



# How AI-Driven Data Analysis Improves Business Performance: A Review of the Evidence

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Oct 29, 2026

## Abstract

Businesses are adopting artificial intelligence (AI) quickly: 88% of organizations in a 2025 global survey reported regular AI use in at least one business function [1]. Adoption is much lower across the Canadian business population: 19.2% of Canadian businesses used AI to produce goods or deliver services in the second quarter of 2026, up from 12.2% a year earlier [2], [19]. This review summarizes peer-reviewed studies, working papers and survey reports on how AI-based data analysis affects business performance. Firms that base decisions on data show output and productivity 5% to 6% higher than expected from their other investments [3]. Big data and analytics assets are associated with a 3% to 7% gain in firm productivity, but mainly in IT-intensive or highly competitive industries [5]. Firms that invest in AI grow faster in sales, employment and market value, largely through product innovation [8]. Machine learning methods improved retail sales forecast accuracy by 22.4% over the best statistical benchmark in a large forecasting competition [9]. In randomized field experiments, an AI pre-sale chatbot raised e-commerce sales by 16.3% [10], and AI assistance raised customer-support productivity by 14% on average and 34% for novice workers [13]. Gains are uneven: AI reduced correct answers by 19% on tasks outside its capabilities [15], and disclosure of a sales chatbot cut purchase rates by more than 79.7% [11]. The evidence suggests that AI-based data analysis improves business performance most when it is combined with complementary data assets, skills and human oversight [5], [12], [15].

**Keywords:** artificial intelligence; data analytics; data-driven decision-making; firm productivity; sales forecasting; generative AI; business performance

## 1. Introduction

The use of data to guide business decisions spread quickly in the early 2010s, with the share of U.S. manufacturing plants using data-driven decision-making nearly tripling from 11% to 30% between 2005 and 2010 [4]. AI has since extended data analysis from describing the past to predicting outcomes and generating content [16]. AI use in at least one business function rose from 78% to 88% of surveyed organizations between 2024 and 2025 [1]. Marketing and sales, together with IT, has been one of the functions where respondents most often report AI use across eight years of surveys [1]. Generative AI alone has been estimated to add \$2.6 trillion to \$4.4 trillion in annual economic value across 63 use cases [16].

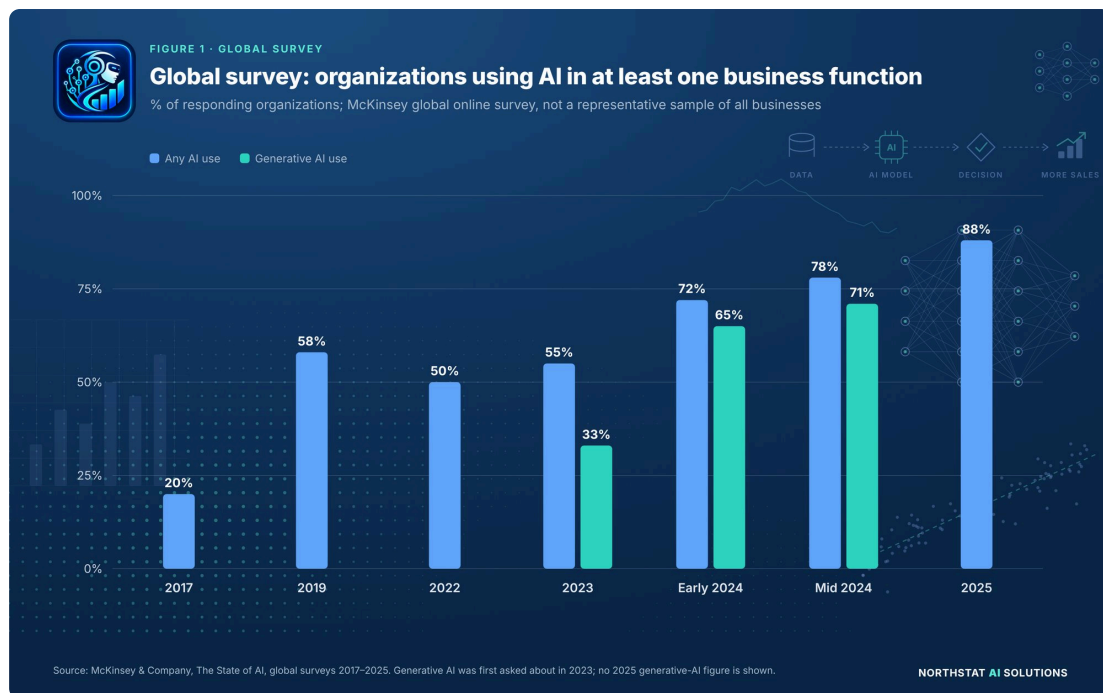


**Figure 1.** Share of responding organizations using AI in at least one business function, McKinsey global surveys, 2017–2025 [1].

Despite this growth, adoption remains uneven across firm sizes and industries [2], [19]. In Canada, 19.2% of businesses used AI to produce goods or deliver services in the second quarter of 2026, up from 12.2% in 2025 and 6.1% in 2024 (Figure 2) [2], [19]. Use ranged from 42.3% of businesses in information and cultural industries and 40.4% in finance and insurance to 4.5% in agriculture, forestry, fishing and hunting (Figure 3) [19]. Businesses with 100 or more employees used AI more often (27.8%) than businesses with 1 to 4 employees (19.9%) [19].

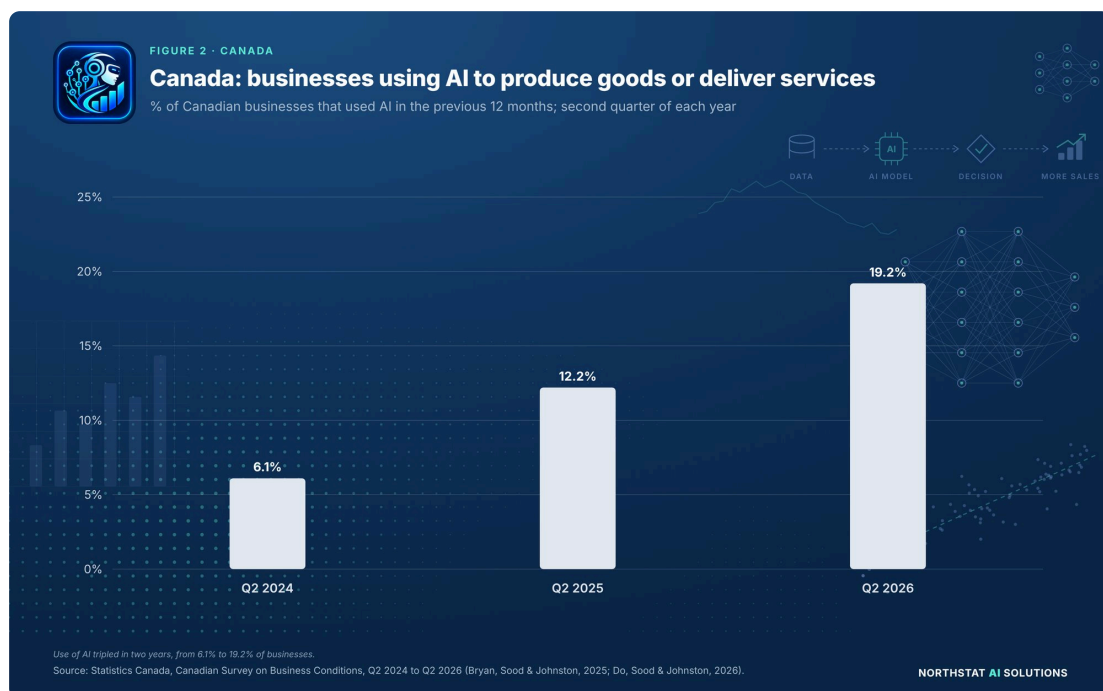


**Figure 2.** Share of Canadian businesses that used AI to produce goods or deliver services in the previous 12 months, second quarter of 2024, 2025 and 2026 [2], [19].

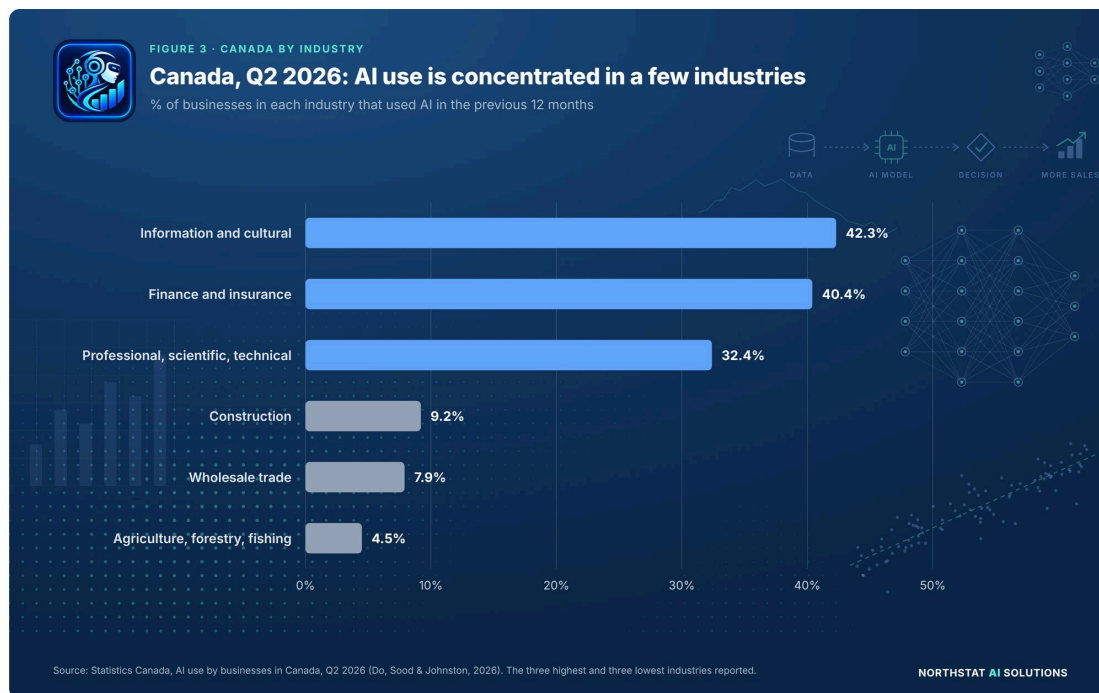


**Figure 3.** Share of Canadian businesses using AI by industry, second quarter of 2026: the three highest and three lowest industries [19].

The McKinsey and Statistics Canada figures are not directly comparable. McKinsey reports the share of respondents' organizations in a global online survey that use AI in at least one business function, and the survey is not designed to represent all businesses [1]. Statistics Canada estimates the share of all Canadian businesses that used AI to produce goods or deliver services in the previous 12 months [19]. The populations, questions, geography and collection dates differ [1], [19].

Managers therefore need evidence on whether, where and under what conditions AI-based data analysis improves performance [5], [8].

This review asks one question: what does recent empirical research show about the effect of AI-based data analysis on business performance? It summarizes 18 studies and reports published between 2011 and 2026 [1]-[18], updated with Statistics Canada's 2026 release [19]. It groups their findings into five themes: data-driven decision-making, firm productivity and growth, forecasting, sales and marketing, and worker productivity [3], [8], [9], [10], [13].

## 2. Methods

This is a narrative (non-systematic) review. Sources were identified in October 2026 through web searches of journal sites, SSRN, NBER, arXiv, RePEc and publisher pages, using terms such as "data-driven decision making", "big data analytics firm performance", "artificial intelligence firm productivity", "generative AI field experiment" and "AI sales". Studies were included if they reported an empirical estimate of AI or analytics effects on a business outcome, such as productivity, sales, growth or forecast accuracy. Randomized experiments and peer-reviewed econometric studies were given more weight than surveys. Industry surveys from McKinsey, Salesforce and Statistics Canada were included to describe adoption, not to estimate causal effects. For each source, the authors' own abstract or report text was read, and figures were taken as stated there.

### **3. Results**

#### ***3.1 Data-driven decision-making and analytics capability***

Firms that adopt data-driven decision-making have output and productivity 5% to 6% higher than expected given their other investments and IT use [3]. The same study links data-driven decision-making to higher asset utilization, return on equity and market value [3]. Instrumental-variable estimates in that study indicate the productivity effect is not explained by reverse causality [3]. In a panel of 814 firms from 2008 to 2014, big data and analytics assets were associated with an average productivity improvement of 3% to 7% [5]. These gains appeared in IT-intensive or highly competitive industries, while no measurable improvement was detected for other firms [5]. A survey of 297 IT managers and business analysts in China found that big data analytics capability improves firm performance both directly and through process-oriented dynamic capabilities [6].

#### ***3.2 AI adoption, productivity and firm growth***

In German firm data, both the adoption of AI and the intensity of AI use are positively and significantly associated with firm productivity [7]. Firms that invest in AI experience higher growth in sales, employment and market valuation [8]. This growth comes primarily through increased product innovation [8]. The result holds when AI investment is instrumented with firms' exposure to universities' supply of AI graduates [8]. The gains are concentrated among larger firms and are associated with higher industry concentration [8].

#### ***3.3 Forecasting***

The M5 competition asked participants to forecast 42,840 hierarchical unit-sales series from Walmart, the world's largest retailer by revenue [9]. It attracted 7,092 participants on 5,507 teams from 101 countries [9]. The winning method improved accuracy by 22.4% over the most accurate statistical benchmark, and most top methods used the LightGBM machine learning algorithm [9].

#### ***3.4 Sales and marketing***

In randomized field experiments on a large cross-border retail platform, a generative-AI pre-sale chatbot increased sales by 16.3% [10]. Other generative-AI tools in the same study had smaller effects, from +2.9% for search query refinement to no statistically significant effect for advertising titles (Figure 4) [10]. Less experienced consumers benefited disproportionately from these AI workflows [10]. In outbound sales calls, undisclosed AI chatbots were as effective as proficient workers and four times more effective than inexperienced workers in generating purchases [11]. AI coaching of sales agents had an inverted-U effect, with middle-ranked agents improving most and bottom- and top-ranked agents gaining little [12]. In a survey of 5,500 sales professionals, 83% of sales teams using AI reported revenue growth, compared with 66% of teams without AI [18]. Among firms using generative AI in marketing and sales, 66% reported revenue increases from it in that function in July 2024 [17].

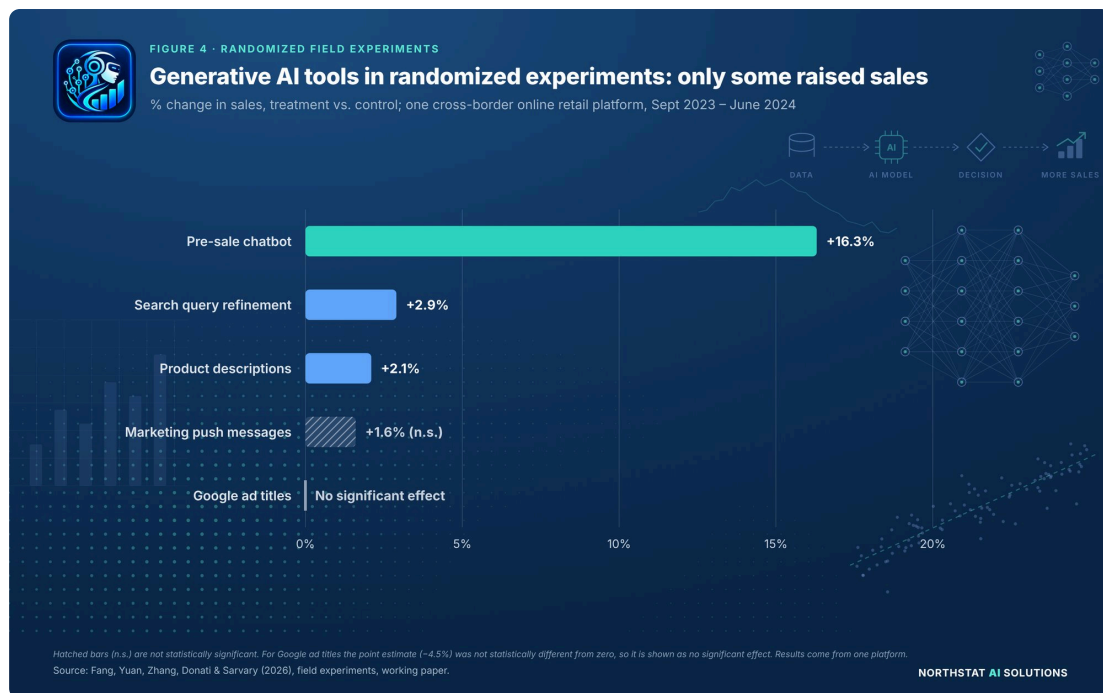


**Figure 4.** Effect of five generative AI applications on sales in randomized field experiments on a cross-border retail platform, September 2023 to June 2024 [10].

### 3.5 Worker productivity

AI assistance increased customer-support productivity, measured as issues resolved per hour, by 14% on average across 5,179 agents [13]. The gain was 34% for novice and low-skilled workers, with minimal impact on experienced and highly skilled workers [13]. AI assistance also improved customer sentiment and employee retention [13]. In an experiment with 444 college-educated professionals, ChatGPT reduced the time taken on writing tasks by 0.8 standard deviations and raised output quality by 0.4 standard deviations [14]. Consultants using AI completed 12.2% more tasks and worked 25.1% faster on tasks within AI's capabilities [15]. Table 1 lists the main effect sizes by outcome; each outcome is measured in its own unit, so the values should not be compared with one another [3], [5], [9], [10], [13], [14], [15].

**Table 1.** Reported effect sizes by outcome. Each row uses its own measure, so values should not be compared across outcomes.

| Outcome                       | Measured as                                                             | Study or setting                                                                  | Reported effect                      | Design                               |
|-------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------|--------------------------------------|
| Firm productivity             | Output and productivity relative to other investments and IT use        | Data-driven decision-making [3]                                                   | <b>5–6%</b>                          | Statistical association              |
| Firm productivity             | Average productivity improvement, 814 firms                             | Big data and analytics assets (IT-intensive or highly competitive industries) [5] | <b>3–7%</b>                          | Statistical association              |
| Sales                         | Change in sales versus a randomized control group                       | Generative AI pre-sale chatbot, one online retail platform [10]                   | <b>+16.3%</b>                        | Randomized experiment                |
| Sales forecast accuracy       | Accuracy gain of the winning method over the best statistical benchmark | M5 forecasting competition, Walmart unit sales [9]                                | <b>22.4%</b>                         | Forecasting competition              |
| Customer-support productivity | Issues resolved per hour                                                | AI assistant, 5,179 agents (all agents; novice and low-skilled agents) [13]       | <b>+14%; +34%</b>                    | Staggered rollout (quasi-experiment) |
| Consultant task output        | Tasks completed; time taken; correct answers outside AI's capabilities  | Consultants using AI [15]                                                         | <b>+12.2%; 25.1% faster; –19%</b>    | Randomized experiment                |
| Professional writing          | Standard deviations (SD) of time taken and of graded quality            | ChatGPT, 444 college-educated professionals [14]                                  | <b>–0.8 SD time; +0.4 SD quality</b> | Randomized experiment                |

## 4. Discussion

Across study designs, the reviewed evidence points in one direction: AI-based data analysis is associated with better business performance, with typical firm-level productivity gains in the low single digits [3], [5], [7]. Task-level and transaction-level effects are larger, ranging from 12.2% more tasks completed [15] to a 16.3% sales lift [10] and a 22.4% forecast accuracy gain [9].

Three mechanisms recur in the literature. First, AI improves the quality of predictions that drive operational decisions, as shown by machine learning methods outperforming statistical benchmarks in retail sales forecasting [9]. Second, AI spreads the know-how of the best workers to less experienced ones, which explains why novice support agents gained 34% while experienced agents gained little [13]. Third, AI supports growth through new products rather than only cost savings, since AI-investing firms grow mainly through product innovation [8].

The benefits depend on complementary conditions. Analytics assets raised productivity only in IT-intensive or highly competitive industries [5]. Analytics capability works partly through a firm's ability to reconfigure its processes [6]. Human oversight also matters: AI coaching helped middle-ranked sales agents most, while bottom-ranked agents faced information overload and top-ranked agents showed AI aversion [12]. Customer perception is a further condition, because disclosing a chatbot before a sales conversation reduced purchase rates by more than 79.7% [11]. Data quality is a practical constraint, as only 35% of sales professionals fully trust the accuracy of their organization's data [18].

For managers, these findings suggest starting with applications close to the customer decision, such as pre-sale assistance and forecasting, where the measured effects are largest [9], [10]. They also suggest testing each AI tool against a control group, since several plausible tools showed no significant sales effect in randomized tests [10].

## 5. Limitations and future research

This review is narrative rather than systematic, so the selection of studies may not represent the full literature. Several included studies are working papers that had not completed peer review when they were read [3], [10], [15]. The observational studies estimate associations, even where instrumental variables are used to address reverse causality [3], [7], [8]. Survey reports from consulting firms and software vendors compare adopters with non-adopters and do not establish cause [1], [17], [18]. Outcomes also differ across studies, from productivity indices to sales and forecast error, so the effect sizes in Table 1 are not directly comparable [3], [9], [10], [13]. Much of the evidence comes from large firms or large platforms, while most Canadian businesses do not yet use AI [2], [8], [10]. Future research should test AI-based analytics in small and mid-sized firms and report long-run effects on sales and profit [2], [8]. AI also lowered the share of correct answers by 19% on tasks beyond its capabilities, which calls for research on how firms can identify those tasks in advance [15].

## 6. Conclusion

Empirical research from 2011 to 2026 shows that analyzing business data with AI improves productivity, forecasting accuracy, sales conversion and worker output [3], [5], [9], [10], [13]. The size of the gain depends on industry context, data assets, worker experience and how humans and AI share the work [5], [12], [13], [15]. Firms that combine AI with good data and human oversight, and that measure results against a control group, are best placed to capture these benefits [5], [10], [12].

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