Strategic Divergence and Performance Disparity: A Comparative Case Study of Siemens and General Electric' IIOT Platform strategies

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Abstract

Industrial Internet of Things (IIOT) is considered as a cornerstone of the fourth industrial revolution, which promotes the deep digital transformation of those established industrial companies. Siemens and General Electric (GE) are two giants in industry. They started this journey with similar goals, resources and opportunities, and launched their own IIoT platforms-Mind Sphere and Predix respectively. However, their paths are quite different. Siemens has made continuous growth, but GE's plan has encountered difficulties. This paper discusses the puzzle of performance differences through a theoretical-driven comparative case study. This study uses the theories of platform strategy, organizational ambidexterity and dynamic capabilities with a view to analyzing the different strategies and organizational choices made by each company. It is found that Siemens' success is due to its gradual and integrated strategy, which has handled the tension between its traditional hardware business and its new software business. This method promotes the co-evolution of its platform and organizational structure. On the other hand, GE made a particularly radical and separate strategy. They wanted to learn from Silicon Valley's startup model and set up a "GE Digital" department. As a result, their digital goals were out of touch with the industrial core, which led to strategic confusion and finally failed. This research contributes to the literature of digital transformation, which emphasizes the key role of organizational integration in realizing "ambidexterity" and shows how dynamic capabilities support the successful implementation of industrial platform strategy.

Keywords: platform strategy; organizational ambidexterity; industrial internet of things (IIoT)

1. Introduction

The contemporary industrial landscape is undergoing a tectonic shift, often termed the Fourth Industrial Revolution, driven by the convergence of the physical and digital worlds (Schwab, 2017) [16]. The core of this revolution is Industrial Internet of Things (IIOT), which connects machines, sensors and advanced analysis platforms into a large network. IIoT platform can break the traditional data island and collect, analyze and share data from various industrial equipment. This ability brings unprecedented opportunities to innovate, improve efficiency, and create new data-driven business models. In order to remain competitive in the future, traditional industrial companies have to start a complex digital transformation (Porter & Heppelmann, 2014) [14].

Among the companies entering this new field, Siemens and General Electric (GE) are the most typical industrial conglomerates. They are all leading enterprises in the world, with profound industry experience and a large number of industrial equipment installed, and they all think it is very important to lead the IIoT revolution. Realizing this, they launched their own IIoT platforms-Mind Sphere of --Siemens and Predix of GE, all aiming to become the most authoritative operating systems in the industry.

Although Mind Sphere and Predix were neck and neck at first, their later development went to a completely different ending. Siemens' digital business has become the core driving force for growth, and Mind Sphere (now renamed Insights Hub) has become an important part of its entire "Siemens Xcelerator" digital business platform. This platform is closely linked to Siemens' overall strategy of combining the real world with the digital world. GE's Predix is completely different. It was launched with great momentum and invested billions of dollars, but it failed in the end. This project failed to achieve its ambitious revenue target and also made GE fall into a bigger financial dilemma. Finally, GE had to give up its goal of becoming an independent software giant.

This difference brings a very interesting academic problem. Existing research on digital transformation has found that established companies usually encounter some common challenges, such as their old systems are difficult to change, and people in the company are unwilling to accept new things (Westerman et al., 2014)[21], And how to find a balance between

a stable business model and new exploratory projects is difficult in itself (O'Reilly & Tushman, 2016)[12]. However, the case of Siemens and GE provides a near-perfect "natural experiment", which allows us to put aside those common obstacles and specifically analyze those strategic choices and corporate mechanisms that determine success or failure. The core of this puzzle lies in the deep conflict between the two companies' ideas: Siemens' patient, integrated and gradual way is a bit like the style of German "Mittel stand" enterprises; GE, on the other hand, adopts a radical, high-risk and fragmented strategy, and clearly wants to move the venture capital model of Silicon Valley to the traditional industrial giants. The main contribution of this paper is to explain these two different paths from multiple theoretical perspectives.

This paper wants to answer a core question: What are the key differences that lead to such great differences in the implementation process and final results of the IIoT platform strategies of Siemens (Mind Sphere) and General Electric (Predix) under the circumstances of similar strategic intentions and huge investment? In order to solve this problem, the paper adopts the theory-driven comparative case study method. It first reviews the theoretical basis of platform strategy, organizational duality and dynamic capability view, and then puts forward a comprehensive analysis framework combining these theories. This framework is used to deeply analyze the cases of Siemens and GE respectively and then make a systematic cross-case comparison. Finally, the paper discusses the main findings, their theoretical contributions to the field of strategic management, and their practical significance to those leaders who are facing complex situations in the digital transformation of industry.

2. Literature Review

2.1 Platform Strategy in an Industrial Context

A platform is a foundational technology, product, or service upon which an ecosystem of external firms can develop their own complementary offerings (Gawer, 2014) [7]. The economic power of platforms stems from “network effects” a positive feedback loop where the platform’s value increases for all participants as more users and complementors join the ecosystem (Rochet & Tirole, 2003) [20]. While this concept is well-understood in consumer-facing (B2C) markets like social media or mobile operating systems, its application in industrial, business-to-business (B2B) contexts presents unique challenges.

In the industrial sphere, platform success is less about viral user acquisition and more about creating a robust business model that carefully aligns the complex incentives of industrial customers, equipment manufacturers, and third-party application developers. The value proposition is often tied to tangible outcomes like operational efficiency, predictive maintenance, and supply chain optimization. Consequently, failures of industrial platforms are frequently rooted not in technological deficiencies but in weak business model configuration or a failure to create a compelling value proposition for ecosystem partners (Eisenmann et al., 2006) [6]. Key design parameters for an industrial platform strategy therefore include the degree of architectural openness, the design of “boundary resources” (such as Application Programming Interfaces, or APIs, and Software Development Kits, or SDKs) that enable third-party innovation, and the governance mechanisms that regulate participation and value distribution within the ecosystem (Baldwin & Woodard, 2009) [2].

2.2 Organizational Ambidexterity: Balancing Exploitation and Exploration

Incumbent firms undertaking transformative innovation face a fundamental strategic paradox, first articulated by March (1991) [10], between exploiting their existing, mature businesses and exploring new, uncertain opportunities. Exploitation involves activities such as refinement, efficiency, and incremental improvement within a known paradigm, whereas exploration encompasses search, discovery, experimentation, and radical innovation. These two activities compete for scarce resources and foster contradictory organizational cultures, structures, and processes, a challenge that requires distinct managerial approaches for each activity to coexist (O'Reilly & Tushman, 2004) [12].

Tushman and O’Reilly (1996) [12] Based on this idea, they put forward the theory of organizational ambidexterity. They say that this is the ability of a company to do exploration and exploration at the same time. They believe that in a rapidly changing environment, having this ability is a prerequisite for a company to live and prosper for a long time (Raisch & Birkinshaw, 2008) [15]. One of the main ways for the company to achieve this goal is through "structural ambidexterity", that is, to create an organizational independent and autonomous department for exploratory activities and utilization activities. However, structural separation alone is not enough, which may lead to the isolation or even failure of the exploratory department. According to this theory, these independent departments must be connected by a closely coordinated senior leadership team, which should provide a common strategic vision, cultivate a shared culture, and ensure that innovations developed by exploratory departments can be used by core businesses (O'Reilly & Tushman, 2004) [12].

2.3 The Dynamic Capabilities View: The Capacity for Strategic Change

In an environment where technology and market are changing rapidly, whether a company can maintain its advantages continuously depends not on how many resources it has now, but on how strong its dynamic capabilities are. Teece, Pisano, and Shuan (1997) [18] famously interpreted it as "the ability of a company to integrate, establish and readjust its internal and external capabilities to cope with a rapidly changing environment." This view shifts our attention from the static question of "who owns how many resources" to some organizational processes and routine practices within the company that can make us adapt and innovate constantly. Teece (2007)[17] further divides this concept into a micro-basic framework, which contains three core organizational processes: Sensing: the ability of a company to identify, evaluate and understand opportunities and threats in the external environment; Seizing: mobilizing resources to seize the opportunity of discovery, including developing new products, services and business models, and making timely investment decisions; Reconfiguring: It means constantly updating and rearranging the company's tangible and intangible assets, including its organizational structure, business processes and culture, so as to keep strategic consistency with the ever-changing environment.

This framework is especially suitable for understanding how large companies make strategic transformations, because it focuses on the management and organizational capabilities that can enable companies to successfully adapt to change (or hinder adaptation). There is a strong causal relationship among these three theories: a company's dynamic capabilities are the key to enabling it to design and manage ambidextrous organization, and ambidextrous organization is the necessary condition for successfully implementing complex and long-term platform strategy.

3. Research Objectives and Analytical Method

This study is guided by a central question and a set of sub-questions designed to deconstruct the divergent paths of Siemens and GE. The central question is that under similar strategic intentions and massive investments, what key differential factors led to the significant divergence in the execution process and ultimate outcomes of Siemens' (Mind Sphere) and General Electric's (Predix) IIoT platform strategies? And these questions are divided into three sub-questions: How did the firms' strategic positioning and business models for their platforms differ, particularly regarding their roles as internal enablers versus external profit centers? What different paths did the firms take in developing their organizational capabilities and integration strategies to manage the inherent conflict between their hardware (exploitation) and software (exploration) businesses? How did their strategies for ecosystem building and governance differ, and how did this affect the health and growth of their respective platforms?

To answer these questions, this study employs a qualitative, theory-driven comparative case study methodology, a research design well-suited for understanding complex organizational phenomena in their real-world context (Eisenhardt, 1989; Yin, 2009) [5][24]. The research relies on a rich dataset constructed from publicly available secondary sources to ensure a comprehensive and triangulated view of each case. Key data sources include corporate annual reports, investor briefings, official press releases, CEO speeches and interviews, in-depth industry analyses, previously published academic case studies, and extensive archival news coverage from reputable financial and technology media outlets. The analysis is conducted through a systematic cross-case comparison, utilizing a pattern-matching logic where the findings from each case are iteratively compared against the theoretical framework。

This study uses a comprehensive analytical framework to trace the causal relationship between the three theoretical perspectives mentioned above. It believes that a company's Dynamic Capabilities (that is, its capabilities of Sense, Seize and Reconfigure) determine how it manages Organizational Ambidexterity (structural and cultural solutions to explore and utilize difficulties). And this kind of organizational design will affect whether the company can successfully implement its Platform Strategy (including business model, technical architecture and ecosystem governance). This multi-level framework allows us to compare systematically and theoretically, and what is the deep mechanism that leads to completely different performance results in the two cases.

4. CASE ANALYSIS AND DISCUSSION

4.1 Case 1: Siemens' Mind Sphere - An Evolutionary and Integrated Path

Siemens strategically positioned Mind Sphere as an "industrial IoT as a service" solution, but its path to market was notably evolutionary and pragmatic. The platform's development began "inside-out", originating as an internal tool to enhance Siemens' own vast portfolio of industrial automation and electrification products. Siemens' own business units were the

first developers and customers, building IoT solutions on Mind Sphere to serve their existing markets. This approach ensured that the platform was rigorously tested and validated against real-world industrial challenges from its inception.

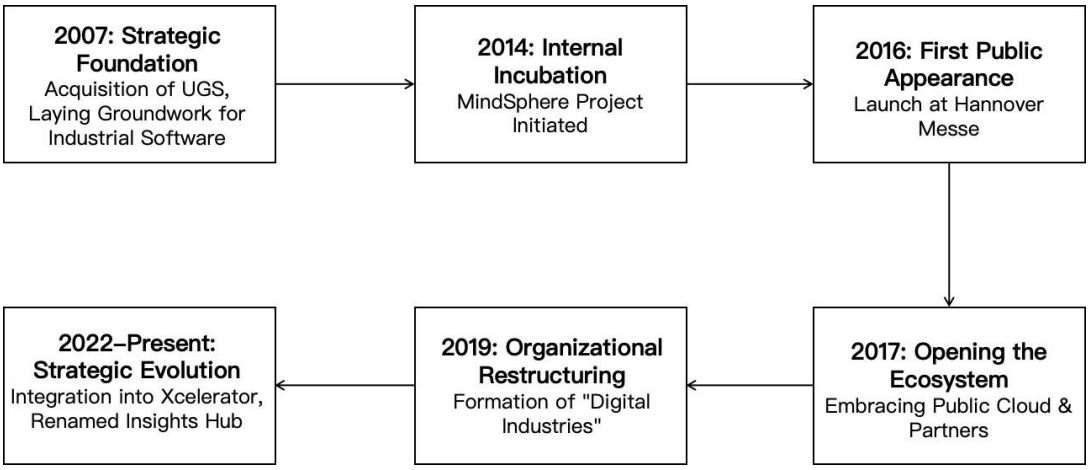

Figure 1. Development of Siemes' Minds Sphere

This internal proving ground served as a critical de-risking phase. By the time Mind Sphere was offered as a fully open, external-facing platform, it was already a mature and battle-tested solution with a clear value proposition. The business model transitioned to emphasize co-creation with a broad ecosystem of partners. Through open APIs and its integration into the Siemens Xcelerator marketplace, Siemens actively encouraged third-party application development, fostering the network effects crucial for long-term platform success. The strategy was not to build a separate software business, but to build a digital layer that enhanced the core industrial business for both Siemens and its partners.

Siemens successfully balances the inherent contradiction between traditional hardware business (exploitation) and new software platform (exploration) through the well-designed "integrated structural ambidexterity" mode. The establishment of the "Digital Industries" department in 2019 is a clear structural separation measure, which gives the digital business the necessary concentration and resources. But this is not an isolated existence. The overall strategy continuously conveyed by the company's top management is "Combine the real and the digital worlds" to ensure the deep integration between software (IT) and industrial automation (OT).

Crucially, the establishment of Digital Industries itself is to promote this integration. It puts the software business (including Mind Sphere) and the traditional factory automation business under the same leadership team. This means that the developer of the platform and its main internal customers are in the same organization and strategic discussion, which greatly reduces the risks of each management and cultivates a common culture. This structure forms a powerful feedback loop: the demand of industrial business directly affects the development of the platform, and the new functions of the platform in turn promote digital innovation within these business departments.

Siemens' success can be traced to its strong dynamic capabilities, which manifested in a patient and deliberate approach to transformation.

Sensing: Siemens' leadership correctly sensed that a successful IIoT platform could not be imposed top-down on the industrial world but must grow organically from its deep domain expertise. They recognized that the primary challenge was not purely technological but organizational—how to weave digital capabilities into the fabric of a 170-year-old industrial company.

Seizing: The company seized the opportunity not with a single, massive bet, but through sustained, long-term investment in R&D and a series of strategic software acquisitions over a decade. This "patient capital" approach viewed digitalization as a multi-generational transformation, not a short-term venture capital play aimed at immediate returns.

Reconfiguring: Most importantly, Siemens demonstrated a profound capability to reconfigure its entire corporate structure to align with its digital-industrial vision. The creation of the Digital Industries and Smart Infrastructure divisions was not merely a rebranding exercise but a fundamental reshaping of the parent company to break down old silos and support the new integrated strategy.

4.2 Case 2: General Electric's Predix - A Revolutionary and Segregated Path

In stark contrast to Siemens' evolutionary approach, GE's strategy for Predix was revolutionary and externally focused from its inception. The explicit goal, championed by then-CEO Jeff Immelt, was to transform GE into a "top 10 software company" by 2020 and generate $15 billion in annual digital revenue. Predix was not conceived as an enabler for GE's existing industrial businesses but as a standalone, dominant IIoT operating system, the "Android for machinery", that would power the entire industrial internet.

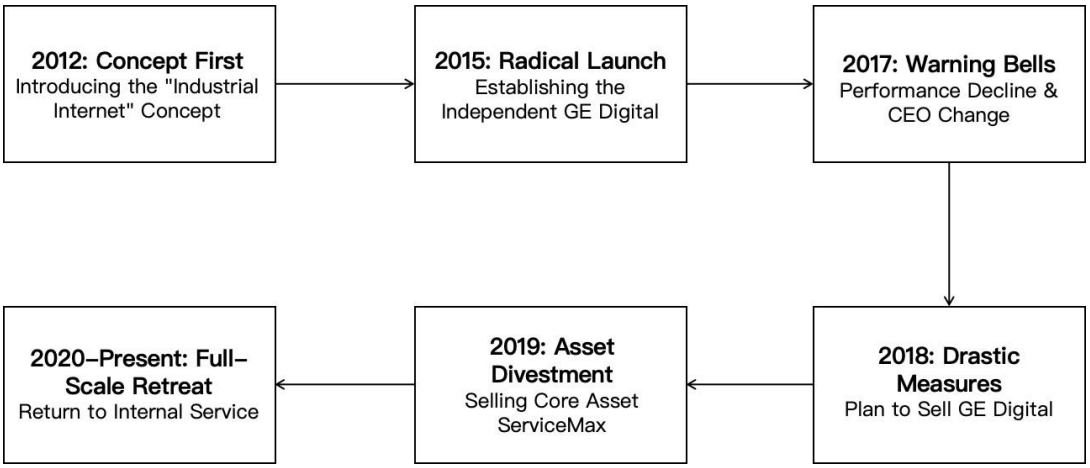

Figure 2. Development of GE's Predix

This grand ambition dictated a business model predicted on rapid external market capture and short-term revenue growth. The platform was designed to be an all-purpose solution for a wide array of industrial verticals simultaneously, a strategy that ultimately diluted its focus and overstretched its resources. Furthermore, the ecosystem strategy proved to be a critical failure. It prioritized one-off partnerships designed to generate immediate revenue rather than building long-term, symbiotic value for partners. The platform's governance and business model failed to provide clear incentives for partners to invest deeply, as it did not offer them a compelling path to "upmarket movement" or sustained profitability.

In 2015, GE tried to make the company structure more flexible. They set up GE Digital to make it an independent company. Headquartered in San Ramon, California, this new company is far from GE's traditional industrial base camp, both geographically and culturally. This is to protect this new project from the influence of the rules and regulations of the parent company, so as to cultivate a flexible culture like "startup", which will use the method of lean startup and attract talents from Silicon Valley.

However, this complete separation has caused serious organizational and cultural divisions. GE Digital's fast-paced and adventurous culture is totally incompatible with GE's own Six Sigma industrial culture which emphasizes efficiency, predictability and risk avoidance. In fact, this structure uses the wrong theory of "grasping with both hands"; Although it has been operated separately, the most important thing is the lack of high-level to connect the two sides. GE Digital is like an island, and its relationship with other departments of GE is very tense. There is a telling example: it is said that the internal departments of GE have to pay GE Digital if they want to use the Predix platform, and they simply regard their strategic projects as external suppliers.

GE's failure was ultimately a failure of its dynamic capabilities, which proved inadequate for navigating such a complex transformation.

Sensing: GE's leadership correctly sensed the macro-level opportunity of the industrial internet. However, they fatally misjudged the immense internal organizational and cultural challenges of execution. The problem was framed primarily as a technological one that could be solved with sufficient investment, rather than a deep-seated organizational one requiring careful integration and cultural alignment.

Seizing: The company seized the opportunity with a massive, front-loaded investment of over $4 billion and a bold, visionary narrative. This "venture capital" logic, however, created immense pressure from investors for rapid, hockey-stick growth, a timeline that was fundamentally incompatible with the patient, decade-long process of transforming a 125-year-old industrial behemoth.

Reconfiguration: GE failed to reconfigure its core organization in any meaningful way. Instead of integrating digital capabilities into its industrial DNA, it isolated them. The core business units, which controlled the company's revenue and customer relationships, viewed GE Digital with skepticism and resisted its encroachment. When Predix faced technical delays and failed to generate the promised revenue, the parent company lacked organizational resilience to adapt. The isolated digital "organ transplant" was ultimately rejected. This led to a forced strategic retreat under new CEO John Flannery, who drastically scaled back GE's digital ambitions, refocusing Predix on serving a narrow set of existing GE customers-effectively reverting to the very strategy Siemens had started with years earlier.

4.3 Cross-Case Analysis and Discussion

The divergent paths of Siemens and GE can be systematically summarized by comparing their choices across key strategic and organizational dimensions. The following matrix illustrates these "polar type" differences and links them to the core theoretical concepts of this study.

Table 1. Comparative Analysis

Comparative Dimension	Siemens (Mind Sphere)	General Electric (Predix)
Strategic Intent	Endogenous: Evolved from an internal enabler to an external platform, prioritizing domain expertise.	Exogenous: Conceived as an external-facing profit center to dominate the market like a software giant.
Technological Route	Open & Pragmatic: Focused on co-creation with partners and seamless integration with existing IT/OT systems.	Dominant & Ambitious: Aimed to be the single "operating system", initially with a more proprietary, all-encompassing architecture.
Organizational Structure	Integrated Ambidexterity: A distinct digital unit deeply embedded within the broader industrial business structure, fostering IT/OT convergence.	Segregated Ambidexterity: An isolated digital unit, physically and culturally detached from the industrial core, creating an IT/OT chasm.
Investment Logic	Patient Capital: Long-term, consistent R&D investment integrated into corporate financial planning.	Venture Capital: Massive, front-loaded investment with expectations of rapid, high-growth returns.
Ecosystem Strategy	Partner-First: Focused on enabling partners' success to build a healthy, sustainable ecosystem with long-term value.	Revenue-First: Focused on short-term monetization from partners, lacking incentives for deep, long-term commitment.
Leadership & Culture	Evolutionary & Aligned: Leadership championed a shared digital-industrial vision and fostered a culture of gradual, integrated change.	Revolutionary & Clashing: Leadership imposed a "startup" culture that conflicted with, rather than transformed, the established industrial core.

The performance disparity between Mind Sphere and Predix was not a matter of luck or technological superiority. It was the direct and predictable result of two fundamentally different philosophies of corporate transformation. The analysis reveals that GE's failure was a textbook case of mistaking structural separation for true ambidexterity. They created the "explore" unit but failed to build the essential organizational and cultural bridges back to the "exploit" core, leading to strategic incoherence and resource rejection (Birkinshaw & Gibson, 2004) [3].

Siemens' road to success is paved by their super dynamic ability. Their sensing capability has enabled them to formulate a real inside-out strategy based on their core strengths. Their capturing capability is reflected in the establishment of an integrated ambidextrous structure, which can not only innovate but also take care of daily operations. Finally, their reconfiguring capability enables them to adjust the whole company to this new model patiently and integrally (Teece, 2007) [17]. Siemens has effectively solved the contradiction between exploration and utilization by making exploration the core, and exploration can naturally increase the extension of value.

GE's path to failure, conversely, demonstrates the breakdown of these capabilities. Its sensing was accurate at a macro level but was blind to the internal execution complexities. Its primary seizing action, creating the isolated GE Digital, was a flawed organizational design that amplified the very tensions it was meant to resolve. This led to a complete inability to reconfigure the core business, which remained resistant and ultimately rejected the digital initiative when financial pressures mounted. In essence, GE's platform strategy failed because its organizational foundation was built on a fault line.

However, this study's limitations should be acknowledged. The focus on two "polar type" cases, while effective for contrast, may limit the generalizability of the findings. Furthermore, the exclusive reliance on public secondary data means the nuanced internal decision-making and cultural dynamics, which primary research like executive interviews could reveal, are not fully captured. Despite these constraints, the study provides a robust theoretical framework for understanding the critical factors in large-scale industrial digital transformation.

5. Conclusion

This comparative case study set out to explain the starkly divergent outcomes of Siemens' and GE's IIoT platform strategies. The analysis concludes that for a large industrial incumbent, a successful digital platform transformation is less a function of the size of its investment or the grandeur of its vision, and more a function of its organizational design and its dynamic capability to execute an integrated, evolutionary strategy. Siemens succeeded by patiently weaving digital threads into its existing industrial fabric, fostering a co-evolution of technology and organization. GE failed by attempting to graft a foreign digital entity onto its industrial body, an approach that led to cultural conflict, strategic incoherence, and ultimate rejection.

This research has made three contributions in theory. First of all, through a powerful empirical example, it shows how critical it is to integrate, not just separate, when making structural duality work effectively in industrial environment, which perfects the theory of organizational duality. Secondly, it contributes to the research of platform strategy, by analyzing the topic of platform failure in detail, which is often covered up by success stories (especially in B2B field). Finally, it shows how the dynamic capability view can be used as a powerful meta-theory to explain the underlying organizational processes that enable companies to successfully manage duality and implement complex platform strategies.

The results of this study provide a clear and practical guide for managers of established companies who are engaged in digital transformation. The most important point is that they should prefer an evolutionary strategy of "from the inside out". Companies should first solve their internal problems and create value for existing customers by using digital platforms, so as to accumulate professional knowledge and prove commercial feasibility before expanding abroad. They must deeply integrate information technology (IT) and operational technology (OT) into the organization, which is more important than establishing an isolated and culturally different innovation center. Finally, they must have the mentality of "patient capital" and understand that transforming an old enterprise is a marathon, not a sprint. GE's case is an important warning, which tells us that the attractive, but dangerous "big bang" and isolated digital transformation will not work.

The future research can be further deepened in several aspects. For example, we can do some long-term follow-up research to see how the Siemens Xcelerator ecosystem will develop in the future, so that we can better understand the long-term changes of a mature and successful industrial platform. In addition, we can also compare and study other big companies engaged in platform strategy, such as ABB, Schneider Electric or Honeywell, so as to verify, test and further improve the theoretical framework proposed in this paper.

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