Journal of Product Innovation Management

WILEY | pdma Connecting Innovators Worldwide

ORIGINAL ARTICLE OPEN ACCESS

Why Industrial Internet of Things Platforms Fail: A Structuration Theory Perspective on Platform Evolution

Philipp Kernstock[1] | Andreas Hein[2] | Maximilian Schreieck[3] | Helmut Krcmar[1]

[1]School of Computation, Information and Technology, Technical University of Munich, Garching, Germany | [2]Institute for Information Systems and Digital Business, University of St. Gallen, St. Gallen, Switzerland | [3]Department of Information Systems, Production and Logistics Management, University of Innsbruck, Innsbruck, Austria

Correspondence: Philipp Kernstock (philipp.kernstock@tum.de)

Received: 30 April 2024 | **Revised:** 17 October 2025 | **Accepted:** 19 December 2025

Associate Editor: Marin Jovanovic

Keywords: digital platform governance | IIoT platforms | industrial platforms | platform evolution | platform failure

ABSTRACT

Despite their transformative potential, Industrial Internet of Things (IIoT) platforms often fail to evolve into scalable ecosystems. Research on IIoT platforms attributes failure to discrete factors such as governance misalignment or technological complexity and rarely considers how failure unfolds. This article adopts a structuration theory perspective to examine IIoT platform failure as a path-dependent process. Through a seven-year longitudinal case study of Alpha, a global industrial manufacturer, we identify four structuration mechanisms—structural embeddedness, misalignment, reproduction, and reversion—that progressively constrain platform scalability. Our findings reveal that failure is not a singular event but an emergent outcome shaped by recursive interactions between architecture, governance, and market structures, as well as strategic actions. We contribute to platform governance research by showing that IIoT platforms inherit, rather than impose, governance structures, making it crucial for firms to actively reshape contracting dependencies rather than replicating existing structures. Based on these insights, we provide recommendations for firms to design governance frameworks that foster openness, modularity, and ecosystem scalability from the outset. These insights offer a more dynamic understanding of IIoT platform evolution, informing theory and practice on overcoming the barriers to the scalability of IIoT platforms.

1 | Introduction

Digital platforms have reshaped industries by shifting value creation from vertically integrated firms to distributed ecosystems of complementors and users (Parker et al. 2017). In the enterprise software industry, digital platforms offered by providers of enterprise resource planning (ERP) and customer relationship management (CRM) systems illustrate this transformation. Conceived initially as firm-level solutions, these platforms evolved into industry-wide standards that integrate diverse organizational processes and attract complementary innovations from independent software vendors (Sarker et al. 2012; Ceccagnoli et al. 2012). Against this backdrop, Industrial Internet of Things (IIoT) platforms promised a similar transformation in the manufacturing industry: connecting machines, sensors, and industrial processes through cloud-based architectures to foster scalable innovation ecosystems (Shim et al. 2019). Yet, despite heavy investment and strategic commitment by leading incumbents (McKinsey 2022), IIoT platforms have struggled to scale, often reverting to narrowly scoped service solutions or being abandoned altogether.

Extant research largely attributes platform failure to discrete, event-based factors, such as governance misalignment (Gawer and Cusumano 2014), mispricing (Lin et al. 2011), strategic mistakes in sharing the surplus and prioritizing

Managerial Summary

Industrial Internet of Things (IIoT) platforms promise to transform manufacturing through scalable innovation ecosystems, yet most fail despite substantial investments by leading firms. This research explains why. We show that IIoT platforms fail because managers unintentionally reproduce legacy product- and service-oriented structures embedded in contracts, sales incentives, and partner relationships, progressively constraining the platforms' ability to scale into open ecosystems. IIoT platform success depends on sustaining governance and architectural choices that continuously favor openness, modularity, and third-party value creation. Three practical lessons stand out:

- *Platform governance must be redesigned early.* Bilateral contracts, project-specific customization, and tight control mechanisms may feel safe but systematically discourage third-party participation. Managers should introduce standardized interfaces, transparent access rules, and scalable contracting models from the outset, even if this initially limits short-term revenue capture.
- *Architectural modularity must be protected against ad-hoc customization*. Allowing every customer or internal business unit to shape the platform may increase adoption locally, but it undermines reusability and slows ecosystem scaling. Well-defined and stable boundary resources, together with non-negotiable core standards, are critical.
- *Ecosystem ambitions require consistent reinforcement through managerial action*. When performance metrics, sales incentives, or investment decisions prioritize service delivery over ecosystem building, platforms gradually revert to closed solutions.

critical mass (Van Alstyne et al. 2016), failure to develop trust (Yoffie et al. 2019), or technological complexity (Drechsler et al. 2022). These studies have deepened our understanding of the hazards platform owners face, but they conceptualize failure as the result of singular design flaws. Yet, if failure were reducible to isolated errors, one would expect experienced incumbents such as General Electric (with Predix) or SAP (with Leonardo), firms with technical sophistication, customer access, and financial resources, to correct course and succeed in the IIoT industry. Their repeated struggles suggest that existing explanations underestimate the embedded and temporal nature of platform failure and offer limited insight into why IIoT platforms repeatedly drift away from ecosystem ambitions.

We define platform failure as the discontinuation or reversion of a platform initiative, specifically the inability to transition from an internally focused solution into a scalable ecosystem that attracts and sustains third-party innovation (Jesus et al. 2024; West and Wood 2013). From this perspective, failure is not a discrete event but a path-dependent process in which architectural, governance, and market logics interact with managerial actions to progressively constrain platform development (Kapoor et al. 2021). To theorize these dynamics, we adopt structuration theory, which conceptualizes structures as both enabling and constraining, continually reproduced through action (Giddens 1984). This lens allows us to trace how IIoT platforms inherit governance and architectural dependencies from legacy business models and how attempts to scale reproduce rather than transform these structures, gradually locking platforms into service-based trajectories (Orlikowski 2000). Framing platform failure in this way motivates our central question: *How does the dynamic interplay between structural constraints and strategic actions lead to IIoT platform failure?*

To answer this question, we conducted a seven-year longitudinal case study (Yin 2014; Eisenhardt and Graebner 2007) of Alpha, a global industrial manufacturer that launched an IIoT platform but ultimately failed to establish a scalable ecosystem. The case presents a rare opportunity to examine failure as it unfolded, allowing us to capture both the strategic actions of managers and the structural constraints of governance, architecture, and market contexts. Our study draws on 64 interviews with executives, business unit leaders, and ecosystem partners, complemented by extensive archival data, enabling a process-oriented analysis of how the platform evolved across four distinct episodes. Using temporal bracketing and structuration theory as analytical scaffolds (Giddens 1984; Langley 1999), we identified the recursive mechanisms that progressively constrained ecosystem scaling and culminated in platform failure.

This article contributes to platform research by reframing failure as a path-dependent process shaped by recursive interactions between structures and strategic actions, rather than as the result of isolated missteps. In doing so, we extend work on platform evolution by explaining how structural reproduction locks IIoT platforms into trajectories that foreclose ecosystem scaling (Jacobides et al. 2024; Jesus et al. 2024). We also advance platform governance theory by showing that IIoT platforms inherit governance logics from legacy product–service models, which persist even as firms attempt to design new mechanisms (Tiwana 2015; Hein et al. 2019). Finally, we add to research on digital transformation of incumbents by illustrating how organizational legacies bias platform initiatives toward service-centric models, highlighting the structural liabilities of incumbency in pursuing ecosystem strategies (Raffaelli et al. 2019).

2 | Theoretical Foundation

This chapter first outlines the intricacies of IIoT platform architecture, governance, and market factors. Following the review that uncovers reasons for platform failure, we identify and discuss critical gaps in our understanding of why platforms fail. To address this gap, we propose adopting a process perspective grounded in structuration theory, which offers deeper insights into the dynamics of structural constraints and strategic actions that lead to IIoT failures.

2.1 | The Distinctive Nature of IIoT Platforms

Platform ecosystems are meta-organizations built around a platform core that facilitates value creation through interactions between ecosystem actors (Kretschmer et al. 2022; Tiwana

et al. 2010). At their foundation, platforms can be distinguished into transaction platforms, which facilitate exchanges in a two- or multi-sided market (Rochet and Tirole 2006); innovation platforms, which provide technological infrastructures and boundary resources such as application programming interfaces (APIs) and software development kits (SDKs) that enable third-party innovation (Tiwana et al. 2010; Ghazawneh and Henfridsson 2013); and hybrid platforms that combine both functions (Cusumano et al. 2019).

How these platforms take shape differs across industries. In business-to-consumer (B2C) contexts, platforms connect large numbers of relatively homogeneous users and providers. Their growth relies on rapid adoption, network effects, and governance regimes that balance openness and control (Jacobides et al. 2024; Parker and Van Alstyne 2017). By contrast, business-to-business (B2B) enterprise software platforms, such as ERP or CRM systems, operate in organizational environments where services are more heterogeneous but functionally standardized. Adoption in these settings depends on integration with existing IT infrastructures, interoperability across systems, and long procurement cycles (Ceccagnoli et al. 2012; Schreieck et al. 2022). While network effects exist, they tend to emerge more slowly and often require industry-specific adaptations (Haki et al. 2024).

Whereas B2C and B2B enterprise software platforms operate in relatively standardized environments, IIoT platforms face more complex environments due to their industrial contexts. IIoT platforms can be defined as infrastructures that integrate operational technologies, such as machines, sensors, and control systems, with IT to enable both transactional efficiency and complementary innovation (Porter and Heppelmann 2014; Boyes et al. 2018; Pauli et al. 2020). IIoT platforms provide a middleware layer that connects industrial assets through sensor networks, wireless communication, and standardized protocols (Yoo et al. 2012; Xu et al. 2014), allowing data to be collected, exchanged, and analyzed across organizational boundaries (Menon et al. 2020). In doing so, IIoT platforms create value by optimizing industrial processes, supporting new service-oriented business models, and enabling third-party developers to build complementary applications (Pauli et al. 2020; Petrik and Herzwurm 2020b).

In contrast to B2C and B2B enterprise software platforms, which scale through rapid matching among homogeneous users (Jacobides et al. 2024) or through standardized digital integration (Schreieck et al. 2022), IIoT platforms combine transaction and innovation functions in environments characterized by heterogeneous assets, fragmented markets, and entrenched bilateral governance practices (Petrik and Herzwurm 2019; Hein et al. 2019). This dual role amplifies complexity, generating high interoperability costs (Menon et al. 2020), delaying network effects (Pauli et al. 2021, 2020), and constraining scalability (Arnold et al. 2022). As a result, IIoT platforms, despite substantial technological advances and sustained investment (McKinsey 2022), struggle to establish sustainable ecosystems. These conditions underscore that IIoT platforms face qualitatively different barriers than other platform types and warrant closer examination of the processes through which failure unfolds (Drechsler et al. 2022; Wlcek et al. 2023).

Table 1 summarizes the key differences between B2C, B2B enterprise software, and IIoT platforms, highlighting the distinct hurdles IIoT platforms face in achieving sustainable growth.

2.2 | Reasons for Platform Failure

Platform failure is well documented across domains, yet the mechanisms through which it unfolds remain insufficiently theorized. Existing studies often treat failure as the consequence of discrete events, such as misaligned governance (Gawer and Cusumano 2014), pricing errors (Lin et al. 2011), or technological shortcomings (Gawer and Cusumano 2014; Drechsler et al. 2022). While this framing has yielded valuable insights into specific causes of platform failure, it pays less attention to how failures develop over time. Illustrative cases, such as the gradual erosion of Symbian's competitiveness (West and Wood 2013) or GE Predix's inability to mobilize an external developer ecosystem and subsequent retreat into internal service provision (Drechsler et al. 2020), show that platform failure is rarely a single collapse but rather a structurally embedded trajectory.

In B2C settings, failure is often attributed to misaligned governance, competitive pressures, and challenges in achieving critical mass (Van Alstyne et al. 2016; Yoffie et al. 2019). A key factor is governance misalignment, where platforms struggle to strike a balance between openness and control (Jacobides et al. 2024). Excessive openness can lead to quality degradation (Parker and Van Alstyne 2017), while overly restrictive governance can deter complementors, limiting network growth (Cennamo et al. 2018; Wareham et al. 2014). Network effects often lead to a few dominant platform owners who accrue market share and establish high barriers for late entrants (Eisenmann et al. 2006; Jullien et al. 2021). These mechanisms explain the failure of B2C platforms but cannot be fully transferred to enterprise and industrial contexts, where adoption depends on complex integration efforts rather than rapid consumer-driven scaling.

Enterprise software B2B platforms face different challenges. Scaling depends on integrating with heterogeneous but functionally standardized IT environments, often under long procurement cycles and high switching costs (Schreieck et al. 2022; Arnold et al. 2022). Network effects are weaker and slower to materialize because adoption typically requires industry-specific customization (Haki et al. 2024). Governance miscoordination, competing standards, and shortages of integration expertise further increase the risk of fragmentation and project-level failure (Huber et al. 2017; Hein et al. 2019). These constraints limit scalability, but they do not fully account for the failure rates observed in IIoT platforms.

IIoT platforms experience failure for reasons that differ from those seen in B2C and B2B enterprise software contexts. Their viability is undermined by the interaction of architectural, governance, and market factors that create persistent structural barriers. From an architectural perspective, IIoT platforms require deep integration of IT and operational technologies. Industrial devices, legacy systems, and cloud-based analytics must function cohesively, often across heterogeneous ecosystems and proprietary industrial protocols (Arnold et al. 2024). This integration is far more complex than in B2B enterprise

TABLE 1 | Comparison of B2C, enterprise software B2B, and IIoT platforms.

Dimension	B2C platforms	Enterprise software B2B platforms	IIoT platforms
Architectural complexity	Standardized digital architectures enable rapid scalability. Homogeneous services and APIs facilitate seamless integration and user adoption (Jacobides et al. 2024).	Software-based architectures (e.g., ERP, CRM) ensure interoperability across enterprise IT but require customization for integration (Schreieck et al. 2022).	Multi-layered architectures integrate hardware, software, and industrial protocols. High interoperability costs, reliance on legacy systems, and lack of standards hinder scalability (Arnold et al. 2022; Pauli et al. 2020).
Ecosystem governance	Homogeneous consumer base with reusable applications enables strong network effects and rapid adoption (De Reuver et al. 2018). Governance ensures service quality, security, and marketplace efficiency (Schreieck et al. 2022).	Diverse industries with standardized frameworks enable network effects but longer adoption cycles due to complex procurement processes (Anderson et al. 2022).	Highly fragmented industries require customized solutions, limiting economies of scale. Slow adoption and high development costs reduce network effects (Pauli et al. 2021; Arnold et al. 2023).
Market structure	Focuses on transactions and user engagement (Parker and Van Alstyne 2017).	Integrates suppliers and enterprises through data security, compliance, and contractual frameworks (Haki et al. 2024).	Coordinates manufacturers, third-party developers, and system integrators. Governance must manage interoperability, value-sharing, and cross-industry collaboration (Petrik and Herzwurm 2020a).

software platforms, which operate in more standardized environments. The absence of universal technical standards further exacerbates interoperability problems, making large-scale adoption difficult (Menon et al. 2020).

From a governance perspective, IIoT platforms must coordinate manufacturers, industrial firms, and third-party developers whose incentives and infrastructural constraints diverge (Pauli et al. 2021; Petrik and Herzwurm 2020a). Unlike B2C platforms that mainly broker interactions between consumers and complementors, IIoT platforms must harmonize governance across firms accustomed to bilateral contracting and firm-specific integrations (Petrik and Herzwurm 2020b). These inherited governance logics, which are akin to a part of the meta-organizational logics of the IIoT platforms (Springer et al. 2025), reinforce service-based arrangements and limit the emergence of scalable, open ecosystems.

From a market perspective, IIoT platforms confront structural fragmentation and adoption barriers. Industrial ecosystems are highly heterogeneous, requiring sector-specific customization that reduces economies of scale, delays network effects, and hinders the development of multi-sided ecosystems (Arnold et al. 2024; Pauli et al. 2021). Moreover, the value proposition is often opaque. While B2C platforms face adoption barriers such as the chicken-and-egg problem (Evans 2009; Stummer et al. 2018), their consumer-facing benefits are more immediate. In IIoT settings, firms must invest heavily before realizing operational improvements, often within entrenched legacy environments (Wlcek et al. 2023). As a result, adoption slows, and firms frequently revert to traditional service-based models when short-term returns do not justify long-term engagement (Kude and Huber 2025; Schüler and Petrik 2023).

These architectural, governance, and market dynamics make IIoT platforms especially vulnerable to failure, underscoring the need for a process-oriented theorization of how such structural constraints evolve.

2.3 | Platform Failure From a Process Perspective: A Structuration Approach

Research has traditionally emphasized discrete events, such as misaligned governance choices, pricing errors, or technological shortcomings, obscuring the temporal dynamics through which platforms deteriorate. However, studies of transitions from product-based to platform-based firms suggest that failure is rarely abrupt. Instead, it emerges through sequences of managerial decisions and structural frictions that accumulate over time (West and Wood 2013; Jesus et al. 2024). More recent research has advanced this perspective by linking internal and external preconditions of platform success (Jesus et al. 2024). Still, the interaction between managerial actions and structural constraints remains insufficiently theorized, particularly in IIoT contexts. Specifically, architecture, governance, and market factors are treated as independent rather than mutually constitutive, reducing failure to a static barrier rather than a path-dependent trajectory.

Consequently, we lack theoretical guidance on how inherited structures are reproduced, how managerial actions unintentionally reinforce them, and how these dynamics compound into trajectories that lead to platform failure. Without addressing these interdependencies and temporal dynamics, theory cannot explain why even resource-rich incumbents repeatedly struggle to transform IIoT platforms into viable ecosystems.

Based on these considerations, we reconceptualize platform failure as a path-dependent process rather than a discrete event. Failure occurs when platform initiatives progressively revert into non-ecosystemic forms because inherited architectural, governance, and market structures are reproduced through managerial action. This definition directs attention away from isolated errors and toward the recursive reinforcement of constraints that foreclose the transition from product- or service-centric models to scalable ecosystems.

Structuration theory provides us with a lens to capture this process. Structures are not fixed determinants but enabling and constraining forces that are continually enacted and reproduced through practice (Giddens 1984; Orlikowski 2000). For IIoT platforms, this means that architectural standards, governance mechanisms, and market arrangements are not static design choices but dynamic outcomes of repeated interactions among platform owners, complementors, and industrial partners (Poole and DeSanctis 2004). Applying structuration theory enables us to develop a process-oriented understanding of IIoT platform failure. By treating failure as a trajectory shaped by the recursive interplay of architectural, governance, and market structures with managerial action, we build the foundation for developing a theory that explains how structural reproduction over time leads to non-ecosystemic outcomes. This perspective shifts attention from static, domain-specific barriers to the dynamics through which failures accumulate and become path dependent.

3 | Method

To answer the research question, we conducted a longitudinal exploratory case study of Alpha, an industrial manufacturing conglomerate that has shifted to an IIoT platform strategy. We used process theorizing to focus on the platform initiative's evolution over time (Van de Ven and Poole 1995; Cloutier and Langley 2020) and drew on structuration theory to explain the interaction of structures and actions within the organization's context (Poole and DeSanctis 2004). We observed Alpha as a unique phenomenon (Siggelkow 2007), from its initial internal strategy to launch an IIoT platform in 2015 to its subsequent consolidation and rebranding as an analytics solution in 2022.

3.1 | Case Selection

Alpha is a leading global industrial manufacturing conglomerate offering hardware and software solutions for various industries with several business units (see Supporting Information Appendix A1). During the case study, Alpha built on its experience as a traditional manufacturing multi-business organization (MBO) that provides products and services to become a digital service provider. For example, Alpha expanded from producing and selling wind turbines with long-term maintenance contracts to offering a subscription model for digitally optimizing sensor-equipped wind turbines. Alpha realized that such business model changes in its traditional core business required leveraging IIoT's potential to create value from large quantities of data gathered from end-to-end production processes and products used by customers in the field. Thus, Alpha established an IIoT platform as one of its strategic core areas. The IIoT platform is a cloud-based, open platform that connects production plants, systems, and machines. It enables the development of applications to capture, share, monitor, and analyze operational data.

We selected Alpha's initiative to build an IIoT platform based on theoretical sampling considerations (Eisenhardt 1989). The case represents a rare and critical instance (Eisenhardt and Graebner 2007) in which a multi-billion-dollar conglomerate, structured as an MBO, strategically invests substantial resources to establish an IIoT platform. The case, therefore, provides a compelling opportunity for studying platform emergence and governance in an organizational context that differs significantly from typical platform ventures and for generating novel theoretical insights (Siggelkow 2007). Specifically, the case of Alpha allows us to explore how legacy firms navigate the transition toward platform-based business models, an area where extant literature remains underdeveloped.

3.2 | Data Collection

We conducted a seven-year longitudinal case study (Yin 2018) based on 64 interviews with Alpha and third-party developers to uncover nuanced, temporally influenced complexities when launching an IIoT platform in the intricate context of the manufacturing industry. Further, we collected secondary data, comprising presentations, marketing, sales, financial reports, and archival data, such as websites and blog entries, to strengthen data triangulation.

We started interviews with Alpha when its IIoT platform was still in the conceptual planning stage. We then continued interviewing throughout the platform's launch and evolution. As efforts to incorporate partners into the platform ecosystem intensified, we started interviews with partner companies, resulting in 18 interviews with partner organizations ranging from software development companies to machinery manufacturers and consulting firms. The interviewed representatives of the platform owner, Alpha, were key informants in our data collection. While the respective interview guidelines evolved throughout the phases, we focused our data collection on deriving insights regarding the actors, their actions, the evolving structures, the context in which they operate, and the relationships between these aspects (Poole and DeSanctis 2004). Table A2 in the Appendix gives an overview of all 64 interviews, and Table A3 provides the interview guides throughout the longitudinal case study. Table A4 gives an overview of the archival data we used to triangulate our findings.

Following inductive reasoning, we then employed a temporal bracketing strategy to derive episodes of platform launch and evolution. The episodes act as comparative units of analysis to explore and replicate theoretical ideas from the longitudinal data (Langley 1999). We derived four episodes by inductively analyzing the focal aspects of Alpha's platform journey (Table 2).

We temporally delineated the episodes using discontinuities in Alpha's IIoT platform evolution. *Episode 1* (Internal Development) spans from 2015 to 2017, beginning with internal plans to develop an IIoT platform and concluding with the official announcement that the platform would be opened to an

TABLE 2 | Overview of the research approach.

	1st Episode - Internal Development	2nd Episode - Market Launch	3rd Episode - Strategic Pivot	4th Episode - Consolidation
Time	2015–2017	2017–2019	2019–2022	After 2022
Episodes of IIoT platform's development	Internal strategizing led to the development of the IIoT platform within Alpha's MBO.	Opening of the platform to third parties; establishment of an ecosystem.	Business model pivot toward offering services as solutions.	Consolidation and rebranding of the IIoT platform into an analytics solution.
Delineating event	Internal strategizing about the platform business model.	Internal rollout completed; release of the public version.	Public announcement of the strategic pivot.	Announcement of new ecosystem initiative.
Data sampling	Interviews with Alpha employees within the existing organization and the emerging platform organization, focusing on strategic aspects.	Interviews with Alpha employees focusing on opening the platform and activities to build and govern the ecosystem, and interviews with early complementors.	Interviews with Alpha employees and complementors focusing on the changing strategy of the platform and the continued efforts to govern the ecosystem.	Focus on publicly available data on the new ecosystem initiative and Alpha's reorganization.
Data collection	9 interviews with Alpha employees. Complemented with archival data.	15 interviews with Alpha employees; 4 interviews with complementors. Complemented with archival data.	22 interviews with Alpha employees; 14 interviews with complementors. Complemented with archival data.	Archival data.
Data analysis strategy	Inductive	Inductive & deductive	Inductive & deductive	Inductive & deductive

ecosystem of partners. We conducted interviews with strategic roles, such as business development and product portfolio management, and IIoT-related roles, such as digital factory experts and solution architects for the internal platform. As our goal was to accompany Alpha during its endeavor to launch an IIoT platform, we asked questions focusing on strategic aspects, such as the added value Alpha wants to deliver through the platform and how it will design the technical platform to analyze and provide data.

Episode 2 (Market Launch) covers the opening process, which started in 2017 and ended in 2019 when a business model change was announced. This episode focuses on the strategies Alpha employed to integrate ecosystem actors and foster value co-creation among them. We interviewed internal actors, such as partner managers and the platform's CTO, and external actors, that is, complementors. Questions ranged from the technologies and governance mechanisms Alpha provided to integrate ecosystem actors to how ecosystem actors perceive these actions and their role in co-creating value.

Episode 3 (Strategic Pivot) ranges from 2019 to 2022 until a new ecosystem initiative was launched. It focuses on the pivot of Alpha's platform model toward a service-centric model and its impact on the IIoT platform ecosystem. We conducted interviews with internal roles, including partner managers, the CEO of the platform association, and the COO of the platform, as well as external ecosystem actors, ranging from machinery manufacturers to software developers and consulting firms. In this episode, we started to identify organizational and market-related structural constraints and a misalignment between strategic actions such as partner programs and governance mechanisms.

Hence, *Episode 4* (Consolidation) covers the consolidation of the IIoT platform into Alpha's newly announced ecosystem initiative, which represents a reversion to a service-driven business model. As this phase is still unfolding, we utilize archival data and media coverage to observe how the platform and its components, such as its app store, are being partially integrated and partially abandoned as part of the new strategy.

3.3 | Data Analysis

In hindsight, the four episodes represent strategic episodes illustrating the process from launch to failure. During our inductive coding of structural constraints and strategic actions in Episode 3, we became aware of the interdependence between these factors, which could help explain why the platform failed. At that point, we decided to reanalyze the case based on structuration theory, which is well-suited to explain structuration processes between strategic actions and organizational and market-related structures (Giddens 1984; Jones and Karsten 2008).

Drawing on process theorizing and bracketing as a sensemaking strategy (Langley 1999), we used structuration theory as a theoretical lens to inductively uncover the launch and evolution process over time and explain why Alpha's efforts to build an IIoT platform failed. Using temporal bracketing to construct episodes of Alpha's platform launch and evolution enables us to incorporate the mutual shaping of organizational structures and strategic actions (Langley 1999). Constructing the episodes of platform evolution and strategy-making allows us to examine how actions in one period led to changes in the context affecting the subsequent periods (Chanias et al. 2019). We combine inductive data-driven approaches and deductive theory-driven approaches iteratively to develop theoretical insights into the failure of Alpha's IIoT platform initiative (Langley 1999).

Following this process, we derive the four episodes (see Table 2). We use an inductive reasoning approach within the episodes to derive structural and action-related aspects that explain the IIoT platform's evolution (Gioia et al. 2013; Strauss and Corbin 1990). In the early phase of our data analysis, we mainly used the analytical moves of asking questions (e.g., how does an incumbent organization build, launch, and evolve an IIoT platform) and focusing on puzzles, namely, why do sound strategies and significant resources not lead to success, as analytical moves (Grodal et al. 2021). Starting with open coding, we identified factors such as the slow development of solutions for customers due to a lack of IIoT specialists, the focus on long-established product-based sales incentives for platform services, and building a revenue-based partner program.

Following structuration theory, we coded relationships between the concepts during axial coding to describe whether they are structures or strategic actions. This included dropping, merging, and splitting categories (Grodal et al. 2021). For example, we dropped first-level constructs like "integration of low-code capabilities" and "selection of infrastructure provider" because they lacked explanatory traction in explaining platform failure. Further, we merged constructs such as "recognition of internal digital transformation need" and "competitive pressure from the market" into an axial code of "contextual triggers to launch IIoT platform initiative." We employed the lens of structuration theory to split constructs into strategic actions and structures if necessary. For example, "changed sales incentive focusing on platform logic" as a structure and "selling IIoT platform as a technology solution" as action in the form of an unfaithful appropriation of this structure by actors within Alpha (DeSanctis and Poole 1994).

Subsequently, informed by our temporal bracketing (Langley 1999), where we sequenced the IIoT platforms evolution and failure into four brackets (internal development, market launch, strategic pivot, and consolidation), we theorized the contextual triggers, strategic actions, and structural changes to derive four selective codes (structural embeddedness, structural misalignment, structural reproduction, and structural reversion), revealing structuration processes between these elements over time. Figure 1 provides an overview of the coding structure for open, axial, and selective codes. Figure 2 illustrates their processual sequence. Following our reporting of the episodes identified through temporal bracketing in the next chapter, we build on these episodes to derive the mechanisms for our process-theoretical model in the model development section (see Figure 3) (Visnjic et al. 2022).

4 | Evolution and Failure of Alpha's IIoT Platform

Grounded in the organizational context of Alpha's existing MBO and the market of IIoT solutions, the following episodes describe the launch, evolution, and failure process of Alpha's IIoT

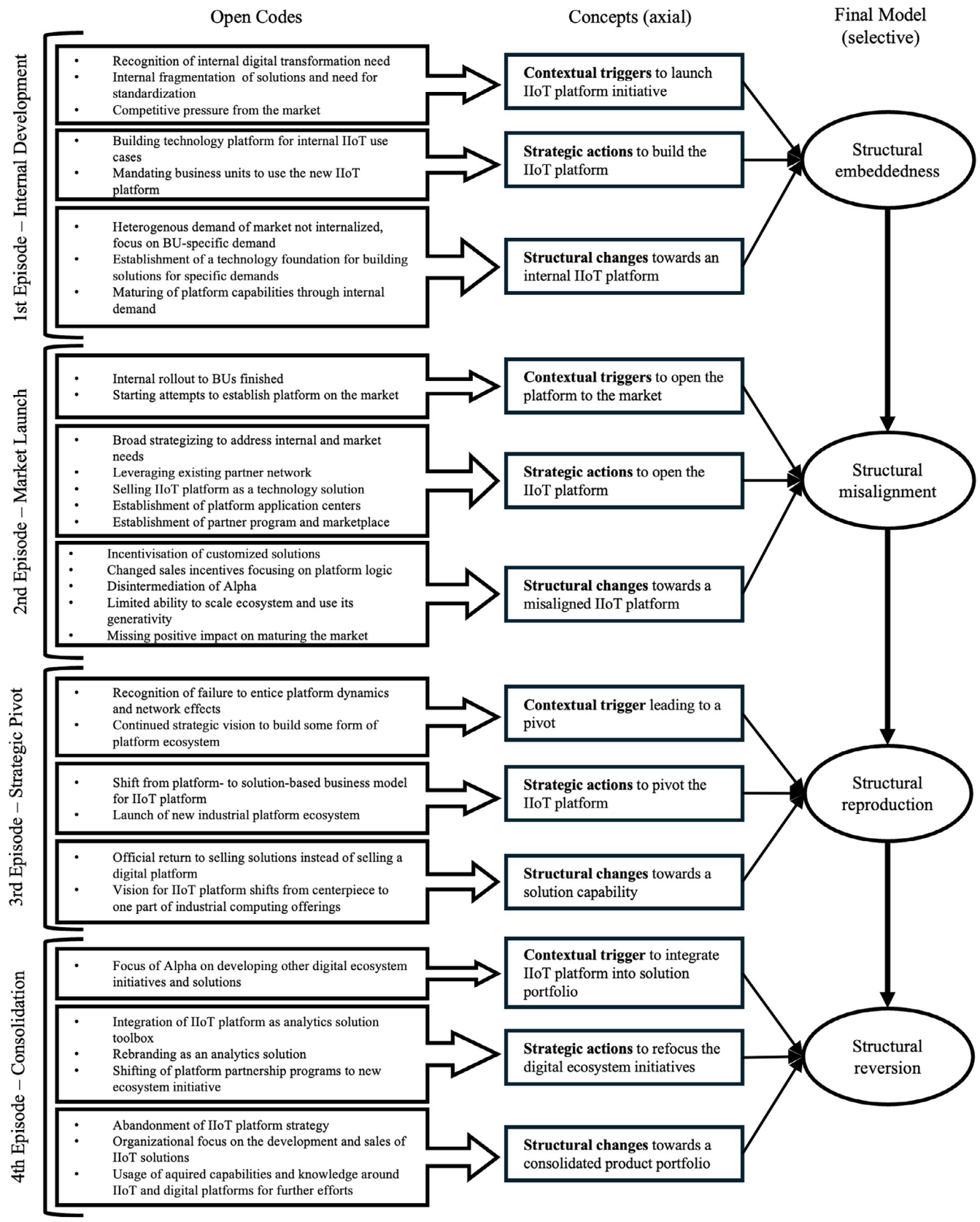

FIGURE 1 | Overview of coding structure.

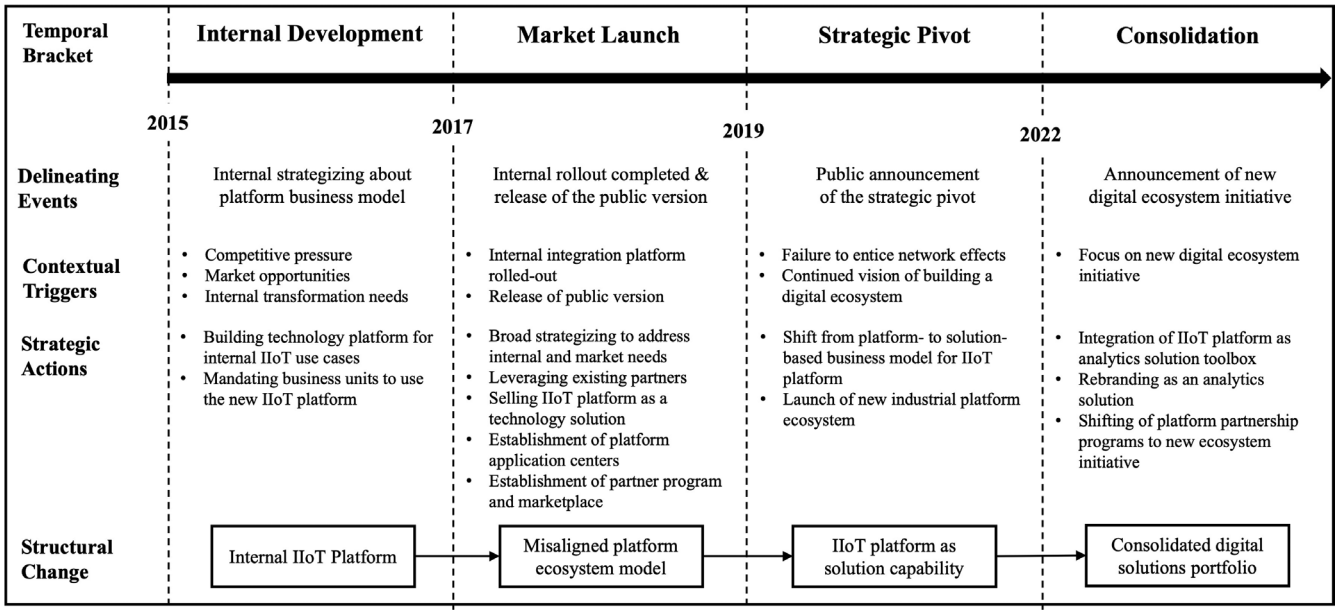

FIGURE 2 | Overview of the episodes.

platform from a structurational perspective. Figure 2 provides a description of the four episodes, their contextual triggers, the strategic actions, and the resulting structural changes.

4.1 | Internal Development—Platform as a Tool for Vertical Integration Projects

The first episode shows how Alpha established the IIoT platform as a tool for vertical integration projects. The development process for the prototypical IIoT platform triggered learnings about the strategic potential of IIoT. To take advantage of this potential, Alpha developed plans to roll out an enterprise-wide IIoT platform that would afford opportunities for its business units, customers, and partners. Alpha's initial IIoT platform was designed to manage the energy consumption of plants and machinery.

The episode was triggered by the early stages of the IIoT market, the competitive pressure for IIoT services, and the overlapping solutions of IIoT services across several business units.

> That was the basic idea, [...] to make a platform for internal use, to consolidate and collect the data there. And to generate better offerings from it or to optimize the existing ones.
>
> (Head of Digital Portfolio, IIoT Platform)

During this phase, the leadership noticed that Alpha had numerous independent IIoT projects across the different divisions and business units without a common strategy. The company decided to consolidate the various IIoT projects within a joint IIoT initiative administered by the digital industries division. The goal was to streamline IIoT activities, facilitate knowledge exchange, and standardize certain processes to increase efficiency. In addition, the initiative enabled internal developers to exchange knowledge and app components and applications that could be reused and adapted by other business units for their respective domains.

> Everybody has had their productivity approach, their own data transfer approach, their own data storage, all over the place. So they said, 'ok, this can be harmonized,' and then we put things together.
>
> (COO, IIoT Platform)

These internally motivated activities gained traction with the prominent announcement by a key competitor in 2013 to launch its IIoT platform. The competitor, which rivaled Alpha in many of its traditional core businesses, announced that it would reinvent IIoT with its new platform, generating significant public attention. This put Alpha under pressure, and many stakeholders, including investors, expected the company to answer with a competitive offer.

> And then [the competitor platform] came along. That means a decisive influence on the IIoT platform's strategy was the circumstance that [the competitor] has created an unbelievable hype with [its platform]. [Alpha] saw itself under pressure, some of it self-made, others from investor direction: 'what's [Alpha's] answer to [the competitor platform]?'
>
> (Senior Innovation Manager, Alpha)

At this time, the IIoT market was characterized by various operational technologies within organizations, including production lines, machinery, equipment, and a plethora of sensors, contributing to a highly heterogeneous landscape. Companies across different sectors presented unique requirements and preferences, which inherently complicated the establishment of uniform industry standards. Implementing universal use cases

that could function as plug-and-play solutions was challenging. The demand for IIoT solutions led to the rise of applications that required further customization to meet the distinct needs of the end-users. Alpha recognized the advances in IIoT technology, its dispersed internal activities and capabilities, potential market opportunities, and the external pressure created through competitors' activities and decided to create an IIoT-focused platform capable of enabling strategic opportunities across business units.

The manufacturing unit pitched the idea of an enterprise-wide IIoT platform. Thus, Alpha, equipped with extensive domain and hardware expertise from its traditional business, developed an initial version of the platform for the manufacturing industry. The heterogeneous and complex market landscape led to Alpha's strategic decision to launch the platform in its internal business units to create initial demand and applications. To do so, Alpha incentivized and mandated internal usage of the platform throughout its business units. However, Alpha struggled to reconcile the differences between all business units as it crafted its broad IIoT platform strategy. Silos led to business units developing smaller IIoT service solutions that were not directly compatible with the IIoT platform from the manufacturing unit. These business units needed to change their existing solutions and adopt the IIoT platform of the manufacturing unit.

> Several units started to build their own IIoT platform solutions and [the IIoT platform] was suddenly the approach to unify this.
>
> (Team Lead Sales, IIoT Platform)

Using the platform approach to unify all IIoT activities across other business units was challenging, as their core businesses varied significantly and required the business units to relinquish some level of independence. Consequently, the business units had specific requirements for the IIoT platform that would allow them to utilize it for their business purposes.

> There are such big differences between what the healthcare industry needs and what the railway industry needs.
>
> (Senior Innovation Manager, Alpha)

Being its own end-user helped Alpha to find software bugs, get detailed feedback, experience challenges, and develop the platform based on the requirements of internal departments and business units. However, this strategy led to unintended outcomes. The platform's usage by other business units, while helpful for bug detection and early feedback, created specific demands that were not scalable. The power of the other business units compared to the new IIoT platform unit further exacerbated this issue, as they demanded highly customized features to adopt the platform. While Alpha intended to quickly adapt to the market's needs and build a user base, its strategic action of developing the platform within its MBO limited the platform's future value co-creation potential. From a structurational perspective, the structure embedded in Alpha's organization was reproduced in the architecture and governance of its emerging internal IIoT platform.

4.2 | Market Launch—Attempts at Fostering Value Co-Creation and Capture

The second episode of Alpha's IIoT platform journey was characterized by attempts at fostering an environment conducive to value co-creation and capture. The market launch episode involved transitioning the internally focused platform to one that engaged with the wider ecosystem. Despite intentions to encourage widespread use internally and efforts to establish value creation on the IIoT platform, this opening led to structural changes that did not align fully with the company's strategic vision, setting the stage for a series of unintended consequences. Specifically, the IIoT platform's broad strategic direction proved challenging when launching the platform to the market.

> The strategy was defined too broadly: I want to create a highly profitable software offering with [the IIoT platform], but at the same time a platform that everyone at [Alpha] uses, which then also secures the hardware [sales] and enables new services.
>
> (Head of Presales, IIoT Platform)

Additionally, predominant sales structures created an agency problem. Alpha's institutional logic incentivized selling solutions, such as hardware or projects, rather than selling the *potential* of an infrastructural platform. This resulted in a mismatch in the business unit's institutional logic, which was focused on developing and selling distinct products at the customer level. Now, Alpha required the business units to sell the solution potential of the new IIoT platform. The business units, however, still used sales incentives for selling products and long-term software licenses.

> A sales department is always incentivized by financial goals. These goals are traditionally achieved with a relatively broad portfolio of software solutions that are not based on the new IIoT platform. And then there is a new topic [...], i.e., the cloud platform. [The sales agent] prefers to say, 'Come on, I'll do it with my old software portfolio, which I've been doing for 15 years. I'll get involved a bit more and sell a few more software licenses to my existing customers.' They are usually faster and more successful that way.
>
> (Head of Presales, IIoT Platform)

Alpha undertook multiple actions concerning organizational setups, internal policies, and technical implementations to overcome these issues. To resolve the agency problem, Alpha implemented two structural changes that aligned the business units' incentive systems with the structure of the enterprise-wide IIoT platform. Alpha restructured its sales force and established internal partner management. Alpha changed the incentives for the sales force from selling hardware to selling platform-based apps that took advantage of connecting diverse machines to the IIoT platform.

> That was the biggest challenge because our sales department is, of course, structured for [...] the product

> business. [...] But here it's about a [...] completely new technology that connects things that the classic machine builder doesn't even know.
>
> (Head of Digital Portfolio, IIoT Platform)

The internal partner management identified use cases for how the platform provides value, collected requirements from individual units, and created connections among departments and customers. Alpha established platform application centers globally, that is, decentralized development units, close to the premises of internal and external customers, that support applications specific to selected markets and industries. The decentralized application centers developed customized applications that allowed business units to draw on the generic infrastructure of the IIoT platform and create value for customers in specific markets and industries. Thus, Alpha created new knowledge on the platform and supported specific use cases to accelerate adoption.

Alpha established typical platform ecosystem components, such as a partner program, technical and social boundary resources, and started building a marketplace. The global partner program, set up in 2017, should bring together platform users and complementors, facilitating interaction within the IIoT platform ecosystem by enabling better matchmaking. The company then introduced specific levels to classify partners based on their competencies. For instance, a silver partner status was sufficient for prototyping, but a gold partner status might have been needed for a large-scale solution. Furthermore, they introduced a referral fee model entitling Alpha to a percentage of the initial revenue when the partner creates an opportunity. Further, Alpha established an IIoT community. The purpose of the community was to enable the exchange of knowledge and best practices among Alpha's IIoT platform users and to help Alpha get better feedback from its users through a more casual setting within the community than the typical customer-supplier relationship.

Alpha focused on investing in the supply side of its emerging platform ecosystem, as it had long-lasting partnerships with other industrial organizations that then joined the platform partner program. Leveraging its trusted relationships and reputation, Alpha rapidly increased the number of complementors. However, the partners stayed in their previous partnership role, which focused on being resellers or technology partners rather than contributors to a platform marketplace.

> The content partners are still somewhat uncharted territory, and I would say that's probably where the greatest need for work remains. [...] The partner manager was subordinate to the sales lead and was incentivized based on the amount of sales generated through partners. As a result, the incentives were obvious—there were very few incentives to say, 'I need a partner who provides content in order to be successful in the long run and to acquire customers in the long run.'
>
> (Portfolio Manager, IIoT Platform)

Alpha's strategic actions significantly contributed to structural misalignment in its platform model. Firstly, Alpha leveraged established industrial networks shaped by legacy buyer–supplier relationships, thereby embedding a product-service logic incompatible with platform governance. The IIoT platform was thus marketed primarily as a technology solution, limiting open innovation. Secondly, governance issues further exacerbated the misalignment. Alpha's partner program and its benefits, such as more prominent promotion, relied on tiered, revenue-driven incentives that encouraged partners to focus on short-term, customized projects rather than scalable solutions. The limited traction of the marketplace reinforced these bilateral dynamics, restricting open participation. Thirdly, third-party developers adapted by creating tailored solutions aligned with short-term incentives, but these rarely contributed to ecosystem-wide innovation. Consequently, development focused narrowly on specific use cases, primarily led by consulting firms, which lacked scalability and industry-wide impact, resulting in additional bespoke implementation projects that reinforced the misalignment.

Consequently, the introduction of Alpha's IIoT platform to the market illuminated a profound structural misalignment between existing governance structures and the open, participatory governance necessary for successful platform ecosystems. This ultimately constrained the potential for transformative digitization and innovative business model development, highlighting the need for significant strategic realignment to achieve platform success.

4.3 | Strategic Pivot—Refocusing on Solution Sales

In the pivoting episode, Alpha realized that operating a platform business model that relies on network effects and the generativity of its ecosystem did not work. A strategic pivot was announced and implemented, where Alpha would focus on developing IIoT solutions and selling them as a service. This marks a departure from the original platform strategy.

Initially, Alpha aimed to position the IIoT platform primarily as a platform business model and counted on an ecosystem of partners and platform users to develop generative innovations. However, after pushing the platform model with significant effort through various measures in the market launch episode, Alpha realized that successfully establishing such a model proved unfeasible due to the misaligned platform model that had evolved from the internal development and market launch episodes.

> Before, we put the platform in the foreground, the platform functionality, and thought, 'OK, we offer the platform functionality, then all the complementors come, use it and make apps from it, and then the consumers come automatically,' and that didn't happen.
>
> (Digital Sales Strategist, IIoT Platform)

Alpha hoped the demand would rise automatically if enough complementors were accumulated on the platform. The prevalent idea was that platform users and complementors were waiting for an IIoT platform that would allow them to build and scale their IIoT solutions. However, this was not the case, as most complementors were not ready or convinced yet to endorse the platform.

> The idea was to bring as many [complementors] as possible on board [...] to create enough mass to generate gravitation, which attracts consumers. [...] This was the basic strategy, I would say. [...] This [approach] blew right up in our faces [...] in the end, we overestimated the maturity of our customers.
>
> (Digital Sales Strategist, IIoT Platform)

Alpha changed its strategy in 2019, focusing on providing and selling IIoT solutions based on its IIoT platform as infrastructure rather than selling the platform itself. Thus, Alpha had to focus on users first and become more active as a solution provider. The priority was co-creating attractive applications tailored to specific customer requirements jointly with other business units and a select number of capable external complementors. Consequently, existing platform ecosystem features were significantly reduced, and the original solution-incentivized sales structure was revived.

> I'll give you two numbers, one is 40 [partner managers] – that was the old resources that were available to partner management before it was sort of flattened and repositioned. And then there's the number 3 – that's what's left, which is 3 partner managers in the respective zones.
>
> (Partner Development Manager, IIoT Platform)

The pivot resulted in a structural change toward a digital service model, prioritizing Alpha as the main contributor of IIoT solutions over an ecosystem of diverse actors providing solutions through the marketplace. Promoting and supporting end-user projects was thought to foster market development and bring mature IIoT solutions to organizations, which could later be scaled through the marketplace. Through this approach, Alpha hoped to push the IIoT platform's marketplace. However, this behavior cemented Alpha's position as the publisher of most apps on the platform's marketplace.

> So, I think of the apps available online, I estimate a ratio of two-thirds to one-third, meaning two-thirds of the apps come from Alpha, one-third from other providers. But I believe that usage-wise it's more 80% of Alpha and then a maximum of 20% by other providers. So, there's still a lot to be done to create a really great marketplace.
>
> (Managing Director, Software Developer A)

During the pivoting episode, the top management's support of the IIoT platform decreased. After significant investments and organizational efforts, the dominant view was that the IIoT platform and its new service business model would have to prove its financial viability.

> So [IIoT platform] was a big project of hope but also a trial-and-error project, and now slowly, this first hype is over, and [the IIoT platform initiative] has to see how it will be financed afterwards. Because first, you are given a lot of leeway, and now comes the phase where you have to prove yourself, and I think that's where [the IIoT platform] stands right now.
>
> (VP Global Alliance Management, IIoT Platform)

The IIoT platform had created a lot of hope and expectations within Alpha. Realizing a return on investment, however, appeared to be challenging. The prevalent opinion was that IIoT was still a very recent technology, and the market needed time to evolve and mature. At the same time, the IIoT platform tried to do too many things right from the beginning.

> It was clear that we had to persevere for IIoT to happen. That we had to persevere that long was not clear to us.
>
> (Senior Innovation Manager, Alpha)

In the pivoting episode, Alpha shifted from a platform model reliant on network effects to selling IIoT solutions as services, essentially abandoning its original platform strategy. Structurally, this pivot represents a reproduction of the initial structure rather than adopting a new platform-related structure. Alpha recognized misalignments but largely retained existing governance structures and legacy routines, constraining innovation. Top management support waned, shifting focus toward financial viability. Alpha expanded its digital solution offerings by integrating the platform into its broader industrial solutions portfolio. The pivot highlights persistent tensions between the embedded structure and the strategic agency to build a platform model.

4.4 | Consolidation—Integration of Platform in Solution Portfolio

The pivoting episode led to a service-centric business model focused on developing and selling integrated digital solutions and the gradual transfer of focus from the IIoT platform topic toward broader digital industrial ecosystem topics, such as digital twins and the metaverse. Alpha explicitly abandoned its earlier aspiration to operate a distinct platform, recognizing internal and market challenges. Instead, it adopted a holistic approach that integrated the IIoT platform into a broader ecosystem initiative, emphasizing digital twins, analytics solutions, and broader industrial digitalization.

> As a company moving to a standard digital platform called [new ecosystem initiative], we didn't want to have [the IIoT platform] as another platform in the new platform ecosystem. We focused more on the unique capabilities we're going to deliver, which are insights into your operational effectiveness, your productivity, and the overall effectiveness of your equipment. This name change is more about the insights delivered with the software and our realization that [the IIoT

> platform] should be an application within [the new ecosystem initiative].
>
> (From secondary data, SVP Business Strategy and Marketing of Digital Business Unit)

Alpha integrated the IIoT platform as a functional analytics solution toolbox, clearly rebranding and repositioning it within the new ecosystem initiative. The platform partnership programs were correspondingly realigned, shifting existing relationships and developer resources toward the new ecosystem initiative. Alpha utilized the knowledge, capabilities, and experiences from its earlier efforts, integrating these acquired assets into the solution-centric portfolio now offered to customers. The structural shift entailed repurposing platform features and resources toward internal optimization and customer-focused solution development, significantly reducing its previous ecosystem-oriented ambitions.

> When [the IIoT platform] first came out, it was positioned as a platform. What we quickly learned is that it was also a toolkit. So, our idea was to give users a platform and a toolkit to do whatever they wanted. Then we realized that what our customers really want are applications.
>
> (From secondary data, SVP Business Strategy and Marketing of Digital Business Unit)

Alpha formally discontinued the platform as a standalone strategy, embedding its remaining functionalities within comprehensive digital solutions marketed explicitly around analytics and operational effectiveness. Despite this fundamental reorientation, Alpha maintained continuity in leveraging previously built platform capabilities, signaling both a structural reversion and a strategic adaptation.

> [Alpha] will integrate [IIoT Platform] into the core of its operations software portfolio and focus even more on generating business value from IoT data. [Alpha] continues to develop [the IIoT Platform] (including partners and developers worldwide) into an [analytics solution] as part of industrial operations and the [new ecosystem initiative].
>
> (From secondary data, official press release in early 2023)

Thus, Alpha's journey through the consolidating episode highlighted an explicit departure from its original platform ambitions toward a service-driven solution approach, reflecting the accumulated learnings from the preceding phases. Structurally, this episode represents a reversion toward the initial structure, where stalled platform scaling prompted Alpha to repurpose its architecture toward internal optimization and customer-focused solution development.

5 | A Structuration-Based Theory of IIoT Platform Failure

The case of Alpha shows that IIoT platform initiatives evolve within a persistent tension between inherited structures and new strategic intent. Existing architectures, governance routines, and market relations carry a product–service logic focused on customized solutions. The platform strategy, in contrast, aspires to create ecosystem-based value creation through openness and scalability. This tension generates a recursive process in which managerial actions reproduce rather than transform the inherited structures, resulting in a gradual strategic drift.

IIoT platform failure, therefore, is not a single event but a path-dependent process of structural reinforcement. Across four recurring mechanisms of *structural embeddedness*, *structural misalignment*, *structural reproduction*, and *structural reversion* (see Table 3). Through these mechanisms, we explain how recursive interactions between architecture, governance, and market structures create reinforcing path dependencies that constrain IIoT platform evolution and lead to failure (see Figure 3).

At the outset, governance inheritance anchors the IIoT platform initiative in the firm's established product–service structures. This creates structural embeddedness, where design and coordination follow existing industrial logics instead of platform logics (Springer et al. 2025). When the platform opens, these inherited structures generate misalignment between bilateral contracting and the multilateral coordination required for ecosystem growth. In response, managers attempt to adapt governance incrementally. These partial adjustments yield structural reproduction, sustaining governance forms that neither abandon nor transform the underlying logic. Over time, accumulated constraints and declining top management support result in structural reversion, in which the platform is repurposed as a firm-specific solution.

5.1 | Structural Embeddedness and the Perpetuation of Legacy Structures

The first mechanism, structural embeddedness, arises when firms attempt to launch IIoT platform initiatives from within their existing organizational structures. To gain early legitimacy, IIoT platform initiatives are often embedded within existing business units, drawing on established resources, governance, and sales structures. Yet, these inherited structures are grounded in a product–service logic that favors customized, bilateral solutions over scalable, modular innovation. As a result, the IIoT platform initiative's architecture and governance reproduce the firm's existing coordination structures rather than transforming them.

This mechanism unfolds as firms navigate two conflicting logics. The product–service logic prioritizes control, customer specificity, and relational contracting, whereas the IIoT platform logic depends on modular design, standardized interfaces, and open participation. Early integration within business units strengthens the former: technical architectures are tailored to internal processes, governance mirrors traditional contracting, and market interactions remain tied to existing client relationships. Rather than developing into an independent, generative IIoT platform, the initiative remains dependent on firm-specific architectures, established governance practices at the business unit level, and market structures inherited from industrial contracting practices.

TABLE 3 | Structuration mechanisms of IIoT platform failure.

Mechanism	Structuration process	Effect	Mapping to empirical findings
Structural embeddedness	Platform governance is shaped by existing enterprise architecture and governance, embedding a product-service rather than a platform logic.	Structures favor customized solutions over scalable, modular applications, constraining ecosystem innovation (e.g., vertical integration projects).	Episode 1—Internal Development
Structural misalignment	Platform governance inherits industrial buyer–supplier contracting, reinforcing one-to-one exchanges over open participation.	Market interactions remain bilateral and service-based, limiting network effects and ecosystem scalability (illustrated by collaborative but vertical use cases led by consulting partners).	Episode 2—Market Launch
Structural reproduction	Despite recognizing misalignment, firms modify governance and architecture incrementally, failing to break from legacy contracting and bilateral dependencies.	Rather than transitioning to a scalable platform model, firms sustain hybrid governance structures that entrench partial platform adoption.	Episode 3—Strategic Pivot
Structural reversion	As platform scaling stalls, firms repurpose architecture for internal process optimization, deprioritizing ecosystem governance.	The platform ceases to function as an open ecosystem, becoming an internally focused or niche solution rather than a multi-sided market.	Episode 4—Consolidation

In Alpha's case, these dynamics meant that the IIoT platform initiative, initially envisioned as an open industry infrastructure, was instead designed around the needs of its own business units. Tailoring the platform for internal business units presented a double-edged sword. On the one hand, it ensured early adoption of the platform within Alpha and consequently helped justify resource allocations. On the other hand, the long-term consequence was that design decisions and governance elements such as partner programs, access control, and pricing structures reflected the logic of project-based service delivery rather than ecosystem coordination. This structural inertia is not limited to the case of Alpha and is commonly observed in industrial platform initiatives (Arnold et al. 2024; Sjödin et al. 2022), which limits generativity, restricts interoperability, and ultimately hinders the formation of scalable platform ecosystems.

5.2 | Structural Misalignment and the Persistence of Bilateral Exchange Structures

The second mechanism, structural misalignment, arises when industrial firms seek to transform internally developed digital solutions into platform-based ecosystems but continue to rely on inherited governance regimes. While structural embeddedness captures how early industrial platform initiatives are shaped by product–service logic, structural misalignment describes the friction that occurs when this logic encounters the coordination demands of an open, multi-actor environment. The governance structures rooted in industrial practice, such as relational contracting, long-term service agreements, and customized integration projects, conflict with the modular, standardized coordination required for scalable participation.

This misalignment stems from the structural divergence between industrial buyer–supplier relationships and platform-based governance models (Gawer and Cusumano 2014). Industrial firms traditionally operate within relational contracting models, where trust-based, long-term partnerships dictate the exchange of customized solutions (Huber et al. 2017). By contrast, scalable platforms depend on transactional standardization, where modularity and open participation facilitate dynamic interactions across a broad ecosystem (Boudreau 2012). In IIoT contexts, this tension manifests as firms attempt to introduce platform governance structures while maintaining their pre-existing relational structures. Instead of fostering an open ecosystem, the platform inherits the closed, dyadic exchange structures of the industrial setting, constraining its ability to generate network effects.

This pattern is not unique to Alpha's IIoT platform efforts but reflects a broader governance inertia across IIoT platform initiatives. Similar trends have been observed in cases such as GE Predix, where platform initiatives initially designed to foster open innovation evolved into facilitators of bespoke industrial solutions rather than scalable marketplaces (Arnold et al. 2022; Agarwal and Brem 2015; Anderson et al. 2022). Instead of generating network effects, these IIoT platforms effectively reinforced firm-specific buyer–supplier relationships, replicating traditional enterprise contracting structures rather than transforming them. This governance inertia extends beyond IIoT platforms to digital manufacturing, smart infrastructure, and industrial automation, where procurement models and regulatory frameworks inhibit the transition to standardized, scalable ecosystems (Arnold et al. 2024; Sjödin et al. 2022).

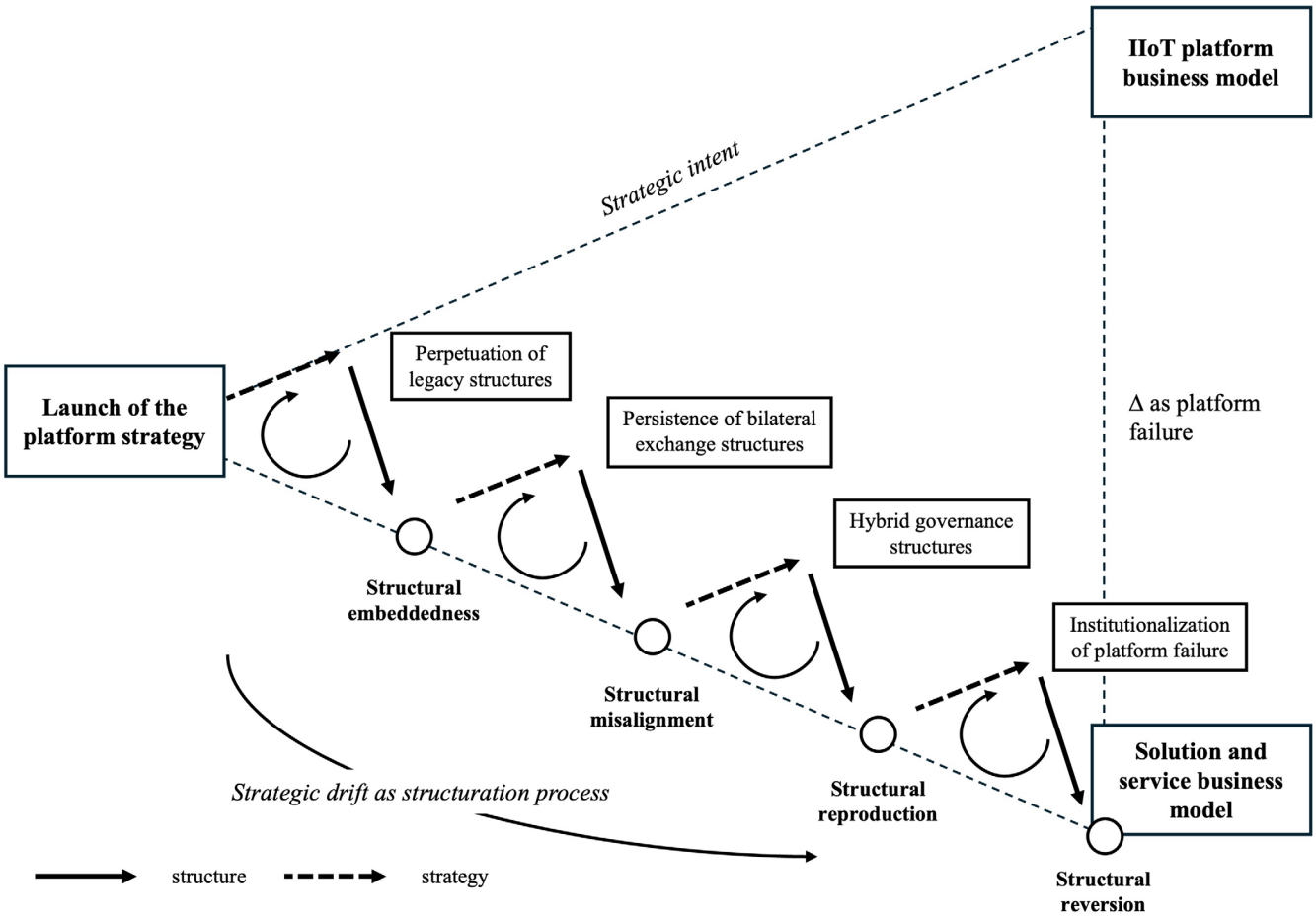

FIGURE 3 | Structuration process of IIoT platform failure trajectories.

5.3 | Structural Reproduction and Hybrid Governance Structures

The third mechanism, structural reproduction, emerges as IIoT platform initiatives attempt to correct the structural misalignment described in the second mechanism through hybrid governance structures. In response to ecosystem inertia, firms introduce governance adjustments to incentivize complementor participation and drive the scaling of the ecosystem. However, these strategic adaptations fail to dislodge embedded bilateral exchange structures, instead reproducing legacy contracting practices within a hybrid governance model. Rather than enabling a shift to scalable multi-sided interactions, they reinforce dependencies on customized industrial transactions.

The structural reproduction arises as IIoT platform initiatives attempt to navigate between two conflicting governance structures: industrial contracting, where firm-specific relationships and project-based transactions dominate, and platform governance, which relies on standardized interfaces, modularity, and network effects. When IIoT platform initiatives introduce governance mechanisms to foster ecosystem-wide interactions, they encounter structural resistance, as industrial partners remain embedded in pre-existing contracting norms. In response, firms adopt hybrid governance models, layering platform mechanisms onto legacy structures rather than replacing them. Instead of shifting toward modular and scalable value creation, these drifts reproduce and reinforce firm-specific transactional patterns.

This phenomenon is not unique to Alpha's IIoT platform efforts but represents a broader challenge for industrial incumbents attempting to transition from product-service models to platform-based ecosystems. Across IIoT platformization initiatives, firms introduce incremental governance adaptations, that is, adjusting partner programs, refining pricing structures, or modifying participation rules, to stimulate third-party innovation. However, research on other IIoT platform initiatives suggests that such governance adjustments often result in incremental modifications to legacy contracting models rather than a decisive shift toward multi-sided ecosystems (Pauli et al. 2025; Arnold et al. 2024). Like Alpha's, these initiatives attempted to bridge industrial contracting with platform governance. Yet, their governance structures ultimately gravitated toward hybrid models, prioritizing customization over modularity and sustaining dependencies on project-based transactions.

5.4 | Structural Reversion and the Institutionalization of Platform Failure

The fourth mechanism, structural reversion, represents the culmination of the reinforcing path dependencies that

constrain IIoT initiatives and prevent them from becoming scalable IIoT platforms. When firms fail to overcome the constraints of legacy incentives, bilateral coordination, and hybrid governance, their industrial platform efforts gradually lose strategic coherence. Instead of maturing into open, generative IIoT platforms, the initiatives regress into firm-specific digital tools or narrowly defined service solutions. This reversion does not occur through a single breakdown but through an institutionalized retreat from the platform vision, as firms redirect resources toward internal efficiency rather than ecosystem development.

The structural nature of this reversion emerges from an accumulative process of reproducing and reinforcing industrial governance models rather than platform-native mechanisms. From their inception, IIoT platform initiatives inherit architectural constraints, governance structures, and incentive models. As these initiatives attempt to expand, they encounter resistance from entrenched industrial exchange structures, leading to incremental governance adjustments that fail to realign ecosystem incentives. Instead of generating network effects, hybrid governance structures sustain bilateral dependencies, limiting scalability. Over time, firms recognize that the IIoT platform initiative has not achieved its intended transformation and repurpose the platform for internal optimization and customer-focused solution development.

This structural reversion is evident in IIoT platform initiatives, such as Alpha's, where initial ambitions for industry-wide ecosystems have progressively narrowed into firm-centric solutions. The inability to attract third-party complementors beyond customized service providers leads firms to prioritize internal adoption over external scalability. By the final phase, the IIoT platform initiative is integrated into the company's broader digital services portfolio, effectively abandoning its open-platform strategy in favor of a service-based model. The IIoT platform does not necessarily collapse, but it ceases to function as a multi-sided market and instead becomes an internal process optimization tool, serving firm-specific needs rather than redefining value creation across the industry.

Thus, the failure in IIoT platform initiatives is not simply a market rejection, but a recursive structuration process in which reinforcing structural constraints at each stage lock the platform into a structurational trajectory leading to failure. Ultimately, IIoT platform failure is institutionalized when firms cease to pursue their original ecosystem vision and repurpose the platform for alternative uses. Unlike temporary platform setbacks, which can be corrected through strategic pivots, this form of failure represents a structural dead-end in which the platform no longer aspires to function as an open, multi-sided market. Without early interventions to disrupt reinforcing path dependencies, IIoT platform initiatives risk becoming permanently locked into firm-specific applications rather than evolving into industry-wide ecosystems.

The proposed model primarily generalizes to industrial and asset-intensive contexts, where platform initiatives emerge from legacy organizations with entrenched architectures, governance routines, and contracting practices. In such settings, the model explains how inherited structures constrain platform evolution and lead to path-dependent failure trajectories. By contrast, its generalizability to enterprise software contexts may be limited. Enterprise software platforms typically operate in digitally more mature environments with standardized data architectures, modular APIs, and established governance mechanisms. Here, structural reproduction and reversion are less likely because platform logics are native rather than inherited.

6 | Discussion

This article explains how industrial platform initiatives become locked into legacy and develops a structuration-based process theory of IIoT platform failure. By tracing how architectural, governance, and market structures interact with managerial actions over time, we demonstrate that IIoT platform failure is not a discrete event, but rather the outcome of recursive structuration processes that progressively constrain platformization efforts.

6.1 | Theoretical Implications

First, this article develops a process perspective for theorizing IIoT platform evolution and failure by explaining how misalignment between legacy structures and emerging platform logics unfolds over time. Prior research has typically interpreted failure within existing theoretical frames as the outcome of discrete design flaws or strategic errors such as governance misalignment (Jacobides et al. 2024), pricing strategies (Lin et al. 2011), late market entry (Chintakananda and McIntyre 2014), or other isolated missteps (Jesus et al. 2024; Wlcek et al. 2023). Our findings extend beyond these event-based explanations by providing a theoretical lens for studying failure as an emergent, path-dependent process. We show that IIoT platform initiatives evolve through recursive interactions between structural persistence and managerial action, which gradually reproduce inherited constraints. Rather than viewing failure as a single-point breakdown (West and Wood 2013), we theorize it as the institutional reproduction of legacy architectures, governance regimes, and market arrangements. This reconceptualization advances theory by identifying failure trajectories as predictable outcomes of structural inertia (Hannan and Freeman 1984) and governance rigidities (Wareham et al. 2014), thereby offering a framework for theorizing how digital transformation, such as IIoT platform initiatives, becomes path dependent over time.

Second, this article contributes to theorizing platform scalability by identifying the structural boundary conditions under which established platform mechanisms fail to operate. B2C and B2B enterprise software platforms typically rely on modular architectures and self-reinforcing network effects that allow governance to stabilize early and scale efficiently (Baldwin and Woodard 2009; Jacobides et al. 2018). In contrast, IIoT platform initiatives emerge in industrial settings characterized by legacy contracting models, fragmented ecosystems, and heterogeneous infrastructures (Pauli et al. 2021). These inherited conditions become embedded in boundary resources and interfaces, enabling and constraining ecosystem actors. This prevents the standardized boundary resources and modular interfaces from being effectively adopted and routinized at the ecosystem level, even when they are technically provided by the platform owner, thereby limiting the generativity observed in other platform types (Ghazawneh and Henfridsson 2013). As

a result, governance structures that sustain scalability in B2C and enterprise software contexts often reproduce organizational lock-in and bilateral dependencies in IIoT settings (Petrik and Herzwurm 2020b). This distinction reveals that scalability depends on underlying institutional and infrastructural structures, thereby specifying when and why platform logics break down in complex industrial environments.

Finally, this article advances platform governance research by revealing how governance evolves under structural constraint rather than through deliberate design (Springer et al. 2025). Prior research has treated misalignment as a correctable design flaw (Tiwana 2015). Our findings show that in IIoT contexts, governance is inherited and reproduced through existing industrial coordination structures (Hein et al. 2019). This inheritance embeds buyer–supplier routines and contracting logics into emerging platforms, limiting their capacity to develop platform-native coordination. By conceptualizing governance adaptation as a path-dependent process, we shift attention from the design of mechanisms to the conditions under which governance becomes structurally entrapped. This reframing explains how hybrid governance, intended to bridge the gap between legacy and platform logics, can instead entrench structural lock-in and constrain ecosystem scaling.

6.2 | Practical Implications

This article provides insights for firms seeking to develop scalable IIoT platforms while avoiding reinforcing path dependencies that drive failure trajectories. Our findings suggest that platform governance, incentive structures, and ecosystem interactions must be designed for long-term scalability rather than immediate internal adoption. The article also raises awareness among practitioners of the tensions that arise from path dependencies and manifest in persistent bilateral relationships. Recognizing these dynamics early enables decision-makers to take preventive action before such dependencies become irreversibly embedded in the platform.

First, IIoT platform governance must be structurally independent of legacy business units to prevent the early embedding of product–service logics that limit ecosystem formation. Many IIoT platforms originate as internal initiatives to support process optimization and secure buy-in from business units, but they also embed pre-existing sales structures, incentive models, and governance frameworks that constrain scalability later in the lifecycle. To avoid this, firms must establish dedicated platform governance structures that remain separate from existing business divisions, so that business units cannot easily influence them to imprint their legacy governance structures on the platform (Schreieck et al. 2025). Crucially, top management support must extend beyond initial sponsorship and continually ensure the platform initiative's independence. This might involve tolerating early financial underperformance and actively legitimizing the platform as a long-term ecosystem investment rather than a short-term product extension. Absent such sustainable support, early governance choices can quickly erode top management confidence, diminishing the platform's legitimacy and endangering its continued development (Gumusluoğlu and Ilsev 2009; Altman and Tushman 2017).

Second, firms must design platform-native incentive structures from the outset to ensure that sales teams and complementors are incentivized to engage in modular, scalable innovation rather than customized industrial solutions. As our findings show, hybrid governance models, which are often implemented as a compromise between platform governance and relational contracting, tend to reinforce existing dependencies rather than facilitate a transition toward multi-sided platform dynamics. Without governance structures that encourage standardized, interoperable solutions, platforms remain locked into bilateral contracting models, limiting network effects and long-term scalability.

6.3 | Limitations and Future Research

This research exhibits several limitations. First, the theoretical model developed relies on a single case study, and as it is the nature of single case studies, the findings are hardly generalizable (Siggelkow 2007). Alpha's specific organizational dynamics and market conditions might only partially represent other contexts within the Industrial Internet of Things, where varying degrees of technological maturity and market dynamics could lead to different outcomes. Furthermore, although we collected a large data sample encompassing Alpha and partners, the interdependencies between architecture, governance, and market structures, as well as strategic actions, are modeled based on retrospective analysis, which may not capture all nuances of real-time decision-making and environmental changes.

Future research could address the limitations by expanding the empirical base across multiple case studies to test the robustness and applicability of the proposed process model of IIoT platform failure. Investigating a variety of IIoT initiatives across different industrial contexts and geographical locations could enrich our understanding of the diverse strategies and structural adjustments that characterize successful versus unsuccessful platform implementations. Beyond extending the empirical base, future studies could explore mechanisms that help firms cope with path dependencies and identify governance designs that enable a shift from bilateral contracting toward scalable platform dynamics. For example, further research could investigate how platform-native incentive systems, modular boundary resources, or organizational ambidexterity contribute to overcoming early structural lock-ins.

7 | Conclusion

This article advances research on digital platforms by demonstrating that IIoT platform failure is not a discrete event but a structurally embedded process. By identifying the mechanisms of structural embeddedness, misalignment, reproduction, and reversion, we offer a framework for understanding why industrial firms struggle to scale IIoT platforms. Unlike B2C and enterprise software B2B platforms, IIoT platforms inherit architecture models and governance structures that reinforce bilateral dependencies rather than foster open ecosystems. Our findings suggest that successful platform strategies require bold design moves that disrupt these reinforcing path dependencies early, rather than incremental adaptations that sustain them. By reframing IIoT platform failure as a process of structural lock-in, this article

underscores the urgency for firms to design platform-native incentives and governance structures from the outset. Without early interventions, IIoT platforms risk becoming internalized solutions rather than industry-wide ecosystems. By shifting the focus from static explanations of failure to a dynamic, process-oriented perspective, this article contributes to a broader understanding of why industrial platformization remains an elusive goal for most providers and how firms can better position themselves to realize the transformative potential of IIoT platforms.

Acknowledgments

We are grateful to the editorial team and the anonymous reviewers for their insightful and constructive comments throughout the review process, which substantially improved this manuscript. We thank Jörg Weking, Vivien Neumann, and Lukas Daßler for their valuable feedback and support during the early stages of this research. We also thank the organizers and participants of the DPE Forum 2024 at the University of Passau, where an earlier version of this article benefited from helpful discussion and feedback. Any remaining errors are our own. Open Access funding enabled and organized by Projekt DEAL.

Funding

This work was partially supported by the Austrian Science Fund (FWF) through funding to Maximilian Schreieck [10.55776/I6567].

Ethics Statement

The authors have read and agreed to the Committee on Publication Ethics (COPE) international standards for authors.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data available on request from the authors.

References

Agarwal, N., and A. Brem. 2015. "Strategic Business Transformation Through Technology Convergence: Implications From General Electric's Industrial Internet Initiative." *International Journal of Technology Management* 67, no. 2–4: 196–214.

Altman, E. J., and M. L. Tushman. 2017. "Platforms, Open/User Innovation, and Ecosystems: A Strategic Leadership Perspective." In *Entrepreneurship, Innovation, and Platforms*. Emerald Publishing Limited.

Anderson, E. G., J. Lopez, and G. G. Parker. 2022. "Leveraging Value Creation to Drive the Growth of B2b Platforms." *Production and Operations Management* 31, no. 12: 4501–4514.

Arnold, L., P. Hukal, and M. Link. 2024. "Consortium Governance and Market Entry of Digital B2b Platforms: The Case of Adamos." *Information Systems Journal* 35, no. 4: 1235–1256.

Arnold, L., J. Jöhnk, F. Vogt, and N. Urbach. 2022. "IIot Platforms' Architectural Features—A Taxonomy and Five Prevalent Archetypes." *Electronic Markets* 32, no. 2: 927–944.

Arnold, L., P. Karnebogen, and N. Urbach. 2023. "Challenges of Organizations' Adoption of Industrial IoT Platforms — Results of a Delphi Study." *International Journal of Innovation and Technology Management* 20, no. 6: 2350041.

Baldwin, C. Y., and C. J. Woodard. 2009. "The Architecture of Platforms: A Unified View." In *Platforms, Markets and Innovation*. Edward Elgar Publishing.

Boudreau, K. J. 2012. "Let a Thousand Flowers Bloom? An Early Look at Large Numbers of Software App Developers and Patterns of Innovation." *Organization Science* 23, no. 5: 1409–1427.

Boyes, H., B. Hallaq, J. Cunningham, and T. Watson. 2018. "The Industrial Internet of Things (Iiot): An Analysis Framework." *Computers in Industry* 101: 1–12.

Ceccagnoli, M., C. Forman, P. Huang, and D. J. Wu. 2012. "Cocreation of Value in a Platform Ecosystem: The Case of Enterprise Software." *MIS Quarterly* 36, no. 1: 263–290.

Cennamo, C., H. Ozalp, and T. Kretschmer. 2018. "Platform Architecture and Quality Trade-Offs of Multihoming Complements." *Information Systems Research* 29, no. 2: 461–478.

Chanias, S., M. D. Myers, and T. Hess. 2019. "Digital Transformation Strategy Making in Pre-Digital Organizations: The Case of a Financial Services Provider." *Journal of Strategic Information Systems* 28, no. 1: 17–33.

Chintakananda, A., and D. P. McIntyre. 2014. "Market Entry in the Presence of Network Effects:A Real Options Perspective." *Journal of Management* 40, no. 6: 1535–1557.

Cloutier, C., and A. Langley. 2020. "What Makes a Process Theoretical Contribution?" *Organization Theory* 1, no. 1: 2631787720902473.

Cusumano, M., A. Gawer, and D. B. Yoffie. 2019. *The Business of Platforms: Strategy in the Age of Digital Competition, Innovation, and Power*. Harper Business.

De Reuver, M., C. Sørensen, and R. C. Basole. 2018. "The Digital Platform: A Research Agenda." *Journal of Information Technology* 33, no. 2: 124–135.

DeSanctis, G., and M. S. Poole. 1994. "Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory." *Organization Science* 5, no. 2: 121–147.

Drechsler, K., R. Gregory, H.-T. Wagner, and S. Tumbas. 2020. "At the Crossroads Between Digital Innovation and Digital Transformation." *Communications of the Association for Information Systems* 47, no. 1: 521–538.

Drechsler, K., T. Grisold, and S. Seidel. 2022. "Cascading Digital Options and the Evolution of Digital Infrastructures: The Case of IIot." ICIS 2022 Proceedings 5.

Eisenhardt, K. 1989. "Building Theories From Case Study Research." *Academy of Management Review* 14, no. 4: 532–550.

Eisenhardt, K. M., and M. E. Graebner. 2007. "Theory Building From Cases: Opportunities and Challenges." *Academy of Management Journal* 50, no. 1: 25–32.

Eisenmann, T., G. Parker, and M. W. Van Alstyne. 2006. "Strategies for Two-Sided Markets." *Harvard Business Review* 84, no. 10: 92.

Evans, D. S. 2009. "How Catalysts Ignite: The Economics of Platform-Based Start-Ups." In *Platforms, Markets and Innovation*, vol. 416. Edward Elgar Publishing.

Gawer, A., and M. A. Cusumano. 2014. "Industry Platforms and Ecosystem Innovation." *Journal of Product Innovation Management* 31, no. 3: 417–433.

Ghazawneh, A., and O. Henfridsson. 2013. "Balancing Platform Control and External Contribution in Third-Party Development: The Boundary Resources Model." *Information Systems Journal* 23, no. 2: 173–192.

Giddens, A. 1984. *The Constitution of Society: Outline of the Theory of Structuration*. Univ of California Press.

Gioia, D. A., K. G. Corley, and A. L. Hamilton. 2013. "Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology." *Organizational Research Methods* 16, no. 1: 15–31.

Grodal, S., M. Anteby, and A. L. Holm. 2021. "Achieving Rigor in Qualitative Analysis: The Role of Active Categorization in Theory Building." *Academy of Management Review* 46, no. 3: 591–612.

Gumusluoğlu, L., and A. Ilsev. 2009. "Transformational Leadership and Organizational Innovation: The Roles of Internal and External Support for Innovation." *Journal of Product Innovation Management* 26, no. 3: 264–277.

Haki, K., M. Blaschke, S. Aier, R. Winter, and D. Tilson. 2024. "Dynamic Capabilities for Transitioning From Product Platform Ecosystem to Innovation Platform Ecosystem." *European Journal of Information Systems* 33, no. 2: 181–199.

Hannan, M. T., and J. Freeman. 1984. "Structural Inertia and Organizational Change." *American Sociological Review* 49: 149–164.

Hein, A., J. Weking, M. Schreieck, M. Wiesche, M. Böhm, and H. Krcmar. 2019. "Value Co-Creation Practices in Business-To-Business Platform Ecosystems." *Electronic Markets* 29, no. 3: 503–518.

Huber, T. L., T. Kude, and J. Dibbern. 2017. "Governance Practices in Platform Ecosystems: Navigating Tensions Between Cocreated Value and Governance Costs." *Information Systems Research* 28, no. 3: 563–584.

Jacobides, M. G., C. Cennamo, and A. Gawer. 2018. "Towards a Theory of Ecosystems." *Strategic Management Journal* 39, no. 8: 2255–2276.

Jacobides, M. G., C. Cennamo, and A. Gawer. 2024. "Externalities and Complementarities in Platforms and Ecosystems: From Structural Solutions to Endogenous Failures." *Research Policy* 53, no. 1: 104906.

Jesus, L., M. Rosemann, K. Desouza, and M. Kowalkiewicz. 2024. "Why Digital Platforms by Incumbents Fail: Results From a Delphi Study." *Communications of the Association for Information Systems* 54: 889–910.

Jones, M. R., and H. Karsten. 2008. "Giddens's Structuration Theory and Information Systems Research." *MIS Quarterly* 32: 127–157.

Jullien, B., A. Pavan, and M. Rysman. 2021. "Two-Sided Markets, Pricing, and Network Effects." In *Handbook of Industrial Organization*. Elsevier.

Kapoor, K., A. Z. Bigdeli, Y. K. Dwivedi, A. Schroeder, A. Beltagui, and T. Baines. 2021. "A Socio-Technical View of Platform Ecosystems: Systematic Review and Research Agenda." *Journal of Business Research* 128: 94–108.

Kretschmer, T., A. Leiponen, M. Schilling, and G. Vasudeva. 2022. "Platform Ecosystems as Meta-Organizations: Implications for Platform Strategies." *Strategic Management Journal* 43, no. 3: 405–424.

Kude, T., and T. L. Huber. 2025. "Responding to Platform Owner Moves: A 14-Year Qualitative Study of Four Enterprise Software Complementors." *Information Systems Journal* 35, no. 1: 209–246.

Langley, A. 1999. "Strategies for Theorizing From Process Data." *Academy of Management Review* 24, no. 4: 691–710.

Lin, M., S. Li, and A. B. Whinston. 2011. "Innovation and Price Competition in a Two-Sided Market." *Journal of Management Information Systems* 28, no. 2: 171–202.

McKinsey. 2022. "The Accelerating Value of the Internet of Things." https://www.mckinsey.com/alumni/news-and-events/global-news/firm-news/the-accelerating-value-of-the-internet-of-things.

Menon, K., H. Kärkkäinen, and T. Wuest. 2020. "Industrial Internet Platform Provider and End-User Perceptions of Platform Openness Impacts." *Industry and Innovation* 27, no. 4: 363–389.

Orlikowski, W. J. 2000. "Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations." *Organization Science* 11, no. 4: 404–428.

Parker, G., and M. Van Alstyne. 2017. "Innovation, Openness, and Platform Control." *Management Science* 64, no. 7: 2973–3468.

Parker, G., M. Van Alstyne, and X. Jiang. 2017. "Platform Ecosystems: How Developers Invert the Firm." *MIS Quarterly* 41, no. 1: 255–266.

Pauli, T., E. Fielt, and M. Matzner. 2021. "Digital Industrial Platforms." *Business & Information Systems Engineering* 63: 181–190.

Pauli, T., E. Marx, E. Fielt, C. Marheine, and M. Matzner. 2025. "Inhibitors and Enablers of Leverage in Digital Industrial Platform Ecosystems." *Business & Information Systems Engineering* 67: 711–731.

Pauli, T., E. Marx, and M. Matzner. 2020. "Leveraging Industrial Iot Platform Ecosystems: Insights From the Complementors' Perspective." ECIS 2020 Proceedings 77.

Petrik, D., and G. Herzwurm. 2019. "Iiot Ecosystem Development Through Boundary Resources: A Siemens Mindsphere Case Study." Proceedings of the 2nd ACM SIGSOFT International Workshop on Software-Intensive Business.

Petrik, D., and G. Herzwurm. 2020a. "Boundary Resources for Iiot Platforms-A Complementor Satisfaction Study." ICIS 2020 Proceedings 2.

Petrik, D., and G. Herzwurm. 2020b. "Towards the IIot Ecosystem Development–Understanding the Stakeholder Perspective." ECIS 2020 Proceedings 74.

Poole, M. S., and G. DeSanctis. 2004. "Structuration Theory in Information Systems Research: Methods and Controversies." In *The Handbook of Information Systems Research*. IGI Global.

Porter, M. E., and J. E. Heppelmann. 2014. "How Smart, Connected Products Are Transforming Competition." *Harvard Business Review* 92, no. 11: 64–88.

Raffaelli, R., M. A. Glynn, and M. Tushman. 2019. "Frame Flexibility: The Role of Cognitive and Emotional Framing in Innovation Adoption by Incumbent Firms." *Strategic Management Journal* 40, no. 7: 1013–1039.

Rochet, J.-C., and J. Tirole. 2006. "Two-Sided Markets: A Progress Report." *RAND Journal of Economics* 37, no. 3: 645–667.

Sarker, S., S. Sarker, A. Sahaym, and N. Bjørn-Andersen. 2012. "Exploring Value Cocreation in Relationships Between an Erp Vendor and Its Partners: A Revelatory Case Study." *MIS Quarterly* 36, no. 1: 317–338.

Schreieck, M., J. Ondrus, M. Wiesche, and H. Krcmar. 2025. "Platform Governance for Established Companies." *California Management Review* 67, no. 4: 48–74.

Schreieck, M., M. Wiesche, and H. Krcmar. 2022. "From Product Platform Ecosystem to Innovation Platform Ecosystem: An Institutional Perspective on the Governance of Ecosystem Transformations." *Journal of the Association for Information Systems* 23, no. 6: 1354–1385.

Schüler, F., and D. Petrik. 2023. "Measuring Network Effects of Digital Industrial Platforms: Towards a Balanced Platform Performance Management." *Information Systems and e-Business Management* 21, no. 4: 863–911.

Shim, J. P., M. Avital, A. R. Dennis, M. Rossi, C. Sørensen, and A. French. 2019. "The Transformative Effect of the Internet of Things on Business and Society." *Communications of the Association for Information Systems* 44: 129–140.

Siggelkow, N. 2007. "Persuasion With Case Studies." *Academy of Management Journal* 50, no. 1: 20–24.

Sjödin, D., V. Parida, and I. Visnjic. 2022. "How Can Large Manufacturers Digitalize Their Business Models? A Framework for Orchestrating Industrial Ecosystems." *California Management Review* 64, no. 3: 49–77.

Springer, V., K. Randhawa, M. Jovanović, P. Ritala, and F. T. Piller. 2025. "Platform Design and Governance in Industrial Markets: Charting the Meta-Organizational Logic." *Research Policy* 54, no. 6: 105236.

Strauss, A., and J. M. Corbin. 1990. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. Sage Publications, Inc.

Stummer, C., D. Kundisch, and R. Decker. 2018. "Platform Launch Strategies." *Business & Information Systems Engineering* 60, no. 2: 167–173.

Tiwana, A. 2015. "Evolutionary Competition in Platform Ecosystems." *Information Systems Research* 26, no. 2: 266–281.

Tiwana, A., B. Konsynski, and A. A. Bush. 2010. "Research Commentary-Platform Evolution: Coevolution of Platform Architecture, Governance, and Environmental Dynamics." *Information Systems Research* 21, no. 4: 675–687.

Van Alstyne, M. W., G. G. Parker, and S. P. Choudary. 2016. "Reasons Platforms Fail." *Harvard Business Review* 31, no. 6: 2–6.

Van de Ven, A. H., and M. S. Poole. 1995. "Explaining Development and Change in Organizations." *Academy of Management Review* 20, no. 3: 510–540.

Visnjic, I., M. Jovanovic, and S. Raisch. 2022. "Managing the Transition to a Dual Business Model: Tradeoff, Paradox, and Routinized Practices." *Organization Science* 33, no. 5: 1964–1989.

Wareham, J., P. B. Fox, and J. L. C. Giner. 2014. "Technology Ecosystem Governance." *Organization Science* 25, no. 4: 1195–1215.

West, J., and D. Wood. 2013. "Evolving an Open Ecosystem: The Rise and Fall of the Symbian Platform." In *Collaboration and Competition in Business Ecosystems*. Emerald Group Publishing Limited.

Wlcek, M., J. Knapp, C. Marheine, and F. Wortmann. 2023. "Revisiting the IIot Platform Graveyard: Key Learnings From Failed Iiot Platform Initiatives." ICIS 2023 Proceedings 6.

Xu, L. D., W. He, and S. Li. 2014. "Internet of Things in Industries: A Survey." *IEEE Transactions on Industrial Informatics* 10, no. 4: 2233–2243.

Yin, R. K. 2014. *Case Study Research: Design and Methods*. 5th ed. Sage Publications.

Yin, R. K. 2018. *Case Study Research and Applications: Design and Methods*. 6th ed. SAGE.

Yoffie, D. B., A. Gawer, and M. A. Cusumano. 2019. "A Study of More Than 250 Platforms Reveals Why Most Fail." *Harvard Business Review*.

Yoo, Y., R. J. Boland, K. Lyytinen, and A. Majchrzak. 2012. "Organizing for Innovation in the Digitized World." *Organization Science* 23, no. 5: 1398–1408.

Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Data S1:** jpim70039-sup-0001-Supinfo.docx.