Predictive analytics

Predictive analytics uses historical data to forecast future trends and outcomes. ERP systems infused with AI tools use past behaviors and organization-specific inputs to predict consumer behavior or market dynamics, allowing business leaders to make data-driven decisions quickly.

Natural language processing

Natural language processing (NLP) allows an ERP system to understand and respond to human language, facilitating better user interactions. In recent years newer [large language model](https://www.ibm.com/think/topics/large-language-models) (LLM) technologies such as ChatGPT have significantly improved the discipline, allowing for more nuanced and contextually relevant NLP tools within ERP software.

For example, NLP can process unstructured text like customer emails to perform sentiment analysis, or understand back-office user queries in informal language, making the software more intuitive to use.

### Robotic process automation

[Robotic process automation](https://www.ibm.com/topics/rpa) (RPA) automates routine and repetitive tasks—or entire workflows—using “bots.” Applications include data extraction, data entry and file migration. Using RPA, an ERP system might automatically generate reports, distribute key human resources documents, or automatically provide data management for customer and employee information.

### Machine learning

Machine learning (ML) systems “learn” from data over time to improve predictions and decision-making processes. Applied to ERP solutions, the technology can help reduce operational errors and increase efficiency as an AI becomes better at a task over time. As ERP systems tend to harness large quantities of organization-specific data, ML models trained for specific business cases can have a major impact on an ERP’s functions.

### Chatbots and virtual assistants

[Chatbots](https://www.ibm.com/think/topics/chatbots) and virtual assistants take advantage of NLP to provide real-time support, improving customer experience and ushering employees through ERP software workflows. In an ERP system, chatbots and [virtual assistants](https://www.ibm.com/think/topics/virtual-agent) are adept at handling employee self-service portals, such as answering questions about routine [human resources](https://www.ibm.com/topics/human-capital-management) tasks.

### Image recognition

Image recognition or [computer vision](https://www.ibm.com/think/topics/computer-vision), uses AI to identify visual inputs such as objects, text or locations. ERP systems use the technology to analyze visual data—such as videos or scanned documents—and render them in searchable or editable formats. Image recognition technology can also be used to monitor manufacturing materials for better quality control.

Bullet point summary:

1. predict consumer behavior or market dynamics
2. NLP can process unstructured text like customer emails to perform sentiment analysis, or understand back-office user queries in informal language, making the software more intuitive to use.
3. ERP system might automatically generate reports, distribute key human resources documents, or automatically provide data management
4. chatbots and [virtual assistants](https://www.ibm.com/think/topics/virtual-agent) are adept at handling employee self-service portals, such as answering questions about routine [human resources](https://www.ibm.com/topics/human-capital-management) tasks.
5. provide real-time support, improving customer experience and ushering employees through ERP software workflows
6. visual inputs such as objects, text or locations. ERP systems use the technology to analyze visual data—such as videos or scanned documents—and render them in searchable or editable formats
7. Image recognition technology can also be used to monitor manufacturing materials for better quality control.

### Report generation

Generative AI can automatically create detailed business reports from raw data, saving time and ensuring consistency. These reports can be generated on-demand, providing stakeholders with information as they need it.

### Content creation

Generative AI can draft emails, marketing content, code or technical documentation based on predefined parameters. Applications include generating personalized messages to individual consumers or employees or translating code from one language to another.

### Scenario planning

AI generates various business scenarios and evaluates potential outcomes, significantly advancing the strategic planning capacity of earlier ERP systems. For example, an AI-enabled ERP system might analyze sustainability regulations and produce a series of customized recommendations to reduce an organization’s carbon footprint.

## **Examples of AI in ERP**

Given the number of AI tools available for integration with ERP platforms, the technology has a wide range of practical applications and potential use cases. Some common AI ERP implementations include:

Predictive maintenance

A [predictive maintenance](https://www.ibm.com/topics/predictive-maintenance) system typically involves [Internet of Things (IoT)](https://www.ibm.com/topics/internet-of-things) sensors or[digital twins](https://www.ibm.com/topics/what-is-a-digital-twin). Using these systems, an organization can monitor a piece of crucial equipment to forecast routine maintenance or flag issues, preventing unnecessary disruptions or costly last-minute repairs.

Industries such as transportation, energy civil infrastructure and defense significantly benefit from intelligent predictive maintenance, as it can prevent potentially dangerous breakages or outages. The technology has been used successfully to [increase wind farm output](https://www.ibm.com/blog/predictive-maintenance-efficiencies-client-case-studies/) and decrease the amount of unnecessary energy [used by agricultural manufacturing plants](https://www.ibm.com/blog/predictive-maintenance-efficiencies-client-case-studies/).

Demand forecasting and spend management

Demand forecasting in ERP systems can be critical in the production planning process. Using historical internal data—and sometimes third-party datasets—an organization can anticipate how the market might fluctuate, enabling more precise planning. In ERP systems demand forecasting can be merged with inventory management systems to prevent stockouts.

Machine learning also augments the spend management process. [Oracle’s](https://www.ibm.com/consulting/oracle) financial AI tools automatically optimize cash flows, by using algorithms to compare projections to actual performance and generating more precise cash forecasts.

Digital transformation and app modernization

AI transforms the code development and migration process by intelligently automating coding, testing and application lifecycle management—various ERP systems tools for automating code translation or the migration of data.

Automated invoice processing

NLP and RPA streamline the processing of invoices and other routine paperwork, reducing manual entry errors and speeding up payment cycles. Some of SAP’s ERP modules automate receipt and invoice verification for deliveries to production sites, while Oracle’s AI-assisted financial tools process supplier invoices with document recognition and intelligent invoice entry.

Customer support

AI-enabled ERP systems dramatically improve the [customer relationship management](https://www.ibm.com/topics/crm) (CRM) process. Using NPL and ML technologies an ERP can automatically resolve common issues, improve the user experience, and respond to consumer queries in real-time, 24 hours a day. For example, SAP’s customer relationship management module uses generative AI to write emails and prepare account briefings.

Human resources management

ERP modules designed for [human capital management](https://www.ibm.com/topics/human-capital-management) (HCM) use AI functionalities to automate routine tasks, personalize the HR process for employees, and surface talent during the recruiting process.

[SAP SuccessFactors](https://www.ibm.com/consulting/sap-successfactors), for instance, provides personalized learning recommendations to over [4 million client employees](https://www.sap.com/documents/2023/09/bac24f28-a57e-0010-bca6-c68f7e60039b.html?url_id=ctabutton-glo-ai-pdf-vision-adint-7075) a month and automatically sources candidates matching specific job descriptions.

Guided purchasing

Machine learning algorithms and AI-enabled search functions embedded into business to consumer (B2C) and business to business (B2B) purchasing platforms surface goods and services meeting specific criteria.

For example, recommendation engines can provide procurement specialists with bids conforming to specific sustainability or budget constraints, as in [SAP’s Ariba](https://www.ibm.com/consulting/sap-ariba) network.

Process mining

[Process mining](https://www.ibm.com/topics/process-mining) uses algorithms to analyze a business’ workflows. With the large volumes of historical organizational data stored within an ERP product, AI can recommend more streamlined, cost-effective or sustainable processes—as well as reveal inefficiencies or pain points.

Anomaly detection

Anomaly detection was one of the first major use cases for AI in ERP systems. The technology automatically flags potential fraud issues, providing an early alarm system for stakeholders and freeing up compliance experts for more complex tasks.

Historically, anomaly detection has been useful for banks and other financial institutions, though in recent years the use case has been applied to more complex parameters [like predefined KPI standards](https://www.ibm.com/products/process-mining).

Order and supply chain management

Intelligent order management can monitor and optimize nearly every aspect of the ecommerce and fulfillment process. From dictating fulfillment routes based on specific constraints to automatically updating customers on the location of their goods. Integrated into an ERP system, these AI-enabled order management tools combine multiple datasets to ensure that the commerce process runs smoothly end-to-end.

The [IBM Sterling® Order Management platform](https://www.ibm.com/products/order-management), for instance, merges sales channels into a unified data stream that tracks inventory levels and organizes customer orders-as well as managing returns and shipping options. The system also identifies potential disruptions, improving supply chain resilience.

Automated summarization

NLP and ML can summarize lengthy reports or documents, providing key insights to human workers. For example, an organization might use AI algorithms to glean key takeaways from legal or compliance documents, or generate summaries of internal reports.