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The evolution of strategic management theory and strategic practices in high-technology industry: Cases of NVIDIA and AMD

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Abstract
The research investigates how strategic management theory developed through time while studying the real-world implementation of this theory by conducting extended case studies on NVIDIA and Advanced Micro Devices (AMD).The research shows strategic development through business history and strategic management research by following the evolution of strategic thinking from its start with financial planning and industrial positioning through to present-day Resource-Based View (RBV) and Dynamic Capabilities Theory and platform ecosystem and digital transformation approaches. The research provides an extensive analysis of Mintzberg's Ten Schools of Strategy because this framework enables researchers to comprehend how strategic choices develop throughout their entire life cycle. The research uses qualitative longitudinal case study methods to examine NVIDIA's strategic development between 1993 and 2026 and AMD's transformation process from 1969 until 2026. Research findings demonstrate that technology-based businesses need more than top-notch technological products to build sustainable market leadership because they must create exclusive systems and build up VRIO assets while maintaining their organizational structure for environmental shifts. The leadership position in industry became NVIDIA's achievement through their development of the CUDA software ecosystem and their accelerated computing platform. The way I see it, AMD managed to regain its market position by combining organizational changes with technological progress and flexible computing system expansion. Strategic management theory has transformed from its original static planning-based models into modern systems which combine dynamic elements with ecosystem-based and innovation-focused approaches. Research findings establish that Dynamic Capabilities Theory provides useful information to management because organizations can select from various methods to maintain their competitive advantage during fast market changes. The research combines historical theory development with modern semiconductor industry case studies to establish new strategic management knowledge which business leaders need to handle digital transformation and AI-based competition in their markets.

Keywords: Strategic management, resource-based view (RBV), dynamic capabilities, platform ecosystem, competitive advantage, NVIDIA, AMD

Introduction

The Industrial Revolution brought about an ongoing expansion of market reach which led to continuous improvements in transportation and communication systems that evolved business strategy into a dedicated management science field (Chandler, 1977) [11]. The nineteenth-century railway revolution established national market unity through its ability to merge regional trade areas which led to the development of large modern business organizations. The model which depends on market forces to allocate resources showed increasing problems so managers needed to develop strategic plans for their business operations in the future. The practical beginnings of contemporary business strategy emerged through the formal establishment of strategic thinking according to John (1997) [18]. The post-World War II global trade system reorganization created escalating market competition between multinational oligopolies. The establishment of game theory by Von Neumann and Morgenstern in 1947 [34] brought mathematical analytical tools into strategic research through their work. Hofer and Schendel (1978) [16] systematically synthesized three major theoretical divergences within the academic community, and subsequent comprehensive synthesis by Bracker (1980) [7] established authoritative definitions of strategy, marking strategic management's emergence as an independent research domain distinct from economics and business policy curricula (Helper & Sako, 2010) [15].

The twenty-first century began with digital technologies and artificial intelligence and diverse computing systems which completely altered how traditional businesses compete in their markets. High-technology businesses now use platform ecosystems and software lock-in effects and cross-industry related diversification as their essential competitive tools. The basic principles of static industrial organization (IO) theories which include Porter's Five Forces framework and value chain analysis stem from manufacturing environments and follow straightforward technological development and base their competition on product-based strategies. Modern GPU and AI compute companies maintain their market leadership through software ecosystem value creation yet current frameworks fail to explain these mechanisms.

NVIDIA Corporation started its business operations in 1993 and has undergone five complete strategic transformations throughout its thirty years of existence. The company transformed into a survival mode after its NV1 technology failed. The business established itself as an established player within the discrete graphics market through its oligopolistic market position. The company established

CUDA general-purpose computing as a strategic investment which they continue to support into the future. The company expanded its operations through related diversification which brought them into the deep learning and AI market. The present-day business strategy involves integrating full-stack global AI computing infrastructure to achieve its operational goals. The business portfolio of this corporation maintains presence in consumer electronics and high-performance computing and artificial intelligence and industrial simulation and biomedical applications which led to its market value increase by more than five thousand times to become a perfect example of digital age strategic evolution (Carayannis & Preissler, 2025) [8].

Etymological Origins and Comprehensive Conceptual Evolution of Business Strategy

Strategic Etymology: Extension from Ancient Greek Military Concepts to Commercial Contexts

The term "strategy" derives from the ancient Greek strategia, composed of stratos (army) and agein (to lead), with the original definition encompassing the general's art of commanding military forces, allocating resources, assessing adversarial conditions, and avoiding fatal risks (Mintzberg *et al*, 1998) [22]. The modern competitive analysis framework contains four essential elements which consist of environmental assessment and resource distribution and future position planning and threat control systems. The emergence of free-market economies in the eighteenth century, articulated through Adam Smith's "invisible hand" proposition in The Wealth of Nations, assumed that market prices achieve spontaneous equilibrium with enterprises passively responding to price signals, rendering proactive long-term business planning unnecessary. The situation continued until railway companies started their extensive national expansion which created one national market from multiple regional markets during the mid-1800s. Businesses needed to develop their operations beyond their original regional markets during this period. The business world saw military strategic thinking enter its operations when managers started using this approach to develop capacity plans and distribution systems and technology evolution strategies which became the foundation for contemporary business strategy (Tennent, 2020) [32].

Pre-World War II Business Strategy Emergence: Experience-Oriented Fragmented Strategic Thinking (1850–1945)

Before World War II global businesses operated mainly at regional levels because they faced separated markets and expensive transportation and communication services and minimal competition in their industries. The business strategy of the organization stayed limited to the combined personal knowledge of its founders and top executives because it lacked any established theoretical framework. The process shows three operational stages which help explain its operational framework. American railway companies during the second half of the nineteenth century worked to achieve market unity across state lines by building professional management organizations which directed scheduling operations and controlled cost reporting and equipment acquisition standardization. The "pre-managerial revolution period" represents the time before managerial practices according to Chandler (1965a) who showed how railways became the first organization to use strategic planning for economic growth through their resource management for achieving economies of scale. The heavy industrial sector including DuPont and General Electric tried to develop new products and expand their businesses through horizontal growth during the first two decades of the twentieth century but their founders made all decisions through personal knowledge without using standard tools to analyze business environments or match resources which led to unpredictable strategic choices. Research in academic fields stayed underdeveloped through this era because economists studied large-scale market structures which included both perfect competition and monopoly equilibrium and management researchers focused on Taylor's scientific management which dedicated its research to optimize factory production efficiency and operational processes but failed to study market competition and resource distribution across different regions. The business strategies between them showed three main characteristics because they developed through personal experience without creating analytical tools for environmental assessment and resource evaluation and they focused on immediate operational needs without making strategic plans for the upcoming decade and their strategies functioned only in stable traditional physical markets with limited changes but failed to explain business actions during the post-World War II period of worldwide oligopolistic market competition.

Post-WWII Modern Business Strategy System Formation and Core Academic Divergences (1946–1990)

Following World War II, declining international trade tariff barriers, rapid multinational enterprise emergence, and significantly accelerated technological iteration elevated competition from regional to global scales, with systematic business strategy theory formally crystallizing alongside simultaneous scholarly school divergences. Four milestone works and scholars established the field's foundations. Von Neumann and Morgenstern (1947) [34], in Theory of Games and Economic Behavior, constructed a mathematically formalized competitive analysis framework, defining inter-enterprise market competition as non-cooperative games, quantifying competitors' strategic actions' impacts on own-firm returns, and breaking through the traditional single-enterprise internal operations analytical perspective. This framework established for the first time a "bilateral enterprise-competitor interaction" analytical paradigm, while refuting Adam Smith's perfect competition assumptions by demonstrating that enterprises can alter market equilibrium through proactive strategic actions, providing mathematical legitimacy for strategic management as an academic discipline and furnishing complete mathematical tools for subsequent Industrial Organization (IO) theory and competitive strategy research (Nag *et al*, 2007). Hofer and Schendel (1978) [16, 23] edited the first authoritative conference proceedings in strategic management, systematically synthesizing persistent academic debates from the 1960s–1970s, identifying three fundamental divergences that constitute the ultimate source of subsequent school differentiation: strategic analysis unit divergence (external industry structure-oriented IO school versus internal resource-capability-oriented Resource-Based View and evolutionary schools); strategy formation process divergence (rational top-down comprehensive planning—design and planning schools—versus endogenous emergent organizational processes—learning and cognitive schools); and research objective divergence (normative optimal strategy design addressing what enterprises "should" do versus descriptive actual strategic behavior addressing what enterprises "actually" do).

The entire strategic management discipline between 1950 and 1979 [29] received a thorough analysis from Bracker (1980) [7] who solved the problem of multiple definitions and unclear concepts by creating a single definition which SSCI journals now frequently reference. Business strategy functions as an enterprise-wide decision framework which organizations develop through structured analysis of their internal and external environments to allocate their distinct limited resources for achieving stationary value targets and operating at all organizational levels and maintaining continuous market dominance. It is recognized four essential elements which form the complete strategic framework that he developed. The strategic direction of purposiveness focuses on achieving enduring market success through sustainable industry leadership which goes beyond typical short-term operational targets. The strategy encompasses all organizational levels because it includes corporate headquarters together with independent business units and R&D and marketing and finance functional departments instead of focusing on particular departmental choices. The strategy requires two-way resource matching between organizational internal assets and external market conditions to prevent companies from expanding across various industries without considering their available resources. Organizations need to update their strategic plans because market demand changes and competitors introduce new products and technology evolves and governments make economic decisions which prevent them from creating permanent static plans.

Three-Stage Macro Periodization of Business Strategy Practice

The historical development of business strategy through research on business history and industrial evolution worldwide shows that practical business strategy growth follows three distinct historical periods which contain unique strategic elements and operational frameworks and business models and academic principles and essential industry challenges. The Macro-Regional Market Stage (1850–1945) began the market expansion through railway and telegraph technologies which established a single national market that gradually removed the separation between regional markets. The strategic core of this stage operated through three main approaches which included achieving cost advantages through mass production and building complete industrial systems and managing logistics operations across different regions. The business landscape included American railway groups together with DuPont Chemical and the first operations of General Electric. The theoretical elements showed no established academic structures which entrepreneurs managed through their personal experience because they operated without any official analytical systems. The main problem emerged from the fact that organizations needed to spend more money for resource management across multiple regions than their factory output numbers would justify when compared to customer requirements in their local markets. The Micro-Industry Oligopolistic Competition Stage (1946–1990) developed through three main factors which included manufacturing growth after World War II and multinational business expansion and the introduction of television and personal computers to the market. The core strategic logic requires businesses to position their operations within industrial frameworks while they expand their product offerings across different markets and merge with competitors operating in their current industry and compete through price-based strategies. Theoretical frameworks which represented these concepts included Porter's IO industrial organization theory together with Ansoff's product-market expansion matrix and the SWOT analysis framework.

During this time the primary contradiction appeared because of price battles between industrial oligopolies and their ongoing fight for market dominance and the dangers which stemmed from entering markets that did not match their core business. The Global Full-Domain Dynamic Competition Stage (1991–present) emerged through Internet expansion which digital technologies and artificial intelligence and software ecosystem network effects and worldwide supply chain networks made possible. The core strategic logic requires businesses to build platform ecosystems while they work to keep software users locked in and they need to make technology investments that look ahead into the future and they must maintain their dynamic capabilities through ongoing transformation and they should pursue diversification by connecting different industries. Theoretical concepts find their representation through Resource-Based View (RBV) and Teece's dynamic capabilities and platform strategy and ecosystem strategy. The main contradictions of this stage include three major conflicts which involve disruptive technological replacement and competition between different industries and worldwide political restrictions and software ecosystem barriers that block technological advancement. Business strategy development follows a three-step process which starts with experience-based methods before moving to theoretical frameworks and finally reaches an integrated operational system.

The Nineteenth-Century Railway Revolution and Chandler's "Visible Hand" Strategic Transformation

Chandler's (1977) The Visible Hand: The Managerial Revolution in American Business constitutes the foundational classic at the intersection of business history and strategic management, selected as a highly cited core work in Business History Review centenary evaluations. The work empirically reconstructed enterprise strategy's underlying logic, effectively refuting Adam Smith's theoretical assumptions regarding exclusive reliance on market regulation. Railway transportation's substantial development significantly reduced transregional goods transportation costs, enabling integration of previously isolated regional markets into unified national markets, with single-factory large-scale capacity capable of covering nationwide consumption demand. However, if enterprises relied exclusively on market spontaneous price signals to regulate production and distribution, systemic problems would inevitably emerge including nationwide overcapacity, regional destructive price competition, and transregional logistics coordination breakdowns. Within this context, enterprises were compelled to establish professional management tiers formulating unified production, distribution, and pricing long-term strategies—the core requirement of modern strategy, "managerial proactive resource planning," was formally born. Chandler further proposed two core variables driving modern enterprise strategy formation—economies of scale and economies of scope. The former refers to single-product mass production continuously amortizing fixed R&D and production equipment costs, while the latter refers to multiple product lines sharing production equipment, distribution channels, R&D teams, and brand resources, reducing multi-product operational marginal costs. Together, these variables drove enterprises to proactively implement vertical integration, capacity expansion, and multi-product line deployment, constituting the theoretical origin of modern enterprise diversification and industrial merger strategies (Toms & Wilson, 2003) [33]. Railway enterprises pioneered multi-tiered functional division organizational structures with independent production, logistics, finance, and marketing departments, concretely validating Chandler's (1962) [9] core proposition that "strategy determines structure"—that is, enterprise long-term business strategy determines internal organizational architecture design, while organizational structure reciprocally supports strategy execution. Compared to Adam Smith's theoretical assumptions of market prices spontaneously regulating social resource allocation with enterprises passively responding to price signals without proactive long-term strategic planning space, Chandler demonstrated through empirical evidence from American century-long railway and large manufacturing enterprises that when market scale exceeds regional thresholds and asset-heavy long-cycle industries emerge, enterprise internal managerial coordination (managers' "visible hand") resource allocation efficiency significantly surpasses market spontaneous transaction coordination (the market's "invisible hand"). This conclusion established strategic management's legitimacy as an independent discipline—enterprise long-term strategy constitutes a proactive instrument for improving scarce resource allocation efficiency, not an ancillary product of market competition, providing underlying logical support for all subsequent enterprise strategy research (Helper & Sako, 2010) [15].

Five Paradigmatic Progressions in Strategy Theory and Mintzberg's Ten Schools of Strategy

Five-Stage Paradigm Evolution of Strategy Theory

The strategic management field has developed through five distinct periods which span from the 1950s until today. The first stage of Basic Financial Planning (1950s) started during the manufacturing recovery period following World War II when businesses focused on managing their expenses and operating their factories through brief planning cycles. The decision process depends on internal historical financial data which transforms short-term annual budgets into 36-month financial plans through financial forecasting models and cash flow calculations and capacity planning tables. The stage focused its entire attention on financial resource distribution within the organization while it ignored all outside market elements and competing businesses and future technological advancements. The operational level performed medium-term financial planning through internal resource distribution but it did not develop an advanced business strategic system which evolved into modern strategic planning methods. The 1960s brought fast industry growth to automotive and consumer electronics businesses which experienced steady market expansion and stable environmental conditions to establish the Forecast-Oriented Rational Planning framework by Ansoff (1965) and Learned *et al*. (1965) [10, 19]. The core logic operated through a basic prediction method which used previous sales numbers to show how the market would expand in upcoming years. Senior managers developed formal strategic plans which they wrote for five to ten years and then used to direct all operations within their organization. The research team used SWOT matrix and Ansoff's product-market expansion matrix and long-term sales linear forecasting models for their analytical work. The system design process ignored how environmental changes would affect the system while it failed to handle the resistance which front-line staff members would show during the implementation process. The 1970s oil shortage worldwide created intense market competition which made traditional demand prediction methods useless so strategic management needed to develop its Industry Environment Analysis approach. Porter's early IO research together with Miles and Snow (1978) [20] established core logic which focused on strategic alignment with industrial competitive structures by analyzing complete industry competition to decide business market positions. The research team used three main tools for their study which included the PIMS database and industry competition classification matrices and multi-scenario environmental simulation tools. The study period saw Hofer and Schendel create a clear distinction between corporate-level strategy and business-level competitive strategy which strategic management became a separate academic field from business policy.

However, excessive emphasis on external industry structural analysis completely neglected internal heterogeneous scarce resources, rendering the framework unable to explain performance differentials among enterprises within identical industries. The 1980s [7] witnessed the Dual-Track Resource-Based View and Competitive Advantage paradigm stage, with two core theoretical branches developing in parallel, jointly establishing modern strategic management's complete analytical framework. The first comprised the Industrial Organization (IO) paradigm (Porter, 1980) [27], proposing the Five Forces competitive model, three generic competitive strategies (cost leadership, differentiation, focus), and value chain analysis tools, with core logic being that industry competitive structure determines enterprise profitability ceilings, with enterprises establishing favorable competitive positioning through differentiation or cost leadership strategies. The second comprised the Resource-Based View (RBV) (Wernerfelt, 1984; Barney, 1991) [6, 35], which conversely corrected IO's exclusively external perspective, asserting that enterprises constitute collections of heterogeneous scarce resources, with unique resources possessing Value, Rarity, Inimitability, and Organizational support (VRIO) constituting the fundamental source of sustained competitive advantage. This stage, against the background of globalized oligopolistic competition and continuously expanding inter-enterprise technological differentiation, achieved a complete "external industry environment–internal scarce resources" bidirectional matching analytical logic. The static resource analysis framework fails to explain how resources experience swift value drops when technology advances at fast rates and businesses choose to modify their resource base actively. Strategic management has achieved the Global Full-Domain Dynamic Integration level through its development which started in the 1990s and continues into the present day. The stage unfolds through Internet growth which leads to software industry development and AI technology disruption and cross-industry market acceptance according to Teece *et al*.'s dynamic capabilities theory and Mintzberg's strategy process theory and platform ecosystem strategy and digital full-domain dynamic strategy. Core logic shows that strategy exists as a never-ending process which companies use to adapt their business operations with changing market conditions and various internal capabilities and organizational knowledge and software platform network effects and international political frameworks. The core elements of this framework consist of dynamic capabilities which include market opportunity detection and business opportunity capture and resource system transformation and the concept of emergent strategy and software platform lock-in and ecosystem growth flywheels. The present stage solves RBV's fundamental problem of analyzing resources as fixed assets because organizations now understand they can establish new valuable resources which they can maintain through strategic asset development for their high-risk technological ventures. The five-stage evolution process shows strategic management theory development through financial planning and environmental analysis and resource analysis which leads to the full-domain integration perspective that demonstrates how theory adapts to real-world changes.

Complete Classification and Analysis of Mintzberg's Ten Schools of Strategy

Mintzberg *et al*. (1998) [22], in Strategy Safari, systematically integrated the complete research trajectory of global strategic management from the 1960s through the 1990s, proposing a ten-school classification system that has influenced the field to the present day. The framework categorizes theoretical traditions into three prescriptive schools (focusing on the "ought" dimension—how enterprises should formulate optimal strategies) and six process schools (focusing on the "is" dimension—describing how enterprise strategies actually emerge), thereby comprehensively addressing Hofer and Schendel's three core academic divergences (Mintzberg, 1999) [21]. The three prescriptive schools—Design School, Planning School, and Positioning School—share core assumptions that enterprise strategy constitutes senior managers' rational, deliberate, and comprehensively planned output, with ultimate objectives of securing optimal competitive positioning within industries. These schools are applicable to stable environments with slow technological iteration, typical of traditional manufacturing. The Design School, represented by Harvard Business School's Andrews (1971) [4], with core analytical model being the SWOT matrix, conceptualizes strategy as the CEO/top management's conceptual process matching internal strengths/weaknesses with external opportunities/threats. While the framework is concise and facilitates organizational consensus implementation, it over-relies on CEO personal vision while neglecting grassroots market information feedback and external environmental dynamism. The Planning School, represented by Ansoff (1965) and Steiner (1979) [5, 29], emphasizes strategy formulation as standardized, programmed annual rolling planning processes, with enterprises establishing dedicated planning personnel translating decade-scale long-term macro objectives into annual functional implementation plans.

Supporting tools include Ansoff's product-market expansion matrix, rolling financial budgets, and multi-scenario long-term planning. However, planning processes are rigid and time-consuming, difficult to adapt to high-technology industries' technological discontinuities and rapid iteration cycles. The Positioning School, represented by Porter (1980) [27], asserts that strategy's essence lies in selecting distinctive advantageous positions within industry competitive structures, using the Five Forces model to assess overall industry attractiveness and applying three generic strategies to avoid undifferentiated price competition. The school's academic contribution consists of introducing mathematical industrial economics into practical enterprise strategy operations; however, the static industrial structure perspective completely neglects internal VRIO resources and software ecosystem-enabled cross-industry competitive dynamics. Correspondingly, the six process schools—Entrepreneurial School, Cognitive School, Learning School, Environmental School, Power School, and Configuration School—collectively break through the "single rational top-level planning" assumption, focusing on describing enterprise strategy's actual emergence and evolution complete processes, demonstrating high applicability to high-turbulence technology industries including digital, AI, and semiconductors. The Entrepreneurial School maintains that founders develop their enterprise strategy through their individual vision and their natural decision-making abilities and their ability to handle uncertainty. Top-level long-term vision controls all decisions about technological roadmaps which span across multiple decades. The business practice of NVIDIA's Jensen Huang demonstrates his dedication to CUDA general-purpose computing through continuous funding which he maintained despite internal company doubts which followed the presented theory. The Cognitive School bases its strategy development on managers who create strategic decisions through their personal mental structures while their information processing and mental shortcuts shape their critical strategic choices. The Learning School presents that enterprise strategy emerges through organizational market testing and technological development instead of being established as a single top-level comprehensive plan—The GPU industry demonstrates this through its ongoing technological testing and developer community advancement which shows how organizations learn together. The Environmental School proposes that external macro-environment serves as the primary factor which restricts business strategy development because organizations must follow industrial technology progress and international policy changes and geopolitical regulatory decisions. The semiconductor industry faces two main obstacles which block multinational corporations from following their preferred international expansion paths because global chip export regulations and technology exchange restrictions remain inflexible. The Power School defines strategy as the result of organizations working through their internal departmental interests and their position in industry value chain negotiations. The bargaining process between NVIDIA and its worldwide cloud service providers and software developers and chip manufacturers becomes understandable through this theoretical framework which also explains their patent licensing discussions. The Configuration School which Mintzberg leads states that business organizations develop through organizational structural phases which remain consistent until strategic changes occur during institutional transitions. The research periodization divides NVIDIA's thirty-year evolution into five independent strategic stages by following the Configuration School's stage-based development framework. The ten-school classification system presents a structured framework which defines strategic management theories and helps future researchers identify specific schools and establish communication channels between them.

The academic field of global strategic management before 1990 focused on theoretical discussions about concepts and academic debates between different educational institutions. The research direction of leading academic journals has undergone a total transformation since 2000 [12] because they moved away from theoretical debates to focus on three specific empirical research areas. First, industry heterogeneity classification research focuses on identifying specific strategy logics which work for traditional manufacturing and software platform enterprises and semiconductor chip enterprises and biomedical enterprises and other business sectors. First, the research focuses on industry heterogeneity classification to identify specific strategy logics which operate in traditional manufacturing and software platform enterprises and semiconductor chip enterprises and biomedical enterprises and other business sectors. The research shifted away from its initial goal to establish a single strategic framework which would work across all business sectors. Second, long-cycle longitudinal case empirical research depends on companies' historical records which include their annual financial statements and technical documentation and founder interviews to study how dynamic capabilities and platform ecosystem strategies perform over time. The research uses NVIDIA's thirty-year corporate evolution as a core example to study extended business performance because the company allows access to its entire development history. Third, digital full-domain strategy integration research—integrates big data with artificial intelligence and software ecosystem network effects to develop full-domain dynamic strategy frameworks which operate in digital economies and AI industries (Zhou & Kuang, 2025) [36].

Vision and Mission

Vision

The top-level strategy which includes Vision and Mission serves as the starting point for all enterprise operational strategy development because it establishes the enterprise's permanent value goals and fundamental business operations and essential organizational principles which then develop into corporate diversification strategies and business-level competition plans and functional R&D and marketing and financial operations strategies to create a full closed-loop logical sequence. The academic field defines enterprise vision as the long-term developmental path which businesses pursue across their 10-to-30-year operational span to reach their ultimate organizational goal. The enterprise vision defines the organization's future state through a 10-to-30-year developmental path which focuses on industrial technology and social value instead of short-term financial targets (Mintzberg Entrepreneurial School). The official NVIDIA vision statement which says "accelerate global computing, empower artificial intelligence innovation across all industries" has stayed the same since the company introduced CUDA in 2006. The vision of an organization serves three essential purposes which help the organization achieve its goals. Organizations use vision as their primary decision-making tool for long-term planning because it helps them navigate strategic inflection points which involve technological direction choices and massive R&D funding commitments and industry expansion initiatives. The 2006 launch of CUDA by NVIDIA brought about a new general-purpose computing architecture which the company supported with major funding because it matched their long-term goal to boost worldwide computer performance. Organizations need vision to fulfill three essential purposes which help them achieve their organizational goals. Organizations use vision as their main decision-making tool to establish long-term plans because it guides them through strategic inflection points which require technological direction decisions and massive R&D funding commitments and industry expansion initiatives. The 2006 launch of CUDA by NVIDIA brought about a new general-purpose computing architecture which the company supported with major funding because it matched their long-term goal to boost worldwide computer performance. Organizations use vision to create consensus throughout their entire organization which aligns their global branches with R&D and marketing and finance departments to achieve their long-term development goals while reducing important strategic disagreements and resource allocation disagreements between different organizational units. Organizations use vision to create consensus throughout their entire organization which aligns their global branches with R&D and marketing and finance departments to achieve their long-term development goals while reducing important strategic disagreements and resource allocation disagreements between different organizational units. Organizations use vision to create consensus throughout their entire organization which aligns their global branches with R&D and marketing and finance departments to achieve their long-term development goals while reducing important strategic disagreements and resource allocation disagreements between different organizational units. Organizations use vision to create consensus throughout their entire organization which aligns their global branches with R&D and marketing and finance departments to achieve their long-term development goals while reducing important strategic disagreements and resource allocation disagreements between different organizational units. Organizations use vision to create consensus throughout their entire organization which aligns their global branches with R&D and marketing and finance departments to achieve their long-term development goals while reducing important strategic disagreements and resource allocation disagreements between different organizational units.

Mission

The current operational boundaries of an enterprise become defined through its mission, which answers the question about which customers receive what unique value from the company at this moment. Bracker (1980) [7] conducted a literature review which led to the identification of eleven essential elements that mission statements need to include. The research framework serves as the standard analytical benchmark for SSCI journals because of its eleven essential elements which include customer base definition and product matrix and technology service matrix and market coverage and core business technology and competitive advantage and business survival and growth targets and core values and employee rights and development programs and supply chain and industrial partner systems and social and industry public responsibilities and worldwide market position and technology innovation funding for extended durations. The research establishes its base by uniting the Planning School's typical strategic development system with the Configuration School's stage-matching approach to create a five-step method which helps semiconductor and AI high-tech companies build their vision and mission statements. The first step requires organizations to create a complete record of their founder's enduring technological goals and worldwide industry development patterns which will span from 10 to 30 years into the future. The research process involves complete stakeholder analysis which includes employees from R&D and marketing and finance departments together with outside end users and software developers and industry investors and supply chain partners. The system requires testing against the eleven essential mission components to define business operations and determine future research and development spending levels. The process of vision and mission alignment requires internal validation to remove statements which focus on immediate financial gains that contradict future technological development plans. The organization needs to create a link between its vision and mission statements with its internal performance evaluation system and strategic resource distribution system which should incorporate main organizational objectives into every technology development project and business expansion through acquisitions. The system presents a complete four-level closed-loop structure which cascades strategic information from top to bottom while receiving feedback from bottom to top. The system maintains four separate levels which perform their own operational duties. The highest level of Vision and Mission establishes permanent value targets together with essential business operations and strict resource allocation boundaries which all lower-level strategies must follow. The corporate-level strategy unit manages the process of selecting industries for business operations and performs worldwide acquisition activities and industrial integration through vertical and horizontal methods while creating enduring investment distribution plans. The business-level competitive strategy establishes market segment positions through three competitive approaches which include differentiation and cost leadership and software ecosystem lock-in. The functional-level execution strategy breaks down into separate plans which include R&D technology roadmaps and developer ecosystem operations and global marketing strategies and supply chain management systems and financial investment plans that enable organizations to reach their strategic targets through daily operational activities.

Case Study 1: NVIDIA's Strategic Evolution (1993–2026) [28]

NVIDIA Corporation started its official operations on April 5, 1993, when Jensen Huang joined forces with Chris Malachowsky and Curtis Priem to create the company through their initial capital of $40,000. The company started its business operations by developing and manufacturing 3D graphics processors for personal computers throughout its startup period. The Fiscal Year 2025 [8] 10-K Annual Report from NVIDIA shows that the company operates completely under its mission to advance "accelerated computing" because society now encounters a new industrial revolution which relies on intelligence as its fundamental product. The new industrial revolution depends on intelligence because it has become the fundamental product of this technological shift. People now have unrestricted access to generative AI and agentic AI because they function as basic utilities which operate like electrical power. The company describes itself as a worldwide intelligent computing infrastructure developer which aims to make accelerated computing the main technological solution for all traditional business sectors in the future. The FY2024 official report establishes that accelerated computing functions as sustainable computing because worldwide data centers must decrease their energy usage through GPU acceleration to reach their net-zero emission goals. The current computing landscape needs generative artificial intelligence because it functions as a universal operating system which will transform major established business sectors while creating new markets that will generate over one trillion dollars in revenue. The enterprise has operated through five strategic operational stages since its establishment in 1993 until 2023 [1]. The company spent two years developing its first product NV1 which used unconventional quadrilateral texturing QTM technology but failed to meet PC industry graphics requirements thus causing worldwide motherboard manufacturers to reject the product. The company shipped 250,000 units but most of them came back because of compatibility problems which led the business to face financial collapse. The business faced financial collapse because it needed to repay all its returned products which forced the company into bankruptcy protection. The disaster led to an emergency situation which forced NVIDIA to perform a major strategic shift that resulted in the company dropping its QTM system to create 3D graphics processors which followed industry rules. The disaster forced NVIDIA to make a vital strategic change because they needed to stop using their QTM system to build 3D graphics processors which followed industry standards. The RIVA 128 launch in 1997 [18] achieved full compatibility with universal standards which earned the product recognition from both consumers and hardware manufacturers while successfully overcoming the bankruptcy crisis. The research team discovered that new industries with undefined technology standards need to achieve two-way equilibrium between technical progress and market acceptance for their solutions. The strategic discovery required all future technology roadmap decisions to follow its guidance.

Stage Two (1998–2006)—Horizontal Industry Consolidation Plus Annual Product Iteration Dual-Core Strategy—in 2000, NVIDIA completed full acquisition of 3dfx, the former 3D graphics industry leader, eliminating the core competitor, reducing industry price competition impact, and acquiring decades of accumulated graphics technology patents, R&D teams, and brand user loyalty, accumulating inimitable technological assets. The company started to follow a consistent product release schedule which resulted in new GPU hardware architectures appearing every two years at most. The release of CUDA in 2006 established NVIDIA as the dominant player which controlled more than seventy percent of the worldwide market for specialized graphics cards. The business faced its most crucial strategic transformation in 2006 when it decided to implement a high-risk approach which industry experts and company staff members both doubted. The business chose to include CUDA technology in their products although this choice established a 50% increase in production expenses because gaming customers did not require any generic programming abilities from their computers. Huang later admitted that the company came close to failing because of this decision but his team worked to establish NVIDIA as a complete computing solution provider which extended beyond their previous focus on graphics hardware. The short-term irrational investment created an untouchable competitive barrier which allowed NVIDIA to establish its AI computing leadership position by 2026 through its CUDA platform which hosts more than 1,000 specialized software libraries. The software barrier prevents competitors from duplicating it during the short term because developers face substantial costs when learning CUDA programming languages and ecosystem tools before they can switch to different platforms.

The 2006 CUDA decision established a theoretical basis which matches perfectly with the three stages of dynamic capabilities—sensing (predicting that general-purpose parallel computing would establish itself as basic infrastructure for scientific computing and AI), seizing (forcing complete GPU line CUDA implementation which resulted in brief financial setbacks while maintaining multi-billion-dollar software ecosystem R&D funding), and transforming (R&D funds and company structure moved from traditional graphics work to support the dual-track system which combines GPU hardware and software programming platforms). The CUDA ecosystem fulfills all four essential VRIO criteria which Barney developed in 1991 [6] for assets that remain scarce in the market—Value (the system enables users to save major expenses when working with AI and scientific simulations), Rarity (NVIDIA stands alone as the company which built a full general-purpose computing platform that combines chip manufacturing with software development), Inimitability (the software libraries which cover twenty years of development together with the network effects from millions of developers create an unbreakable barrier that prevents competitors from copying the system during the initial years), and Organization (the company developed separate departments for CUDA R&D and developer ecosystem operations which their organizational structure enables them to keep evolving their ecosystem). Stage Four (2007 [30]–2022) saw the company shift its strategic focus from manufacturing graphics processors to becoming a complete accelerated computing platform provider which used Ansoff's matrix to pursue diversification through related business expansion—without leaving GPU parallel computing technology behind the company developed its VRIO assets for entry into new market segments and established a "three-pillar" business structure which included gaming GPUs and data center AI compute and autonomous vehicles. The data center AI compute business experienced rapid expansion because of deep learning technology developments which started when NVIDIA's GPUs proved their superiority during the 2012 AlexNet ImageNet competition victory which marked the first time GPUs showed their power for big deep learning training and inference tasks—research institutions worldwide and cloud service providers and AI startups all started using CUDA-based GPUs. The data center business evolved from producing minor revenue to becoming the company's main source of revenue and profit which marked NVIDIA's complete shift from its original role as a gaming GPU producer to becoming a worldwide AI computing system provider. The company started its complete global industry network unification plan during Stage Five (2023–2026) [28] which brought about major business expansion across all its operations—The company achieved $130.5 billion in FY2025 revenue which showed a 114% increase from FY2024's $60.9 billion revenue that had previously expanded by 126% from FY2023's $27.0 billion revenue while maintaining a 75.0% gross margin rate. The Blackwell new architecture platform introduced as the world's fastest mass-production AI chip platform with top performance capabilities achieved 30 times better inference speed than the previous Hopper architecture and customers obtained 25 times lower total ownership costs; Blackwell Ultra version extended its large-scale AI factory compute potential to reach 50 times the performance of Hopper architecture. The FY2025 annual report headline redefines overall strategic positioning as "all future industries will operate on accelerated computing," explicitly identifying core positioning not as chip hardware seller but as global artificial intelligence infrastructure complete supply chain builder.

Synthesizing the thirty-year development cycle, NVIDIA's three major strategic decisions provide complete theoretical cross-validation value: First critical decision (1995–1997) [18]—abandoning NV1 non-mainstream architecture for industry standards—precisely validates the Learning School's strategy formation mechanism—strategy does not constitute top-level one-time static planning but emerges dynamically through continuous market experimentation, failure experience accumulation, and collective organizational learning. Second critical decision (2006)—high-risk CUDA ecosystem investment—simultaneously validates dynamic capabilities theory (enterprises sensing latent opportunities in high-velocity environments, proactively reconfiguring scarce resources) and RBV (CUDA's twenty-year accumulated software ecosystem as standard VRIO asset, with superior profits deriving from heterogeneous software ecosystem rather than hardware alone). Third critical decision (2010s–present)—transformation from standalone GPU hardware manufacturer to full-stack AI compute platform enterprise—completely validates Teece's (2007) [30] dynamic capabilities "sensing-seizing-transforming" three-layer framework: sensing (continuously tracking deep learning and generative AI trends, accurately identifying global compute infrastructure market opportunities), seizing (converting long-term opportunities into sustainable revenue product portfolios through GPU hardware iteration, CUDA software library expansion, and developer support programs), and transforming (internally restructuring R&D, marketing, and industry partnership teams, adjusting global capital allocation directions, completing organizational transformation from graphics hardware enterprise to full-stack AI compute platform enterprise).

Case Study 2: AMD's Strategic Transformation (1969–2026) [28]

Advanced Micro Devices (AMD) was established on May 1, 1969, by Jerry Sanders together with seven engineers who left Fairchild Semiconductor to start their company in Silicon Valley California. Advanced Micro Devices started its business as a secondary semiconductor supplier which made integrated circuits and memory products that matched the products of major technology companies during its beginning phase. Unlike NVIDIA, which entered the graphics market as a start-up in the 1990s, AMD evolved through multiple decades of competition across CPUs, GPUs, memory chips, and embedded computing markets. The latest annual reports from AMD reveal that the company focuses on creating powerful computing systems which adapt to needs while enabling fast development of cloud technology and artificial intelligence and gaming and communication and embedded systems. Its long-term vision emphasizes enabling the future of computing through leadership in high-performance, energy-efficient, and adaptive semiconductor technologies (Advanced Micro Devices, Inc, 2024) [2]. AMD has developed through five primary phases which show how the company has evolved to handle new technological breakthroughs and changing market conditions and industry transformations.

Stage One (1969–1995): Survival, Market Entry, and Second-Source Strategy

The first stage showed survival-oriented growth while organizations-built market legitimacy. During the 1970s and early 1980s [7], AMD operated as a second-source manufacturer which involved producing Intel-compatible processors and semiconductor components through authorized licensing agreements. The strategy decreased technological unpredictability because it allowed AMD to create its manufacturing abilities while building financial strength and engineering resources. The company maintained its strategic independence through technology which Intel developed instead of depending on Intel's technology. The legal battles about x86 processor licensing between 1980s [7] and 1990s led AMD to understand they needed to build their own technology instead of copying others for their survival. The business dedicated major financial resources to develop its own microprocessor design capabilities while it established research and development facilities.

Stage Two (1996–2008): Independent Innovation and CPU Market Challenge

The global microprocessor market experienced its second phase when AMD evolved from following industry leaders into challenging them as a major competitor. The K6 processor series introduced by AMD during the late 1990s represented their initial attempt to enter direct competition with Intel for consumer CPU market share. The Athlon architecture launch in 1999 [21] brought a complete market position change to AMD which became their most crucial achievement. The Athlon processor achieved the first position as an x86-compatible CPU which outperformed Intel's Pentium flagship products in multiple performance tests. The success led AMD to launch their Opteron server processor together with the AMD64 architecture which brought revolutionary changes to the market in 2003. The AMD64 system brought 64-bit architecture to x86 computing from its 32-bit roots while preserving full support for programs which ran on previous software systems. The semiconductor industry reached a critical moment when the company needed to pick its next strategic direction. Intel developed the Itanium architecture for their own use because they thought business clients would adopt their all-new computing system. The market showed strong preference for AMD's method which worked with existing systems. The Intel Company later accepted AMD's 64-bit standard which proved the worth of AMD's technological approach.

Stage Three (2009–2016): Strategic Crisis and Organizational Restructuring

AMD encountered a major strategic breakdown which led to their downfall after their initial achievements from 2008 onward. The worldwide economic collapse created a drop-in technology market sale because Intel expanded its factory operations to dominate the industry. The Bulldozer CPU architecture from AMD failed to deliver its promised performance which caused the company to lose market position and experience financial deterioration. During this period, AMD faced existential challenges. The company experienced no increase in sales while its financial results worsened and it did not have enough money to match Intel's research capabilities and manufacturing operations. The company responded with a series of major restructuring initiatives which led to lower operational expenses and asset sales of unimportant properties and new business focus areas. The year 2014 [14] brought a major development when Lisa Su stepped into the position of Chief Executive Officer. The leadership of AMD under her guidance moved away from immediate survival tactics to develop sustainable organizational competencies which would last for years. The company focused its energy on developing select vital technologies instead of working to develop all market segments at once. Teece shows his dynamic capabilities through this particular stage in his model. AMD management discovered their present resource setup needed improvement so they decided to start a total organizational change. The company directed its limited financial and staff resources toward new business growth prospects through its decision to stop operating unprofitable business units.

Stage Four (2017–2022): Zen Architecture and Competitive Advantage Reconstruction

The Zen CPU architecture launch took place in 2017 which started AMD's strategic revival process. The Zen processor architecture emerged from a complete architectural redesign which Chief Technology Officer Mark Papermaster and CEO Lisa Su developed for AMD. The product showed major enhancements in its performance and energy efficiency and scalability when compared to its earlier models. The Ryzen processor line for consumers and EPYC server processors achieved fast market success. AMD established itself as a market contender for desktop computers and workstations and enterprise servers after more than ten years of absence. The company started using Taiwan Semiconductor Manufacturing Company's modern production systems which enabled AMD to stay competitive through their manufacturing partnerships instead of building their own factories (Advanced Micro Devices, Inc, 2025) [3]. The company used this phase to grow its GPU business through Radeon products and it also secured gaming console partnerships with Sony and Microsoft. The partnerships generated consistent income which brought together various business divisions through their shared operational advantages.

Stage Five (2023–2026): AI Acceleration and Adaptive Computing Ecosystem Strategy

The strategic landscape of AMD experienced a fresh opportunity when generative AI systems and large language models entered the market. The fast expansion of AI computing needs started to show possible risks which stemmed from users who depend on the NVIDIA system for their operations. The main cloud service providers actively worked to find different suppliers because they wanted to spread their risks while they worked to decrease their infrastructure expenses. AMD responded by accelerating investment in AI accelerators, high-performance GPUs, and software ecosystem development. The Instinct MI300 series launch made AMD a strong competitor for AI data-center computing power. The Xilinx acquisition brought AMD new abilities to work with adaptive computing systems and field-programmable gate arrays (FPGAs) and embedded systems (Advanced Micro Devices, Inc, 2026). AMD faced its most crucial strategic decision when it decided to buy Xilinx which became their most vital business move in company history. AMD developed adaptive computing architectures which operate beyond CPU and GPU technology to support telecommunications systems and aerospace operations and industrial automation and automotive systems and AI processing needs. The strategic decision led AMD to gain multiple technology assets which made the company stronger in the developing AI infrastructure market. AMD established its platform through an open-system approach which differs from NVIDIA's approach of using vertical integration. AMD aims to reduce customer dependency on proprietary computing environments through its ROCm software ecosystem which works with open-source communities. The strategy gained particular value for enterprise customers who needed improved system compatibility with various platforms.

Conclusions

This study examined the historical evolution of strategic management theory and explored its practical application through longitudinal case analyses of NVIDIA and AMD. By integrating the major theoretical traditions of strategic management, including the Design School, Planning School, Positioning School, Resource-Based View (RBV), Dynamic Capabilities Theory, and Mintzberg's Ten Schools of Strategy, the study developed an evolutionary framework for understanding how firms achieve and sustain competitive advantage in rapidly changing technology-intensive industries. The findings indicate that strategic management theory has evolved from static planning-oriented approaches toward dynamic and ecosystem-based perspectives. While early theories emphasized rational planning, environmental analysis, and industry positioning, contemporary competitive environments require firms to continuously sense opportunities, seize emerging market demands, and reconfigure resources in response to technological discontinuities. The comparative analysis of NVIDIA and AMD demonstrates that sustainable competitive advantage can emerge through different strategic pathways. NVIDIA achieved industry leadership through the development of the CUDA ecosystem and platform-based network effects, whereas AMD rebuilt competitiveness through technological innovation, organizational transformation, and adaptive strategic renewal. Together, these cases illustrate the growing importance of dynamic capabilities, ecosystem development, and long-term strategic vision in the AI-driven digital economy.

This research makes three primary theoretical contributions to the strategic management literature. First, the study provides an integrated historical framework that connects the major stages of strategic management theory development. Existing literature often examines individual theories independently, such as Porter's competitive strategy, Barney's Resource-Based View, or Teece's dynamic capabilities. This study synthesizes these perspectives into a coherent evolutionary framework, demonstrating how each theoretical paradigm emerged as a response to the limitations of previous approaches. The findings show that strategic management has progressively evolved from internal planning and external positioning toward dynamic resource orchestration and ecosystem competition. Second, the research extends the application of Dynamic Capabilities Theory within the context of the contemporary semiconductor and AI industries. Through the NVIDIA and AMD cases, the study demonstrates that competitive advantage is increasingly derived from a firm's ability to continuously adapt technological capabilities, organizational structures, and ecosystem relationships rather than relying solely on existing resources or market positions. The findings support Teece's sensing–seizing–transforming framework while illustrating its practical relevance in industries characterized by rapid technological change. Third, the study contributes to the growing literature on platform ecosystems and digital strategy. The NVIDIA case illustrates how software ecosystems can evolve into strategic assets that satisfy the VRIO criteria and generate long-term competitive advantages through network effects and customer lock-in mechanisms. In contrast, the AMD case demonstrates that firms may pursue alternative ecosystem strategies through open architectures, strategic alliances, and complementary technology integration. Together, the two cases enrich understanding of multiple pathways toward sustainable competitive advantage in the digital era.

The findings provide several practical implications for managers and business leaders operating in highly dynamic industries. First, organizations should recognize that sustainable competitive advantage increasingly depends on the development of unique and difficult-to-imitate strategic assets. While technological innovation remains important, long-term value creation often emerges from complementary capabilities such as software ecosystems, organizational learning mechanisms, strategic partnerships, and accumulated knowledge resources.

Second, enterprises should adopt a dynamic capabilities perspective when managing strategic uncertainty. The experiences of NVIDIA and AMD demonstrate that successful firms continuously monitor technological trends, identify emerging opportunities, and proactively reallocate resources before market disruptions become fully visible. Strategic flexibility and organizational adaptability are therefore essential managerial capabilities in rapidly evolving industries. Third, managers should view ecosystem development as a strategic priority rather than merely a supporting activity. The success of NVIDIA's CUDA ecosystem highlights how software platforms, developer communities, and industry partnerships can create substantial barriers to imitation. Similarly, AMD's expansion into adaptive computing through the acquisition of Xilinx demonstrates the value of integrating complementary technologies to enhance ecosystem competitiveness. Fourth, the study emphasizes the importance of long-term strategic vision. Both NVIDIA and AMD achieved major strategic transformations only after making substantial investments whose benefits were not immediately observable. This finding suggests that effective strategic management requires balancing short-term financial performance with long-term capability development and technological positioning. Finally, the research highlights the growing significance of leadership in strategic transformation. The roles of Jensen Huang and Lisa Su illustrate how visionary leadership can guide organizations through periods of uncertainty, resource constraints, and technological disruption. Strategic leaders must therefore function not only as decision-makers but also as architects of organizational learning and transformation.

Several opportunities for future research emerge from this study. First, future studies may expand the comparative scope by incorporating additional semiconductor and technology firms such as Intel, TSMC, Google, Microsoft, Apple, and Amazon. Comparative analyses across multiple firms could provide deeper insights into how different strategic approaches influence long-term competitive outcomes under varying industry conditions. Second, future research could employ quantitative methods to complement the qualitative longitudinal case approach adopted in this study. Large-scale empirical analyses using financial performance indicators, patent databases, R&D investment data, and ecosystem metrics may further validate the relationships among dynamic capabilities, ecosystem development, and sustained competitive advantage. Third, additional research is needed to investigate the role of artificial intelligence in strategic decision-making processes. As AI technologies become increasingly integrated into organizational planning, resource allocation, and market analysis, future studies may explore how AI-enabled decision systems influence strategic adaptation and organizational performance. Fourth, future scholars may examine the interaction between geopolitical factors and strategic management in global technology industries. Export controls, supply-chain security concerns, industrial policies, and technological sovereignty initiatives increasingly affect corporate strategy. Understanding how firms adapt to these institutional and geopolitical constraints represents an important research frontier. Finally, future studies may further explore the evolution of platform ecosystems and digital infrastructure competition. As industries become increasingly interconnected through AI, cloud computing, and software-defined technologies, ecosystem-level analysis may become more important than traditional firm-level analysis in explaining competitive advantage. Such research could contribute to the development of next-generation strategic management theories suitable for the AI-driven digital economy.

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