Why Successful Companies Fail: Innovator's Dilemma *versus* Learning Propensity Model

Bowon Kim
KAIST College of Business, Seoul, Korea

Abstract

This paper explores why successful firms unexpectedly fail when confronted by market or technological disruptions. Building on the Innovator's Dilemma and Learning Propensity Model, we examine how virtuous resource allocation and learning cycles can become traps. These feedback loops ultimately delay adaptation and lead to sudden organizational collapse. Using a system dynamics model, we develop causal loop and stock-and-flow diagrams to capture how incumbents become overcommitted to existing products. We then simulate scenarios involving disruptive market shifts to analyze how reliance on established capabilities, resource dependence, and slow recognition of emerging demand collectively drive or mitigate firm decline. Base-case simulations show incumbents thriving until the product life cycle nears saturation. With disruptive innovations, simulation outcomes reveal a swift decline in market share and profitability unless proactive investments in new product lines are maintained. Sensitivity tests suggest earlier R&D allocations and autonomous divisions substantially lower the risk of collapse. Findings underscore the importance of timely resource reallocation to balance current profitability with evolving market needs. The system dynamics perspective highlights how reinforcing loops can harden into rigidities that entrap incumbents. For practitioners, ongoing market vigilance, small-scale experimentation, and learning-oriented structures offer viable strategies to escape the competence trap and ensure longevity.

1. Introduction

We often observe that once-dominant firms experience a swift and sometimes catastrophic decline. For instance, there have been many high-profile cases, such as IBM's near-collapse when personal computers emerged, Polaroid's reluctance to embrace digital imaging, or Silicon Valley Bank's sudden downfall after enjoying a niche market stronghold. Classic explanations often rely on Clayton Christensen's (1997) *Innovator's Dilemma*, highlighting how incumbents, driven by their most significant and profitable customers, overlook early-stage disruptive technologies. These innovations are initially unappealing due to their narrow margins or unproven value. But later, they evolve rapidly and surpass the capabilities of incumbents' mainstream offerings.

Market-driven factors alone, however, cannot fully explain why well-established organizations fail to adapt. Focusing more on the internal dynamics of learning and capability development,

Bowon Kim's (1998) *Learning Propensity Model* shows that extensive improvements in one domain can trap a firm in rigid routines, leaving it unable to pivot quickly when external conditions shift. This tension between *exploiting* existing competencies and *exploring* new possibilities often underpins dramatic failures—even when managers do "everything right" for current markets.

In this paper, we integrate insights from Christensen's disruptive innovation framework and Kim's emphasis on organizational learning to examine how resource allocation patterns, feedback loops, and core rigidities converge to cause incumbent breakdowns. We employ a system dynamics approach, building causal loop and stock-and-flow models to capture the subtle feedback mechanisms that lock successful companies into a "virtuous cycle turned trap." Through simulation-based scenario analysis, we illustrate how timely strategic interventions—such as dedicated autonomous units for emerging technologies or maintaining "learning slack" in operations—can empower incumbents to navigate disruptive environments and avoid precipitous decline.

We structure this paper as follows. In the next section, we elaborate on the concept of the competence trap, the core proposition of the paper. We discuss real-world cases to explain the concept. Then, we compare two theories, i.e., the innovator's dilemma and the learning propensity model, that can explain why and how successful companies might fail when facing disruptive market changes. In Section 4, we develop a system dynamics simulation model to prove our proposition. Finally, we review the analysis results and suggest key managerial implications.

2. Competence Trap

Kim (1998) developed the Learning Propensity Model (LPM), which explains how an organization forms its learning propensity initially, which affects the managers' decision-making on resource allocation; such resource allocation generates actual performance, which in turn reinforces the learning propensity, and the whole process becomes self-reinforcing. LPM can explain how a firm's initial, sometimes small or benign, commitment to a specific technology or method grows more prominent and moves in a particular direction very vigorously. The reinforcing or accelerating commitment can help the firm grow and develop faster if such a commitment is consistent with the market. However, when the market changes its course suddenly, the fit between the commitment and the market breaks down. Unless the firm has prepared to cope with sudden changes in the market, e.g., by preparing a new product or technology that is attractive in the new market, it cannot adapt to the new environment and may collapse unexpectedly.

We call the situation described above "a competence trap," which refers to a situation in which an organization's past success with established skills, processes, or technologies leads to over-

reliance on existing competencies, preventing adaptation to changing market conditions, technological advancements, or strategic shifts. This occurs when firms continue to refine and exploit their core strengths while neglecting exploration of new capabilities, ultimately resulting in stagnation and competitive disadvantage. This concept is closely related to organizational inertia, exploitation-exploration imbalance (March, 1991), and the rigidity paradox (Leonard-Barton, 1992) in strategic management and innovation literature.

Examples – Below is a brief discussion of three representative cases that illustrate a "virtuous cycle-turned-trap" or a competence trap more generally:

(1) **IBM**'s Near Collapse in the 1980s

IBM dominated the mainframe computer market, where continuous improvements in hardware and service networks generated massive revenues (Christensen, 1997). These successes fueled even greater investment in mainframes, reinforcing IBM's market dominance. When personal computing emerged, IBM's ingrained routines and resource allocation patterns inhibited its response (Harreld, O'Reilly III, & Tushman, 2007). Its core capabilities had effectively turned into *core rigidities*. In the early 1990s, IBM had to undergo a significant restructuring. IBM's struggle indicated that an organization's most refined competencies could become its most rigid liabilities in the face of a disruptive market shift.

(2) **Intel**'s Difficulties in the 1990s

Intel gained fame after pivoting from memory chips (DRAM) to microprocessors, quickly becoming a powerhouse in the PC era (Christensen, 1997). However, during the 1990s, Intel encountered intense competition from alternative architectures, such as RISC-based designs, which challenged Intel's longstanding focus on high-performance desktop processors (Burgelman, 1994). The "Pentium floating-point division (FDIV) bug" in 1994 and rising demand for energy-efficient chips exposed areas where Intel's routines and culture—fine-tuned for desktop CPUs—required swift adaptation. Eventually, Intel diversified, tapping into servers, embedded processors, and mobile platforms. Intel demonstrated a recipe for overcoming strategic challenges, i.e., identifying disruptive changes early and adjusting its resource allocations properly (Rivlin, 1999).

(3) Collapse of **Silicon Valley Bank (SVB)** in 2023

Silicon Valley Bank (SVB) thrived by catering to tech startups, benefiting from a surge in venture capital-funded deposits. This fueled a self-reinforcing "virtuous cycle" of rapid deposit growth and expanded lending (McLean, 2023). During historically low interest rates, SVB heavily invested in longer-term bonds, believing these were safe assets. However, when interest rates rose sharply, and tech-sector liquidity tightened, depositors withdrew funds at an accelerating pace, forcing SVB to sell its bond portfolio at a loss (Smith, 2023). The bank's highly specialized focus ultimately became a trap, showing how success in a narrow niche can exacerbate vulnerability when market conditions change suddenly.

We can suggest common threads of these cases. That is, across these cases, the pattern is similar:

(a) Early Success leads to a reinforcing loop of allocating resources to what works well—be that mainframes, x86 processors, or a niche banking model.
(b) Market Shift or External Shock (personal computing revolution for IBM, RISC competition for Intel, rising interest rates for SVB) reveals vulnerabilities in an otherwise thriving organization.
(c) Core Rigidities inhibit rapid adaptation. Success has locked firms into routines, assumptions, and resource allocations that become severe liabilities under new conditions.
(d) Sudden Collapse or Near Failure can occur when feedback loops accelerate (e.g., deposit flight for SVB, quick changes in market demand for IBM).

By applying a system dynamics lens, these examples illustrate how positive feedback loops (the "virtuous cycle") can turn into vicious cycles when the external environment changes and the organization is unable—or unwilling—to shift resources effectively.

There are a few lesser-known (or less-frequently cited) cases that also highlight how incumbents can fail due to disruptive forces or internal rigidities, along with brief explanations and suggested references:

Digital Equipment Corporation (DEC) – DEC thrived in the mid-range computer market (minicomputers) during the 1970s and 1980s. Its PDP and VAX product lines were highly successful. As personal computers rose in the 1980s, DEC was slow to pivot, mainly because its core capabilities (designing and marketing minicomputers for specialized use) did not translate well to emerging consumer-oriented computing. The company was acquired by Compaq in 1998, effectively marking its exit from the industry. A key takeaway is that DEC's tight coupling of engineering expertise and product lines around minicomputers acted as *core rigidities* once PCs and smaller workstations became the new market standard (Burgelman, 1994).

Polaroid – It pioneered instant photography and dominated the market for decades. The company continued investing in film-based instant cameras. It reinforced the company's specialized knowledge, manufacturing capacity, and distribution channels. The company improved these capabilities to a great extent, so when digital cameras emerged, it failed to adapt its core product offering, ultimately filing for bankruptcy in 2001. A key takeaway is that the virtuous cycle of success around film technology inhibited Polaroid from aggressively developing digital imaging, exemplifying the *Innovator's Dilemma* (Tripsas & Gavetti, 2000).

Compaq – It rose to prominence in the 1980s as a leader in IBM-compatible PCs, known for portability and technical innovation. However, as PCs became commoditized in the 1990s, Compaq struggled to maintain margins and adapt its product mix while facing stiff competition from Dell's direct-sales model. Eventually, Hewlett-Packard acquired Compaq in 2002 after failing to differentiate beyond its legacy PC business (Pollack, 2002). A key takeaway is that a once-successful business model (high-quality, standardized PCs sold through traditional

channels) lost its competitive edge when market dynamics and consumer preferences shifted toward lower-cost and more direct purchasing options.

Myspace – The company was a leading social networking site in the mid-2000s, ahead of Facebook by user counts for several years. Reliance on ad-driven revenue and an unfocused user experience led to complacency. Meanwhile, Facebook innovated on user privacy controls, a cleaner interface, and an open API ecosystem (Boyd & Ellison, 2007). Mypace rapidly lost market share and was sold multiple times, highlighting how success can degrade when a competitor offers better engagement features. A key takeaway is that Myspace's early dominance became a trap when the platform failed to adapt swiftly to users' shifting expectations around personalization, privacy, and ease of use—core elements that Facebook honed.

Sears – It was once one of the largest retailers in the United States, with a vast physical store footprint and a famous mail-order catalog. In the late 20th century, Sears failed to fully adapt to discount retail competition (like Walmart) and later e-commerce (like Amazon), in part due to organizational inertia and capital tied up in traditional stores (Rosenberg, 2018). Its prolonged decline led to bankruptcy filings as consumer preferences shifted to lower-cost and more convenient online channels. We can learn a lesson that Sears' legacy infrastructure and brand recognition, which were once tremendous assets, turned into rigidities when the retail landscape pivoted toward big-box discounts and digital convenience.

These examples parallel the dynamics behind more frequently cited cases like IBM, Intel, or SVB, but illustrate similar *virtuous cycle-turned-trap* phenomena in different industries or eras. Each can highlight how *core capabilities* can stifle adaptation when market conditions, consumer preferences, or technological paradigms shift rapidly.

3. Innovator's Dilemma *versus* Learning Propensity Model

There are two prominent theories to explain the dynamics of the 'competence trap' discussed so far, i.e., Christensen's *Innovator's Dilemma* framework and Bowon Kim's *Learning Propensity Model*. Below is a high-level comparison highlighting the main distinctions between the two in explaining why successful firms can struggle or fail in changing environments.

The competence trap, which explains why successful firms struggle or fail in changing environments, has been analyzed through two prominent theoretical lenses: Clayton Christensen's Innovator's Dilemma framework and Bowon Kim's Learning Propensity Model. Although both offer insights into the dynamics that hinder adaptation, they differ in their primary focus, mechanisms of failure, and proposed solutions for incumbents. Christensen emphasizes the external pressures of market-driven resource allocation and disruptive

technologies, while Kim highlights the internal learning processes that shape a firm's strategic responses. A closer comparison of these frameworks enables us to elucidate why even well-managed organizations can become vulnerable in times of change.

One key distinction between the two models lies in their core focus and level of analysis. Christensen's Innovator's Dilemma framework primarily examines how disruptive technologies challenge incumbents, leading them to allocate resources toward improving existing products for their most profitable customers rather than investing in emerging, seemingly unprofitable innovations (Christensen, 1997). Christensen highlights market entry dynamics, demonstrating how incumbents fail when new competitors emerge in neglected niches, gradually developing products that eventually surpass existing offerings. On the contrary, Kim focuses on the internal mechanisms of organizational learning, emphasizing how firms refine their capabilities through cumulative experience (Kim, 1998). This model suggests that firms become entrenched in their existing competencies, as investments in established processes lead to efficiencies but also to inflexibility. Whereas Christensen's framework prioritizes external technological disruptions and market shifts, Kim's model explores how internal learning loops shape—and sometimes constrain—a firm's ability to adapt to change.
The mechanism of failure also differs between the two theories. Christensen argues that firms become trapped because their resource allocation strategies are dictated by customer-driven priorities, which push them toward incremental improvements rather than disruptive innovation. Since disruptive technologies often emerge as small, low-margin opportunities, incumbents fail to recognize their potential and do not invest until it is too late (Christensen, 1997). Newer entrants will have established a dominant market position when these technologies gain traction. Conversely, Kim's Learning Propensity Model suggests that firms accumulate extensive routines and learning curves, leading to cost advantages and efficiency gains (Kim, 1998). However, these learning structures—people, processes, and capital investments—can become rigid, making it difficult for firms to pivot toward new tasks or product domains. While the Innovator's Dilemma framework highlights the mismatch between market needs and incumbent resource allocation, the Learning Propensity model underscores how deep-rooted learning processes can reinforce organizational inertia, preventing timely adaptation.

A further point of divergence is in the nature of the traps that each framework describes. According to Christensen, the competence trap arises because incumbents cannot justify investing in early-stage, low-margin innovations that do not immediately align with their existing market structures (Christensen, 2013). Over time, however, these new products improve and reach a growth inflection point, eventually surpassing the incumbent's existing offerings. By contrast, Kim attributes the trap to learning inertia, in which firms become overly specialized as they refine current products and processes (Kim, 1998). This over-specialization makes it challenging to shift toward new opportunities, as emerging alternatives appear inefficient relative to the well-honed existing operations. In Christensen's view, the primary constraint is the economic logic of resource allocation. At the same time, in Kim's framework, the challenge is the cognitive and organizational inertia that comes from deeply embedded

learning routines.

The two models also offer different perspectives on the role of organizational learning. Christensen primarily frames learning as a market-driven process, wherein firms refine their products based on customer feedback and incremental improvements. While established firms are adept at learning and improving within existing performance trajectories, this strength becomes a liability when market needs shift in ways incumbents fail to anticipate (Christensen, 1997). In contrast, Kim places learning at the center of his model, arguing that firms internalize knowledge through structured operational routines (Kim, 1998). He introduces the concept of learning propensity, or the firm's ability to improve existing processes and explore and adapt to new domains. When this propensity is low, firms remain locked in familiar routines, unable to recognize or respond to transformative changes. Thus, while Christensen views learning as a function of customer demands, Kim explores the deeper mechanics of how organizations absorb and institutionalize knowledge, including the risks of over-optimization.

Finally, they suggest different remedies for incumbents who try to escape the competence trap. Christensen advocates for structural solutions, such as creating autonomous business units or spin-offs that can focus on disruptive technologies without the constraints of the parent organization (Christensen, 1997). In addition, he emphasizes the need for firms to align with more minor, emerging customer segments representing the industry's future. On the other hand, Kim suggests that firms should cultivate organizational ambidexterity, balancing operational efficiency with exploratory learning (Kim, 1998). His model calls for the development of learning slack—the capacity to experiment with new knowledge domains without being immediately constrained by efficiency demands. While Christensen recommends restructuring and external alignment, Kim highlights the importance of internal flexibility and the ability to reconfigure learning processes in response to environmental shifts.

We recapitulate that Christensen's Innovator's Dilemma and Kim's Learning Propensity Model provide complementary but distinct explanations for why successful firms can struggle in changing environments. Christensen's framework is rooted in the economic constraints of large incumbents, showing how resource allocation biases and market dynamics lead to failure. On the other hand, Kim's model examines the internal learning structures that shape firms' strategic trajectories, indicating how deep specialization can often hinder adaptability.

Both perspectives offer valuable insights to illustrate how firms can become vulnerable due to external technological shifts or internal rigidities in learning and specialization. Recognizing these dynamics is essential for organizations seeking to sustain long-term success in an era of continuous disruption.

Table 1 Comparison between the two theories

Dimension	Christensen's Innovator's Dilemma	Bowon Kim's Learning Propensity Model
Core Focus and Level of Analysis	External market dynamics and disruptive technologies (Christensen, 1997)	Internal learning processes and operational capabilities (Kim, 1998)

Dimension	Christensen's Innovator's Dilemma	Bowon Kim's Learning Propensity Model
Mechanism of Failure	Incumbents over-serve existing customers and miss emerging, low-end or niche markets	Deeply embedded routines and specialization create inertia, slowing response to changes
Nature of the Trap	**Resource Dependence**: Firms invest heavily in familiar products with large margins	**Learning Inertia**: Success in one domain locks the firm into rigid operating methods and mindsets
Role of Organizational Learning	Mainly incremental improvements aligned with current customers, which blindsides the firm to new product trajectories	Central focus on how firms accumulate and embed know-how in operations; learning can become "locked in," limiting flexibility (Kim, 1998)
Prescriptions for Incumbents	Create autonomous units or spin-offs to pursue disruptive tech; partner with "right" early customers (Christensen, 2013)	Develop ambidexterity in learning; maintain "slack" to invest in new product lines; encourage flexible routines for easier pivoting

Table 2 Strategic remedies suggested by the two theories

Dimension	Christensen's Strategic Remedies	Bowon Kim's Strategic Remedies
Primary Concern	Overcoming resource allocation traps and meeting disruptive innovations head-on	Reducing learning inertia and enabling adaptation through flexible internal processes
Core Strategies	1. Create autonomous units/spin-offs 2. Target "right" customers in niche segments 3. Fail early and often 4. Separate resource allocation for disruptive projects	1. Enhance organizational ambidexterity (exploration + exploitation) 2. Maintain "learning slack" and flexible routines 3. Encourage cross-functional teams to diversify knowledge 4. Track and adapt learning curves across old and new products
Key Mechanism	Structural separation and market experimentation	Internal learning flexibility and operational readiness
Benefits	- Protects new initiatives from core business constraints - Discovers viable disruptions via rapid prototyping - Attracts early adopters	- Prevents over-specialization - Facilitates quick pivoting to new product/process domains - Sustains long-term adaptability
Drawbacks / Risks	- Spin-offs may become isolated from the main organization - Risk of underfunding if the unit stays too peripheral	- Maintaining organizational slack can be costly in the short run - Balancing exploitation and exploration may create internal tension

4. System Dynamics Analysis and Strategy

We develop a system dynamics model to simulate the 'competence trap' dynamics. For example, we simulate a case similar to the one faced by IBM in the 1980s. Table 3 fully explains the simulation scenario, which we implement using the system dynamics simulation software Vensim (Figures 1 and 2).

Table 3 Scenarios for the System Dynamics Simulation Model

Simulation Scenario for "The Virtuous Cycle That Becomes a Trap"

- Initial Success and Reinforcement
  - The incumbent enjoys market dominance with a successful product.
  - More resources—human and financial—are allocated to the division producing the product.
  - Increased resources enhance efficiency, improving production and sales.
  - The division refines its product through learning and experience, improving quality and cost-effectiveness.
  - As the product becomes better and cheaper, market dominance grows.
  - Higher sales attract even more resources, further strengthening the division.
  - This self-reinforcing cycle appears to ensure long-term success.
- Dependence on Stability
  - The cycle remains beneficial as long as the product meets market demands.
  - However, market preferences are not static—they change in response to external and internal forces.
- Forces That Disrupt the Cycle
  - Market shifts occur due to powerful external and internal disruptions.
  - Technological breakthroughs—inside or outside the industry—can render the current product obsolete.
  - Cultural influences, such as movies, TV shows, or generational trends, can suddenly shift consumer preferences.
  - Regulatory changes, economic shifts, or competitive innovations can reshape demand overnight.
- The Incumbent's Critical Mistake
  - The company fails to invest in new products because its focus remains on the current cash-generating product.
  - Since the current product has driven profitability, it seems logical to continue prioritizing it.
  - However, this creates an addiction to the existing revenue stream, starving innovation.
  - Any division working on the new product is underfunded, neglected, or eliminated.
- The Trap Springs Shut
  - Suddenly, the market no longer wants what the company produces.
  - The incumbent lacks the capability and resources to meet the demand for the emerging product.
  - Meanwhile, nimble, aggressive new entrants—unburdened by legacy investments—quickly capture market share.
  - As the incumbent struggles, competitors sweep the market with new offerings.
- Worst-Case Scenario: Market Exit
  - The incumbent, unable to adapt, suffers a drastic decline.
  - If the company fails to pivot, it may be completely displaced by new players.
  - What once was a virtuous cycle of dominance has now become a trap leading to downfall.

Figure 1 System Dynamics Simulation (a)

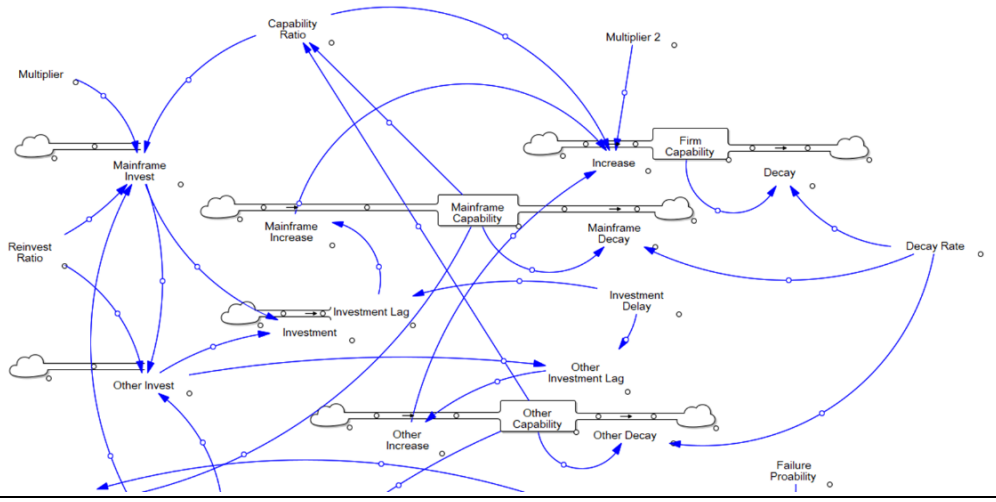
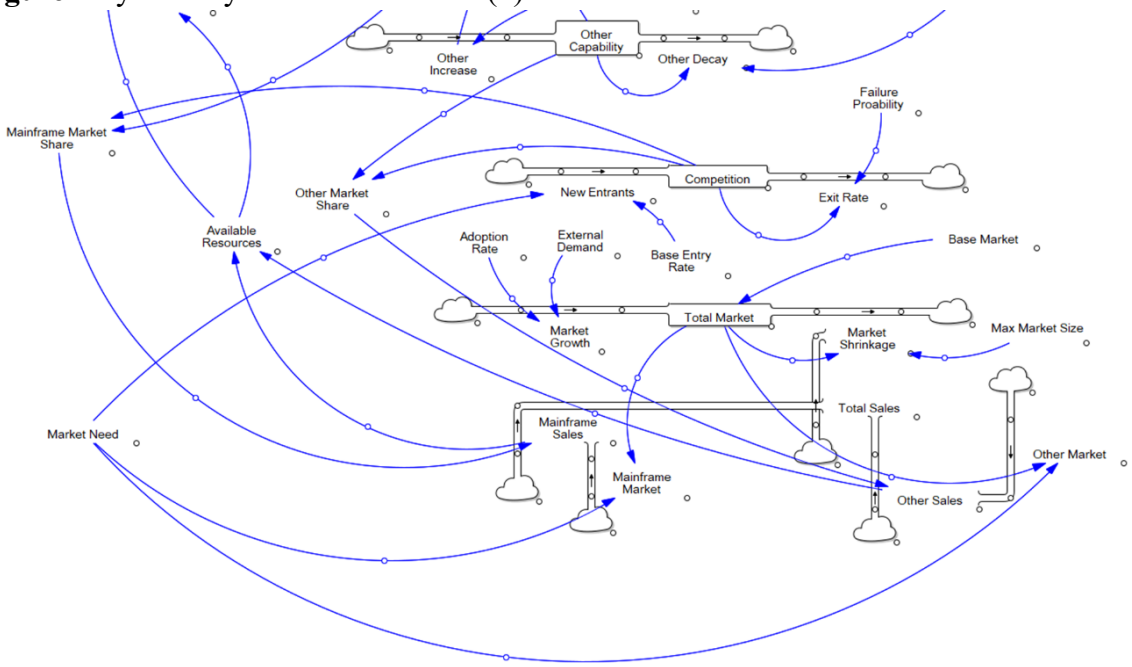


Figure 2 System Dynamics Simulation (b)



With the system dynamics simulation, we aim to highlight how a slight change in strategic resource allocation can enable the firm to overcome the competence trap. In this paper, we specifically focus on the resource allocation rules between the dominant product (e.g., mainframe) and the other product (e.g., other product) that doesn't sell well in the current market.

Table 4 The Base Strategy

- Mainframe Invest = MAX(MIN(Reinvest Ratio * Available Resources * Capability Ratio * Multiplier, Available Resources), 0)
- Other Invest = MAX(Reinvest Ratio * Available Resources - Mainframe Invest, 0)

The base model adopts a strategy to invest all the resources in the winning product so that the company's capability of the high-demand product becomes even more significant, i.e., accelerating the positive reinforcing process. It is a winner-takes-all strategy. On the contrary, the alternative strategy is a balanced approach, which makes it a rule to invest a minimum amount of resources in the other currently 'low-demand' product. Table 5 shows the balanced strategy, which invests a certain % of leftover resources in the low-demand product, even when the market overly prefers the dominant product. The difference between the base and the balanced strategy is concerned with investing '(Available Resources-Mainframe Invest)*R' in the low-demand product, where 'Available Resources-Mainframe Invest' is the leftover resources after investing in the dominant product. We use several different values of R, i.e., 0.1 ~ 0.5, in our system dynamics simulation.

Table 5 The Balanced Strategy

Base strategy: Other Invest = MAX(Reinvest Ratio * Available Resources - Mainframe Invest, 0)

Balanced strategy: Other Invest = MAX(Reinvest Ratio * Available Resources - Mainframe Invest, MAX((Available Resources-Mainframe Invest)*R, 0))

Model names with different scenarios:

- Base 00: R = 0.0 (investing 0% of remaining resources in low-demand product; base/default strategy)
- Base 01: R = 0.1 (investing 10% of remaining resources in the low-demand product)
- Base 02: R = 0.2 (investing 20% of remaining resources in the low-demand product)
- Base 03: R = 0.3 (investing 30% of remaining resources in the low-demand product)
- Base 04: R = 0.4 (investing 40% of remaining resources in the low-demand product)
- Base 05: R = 0.5 (investing 50% of remaining resources in the low-demand product)
- Base 10: R = 1.0 (investing 100% of remaining resources in the low-demand product)

We report the system dynamics simulation results for seven different scenarios. Figure 3 shows the monthly total sales for the various values of R, the % of remaining resources invested in the low-demand product. The base strategy clearly shows that when the market suddenly changes (at around t = 60), the company's total sales (mainframe plus low-demand product) plunge to almost zero and cannot recover from the near bankruptcy. If the company invests 10% of its remaining resources in the low-demand product, it can mitigate the enormous drop in total sales. However, 10% does not seem enough to change the course significantly. Only when the investment ratio reaches 20% can the company stop the complete bankruptcy and manage to reverse the course since t = 60. When R=50%, toward the end of the time horizon (t = 100), the company can recover what it has lost at t = 60. Although total sales can be a good indicator, we cannot decide on an optimal strategy by looking at just one measure. For instance, Figure 3 implies that the larger the investment %, the larger the total sales.

Figure 4 displays the company's cumulative profits. Our simulation model defines profit as

'available resources – total investment (in both mainframe and the low-demand product).' Figure 4 shows that if the company invests all its remaining resources in the low-demand product, its cumulative profit stays zero throughout the decision horizon. This observation enables us to reassess the case of total sales, i.e., investing all the remaining resources in the low-end product is the best choice for total sales. From the viewpoint of cumulative profits, it looks like 30% is the optimal decision.

Figure 3 System Dynamics Simulation Result – Monthly Total Sales

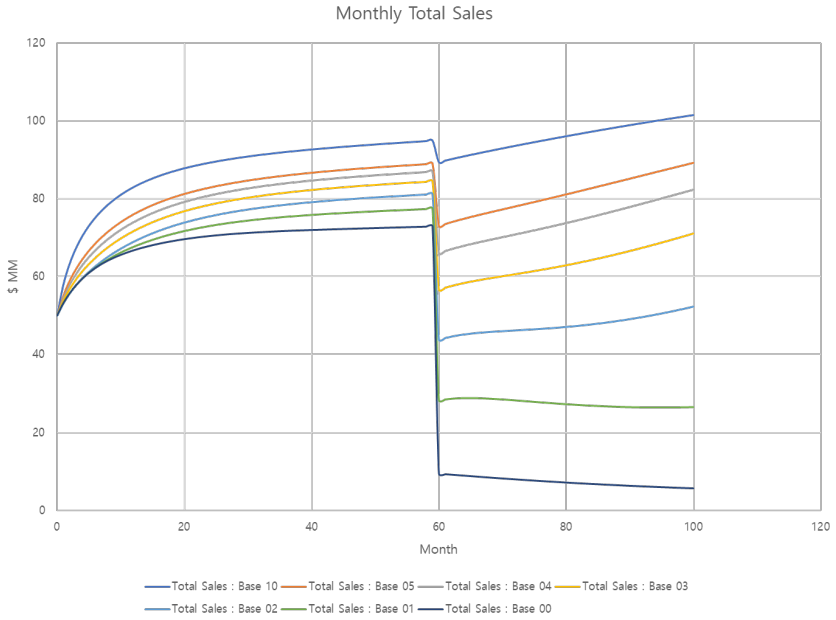
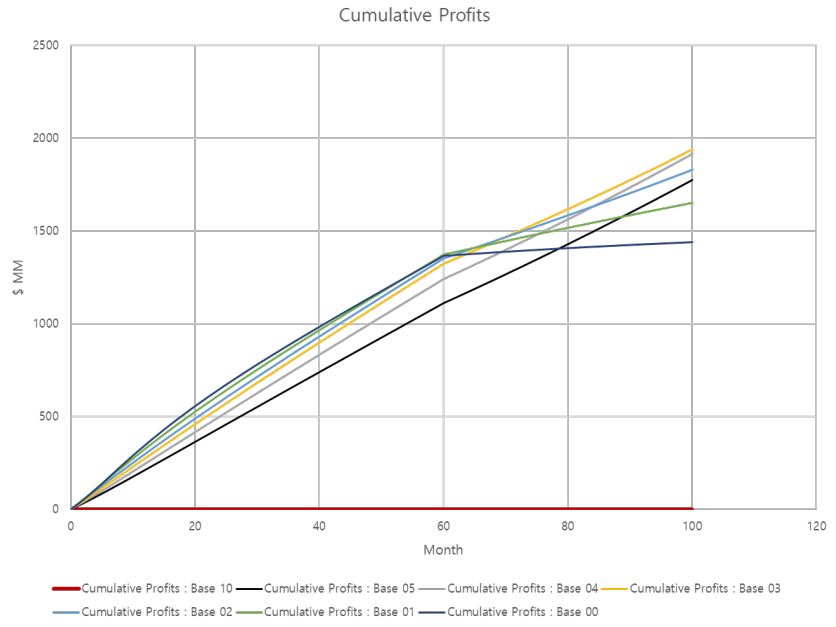
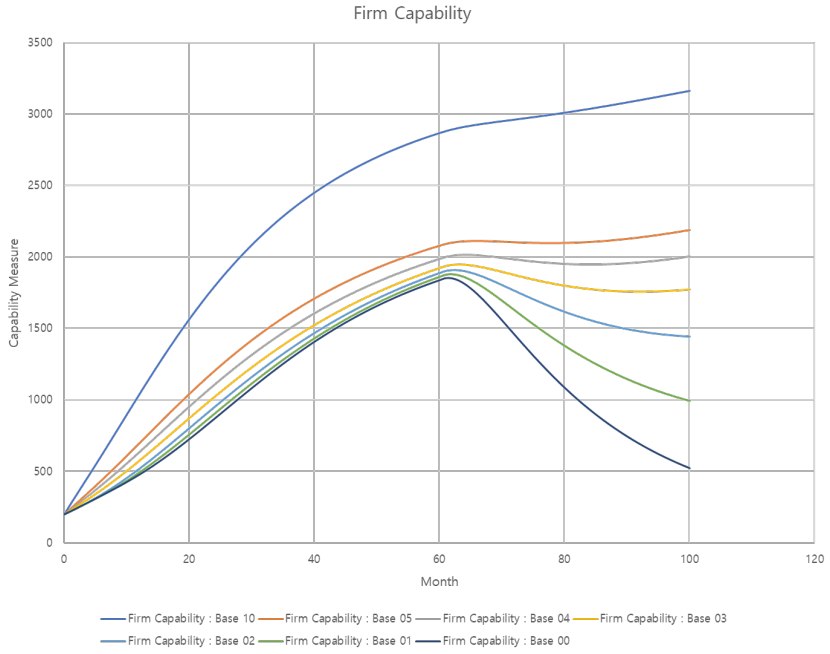


Figure 4 System Dynamics Simulation Result – Cumulative Profits



Another criterion for decision-making is capability. When a company invests resources in a product, its associated capability increases. The firm's total capability is the sum of the individual capabilities of its mainframe and the other, i.e., the low-demand product. Figure 5 illustrates how the company's total capability evolves as the investment ratio in the low-demand product changes. Without a minimum investment in this product, the company's capability experiences a sudden drop when market demand shifts abruptly. Following this decline, the company's capability fails to recover and may approach zero: it is the base strategy. Even when the drop is less severe, capability continues to deteriorate as long as the investment ratio for the low-demand product remains below 30%.

Figure 5 System Dynamics Simulation Result – Firm Capability



However, Figure 5 shows that once the investment ratio surpasses 30%, the company's total capability begins to recover. Notably, as the investment ratio increases, total capability improves, reinforcing the importance of sustained investment.

For a more complete understanding, we need to look at each product capability separately. Figure 6 displays the evolution of the mainframe capability, while Figure 7 shows the evolution of the low-demand product capability. In Figure 6, we observe that the base strategy makes the mainframe capability plunge when the market shifts significantly. It is very important to see the mainframe capability increasing as the investment in the low-demand product increases. That is, the investment in the low-demand product enhances not only the low-demand product capability but also the mainframe capability. Although it feels counterintuitive at first, there is a logical explanation. As the investment in the low-demand product increases, the company keeps a certain level of the low-demand product capability, which enables the firm to sustain and even prosper when the market changes abruptly. Now the company can profit from selling

the low-demand product, which fits better with the market since its sudden change. Profits from the (former) low-demand product help the company continue investing in the mainframe, which maintains or even increases the mainframe capability. Finally, Figure 7 depicts the evolution of the low-demand product capability: while the base case (no investment in the low-demand product) causes the company's low-demand product capability to almost disappear toward the end of the decision horizon, 30% and more investment ratios not only keep the low-demand product capability at a reasonable level but also enable the company to recover its low-demand capability since the abrupt market change.

Figure 6 System Dynamics Simulation Result – Mainframe Capability

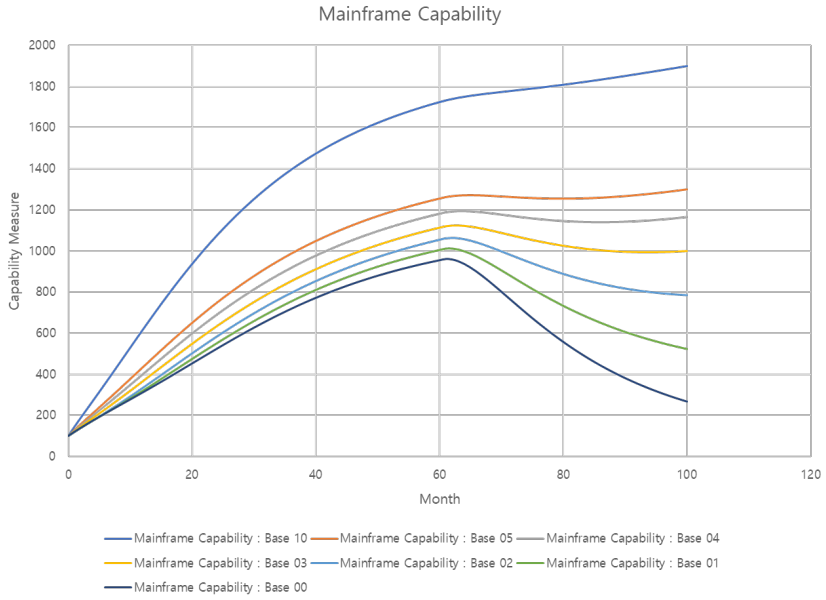
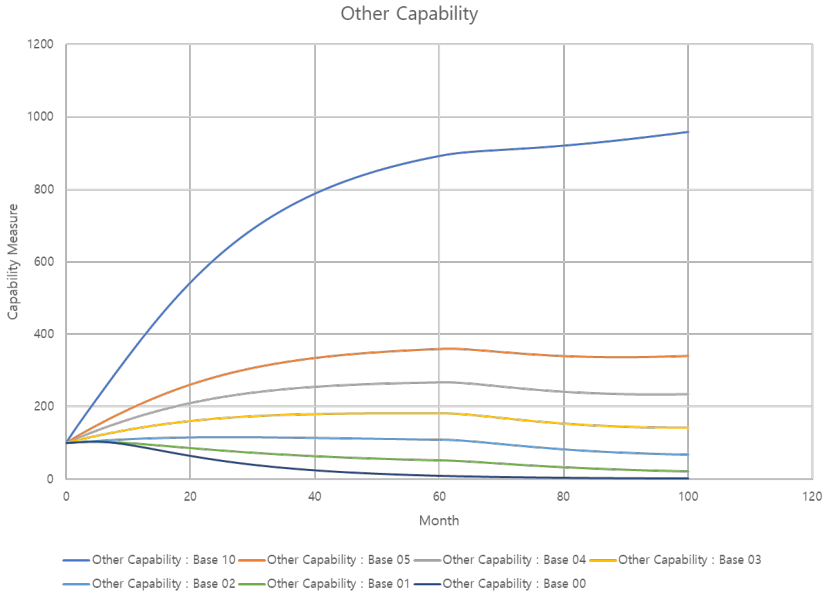


Figure 7 System Dynamics Simulation Result – Other Capability



5. Managerial Implications and Conclusion

We have started with a research question: "Why do successful firms unexpectedly fail when confronted by market or technological disruptions?" Building on Christensen's (1997) Innovator's Dilemma and Kim's (1998) Learning Propensity Model, we have postulated how virtuous resource allocation and learning cycles can become competence traps. These feedback loops ultimately delay adaptation and lead to sudden organizational collapse. To prove our propositions, we have developed a system dynamics model using causal loop and stock-and-flow diagrams to capture how incumbents become overcommitted to existing products, e.g., IBM's mainframe computer. We then simulate scenarios with different levels of investment in the low-demand product. The simulation model involves disruptive market shifts to analyze how reliance on established capabilities, resource dependence, and slow recognition of emerging demand collectively drive or mitigate firm decline.

We can derive a few insights from our system dynamics simulation.

First, betting entirely on and investing all the resources in the dominant product could make the company vulnerable to the market's disruptive changes. It is a classic example of a competence trap, e.g., the competence-turned rigidity (Leonard-Barton, 1992; Vergne & Durand, 2011).

Second, the company can avoid this trap by proactively preparing for unexpected events in the market. Often, the preparation doesn't have to be dramatic. For example, a simple rule like steadily investing a small amount of resources in an underdog or low-demand product can be an effective remedy. Sometimes, a modest strategy enhances the low-demand product capability and sustains the dominant product capability after the abrupt market change (Becker, 2004). Thus, the company can weather the disruptive market and retain resources enough to enable the company to prosper continuously.

Third, the company should analyze multiple performance measures when deciding on an optimal resource allocation rule. As we see in the simulation results, each different measure favors a different strategic option. From the total sales perspective, investing 100% of the leftover resources in the low-demand product looks best. On the contrary, from the profit perspective, the company should invest 30% of the leftover resources in the low-demand product. Once the company prioritizes its objectives, it should determine the most appropriate performance measure and choose its implementation strategy accordingly (Franco, Minatogawa, & Quadros, 2023).

Our findings highlight the importance of timely resource reallocation to balance current profitability with evolving market needs. We should reemphasize how reinforcing loops can harden into rigidities that entrap incumbents (Tushman & O'Reilly, 1996). Managers and practitioners must pay attention to ongoing market vigilance, small-scale experimentation, and learning-oriented structures as their viable strategies to escape the competence trap and ensure

the continual prosperity of their organizations.

References

Becker, M. C. (2004). The competence trap: Exploring issues in winning and sustaining core competence. *Industrial and Corporate Change, 13*(4), 643–677.

Boyd, D. M., & Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication, 13*(1), 210–230.

Burgelman, R. A. (1994). Fading memories: A process theory of strategic business exit in dynamic environments. *Administrative Science Quarterly, 39*(1), 24–56.

Christensen, C. M. (1993). The rigid disk drive industry: A history of commercial and technological turbulence. *Business History Review*, *67*(4), 531-588.

Christensen, C. M. (1997). *The innovator's dilemma: When new technologies cause great firms to fail*. Harvard Business Review Press.

Franco, M., Minatogawa, V., & Quadros, R. (2023). How transformative business model renewal leads to sustained exploratory business model innovation in incumbents: Insights from a system dynamics analysis of case studies. *Systems, 11*(2), 60.

Harreld, J. B., O'Reilly III, C. A., & Tushman, M. L. (2007). Dynamic capabilities at IBM: Driving strategy into action. *California Management Review, 49*(4), 21–43.

Igami, M. (2017). Estimating the innovator's dilemma: Structural analysis of creative destruction in the hard disk drive industry, 1981–1998. *Journal of Political Economy, 125*(3), 798-847.

Kim, B. (1998). Manufacturing learning propensity in operations improvement. *Human Factors and Ergonomics in Manufacturing & Service Industries, 8*(1), 79–104.

Leonard-Barton, D. (1992). Core capabilities and core rigidities: A paradox in managing new product development. *Strategic Management Journal, 13*(S1), 111–125.

March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science, 2*(1), 71–87.

McLean, B. (2023, March 16). *How Silicon Valley Bank's strategy backfired*. *Fortune*.

Pollack, A. (2002, September 4). *Hewlett-Packard completes Compaq acquisition. The New York Times*.

Rivlin, G. (1999). *The plot to get Bill Gates: An irreverent investigation of the world's richest man... and the people who hate him*. Times Books.

Rosenberg, K. (2018, October 15). *Sears bankruptcy: A cautionary tale of retail overreach. The Wall Street Journal*.

Smith, E. (2023, March 12). *The meltdown of Silicon Valley Bank. The Wall Street Journal.*

Tripsas, M., & Gavetti, G. (2000). Capabilities, cognition, and inertia: Evidence from digital imaging. *Strategic Management Journal, 21*(10–11), 1147–1161.

Tushman, M. L., & O'Reilly, C. A. (1996). The ambidextrous organization: Managing evolutionary and revolutionary change. *California Management Review, 38*(4), 8–30.

Vergne, J.-P., & Durand, R. (2011). Escaping the competency trap: Revisiting organizational inertia in a structural perspective. *Journal of Management Inquiry, 20*(1), 58–75.