

# **Title: AI-Driven Innovation in Business Models: A Pathway to Competitive Advantage for Startups**

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## **Abstract**

Business Model Innovation (BMI) is a critical driver of startups' success. The high failure rate of new ventures highlights the survival challenges they face, with BMI often constrained by limited resources and uncertain conditions. In this context, Artificial Intelligence (AI) emerges as a powerful enabler of BMI, offering new capabilities to rethink how startups create, deliver, and capture value. AI has progressed from a supportive technology into a strategic resource that can reshape products and operations. Despite the emergence of AI-first startups, whose core value proposition depends on AI capabilities rather than simply adding AI features to an existing product, research still lacks a clear understanding of how these startups leverage AI to enable BMI and build sustainable competitive advantages that extends beyond short-term financial performance.

This study addresses this gap through a theory-building qualitative investigation of AI-driven BMI in AI-first startups. The central aim is to explain how AI-first startups innovate their business models, by tracing the causal chain linking internal conditions and external ecosystem conditions to AI capability-building, and linking AI capabilities to BMI mechanisms and competitive advantage outcomes. The study is organized around four guiding research questions: (RQ1) How do AI-first startups use AI capabilities to innovate value creation, value delivery, and value capture? (RQ2) How do internal factors, such as founder cognition, entrepreneurial orientation, team composition, resources, and governance choices, influence the creation of AI capabilities and the

implementation of AI-driven BMI? (RQ3) How does AI-driven BMI contribute to competitive advantage in startups, and through which mechanisms are these effects manifested? (RQ4) How do ecosystem conditions, such as regulation, procurement dynamics, funding availability, data infrastructure, and talent markets, influence how quickly and in what ways startups adopt and develop AI-enabled business models?

Conceptually, the study adopts an integrative process view in which AI capabilities function as the pivotal bridge between antecedent conditions and business model outcomes. Internal conditions include founder and team characteristics, organizational resources and constraints, and organizational routines. Ecosystem conditions include institutional pressures and regulations, market structure and adoption frictions, and enabling infrastructures. AI capabilities are examined as a multidimensional construct that includes (1) data capabilities (data acquisition or generation, data quality and integrity, governance, lineage, and privacy management), (2) model capabilities (selection, training or fine-tuning strategies, evaluation, monitoring, and adaptation), (3) architecture and reliability capabilities (guardrails, grounding strategies, human-in-the-loop escalation, and auditability), and (4) integration capabilities (connecting AI systems to customer workflows, databases, inventories, marketing automation, and security requirements).

BMI is analyzed through the triad of value creation, value delivery, and value capture, while competitive advantage is treated as a multidimensional outcome that may include differentiation (technology or data-based), credibility and trust in high-stakes contexts, faster deployment and time-to-value, improved customer retention and loyalty, scalability and ecosystem fit, or investor validation. The study also examines iterative dynamics, including how measurable customer outcomes can reinforce adoption and guide subsequent capability refinement

This study adopts an abductive, Gioia approach supported by NVivo, in which prior theory serves as a sensitizing framework that guides data collection and interpretation while allowing novel constructs and mechanisms to emerge from the empirical material. Affordance theory informs analysis of how specific AI capabilities open new action possibilities in value creation, delivery and capture; dynamic capabilities guide attention to sensing, seizing, and transforming activities; and the Technology–Organization–

Environment (TOE) framework supports systematic comparison of internal and ecosystem conditions shaping adoption and scaling trajectories.

Empirically, the study draws on semi-structured interviews with founders of AI-first startups across multiple industries from Europe and the United States, targeting approximately 20–30 interviews, or until thematic saturation is reached. Sampling is purposive and theory-driven, designed to maximize variation on analytically relevant dimensions expected to shape AI capability-building and BMI pathways. To construct the interview pool systematically, the study began with a structured search on Crunchbase to identify AI-oriented ventures. The initial pool was filtered to include firms founded after January 1, 2016, ensuring the ventures fall within approximately the first decade of organizational development and remain within startup growth dynamics. To focus on firms with sufficient operational maturity to have implemented AI strategically while still retaining startup flexibility, inclusion was further limited to ventures that had raised Series A or Series B funding and reported between 1 and 250 employees. The geographical scope was restricted to startups headquartered in Europe and the United States, enabling contextual comparison across two mature AI entrepreneurship ecosystems. Applying these criteria yielded a population of 1,866 eligible ventures. From this pool, recruitment prioritized diversity across industry groups and across the theoretical dimensions above, rather than concentrating on a single vertical.

Because database labels alone do not reliably capture whether a startup is truly “AI-first,” shortlisted ventures were further assessed through publicly available material to verify that AI is central to the venture’s value proposition and operating model. In addition, the interviewed founders were asked to describe concretely how AI is embedded into value creation, delivery, and capture, and what capabilities are required for the business to function. All data are treated confidentially and analyzed in aggregated form.

The primary contribution of this exploratory phase is theory development: specifying constructs and mechanisms that explain how AI capabilities enable BMI and how these mechanisms can contribute to competitive advantage under varying internal and ecosystem conditions.

Rather than assuming a single trajectory, the study is designed to identify patterns of variation in how startups build and deploy AI capabilities, and in how these choices map onto BMI outcomes. In particular, the analysis will pay attention to recurring capability-

building challenges that founders describe (such as accessing or generating high-quality data; ensuring reliability and avoiding errors in high-stakes environments; reducing the costs of inference; recruiting scarce technical talent; and navigating enterprise procurement and compliance). It will also identify recurring BMI mechanisms that founders associate with AI, such as: (a) redesigning value creation by enabling new forms of decision support, automation, or augmentation; (b) innovating value delivery by embedding AI into existing workflows and reducing adoption friction through integration smoothness, onboarding speed, and assurance practices; and (c) extending value capture through pricing logics that better reflect AI cost structures and delivered value (usage-based pricing, tokenization of specific services, per-device models, or outcome-linked arrangements). Importantly, the study will treat these mechanisms as empirically contingent: their feasibility and strategic relevance may differ across contexts such as regulated industries, physical-world versus digital-only products, and B2B enterprise markets with long adoption cycles.

Preliminary analysis of the interviews conducted so far suggests four recurring “mechanism clusters” that are likely to structure the emerging model. First, startups appear to follow distinct data-capability paths: some create or capture unique data, others operate under strict customer-data constraints, and others rely on derived signals such as user feedback and annotation loops; these choices shape both defensibility and scaling speed. Second, “trust engineering” repeatedly emerges as a gatekeeper to adoption, particularly in enterprise and high-stakes settings through practices such as grounding strategies, guardrails, auditability, and structured human-in-the-loop escalation, which founders often treat as non-negotiable for credibility. Third, value delivery innovation frequently centers on integration depth and time-to-value: founders emphasize embedding AI into existing workflows and compressing deployment and onboarding cycles, which then influences adoption and retention. Fourth, value capture logics show early signs of divergence: while many startups retain familiar subscription models, several describe add-on or hybrid approaches that reflect the variable cost structure of AI inference and the need to align pricing with measurable value. These patterns will be refined through further interviews and cross-case comparison.

The study also aims to clarify how competitive advantage is experienced and articulated by founders in AI-first settings. Without presuming that any single outcome applies universally, the analysis will explore a bounded set of advantage dimensions that appear

repeatedly in AI-first narratives: trust and legitimacy (especially in contexts where errors have high consequences), time-to-value and deployability (faster onboarding, reduced human intervention, quicker iteration), defensibility and imitation resistance (data-related or architecture-related 'moats'), and scalable delivery (the ability to serve more customers without proportional increases in operational complexity). Where founders provide evidence of measurable impacts (such as reduced operational incidents, improved conversion, higher productivity, or reduced compliance risk), these will be treated as illustrative examples rather than generalized performance claims, and used to support mechanism development rather than to quantify outcomes.

Finally, the study is expected to provide practical implications that remain consistent with the evidence base. Specifically, the findings should inform founders and ecosystem stakeholders about the kinds of AI capabilities that tend to be strategically emphasized in AI-first startups, the adoption frictions that repeatedly constrain scaling, and the design choices that appear to reduce risk while enabling iterative improvement. These insights are intended to support more informed decisions about capability investment priorities and business model design under uncertainty.

**Keywords:** Business Model Innovation; Artificial Intelligence; AI-First Startups; AI Capabilities; Competitive Advantage; Qualitative Research; Entrepreneurship.