AI as Shared Business Infrastructure: Firm Growth and the Distribution of Gains

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From Task-Level Gains to Firm Growth

Generative AI improves performance on individual tasks. But do those gains translate into firm growth?

- Firms must incorporate AI into **recurring operating activities**—product listings, market decisions, customer acquisition, service, and fulfillment.
- The required investments in models, data, workflows, and organization have so far **favored large firms**.

Task-level evidence: Noy and Zhang (2023); Brynjolfsson et al. (2025); Cui et al. (2026).

Platform-Provided AI as Business Infrastructure

Yet a growing share of AI tools reaches firms not through their own investments but through **external providers**.

Our setting: AI is supplied as shared business infrastructure.

1. **Centralized development:** the platform builds and trains AI models.
2. **Integrated information:** platform-wide information + firm's operating data.
3. **Ready-to-use applications:** AI embedded in existing business workflows.

Shared AI infrastructure can turn task-level gains into firm growth for firms unable to make large investments themselves.

Research Questions

Firm-level and market-level effects remain ambiguous.

1. **Do Firms gain from shared AI infrastructure?**

2. **Distributional Effects: Which firms gain more?**
   - **Smaller firms:** Shared infrastructure removes fixed costs and integration burdens.
   - **Larger firms:** Stronger knowledge, management, and organizational complements may amplify AI returns.

3. **Market-Level Effects: Does AI expand the market?**
   - **Market expansion:** AI enables new activity and demand creation.
   - **Business stealing:** Adopters gain sales at the expense of non-adopters.

Related studies: Cohen and Levinthal (1990); Bresnahan et al. (2002); DeStefano et al. (2025); Otis et al. (2026).

This Paper: Platform AI in E-Commerce

Setting

- AI embedded in sellers' operating software on a leading e-commerce platform.
- One month free, then RMB 99 per month.

Linked Data: October 2023–July 2025

- Actual adoption dates, functions used, and usage intensity linked to monthly operating and transaction records.
- 148,770 adopter–control pairs; 77,347 distinct never-adopters.

Empirical Design

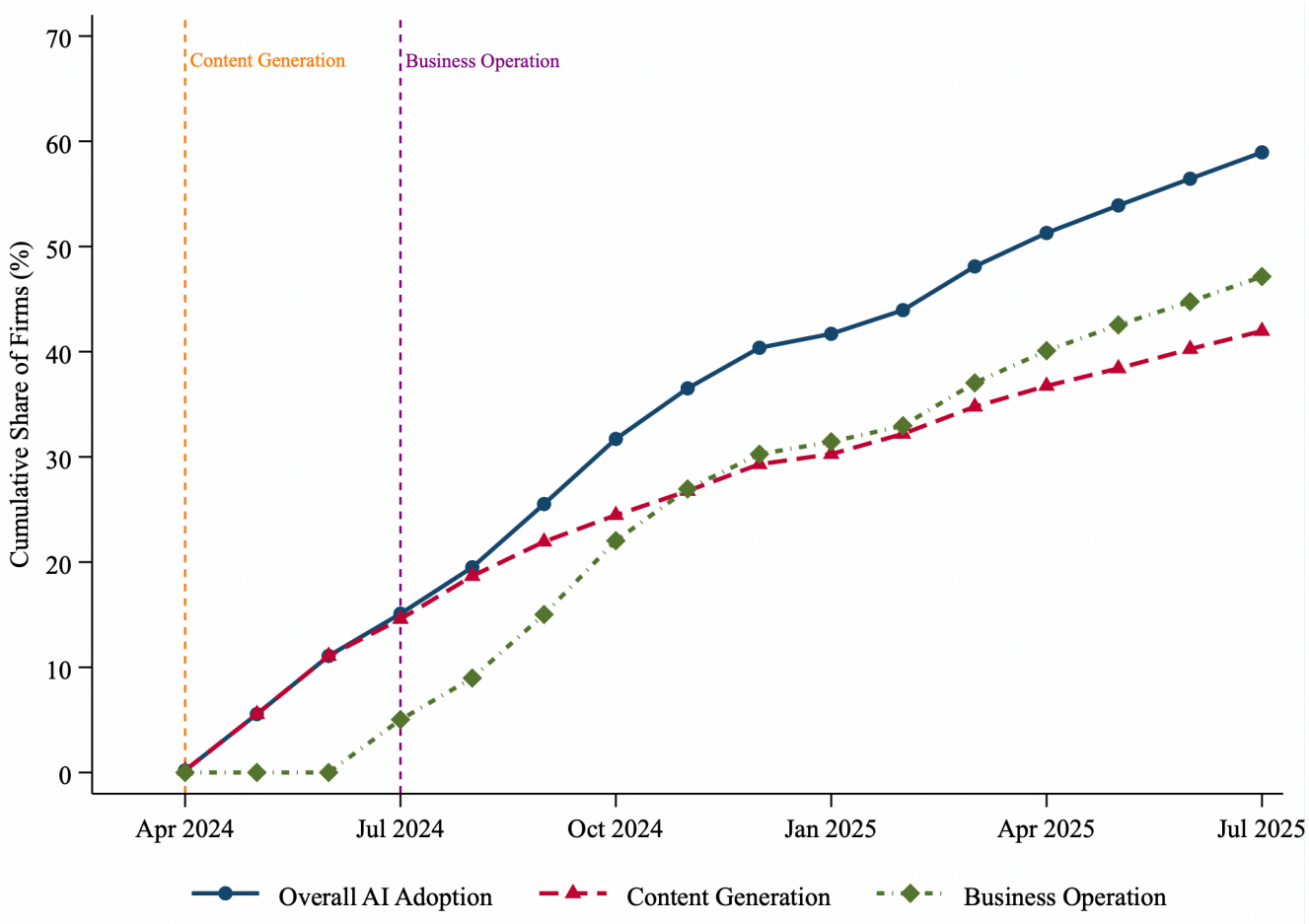
- Cohort-specific matching and difference-in-differences.
- Compare joint adopters with matched never-adopters over the same calendar months.

Baseline: continuing physical-goods sellers with pre-launch annual sales of at most RMB 5 million. IV, staggered DID, and synthetic DID provide complementary checks.

Timeline of AI Launch

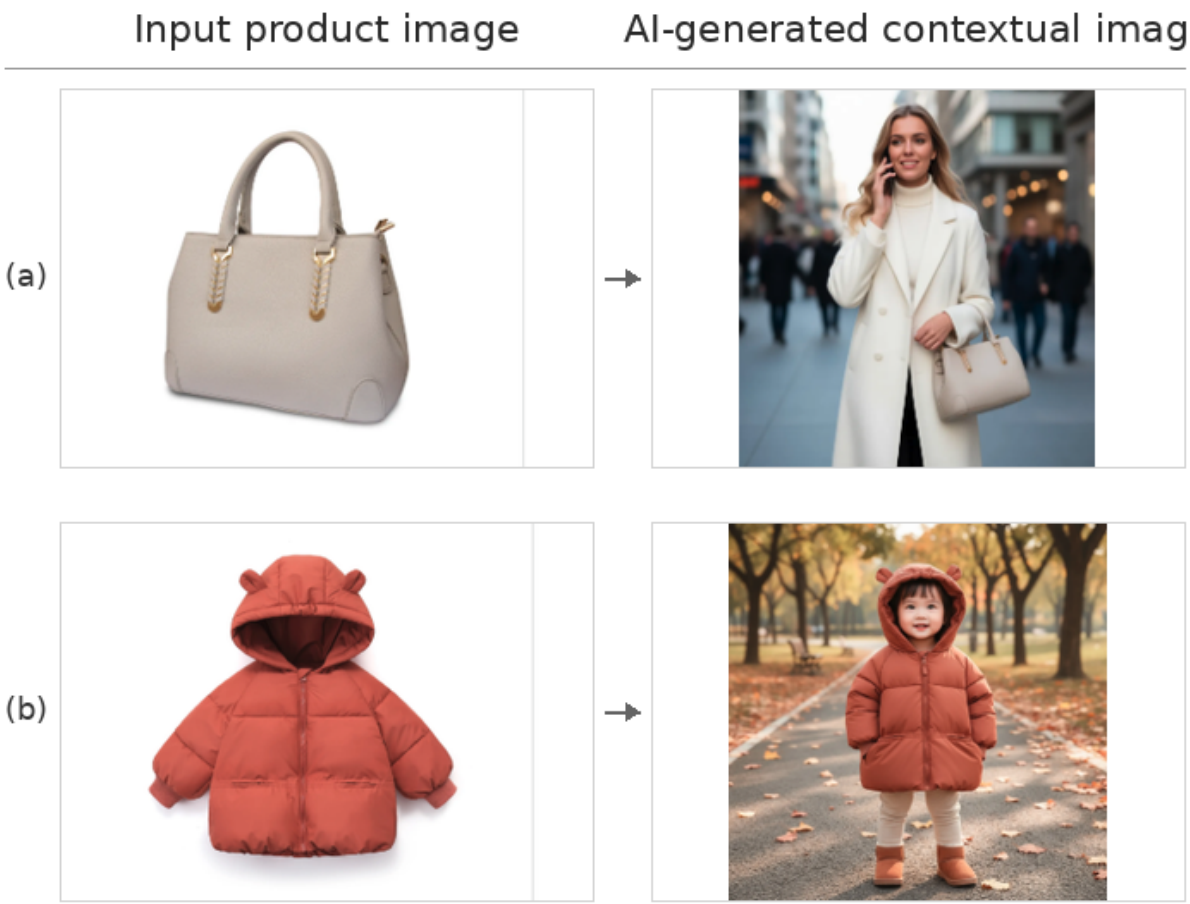
Two AI functions were introduced sequentially:

- **April 2024:** Content generation.
- **July 2024:** Business operation.



Function I: Content Generation

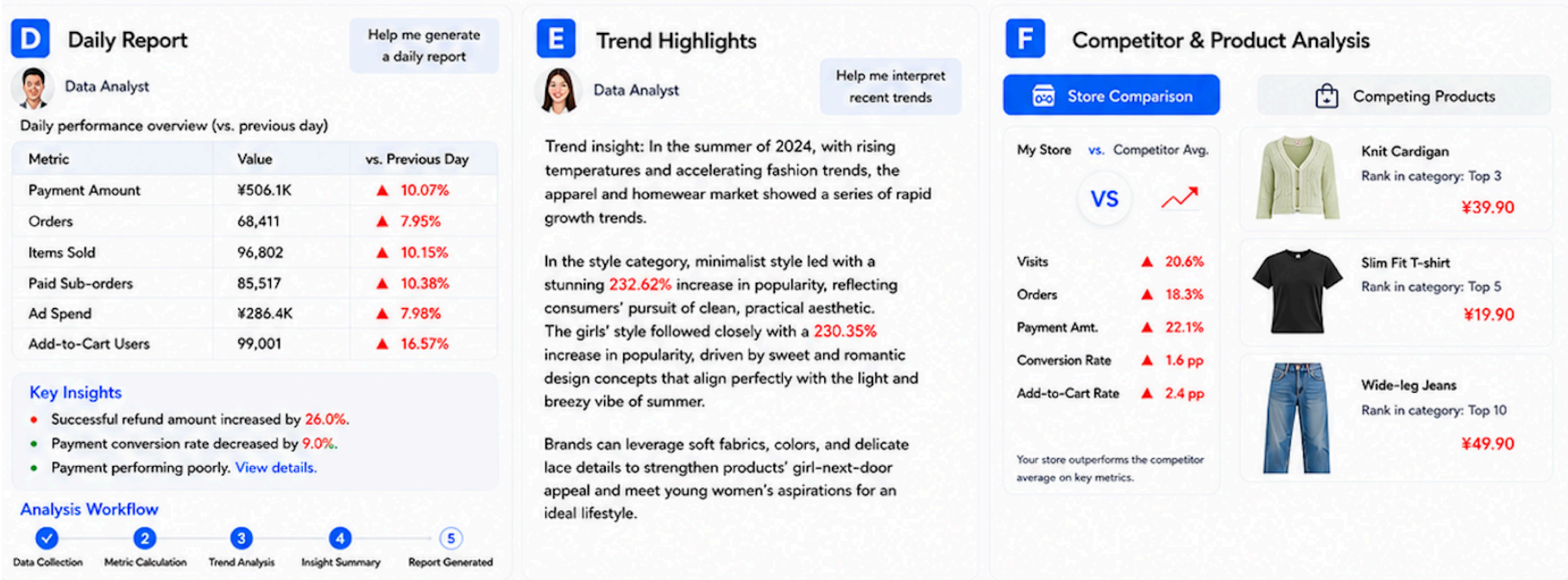
AI creates and revises text, images, and videos for product listings.



AI turns isolated product photos into contextual images showing the product in use.

Function II: Business Analytics

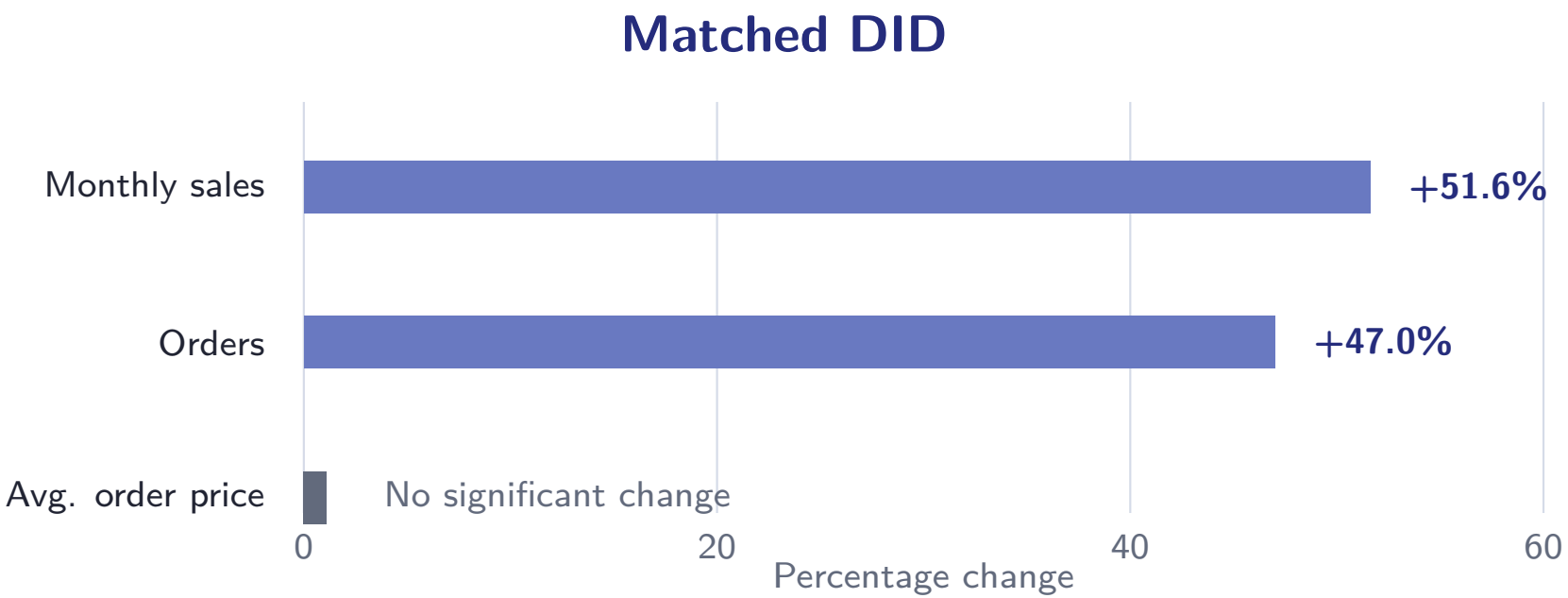
AI combines firm data with platform-wide information to support recurring business decisions.



The tool summarizes store performance, interprets market trends, and compares competing products.

Sales Performance

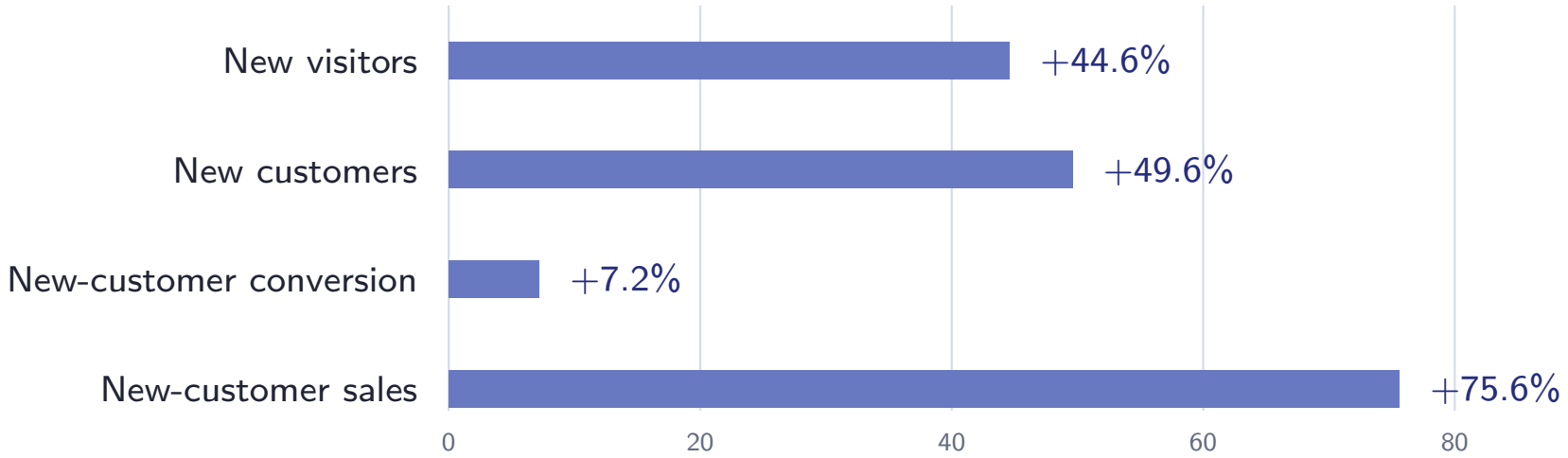
AI increases firm sales by 51.6%, mainly through a 47.0% increase in orders.



The baseline pattern is supported by pretrend diagnostics and a complementary IV strategy.

Capability I: Reaching Customers

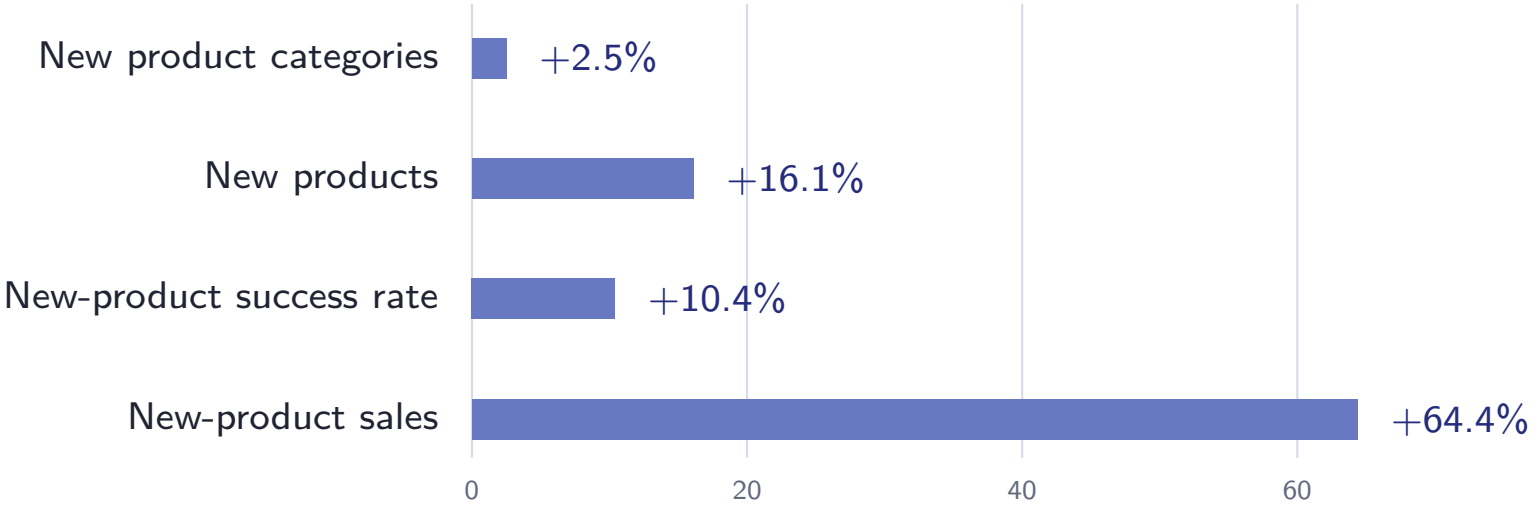
AI improves both customer discovery and conversion into sales.



Customer acquisition expands at both the discovery and transaction stages.

Capability II: Improving Product Offering

Firms need to adjust product offerings in response to changing market trends.



Firms improve the breadth of what they offer and the commercial value of new products.

New-product success rate is observed only in firm-months with at least one newly introduced product.

Capability III: Maintaining Quality

Sales growth does not come at the expense of firm-controlled quality.

Better product and service outcomes

Negative reviews	−21.9%
Firm-liability disputes	−20.6%
24h pickup on-time	+2.7%
Delivery time	−2.3%

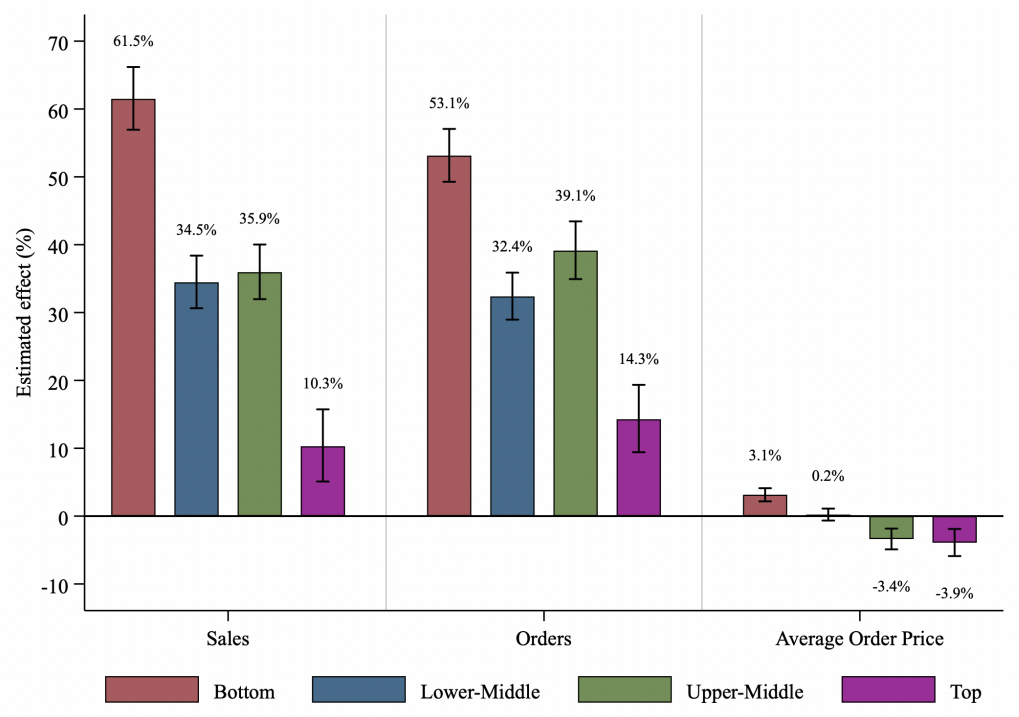
Refunds reveal important composition

All refunds	**+4.2%**
Consumer-attributed refunds	**+5.4%**
Firm-attributed refunds	−2.7%

- Firms improve their product and service quality along multiple dimensions
- Consumer-attributed refunds increase alongside expanded reach and product experimentation

Heterogeneity in Sales Performance

Proportional sales gains are largest among initially smaller firms. Quartiles of pre-launch annual sales within the baseline SME sample.



Sales: +61.5% in the bottom quartile, +10.3% in the top.

Smaller firms also gain more in customer reach and product adaptation. Detailed capability results are in the appendix.

Mechanism I: Lower Operating Costs

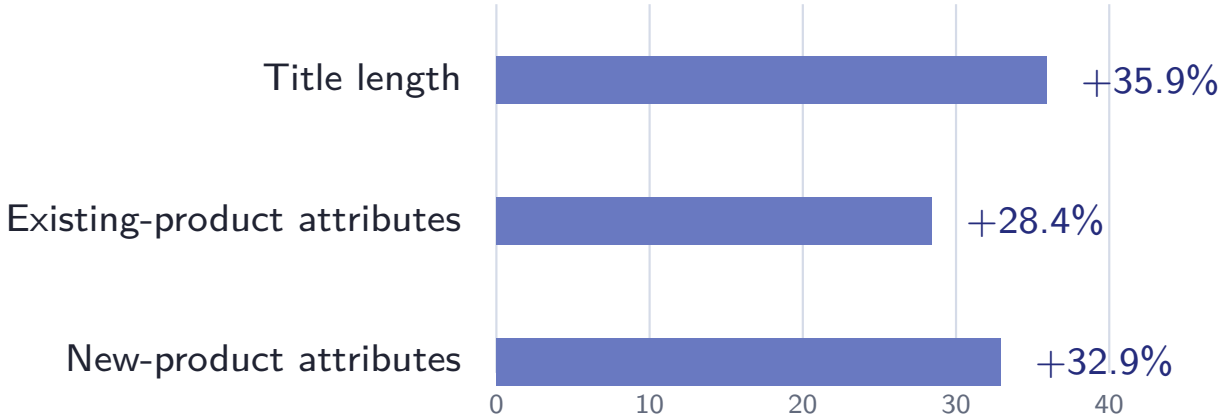
AI expands routine activities while reducing customer-service inputs per order.

More activity		Lower human inputs	
New images generated	**+39.9%**	Service time per order	−5.6%
Modifications per product	**+23.4%**	Customer-service accounts	−1.5%

Sales gains are larger for firms facing heavier pre-adoption operating-cost burdens relative to sales.

Mechanism II: Information Frictions

Adopters listings become substantially more informative.



- **Existing products**: information gains do not simply reflect introducing new products.
- **Attributes**: firms must complete these fields themselves; AI cannot automatically fill them.

Mechanism II: Information Frictions

AI generates larger sales gains where baseline information frictions are more severe.

Matching Frictions

- Lower conversion rates and higher refund rates before the launch.

Market Instability

- Higher exit, more volatile sales, shorter product lifetimes, and greater product turnover.

These relationships are stronger among smaller firms.

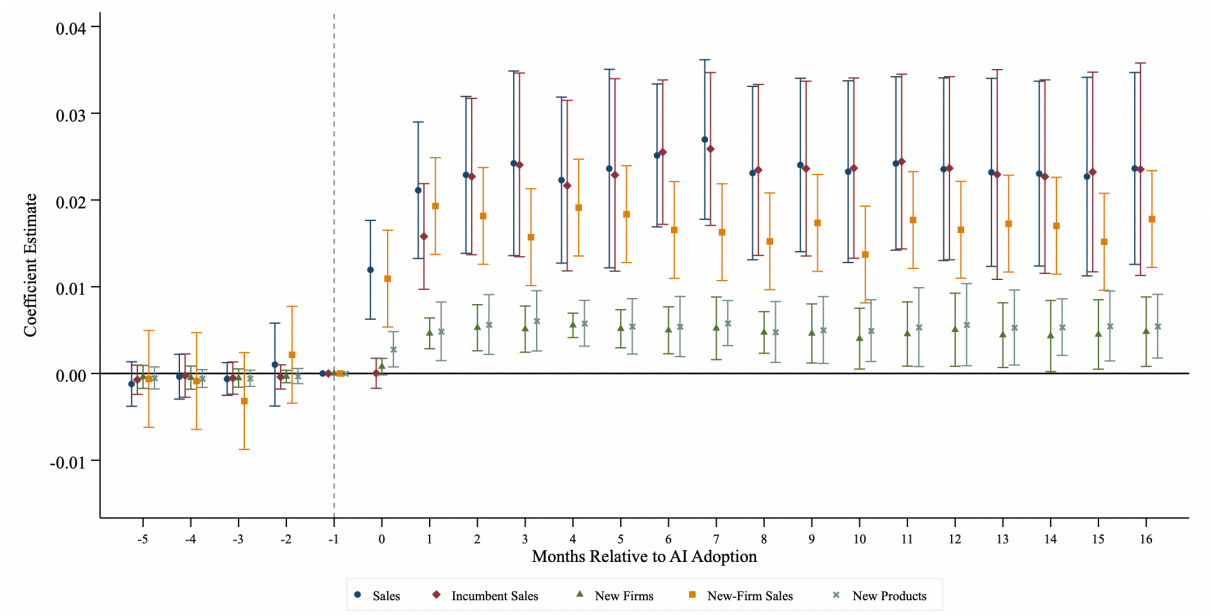
Competitive Spillovers

Three tests provide little evidence of negative business-stealing spillovers.

Category Exit	No significant increase in exit, either overall or among non-adopters.
Competition Exposure	The adopter–control gap does not systematically increase with market AI adoption.
Historical Benchmark	Estimates remain similar when using adjusted pre-AI histories as controls.

Market Expansion

Joint increases in incumbent activity, entry, entrant sales, and new varieties favor category-market expansion over pure reallocation.



Four margins

Total and incumbent sales

New-firm entry

Entrant sales

New-product introductions

Design: differential post-launch changes by *pre-launch category refund rates*, a proxy for information frictions.

Takeaways

1. **Firm growth:** platform-embedded AI raises sales, largely by expanding orders, and improves operating capabilities.
2. **Distribution:** smaller firms experience larger proportional gains as costs and information frictions become less binding.
3. **Market expansion:** incumbent growth is accompanied by entry and broader product offerings within categories.

Shared AI infrastructure can broaden firms' access to capabilities and support growth beyond individual task productivity.

Literature and Contributions

- **From task-level productivity to firm-wide growth.**
  - *Prior work:* Documents productivity gains on specific tasks; firm-level studies often rely on surveys or indirect measures of AI adoption.
    Noy and Zhang (2023); Brynjolfsson et al. (2025); Czarnitzki et al. (2023); Babina et al. (2024).
  - **This paper:** Traces the full chain from firms' actual adoption of AI, through changes in firm-wide capabilities, to growth in orders and sales.

- **The distribution of gains from AI adoption.**
  - *Prior work:* Finds that AI adoption and its measured benefits are often concentrated among larger firms.
    Back et al. (2022); Babina et al. (2024); McElheran et al. (2024); Acemoglu et al. (2025).
  - **This paper:** Finds larger proportional gains among smaller firms, especially where operating-cost burdens and information frictions are greater.

- **From firm-level adoption effects to market adjustment.**
  - *Prior work:* Studies expansion versus business stealing for other technologies, or how broad changes in AI and cloud access affect entry/exit.
    Horn et al. (2022); Lu et al. (2024); Cai et al. (2025); Athey and Scott Morton (2026).
  - **This paper:** Links firm AI adoption to market outcomes, with suggestive evidence of market expansion rather than business stealing.