative or contradictory evidence (Lincoln & Guba, 1985). Retention of first-order participant terms and extensive quotation in the results chapter ensured that higher-level abstractions remained grounded in the empirical material (Gioia et al., 2013). Regular supervisory reviews functioned as a light external audit, requiring explicit demonstration of the chain of evidence connecting data to interpretation.

These procedures align with established quality criteria for interpretive case research: triangulated data enhance construct validity; temporal bracketing and process tracing strengthen internal validity by articulating plausible causal sequences; thick contextualisation fosters external validity through analytical generalisation; and a clear documentation protocol supports reliability (Beach & Pedersen, 2013; Langley, 1999; Yin, 2014). Collectively, the approach constitutes a coherent quality system suitable for an interpretive, qualitative single-case design in a digital platform-ecosystem context (Adner, 2017; Jacobides et al., 2018).

3.5 Ethical Considerations

This study complied with institutional research-ethics guidance and applicable data-protection law (e.g., GDPR). The research was conducted in accordance with the ethical standards of Delft University of Technology (TU Delft) and its Faculty of Technology, Policy and Management (TPM), following the university's guidelines for research integrity, informed consent, and data protection. As the study involved voluntary interviews with professionals and contained no sensitive personal data, formal ethics review was not required under the faculty's human-subjects policy. Participation was voluntary. Before each interview, participants received an information sheet describing the study's purpose, procedures, potential risks and benefits, confidentiality measures, data use, and storage. Written (or recorded verbal) informed consent was obtained, including permission to audio-record. Participants could decline any question and withdraw at any time without penalty.

Confidentiality and anonymity were protected throughout. All organisational and personal identifiers were replaced with pseudonyms: the focal firm is referred to as AlphaPlatform, orchestrator interviewees carry α- codes, and complementor interviewees β–ζ codes. Transcripts were pseudonymised at source; direct and indirect identifiers (e.g., specific role titles, product names, client lists, unique events) were generalised or removed where necessary to prevent "jigsaw" identification. Quoted material was screened to reduce identifiability while preserving informant meaning.

Data minimisation and security principles were applied. Only information necessary for the research aims was collected. Audio files were stored in encrypted form and deleted after verbatim transcription and quality checks. Pseudonymised transcripts and the working codebook were stored in a restricted repository accessible only to the researcher (and, if required, the supervisory team). No raw interview data are publicly available. Public and archival materials used for triangulation were cited in generic, non-identifying form within the thesis to preserve case anonymity; a confidential evidence register is retained separately for audit on request.

Limited member validation was used for factual clarification (e.g., chronology, terminology), without granting editorial control over interpretations. No undue inducements were offered; participants incurred no costs. The researcher declares no conflicts of interest or commercial ties with the organisations involved.

To safeguard privacy when using digital aids for drafting and organisation, only de-identified material was handled; no personally identifying data were shared with third-party services. The combination of informed consent, strict pseudonymisation, controlled access, and an auditable record of decisions is intended to ensure credibility while protecting participants' rights and the confidentiality of the focal ecosystem.

4. Results

This chapter focusses on the actions and statements of individuals inside a functioning platform ecosystem. Instead of embellishing the narrative with theoretical discourse, the report remains focused on practical application: detailing how the orchestrator and a dynamic ensemble of collaborators navigated daily challenges, made technological investments, and devised methods, sometimes sophisticated, occasionally improvised, to maintain overall productivity. What unifies such an ecosystem when code, contracts, and competition pull in divergent directions? The succinct response is a dynamic equilibrium of capacity, coordination, and limitation.

Our perspective is intentionally co-evolutionary. Boundary resources, APIs, data interfaces, and the associated tools, establish the practical constraints of potential actions; organisations subsequently adapt or modify their routines to optimise these opportunities; governance ensues, instituting rules, programs, and incentives that determine participation and success; and overarching this framework, regulation delineates the non-negotiable boundaries. One may assume that technology leads while other domains follow; however, research indicates a more reciprocal relationship, where decisions in one area swiftly influence others. Occasionally in an uncomfortable manner.

The story amplifies the perspectives of those involved, allowing their words to elucidate systems or reveal trade-offs. The focus is on the alterations, the mechanisms of change, and their significance in the daily operations of the ecosystem, rather than on neat abstractions. It is, in essence, a meticulously composed field note.

Roadmap Section 4.1 analyses Technological Infrastructure and Data Exchange; 4.2 addresses Organisational Capabilities and Operating Routines; 4.3 evaluates Ecosystem Governance and Power Dynamics; 4.4 contextualises the findings within the Regulatory and Societal Framework; and 4.5 concludes with a concise integrative synthesis. 4.1 Technological Infrastructure & Data Exchange

4.1 Technological Infrastructure & Data Exchange

The platform's technical architecture plays a pivotal role in orchestrator–complementor co-evolution. In the case, Alpha's design choices, its APIs, communication channels, data interfaces, logistics integration points, and emerging AI features, both enable complementors to create value and prompt adaptations on both sides. This section synthesises how these technical facets set the stage for dynamic feedback loops between the platform (orchestrator) and third-party partners (complementors). Each subsection corresponds to a specific theme (2nd-order) within this technological infrastructure, anchored by illustrative first-order concepts and anonymised interview evidence. We detail how API governance, status communications, data/analytics affordances, logistics integration, seller-facing tools, and AI/automation all contribute to a co-evolutionary "push-and-pull" cycle. A short takeaway concludes each subsection, highlighting the insight gained.

4.1.1 API governance & integration stability

Alpha's API governance underpins stable integrations and exemplifies co-evolution in action. The orchestrator requires that, as one API specialist emphasised,

> "*Everything goes through our API. That's how we keep integrations stable and traceable for everyone.*" — (Ecosystem Manager α-2)

This strict API-centric approach moves complementors away from ad-hoc or scraping methods toward official endpoints. It gives the platform control over functionality and data access but also obliges it to manage change responsibly. Both sides have learned that unexpected changes can be disruptive. In response to earlier experiences with frequent, low-impact version changes and limited communication, Alpha now involves key integrators in development discussions, provides advance notice of updates, and only releases a new API version when there are substantive changes to justify complementors' rework. Complementors, for their part, have adapted wholeheartedly to the official API. Many early third parties transitioned from screen-scraping to the Retailer API as it matured, and some even influenced its design. One integrator recalled:

> "*We were closely involved in API development from the very beginning, giving feedback on what data endpoints sellers actually needed.*" — (Complementor ε-1)

Despite this progress, complementors continue to push for more openness. Several complementors noted that the near-complete shutdown of scraping traffic, while improving cleanliness and control, also reduced their visibility of certain data (such as specific brand identifiers), prompting repeated requests for additional fields and clearer release planning. This ongoing negotiation reflects a balancing act: the platform curates API scope to ensure integration stability and prevent misuse (even considering limiting openness to curb bots) (Manager α-2), while complementors continually advocate for richer endpoints and predictable release cycles. The result is a gradual alignment. Alpha's governance choices (such as a consistent release schedule, deprecation policies, and feedback forums) have increased integrators' confidence in the API's stability, encouraging them to build more sophisticated services. In turn, the complementors' adaptations, from migrating fully to official APIs to contributing targeted feature requests, feed back into API improvements over time (e.g. new data fields, clarified documentation).

Mechanism Effective API governance creates a two-way street: the platform provides a stable, comprehensive integration interface and manages change transparently, while complementors commit to that interface and use their feedback to directly shape the API's scope and reliability over time.

4.1.2 Empowering Sellers through Third-Party Tools

A striking theme in the results is how third-party tools act as enablers for sellers, extending the platform's native seller interface and capabilities. Alpha's strategy deliberately leverages these complementors to empower merchants, especially smaller or less technically skilled ones, to succeed on the marketplace. As one Alpha API expert explained:

> "*It's technically possible for a seller to build a direct connection with us, but most partners simply don't have the technical know-how or developers to do that themselves. They just want to focus on selling, not on writing API code.*" — (API Expert α-4)

Because many sellers "just want to do business" rather than deal with data pipelines or software maintenance, the orchestrator relies on ecosystem tools to close that gap. These tools range from full-service integrators that manage all connectivity, updates, and maintenance, to small, specialised apps that provide a friendly interface for a single function.
A clear example is analytics dashboards. Alpha's native seller dashboard shows only basic metrics on sales and performance, leaving a major blind spot in profitability insights. One integrator described this gap:

> "*At AlphaPlatform you can see your sales and performance, but you can't see your total profit. You don't know what's actually left after costs*." — (Complementor β-1)

To address this, the same firm built an enhanced analytics tool that allows sellers to enter all relevant costs (such as advertising, shipping, and platform fees) and calculate their profit per product more accurately. Tools like these, along with similar services for stock forecasting, SEO optimisation, and advertising management, drastically reduce analytical barriers for merchants. They standardise information and make data-driven decision-making accessible even to novices.

Recognising their value, Alpha actively supports such innovation by routinely sharing seller pain points and unmet needs with developers, inviting them to explore solutions that the platform does not have the capacity or strategic priority to build itself. This cooperation has produced third-party solutions for unified messaging, campaign management, and automated repricing, tools that make AlphaPlatform more attractive and easier to operate on.

Seller enablement also extends to training and support. Alpha maintains a curated network of agencies that help merchants with strategy and account optimisation, but increasingly, technical tools supplement these human services. Some complementors now offer AI-driven listing optimisers and repricers as subscription products, performing at scale what consultants once handled manually. At the same time, complementors stress that they absorb a substantial share of the day-to-day support workload by handling many of the questions and issues that sellers would otherwise direct to Alpha's own customer service teams. In this sense, third-party providers function as extensions of the platform's operational capacity.

The co-evolutionary pattern is clear: as the platform scales and attracts more novice sellers, third-party providers emerge and expand to meet their needs; as those providers identify recurring problems, such as missing performance metrics or cumbersome advertising setup, the platform responds by supplying additional data access, API endpoints, or, when a function becomes strategically critical, by developing its own native features. Complementors, in turn, keep refining their offerings based on both platform updates and seller feedback. For instance, when Alpha released new advertising APIs, several analytics firms swiftly integrated them so that merchants could manage sales and ads from a single dashboard, accelerating adoption of the platform's innovations.

Mechanism Third-party tools form an innovation layer on top of AlphaPlatform's boundary resources, translating technical interfaces into accessible, seller-facing solutions. By accommodating and actively signalling opportunities to this layer, the orchestrator multiplies

its effective support capacity and feature scope, while sellers gain a richer, plug-and-play toolkit that reinforces growth and deepens ecosystem alignment.

4.1.3 Building data capabilities for data-driven insights

Alpha's evolution into a data-driven, advertising-enabled platform has unlocked new co-evolution dynamics with its complementors. Over the study period, the orchestrator expanded the volume and type of data exposed through new analytics endpoints and an Advertising API, marking a deliberate strategic shift toward retail media and insight monetisation. One partnership manager recalled internal discussions about whether Alpha should integrate or acquire existing expertise rather than build everything itself:

> "*We even asked ourselves whether we should take over an ecosystem party that owns a bunch of data and market-intelligence capabilities, because those insights are becoming strategically important.*" — (Ecosystem Manager α-1)

The comment underscores the high value placed on complementors' analytical know-how. Rather than displacing them, Alpha's expansion has generally stimulated more collaboration. A clear illustration was the launch of Alpha's native advertising tools and its corresponding API. According to analytics providers, the announcement was received positively across the ecosystem and quickly turned into a co-creation process in which complementors provided practical feedback that influenced the API's design and usability. Early participants report that being among the first to establish a working connection and deliver end-to-end advertising solutions for sellers gave them a noticeable head start in the market.

This episode typifies the two-way learning between orchestrator and complementors. As Alpha opened new data streams, analytics complementors expanded their own products. Several firms that had begun as basic sales-performance dashboards added new modules for advertising management, bidding optimisation, and market-intelligence reporting once the relevant endpoints became accessible. One founder reflected on this pivot:

> "*It started out as a pure analytics tool, but now we also offer advertising services. We had to evolve with the platform to stay relevant.*" — (Complementor γ-1)

Other complementors faced strategic decisions about scope. The availability of granular keyword and advertising-performance data pushed them to choose between investing in new ad-related functionality or doubling down on analytics niches. These choices show how platform actions, especially changes in data availability, directly shape complementor roadmaps.

The influence also runs in reverse. Alpha's managers observed the novel insights third-party analytics providers were generating, such as profitability breakdowns, dynamic pricing intelligence, and cross-channel reporting, and responded by strengthening internal capabilities, including targeted investments and acquisitions in analytics. At the same time, Alpha deliberately leaves certain analytical niches to the ecosystem, such as profit-margin analysis that depends on sellers' confidential cost data or dashboards that combine AlphaPlatform results with external marketplaces. These domains remain complementor territory by design. To signal this division of labour, Alpha formally recognises "Data & Insights" and "Advertising" as dedicated complementor categories and emphasises that many of these tools are particularly aimed at new or smaller sellers, helping them identify promising niches and

understand performance. Such complementors also provide automation beyond what Alpha's native interfaces support, for instance bulk bid adjustments or campaign optimisation across hundreds of products.

The result is a reinforcing feedback loop: Alpha supplies data access and APIs; complementors invest in new features and occasionally co-develop them with Alpha; and the orchestrator learns from these external innovations, sometimes integrating the most successful ideas into its core services. Through these iterative exchanges, the entire ecosystem becomes progressively more data-centric and analytically capable.

Mechanism AlphaPlatform's move into data and advertising has catalysed mutual growth rather than displacement: new data and advertising boundary resources enable complementors to broaden and upgrade their offerings, while complementor innovations and feedback guide Alpha's own product and analytics evolution, so that orchestrator and complementors co-evolve toward an increasingly insight-driven marketplace.

4.1.4 Integrating Logistics & Inventory Systems.

Technical integration in logistics and inventory management emerged as another crucial domain of co-evolution between Alpha and its complementors. Over time, the orchestrator has introduced its own fulfilment and shipping services, but seamless connection with sellers' day-to-day operations still depends heavily on third-party solutions. As one integrator explained:

> "*Setting up the first order-shipping configurations and turning on inventory synchronisation are usually the two biggest hurdles for new sellers. Once those work, everything else becomes easier.*" — (Complementor ε-1)

Aligning a seller's warehouse or multi-channel stock system with the platform can be complex and error prone. Complementors have taken the lead in simplifying this task, building middleware that continuously updates stock levels on AlphaPlatform when a sale occurs elsewhere, and vice versa, to prevent overselling. Although Alpha's API provides endpoints for order retrieval and stock updates, some parameters (such as detailed shipping cost information) remain inaccessible, forcing complementors to maintain separate spreadsheets and manual configurations. The absence of real-time logistics data increases maintenance effort and can lead to occasional mismatches between quoted and actual fees. According to participants, Alpha has acknowledged this feedback and is exploring additional endpoints, such as a dedicated shipping-cost API, illustrating how complementor experience feeds back into technical improvement.

Complementors have also devised creative interim solutions for data transparency. Before official inventory-visibility tools existed, some analytics complementors relied on a so-called "shopping-cart method", repeatedly adding products to a basket on AlphaPlatform's site to estimate available quantities and competitor stock levels. Although such practices were never officially sanctioned, they helped complementors advise sellers on demand and stock gaps. Alpha later restricted this behaviour for cost and fairness reasons and instead introduced formal API access and reporting that provided comparable insights, effectively institutionalising a function that had originated as a bottom-up workaround.
A further interplay concerns multi-channel inventory management. Many larger merchants use integrators to synchronise orders from AlphaPlatform, Amazon, their own web shop, and other marketplaces within one interface. Alpha maintains a pragmatic position toward this practice.

It does not build direct links with rival platforms but recognises that complementors such as η (Eta) or ε (Epsilon) fulfil that cross-platform need. As one Alpha manager candidly observed:

> "*It's difficult to convince our management to build a link with Amazon, but our integrators already have those connections. It makes life easier for our sellers.*" — (Manager α-2)

By not obstructing such external connectivity, and occasionally coordinating with these integrators, the orchestrator indirectly strengthens its own attractiveness. Interviewees consistently described this tolerant, partnership-based approach as a regional advantage, particularly for sellers lacking sophisticated in-house systems to manage fulfilment, stock, and shipping.

In summary, logistics and inventory integration is a zone of continuous, reciprocal adaptation. The platform defines the technical foundations (APIs for orders, stock, and shipping labels) and compliance policies (such as mandatory tracking information), while complementors extend and refine these through specialised software and operational know-how. Each side's actions stimulate responses from the other: Alpha's introduction of its fulfilment service prompted rapid complementor updates to support it, and persistent complementor feedback on missing logistics data prompted Alpha to improve its APIs and documentation.

Mechanism Logistics and inventory integration illustrates collaborative problem-solving across organisational boundaries: complementors bridge operational gaps and translate platform functionality into seller-friendly workflows, while their innovations and requests guide Alpha in expanding and refining its technical infrastructure, producing a progressively more synchronised commerce process jointly achieved through orchestration and partnership.

4.1.5 Communicating Outages & Status Updates

Even the most robust API infrastructure occasionally experiences downtime or technical glitches, and in such moments the quality and speed of communication between orchestrator and complementors becomes critical. Interviews show that integrators often act as the first detectors of problems, alerting the platform indirectly through their own monitoring. One integrator explained:

> "*We often notice a malfunction on the platform before they do, because all our connected partners suddenly can't process orders anymore. We see it instantly across dozens of clients.*" — (Complementor β-1)

When Alpha's systems falter, the ripple effect is immediate and visible across multiple third-party tools, as many sellers simultaneously lose the ability to process orders or update data. Ideally, the orchestrator's outage alerts would match the speed at which complementors observe these disruptions. While Alpha maintains a public status page and RSS feed, several complementors indicated that official notifications have not always kept pace with what they see in their own dashboards, leaving a window in which sellers are already calling support teams but no confirmed information is yet available. This delay places complementors in an awkward position, forced to reassure merchants and implement technical workarounds without clear guidance.

To manage this risk, many complementors have engineered their own contingency systems. Some have built mechanisms that automatically queue orders instead of failing outright when

the API does not respond, so that transactions can be processed once the service recovers. Others have set up internal alerts and monitoring dashboards that track traffic patterns and status feeds to detect outages before any formal announcement. These improvised solutions highlight that timely and transparent communication is as vital as the underlying technical fixes. As one interviewee stressed:

> "*Communication is the most important thing there. If we know what's happening, we can explain it to our clients and act fast.*" — (Complementor β-1)

Recognising these concerns, Alpha has recently upgraded its status alert system, shortened the time to acknowledge incidents, and clarified communication channels to complementors, changes that interviewees contrasted favourably with more distant, impersonal approaches at some competing platforms. Importantly, a feedback loop has emerged: repeated complementor complaints and concrete examples of the consequences of slow notification have prompted the orchestrator to refine its monitoring, incident detection, and reporting processes. The result is a more consistent and proactive information flow that reduces confusion and supports complementors in maintaining trust with their own customers when disruptions occur.

Mechanism Transparent and rapid outage communication is a core element of ecosystem reliability: when the orchestrator provides early, clear information about incidents, complementors can implement contingencies and manage seller expectations more effectively, and complementor feedback on gaps in communication feeds directly into improved detection and reporting routines, reinforcing collective trust and technical stability across the ecosystem.

4.1.6 Adopting AI & Automation.

Artificial intelligence (AI) and automation are becoming central forces reshaping orchestrator–complementor relations within Alpha's ecosystem. Both the platform and its complementors are investing in intelligent systems to improve efficiency and scale. In some cases, these advances emerge from collaboration; in others, they generate new competitive tensions as automation redefines traditional boundaries.
On the orchestrator side, Alpha has gradually automated tasks that were once handled manually, such as content moderation, data classification, and pricing optimisation. For example, Alpha is experimenting with AI-driven dynamic pricing to optimise retail margins, using supervised algorithms that can adjust prices automatically within defined parameters. These initiatives reflect a careful, stepwise move toward more self-adjusting systems while maintaining human oversight.

Meanwhile, complementors are introducing automation into their own service models. A clear example comes from content generation. One API expert observed how generative AI has changed the composition of ecosystem participants:

> "*A few years ago, you mainly hired copywriters. Nowadays, there are AI companies that automatically generate product text from an image or basic specs. That's becoming the norm.*" — (API Expert α-7)

This evolution has given rise to new types of complementors, specialised AI content providers, and has required Alpha to adjust its infrastructure to accommodate bulk updates and image-based inputs via API.

Automation has also entered advertising. Several complementors now use machine-learning algorithms for bid management and campaign optimisation. One complementor experimenting with such systems explained:

> "*We built an AI model to set PPC bids automatically. It's not working perfectly yet, but it's getting better, hopefully soon it will outperform manual tuning.*" — (Complementor γ-1)

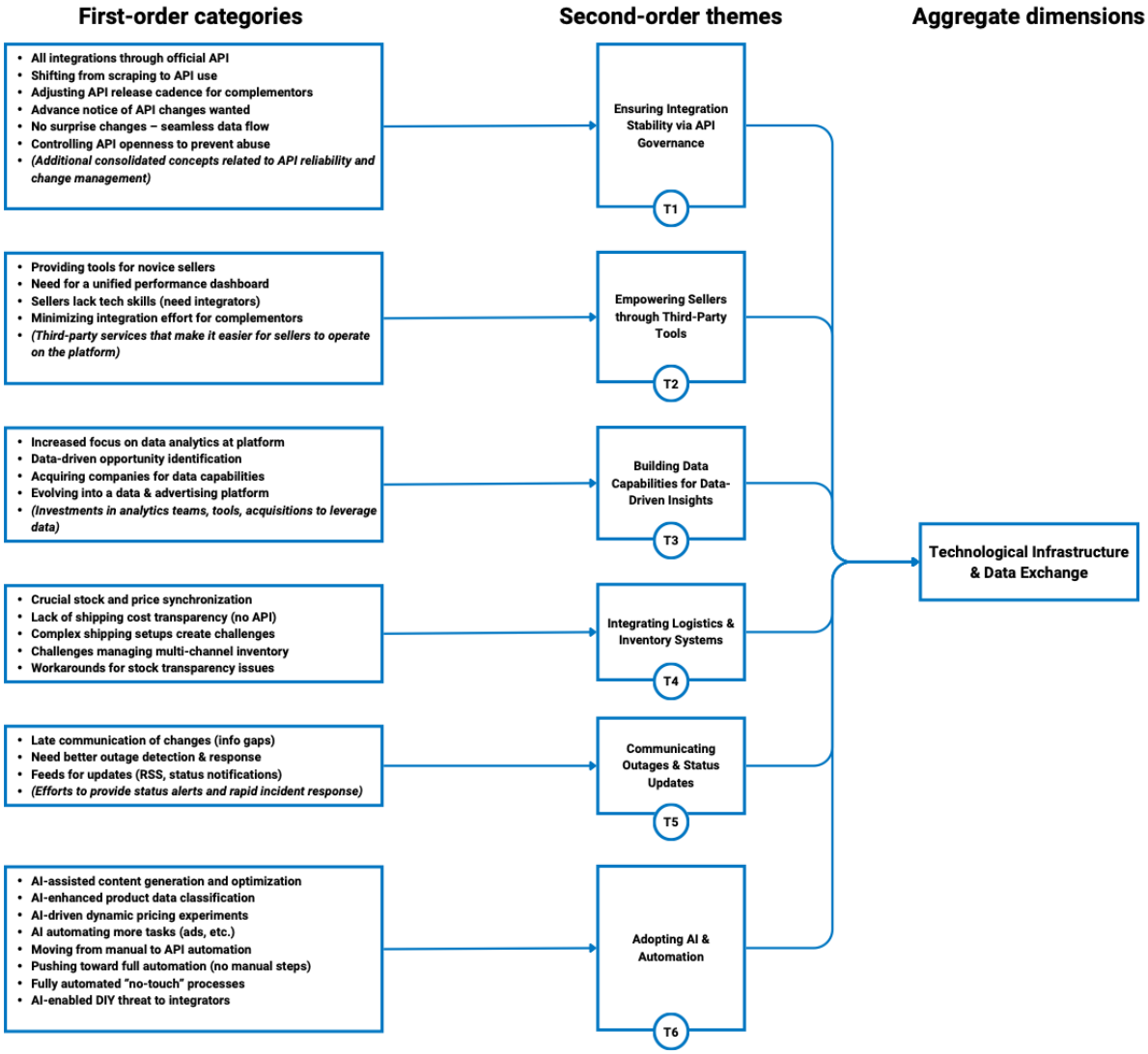
Across these developments, a recurring theme is the tension between full automation and human control. Both Alpha and its complementors promote "hands-off" solutions, such as automated order fulfilment or pricing, yet most actors maintain a cautious stance, retaining manual review for critical decisions to avoid errors and preserve trust. As a result, AI is typically deployed to handle routine, high-volume tasks, while humans remain responsible for exception handling and strategic choices.

Two complementary patterns define how AI is reshaping collaboration. First, collaborative co-development: Alpha often relies on complementors to pilot new AI applications, later supporting or integrating the most successful ones. For instance, when a third party created an AI tool that generated search-optimised listings using Alpha's product data, the platform granted API access and encouraged adoption; once usage proved strong, similar functionality was incorporated into Alpha's own seller portal to scale the idea across the ecosystem. Second, potential disintermediation: several complementors expressed concern about an "AI-enabled DIY" scenario, in which sellers increasingly rely on native, one-click optimisation tools offered directly by Alpha, potentially reducing demand for external services. Experience has shown that if a complementor feature becomes highly successful, the platform may later consider offering a comparable capability natively at scale, prompting ongoing negotiation over boundaries.

So far, Alpha has tended to introduce AI in ways that are complementary rather than directly competitive with its complementors. Examples include launching an AI-based translation service for product listings via open APIs, so that complementors can embed this functionality within their own tools, and inviting selected complementors to test early prototypes such as a machine-learning-driven "search results prediction" API to ensure compatibility from day one. Across the ecosystem there is broad agreement that automation will continue to advance: low-level, repetitive tasks such as stock updates, bid adjustments, and basic content creation are being delegated to algorithms, freeing both the platform and complementors to focus on higher-value innovation. Alpha monitors which AI applications prove most useful to sellers and often formalises support for them through partnerships or native integrations.

Mechanism AI and automation represent a new frontier of co-evolution within the platform ecosystem: by automating formerly manual interactions while consciously preserving human oversight and complementor roles, AlphaPlatform and its complementors use joint experimentation to discover where intelligent technologies add the most value, and this ongoing negotiation over what to automate and who should provide it becomes a central mechanism for sustaining long-term efficiency, innovation, and mutual benefit.

4.1.7 Coding Tree: Technological Infrastructure & Data Exchange



4.1.7 Coding Tree Technological Infrastructure & Data Exchange

Link to the coding structure. These six mechanisms correspond to the second-order themes in the coding tree (Figure 4.1.7) for *Technological Infrastructure & Data Exchange* and together constitute the aggregate dimension. In other words, the empirical patterns observed across 4.1.1–4.1.6 map directly from first-order categories (e.g., "all integrations through official API", "AI-assisted content generation") to these second-order themes, evidencing how technical choices materialise as co-evolutionary mechanisms in practice.

Transition. Taken together, these mechanisms show how Alpha's technological layer functions as the ecosystem's backbone for reciprocal adaptation. The next section (4.2) shifts from technological affordances to *organisational capabilities and operating routines*, analysing how actors mobilise skills, structures, and processes to capitalise on, and further shape, these technical levers.

4.2 Organisational Capabilities & Operating Routines

4.2.1 Complementor Leadership and Organizational Development

Complementor leadership and organisational development refer to the internal capabilities that allow third-party firms to structure, guide, and scale themselves effectively within the platform ecosystem. Most complementors are led by entrepreneurial founders who exhibit a distinctly hands-on and problem-solving ethos. Many established their ventures after encountering limitations in prior corporate roles or in existing marketplace tools, seeking more autonomy, agility, and direct impact. As one founder explained:

> "*I was really done with the corporate world. I wanted more speed, more excitement, and I thought that small companies could offer that freedom to build and adapt faster.*" — (Complementor γ-1)

This entrepreneurial orientation strongly shapes how these organisations function. Leaders often assume multiple operational roles and remain deeply involved in the day-to-day business even as their companies expand. A technical co-founder of an integrator described running a small, tightly knit team:

> "*We're a team of about ten people, and I'm mainly hands-on. I still do development work myself because that's how I stay close to what really happens with our clients.*" — (Complementor β-1)

Such direct engagement by leadership constitutes a core capability: it generates concrete behaviours like rapid troubleshooting, quick decision-making, and close customer contact. These behaviours, in turn, yield tangible outcomes such as fast issue resolution and high adaptability to change.

In their early stages, many complementor firms operated informally and reactively. Over time, however, strong founder-led leadership enabled them to professionalise and scale. Several agencies evolved from project-based or hourly service providers into structured software companies offering subscription models, which required hiring developers, putting formal processes in place, and standardising products. This shift from ad hoc consulting to a SaaS model demanded substantial organisational development, investments in technical expertise, structured management routines, and internal quality assurance, all underpinned by leadership's strategic vision. Founders typically maintained personal involvement with clients throughout these transitions, ensuring that growth remained anchored in actual seller needs rather than abstract strategic ambitions. A recurring pattern across interviews was the prioritisation of immediate, practical solutions to sellers' operational problems over more speculative expansion, keeping complementor firms closely attuned to the realities of the platform's ecosystem and its evolving technologies.

By combining entrepreneurial drive with adaptive organisational design, complementor leaders create a clear capability–behaviour–outcome chain: because they remain personally engaged and responsive to both platform developments and seller feedback, they can pivot business models, refine offerings, and sustain relevance as the platform evolves.

Mechanism Entrepreneurial, hands-on leadership within complementor firms drives organisational professionalisation and agility; founders' direct involvement in technical and operational work builds a problem-solving, customer-centred culture that enables rapid business model and process adjustments, helping complementors stay aligned with AlphaPlatform's evolving technologies and maintain long-term relevance in the ecosystem.

4.2.2 Addressing Internal Alignment & Responsiveness Gaps

While Alpha, as the platform orchestrator, holds substantial influence over its ecosystem, its ability to adapt and respond effectively depends on internal organisational alignment and available resources. Internal alignment refers to the coordination between the platform's various departments, technical, product, legal, and partnership management, while resource constraints denote the limits of time, personnel, and budget that can be dedicated to ecosystem initiatives. The findings show that even a technologically advanced orchestrator must maintain coherent internal structures to ensure timely, ecosystem-oriented action.

In practice, Alpha sometimes struggles with fragmented decision-making and stretched capacity, which can hinder responsiveness to complementor needs. One API expert explained that even seemingly minor complementor requests can stall because of competing internal priorities:

> "*Partners often ask us for what look like simple improvements or extra data fields, but the product teams are busy with other priorities. And that's frustrating, for us and for them.*" — (API Expert α-3)

Here, the technical ability to make an improvement exists, but misalignment between teams prevents execution. Partnership managers may understand external developer needs but must compete internally for attention among projects driven by different business units. Without a shared strategic focus on ecosystem goals, agreed-upon improvements can remain in backlog for extended periods. Several complementors corroborated this, describing how Alpha sometimes communicates updates late or fails to share a coordinated roadmap, which they interpret as evidence that internal priorities are often guided by short-term deliverables rather than ecosystem-level strategy.

Resource limitations compound these coordination challenges. Developer bandwidth and complementor-onboarding capacity are finite, forcing selective prioritisation and triage of ecosystem requests. Staff acknowledge that demand from existing and prospective complementors regularly exceeds the available capacity, meaning some smaller or newer complementors wait longer for support. From the complementor's perspective, such delays can appear as disinterest or rigidity rather than as a resource bottleneck. One experienced analytics complementor offered a structural explanation:

> "*There are so many different teams at Alpha; they can't just say, 'You're going to change this now.' Everything must go through several departments first.*" — (Complementor δ-1)

This comment captures the inherent complexity of large, multi-departmental platforms: no single manager can unilaterally act on feedback, as proposals often circulate between API, product, legal, and other functions before approval.

Overall, Alpha's responsiveness to its ecosystem is thus constrained less by technology than by organisational coherence. When cross-functional coordination is strong and sufficient staff are allocated to partnership activities, the platform can respond swiftly and effectively. When internal silos and capacity shortages dominate, even high-priority ecosystem improvements face delay or repeated reprioritisation.

Mechanism The orchestrator's internal alignment and resource availability determine its practical adaptability; strong cross-team coordination and adequate staffing enable fast, ecosystem-oriented decisions, whereas siloed structures and limited capacity slow response times and force trade-offs, so Alpha's organisational coherence, more than its technical sophistication, governs the ecosystem's collective agility and long-term responsiveness.

4.2.3 Fostering Continuous Learning & Adaptation

Both orchestrator and complementor firms demonstrate a strong capability for continuous learning and experimentation, which translates into adaptive behaviour amid technological and market change. This shared capacity reflects a learning-by-doing culture in which feedback, experimentation, and accumulated experience drive ongoing improvement.
For complementors, constant platform updates and evolving seller demands leave little choice but to learn and adapt rapidly. As one agency founder candidly reflected on their early experience:

> *"We also failed and learned. Every time something didn't work, we tried again until we understood how to make it work better." — (Complementor θ-1)*

Rather than being discouraged by setbacks, successful complementors treat such moments as learning opportunities. They quickly adjust strategies or even reconfigure entire service models based on what proves effective in practice. In an ecosystem without predefined playbooks or official guidance on third-party development, trial and error remains the dominant mode of capability building; interviewees noted that no comprehensive manual exists for success on the platform and that competence grows through repeated problem-solving, when
their addressing API throttling, managing new data formats, or overcoming integration limits.
Experimentation naturally extends this learning orientation. Complementors frequently test new ideas and methods, such as A/B testing pricing algorithms or trialling content-optimisation scripts, to discover what produces the best outcomes for clients. Over time, these routines evolve into a habitual pattern of small-scale experiments and incremental refinements. Competitive pressure reinforces this behaviour. As one Alpha manager observed:

> "*Maybe it's less about who has the best tool and more about who adapts to change faster.*"
> — (Manager Account Development α-8)

The complementor that learns to leverage a new API or policy update most quickly typically gains an advantage, both in customer satisfaction and market position. This responsiveness leads to shorter adaptation cycles and higher resilience: firms that internalise rapid learning can absorb platform modifications without significant disruption.

The orchestrator likewise institutionalises continuous learning through structured experimentation. Alpha routinely pilots new features with selected complementors before full rollout to gather data and evaluate impact, using limited API releases and controlled tests of new algorithms to assess whether changes trigger the desired behaviour and contribute to sales. By validating assumptions before scaling, the platform reduces unintended disruptions and ensures that updates align with complementor workflows. This data-driven discipline, combined with openness to complementor feedback, exemplifies the orchestrator's own learning loop.

Together, these reciprocal practices form a dynamic learning cycle at ecosystem level. Complementors refine processes through iterative experimentation, while Alpha observes their results, collects feedback, and adjusts its governance or technical design accordingly. The outcome is a co-evolving system characterised by shared experimentation, progressive alignment, and increasing robustness in the face of change.

Mechanism A culture of continuous learning and experimentation enables both orchestrator and complementor firms to adapt to technological and market shifts; through iterative trial-and-error, A/B testing, and structured feedback loops, participants convert experience into improvement and resilience, so that fast-learning complementors gain an edge and a data-driven orchestrator keeps the ecosystem aligned, jointly sustaining long-term evolution.

4.2.4 Coding Tree: Organisational Capabilities & Operating Routines

Link to the coding structure. The mechanisms in 4.2.1–4.2.3 map directly from first-order categories (e.g., Entrepreneurial actors take hands-on roles; Service-to-technology business model evolution; "Learning by doing" in integrations; Trial-and-error, A/B testing, quick adjustments; Internal team bandwidth limitations; No shared roadmap with complementors) to the second-order themes Complementor leadership & organisational development, Addressing Internal Alignment & Responsiveness Gaps, and Fostering continuous learning & adaptation. Together these themes constitute the Organisational Capabilities & Operating Routines aggregate dimension in the coding tree (Figure 4.2.4). In other words, the empirical patterns observed across 4.2.1–4.2.3 roll up from these first-order categories to the stated second-order themes, showing how human capital, structure, and process choices operate as co-evolutionary mechanisms in practice.

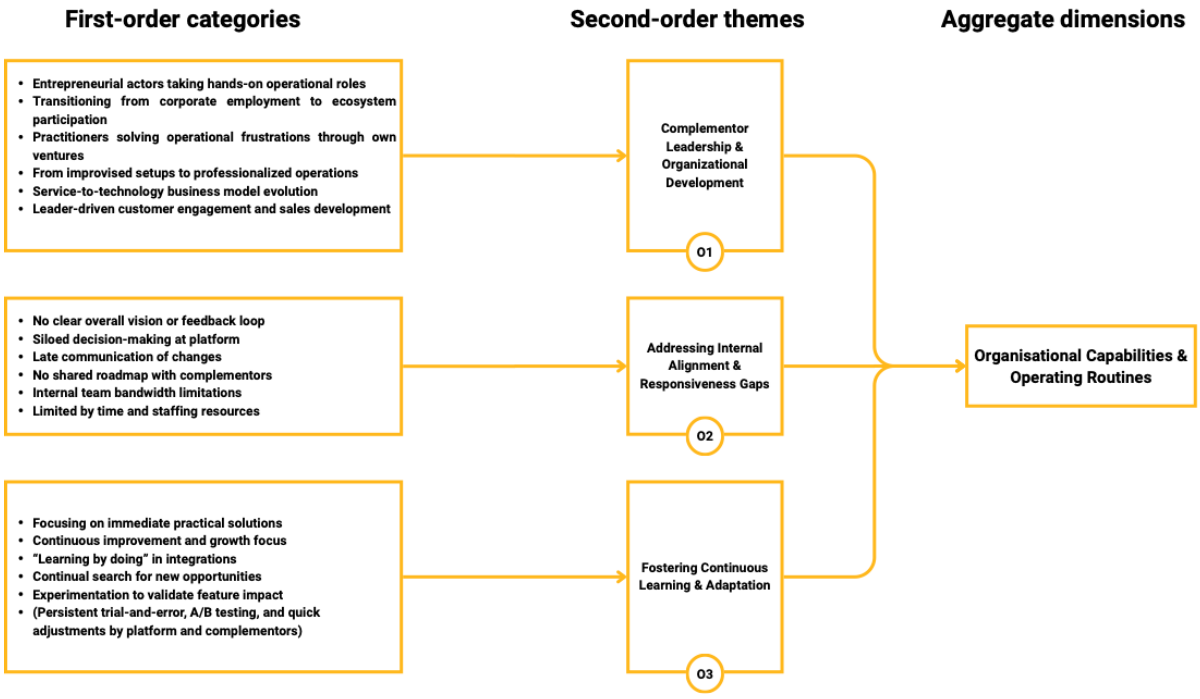


Figure 4.2.4 Coding Tree: Organisational Capabilities & Operating Routines

Transition Taken together, these mechanisms show how organisational capacity and routines translate technical possibilities into reliable execution and rapid adaptation. The next section (4.3) shifts from firm-internal capabilities to ecosystem governance and power dynamics, where tiering, boundary setting, data sharing, and trust shape participation and alignment.

4.3 Ecosystem Governance and Power Dynamics

4.3.1 Identifying & Formalizing Strategic Complementor Relationships

In its early development phase, Alpha managed ecosystem partnerships on an informal basis, relying on personal contacts and ad hoc arrangements. Over time, however, the orchestrator introduced a formal complementor programme with clear tiers, each defined by eligibility criteria, expectations, and benefits, to professionalise relationships and enhance accountability. An ecosystem manager explained the rationale:

> "*We divided the ecosystem into several segments and now have a clear tiering system. For the highest-level partnerships, we share the most sensitive data and work together closely, because at that level the mutual dependence is quite high.*" — (Ecosystem Manager α-1)

This formalisation gave structure to an expanding network without imposing rigid transactions. Alpha's governance philosophy deliberately avoids direct payments between the platform and its complementors, focusing instead on shared value creation. Complementors recognise the advantages of this structured yet collaborative model. An integrator that had reached the top partnership tier reflected on the tangible benefits of this approach:

> "*We're now at the highest tier in the programme, and you can really see the difference. The level of support, communication, and access to features is top notch.*" — (Complementor δ-1)

These accounts collectively show that formalising complementor relationships has strengthened alignment and mutual commitment within the ecosystem. Structured agreements, such as tier criteria, KPIs, and quality standards, create transparency and predictability while maintaining a trust-based, non-transactional ethos.

Mechanism Formalised complementor programmes establish a governance framework that clarifies roles, encourages quality, and reinforces trust across the ecosystem, giving Alpha a structured way to prioritise and deepen its most strategic relationships.

4.3.2 Segmenting a Heterogeneous Complementor Base

Alpha's ecosystem comprises a wide variety of complementors, from small, part-time developers and niche agencies to large, established integration firms. Managing such diversity requires the orchestrator to tailor its approach rather than apply uniform policies. Both orchestrator and complementors recognise that treating every complementor identically is ineffective and sometimes counterproductive. One orchestrator described the ecosystem's composition:

> "*It's a relatively small world, but very diverse. Everyone knows exactly what kind of complementors they are targeting and where they fit. Some specialise in niche solutions, others serve big retail chains, and that mix keeps the ecosystem balanced*." — (API Expert α-4)

This diversity also means that the value and needs of complementors differ widely. Complementors themselves apply segmentation logic when managing their own client relationships, often focusing more intensive support on larger, high-revenue sellers and lighter-touch service on smaller accounts. Several complementors voiced that equal treatment across

the board can create unintended inequities: a complementor handling millions in sales and a complementor with only a handful of orders cannot reasonably be managed in the same way. Such feedback has prompted Alpha to adopt a differentiated approach. The complementor programme now includes tiered support levels and criteria, such as performance or turnover thresholds, ensuring that resources are allocated proportionately. This strategy recognises the varying capacities and strategic importance of complementors, improving both efficiency and perceived fairness in how the ecosystem is governed.

Mechanism Segmenting a heterogeneous complementor base allows the platform to allocate support, communication, and policy requirements in proportion to each complementor's scale, maturity, and contribution, thereby enhancing ecosystem effectiveness and fairness.

4.3.3 Facilitating Complementor Engagement & Communication

Alpha actively promotes complementor engagement throughout the platform's innovation process and maintains structured, two-way communication channels. Rather than simply informing complementors of new updates, the orchestrator frequently involves them early in pilot projects and prototype testing. One ecosystem manager explained this collaborative approach:

> "*We run a lot of pilots, and they're not always purely technical. We often bring in ecosystem partners to participate in those pilots, because their input helps us understand how things will work in practice.*" — (API Expert α-4)

These pilots and feedback loops enable the platform to validate ideas and uncover potential challenges before full-scale implementation. From the complementor side, early participation is viewed as both valuable and unusual compared to other marketplaces. One integrator described the benefits of this practice:

> "*If we can join a pilot at an early stage, we can experiment right away. That early involvement is quite unique for AlphaPlatform. It's not something we usually get with other marketplaces*." — (Complementor β-1)

Beyond pilots, Alpha provides multiple venues for open dialogue. These include regular complementor days, online feedback forums, and recurring "Voice of the Complementor" meetings, where product teams and complementors discuss operational issues and upcoming features. According to participants, these exchanges are more than symbolic; they often influence actual product and policy decisions. The orchestrator uses complementor insights to adjust release plans, improve documentation, or add functionality requested by the ecosystem.

This structured engagement approach ensures that complementors are not passive recipients of change but active contributors to the platform's evolution. Early communication fosters preparedness, reduces friction during rollouts, and builds a sense of shared ownership among complementors, reinforcing long-term commitment to the ecosystem.

Mechanism Early involvement of complementors in pilots and the maintenance of consistent, two-way communication forums strengthen complementor commitment and ensure that platform innovations align closely with ecosystem needs.

4.3.4 Defining and Communicating Platform Boundaries

A recurring governance challenge for Alpha is deciding which services to develop internally and which to leave to external complementors. This boundary management determines how responsibilities, innovation opportunities, and competition are distributed across the ecosystem. Alpha's managers emphasised that certain functions are strategically critical and therefore kept in-house. As one explained:

> "*We deliberately choose to do some things ourselves. For example, we have our own advertising proposition and our own logistics proposition. Those are core areas where we want full control over the customer experience.*" — (Ecosystem Manager α-2)

This stance reflects the belief that essential infrastructure, advertising, fulfilment, and other core systems, must remain under the platform's governance to safeguard reliability and data consistency. At the same time, Alpha recognises that not every solution should come from the core. The same manager acknowledged that external innovation often delivers greater flexibility and specialisation:

> "*A platform-only solution is often not enough. In many cases, the most effective approach comes from the ecosystem itself. An ecosystem solution can be the most appropriate one.*" — (Ecosystem Manager α-2)

This demonstrates an evolving governance philosophy in which the orchestrator selectively combines internal development with delegated innovation by third parties. Complementors generally accept Alpha's right to build strategic capabilities internally, but they remain attentive to potential overlap. Several complementors described moments of tension when the platform launched native tools, such as analytics dashboards or campaign management features, that resembled their own products. In these instances, open communication proved essential.

Interviewees highlighted that boundary clarity builds confidence among ecosystem members. When the platform explicitly communicates which domains it will and will not enter, complementors can plan investments and product strategies more securely. Conversely, ambiguity around these limits' risks discouraging innovation. Complementors reported valuing discussions where Alpha clarified its intentions early, allowing them to focus on complementary niches without fear of direct competition from the core.

Overall, the findings underline that transparent and deliberate boundary-setting not only reduces conflict but also fosters trust and long-term commitment. By signalling where third-party innovation is encouraged, and where the platform will retain ownership, Alpha maintains equilibrium between control and openness.

Mechanism Clearly defining and communicating platform boundaries between in-house and third-party domains minimises overlap and channel conflict. Transparent boundary management gives complementors the confidence to invest in complementary innovations while enabling the orchestrator to maintain control over core infrastructure and quality standards.

4.3.5 Data Sharing Constraints & Privacy

Data exchange between Alpha and its complementors is tightly controlled through privacy regulations and selective sharing protocols. The orchestrator grants limited access to sensitive data only to trusted complementors, typically under formal nondisclosure agreements (NDAs). One manager described how these agreements make controlled collaboration possible:

> "*All of our key partners are under NDA, and that allows us to share more detailed information with them from time to time, things we would never disclose publicly. It gives us the flexibility to collaborate without compromising privacy*." — (API Expert α-4)

Complementors expressed appreciation for this arrangement, as it allows them to access the information necessary to build and maintain their services. At the same time, they are careful to respect the strict data-use boundaries that come with these agreements. One integrator explained how their company manages multi-platform data responsibly:

> "*Even though we work with multiple marketplaces, we keep everything strictly separated. We would never share data from one platform with another. Each environment is completely siloed to protect our clients and comply with the agreements we've signed.*" — (Complementor β-2)

Both orchestrator and complementors thus exercise a high degree of caution in handling data. The platform enforces privacy safeguards to meet regulatory requirements, particularly under GDPR, and complementors reciprocate by implementing their own internal partitioning and compliance checks. Complementor managers emphasised that these principles are codified in Alpha's general terms and conditions, which explicitly require responsible data handling and prohibit sharing seller information without explicit consent.

Together, these practices illustrate a balance between collaboration and protection. Limited, conditional data sharing enables innovation and service development, while robust safeguards preserve trust between parties and ensure adherence to privacy obligations. Complementors reported that such clarity makes them confident that their proprietary data, and their clients' information, remain secure within Alpha's ecosystem.

Mechanism By enforcing strict privacy controls (e.g., NDAs, data-use clauses, and scoped API permissions) and preventing cross-platform data sharing, Alpha achieves a balance between openness and compliance. These measures build mutual trust among complementors while safeguarding end-user privacy and the platform's integrity.

4.3.6 Expanding & Internationalizing the Ecosystem

Alpha's ecosystem strategy has evolved from a domestic, invitation-only network into a more open and increasingly international system. In the early phases, the orchestrator onboarded only a small, carefully selected group of Dutch and Belgian complementors to maintain quality control and close coordination. Over time, however, international expansion has become a strategic priority. One orchestrator described this shift:

> "*Traditionally, we focused mainly on West European complementors, but recently we've been welcoming more non-EU partners as well. We now have several Asian and other international parties joining the ecosystem.*" — (API Expert α-6)

This evolution reflects Alpha's deliberate effort to globalise its complementor base. The orchestrator now actively invites and supports foreign complementors that can extend the platform's reach and serve its growing international seller population. Another API specialist confirmed the rising importance of cross-border complementors:

> "*Foreign complementors are becoming increasingly important to us. We're very open to collaborating with them, especially because international sellers often prefer to use third-party tools from their own region.*" — (API Expert α-3)

From the complementor side, globalisation is seen as an opportunity for growth and diversification. Interviewees noted growing interest from international firms exploring whether AlphaPlatform is an attractive marketplace to connect to, interpreting this as a sign that the ecosystem is gaining global visibility.

Yet international expansion introduces new challenges. Language, cultural fit, and regulatory differences make integration and coordination more complex. To address these issues, Alpha has begun translating its complementor documentation and interfaces into English and is exploring the appointment of dedicated international complementor managers to support non-Dutch-speaking firms. The goal is to ensure that complementors from abroad can easily navigate the platform's governance, understand compliance requirements, and offer localised support to their own clients.

Complementors from outside the Netherlands often add value by bridging cultural and linguistic gaps, helping sellers from their regions adapt to the platform's standards. In doing so, they complement Alpha's strengths where local expertise or direct presence is limited.

Mechanism By opening the ecosystem to international complementors and adapting governance structures, through language localisation, regional support roles, and flexible onboarding, the orchestrator broadens its network reach while bridging cultural and regulatory gaps, strengthening the ecosystem's overall capability and inclusivity.

4.3.7 Implementing Complementor Management & Support Routines

To sustain complementor performance and ensure strategic alignment, Alpha has institutionalised structured management and support routines. Dedicated partnership managers maintain regular communication with each complementor, creating predictable cycles of contact and feedback. One ecosystem manager described the cadence of these interactions:

> "*Each partnership manager meets with their assigned parties every two weeks. We discuss how things are going, which issues they're facing, what's on our agenda, and what's on theirs. It's a standing moment to stay aligned.*" — (Ecosystem Manager α-2)

These biweekly meetings establish a consistent feedback loop that allows both sides to identify problems early and adjust priorities before they escalate. Complementors confirmed that this routine engagement is highly valued and compares well with practices at other major marketplaces. As one integrator explained:

> "*We have a meeting once every two weeks. We used to have that at AlphaPlatform, and now we also have it at [a competitor]. It's a good rhythm, enough to keep each other up to date without becoming repetitive.*" — (Complementor β-2)

Beyond direct communication, the platform supports complementors through broader enablement initiatives. These include co-marketing opportunities, training sessions, and participation in seller events where complementors can showcase their solutions and share success stories. Such exposure helps complementors attract new clients while reinforcing the message that Alpha views them as integral contributors to the ecosystem rather than external vendors.

Internally, the orchestrator has developed tools and processes to monitor complementor engagement and performance. An ecosystem support team uses dashboards to track integration stability, API health, and response times, allowing proactive outreach when issues arise. Together, these routines, scheduled meetings, performance monitoring, and joint promotional activities, form a management framework that strengthens collaboration and mutual visibility.

Through these systematic practices, Alpha embeds complementor management into its operational rhythm. Regular dialogue builds trust and transparency, while shared initiatives enhance complementors' capabilities and commitment to the platform.

Mechanism Structured management and support routines, such as biweekly complementor meetings, co-marketing activities, and dedicated ecosystem liaison roles, enable the orchestrator to maintain alignment, resolve issues quickly, and co-promote innovation for mutual benefit.

4.3.8 Ensuring Ecosystem Compliance & Quality

Alpha enforces strict quality and compliance standards to safeguard the integrity of its ecosystem. Both sellers and complementors are subject to continuous oversight, ensuring that operational reliability and fair conduct are maintained across the network. On the seller side, Alpha monitors core performance metrics such as on-time delivery, cancellation rates, and customer satisfaction. A dedicated "complementor quality" department investigates anomalies and flags any behaviour that may harm the platform's reputation.

Complementors are also held to defined compliance and technical standards. When a third-party integration fails or violates policy, the orchestrator intervenes quickly to prevent broader disruption. As one API expert described:

> "*If we see that a party is causing technical problems or violating the rules, we follow up immediately. And if we can't reach them or they don't fix it, we temporarily block that complementor until the issue is resolved*." — (API Expert α-6)

This account illustrates the orchestrator's readiness to impose sanctions when ecosystem stability is threatened. Complementors generally acknowledge the importance of these governance measures, recognising that they help maintain quality and trust among all participants. However, some complementors perceive the enforcement process as occasionally lacking flexibility. One integrator reflected on this tension:

> "*You can get penalised for something that has been working fine for years, and then suddenly the rules change. Sometimes the system just lacks nuance.*" — (Complementor δ-1)

This comment captures a common concern that blanket policies or automated enforcement may fail to account for individual circumstances. Several complementors expressed that fair, transparent communication, such as providing warnings or explanations before a sanction, is essential for preserving trust. They emphasised that understanding the rationale behind compliance actions enables them to correct problems quickly and maintain alignment with the platform's standards.

Overall, Alpha strives to balance rigour with fairness in its enforcement practices. Its active monitoring protects the ecosystem against misuse, counterfeiting, and technical instability, while its evolving approach shows increasing sensitivity to complementor context. Effective governance thus depends not only on clear rules but also on consistent and transparent application.

Mechanism Continuous monitoring and enforcement of quality standards, through follow-ups, temporary suspensions, and corrective communication, maintain ecosystem security and performance. The orchestrator's judicious and transparent exercise of sanctioning power is essential to sustaining complementor trust and long-term cooperation.

4.3.9 Managing Complementor Coopetition & Multi-Complementor Dynamics

Complementors within Alpha's ecosystem operates in a mixed mode of cooperation and competition, a coopetitive dynamic. The community of integrators, agencies, and service providers is relatively small and tightly connected, with each firm carving out its own area of specialisation. As one orchestrator described:

> "*It's quite a small world. Of course, there's real competition between them, but it's not cutthroat. They each have their own focus and don't just copy what others are doing*." — (API Expert α-3)

This reflects an environment where rivalry coexists with mutual respect. Complementors tend to differentiate themselves by merchant segment, technology domain, or service focus, which reduces direct head-to-head conflict. At the same time, overlapping interests and complementary expertise often create opportunities for collaboration. Sellers frequently combine multiple tools, so-called stackable solutions, and integrators sometimes refer clients to peers when another's software or specialisation is a better fit.

Despite this cooperative undercurrent, a degree of competition remains inevitable. Complementors regularly exchange operational knowledge in informal settings such as ecosystem events or online communities, yet they are cautious about revealing proprietary innovations too early. One experienced integrator explained this tension:

> "*I used to share ideas quite freely, but some of them got picked up, not always to our advantage. These days I keep new concepts to myself until we've built and launched them.*" — (Complementor β-2)

This statement highlights a pragmatic balance between openness and protection. While collaboration can expand collective value creation, firms remain vigilant about safeguarding their competitive edge.

Alpha's role in this dynamic is largely facilitative. The orchestrator organises community events, complementor forums, and networking sessions that encourage cross-pollination of ideas but then steps back to let complementors self-organise where collaboration makes sense. This light-touch approach acknowledges the natural boundaries of coopetition: the platform fosters a space for interaction without imposing artificial coordination or forcing disclosure.

Mechanism A stable coopetitive equilibrium emerges in which complementors leverage community relationships and interoperability, such as referring clients or integrating each other's solutions, while simultaneously protecting distinctive innovations. This dual behaviour collectively expands ecosystem value and sustains a healthy, dynamic balance between collaboration and competition.

4.3.10 Managing Platform Dependency & Multi-Homing

Most complementors in Alpha's ecosystem depend heavily on the platform for their core business, yet many also diversify by connecting to other marketplaces, a strategy known as multi-homing. Despite this potential vulnerability, the data reveals a remarkably low attrition rate, with interviewees describing that more complementors are joining than leaving and portraying the ecosystem as stable and attractive.

This finding indicates strong mutual reliance between Alpha and its complementors. Several service providers have built their entire operations around AlphaPlatform, particularly given its dominant position in the regional market. Others, however, consciously hedge their risk by supporting multiple platforms in parallel. Alpha's technical openness facilitates this: its well-documented APIs and integration tools make it feasible for complementors to serve several ecosystems at once. One manager confirmed that this policy is deliberate:

> "*Our openness attracts a group of partners who are active on many different marketplace platforms. We don't restrict that, because it keeps them flexible and more invested in our ecosystem too.*" — (API Expert α-6)

From the complementor perspective, dependence on a single dominant platform is both an opportunity and a risk. Policy changes, API disruptions, or outages can directly affect their revenue streams. A few firms have responded by diversifying their client base or strengthening their proprietary software offerings. Still, most complementors view continued alignment with Alpha as the rational choice, given its market leadership and collaborative stance. One integrator articulated this balance clearly:

> "*Alpha naturally has more power; it's by far the largest marketplace. But that scale works in our favour too, we reach so many sellers here that it's worth staying committed*." — (Complementor β-2)

These accounts reveal an implicit understanding between orchestrator and complementors. The platform recognises that allowing complementors to multi-home reduces their sense of dependency and enhances trust, while complementors remain loyal because the ecosystem

offers unrivalled reach and stability. This mutual accommodation forms the basis of a sustainable relationship that benefits both sides.

Mechanism A pragmatic symbiosis develops in which complementors stay committed to the dominant platform for its scale, user base, and cooperative governance, while the orchestrator tacitly permits multi-homing to mitigate lock-in fears. This equilibrium maintains loyalty through freedom rather than restriction, strengthening the ecosystem's resilience over time.

4.3.11 Managing Power Imbalances & Building Trust

All participants acknowledged that Alpha, as orchestrator, holds a structural power advantage within the ecosystem. Yet interview evidence shows that Alpha makes deliberate efforts to cultivate trust, fairness, and a sense of partnership in its relationships with complementors. A recurring challenge discussed by both sides concerns demonstrating the mutual value created through collaboration. From the orchestrator's perspective, quantifying the tangible contribution of third-party services to overall platform performance remains difficult. As one ecosystem manager explained:

> "*One of the biggest challenges we face is showing exactly where the value lies and how much it is. It's super hard to demonstrate, because the results are spread across so many actors in the ecosystem.*" — (Ecosystem Manager α-2)

Complementors, in turn, invest effort in proving their value, both to sellers and to the platform, through case studies, metrics, and performance reports. Despite the platform's structural control over access, policies, and visibility, many complementors described their relationship with Alpha as collaborative and fair. One integrator elaborated on this openness:

> "*We have very good contact with AlphaPlatform. We meet every two weeks, and sometimes we can even influence how things work in the API. They really do listen to our feedback.*" — (Complementor β-1)

This testimony illustrates that Alpha not only maintains active dialogue with its complementors but also occasionally integrates their suggestions, such as refining API functionalities or clarifying documentation. These gestures of responsiveness are key trust-building mechanisms.

Nonetheless, moments of friction do occur. Several complementors mentioned frustrations over sudden policy updates or algorithm changes that affected their operations without prior notice. Such events reminded them of the inherent asymmetry of the relationship and prompted calls for greater transparency and consistency in decision-making. As one participant noted during a follow-up discussion, ensuring that "rules are applied evenly, and everyone knows what's changing" would reinforce perceptions of fairness.

Overall, however, the prevailing sentiment among experienced complementors is positive. Established complementors characterised Alpha as a reliable and principled collaborator that "does what it says" and values long-term relationships over short-term transactions. Informal consultations, early feedback opportunities, and consistent two-way communication were all cited as evidence that the orchestrator genuinely seeks equitable cooperation.

Mechanism Continuous, good-faith engagement, such as inviting complementor input on platform decisions, maintaining transparent communication, and treating complementors

equitably, helps mitigate inherent power asymmetries. These practices foster relational trust and reinforce complementors' perception of the orchestrator as a fair and dependable complementor.

4.3.12 Maintaining Platform Flexibility for Evolving Complementor Expectations

As Alpha's ecosystem has matured, the orchestrator has progressively adopted a more flexible and responsive governance approach, adjusting early rigid policies considering complementor feedback. During the initial stages of ecosystem growth, Alpha sometimes implemented unilateral rules that later proved impractical or overly burdensome. A notable example was an attempt to mandate invoice uploads for every seller transaction. One integrator recalled how this policy was later relaxed:

> "*Last year the platform introduced a new invoice-upload requirement for sellers. After receiving partner feedback about its practical impact, Alpha adjusted the rule's application to make it more workable.*" — (Complementor β-1)

This example illustrates the orchestrator's willingness to course-correct when policies hinder rather than help operational efficiency. Over time, the platform has moved from a "command-and-control" stance toward an adaptive model that considers complementor capacity and context. For instance, Alpha no longer enforces immediate adoption of new API versions or technical features. Instead, it provides transition periods and occasionally allows optional implementation, recognising that complementors vary in their readiness to integrate updates.

As the ecosystem has become more sophisticated, complementor expectations have evolved correspondingly. Complementors now seek greater transparency about platform priorities and development timelines. One integrator voiced this desire for clearer communication:

> "*At least share what you're working on. I think that might be the answer I was looking for myself. It helps us plan and prepare.*" — (Complementor β-2)

Alpha has begun to respond to these calls for openness. The orchestrator now publishes detailed API change logs, offers sandbox environments for pre-release testing, and invites select complementors to early planning discussions. These initiatives demonstrate a conscious shift toward collaborative, two-way adaptation, where governance evolves through ongoing dialogue rather than top-down imposition.

Nevertheless, several complementors still express the need for further improvement, particularly in long-term roadmap transparency and early communication of major policy changes. Even so, the platform's increasing flexibility and willingness to reconsider rules have improved perceptions of fairness and partnership.

Mechanism By relaxing rigid policies and enhancing transparency in response to complementor feedback, the orchestrator strengthens trust, increases agility, and aligns more closely with complementor expectations. This adaptive governance style sustains goodwill and ensures that the ecosystem remains capable of evolving alongside its participants.

4.3.13 Value Measurement & Attribution

Measuring the value contributed by complementors and attributing specific performance outcomes when multiple actors are involved, emerged as a recurring challenge across the interviews. Both orchestrator and complementor participants emphasised the difficulty of determining who deserves credit for observed improvements.

From the platform's perspective, sellers often work with several third-party services simultaneously, for example, an integrator managing inventory and an agency optimising advertising, making it complex to identify which contribution produced a given result. One ecosystem manager reflected on this challenge:

> "*It's rarely a standalone solution. The question is always: what part of the result is attributable to the ecosystem solution, and what part comes from the entrepreneur's own growth and experience?*" — (Ecosystem Manager α-2)

This observation captures the fundamental ambiguity of attribution: performance gains may stem from the tool, the seller's own learning, or broader market dynamics.

Complementors, in turn, devote considerable effort to demonstrating their individual return on investment (ROI) both to clients and to the platform. One integrator described how their firm tracks measurable before-and-after outcomes to evidence impact:

> "*We look at the advertising costs compared to turnover, what it was before working with us and what it is after. That's how we show the value we deliver.*" — (Complementor γ-1)

Such metrics help make the complementor's contribution visible and quantifiable. Yet both sides recognised that not all benefits can be captured through financial indicators. Improvements in decision-making quality, time savings, or enhanced resilience often remain intangible and therefore go uncredited in formal reports.

To address this attribution gap, Alpha has begun exploring collaborative approaches to measurement. Orchestrator representatives mentioned discussions with leading complementors about creating shared success metrics, such as tracking seller growth or performance improvements directly linked to third-party tool usage. These initiatives include testing more transparent, privacy-compliant data-sharing models to enable multi-touch attribution in the future.

Analytical insight. As the ecosystem becomes increasingly interdependent, traditional performance indicators must evolve. Establishing cooperative measurement frameworks allows both the platform and complementors to acknowledge each contributor's role in shared outcomes. This joint approach not only validates the complementors' value but also reinforces trust and alignment around co-created success.

Mechanism Developing collaborative attribution and performance metrics enables the orchestrator and its complementors to recognise each actor's contribution to collective value creation. This transparency strengthens justification for continued collaboration and fosters mutual accountability within the ecosystem.

4.3.14 Engaging in Co-Innovation & Feedback Loops

A final theme in ecosystem governance concerns the continuous co-innovation between the orchestrator and its complementors, maintained through a structured feedback loop. Alpha's ability to evolve depends on encouraging complementors to contribute ideas and collaborate on technical and commercial improvements. One partnership manager summarised this approach:

> "*We listen carefully to each other's innovation wishes so we can improve the technology together. It's about collaboration, making the platform stronger by combining insights.*" — (Manager Ecosystem Partnerships α-1)

In practice, partnership managers collect feature requests and improvement suggestions from complementors and relay them to the relevant internal teams. Several interviewees described this process as an innovation cycle, in which complementor input directly informs Alpha's product roadmap. Complementors confirmed that many of their ideas lead to tangible updates, whether new API endpoints, usability enhancements, or entirely new features.

The orchestrator actively leverages complementor expertise by involving them as external specialists and trend scouts. One manager explained:

> "*We often organise breakout sessions with external experts who share what's happening in the market. Many of those experts are ecosystem partners, and we use their insights to spot developments early.*" — (API Expert α-3)

Through these interactions, Alpha accesses up-to-date knowledge about emerging e-commerce technologies, shifting seller needs, and global marketplace trends. This collaboration helps the platform anticipate change and maintain technological relevance.

Complementors, in turn, see their contributions reflected in platform evolution. Some even witness their innovations scaled into native features by the platform itself. While this can initially feel like competition, many interpret it as validation that their ideas filled a real need. As one integrator described informally, having the platform adopt their feature "proved that the idea worked" and motivated them to innovate further rather than dwell on lost exclusivity. These dynamic highlights a mature, resilient innovation culture in which complementors expect and accept continual renewal.

Overall, Alpha's co-innovation system strengthens both parties. The orchestrator benefits from distributed creativity, while complementors gain influence, early visibility, and a sense of ownership over the ecosystem's trajectory.

Mechanism A collaborative innovation cycle, wherein complementor insights feed platform development and the platform's enhancements generate new opportunities for complementors, drives continuous, mutual growth in the ecosystem.

4.3.15 Coding Tree: Ecosystem Governance & Power Dynamics

Link to the coding structure. The mechanisms detailed in 4.3.1–4.3.14 map directly from first-order categories (e.g., Formalising complementor relationships with agreements; Complementor tier programme; Small, tight-knit integrator community; Constrained data sharing under NDAs; Providing support and co-marketing; Tracking grey-market activities; Complementors refer/stack solutions; Platform openness enables multi-homing; Need for fair, transparent algorithms; Regular structured communication; Pushing for co-creation; Initial strict policies later relaxed; Difficulty proving complementor ROI) to the second-order themes Identifying & Formalising Strategic Complementor Relationships; Segmenting a Heterogeneous Complementor Base; Data Sharing Constraints & Privacy; Expanding & Internationalising the Ecosystem; Implementing Complementor Management & Support Routines; Ensuring Ecosystem Compliance & Quality; Managing Complementor Coopetition & Multi-Complementor Dynamics; Define and Communicate Platform Boundaries; Managing Platform Dependency & Multi-Homing; Managing Power Imbalances & Building Trust; Facilitating Complementor Engagement & Communication; Engaging in Co-Innovation & Feedback Loops; and Maintaining Platform Flexibility for Evolving Complementor Expectations. Together, these themes constitute the Ecosystem Governance & Power Dynamics aggregate dimension (Figure 4.3.15), showing how governance choices (tiering, boundaries, data rules, support routines, enforcement, engagement, and flexibility) function as co-evolutionary mechanisms that shape complementor behaviour and system-level outcomes.

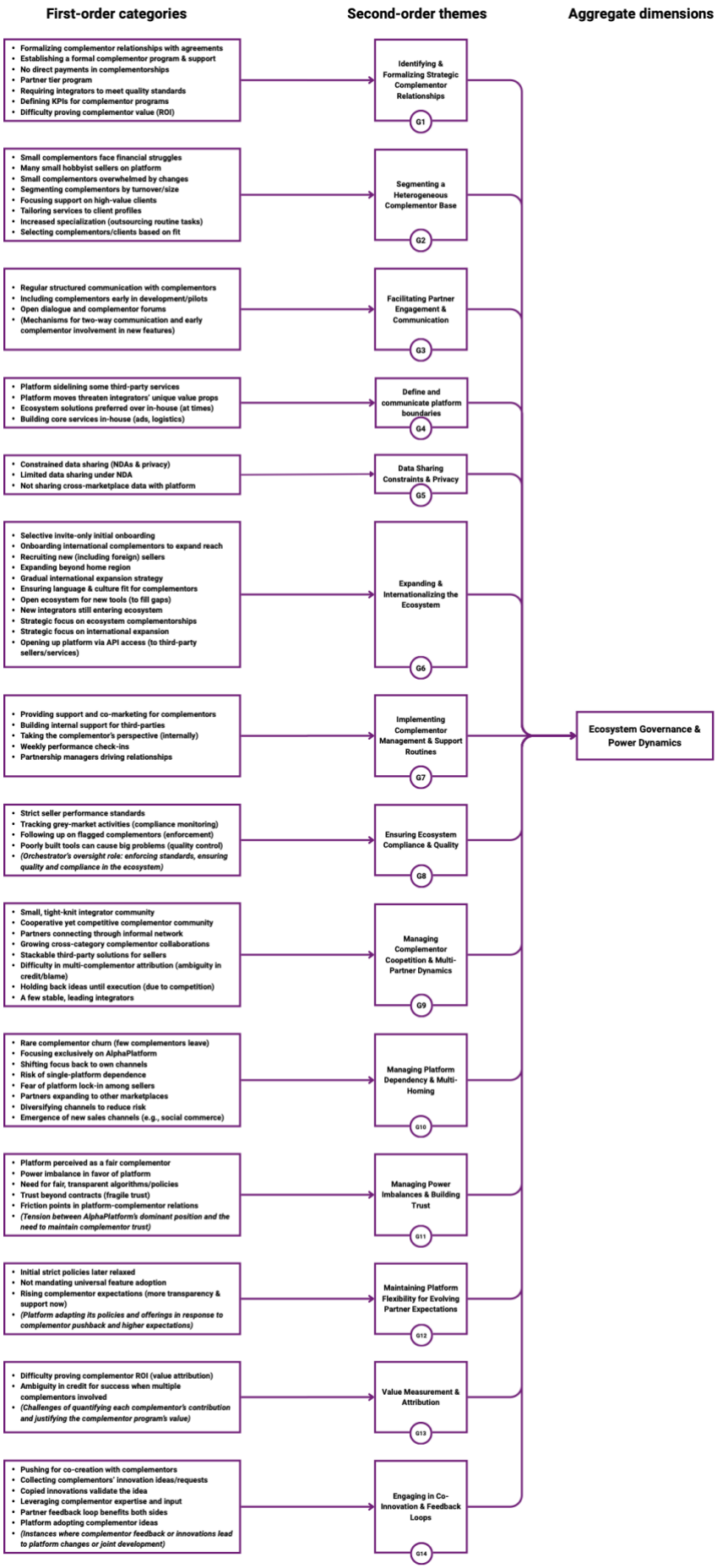


Figure 4.3.15 Coding Tree: Ecosystem Governance & Power Dynamics

Transition Taken together, these governance mechanisms operate under external constraints. 4.4 now examines how regulatory and societal context (e.g., data-protection regimes and competitive pressures from global rivals) conditions and channels the orchestrator's choices, further influencing orchestrator–complementor co-evolution.

4.4 Regulatory & Societal Context

The Alpha ecosystem does not evolve in isolation. External forces, most notably European regulatory reforms, heightened data-security and privacy expectations, and the entry of global marketplaces with international sellers, create both constraints and opportunities for adaptation. These contextual pressures compel the orchestrator to translate compliance and market requirements into new platform rules, technical boundary resources, and governance routines. This section examines how such external conditions reshaped Alpha's operations between June and October 2025, drawing on short, role-coded quotations to illustrate the resulting frictions and organisational responses. Each subsection concludes with a concise Mechanism summarising the practical implications of these external influences.

4.4.1 Responding to Competitive Pressures & New Entrants

The local arrival of a global marketplace intensified price competition and raised service benchmarks. Practitioners reported a visible shift:

> "*Since [the competitor] entered, price has become very important*." — (Ecosystem Manager α-2)

Scale asymmetry was salient. Managers contrasted Alpha's roughly 50,000 platform sellers with the competitor's several hundred thousand and set their sights on onboarding many more complementors to remain attractive. This pushed Alpha to broaden its assortment and compress reaction times on pricing and availability.

Alpha's countermoves operated on three levers. First, fulfilment parity: complementors perceived the platform's logistics service as matching or even exceeding the rival's performance frontier in terms of speed and cost, positioning Alpha as a competitive fulfilment option. Second, data surfaces for competition: pricing-insight endpoints and bulk advertising operations were opened so that complementors could automate tactical adjustments across large catalogues, enabling faster responses in buy-box competition. Third, relational governance: Alpha leaned into close complementor contact to differentiate on collaboration and responsiveness, with complementors emphasising that personal contact and co-problem-solving added value beyond pure price and feature comparisons.

Complementors, in turn, industrialised repricing and retail-media optimisation, shifting from manual checks to algorithmic routines that target the purchase block. Technical staff described how activities that used to be hand-tuned on a daily basis have become fully automated, allowing complementors to react at machine speed to marketplace dynamics. At portfolio level, many providers enabled multi-homing, integrating the rival's marketplace alongside Alpha so sellers could diversify without abandoning the home platform. These adaptations protected seller margins in a tighter buy-box race and helped keep Alpha attractive as a primary channel.

Mechanism Competitive pressure channels through boundary resources: pricing and advertising APIs, fulfilment parity, and relational support on the platform side; automation and multi-homing on the complementor side. The outcome is a data-driven equilibrium in which faster, coordinated responses to price and service shocks sustain both participation and performance on Alpha.

4.4.2 Navigating Regulatory Changes & Legal Constraints

Across all interviews, regulatory compliance was described as non-negotiable and increasingly prescriptive:

> "*There's no option not to do it, because it's law and regulation*." — (API Expert α-3)

While the obligation is absolute, the timing and specificity of new legal requirements often create operational strain. Several interviewees noted that official guidance from regulators can arrive late or ambiguously, forcing last-minute adjustments that cascade into complementor workflows. Complementors occasionally voiced frustration with the perceived bureaucracy but acknowledged that, in practice, they "just have to deal with it". Compliance is thus no longer a peripheral task but a constant operating condition.

Regulatory tightening has been embedded directly into Alpha's boundary resources and complementor policies through several design features. Consent-based data access has become central: managers emphasised that, under GDPR, the data is formally owned by the seller, who must explicitly authorise sharing with third parties for analysis. Consequently, analytics and optimisation complementors shifted toward logged permissions and NDA-backed scopes rather than informal exchanges.

Second, IT-security diligence has become a primary selection criterion for both new and existing complementors. The ecosystem team now reviews encryption practices, storage separation, and access protocols before certification, with ecosystem managers highlighting that the security "piece" is currently the main focus in complementor vetting.

Third, procedural transparency has increased under EU "marketplace-fairness" obligations. Requirements around notice periods, reasons for suspensions, and clear escalation channels have prompted more structured communication and audit trails around policy and API changes, even when the administrative load feels burdensome internally. Complementors have responded by productising compliance: collecting and storing verification data, safety certificates, and tax information for clients, embedding consent capture into onboarding flows, and re-engineering data pipelines to remain traceable and evidence-ready. As one complementor put it in summary, if customers do not provide the required regulatory information, they simply cannot sell.

At the interface level, Alpha hardened technical access by expanding official API endpoints and curbing scraping or bot traffic. These measures preserve auditability and fairness while retaining enough visibility for complementors to innovate responsibly.
Mechanism Regulatory and security requirements have become design inputs for both the platform and its complementors. Consent-based data sharing, NDA-gated scopes, IT-security vetting, and anti-scraping policies formalise trust and accountability without constraining complementor innovation. Compliance is effectively coded into APIs, policies, and operational routines that stabilise data exchange while keeping value-added analytics possible.

4.4.3 Coding Tree: Regulatory & Societal Context

Link to the coding structure. The mechanisms in 4.4.1–4.4.2 map directly from first-order categories (EU regulations pressuring changes; Legal constraints limiting features/data sharing; Favouring EU suppliers for compliance; Major competitor more advanced in tech; Platform easier for local sellers; Comparing fulfilment speed/cost; Increased price competition after entry; Influx of international sellers) to the second-order themes Navigating Regulatory Changes & Legal Constraints and Responding to Competitive Pressures & New Entrants. Together these themes constitute the Regulatory & Societal Context aggregate dimension (Figure 4.4.3).

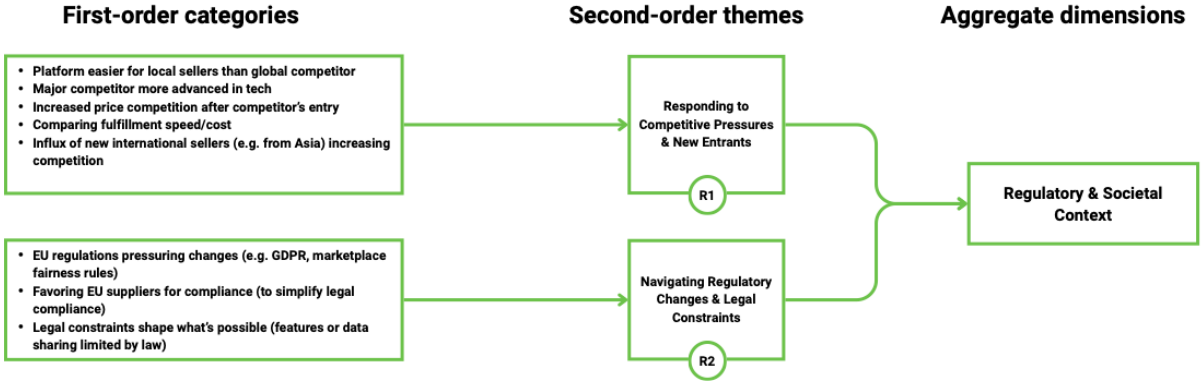


Figure 4.4.3 Coding Tree: Regulatory & Societal Context

Transition Taken together, these contextual mechanisms show how law and rivalry become design inputs that channel orchestrator–complementor co-evolution. Chapter 5, A Co-Evolutionary Framework for Orchestrating Digital Platform Ecosystems, now integrates these contextual, organisational, governance, and technological dimensions into a single process model explaining how initiatives, adaptations, and feedback loops co-produce alignment, innovation, and resilience over time.

5 Discussion: A Co-Evolutionary Framework for Orchestrating Digital Platform Ecosystem

This chapter develops an empirically grounded conceptual framework that explains how a digital platform orchestrator and its complementors co-evolve over time as an integrated ecosystem. The aim is to translate the qualitative findings of Chapter 4 into a cohesive visual and conceptual model, a "theory drawing", that captures the dynamic relationships observed in the case. The chapter focuses exclusively on describing the framework and its derivation from the data, without introducing implications, conclusions, or recommendations. The emphasis is on model construction: consolidating the key themes and mechanisms from the case study into a structured representation of the platform ecosystem's co-evolutionary process.

The chapter first outlines its purpose and methodological foundation. Using an inductive, grounded-theory approach inspired by the Gioia methodology, the coded findings from Chapter 4 are systematically connected to the development of the framework. This approach ensures that the model remains firmly grounded in empirical evidence. The framework, presented as Figure 5.1, the Co-Evolutionary Double-Loop Framework for Digital Platform Ecosystems, is then introduced and described in detail. It is termed "double loop" because it comprises two intertwined feedback loops: a left-hand loop centred on the platform orchestrator (focal firm) and a right-hand loop centred on the complementors (third-party complementors). These loops interact through a central nexus of feedback mechanisms, illustrating the bidirectional, cyclical nature of ecosystem evolution.

Each element of the framework is explained, including the orchestrator side (governance, boundary resources, infrastructure), the complementor side (capabilities, adaptation, investments), the interaction mechanisms (co-creation and feedback processes), the bidirectional feedback cycles, the resulting outcomes (such as alignment, innovation, and resilience), and the influence of the external environment (regulatory and market factors). Academic definitions are provided for all major elements, platform governance, boundary resources, complementor capabilities, co-creation, and feedback loops, supported by relevant literature. Each component is traced back to the second-order themes and aggregate dimensions identified in Chapter 4, demonstrating the empirical grounding of every element in the model. The interaction mechanisms and feedback cycles are described in detail, showing how changes on one side of the ecosystem induce responses on the other in a recurring co-evolutionary pattern.

Consistent with the chapter's purpose, the focus remains exclusively on constructing and substantiating the framework as an empirically grounded model derived from the qualitative findings of Chapter 4.

5.1 The Co-Evolutionary Framework: Conceptual Foundation

Before introducing the framework itself, it is necessary to clarify how the model was derived from the findings presented in Chapter 4 and to situate the process within methodological rigour. The framework was developed through an inductive, empirically driven procedure consistent with grounded theory building (Corley & Gioia, 2011). Chapter 4 provided a detailed coding of the case study data, resulting in a hierarchy of first-order concepts, second-order themes, and aggregate dimensions. This data structure captured the central phenomena observed in the evolution of the platform ecosystem. As noted by Gioia et al. (2013), a static hierarchy of themes represents only an intermediate step; researchers must subsequently "transform the static data structure into a dynamic theoretical model" that explains how the emergent concepts interrelate and evolve over time. The framework assembled in this chapter translates these empirical components into a cohesive conceptual model.

The conceptual foundation of the framework lies in examining the platform ecosystem through a co-evolutionary lens. In organisational literature, co-evolution refers to a process of reciprocal and interdependent change, where adaptation by one entity triggers responses in others, which in turn influence the original entity. Lewin and Volberda (1999) define co-evolution as a multi-level, multi-causal process of mutual adaptation between organisations and their environment, characterised by reciprocal rather than one-way causality (Van de Ven et al., 1994; Lewin & Volberda, 1999). This perspective informed the analytical approach in Chapter 4 and remains central to the framework developed in Chapter 5. Applying a co-evolutionary lens involved tracing sequences of actions and reactions over time, how orchestrator initiatives, such as policy or technological changes, elicited responses from complementors, and how those responses subsequently prompted further adaptation by the orchestrator. Through this iterative analysis, recurring feedback patterns and adaptive mechanisms were identified, forming the foundation of the framework.

The coding results in Chapter 4 were explicitly structured to capture these dynamics. Four aggregate dimensions emerged: (1) Technological Infrastructure & Data Exchange, (2) Organisational Capabilities & Operating Routines, (3) Ecosystem Governance & Power Dynamics, and (4) Regulatory & Societal Context. Collectively, these dimensions reflected both sides of the platform partnership and the external context in which they operate. Technological Infrastructure & Data Exchange addressed the evolution of technical interfaces, such as APIs, data-sharing mechanisms, and support tools, closely linked to the orchestrator's boundary resources and infrastructural capabilities. Organisational Capabilities & Operating Routines captured how complementor firms developed routines, skills, and processes for platform collaboration. Ecosystem Governance & Power Dynamics encompassed the rules, policies, and influence mechanisms through which the orchestrator managed the ecosystem, including patterns of interdependence and control. Regulatory & Societal Context referred to external forces, such as legal or market shifts, that imposed adaptive pressures on the ecosystem. These dimensions were interdependent rather than discrete. Governance changes (Dimension 3), for instance, often contained technological implications (Dimension 1), necessitated adjustments in complementor routines (Dimension 2), and were frequently triggered by external developments (Dimension 4).

Construction of the conceptual framework followed an approach comparable to axial coding or Gioia's theoretical modelling stage. The aim was to identify a central narrative that linked the categories into a coherent process sequence. Consistent with Gioia et al. (2013), the second-order themes and aggregate dimensions were connected through dynamic relationships to

articulate a grounded process theory. In practice, this involved identifying feedback loops and iterative cycles linking orchestrator actions to complementor reactions and subsequent recalibrations. A visual model was refined iteratively to incorporate all key elements from Chapter 4 in a structure depicting the relationships and cycles identified in the data.

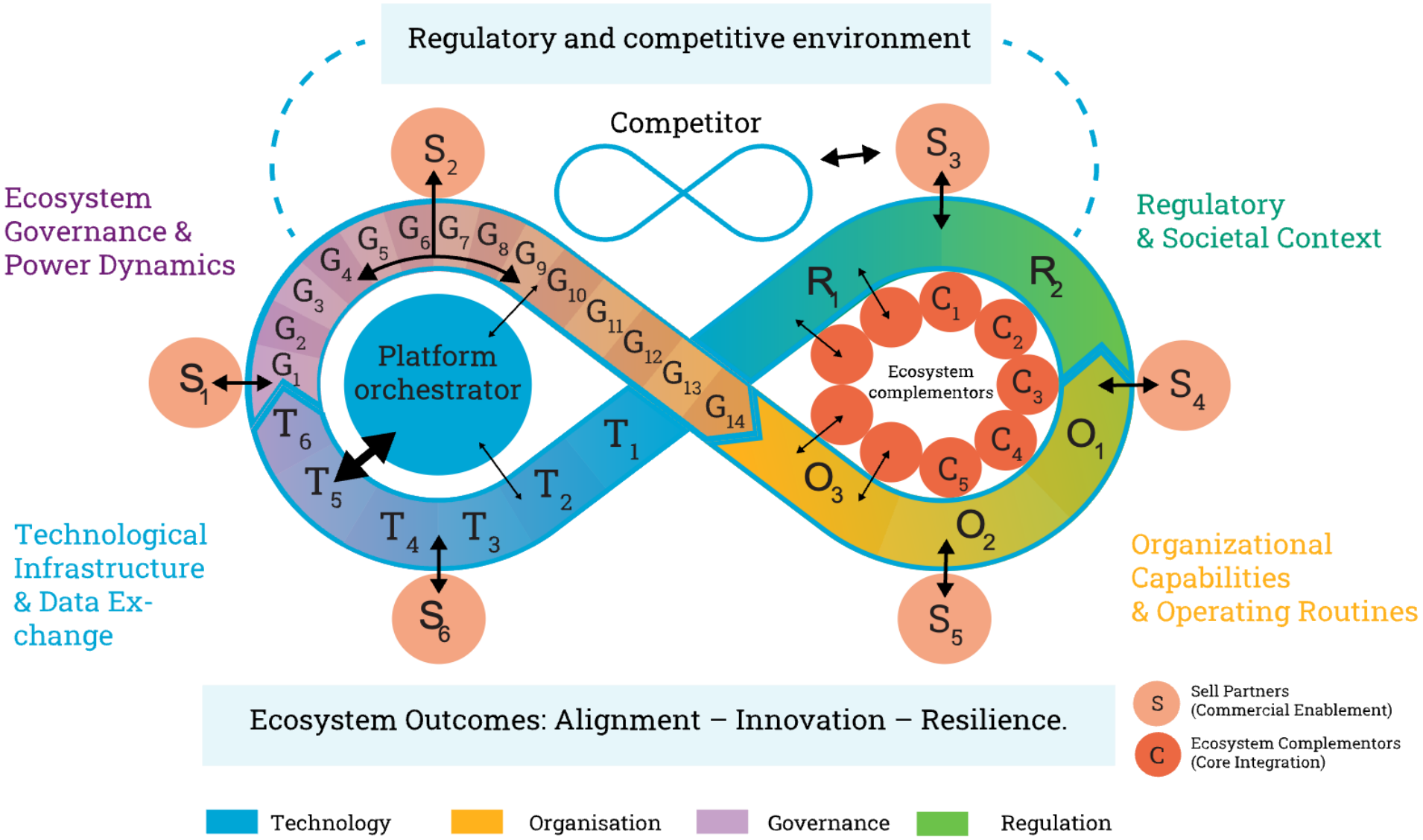
5.2 The Co-Evolutionary Framework: Model Description

This section presents the framework that explains how the platform orchestrator and its complementors co-evolve within the wider digital ecosystem. The framework consolidates the four aggregate dimensions identified in the data ,Technological Infrastructure & Data Exchange, Organisational Capabilities & Operating Routines, Ecosystem Governance & Power Dynamics, and Regulatory & Societal Context ,into a dynamic model of reciprocal adaptation.

This paradigm illustrates the ongoing interaction between the orchestrator's governance actions and resource configurations and the complementors' capability development and strategic adaptability. These interrelated feedback mechanisms demonstrate the ongoing cycles of ecosystem change. The model clearly delineates the influence of the external environment ,regulation, competition, and market dynamics ,as both a catalyst and a moderator of co-evolution.

Figure 5.1 below presents the framework, illustrating the double-loop structure that links the orchestrator and complementors via continuous feedback mechanism. It illustrates how internal interactions, influenced by contextual factors, produce system-level results such as alignment, innovation, and resilience throughout the ecosystem.

A Co-Evolutionary Framework for Orchestrating Digital Platform Ecosystem



At a conceptual level, the framework provides a visual overview of the orchestrator–complementor co-evolution process as derived from the empirical case. It illustrates two interlocking loops representing the two sides of the platform ecosystem and their ongoing interactions. The left loop corresponds to the Platform Orchestrator, encompassing governance actions, boundary-resource provision, and the technological infrastructure maintained by the focal firm. The right loop represents the Complementor System, encompassing complementors' capability development, strategic adaptation, and investment in the ecosystem. Within this complementor loop, the dual-layer design highlights differing degrees of coupling to the platform. The inner layer consists of core complementors that are tightly integrated, such as API-based software developers or platform-native tool providers whose products operate exclusively within the platform. The outer layer comprises loosely coupled complementors ,third-party software integrators, repricing vendors, marketing agencies, and warehouse or logistics solution providers ,who engage with multiple platforms. Because of their peripheral yet connected position, these outer-layer actors introduce external knowledge, comparative insights, and innovation impulses from outside the ecosystem, thereby exerting adaptive pressure on the orchestrator. This dual-layer representation emphasises that complementors constitute a heterogeneous group, ranging from deeply embedded insiders to cross-platform collaborators, each shaping the ecosystem's evolution in different ways.

The two loops are linked through a central feedback nexus of interaction mechanisms, illustrating continuous mutual influence between orchestrator and complementors. Bidirectional arrows connect the loops, depicting a cyclical process of action, reaction, and recalibration rather than a linear cause-and-effect chain. An External Context Layer surrounds both loops, indicating that environmental conditions ,such as new regulation, shifting market structures, or external shocks ,affect the dynamics of both subsystems. Dashed arrows from this contextual layer into the loops indicate that these external forces can trigger or moderate interactions within the ecosystem.

At the outcome stage of the diagram, the framework introduces a distinct Ecosystem Outcomes component comprising three emergent results of co-evolution: *alignment*, *innovation*, and *resilience*. These outcomes arise from the ongoing interplay between orchestrator and complementors, while also feeding back into the system to influence subsequent evolution. For instance, increased alignment may enable greater openness or coordination within the platform, whereas innovation surges initiated by complementors may reshape competition or alter environmental conditions, thereby affecting future adaptation.

Overall, the figure conceptualises the platform ecosystem as a dynamic double-loop system operating through continuous cycles of action and response, embedded within a broader external environment and producing system-level outcomes.

The subsequent subsections examine each component of the framework in detail. Each element is defined with reference to relevant academic literature and linked to the empirical findings presented in Chapter 4, identifying which second-order themes or case evidence informed it. Interaction mechanisms between components are described, and examples drawn from the case (AlphaPlatform and its ecosystem complementors) are used to illustrate the abstract processes. Table 5.1 provides a structured summary linking the framework components to their empirical foundations, while textual explanations throughout the section elaborate on these connections.

Governance of platform orchestrators in platform ecosystems, platform governance comprises the rules, policies, decision-making processes, decision rights partitioning, and incentive structures that the platform orchestrator establishes to manage and align the ecosystem. The orchestrator sets the framework for participation and defines the parameters within which actors engage. Governance spans formal policies, such as platform policy, pricing structures, data access rules, and app review guidelines, as well as informal norms and the general philosophy regarding control versus openness. It also covers access governance, standards, monitoring, control (process & output), and enforcement, how the orchestrator ensures adherence and maintains quality through audits, performance expectations, and sanctions. In scholarly discussions, platform governance is described as "the rules and processes, designed by the platform owner, that prescribe the development and commercialisation opportunities of complementors" (Ghazawneh & Henfridsson, 2013; Tiwana, 2015). In essence, governance specifies the actions that complementors can undertake on the platform and shapes the landscape of innovation and interaction. Prior research (e.g., Tiwana, 2013; Wareham et al., 2014) emphasizes that platform governance requires balance: very stringent rules can constrain complementor creativity, whereas very lenient rules can yield disorder or poor outcomes. Within this study's framework, platform governance is a core element of the left-side loop. It comprises the strategic decisions and guidelines through which the orchestrator directs the ecosystem's trajectory and sets participation parameters. The openness–control paradox is salient; the orchestrator addresses it through governance by design that encodes guardrails into interfaces and processes.

Boundary resources and infrastructure comprise the technical and operational interfaces that connect the platform with complementors. Ghazawneh and Henfridsson (2013) define boundary resources as "the software tools and regulations that serve as the interface for the arm's-length relationship between the platform owner and the application developer." Available resources include APIs, SDKs, technical documentation, interface specifications, sandbox environments, libraries, and support services or developer communities provided by the platform orchestrator. In practical terms, boundary resources are the tools and guidelines the orchestrator provides to enable complementors to build on the platform while managing that interaction. They are "boundary" resources because they sit at the interface between the platform and complementors, empowering external innovation while upholding platform requirements. In addition to boundary resources, the platform infrastructure, which includes the platform architecture and data pipelines, is a crucial element that the orchestrator maintains to ensure the ecosystem's smooth operation. This study integrates boundary resources and infrastructure into the orchestrator loop because together they embody the orchestrator's concrete tools for enabling and shaping third-party innovation. Changes to boundary resources, such as introducing a new API or updating an SDK, and changes to infrastructure, such as major system upgrades or new data interfaces, are strategic choices by the orchestrator that directly affect complementors' capacity to create value. Such choices often involve versioning and deprecation policies, boundary resource tuning, and adjustments to documentation and sandbox access.

Considered together, platform governance and boundary resources and infrastructure represent the orchestrator's role in the co-evolutionary process. By utilizing these mechanisms, the platform orchestrator can promote certain contributions by complementors while deterring others, seeking a dynamic equilibrium between platform integrity (stability, security, and quality) and complementor-led innovation (openness and generativity) (Wareham et al., 2014; Tiwana, 2013). In this case, this study observed the orchestrator loop as a critical component

of the co-evolution engine. The platform orchestrator, AlphaPlatform (pseudonym), often initiated changes through platform policy or boundary resources, but it also needed to respond to ecosystem feedback, which this thesis examines through the interaction mechanisms. Chapter 4 highlighted examples of orchestrator initiatives, including API versioning updates, new data access rules, and complementor program incentives, illustrating their intended effects on complementor behaviour. These initiatives elicited complementor adaptive responses that, in turn, informed subsequent orchestrator initiatives, creating feedback loops. Continuous adjustment of governance and resources by the orchestrator is central to the co-evolution process.

On the opposite side of the model lies the Complementor Capability System, illustrated by the right-hand loop. Complementors are third-party firms that provide complementary products or services on the platform. This group includes external developers, service providers, and merchants, such as the various complementor companies that integrate with AlphaPlatform. It is important to recognise that complementors within the platform ecosystem do not share identical roles or exhibit the same degree of integration. A select group of complementors, such as dedicated software developers creating add-ons specifically for the platform or merchants whose businesses are tightly linked to the platform's marketplace, forms a core of complementors with a high level of specialisation. In contrast, other complementors play a more supportive role. These include systems integrators connecting the platform to merchants' IT systems, providers of repricing or analytics tools used across multiple marketplaces, digital marketing agencies assisting sellers, and third-party logistics or warehouse solution providers. This configuration represents an outer layer of complementors operating at the periphery of the ecosystem, characterised by looser coupling to the platform, consistent with a core–periphery design.

The inner core complementors show strong commitment to the platform's technology and governance policies, often relying on it for a substantial share of their value creation. Outer layer complementors, by contrast, operate with a broader perspective that spans multiple platforms, infusing external knowledge, comparative insights, and best practices into the ecosystem. This outer layer can also exert adaptive pressure on the platform orchestrator. For example, when an integrator or tool provider supports several marketplaces, it may showcase features that AlphaPlatform has not yet implemented, prompting the orchestrator to consider similar enhancements. Moreover, by enabling multi-homing for sellers, outer layer complementors compel the orchestrator to continuously refine its offerings to sustain engagement. Understanding this dual-layer structure on the complementor side is therefore crucial, as it underscores the diverse roles and feedback dynamics driving orchestrator–complementor co-evolution.

This framework illustrates how complementor organisations develop their own capabilities that evolve alongside the platform. Complementor capabilities refer to the skills, knowledge, assets, and routines that allow them to create value within the platform ecosystem. These include technical abilities, such as mastering the platform's boundary resources (APIs, SDKs, and documentation), and software development expertise. They also include business-oriented skills, like marketing to platform users, delivering customer support, and maintaining compliance with governance and policy requirements. Finally, they involve strategic abilities: perceiving shifts in the orchestrator's direction, adapting to policy or market changes, and deciding when to engage with multiple platforms. Together, these capabilities determine how effectively complementors can participate in and thrive within the ecosystem.

Viewed through the lens of dynamic capabilities (Teece, 2007), complementors must continually integrate, develop, and reconfigure their competencies to match a changing environment, in this case, the platform itself. They are not passive recipients of orchestrator decisions but adaptive organisations that invest and evolve. When the platform introduces a new API or modifies data-access rules, complementors may train their developers, update software for compatibility, or allocate resources to meet compliance demands. Likewise, when new opportunities arise, such as a platform expansion into new markets, complementors may launch additional services or build new expertise to capture value. Over time, some mature from small start-ups into professionalised firms with formal management and quality systems, while others struggle to adjust and eventually exit the ecosystem.

Chapter 4 linked these dynamics to the aggregate dimension of Organisational Capabilities and Operating Routines. The data showed patterns of learning, resource investment, and strategic adaptation among complementors working with AlphaPlatform. One observed theme, continuous learning and adaptation (4.2), illustrated how complementors refined their capabilities in response to orchestrator initiatives. When AlphaPlatform released a new analytics API, several complementors trained staff in data analysis to provide richer insights to clients, aligning their services with the orchestrator's data-driven focus. When stricter security standards were introduced, others hired specialists or gained certifications to comply. These examples reveal a co-evolutionary pattern: the orchestrator's actions create both constraints and opportunities, and complementors adjust in turn, reinforcing the interdependence that sustains the ecosystem.

The framework diagram indicates that the complementor capability-development loop is both dynamic and responsive. This phenomenon is shaped by two primary influences: inputs from the platform orchestrator, which originate from the left-hand loop, and the external context provided by the surrounding layer. Decisions by the platform orchestrator regarding platform governance and changes in boundary resources encourage complementors to enhance or modify capabilities. For instance, the introduction of new APIs opens avenues for innovative complementary services. Complementors equipped with the necessary skills will seize these opportunities, while those lacking such skills must adapt swiftly to avoid falling behind. External shocks, such as new regulations or market shifts, can also prompt complementors to establish new routines. For example, the introduction of GDPR privacy rules necessitated that complementors implement enhanced data protection processes, a phenomenon observed in this case. As complementors develop over time, their growing capabilities can also have a reciprocal effect on the platform orchestrator. Highly skilled or creative complementors may expand the boundaries of what the platform is capable of or operate in areas adjacent to the platform's domain, which can lead the platform orchestrator to act. In the analysis, certain influential complementors began offering services that intersected with features of the platform, which prompted AlphaPlatform to reassess platform policy and, in one case, to acquire a complementor's technology, an instance of platform-owner entry into the complementor space. In a similar vein, when complementors came together to express needs or suggestions, such as through a complementor advisory council, this complementor voice prompted the platform orchestrator to implement changes, such as simplifying an API or modifying a policy. In this way, complementor advances and feedback shape the platform orchestrator's strategy, highlighting the reciprocal relationship inherent in co-evolution and the operation of feedback loops between orchestrator initiatives and complementor adaptive responses.

Central to the framework, which connects the orchestrator loop and the complementor loop, are the interaction mechanisms and the ensuing feedback loops. This central element illustrates co-evolution: a continuous interaction in which the platform orchestrator and complementors engage, navigate conflicts, learn, and adapt together over time. Put simply, it refers to the set of cooperative and feedback-oriented activities that link both sides of the platform ecosystem.

The case revealed several types of interaction mechanisms. There were organized activities such as complementor meetings, developer forums, and feedback sessions. For instance, AlphaPlatform hosted events to gather insights from complementors and ran workshops to provide training. The established channels enabled a two-way exchange of information, allowing the platform orchestrator to convey changes or strategies to complementors, while complementors could offer feedback, raise concerns, or propose ideas to the orchestrator. There were also collaborative projects in which the platform orchestrator and selected complementors jointly developed new features or pilot initiatives. For example, AlphaPlatform conducted a beta program in which several complementor firms collaborated to test a new API. In another case, the platform orchestrator partnered with a key complementor to co-create an integration module tailored for a major client. Interactions also occurred through informal channels, including support tickets, communications with account managers, and community discussions such as online forums. These channels enabled complementors to express needs or frustrations, while the platform orchestrator gained insights into end users' real-world experiences. All of these are feedback mechanisms that connect the two loops.

This study suggests that platform ecosystems flourish through co-creation of value, as highlighted by Lusch and Nambisan (2015) and Vargo and Lusch (2004). Furthermore, co-creation is facilitated by ongoing interactions between the platform orchestrator and complementors. In this context, co-creation denotes the collaborative generation of new value, such as innovations, solutions, and improvements. The platform provides essential resources and a supportive environment, while complementors contribute innovations and specialized knowledge. Frequently, the most effective results arise from their combined efforts. The interaction nexus of this study's framework embodies this idea by showing that through the exchange of ideas, requirements, and feedback, the platform orchestrator and complementors adapt to one another, fostering advancements at the ecosystem level.

Chapter 4 offers multiple examples that illustrate these interaction and feedback dynamics in practice. A notable second-order theme identified in Section 4.3 on Governance & Power Dynamics was "iterative solution development." This theme captures the collaborative efforts between AlphaPlatform and several key complementors in co-developing a solution tailored for a large merchant. The case narrative described a series of iterative meetings and technical refinements that culminated in a successful integration. Following this achievement, AlphaPlatform decided to extend that integration to all complementors. This provides evidence of a co-creation process and a learning feedback loop: the orchestrator–complementor interaction influenced the platform orchestrator's wider platform features, including the design of boundary resources. Another instance concerned a theme centred on the "complementor feedback loop on policy." Following a contentious platform policy change, AlphaPlatform organized a webinar to address complementor concerns and revised the policy a month later. A complementor stated, "We expressed our concerns during the call, and to their credit, they did roll back the most problematic aspect of the policy." This illustrates a negative feedback loop, in which pushback from complementors prompted a course correction by the platform orchestrator. Collectively, these instances support the interaction and feedback component of the framework. The findings show that the interactions represented in the model, with arrows

indicating mutual communication between the platform orchestrator and complementors, were reflected in real-world settings. This was evident through communication forums, collaborative pilots, support exchanges, and adaptive changes. The interactions form an essential connection within the platform ecosystem, helping keep both sides aligned, or at least in active discussion, as the ecosystem develops over time.

The last component of the framework consists of the ecosystem outcomes that arise from co-evolution between the orchestrator–complementor. Drawing on the case evidence and pertinent literature, this study concentrates on three interconnected outcomes: alignment, innovation, and ecosystem resilience.

In the context of platform ecosystems, *alignment* refers to the degree to which the objectives, actions, and indicators of success of both the orchestrator and the complementors harmonise with each other (Adner, 2017). High alignment indicates that the platform and its complementors are in harmony, sharing a unified vision for value creation. Their incentives are closely connected, meaning that when complementors thrive, the platform benefits as well, and the same holds true in reverse. This collaboration contributes to minimising conflicts and tensions. This case study demonstrates a significant improvement in alignment over time. By the later stages of AlphaPlatform's evolution, interviews revealed enhanced coordination and understanding between the platform and its complementors. A long-term complementor remarked, "In the past few years, we have aligned closely with AlphaPlatform, our understanding of each other's businesses has significantly improved." In a similar vein, an executive from AlphaPlatform remarked, "Our objectives and those of our complementors have become significantly more aligned, when they succeed financially, we also benefit." These observations highlight alignment because of ongoing co-evolution: through persistent adjustments and shared learning, the interests and actions of ecosystem members became increasingly coordinated.

Innovation as an outcome of an ecosystem involves the creation of new ideas, products, or services within that ecosystem, along with the overall capacity for innovation that the ecosystem demonstrates. This encompasses both gradual enhancements and significant advancements that emerge from collaborative interaction between the platform and its complementors. Within this framework, innovation emerges as a vital outcome of continuous co-creation and the dynamic exchange of feedback. This case presented clear evidence of this phenomenon: for instance, the launch of AlphaPlatform's new advertising API prompted several complementors to develop innovative analytics and campaign-management features, thereby enhancing the platform's overall value proposition. The involvement of diverse complementors, particularly those at the periphery who leverage external knowledge, can significantly enhance innovation by bringing in new viewpoints. Throughout the study period, the ecosystem generated a variety of complementary innovations, including AI-driven pricing tools and integrated marketing dashboards. These advancements were made possible through the collaborative efforts of the orchestrator and multiple complementors, highlighting the power of collective ingenuity. The result of innovation reflects this shared creative effort. This concept resonates with Iansiti and Levien (2004), who refer to it as "productivity" or "niche creation" within a thriving ecosystem. It highlights the ecosystem's capacity to consistently produce innovative solutions and address emerging market needs.

Resilience refers to the capacity of an ecosystem to endure shocks and stresses while also adapting to emerging challenges. A robust platform ecosystem can withstand disruptions, whether they arise from regulatory changes, emerging competitors, or technological

advancements, while continuing to uphold essential functions and relationships. This also suggests a capacity to recover from challenges and to adapt as circumstances evolve. In this case, resilience was evident through the ecosystem's ability to endure and thrive even in the face of external challenges, such as the emergence of a significant global competitor and the introduction of new data regulations. The co-evolutionary process played a significant role in fostering resilience. As the orchestrator and complementors engaged in ongoing learning and adaptation, they cultivated capabilities that enabled them to navigate unexpected challenges effectively. For instance, after several feedback cycles, both the platform and its complementors evolved to become more agile and better equipped for future changes. They established effective communication routines, fostered trust, and diversified their capabilities, among other improvements. In this framework, resilience aligns with the notion of "robustness" in parts of the ecosystem literature (Iansiti & Levien, 2004). It refers to the ecosystem's capacity to endure and maintain itself over time.

It is essential to recognize that these three outcomes are interconnected rather than separate. In the case study, this study found that when complementors exhibit strong alignment, innovation often increases because trust and mutual understanding encourage collaboration on new ideas. Additionally, a history of successful innovation plays a vital role in building resilience, as the ecosystem becomes stronger and more adaptable following each successful adaptation. Conversely, misalignment may reduce innovation because conflicts or mistrust make complementors less inclined to share ideas, and it can weaken resilience; if a shock occurs while stakeholders work at cross-purposes, the system becomes more fragile. Incorporating these outcomes into the framework highlights that co-evolution is more than a perpetual cycle; it yields concrete results that significantly influence ecosystem health and success. From the data, this study identified alignment, innovation, and resilience as key areas for evaluating the trajectory of the case ecosystem. Themes found in the literature on ecosystem health and performance are also reflected here (Adner, 2017; Iansiti & Levien, 2004). The framework depicts these outcomes at the conclusion of the process, with dotted lines connecting back to earlier components of the model. This signifies that reaching these outcomes can influence new initial conditions for the subsequent cycle of co-evolution. For instance, an ecosystem that has reached a state of alignment can enable the orchestrator to expand the platform, as trust levels are elevated. Similarly, an ecosystem that fosters substantial innovation may attract new participants, thereby influencing the external environment. In a similar vein, demonstrating resilience can foster greater investment from both the orchestrator and complementors, as it signals that the ecosystem can adapt to change.

Encircling the core loops in Figure 5.1 is the external context, which comprises the broader environmental conditions in which the platform ecosystem operates. This study includes this layer in the framework to acknowledge that the co-evolution of the platform orchestrator and complementors does not occur in a vacuum; it is embedded in a larger context that can shape or modulate their interactions. Key external factors evident in this case (and commonly noted in the literature) include regulatory changes, market competition, and the maturity or stage of the ecosystem.

Regulatory and legal factors (e.g., new laws, industry standards, government policies) can significantly influence platform ecosystems. In this case, for instance, the introduction of a new data protection regulation (regulatory change) forced AlphaPlatform to alter its data policies and APIs, which in turn compelled complementors to adapt their data handling processes. This was documented in Chapter 4 under the Regulatory & Societal Context dimension: interviewees noted that "the new law forced everyone to change the way we operate," leading

to coordinated adjustments by both the platform orchestrator and complementors. Thus, this study depicts regulation as an external input that can trigger co-evolution (represented by a dashed arrow entering the loops).

Market competition is another external factor. The entry of a major competitor in AlphaPlatform's regional market was captured in the case (under a theme of "Competitive Shock"). That event spurred changes in platform orchestrator behaviour (the platform became more attentive to complementor needs, adjusted fees, etc.) and prompted complementors to "step up their game." One complementor recalled, "When [Competitor] came in, [AlphaPlatform] suddenly became much more attentive to our needs, they lowered some fees and asked us how they could help us improve. We also had to step up our game." This illustrates how the competitive environment can intensify the co-evolutionary cycling: external competition put pressure on both the platform orchestrator and the complementors, accelerating their mutual adjustments. In the framework, this study includes competition as part of the external context that feeds into both loops.

Ecosystem maturity or life-cycle stage can also moderate interactions. A young, growing ecosystem might experience very different orchestrator–complementor dynamics (more experimentation, loose structures) compared to a mature ecosystem (more formalized roles, possibly power asymmetries). In Chapter 4, although this study focused on a single in-depth case reconstructed retrospectively over multiple periods, it observed early-phase versus later-phase differences in how AlphaPlatform engaged complementors, suggesting that as the ecosystem matured, the co-evolutionary pattern evolved (initially more exploratory and later more standardized with a formal partner program). This study treats maturity as another contextual factor that can shape the nature of feedback loops (e.g., early on, the platform orchestrator might be more open and adaptive, whereas later it might become more controlling, or vice versa depending on strategy).

In the figure, this study illustrates these moderating factors (regulation, competition, maturity) with dashed influence lines to the relevant parts of the loops. For example, regulatory forces might affect the platform orchestrator's governance decisions (a new law leading to a platform policy update) and complementor capabilities (needing new compliance routines). Competition can affect both sides by altering urgency or bargaining power (a platform orchestrator under competitive threat might relax platform governance to attract complementors, and complementors facing more platform choices might demand more from the platform orchestrator). Ecosystem maturity might modulate the strength of feedback loops (a mature ecosystem might have more established feedback channels, but also potentially more inertia).

The external context is drawn as surrounding everything to indicate that it is ever-present. It provides the stage and sets boundary conditions for the co-evolutionary drama. Changes in the external context often act as perturbations or catalysts that kick off a new cycle of adjustments. Crucially, these forces are largely outside the direct control of the ecosystem's actors (the platform and its complementors cannot, for instance, stop a new law or prevent a competitor from entering the market), yet they must respond to them. This study explicitly includes this layer in the framework to highlight that orchestrator–complementor co-evolution is nested within, and influenced by, a larger environment.

To summarize the framework description: Figure 5.1 brings together all these pieces, external context (the surrounding environment and triggers), platform orchestrator governance and resources (the platform firm's levers and actions), complementor capabilities and adaptations (the complementors' evolving contributions and responses), interaction mechanisms (the feedback glue binding them), and outcomes (the emergent alignment, innovation output, and resilience of the whole system). The model visualizes how these elements connect in a continuous loop of reciprocal influence.

Table 5.1 Mapping of framework elements to illustrative Chapter 4 evidence and model directionality. Codes (T, G, O, R) correspond to second-order themes in the coding tree and labels used in Figure 5.1.

Framework element (aggregate dimension) & codes	**Mechanism**	**Illustrative evidence referenced in Chapter 4**	**Direction in model & linked outcomes**
External context: Regulation (R1)	Regulatory change prompts adjustments by both sides.	New privacy/data rules required policy changes and API constraints; complementors implemented stronger compliance routines.	External → Orchestrator & Complementors → Alignment, Resilience
External context: Competition (R2)	Competitive entry/pressure accelerates co-evolution.	A major entrant led the platform to adjust fees/roadmap and complementors to improve service quality.	External → Both loops → Innovation, Resilience
Orchestrator: Governance – participation & access (G1–G3)	Entry criteria, quality standards, reviews.	Tightened participation rules raised bar for complementors; some requested clarifications via feedback sessions.	Orchestrator → Complementors → Alignment
Orchestrator: Governance – complementor segmentation/tiers (G4–G6)	Tiered programme, incentives, performance metrics.	Complementors invested (e.g., extra support staff) to reach higher tier; later fine-tuning after complementor feedback.	Orchestrator ⇄ Complementors → Alignment
Orchestrator: Governance – trust, transparency & fairness (G7–G9)	Communication of rationale; transparency on decisions.	Webinars and Q&A improved clarity; reduced friction around contentious policy changes.	Two-way interaction → Alignment, Resilience

Orchestrator: Governance – dispute/escalation (G10–G11)	Channels to resolve conflicts.	Formal escalation led to policy refinement in a specific case.	Complementors → Orchestrator (feedback) → Alignment
Orchestrator: Governance – co-innovation boundaries (G12–G14)	Rules for overlap with platform roadmap; M&A/absorption.	Complementor offerings overlapping with native features triggered boundary clarifications and, once, a technology acquisition.	Complementors → Orchestrator (feedback) → Innovation, Alignment
Orchestrator: Boundary resources – APIs & standards (T1)	Availability and design of APIs/interface contracts.	API version release drove complementor re-work but enabled new complementary features.	Orchestrator → Complementors → Innovation
Orchestrator: Boundary resources – data & analytics enablement (T2)	Data endpoints, reporting, telemetry.	New analytics interface spurred third-party dashboards/insight tools.	Orchestrator → Complementors → Innovation
Orchestrator: Boundary resources – developer tooling & support (T3)	SDKs, docs, sandboxes, support channels.	Better tooling/training lowered integration time and error rates.	Orchestrator → Complementors → Alignment
Orchestrator: Technical infrastructure – reliability & versioning (T4)	Backward compatibility, stability, migrations.	Integration stability improved after versioning discipline; complementors adjusted routines.	Orchestrator → Complementors → Resilience
Orchestrator: Technical infrastructure – automation/AI hooks (T5)	Hooks that allow automation and AI-driven services.	Complementors built repricing/automation features once secure hooks were provided.	Orchestrator → Complementors → Innovation
Orchestrator: Technical infrastructure – logistics/integration backbone (T6)	Connectors to warehousing, shipping, payments.	Expanded connectors widened complementor solution scope for merchants.	Orchestrator → Complementors → Innovation, Alignment
Complementors (inner layer): Core ecosystem complementors (capabilities) (O1)	Platform-native developers/tool providers tightly coupled to APIs/policies.	Rapid adoption of new endpoints; frequent participation in betas/pilots.	Orchestrator → Complementors, Complementors → Orchestrator (beta feedback) → Innovation
Complementors (outer layer): Sell complementors / peripheral actors	Software integrators, agencies, repricers,	Cross-platform experience surfaced external benchmarks	Outer → Orchestrator (knowledge/pressure

(knowledge inflow) (O2)	WMS tools; multi-home across platforms.	and pressured platform to match features.	) → Innovation, Alignment
Complementors: Organisational learning & routines (O3)	Training, process formalisation, capability investments.	Complementors hired/retained talent, formalised QA and deployment to keep pace with platform changes.	Orchestrator → Complementors → Resilience, Alignment
Interaction mechanisms: Co-creation pilots	Joint development/testing with selected complementors.	Pilot integrations for key clients later generalised into platform resources.	Two-way feedback (centre nexus) → Innovation
Interaction mechanisms: Complementor feedback on policy	Webinars, advisory councils, surveys.	Policy rollback/adjustment after collective complementor concerns.	Complementors → Orchestrator → Alignment
Interaction mechanisms: Support & community channels	Tickets, forums, AM touchpoints.	Continuous micro-feedback improved docs/tooling and reduced integration friction.	Two-way → Alignment, Resilience
Ecosystem outcomes: Alignment	Strategic/operational fit; fewer frictions.	Higher complementor engagement/retention; shared success metrics discussed by both sides.	Emergent from loops
Ecosystem outcomes: Innovation	New complements, features, services.	Third-party analytics/automation; platform roadmap informed by ecosystem solutions.	Emergent from loops
Ecosystem outcomes: Resilience	Ability to absorb shocks and adapt.	Ecosystem adapted to regulation and competition without major disruption.	Emergent from loops

Notes: *T = Technological Infrastructure & Data Exchange (T1–T6); G = Ecosystem Governance & Power Dynamics (G1–G14); O = Organisational Capabilities & Operating Routines (O1–O3); R = Regulatory & Societal Context (R1–R2). The complementor loop is shown with two concentric layers in the figure: an inner core (platform-native complementors) and an outer layer of sell complementors (e.g., software integrators, agencies, repricers, WMS tools) who are generally less locked-in and may bring external knowledge into the ecosystem.*

Chapter 6 Conclusion

Chapter 6 concludes this thesis by synthesising the main insights on co-evolution in digital platform ecosystems and by drawing together the answers to the research question and sub-questions. It first revisits the research questions and provides concise, integrated answers based on the empirical findings. It then sets out the study's theoretical contributions and managerial implications for platform orchestrators and complementors, followed by a reflection on key limitations and the scope of analytical generalisation. The chapter closes with an agenda for future research and a summary matrix linking each research question to its corresponding answer, thereby positioning the thesis within ongoing scholarly and practical debates on digital platform ecosystems.

6.1 Revisiting the Research Questions

Sub question 1 How do the orchestrator's strategic initiatives and governance decisions influence the evolutionary trajectories of its ecosystem complementors?
The research showed that AlphaPlatform's strategic and technological initiatives had a significant impact on the behaviour and investments of complementors. For example, when the orchestrator implemented new boundary resources such as API functions or made policy changes, complementors responded by reallocating their development resources and adapting their service offerings to the updated regulations and functionalities. A stable and comprehensive API initially enabled third-party innovation, and later enhancements (additional endpoints, data access) enabled more complex solutions from complementors. Conversely, the platform's restrictive policies or design choices sometimes constrained complementors, forcing them to adapt (if feasible) or to develop workarounds and innovative alternatives. The orchestrator's initiatives determine the opportunities and limitations for complementors and influence the services they create, the capabilities they develop, and their overall success or challenges. AlphaPlatform's periodic changes (e.g., formalising API version management, adjusting data sharing terms) prompted complementors to update their software, improve their technical infrastructure, and in some cases adapt their business models, steering the evolution of complementors in a direction determined by the orchestrator's strategy.

Sub question 2 How do the ecosystem complementors' adaptations, innovations, and strategic responses feed back to shape the orchestrator's evolution and platform strategy? The findings show that the actions of complementors provided crucial feedback that served as a guide for the ongoing adjustments to the platform. Complementors were not passive followers; their innovations, challenges and demands prompted AlphaPlatform to learn and adapt. For instance, when multiple complementors independently developed workarounds or requested new features, the orchestrator incorporated those insights into a platform upgrade (e.g., by adding officially supported features that mirrored popular third-party features). When complementors expressed concerns about strict policies or demonstrated unintended uses of the platform, AlphaPlatform often responded by refining its governance, for example, by simplifying certain rules for reliable collaborators or improving support tools, to better accommodate valuable third-party contributions. The market behaviour of complementors (e.g., rapid growth of a complementor or collective resistance to a change) also contributed to a redistribution of power, prompting the orchestrator to establish advisory councils or tiered partnership programmes to formalise complementor input, for example. Essentially, the responses of complementors acted as a selection environment for the platform's tactics: strategies that caused friction between complementors were reconsidered, while strategies

embraced by complementors were reinforced. This mutual influence confirms that the evolution of AlphaPlatform was partly determined by the reactions of complementors, making the platform's trajectory the result of an ongoing dialogue with its ecosystem rather than unilateral planning.

Sub question 3 What outcomes emerge from the dynamic, multi-actor interactions between the orchestrator and complementors in terms of ecosystem alignment, innovation, and resilience? The ongoing orchestrator-complementor interplay produced three notable emergent outcomes at the ecosystem level: alignment, innovation, and resilience. Alignment refers to the degree of strategic and operational fit between the platform and its complementors; the study showed that alignment was not a static end-state but an outcome that had to be continuously re-achieved through adaptation. Periods of misalignment (e.g. when a new platform policy temporarily conflicted with complementors' business models) were followed by corrective interactions, such as policy tweaks or collaborative problem-solving, that restored a better fit. Innovation in the ecosystem was fostered by co-evolutionary interactions: many new features and services arose from iterative feedback and co-creation between AlphaPlatform and complementors. The orchestrator's introduction of new technical possibilities spurred complementors to innovate, and in turn, novel complementor ideas (sometimes originating as unofficial extensions or experimental integrations) fed into the platform's development of new offerings. Resilience was another outcome: the ecosystem developed an improved capacity to absorb and adapt to shocks (such as regulatory changes or competitive threats) because both orchestrator and complementors had learned to adjust quickly and jointly. When external disruptions occurred, prior co-evolutionary experience meant the platform and its complementors could coordinate responses, mitigating negative impacts. These outcomes, alignment, innovation, and resilience emerged from the cumulative cycles of interaction rather than from any single initiative, underscoring that the health of the ecosystem was an evolving property of the co-evolutionary process.

Main Research Question How do the focal platform orchestrator and its ecosystem complementors co-evolve within a digital platform ecosystem? The case findings show that AlphaPlatform and its complementors co-evolve through continuous, reciprocal adaptation. The platform orchestrators' governance initiatives and technical changes (e.g. API updates, policy revisions) spur complementors to adjust their strategies and offerings, while complementor innovations and feedback loop back into the platform's evolution, prompting the orchestrator to recalibrate its approach. This ongoing action reaction cycle , orchestrator introduces change → complementors respond → orchestrator adapts in turn, drives the joint trajectory of the ecosystem. Co-evolution, in this context, is a reciprocal process: the orchestrator modifies the environment to which complementors must adjust, and these adaptations by complementors subsequently affect the orchestrator's subsequent actions. Through these interactions, emergent outcomes such as ecosystem alignment, innovation, and resilience continually unfold rather than being achieved once and for all.

6.2 Theoretical Contributions

Building on the above answers, the research offers four contributions to the literature on digital platform ecosystems and co-evolution. Each contribution is clearly labelled and described below, emphasising how this study builds upon previous research and situates its insights within the relevant academic discussions.

Platform Governance as an Adaptive, Co-Created Process This study contributes to the platform governance literature by reconceptualizing governance not as a static design or one-off "rules of the game," but as an ongoing, co-created process that evolves through orchestrator–complementor interaction. Prior platform governance research has typically emphasized how the platform owner sets rules and interfaces to balance control and openness, for example, deciding how strict versus permissive to be to harness third-party innovation while maintaining quality (cf. Tiwana, 2013; Wareham et al., 2013; Gawer & Cusumano, 2014). This study extends this view by providing empirical evidence that governance mechanisms themselves undergo iterative change via feedback from complementors. In AlphaPlatform's case, policies, standards, and API specifications were continually adjusted in response to complementor behaviour and input, rather than remaining fixed. For example, when an initially strict policy on data usage hindered legitimate additional services, the orchestrator introduced more nuanced, layered rules for data access. Conversely, when overly lax control led to quality issues, the platform tightened certain standards. These adjustments illustrate governance agility, the orchestrator's capability to modify rules and roles as the ecosystem evolves, which goes beyond the static control/openness balance depicted in earlier models. By documenting concrete instances of governance change (such as AlphaPlatform rolling back an unpopular policy after collective complementor feedback, then relaunching a revised version), this study shows how effective governance in ecosystems requires ongoing learning and recalibration. This contribution thus injects a process perspective into platform governance literature: Governance is not a one-time architecture set by the orchestrator alone, but a responsive strategy co-produced with ecosystem participants over time. In summary, the analysis helps explain why some platform ecosystems sustain innovation and complementor loyalty better than others, it may hinge on the orchestrator's adeptness at governing through continuous co-evolution rather than by static decree.

Extending Co-evolutionary Perspectives to Multi-Actor Ecosystems The research enriches co-evolutionary theory in organizational ecosystems by translating its concepts to a multi-actor digital platform context and identifying specific interaction mechanisms. Classic co-evolutionary frameworks (e.g. Lewin & Volberda, 1999; Volberda & Lewin, 2003) describe how organizations and their environment mutually adapt over time, emphasizing non-linearity and feedback. This perspective is extended from a dyadic firm–environment view to the meso-level of a platform ecosystem, where multiple intentional actors (a focal orchestrator and many complementors) co-evolve together. The findings demonstrate that co-evolutionary dynamics operate within an ecosystem of interdependent firms: the orchestrator's strategic moves alter the selection environment for complementors, and complementors' adaptations in turn create pressures and opportunities that the orchestrator must respond to, forming an ongoing cycle. Granularity is added to co-evolutionary scholarship by mapping concrete mechanisms of reciprocal adaptation in this setting. In particular, "boundary-resource tuning" was observed, iterative adjustments to APIs/SDKs and other interface tools based on use and feedback, and "strategic recalibration", the orchestrator altering its strategy or rules in response to complementor innovations or pushback. These mechanisms exemplify how the variation, selection–retention cycle from evolutionary theory (Van de Ven & Garud, 1994) plays out among conscious, strategizing agents on both sides. For example, a typical sequence documented in the case was: the orchestrator introduces a change X (say, a new API or policy) → complementors respond with Y (alterations in their offerings or behaviour) → the orchestrator counters with X_2 (a refined strategy or rule), and so on, a repeating feedback loop consistent with co-evolutionary adaptation. Moreover, the role of external shocks and context is incorporated into the co-evolution model. In line with ecosystem research (Adner, 2017; Jacobides et al., 2018), the case showed that events like regulatory changes or competitor

moves can reset or accelerate the co-evolutionary cycles without fully determining outcomes. For instance, a new regulation prompted AlphaPlatform to change policies and required complementors to adjust, effectively creating a new phase of co-adaptation rather than a purely exogenous result. This suggests that platform co-evolution is nested within broader environmental co-evolution, and robust theories must account for multi-layered interactions. In sum, this research broadens co-evolutionary theory by showing it can accommodate heterogeneous, networked actors (one orchestrator, many diverse complementors) instead of just two entities. The multi-actor perspective offered by the "double-loop" framework pushes co-evolutionary research toward greater realism: ecosystem evolution is depicted as a web of interdependent feedback loops rather than a simple firm - environment dyad. This contribution calls for future theoretical models to move beyond dyadic narratives and consider the complexity of co-evolution in networks of organizations.

Boundary Resources as Dynamic, Mutually Shaped Artifacts This study contributes to the boundary resources literature (APIs, SDKs, and other platform tools) by revealing how these resources evolve through orchestrator-complementor interaction, highlighting a mutual shaping process. Traditional views, such as the boundary resources model of Ghazawneh and Henfridsson (2013), conceptualise APIs and related tools as mechanisms for the platform owner to provide functionality and impose control on third-party development. Prior work has stressed the delicate balance these resources must strike, empowering complementors to innovate, yet constraining them to protect platform integrity. The theory is extended by showing that boundary resources are not static design artifacts, but dynamic objects of co-evolution that change over time with use. In the AlphaPlatform case, for example, the core API underwent continuous "distributed tuning" (Eaton et al., 2015) as a result of interactions: the orchestrator initially defined the API's scope and rules, but as complementors experimented and found limitations, their creative uses and requests fed back into subsequent API versions. One complementor workaround for a missing feature eventually led the platform to officially support that capability in a new release. Similarly, instances of misuse or instability prompted the orchestrator to modify API policies (e.g. adding authentication requirements or rate-limit changes). This evidence supports a key insight: platform technologies are shaped by how complementors use them, echoing Orlikowski's (2000) notion of technology-in-practice, but at the ecosystem level. Complementor innovations were observed to influence the trajectory of boundary resources, not just the other way around. This adds an evolutionary, bidirectional dimension to Ghazawneh & Henfridsson's model of "provisioning" and "gatekeeping" by the platform: the findings suggest a third element, iterative reconfiguration, wherein the platform owner learns and adjusts the boundary resources based on complementor input. Concrete mechanisms illustrated in the case include developer feedback forums and beta programs through which complementors suggested improvements, and the platform's adoption of popular third-party extensions into the official toolkit. By capturing how APIs and tools changed in tandem with ecosystem activity, this contribution broadens the predominantly static view of boundary resources into a process view. It ties into broader debates on platform generativity vs. control, providing empirical evidence that one-way platforms resolve this tension is by gradually opening or tightening their interfaces in response to developer behaviours. In summary, a nuanced understanding is contributed that boundary resources are "living" artefacts: they continuously evolve as a result of the push and pull between orchestrator governance and complementor creativity. This insight encourages scholars to examine the temporal evolution of platform interfaces (not just their design at a single point), and it complements existing literature by emphasizing the co-creative dance at the platform's technical boundary.

Ecosystem Alignment as an Emergent, Ongoing Process This research adds to the ecosystem strategy literature (particularly the concept of ecosystem alignment) by reframing alignment as an ongoing, dynamic process rather than a one-time structural achievement. In ecosystem research, alignment is often defined structurally: it denotes a configuration where participants' roles and activities fit together so the ecosystem's value proposition is realized (Adner, 2017). Adner's work, for instance, talks about an "alignment structure" that must be in place for the ecosystem to deliver its intended value. The findings complement this view by showing that in practice alignment is not a binary state (aligned vs. misaligned) achieved once, but a continuous variable that fluctuates and must be actively managed over time. In the AlphaPlatform ecosystem, case evidence revealed episodes where alignment eroded, for example, when the platform introduced a feature that competed with a complementor's offering or when a policy change upset the complementors' economic incentives. These misalignments were not permanent: through subsequent adjustments (e.g. the orchestrator engaging in dialogue, adjusting the policy, or offering compensations; complementors refining their strategies), a new alignment was attained or restored. This cyclical pattern indicates that alignment emerges from iterative interactions, it is fragile and can degrade with each new change, requiring further action to re-align. Alignment is explicitly incorporated as an endogenous outcome of the co-evolutionary model (see Chapter 5), in line with the idea that alignment, like innovation and resilience, is an emergent property of ecosystem processes.

The contribution to theory here is twofold. First, this study adds a temporal, process dimension to the concept of alignment. Whereas existing frameworks (e.g. Adner's) provide a snapshot of who needs to be aligned and how, the present study asks how alignment is achieved and maintained (or lost) over time. Mechanisms such as feedback loops, joint problem-solving, and iterative governance adjustments were found to be crucial to maintaining alignment in the case , for instance, complementor dissatisfaction over a policy was addressed through discussions and policy tweaks, which realigned interests. This implies alignment is not self-sustaining; without continual effort ("alignment work" by the orchestrator and key complementors), alignment can drift as the ecosystem evolves. Second, the notion of alignment is broadened to be multi-dimensional. It is not just about strategic agreement on roles (the focus of structural definitions), but also about operational alignment (technical compatibility, synchronized updates, data-sharing practices) and relational alignment (trust, fair value distribution, mutual understanding). The case revealed that even when strategic goals were shared, misalignments could occur on the operational level (e.g., integration breakdowns due to unsynchronized changes) or relational level (e.g., erosion of trust due to perceived inequities), each of which required management action to fix. Thus, this research contributes the insight that ecosystem alignment is multi-faceted and that sustaining it is an active management task, not a one-off design exercise. By viewing alignment through a co-evolutionary lens, it is shown to be a "moving target", the health of an ecosystem lies in the ability to repeatedly realign as conditions change. This enriches ecosystem theory by urging a shift from static alignment blueprints to a more dynamic perspective wherein the orchestrator's role includes continually orchestrating alignment amidst ongoing evolution.

6.3 Managerial Implications

Beyond theoretical insights, the findings carry concrete implications for practitioners in platform ecosystems. We outline separate recommendations for platform orchestrators (the focal platform firms) and complementors (third-party developers, service providers, etc.), reflecting the co-evolutionary perspective that both sides can take actions to improve joint outcomes. These implications are actionable guidelines derived from our case analysis, aimed at helping ecosystem actors foster alignment, innovation, and resilience through their strategic and operational choices.

Implications for Platform Orchestrators
Institutionalize Two-Way Feedback Mechanisms Orchestrators should set up formal and informal channels to listen and respond to complementor input. Consistent engagement through developer forums, complementor advisory councils, surveys, and beta testing programs allows for the early recognition of complementor concerns and ideas. AlphaPlatform benefited from engaging with A tiered complementors in feedback loops for example, involving them in beta releases helped detect issues and opportunities promptly. Platform leaders should make it routine to gather ecosystem feedback and incorporate it into decision-making, rather than relying only on internal viewpoints. Proactively gathering input on areas of concern (e.g. problematic policies or needed features) and showing willingness to adjust builds complementor trust and leads to more relevant platform improvements.

Embrace Governance Agility Governance Agility means being able to change rules, contracts, and resource access as the ecosystem grows and changes. Instead of treating governance policies as set in stone, orchestrators should embrace governance agility. This might involve implementing tiered or adaptive policies (e.g.more relaxed API usage limits for verified complementors, as AlphaPlatform did) and periodically revisiting platform terms to ensure they remain conducive to innovation and fair play. It also means being prepared to rollback or modify decisions that prove counterproductive. Internally, platform managers should conduct regular ecosystem "health checks" to identify emerging misalignments or frictions (technical, economic, or relational) and address them through updated governance. By staying adaptable, such as piloting a change with a small group before expanding it if successful, orchestrators can prevent stagnation and ensure the ecosystem remains responsive. The main shift is moving away from a one-sided approach of simply announcing and enforcing regulations, towards a more conversational and collaborative framework where regulations evolve through interaction with complementors.

Coordinate Cross-Functionally to respond coherently The case underscored that an orchestrator's ability to adapt depends on internal coordination. Therefore, platform firms should break down silos between technical, business, and legal teams involved in ecosystem management. For example, when adjusting an API policy, the technical developers, complementor managers, and compliance officers should work in concert so that changes are communicated clearly and implemented smoothly. AlphaPlatform improved its responsiveness by creating dedicated complementor support roles and interdepartmental routines, other orchestrators can similarly invest in internal processes that enable quick, consistent reactions to complementor needs (e.g. a cross-functional "ecosystem taskforce" to handle major complementor issues or inquiries). Well-coordinated internal responses prevent mixed signals and delays, thereby sustaining complementor confidence. In essence, treat ecosystem management as a company-wide responsibility, not just the remit of a single department.

Cultivate a Trust-Based Complementor Relationship Effective co-evolution requires trust and transparency. Orchestrators should manage key complementors almost as extensions of their team, sharing roadmaps, co-developing solutions, and maintaining open communication. For instance, involve select complementors in early-stage projects (joint pilots) so both sides can learn together. AlphaPlatform's collaborative pilot initiatives (e.g. testing new AI features with chosen complementors) showed that tapping complementor expertise can accelerate innovation and also signal to complementors that the platform is invested in their success. Additionally, be transparent about upcoming changes (no surprise sudden API deprecations without warning) and fair in policy enforcement. Trust is built when orchestrators provide consistent, equitable opportunities (e.g. not favouring an in-house app over third-party equivalents unfairly, or if they must, explaining the rationale and exploring win-win avenues). Ultimately, platform leaders who embrace an ecosystem mindset, recognizing that "*the platform succeeds when partners succeed*", will make decisions that foster long-term mutualism rather than short-term extraction. This might include, for example, refraining from cloning a complementor's product without discussion, or offering transition support when platform changes disrupt a complementor. Such practices strengthen the ecosystem's capacity to co-evolve constructively, as complementors will be more willing to invest and adapt knowing the orchestrator is a trustworthy collaborator.

Implications for Complementors

Investing in dynamic capabilities and agility Complementors ought to see co-evolution as a necessary approach to remain adaptable and consistently enhance their skills. Given that changes in platforms are a natural part of the landscape, those complementors who thrive are often the ones who can adapt quickly and acquire new knowledge efficiently. This involves a commitment to building robust technical teams and processes. It is essential that developers possess the necessary skills in the platform's technologies, enabling them to seamlessly integrate new APIs or adapt to policy changes with minimal delay. Adopting agile development methodologies, continuous integration, and ongoing training will help the firm respond quickly to updates. It's equally important to build organizational agility, for instance, having contingency plans or flexible business models that can accommodate shifts in platform strategy. The complementors that succeeded in our scenario were those who were able to adapt their service or pricing models in response to changes in platform rules more quickly than their less agile competitors. Treat major platform changes as opportunities each adjustment by the orchestrator (a new feature, a new fee structure, etc.) can be a chance to innovate new offerings or improve efficiency. By cultivating a culture of continuous learning and keeping a "pulse" on platform developments (e.g. following platform developer blogs, attending ecosystem events), complementors can turn potential disruptions into advantages.

Engage Proactively with the Platform Rather than remaining a passive user of the platform, complementors should actively engage and shape the co-evolution process. This means taking initiative to participate in any collaborative programs the orchestrator offers, such as beta tests, advisory boards, hackathons, or pilot projects. Engaging early allows complementors to have a say in the process by sharing their feedback and ideas prior to finalising changes, they can guide the platform's direction in ways that benefit both the ecosystem and their own interests. AlphaPlatform's complementors who joined advisory councils or volunteered for new feature pilots often saw their feedback result in platform improvements, effectively co-creating value. Even without formal programs in place, complementors can foster open communication by regularly sharing user feedback with the orchestrator, reporting issues along with suggestions for solutions, and showcasing their innovative thinking within the community. The implication is to position oneself as a valuable collaborator to the orchestrator. Over time, this can lead to

a reputational status where the orchestrator consults you on upcoming decisions (some AlphaPlatform complementors achieved such a position of influence). Proactive engagement not only helps shape the platform in a beneficial way, it also keeps the complementor informed of where the platform is headed, reducing uncertainty.

Manage Dependency and Mitigate Risk Strategically Complementors inevitably depend on the platform, but they can take strategic steps to balance and leverage this dependency. One approach is specialization, develop a niche expertise or unique value-add tightly connected to the platform's technology or user base, making the complementor indispensable or highly valued. By aligning deeply with the platform's core needs (for example, becoming the top provider of an analytics tool that most of the platform's customers use), a complementor can gain negotiating power and security, as the orchestrator will be less likely to alienate or replace them. Another approach is diversification or multi-homing, engaging with multiple platforms or markets to avoid over-reliance on a single ecosystem. Multi-homing (participating in more than one platform ecosystem) can cushion against one platform's adverse changes and even provide cross-learning opportunities (several AlphaPlatform complementors operated on other platforms too, bringing back best practices and competitive insights). However, multi-homing comes with added complexity and cost, so complementors should weigh it against their resources and strategic fit. At minimum, all complementors should monitor the platform's moves closely (e.g. if the orchestrator starts introducing native features like your service, that's a signal to differentiate or adjust). They should also cultivate options: for instance, if a policy change threatens their model, have a plan, whether it's lobbying collectively (as some did in the case), adjusting the business model, or shifting focus to a different customer segment. By being strategic about dependency, complementors turn co-evolution into a more symmetric game: leveraging the platform's growth when possible but also preparing for and offsetting the inherent power imbalance.

Fostering Trust and Communication in the Partnership Just as orchestrators should build trust, complementors too benefit from relationship management. This requires them to maintain professionalism and openness in their interactions with the platform. They provide honest yet constructive feedback; if a platform action is hurting their business, they communicate it tactfully with evidence and potential solutions. Additionally, it is important for complementors to align with the goals of the orchestrator. Gaining insight into what the platform aims to accomplish, such as entering a new market or enhancing user experience, assists them in positioning their product as an integral part of that vision. By understanding the platform's viewpoint and striving for mutually beneficial results, complementors are able to establish more robust connections. Additionally, they adhere to the platform's guidelines and commitments; their reliability and compliance earn goodwill, while constant rule-bending or surprises (like causing security issues) would erode trust. In the AlphaPlatform ecosystem, complementors who consistently delivered quality and respected policies often gained early access to opportunities. They treat the orchestrator almost like a key account or complementor, scheduling periodic check-ins with complementor managers, sharing their roadmap where appropriate, and celebrating joint successes (case studies, testimonials). By establishing a trusting relationship, complementors increase the likelihood of receiving support or flexibility when necessary, allowing them to become an integral part of the orchestrator's extended team rather than merely being viewed as another vendor. In the long run, this collaborative stance helps both sides navigate changes more effectively, echoing the mindset that "we rise and fall together" in the ecosystem.

By following these implications, platform orchestrators can lead with agility and openness, continuously aligning the ecosystem through adaptation and complementor engagement; meanwhile, complementors can move with agility and foresight, aligning with platform evolution while safeguarding their own value. Together, these practices turn the abstract idea of co-evolution into concrete managerial action, enabling all parties to harness their interdependence for mutual growth and innovation in the platform ecosystem.

6.4 Limitations

This research offers valuable insights; however, it is crucial to recognise its limitations to ensure balanced interpretations and to inform the appropriate use of the findings:

The study begins by utilising a single-case, retrospective design, concentrating on a particular platform, referred to as "AlphaPlatform," within the context of a well-established B2C online marketplace, along with a chosen group of its complementors. This in-depth approach provides a comprehensive understanding of processes, yet it naturally restricts the ability to generalise findings to broader contexts. The co-evolutionary patterns we see are certainly illustrative, but they may not be applicable to every platform or industry out there. A newly emerging social media platform or an enterprise software ecosystem may display distinct dynamics compared to the more established commerce platform that was analysed. The goal in this context is to achieve analytic generalisation instead of statistical generalisation. The findings provide theoretical insights and propositions that could be applicable to similar situations; however, it is important to explore additional cases to assess the extent of their applicability. It is important for both scholars and practitioners to exercise caution when applying conclusions to significantly different ecosystems without further investigation (Yin, 2014; Eisenhardt, 1989). Second, there is a retrospective bias in the data, as much evidence comes from interviews and archival documents reflecting on past events. Human recall is fallible, interviewees may emphasize or misremember certain events in hindsight (Patton, 2015). We mitigated this by triangulating multiple sources and cross-validating timelines, but we acknowledge that some subtle interactions or failed experiments might have gone unreported. Moreover, the evolution we documented is essentially a slice of an ongoing process, the endpoint of data collection was arbitrary relative to the continuous evolution of the ecosystem. Dynamics may have shifted even further after our study period. In other words, our conclusions are contingent on the time frame captured; different phases of the platform's life (e.g. its early emergence or a potential future decline) might reveal different co-evolutionary patterns. The results should thus be interpreted with the understanding that they describe a particular period in the platform's history.

Third, the scope of actors and interactions examined was limited. We focused primarily on orchestrator–complementor interactions. While we did include a diverse set of complementors (inner-core developers, peripheral complementors, agencies), we inevitably did not capture every type of actor, for instance, very small-scale developers or ones who exited the ecosystem early were not directly represented. These "missing voices" might offer insight into potential failure modes or the dark side of co-evolution (e.g. cases where adaptation was not successful, or where orchestrator actions drove complementors away). In addition, interactions among complementors (complementor–complementor competition or collaboration) were not a focal point of our analysis, yet such interactions can also shape ecosystem evolution (for example, rivalries between complementors might spur innovation or influence the orchestrator's decisions (cf. Jacobides et al., 2018). Future work could explore these dimensions. Our

concentrated scope means the findings emphasize the orchestrator–complementor co-evolution engine, potentially underplaying other ecosystem dynamics.

Fourth, certain methodological limitations accompany our qualitative, process-tracing approach. The analysis involved interpretive coding and narrative building (following Gioia methodology and temporal bracketing), which rely on researcher judgment. Although we took steps to ensure rigor, such as using multiple coders, maintaining an audit trail, and iteratively validating our interpretation against data, another researcher might interpret some events differently. Also, establishing causality in co-evolution is inherently challenging: changes influence each other in circular ways, defying simple cause–effect attribution. We identified plausible causal sequences (mechanisms) from qualitative evidence, but we cannot claim definitive proof of causality; the explanation remains an informed interpretation, consistent with theory but not verified by experimental control. This is a common limitation in inductive case research (Langley, 1999), and readers should view the process model as a theoretical synthesis of observed patterns rather than a tested causal model.

Finally, it's worth noting the contextual constraints of the study. AlphaPlatform operates in a European regulatory environment and was subject to specific EU regulations on data privacy and platform fairness during the study (e.g., EU Regulation 2019/1150). These external conditions influenced some co-evolutionary responses we observed (for instance, stricter data policies and the resulting complementor adaptations). Platforms in other regions, or under different regulatory regimes, may experience other pressures. Likewise, AlphaPlatform's position as a market leader in its domain likely affected its behaviour, a smaller or late-entering platform might pursue different strategies (such as more openness or aggressive incentivization of complementors) to grow the ecosystem (cf. Adner, 2017). Thus, our findings are bounded by the studied context of a mature, leading platform in a regulated market. Generalization to, say, unregulated or emerging markets should be done carefully.

In summary, these limitations do not diminish the value of the insights but delineate where and how they should be applied. The goal of this research was to develop understanding (analytic generalization) rather than broad empirical generalization. By clarifying the study's design boundaries, single case, retrospective data, focal scope, and context, we provide a foundation for others to extend, test, or refine the co-evolutionary framework in different settings. A cautious approach is encouraged: use the insights as hypotheses or guiding propositions for further investigation, not as one-size-fits-all truths for all platform ecosystems.

6.5 Future Research Directions

Building on the findings of this study and the above limitations, several promising avenues for future research on platform ecosystems and co-evolution can be identified. The proposed directions each centre on a particular mechanism or aspect emphasised by this study, offering suggestions for how researchers could explore these areas further, such as through comparative case studies, longitudinal designs, or quantitative analysis.

Exploring Governance Agility Cadence Future research could investigate the frequency and specific triggers that lead orchestrators to modify their governance structures, including rules, policies, and interface changes, over time, as well as the resulting impacts of these adjustments. A comparative longitudinal study across various platforms could examine the frequency of governance changes, such as significant API revisions each year, and connect these changes to outcomes within the ecosystem, including the rate of innovation or the retention of

complementors. This would broaden the concept of governance agility explored in this study by examining whether more agile governance, characterised by regular iterative adjustments, is associated with healthier ecosystems. Scholars might also explore the organizational enablers of governance agility (e.g. does having a dedicated ecosystem team make a platform more responsive?). Cross-case comparisons, say, a platform known for rapid policy iteration vs. one with infrequent changes, could yield insights into the optimal balance between stability and flexibility in governance.

Boundary-Resource Versioning and Evolution Another direction is to delve deeper into how boundary resources (APIs, SDKs) evolve over successive versions and how complementors adapt to or even drive those changes. Scholars might conduct detailed case studies examining the evolution histories of specific APIs, potentially utilising archival version logs and discussions from developer forums. Another option is to employ a quantitative approach that examines data from platform developer portals. This could involve measuring how quickly new API versions are adopted and the duration before older versions are phased out across different ecosystems. Key questions include: What patterns do we see in platforms' versioning strategies (e.g. annual big releases vs. continuous updates)? How do these patterns impact complementor innovation, do frequent small updates keep developers engaged or overwhelm them? What are the specific conditions under which complementor inputs, such as feature requests and workarounds, have a notable impact on the development of the next version of a boundary resource? Addressing these questions would enhance our understanding of boundary-resource co-evolution as highlighted in this study and could provide valuable insights for effectively managing technical interfaces within ecosystems.

Complementor Capability Trajectories This study observed complementors developing capabilities over time to keep up with the platform. Future research could systematically study the capability trajectories of complementors in evolving ecosystems. Longitudinal studies tracking new complementors from their entry into an ecosystem through several years could reveal typical patterns of growth, learning, and possible stagnation or exit. Do successful complementors follow a common trajectory (e.g. start with a niche feature, then broaden offerings, build organizational processes, etc.)? How do their prior experiences or resource endowments affect their ability to adapt as the platform changes? A comparative case design might look at multiple complementors within the same ecosystem or analogous complementors across different ecosystems (for instance, compare how third-party developers on two different platform marketplaces build technical and business capabilities over time). Such research could draw on dynamic capabilities theory to analyze what internal investments (training, infrastructure, partnerships) enable some complementors to continuously thrive amid platform evolution while others fall behind. Understanding these trajectories would not only validate and refine the insights of this study about complementor agility, but also provide practical guidance for new complementors on how to develop in tandem with a platform.

Alignment and Misalignment Episodes Given this study's reframing of alignment as ongoing, researchers could investigate specific episodes of alignment achievement or breakdown in ecosystems. This would involve identifying moments in a platform's history where alignment was notably gained or lost, for example, a major conflict that arose between the orchestrator and complementors (misalignment) and how it was resolved (realignment). Using a process tracing or even an event-history analysis, one could examine factors like: What precipitated the misalignment (a sudden policy change? an external shock? a power shift)? Which mechanisms were employed to realign (negotiation, compensation, technology adjustments)? And were there cases where misalignment was not effectively resolved, leading to lasting ecosystem harm

(e.g. significant complementor exodus)? Studies might use multiple cases of such episodes across different ecosystems to develop a typology of alignment-restoring practices. Another angle is to survey or interview ecosystem participants about perceived alignment over time, quantifying how aligned they feel with the platform's strategy at different intervals. The goal would be to move beyond static analysis and really unpack the dynamics of alignment, furthering this study's contribution that alignment is a continuous process.

Ecosystem Response to External Shocks This research hints at how external shocks (regulatory changes, new competitors, macroeconomic events) trigger co-evolutionary responses. Future research can take a comparative event study approach, examining how different platform ecosystems respond to the same type of shock. For example, if a certain regulation (like a new data privacy law) impacts multiple platforms, one could compare Platform A's co-evolutionary response (and its outcomes) with Platform B's. Did the orchestrators react differently (one might collaborate with complementors to adjust, another might unilaterally impose changes)? How did complementors in each ecosystem cope or participate in the response? Over time, which ecosystem showed more resilience or innovative adaptation as a result? Such comparative research could leverage interviews and archival data around the time of the shock, or even utilize performance metrics (number of active apps, user growth) pre- and post-shock. Another fruitful angle is examining multi-platform complementors during shocks, complementors who operate on several platforms, to see if they transfer adaptive knowledge from one ecosystem to another (as some AlphaPlatform multi-homers did, bringing in external best practices). Studying responses to shocks would extend the insights on resilience developed here and demonstrate how co-evolutionary capacity can buffer ecosystems against turbulence. It also has practical import: as digital ecosystems face more external scrutiny and disruption, understanding what strategies foster coordinated, effective adaptation becomes critical.

Through these avenues (and others), future research can build a more comprehensive and comparative understanding of co-evolution in platform ecosystems. By focusing on the mechanisms and contexts highlighted here, governance agility, boundary resource evolution, complementor development, alignment work, and external shocks, scholars will be able to test the transferability of the findings reported in this study, address open questions (like the role of power and multiple platforms), and inform the next generation of ecosystem management practices.

6.6 RQ Answer Matrix

To synthesize the findings, Table 6.1 maps each research question (RQ) and sub-question (SQ) to a brief answer based on this study's results:

Research Question	Synthesized Answer
Main RQ: How do the orchestrator and complementors co-evolve in a digital platform ecosystem?	Through a continuous cycle of reciprocal adaptation. The platform orchestrator's changes (in governance, technology, etc.) trigger complementors to adjust their strategies and offerings; in turn, complementor responses (innovations, feedback, pushback) lead the orchestrator to further refine its approach. This ongoing action–reaction process co-produces emergent outcomes (e.g. increasing alignment of goals, new innovations, and greater resilience to shocks) that define the ecosystem's evolutionary trajectory.
SQ1: How do the orchestrator's initiatives influence complementors?	Primarily by shaping the opportunity and constraint space for complementors. Orchestrator initiatives – such as new APIs, policy changes, or program incentives – set requirements or possibilities that complementors must respond to. In our case, platform changes led complementors to modify their technical integrations, develop new capabilities, or in some cases alter business models. Essentially, the orchestrator's moves steer complementor behavior, encouraging certain kinds of innovation and investment while discouraging or rendering others obsolete.
SQ2: How do complementors' responses feed back into the platform's evolution?	Complementor actions fed into the platform's decision-making through feedback loops. For example, collective requests and creative workarounds by complementors signaled needs that prompted the orchestrator to update features and relax certain rules. Likewise, when complementors resisted or struggled with a change, the platform often learned from that and adjusted its strategy. Thus, complementors' successes, challenges, and adaptations became input for the orchestrator, influencing subsequent platform designs, governance adjustments, and resource allocations.
SQ3: What outcomes emerge from these reciprocal interactions?	Three key emergent outcomes were observed: (1) Alignment – a better fitting integration of complementor offerings with the platform's goals and processes, continually achieved through iterative adjustments rather than once-off. (2) Innovation, ongoing co-creation of new value (features, services) stimulated by the interplay of platform capabilities and complementor ideas. (3) Resilience, an increased capacity of the ecosystem to absorb and adapt to external shocks (like regulatory changes or competitor moves), stemming from the adaptive routines developed via co-evolution. These outcomes were not directly designed but arose from the cumulative interaction cycles between the platform and its complementors.

Table 6.1: Research Questions and Answers Summary

Closing Remark. Taken together, the directions above demonstrate that co-evolution in digital platform ecosystems remains a fertile research domain. Building on this study's foundation, future theoretical refinements, methodological innovations, and contextual explorations can further clarify how orchestrators and complementors adapt in tandem over time. The overarching ambition is to deepen our understanding of how digital platform ecosystems evolve through connection, how APIs and broader boundary-resource design shape the surrounding digital ecology, in order to foster sustainable innovation and long-term ecosystem value creation in the digital age.

References

Adner, R. (2017). Ecosystem as Structure: An Actionable Construct for Strategy. *Journal of Management*, *43*(1), 39–58. https://doi.org/10.1177/0149206316678451

Adner, R., & Kapoor, R. (2010). Value creation in innovation ecosystems: How the structure of technological interdependence affects firm performance in new technology generations. *Strategic Management Journal*, *31*(3), 306–333. https://doi.org/10.1002/smj.821

Autio, E. (2022). Orchestrating ecosystems: A multi-layered framework. *Innovation*, *24*(1), 96–109. https://doi.org/10.1080/14479338.2021.1919120

Autio, E., & Thomas, L. D. W. (2022). Researching ecosystems in innovation contexts. *Innovation & Management Review*, *19*(1), 12–25. https://doi.org/10.1108/INMR-08-2021-0151

Basole, R. C. (2009). Visualization of Interfirm Relations in a Converging Mobile Ecosystem. *Journal of Information Technology*, *24*(2), 144–159. https://doi.org/10.1057/jit.2008.34

Beach, D., & Pedersen, R. (2019). *Process-Tracing Methods: Foundations and Guidelines*. University of Michigan Press. https://doi.org/10.3998/mpub.10072208

Berger, P. L., & Luckmann, T. (2011). *The social construction of reality: A treatise in the sociology of knowledge*. Open Road Media Integrated Media.

Brandenburger, A. (with Nalebuff, B.). (1996). *Co-Opetition*. Crown/Archetype.

Ceccagnoli, M., Forman, C., Huang, P., & Wu, D. J. (2012). Cocreation of Value in a Platform Ecosystem: The Case of Enterprise Software1. *MIS Quarterly*, *36*(1), 263–290. https://doi.org/10.2307/41410417

Cennamo, C. (2018). Building the Value of Next-Generation Platforms: The Paradox of Diminishing Returns. *Journal of Management*, *44*(8), 3038–3069. https://doi.org/10.1177/0149206316658350

Cennamo, C. (2021). Competing in Digital Markets: A Platform-Based Perspective. *Academy of Management Perspectives*, *35*(2), 265–291. https://doi.org/10.5465/amp.2016.0048

Cennamo, C., & Santaló, J. (2019). Generativity Tension and Value Creation in Platform Ecosystems. *Organization Science*, *30*(3), 617–641. https://doi.org/10.1287/orsc.2018.1270

Chertow, M. R. (2007). "Uncovering" Industrial Symbiosis. *Journal of Industrial Ecology*, *11*(1), 11–30. https://doi.org/10.1162/jiec.2007.1110

Clarysse, B., Wright, M., Bruneel, J., & Mahajan, A. (2014). Creating value in ecosystems: Crossing the chasm between knowledge and business ecosystems. *Research Policy*, *43*(7), 1164–1176. https://doi.org/10.1016/j.respol.2014.04.014

Corbin, J. M., Strauss, A. L., & Strauss, A. L. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (3rd ed). Sage Publications, Inc.

Corley, K. G., & Gioia, D. A. (2011). Building Theory about Theory Building: What Constitutes a Theoretical Contribution? *Academy of Management Review*, *36*(1), 12–32. https://doi.org/10.5465/amr.2009.0486

De Reuver, M., Sørensen, C., & Basole, R. C. (2018). The Digital Platform: A Research Agenda. *Journal of Information Technology*, *33*(2), 124–135. https://doi.org/10.1057/s41265-016-0033-3

Denzin, N. K. (2017). *The Research Act: A Theoretical Introduction to Sociological Methods* (1st edn). Routledge. https://doi.org/10.4324/9781315134543

Eaton, B., Elaluf-Calderwood, S., Sørensen, C., & Yoo, Y. (2015). Distributed Tuning of Boundary Resources: The Case of Apple's iOS Service System1. *MIS Quarterly*, *39*(1), 217–243. https://doi.org/10.25300/MISQ/2015/39.1.10

Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *The Academy of Management Review*, *14*(4), 532. https://doi.org/10.2307/258557

Francis, J. J., Johnston, M., Robertson, C., Glidewell, L., Entwistle, V., Eccles, M. P., & Grimshaw, J. M. (2010). What is an adequate sample size? Operationalising data saturation for theory-

based interview studies. *Psychology & Health*, *25*(10), 1229–1245. https://doi.org/10.1080/08870440903194015

Frosch, R. A., & Gallopoulos, N. E. (1989). Strategies for Manufacturing. *Scientific American*, *261*(3), 144–152. https://doi.org/10.1038/scientificamerican0989-144

Fusch, P., & Ness, L. (2015). Are We There Yet? Data Saturation in Qualitative Research. *The Qualitative Report*. https://doi.org/10.46743/2160-3715/2015.2281

Gawer, A. (2014). Bridging differing perspectives on technological platforms: Toward an integrative framework. *Research Policy*, *43*(7), 1239–1249. https://doi.org/10.1016/j.respol.2014.03.006

Gawer, A., & Cusumano, M. A. (2014). Industry Platforms and Ecosystem Innovation. *Journal of Product Innovation Management*, *31*(3), 417–433. https://doi.org/10.1111/jpim.12105

Geertz, C. (1973). *The interpretation of cultures: Selected essays*. Basic Books.

Ghazawneh, A., & Henfridsson, O. (2013). Balancing platform control and external contribution in third-party development: The boundary resources model. *Information Systems Journal*, *23*(2), 173–192. https://doi.org/10.1111/j.1365-2575.2012.00406.x

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology. *Organizational Research Methods*, *16*(1), 15–31. https://doi.org/10.1177/1094428112452151

Glaser, B. G., & Strauss, A. L. (2017). *The Discovery of Grounded Theory: Strategies for Qualitative Research* (1st edn). Routledge. https://doi.org/10.4324/9780203793206

Granstrand, O., & Holgersson, M. (2020). Innovation ecosystems: A conceptual review and a new definition. *Technovation*, *90–91*, 102098. https://doi.org/10.1016/j.technovation.2019.102098

Guest, G., Bunce, A., & Johnson, L. (2006). How Many Interviews Are Enough?: An Experiment with Data Saturation and Variability. *Field Methods*, *18*(1), 59–82. https://doi.org/10.1177/1525822X05279903

Guest, G., Namey, E., & Chen, M. (2020). A simple method to assess and report thematic saturation in qualitative research. *PLOS ONE*, *15*(5), e0232076. https://doi.org/10.1371/journal.pone.0232076

Hein, A., Schreieck, M., Riasanow, T., Setzke, D. S., Wiesche, M., Böhm, M., & Krcmar, H. (2020). Digital platform ecosystems. *Electronic Markets*, *30*(1), 87–98. https://doi.org/10.1007/s12525-019-00377-4

Hollands, R. G. (2008). Will the real smart city please stand up?: Intelligent, progressive or entrepreneurial? *City*, *12*(3), 303–320. https://doi.org/10.1080/13604810802479126

Iansiti, M., & Levien, R. (2004). *The keystone advantage: What the new dynamics of business ecosystems mean for strategy, innovation, and sustainability*. Harvard Business School Press.

Jacobides, M. G., Cennamo, C., & Gawer, A. (2018). Towards a theory of ecosystems. *Strategic Management Journal*, *39*(8), 2255–2276. https://doi.org/10.1002/smj.2904

Katz, M. L., & Shapiro, C. (1986). Technology Adoption in the Presence of Network Externalities. *Journal of Political Economy*, *94*(4), 822–841. https://doi.org/10.1086/261409

Kretschmer, T., Leiponen, A., Schilling, M., & Vasudeva, G. (2022). Platform ecosystems as meta-organizations: Implications for platform strategies. *Strategic Management Journal*, *43*(3), 405–424. https://doi.org/10.1002/smj.3250

Langley, A. (1999). Strategies for Theorizing from Process Data. *The Academy of Management Review*, *24*(4), 691. https://doi.org/10.2307/259349

Lewin, A. Y., & Volberda, H. W. (1999). Prolegomena on Coevolution: A Framework for Research on Strategy and New Organizational Forms. *Organization Science*, *10*(5), 519–534. https://doi.org/10.1287/orsc.10.5.519

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage Publications.

Lusch, R. F., & Nambisan, S. (2015). Service Innovation: A Service-Dominant Logic Perspective1. *MIS Quarterly*, *39*(1), 155–175. https://doi.org/10.25300/MISQ/2015/39.1.07

McIntyre, D. P., & Srinivasan, A. (2017). Networks, platforms, and strategy: Emerging views and next steps. *Strategic Management Journal*, *38*(1), 141–160. https://doi.org/10.1002/smj.2596

Merriam, S. B., & Merriam, S. B. (1998). *Qualitative research and case study applications in education* (2nd ed). Jossey-Bass Publishers.

Moore, J. (1993). Predators and Prey: A New Ecology of Competition. *Harvard Business Review*, *71*, 75–86.

Nam, T., & Pardo, T. A. (2011). Smart city as urban innovation: Focusing on management, policy, and context. *Proceedings of the 5th International Conference on Theory and Practice of Electronic Governance*, 185–194. https://doi.org/10.1145/2072069.2072100

Nambisan, S., & Sawhney, M. (2011). Orchestration Processes in Network-Centric Innovation: Evidence From the Field. *Academy of Management Perspectives*, *25*(3), 40–57. https://doi.org/10.5465/amp.25.3.zol40

Orlikowski, W. J. (2000). Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations. *Organization Science*, *11*(4), 404–428. https://doi.org/10.1287/orsc.11.4.404.14600

Parker, G., Van Alstyne, M. W., & Jiang, X. (2016). Platform Ecosystems: How Developers Invert the Firm. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2861574

Patton, M. Q. (2015). *Qualitative research & evaluation methods: Integrating theory and practice* (Fourth edition). SAGE Publications, Inc.

Platform Ecosystems. (2014). Elsevier. https://doi.org/10.1016/C2012-0-06625-2

Rietveld, J., & Schilling, M. A. (2021). Platform Competition: A Systematic and Interdisciplinary Review of the Literature. *Journal of Management*, *47*(6), 1528–1563. https://doi.org/10.1177/0149206320969791

Rietveld, J., Schilling, M. A., & Bellavitis, C. (2019). Platform Strategy: Managing Ecosystem Value Through Selective Promotion of Complements. *Organization Science*, *30*(6), 1232–1251. https://doi.org/10.1287/orsc.2019.1290

Ring, P. S., & Van De Ven, A. H. (1994). Developmental Processes of Cooperative Interorganizational Relationships. *The Academy of Management Review*, *19*(1), 90. https://doi.org/10.2307/258836

Rochet, J.-C., & Tirole, J. (2003). Platform Competition in Two-Sided Markets. *Journal of the European Economic Association*, *1*(4), 990–1029. https://doi.org/10.1162/154247603322493212

Rong, K., Hu, G., Lin, Y., Shi, Y., & Guo, L. (2015). Understanding business ecosystem using a 6C framework in Internet-of-Things-based sectors. *International Journal of Production Economics*, *159*, 41–55. https://doi.org/10.1016/j.ijpe.2014.09.003

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., Burroughs, H., & Jinks, C. (2018). Saturation in qualitative research: Exploring its conceptualization and operationalization. *Quality & Quantity*, *52*(4), 1893–1907. https://doi.org/10.1007/s11135-017-0574-8

Selander, L., Henfridsson, O., & Svahn, F. (2013). Capability Search and Redeem across Digital Ecosystems. *Journal of Information Technology*, *28*(3), 183–197. https://doi.org/10.1057/jit.2013.14

Spigel, B. (2017). The Relational Organization of Entrepreneurial Ecosystems. *Entrepreneurship Theory and Practice*, *41*(1), 49–72. https://doi.org/10.1111/etap.12167

Stam, E. (2015). Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique. *European Planning Studies*, *23*(9), 1759–1769. https://doi.org/10.1080/09654313.2015.1061484

Strauss, A. L., & Corbin, J. M. (2003). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2. ed., [Nachdr.]). Sage Publ.

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, *28*(13), 1319–1350. https://doi.org/10.1002/smj.640

Thomas, L. D. W., & Autio, E. (2020). Innovation Ecosystems in Management: An Organizing Typology. In L. D. W. Thomas & E. Autio, *Oxford Research Encyclopedia of Business and Management*. Oxford University Press. https://doi.org/10.1093/acrefore/9780190224851.013.203

Tiwana, A. (2013). *Platform ecosystems: Aligning architecture, governance, and strategy*. MK.

Tiwana, A. (2015). Evolutionary Competition in Platform Ecosystems. *Information Systems Research*, *26*(2), 266–281. https://doi.org/10.1287/isre.2015.0573

Tiwana, A., Konsynski, B., & Bush, A. A. (2010). Research Commentary—Platform Evolution: Coevolution of Platform Architecture, Governance, and Environmental Dynamics. *Information Systems Research*, *21*(4), 675–687. https://doi.org/10.1287/isre.1100.0323

Van de Ven, Garud, R., & Andrew, H. (1994). The coevolution of technical and institutional events in the development of an innovation. In *Evolutionary dynamics of organizations* (pp. 425–443). Oxford University Press.

Vandermerwe, S., & Rada, J. (1988). Servitization of business: Adding value by adding services. *European Management Journal*, *6*(4), 314–324. https://doi.org/10.1016/0263-2373(88)90033-3

Vargo, S. L., & Lusch, R. F. (2004). Evolving to a New Dominant Logic for Marketing. *Journal of Marketing*, *68*(1), 1–17. https://doi.org/10.1509/jmkg.68.1.1.24036

Ven, A. H. V. D., & Garud, R. (1994). The Coevolution of Technical and Institutional Events in the Development of an Innovation. In J. A. C. Baum & J. V. Singh (Eds), *Evolutionary Dynamics*

of Organizations (pp. 425–443). Oxford University PressNew York, NY. https://doi.org/10.1093/oso/9780195077360.003.0026

Volberda, H. W., & Lewin, A. Y. (2003). Co-evolutionary Dynamics Within and Between Firms: From Evolution to Co-evolution. *Journal of Management Studies*, *40*(8), 2111–2136. https://doi.org/10.1046/j.1467-6486.2003.00414.x

Wareham, J., Fox, P. B., & Cano Giner, J. L. (2014). Technology Ecosystem Governance. *Organization Science*, *25*(4), 1195–1215. https://doi.org/10.1287/orsc.2014.0895

Wen, W., & Zhu, F. (2019). Threat of platform-owner entry and complementor responses: Evidence from the mobile app market. *Strategic Management Journal*, *40*(9), 1336–1367. https://doi.org/10.1002/smj.3031

Yin, R. K. (2014). *Case study research: Design and methods* (Fifth edition). SAGE.

Yoo, Y., Henfridsson, O., & Lyytinen, K. (2010). Research Commentary—The New Organizing Logic of Digital Innovation: An Agenda for Information Systems Research. *Information Systems Research*, *21*(4), 724–735. https://doi.org/10.1287/isre.1100.0322

Appendix A – Interview Protocol

Purpose & Link to RQs
Investigate how [ORGANISATION] and [PLATFORM] co-evolve across the ecosystem cycle (creation → delivery → retention → resilience).
RQ: How do orchestrator and complementors co-evolve in a digital platform ecosystem?
SQs: (1) Orchestrator influence; (2) Complementor feedback; (3) Outcomes, alignment, innovation, resilience.

This protocol served as a common backbone for all interviews and was minimally adapted in wording and probes to reflect the specific role and organisational context of each participant.

Opening
Thank you for participating. Purpose: understand how collaboration with [PLATFORM] has evolved. Your input is anonymised. May I record? Interview lasts ± [DURATION_MINUTES] min.

1. Intro & Role
Q1 Role & context – Briefly describe your role and link to [PLATFORM].
Why: position & perspective. Probes: tasks? decision scope? KPIs?
Q2 History – Key events with [PLATFORM]? When and what impact?
Why: timeline anchors. Probes: internal response? lasting effect?

2. Value Creation
Q3 Co-creation – Where/how does new value (features, integrations) arise?
Why: creation sources. Probes: API/policy role? experiments?
Q4 Platform influence – Which policies, APIs, or fees affected you most?
Why: governance → behaviour. Probes: example? positive/negative?
Q5 Feedback – How do ideas/requests reach [PLATFORM]?
Why: bidirectional learning. Probes: channels? response speed? results?

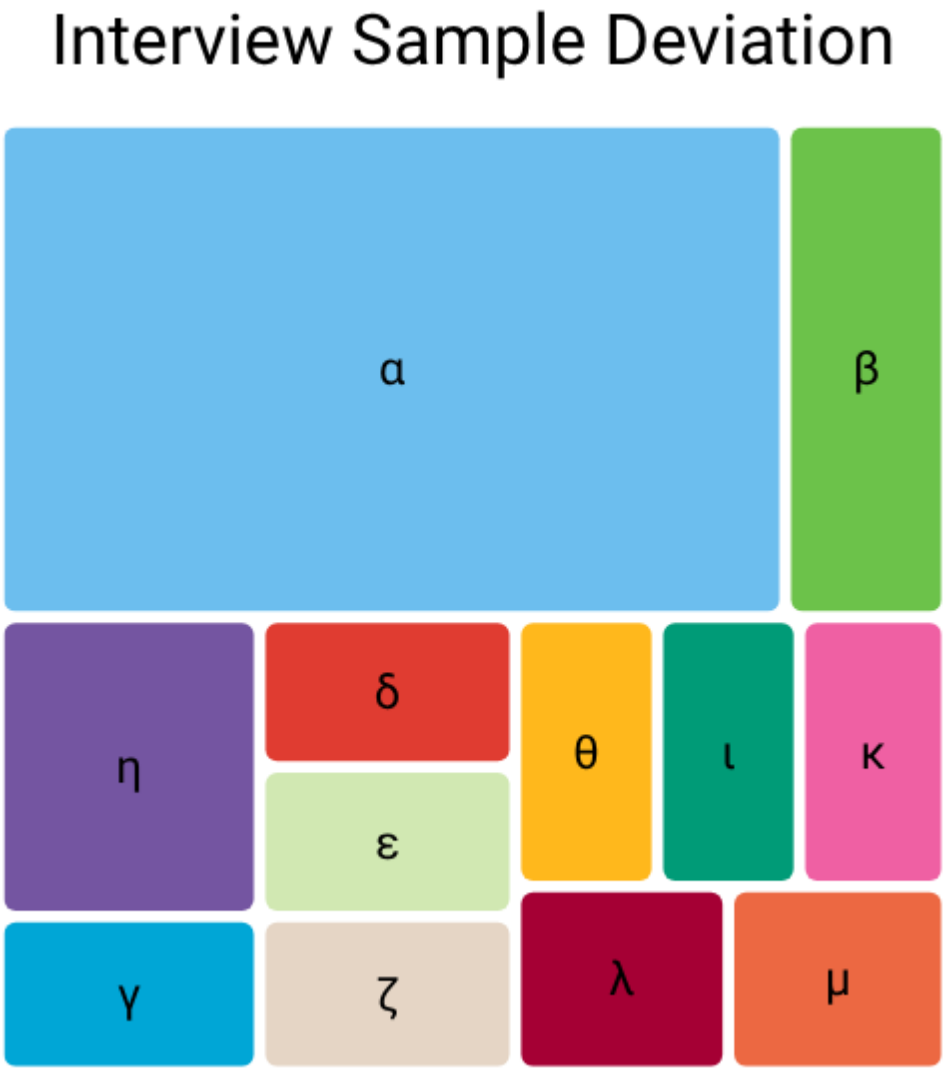
3. Value Delivery
Q6 Roll-out – How is value delivered to customers via [PLATFORM]?
Why: creation → operation. Probes: listing/pricing/logistics? SLA?
Q7 Frictions – Typical bottlenecks or workarounds?
Why: adaptation practices. Probes: example? later formalised?
Q8 Metrics – How do you measure success? (conversion, GMV, NRR?)

4. Value Retention
Q9 Retention – How is customer/complementor value maintained?
Why: sustainability. Probes: subscriptions, support, community?
Q10 Value sharing – Is value distribution with [PLATFORM] fair?
Why: incentives & trust. Probes: fees vs benefits? changes over time?

5. Resilience & Future

Q11 Shocks – Which policy or market shocks tested resilience, and responses?
Why: adaptive capacity. Probes: what worked/not? missing skill?
Q12 Future – Expected changes (12–24 mo) & needs from [PLATFORM]?
Why: forward co-evolution. Probes: joint pilots? multi-homing?

Appendix B – Interview Sample Deviation



TU Delft