



Artificial intelligence and machine learning in enterprise performance management solutions



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Abstract

This paper delves into the transformative potential of Artificial Intelligence (AI) and Machine Learning (ML) in enhancing Enterprise Performance Management (EPM) solutions. By leveraging AI and ML, organizations can significantly refine their planning processes across various domains, including finance, workforce, and capital management. **Optimization of company operations was noted as the top benefit experienced by 75% of companies in the 2025 “Boardroom Lens on Generative AI” KPMG survey¹.**

Key topics include:

1 Predictive analytics and forecasting



2 Cognitive and prescriptive decision support



3 Data management and integration



4 Reporting and visualizations



5 Automation of planning and budgeting processes

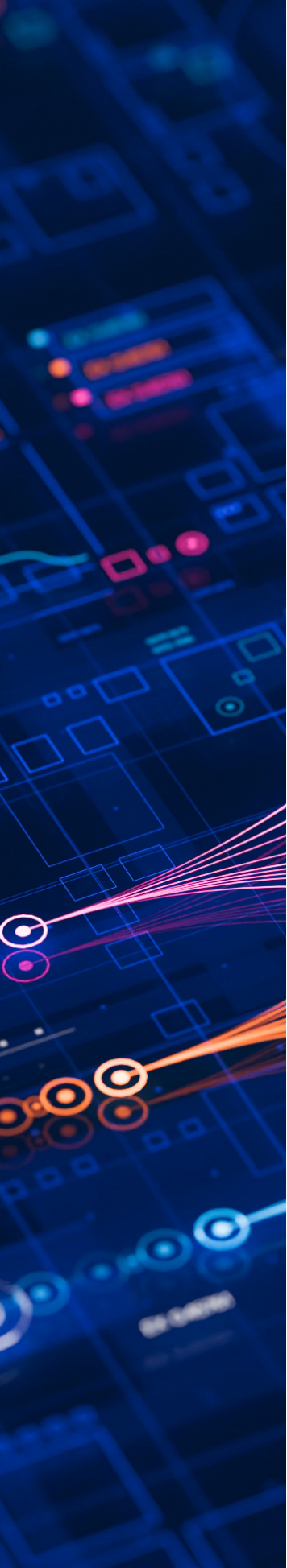


In KPMG’s Quarterly AI Pulse Survey, 90% of executives said that “their organizations are past AI-agent experimentation, of which 33% have deployed agents and 50% are piloting agents”². These advancements not only enhance the accuracy and reliability of forecasts but also enable continuous learning and adaptation, ensuring that predictions remain relevant and up to date as new data becomes available.

The insights presented in this paper aim to guide clients to harness the power of AI and ML to drive superior business outcomes. By embracing these technologies, organizations can optimize their operations, enhance decision-making processes, and achieve long-term success in today’s data-driven world.

¹ KPMG’s 2025 Survey “Boardroom Lens on Generative AI”

² KPMG Board Leadership Center’s paper on “AI: Looking for ROI, moving toward agency”



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Introduction to Machine Learning and Artificial Intelligence

Artificial Intelligence (AI) and Machine Learning (ML) are transformative technologies with the potential to revolutionize various industries. AI involves simulating human intelligence in machines, enabling them to perform tasks such as visual perception, speech recognition, decision-making, and language translation. ML, a subset of AI, uses algorithms and statistical models to improve machine performance on specific tasks through experience and data. The areas of AI and ML are ever evolving. Some of the key areas in the AI space include:

Generative AI (Gen AI)

These models create new content based on learned patterns. For example, chatbots developed using Gen AI can generate human-like text responses. Trained on vast datasets of conversations, these chatbots understand context, generate coherent responses, and exhibit a degree of creativity in their interactions.³

Agentic AI

This refers to AI systems that possess the ability to autonomously analyze information from both internal and external sources, detect anomalies, and generate actionable insights. These systems can perform tasks such as natural language querying and automate scenario planning.⁴

Predictive AI

Predictive AI refers to the use of advanced algorithms and machine learning techniques to analyze historical data and identify patterns and trends. This analysis helps generate insights that inform future predictions.⁵



Prescriptive AI

Prescriptive AI refers to the use of advanced algorithms and machine learning techniques to analyze data and provide actionable recommendations. Unlike predictive AI, which forecasts future outcomes based on historical data, prescriptive AI goes a step further by suggesting the best course of action to achieve desired outcomes. This type of AI is particularly valuable in decision-making processes, as it helps organizations determine the optimal actions to take in various scenarios.⁶

³ Article by Bernard Marr titled "The AI Revolution: How Predictive, Prescriptive and Generative AI are reshaping our world" for Forbes

⁴ Article by Cole Stryker titled "What is agentic AI" for IBM

⁵ See footnote 3

⁶ See footnote 3

Artificial Intelligence in Enterprise Performance Management Systems



Reporting

Analytics

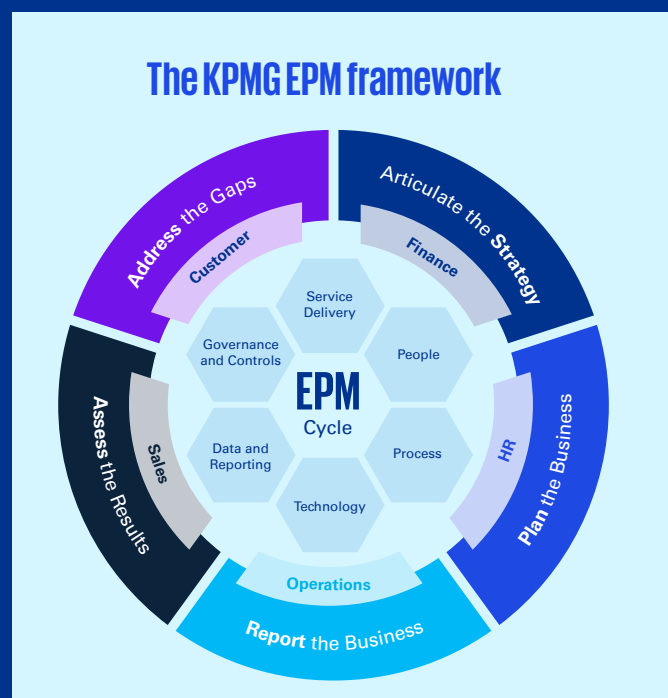
Financial planning

Consolidation

Enterprise Performance Management (EPM) solutions have become indispensable tools for organizations aiming to align their activities with strategic goals and improve overall performance. These solutions integrate various functionalities such as budgeting, forecasting, and reporting while maintaining a unified foundational data model, enabling businesses to make data-driven decisions. For professionals within FP&A and other users of EPM systems, AI and ML offer exciting opportunities to enhance their work. These technologies can automate routine tasks, freeing up time for more strategic activities.

Some EPM features include using ML to enhance predictive forecasting capabilities by analyzing historical data to identify patterns and trends. Other EPM solutions have introduced Agentic AI capabilities, which include natural language querying and automated generation of scenario plans. These agents can analyze information from both internal and external sources to identify trends, detect anomalies, and build a comprehensive picture of the drivers behind data and performance patterns.

These examples collectively demonstrate the transformative potential of AI within EPM solutions in driving better business outcomes through advanced analytics and forecasting capabilities.



Predictive Analytics and Forecasting

Predictive analytics represents a significant advancement in the realm of data-driven decision-making. AI and ML driven methods examine historical data, sometimes combined with related data, to generate insights that inform future predictions. By employing advanced algorithms, businesses can better understand the patterns and trends within their models, enabling them to make informed decisions and plan with greater confidence.

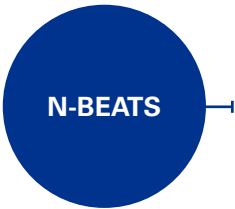
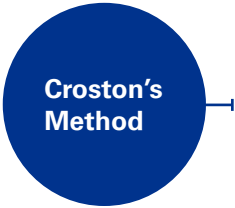
EPM systems have innate features that enable users to employ a variety of algorithms to generate predictive forecasts, each suited to different scenarios and data characteristics. In modern EPM platforms, these features can be configured by planners and end-users who do not have to have a technical background in AI, making them both powerful and accessible. The algorithms are often

available to be chosen from a drop-down list, so it may be beneficial to become familiar with the pros and cons of each algorithm in the case that one may suit the requirements best⁷. For instance, time series analysis algorithms are ideal for data with clear temporal patterns, such as sales data with seasonal fluctuations. These algorithms can identify trends and seasonal effects to provide accurate short-term forecasts. Regression analysis is another commonly used technique, particularly effective when there are multiple influencing factors. It helps in understanding the relationships between variables and predicting outcomes based on these relationships. For instance, if a company were looking to forecast sales based on number of advertisements, a regression analysis forecast would be best applicable.



⁷Workday Adaptive Planning documentation was referenced for algorithm descriptions

For more complex scenarios involving non-linear patterns, machine learning algorithms like neural networks and decision trees are employed. These algorithms can handle large datasets with numerous variables, making them suitable for intricate forecasting tasks where traditional methods might fall short. These machine learning algorithms enable EPM solutions to provide more accurate and reliable forecasts, adapting to new data and evolving business conditions. These algorithms each have their strengths and are chosen based on the specific characteristics of the data and the forecasting requirements. Below outlines several AI algorithms used by EPM solutions today, as well as practical use cases for each:

Algorithm	How it works	How to apply it
	Neural Basis Expansion Analysis Time Series is a deep learning model designed specifically for time series forecasting. It excels in capturing complex patterns and trends in data by leveraging neural networks. N-BEATS is highly flexible and can be applied to a wide range of forecasting tasks, from short-term predictions to long-term trend analysis. Its architecture allows it to learn from historical data and make accurate forecasts by decomposing the time series into interpretable components.	Retail Industry: Sales forecasting at store levels where complex patterns such as promotions, events, and holidays affect demand. Finance: Stock price predictions where historical price data exhibits intricate patterns influenced by market dynamics. Energy Sector: Forecasting electricity demand where consumption is affected by factors like weather patterns and time of day.
	Croston's method is a specialized forecasting technique used for intermittent demand data, which is characterized by sporadic and irregular demand patterns. Traditional forecasting methods often struggle with such data, but Croston's method addresses this by separately estimating the demand size and the intervals between demands. This approach makes it particularly useful for inventory management, supply chain planning, and sales forecasts for seasonal products where intermittent demand is common.	Inventory Management: Predicting reorder points for items with sporadic demand, such as spare parts or niche products. Supply Chain: Forecasting demand for seasonal goods, such as holiday decorations, which have unpredictable, intermittent sales. Manufacturing: Estimating the demand for raw materials with irregular order cycles.

Algorithm

How it works

How to apply it

LightGBM

LightGBM is a powerful machine learning algorithm that is widely used for classification, regression, and ranking tasks. It is based on the gradient boosting framework and is known for its efficiency and speed. LightGBM can handle large datasets with high-dimensional features and is capable of producing highly accurate predictions. It uses a histogram-based approach to split data, which reduces memory usage and speeds up training. LightGBM is particularly effective in scenarios where quick and accurate predictions are required, such as real-time decision-making and large-scale data analysis. LightGBM can be particularly useful in identifying risk and fraud detection.

Finance: Credit scoring and fraud detection by analyzing patterns from high-dimensional transactional data.

Retail: Customer segmentation and churn prediction by evaluating purchase history, demographics, and behavior data.

Healthcare: Predicting patient outcomes or risk stratification using multiple health indicators and historical data.

Kalman Filter

The Kalman Filter algorithm is especially useful in analyzing complex and noisy datasets to identify accurate variables vs inaccurate noise. Within financial data, Kalman Filter can be incredibly efficient at detecting anomalies and signaling operational issues early. The Kalman Filter can be used to enhance forecasting models by dynamically updating predictions as new data becomes available. This is particularly useful in environments where real-time adjustments are necessary for accurate forecasts, such as revenue projections or cash flow forecasts.

Aerospace: Real-time navigation and tracking where sensor data must be processed to estimate aircraft position and velocity.

Finance: Dynamic updating of revenue projections or cash flow forecasts based on recent operational data.

Engineering: Predictive maintenance for equipment by filtering noise from sensor data to accurately estimate the operational condition.

Algorithm

How it works

How to apply it

Holt-Winters

The Holt-Winters algorithm is best employed for data that exhibits seasonal trends. Holt-Winters utilizes an iterative approach accounting for level, trend, and seasonality to form accurate forecasts. Retail sales forecasting, inventory management, and energy consumption forecasting are areas in which Holt-Winters can handle with ease.

Retail: Seasonal sales forecasting, such as predicting winter clothing sales based on historical seasonal trends.

Energy Sector: Forecasting electricity consumption that varies seasonally due to weather changes.

Transportation: Estimating passenger demand that fluctuates seasonally, such as holiday travel.

Prophet

Developed by Facebook, Prophet is an open-source forecasting tool designed for time series forecasting. It is highly useful due to its ability to account for seasonality and manage common data issues such as outliers and missing values. In FP&A, Prophet can be exceptional for revenue forecasting, expense planning, and cash flow projections.

Finance: Forecasting monthly cash flow by accounting for holidays, outliers, and missing data.

Sales: Predicting future sales trends by considering seasonality and sudden spikes due to marketing campaigns.

Public Health: Monitoring disease spread patterns that involve seasonal components and anomalies.

AutoFit⁸

AutoFit is designed to automatically adjust or “fit” a given model to a dataset in the most optimal way. Its primary purpose is to streamline and automate the process of choosing parameters and configurations of a model. It is a self-improving system. For organizations focused on resource optimization, like energy management or staffing, AutoFit can adjust its predictive models to help maximize efficiency while minimizing costs.

Energy Management: Optimizing energy usage forecasts by adjusting models dynamically to minimize consumption and costs.

Human Resources: Predicting staffing needs based on project requirements and historical employee performance data.

Manufacturing: Resource optimization in production schedules to minimize downtime and maximize efficiency.

⁸ Workday Adaptive Planning Documentation's definition of Autofit

Automation of Planning and Budgeting

The automation of planning and budgeting processes is a transformative approach that aims to minimize manual effort and enhance overall efficiency. By leveraging advanced technologies, organizations can streamline their planning and budgeting activities, leading to more accurate and timely financial insights. This automation is achieved through various methods, including forecasting future revenues and expenses, conducting scenario analysis, and performing automated data evaluation.

Furthermore, machine learning predictive forecasts significantly streamline the corporate planning process, leading to substantial time savings. By leveraging advanced algorithms and vast amounts of data, machine learning models can accurately predict future trends, demand, and potential risks. This allows companies to make informed decisions quickly, reducing the time spent on manual data analysis and scenario planning. Additionally, predictive forecasts enable more efficient resource allocation and inventory management, minimizing delays and enhancing overall productivity. As a result, organizations can respond to market changes swiftly and maintain a competitive edge.



Examples of using automation in planning

Demand Forecasting

Machine learning models can predict customer demand with high accuracy, allowing companies to adjust their production schedules accordingly. This reduces the time spent on manual forecasting and minimizes the risk of overproduction or stockouts.

Inventory Management

Predictive forecasts help in optimizing inventory levels by predicting which products are likely to be in demand. This reduces the time spent on inventory checks and reordering, ensuring that the right products are available when needed.

Resource Allocation

By predicting future resource needs, machine learning models enable companies to allocate resources more efficiently. This reduces the time spent on manual resource planning and ensures that resources are used optimally.

Risk Management

Predictive models can identify potential risks and their impact on the business. This allows companies to take proactive measures to mitigate risks, reducing the time spent on crisis management and recovery.

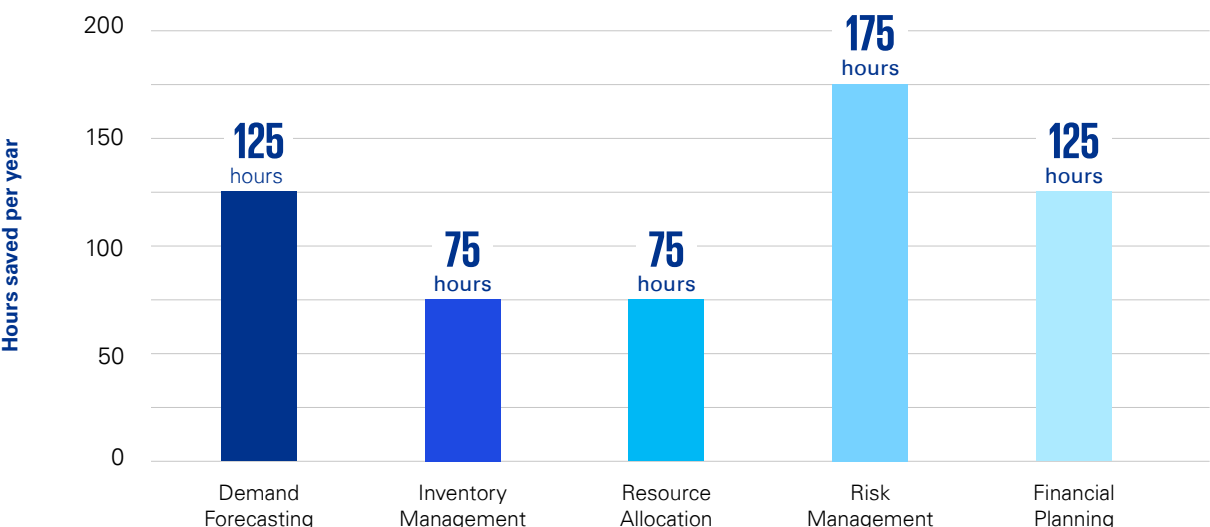
Financial Planning

Machine learning can predict financial trends and outcomes, helping companies to create more accurate budgets and financial plans. This reduces the time spent on manual financial analysis and improves the accuracy of financial forecasts.

These examples illustrate how machine learning predictive forecasts can streamline various aspects of corporate planning, leading to significant time savings and improved efficiency.

Planing and Budgeting Time Savings

Machine learning predictive forecasts significantly streamline the corporate planning process, leading to substantial time savings. The graphic below outlines the time savings per year for various planning activities



Cognitive and Prescriptive Decision Support

In the realm of EPM, the integration of cognitive and prescriptive decision support tools represents a significant advancement. These tools leverage prescriptive analytics to provide users with actionable insights and recommendations, determining the best possible actions to take using insights that may not be readily apparent to human analysts. For example, AI can recognize patterns or relationships between dimensions or data points like seasonality or customer segmentation. This capability not only enhances decision-making processes but also drives more efficient and effective business outcomes.

Many EPM technology vendors have launched built-in **Agentic AI** capabilities. These features include natural language querying and automated generation of scenario plans. There are three types of agents that are often discussed in the realm of EPM: Analyst Agents, Planner Agents, and Model Agents.^{9,10}

Discover Hidden Trends with Analyst Agents

An *Analyst Agent* can help explore information from both internal and external sources to identify trends, detect anomalies, and build a comprehensive picture of the drivers behind data and performance patterns. It presents insights in various formats, such as dashboards, reports, and audio, and offers recommendations to help teams act.

Drive Strategy with Planner Agents

The *Planner Agent* collaborates with the Analyst Agent to translate these insights into actionable steps, leveraging domain expertise in areas like finance, supply chain, and operations. It proactively suggests recommendations based on factors such as company goals and market conditions. For example, if sales in North America are lagging while EMEA is exceeding expectations, the Planner Agent will simulate different regional strategies to bring global performance back on track.

Optimize Models with Modeler Agents

The *Modeler Agent* autonomously builds and updates the models within the system, serving as the foundation for the Analyst and Planner agents. It maintains these models based on business changes and performs data quality checks to ensure real-time accuracy and relevance.

In addition to Agentic AI capabilities available within EPM solutions directly, organizations may be looking to build and use **custom GPTs (Corporate GPTs/Agents)** that can further enhance the capabilities of EPM systems and other tools used by the strategic and operational leaders. Creating custom GPTs or AI Agents involves providing specific instructions for desired outputs based on given prompts¹¹. For example, one can instruct the GPT to generate a table of the latest stock prices when prompted with a specific stock ticker symbol, specifying the format and information to be included. Most tools that enable the creation of custom GPTs allow custom integrations with various EPM platforms using APIs or third-party integration tools. Using these tools alongside EPM's provides teams with the ability to leverage data inside and outside of the EPM for additional use cases and insights.



⁹Article by Ben Previeux titled "AI agents, How Pigment will change business planning again" for Pigment

¹⁰Information about Workday's "Planning Agent" on Workday's Marketplace for agents: <https://marketplace.workday.com/en-US/apps/601658/planning-agent>

¹¹Instructions on creating a GPT were found on OpenAI's Help Center pages.

Custom GPTs can be used for various purposes, such as:



Explaining budget variances by querying internal databases



Looking up previous assumptions from forecast decks and emails



Answering general information queries like the average cost per hire in a specific region

AI can make decision-making faster and easier by bringing attention to insights that may be unobvious to a human or by uncovering insights sooner than a planner could have due to the amount of data.



Data Management and Integration

In today's data-driven world, the ability to effectively manage and integrate data across various systems is crucial for organizations aiming to maintain a competitive edge. Employing AI for the harmonization, integration, and management of data significantly enhances the efficiency, precision, and strategic significance of data operations. This includes critical aspects such as data quality management, data enrichment, and supporting the organization's Master Data Management (MDM) sustainability¹².

By leveraging AI, organizations can ensure that their data is not only accurate and reliable but also strategically aligned with their business goals. This capability is essential for driving informed decision-making and achieving long-term success.

In the realm of data management, AI can offer significant efficiencies through:

1

Preparing and cleaning data

2

Error detection and correction

3

Duplication and outlier elimination

Utilizing AI for data integration can transform the way organizations handle complex datasets. With advanced machine learning, AI can align and merge separate data sources effortlessly. AI algorithms can automatically match and map data elements from different data sources that are semantically similar, even if they have different naming conventions. Through this process of schema matching the manual efforts related to aligning data sources are drastically reduced.



¹² Article by Matthew Kosinski titled "What is AI Data Management?" for IBM

Reports, Visualizations, & Dashboards

Generative AI (GenAI) can significantly benefit the strategic and operational leaders at firms by enhancing their ability to create analytical visualizations, reporting packs, and other data-driven insights. By leveraging GenAI, these leaders can automate the generation of complex visualizations and reports, which not only saves time but also ensures accuracy and consistency in the data presented. This automation allows FP&A professionals to focus more on strategic analysis and decision-making rather than spending time on manual data preparation and visualization tasks.

For instance, there are tools that can generate visualizations based on natural language prompts¹³. This means that teams can simply describe the data they need to visualize, and the tool will create the appropriate charts and graphs. For example, if a sales leader wants to see

real-time progress against their quota, they can prompt AI to generate a visualization that displays this information along with recommendations for meeting their goals. Similarly, if the average order value is decreasing, AI can create visuals that provide insights into the reasons behind this trend and suggest solutions to address the issue. This capability extends to various roles within an organization, such as commerce leaders and service leaders, who can benefit from automated visualizations that highlight key performance indicators and potential areas for improvement.

By incorporating GenAI tools into their workflows specifically for reporting and visualizations, teams can improve their efficiency and accuracy, while providing more valuable insights to their organizations.



¹³"Salesforce Introduces the Next Generation of Tableau, Bringing Generative AI for Data and Analytics for Everyone" found on Salesforce website

Conclusion

Exploring the integration of AI and ML into EPM solutions through real-world examples from various platforms reveals significant opportunities for enhancing business outcomes. The insights presented aim to guide clients on harnessing the power of AI and ML to improve the accuracy and reliability of forecasts but also enable continuous learning and adaptation. By embracing AI and EPM technologies together, businesses can optimize their operations, enhance decision-making processes, and achieve long-term success. The integration of AI and ML into EPM solutions is not just a technological advancement but a strategic imperative for organizations aiming to maintain a competitive edge in today's data-driven world.



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