Forecasting with Artificial Intelligence: How Much Should Management Rely on the Model?

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Introduction

In early February, Mark Simkin, Director of Financial Planning and Analysis (FP&A) at MidWest Components, Inc., was finalizing the company's preliminary budget for the upcoming fiscal year. MidWest Components was a publicly traded manufacturing firm with annual revenues of approximately $850 million. Although demand for the firm's products had historically been stable, recent supply-chain disruptions, inflationary pressures, and changing customer purchasing patterns had made forecasting more difficult than in prior years.

Sales forecasts played a central role in MidWest's planning process. Revenue projections affected production schedules, labor planning, capital expenditures, and communications with external stakeholders. In recent years, the firm relied primarily on management judgment informed by historical trends and industry benchmarks. While this approach had generally produced reasonable results, senior leadership had expressed concern that it was increasingly subjective and potentially slow to adapt to changing conditions.

Forecasting using AI

During a recent executive meeting, the Chief Financial Officer suggested exploring artificial intelligence (AI) tools to support forecasting decisions. Several competitors had publicly discussed using AI-based analytics to enhance planning and budgeting processes, and the board had begun asking whether MidWest was "keeping up" with advances in data analytics. Mark was asked to pilot an AI-assisted forecasting process and return with a recommendation.

Mark assembled a dataset containing historical annual sales for MidWest and a group of peer firms operating in the same industry. The dataset spanned more than a decade and included periods of both growth and contraction. Using an AI-based analytics platform approved by the company's information technology department, Mark asked the system to generate a predictive sales forecast for the upcoming year.

The AI tool quickly produced a model and forecast. According to the output, MidWest's sales were expected to increase by nearly 40 percent in the next fiscal year. The system highlighted patterns in prior growth rates and emphasized that firms in the industry had experienced strong rebounds following recent downturns.

At first glance, the forecast appeared optimistic but not entirely implausible. MidWest had posted modest growth in the prior year, and several competitors had reported

improved order backlogs. However, a 40 percent increase in sales would represent one of the largest year-over-year jumps in the firm's history. Mark reviewed the output carefully. The AI tool provided summary statistics and high-level explanations but did not clearly articulate why such a large increase was expected specifically for MidWest. The model appeared internally consistent, but Mark was uneasy about relying on a result he could not fully explain to others.

Before drawing any conclusions, Mark asked the AI system to evaluate how the forecast might be improved. In response, the tool suggested incorporating additional variables, including macroeconomic indicators, lagged performance measures, and alternative transformations of the sales data. It also recommended exploring non-linear modeling techniques that could potentially capture more complex relationships.

After implementing these suggestions within the platform, the revised forecast changed noticeably. The updated model projected sales growth of approximately 18 percent for the upcoming year—still strong, but far less dramatic than the original estimate. The AI system described this forecast as more robust, citing improved statistical fit and reduced sensitivity to outliers.

Deciding How to Proceed

Although the revised forecast aligned more closely with Mark's intuition, it raised additional questions. The AI tool had effectively altered its own recommendation, and Mark was unsure which version should carry more weight. Moreover, the system's explanations remained abstract, focusing on statistical improvements rather than business fundamentals.

As the budgeting deadline approached, Mark needed to prepare a briefing for the Chief Financial Officer and senior leadership. He faced several unresolved questions. Should the AI-generated forecast be incorporated into the budget at all? If so, which version of the forecast should be used? How should the uncertainty surrounding the AI models be communicated? What responsibility did Mark retain for the forecast if management later relied on it to make decisions?

Mark recognized that AI offered potential benefits, including speed, scalability, and the ability to analyze large datasets. At the same time, he was concerned that decision-makers might place undue confidence in a model simply because it was generated by AI. If the forecast proved inaccurate, Mark would still be accountable for recommending its use.

As he finalized his materials, Mark considered whether AI should serve as a primary forecasting tool, a secondary input to support managerial judgment, or something to be excluded from the current decision altogether. The answer would shape not only the upcoming budget, but also how MidWest Components approached analytics and professional judgment going forward.

Discussion Questions

1. What are the potential benefits and risks of relying on AI-generated forecasts in this situation?
2. How should Mark evaluate the reasonableness of the AI's initial and revised forecasts?
3. What role should professional judgment play when AI outputs conflict or change?
4. How should uncertainty and limitations be communicated to decision-makers?