

Use-Case Prism: Artificial Intelligence for Technology Planning and Innovation

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Initiatives: [Digital Innovation and Enablement Function](#); [Digital Technology Leadership for CIOs in China](#)

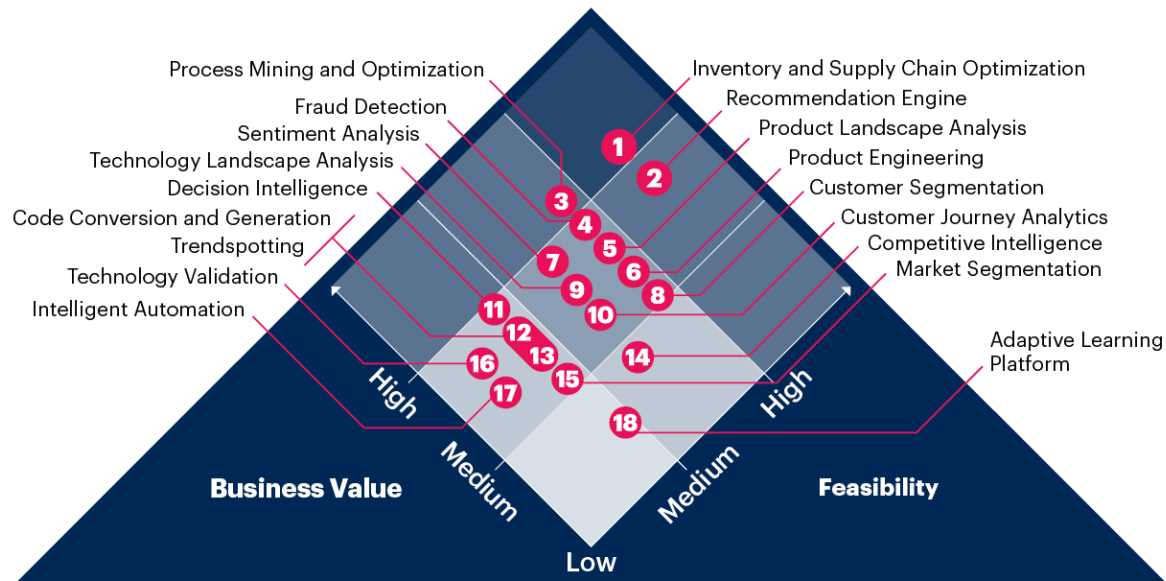
CTOs see the transformational impact of AI on their activities, but are uncertain where to start adopting AI. This research provides AI use cases for technology planning and innovation, to help focus their efforts.

Overview

CTOs and their teams are usually overwhelmed with the number of activities they need to deliver. The need to focus on more short-term, operational issues can mean that less time is dedicated to focus on technology planning and innovation. While CTOs anticipate how AI can drive technology innovation, it is also an enabler of specific use cases that have long-term business value. Economic headwinds and high inflation are driving a strong focus on productivity, so CTOs should explore how AI technologies can increase productivity in operations, as well as how it can contribute to revenue and optimize cost. Top goals for CTOs include operational efficiency and productivity, as well as digital product innovation. AI is an enabler of specific use cases for technology planning and innovation. To guide CTOs on where to start, this Use-Case Prism plots these use cases against business value and feasibility axes, inviting strategic conversations and driving investment decisions (see Figure 1). Note that the use case of using AI to improve IT operations is already covered in a separate Use-Case Prism: [Infographic: Artificial Intelligence Use-Case Prism for AIOps](#).

Figure 1: AI Use-Case Prism for Technology Planning and Innovation

AI Use-Case Prism for Technology Planning and Innovation



Source: Gartner
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Gartner.

How to Use

Review the AI-enabled use cases plotted on the Prism, comparing them with the maturity and requirements of your own technology planning and innovation strategy. To assist with this task, we have a presentation summary of this research and a Toolkit.

Presentation

Download a summary presentation of this research here:

[AI Prism Presentation for Technology Planning and Innovation](#)

Toolkit

A companion Toolkit allows you to tailor the Use-Case Prism for your organization's needs. [Navigate to the Toolkit](#) and download the Excel file to customize the use cases, business value and feasibility dimensions, relative weightings, and use-score scores.

Scoring Breakdown

Figure 2 shows how each use case was scored against each business value and feasibility dimension. See Table 1 just below for explanations of each dimension. Our scoring was guided by results from Gartner's 2023 Changing Role of the CTO Function Survey, where we asked respondents to rate whether AI would have a transformational or useful impact in assisting the CTO and their teams in performing certain activities. ¹

Figure 2: AI Use-Case Scorecard for Technology Planning and Innovation

AI Use-Case Scorecard for Technology Planning and Innovation

		Business Value			Feasibility	
		Operational Efficiency	Revenue Growth	Cost Optimization	Technical Feasibility	Organizational Readiness
1	Inventory and Supply Chain Optimization	●	●	●	●	●
2	Recommendation Engine	●	●	●	●	●
3	Process Mining and Optimization	●	●	●	●	●
4	Fraud Detection	●	●	●	●	●
5	Product Landscape Analysis	●	●	●	●	●
6	Product Engineering	●	●	●	●	●
7	Sentiment Analysis	●	●	●	●	●
8	Customer Segmentation	●	●	●	●	●
9	Technology Landscape Analysis	●	●	●	●	●
10	Customer Journey Analytics	●	●	●	●	●
11	Decision Intelligence	●	●	●	●	●
12	Code Conversion and Generation	●	●	●	●	●
13	Trendspotting	●	●	●	●	●
14	Competitive Intelligence	●	●	●	●	●
15	Market Segmentation	●	●	●	●	●
16	Technology Validation	●	●	●	●	●
17	Intelligent Automation	●	●	●	●	●
18	Adaptive Learning Platform	●	●	●	●	●

Source: Gartner
795727_C

Gartner

Table 1: Use-Case Dimension Explanations

<i>Dimension</i> ↓	<i>Explanation</i> ↓
Operational Efficiency	The ability to meet or exceed performance goals with equal or fewer resources, such as capital investments, staff, technology or time duration.
Revenue Growth	The ability to support new business opportunities that drive top-line growth.
Cost Optimization	The ability to drive spending and cost reduction, while maximizing business value.
Technical Feasibility	The ability to meet the technical requirements of a use case, including the capabilities of the AI technology itself, the availability of vendor support and the current state of the organization's technology infrastructure.
Organizational Readiness	The ability of the organization to use and incorporate the use case, including the willingness of internal stakeholders, the availability of data, talent and culture readiness.

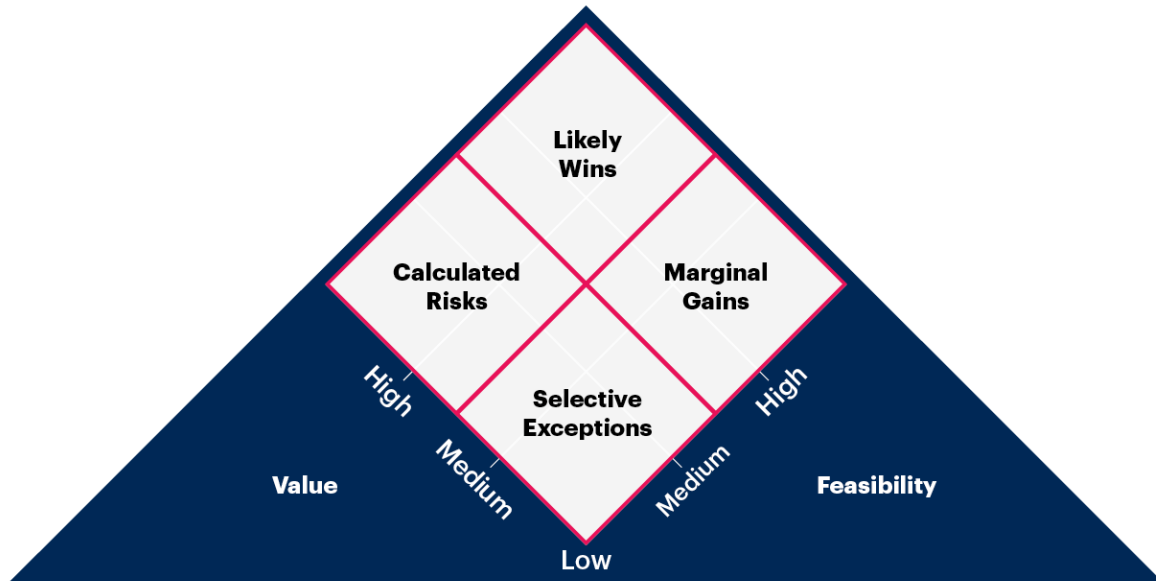
Source: Gartner

Scoring Breakdown by Category

Figure 3 shows the Prism overlaid with the four categories we've split the use cases into. The sections that follow summarize the rationale for each use-case score.

Figure 3: Use-Case Prism Categories

Use-Case Prism Categories



Source: Gartner
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Gartner

Use-Case Prism Categories

Each use case is placed into one of four categories based on its position on the Prism. Click on the category name to jump to a section summarizing the rationale for each use-case score in that category:

- **Likely Wins:** Use cases at the top of the Prism combine high feasibility and high business value, making them wins in most circumstances.
- **Calculated Risks:** Use cases on the left side of the Prism offer high business value but low feasibility, meaning they represent riskier options.
- **Marginal Gains:** Use cases on the right side of the Prism are highly feasible but offer low business value, making them low-risk but for marginal gains.
- **Selective Exceptions:** Use cases at the bottom of the Prism offer low business value and low feasibility, making them lower-priority except in select circumstances.

Likely Wins

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Table 2: Scoring Breakdown: High-Value, High-Feasibility Use Cases

(Enlarged table in Appendix)

Use Case ↓	Business Value ↓	Feasibility ↓
1. Inventory and Supply Chain Optimization <i>AI and ML can optimize inventory supplies and maintain an optimum level of stock by predicting required demand/supply levels and automating the supply chain processes. This avoids running out of stock, overstocking or poor customer demand fulfillment.</i>	Operational Efficiency: 4 Revenue Growth: 2 Cost Optimization: 3 Facilitates service efficiency and cost reduction without compromising customer experience by optimizing inventory levels and assets across the supply chain.	Technical Feasibility: 4 Organizational Readiness: 3 Technology platforms and vendor solution support are widely available. However, some organizations may be resistant to implement, because of the fear of losing control of technology or an inability to assess it.
2. Recommendation Engine <i>A type of data filtering tool that uses ML algorithms to recommend the most relevant items to a particular user or customer. It operates on the principle of finding patterns in consumer behavior data, which can be collected implicitly or explicitly.</i>	Operational Efficiency: 2 Revenue Growth: 4 Cost Optimization: 1 This has tremendous potential to offer personalization in the customer experience, which can improve conversion rates. Customer experience teams can adapt recommendations as customer behavior changes and suggest new products to optimize revenue per customer, customer retention and customer lifetime value.	Technical Feasibility: 4 Organizational Readiness: 3 Recent advances in AI have already made these interfaces available in the market, and many B2C organizations are leveraging these tools to create customer delight. Meanwhile, privacy concerns and a lack of data analytics capabilities still prevent wider adoption.
3. Process Mining and Optimization <i>Enhances the identification of patterns, anomalies and predictive insights, aiding in the discovery of hidden inefficiencies and suggesting data-driven strategies for process optimization.</i>	Operational Efficiency: 4 Revenue Growth: 2 Cost Optimization: 3 Facilitates easy identification and optimization of processes with the help of available business data and insights, thereby reducing the need for human efforts and capital costs.	Technical Feasibility: 3 Organizational Readiness: 3 Availability of the correct data at the right time can be an obstacle here, but organizations have started exploring this practice to proactively identify inefficiencies for business process optimization.
4. Fraud Detection <i>ML algorithms can be used to detect fraudulent and abnormal actions and as they adapt to new unknown fraud patterns. These AI systems can be used to automate the detection of fraudulent transactions.</i>	Operational Efficiency: 4 Revenue Growth: 1 Cost Optimization: 4 Easily identifies fraud patterns/transactions through automated inspections, which improves overall service efficiency and safety. In turn, this can reduce manual efforts that lead to excessive cost requirements.	Technical Feasibility: 3 Organizational Readiness: 3 Organizations (e.g., in the financial services industry) are using ML algorithms to detect fraudulent actions to ensure quality and safety. However, not all organizations are ready, due to insufficient data and lack of explainability of the technology.
5. Product Landscape Analysis <i>The process of identifying and analyzing competitors' products and services portfolios, in order to understand their product features, market and customer base.</i>	Operational Efficiency: 2 Revenue Growth: 3 Cost Optimization: 3 Ability to provide insight into the latest product features available in the market to allow for enhanced product development and faster time to market, without requiring intensive person-hours and cost. Ensures advanced features and quality, which contributes to increased revenue.	Technical Feasibility: 3 Organizational Readiness: 3 Organizations are leveraging this technology to test their products against peers. Authentication of data collection and availability of data outside the organization is a major requirement, and also a factor that prevents wider adoption.
Use cases are scored on a 0 to 4 scale for each dimension, with 0 being the lowest and 4 being the highest.		

Source: Gartner

Calculated Risks

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Use cases on the left side of the Prism offer high business value but low feasibility, meaning they represent riskier options.

Table 3: Scoring Breakdown: High-Value, Low-Feasibility Use Cases

(Enlarged table in Appendix)

Use Case ↓	Business Value ↓	Feasibility ↓
7. Sentiment Analysis <i>The use of natural language processing, text analysis, computational linguistics and biometrics to systematically identify, extract, quantify and study the emotional responses of individuals.</i>	Operational Efficiency: 2 Revenue Growth: 4 Cost Optimization: 2 Provides insights into changing customer sentiments that can be used to improve the customer experience and risk management, without requiring significant manual efforts.	Technical Feasibility: 3 Organizational Readiness: 2 Organizations struggle to find the right tools and techniques to leverage this technology to get unique customer insights. Recent advances in AI, like ChatGPT, will make this process easier.
9. Technology Landscape Analysis <i>A process that involves identifying, visualizing and analyzing the relationships among different technologies, their components and their interdependencies. By doing this, AI can help identify gaps, opportunities and potential collaborations of technology in specific industries.</i>	Operational Efficiency: 3 Revenue Growth: 2 Cost Optimization: 3 Easily identifies emerging technologies and trends, which helps companies evaluate potential related opportunities, challenges and business impact. Automating the process reduces the resource requirement and makes the process faster (e.g., trendspotting).	Technical Feasibility: 2 Organizational Readiness: 3 While there are challenges in defining the scope of technology strategy and decision-making solutions, some organizations are finding it beneficial, at least in the initial stages of data gathering and filtering.
11. Decision Intelligence <i>A practical discipline used to improve decision making by explicitly understanding and engineering how decisions are made and how outcomes are evaluated, managed and improved by feedback.</i>	Operational Efficiency: 4 Revenue Growth: 2 Cost Optimization: 2 Enables faster identification of patterns and important insights in order to make strategic business decisions, which improve overall process quality and provide efficiency gains.	Technical Feasibility: 2 Organizational Readiness: 2 Available AI models need to be fine-tuned for better decision insights. Although some organizations are developing automated processes, others find this requires too much time and effort for implementation.
12. Code Conversion and Generation <i>Natural-language translation capabilities translate code to legacy core languages like C/CPP or Java. LLM-based tools further assist developers to generate code based on prompts, as well as test, debug and find already-generated codes.</i>	Operational Efficiency: 3 Revenue Growth: 2 Cost Optimization: 3 Makes code development faster and assists developers in testing and debugging. Reduces strain on developers' manual efforts, making them available for more valuable development tasks. Ultimately improves the development cycle and reduces cost and time requirements.	Technical Feasibility: 2 Organizational Readiness: 2 Generated code results have to be validated before implementation, because they can include errors, have security flaws or include copyrighted material. Employees may resist this technology because of the fear their jobs may be replaced.
16. Technology Validation <i>Provides a simulated virtual environment to evaluate the performance of technology solutions in the physical world. AI systems can help in data collection and real-world demonstration to determine if the technologies meet the desired performance.</i>	Operational Efficiency: 3 Revenue Growth: 2 Cost Optimization: 3 Makes technology testing and quality control efficient in the testing and validation process by creating digital twins of technology solutions and use of synthetic data. It greatly reduces manual efforts and resource requirements, making it cost-effective for the business.	Technical Feasibility: 2 Organizational Readiness: 1 Vendors are advocating for the technology in the market with emerging solutions. However, organizations are facing significant challenges to build the simulated virtual environment, due to the complexity of real-life use cases, lack of data and inability to leverage the computing power of existing infrastructure.
Use cases are scored on a 0 to 4 scale for each dimension, with 0 being the lowest and 4 being the highest.		

Source: Gartner

Marginal Gains

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Use cases on the right side of the Prism are highly feasible but offer low business value, making them low-risk but for marginal gains.

Table 4: Scoring Breakdown: Low-Value, High-Feasibility Use Cases

(Enlarged table in Appendix)

Use Case ↓	Business Value ↓	Feasibility ↓
6. Product Engineering <i>A process that includes all the aspects of the product life cycle, including innovating, designing, developing, testing, deploying and maintaining a product. AI systems can automate certain tasks and processes, leading to shorter development cycles and faster time to market.</i>	Operational Efficiency: 3 Revenue Growth: 2 Cost Optimization: 2 Automating design, testing and prototyping greatly improves the efficiency for product development and increases the success rate. Digitalization greatly reduces costs and time requirements.	Technical Feasibility: 3 Organizational Readiness: 3 Some companies are already accelerating use of these techniques in product life cycle management, while others are facing challenges in addressing the resistance from creative product specialists.
8. Customer Segmentation <i>The process of dividing customers into groups of individuals with similar characteristics in terms of behaviors, needs and preferences. AI can be used to optimize and personalize customer targeting, by using data-driven algorithms to identify and create segments.</i>	Operational Efficiency: 2 Revenue Growth: 3 Cost Optimization: 1 Provides business value by gaining insights to create customer behavior models. Targeting customer profiles will aid in better positioning of products and services, as well as maintaining proper inventory levels, which will ultimately improve sales.	Technical Feasibility: 3 Organizational Readiness: 3 Organizations need to make sure they have the right data in place to make the technology work. Additionally, business processes need to be improved to make them more customer-centric.
Use cases are scored on a 0 to 4 scale for each dimension, with 0 being the lowest and 4 being the highest.		

Source: Gartner

Selective Exceptions

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Use cases at the bottom of the Prism offer low business value and low feasibility, making them lower-priority except in select circumstances.

Table 5: Scoring Breakdown: Low-Value, Low-Feasibility Use Cases

(Enlarged table in Appendix)

Use Case ↓	Business Value ↓	Feasibility ↓
10. Customer Journey Analytics <i>The process of understanding customer behavior across touchpoints and measuring the impact of every customer interaction on your business outcomes. AI systems can help analyze how prospective customers behave, engage and are converted into current customers.</i>	Operational Efficiency: 2 Revenue Growth: 3 Cost Optimization: 2 Enables faster tracking of customer interactions and feedback across business transactions. Facilitates proactive identification and resolution of customer issues thereby improving customer experience and providing more personalization.	Technical Feasibility: 3 Organizational Readiness: 2 There can be challenges in getting access to data across each customer touchpoint. Also, customer journeys are spread across different business transactions, requiring cross-functional collaboration to ensure organization readiness.
13. Trendspotting <i>A purposeful and targeted set of techniques to explore and analyze current and future changes that may impact the enterprise. AI can help in initial trend information gathering and analysis.</i>	Operational Efficiency: 3 Revenue Growth: 2 Cost Optimization: 2 Improves process efficiency by automating data-gathering and filtering stages, freeing up trend scouts for the other important tasks of business impact analysis and decision making.	Technical Feasibility: 2 Organizational Readiness: 2 Gathering correct data and distilling insights from it is a challenge in this process. Additionally, organizations may have resistance regarding human intervention versus machine contribution for important technology strategy decisions.
14. Competitive Intelligence <i>Involves gathering and analyzing information on competitors, markets and customers to identify competitive advantage opportunities for the business. AI can be used to collect and analyze that information to generate data-driven insights for decision making.</i>	Operational Efficiency: 2 Revenue Growth: 2 Cost Optimization: 1 Enables faster competitive analysis by identifying peer businesses, opportunities and threats. This can help in creating new business models or improving current processes to contribute to revenue growth.	Technical Feasibility: 3 Organizational Readiness: 2 Many AI interfaces are available to gather and analyze the information, but organizations might find human intervention necessary for strategic business decisions dependent on competitive advantage.
15. Market Segmentation <i>The practice of dividing your target market into distinct groups. Market segmentation creates subsets of a market based on demographics, needs, priorities, common interests and other psychographic or behavioral criteria used to better understand the target audience.</i>	Operational Efficiency: 2 Revenue Growth: 3 Cost Optimization: 1 Faster identification of subsets of customer priorities, behaviors and sentiments leads to competitive advantage and contributes to greater sales and revenue.	Technical Feasibility: 2 Organizational Readiness: 2 Data availability is the main challenge for adoption, due to the privacy concerns of customers. Companies may find some insights superficial and not related to specific customer requirements.
17. Intelligent Automation <i>Combines robotic process automation (RPA) with AI to automate end to end complex business processes, and optimize and streamline workflows to accelerate business transformation.</i>	Operational Efficiency: 4 Revenue Growth: 1 Cost Optimization: 2 Enables faster automation and decision making to improve business workflow efficiency and reduce dependency on manual efforts for mundane tasks.	Technical Feasibility: 2 Organizational Readiness: 1 The organizational hybrid technology landscape is complex, so it can be challenging to arrive at the scope of the automation. We don't see widespread adoption because organizations are still struggling to migrate their legacy infrastructure to advanced versions (like cloud), which is required for intelligent automation.
18. Adaptive Learning Platform <i>A technique to deliver custom learning experiences based on data-driven instruction and tailored to unique individual learning needs. AI-based adaptive learning systems can offer personalized learning and development plans, depending on an individual's learning pace and strength.</i>	Operational Efficiency: 2 Revenue Growth: 1 Cost Optimization: 2 Facilitates effective training and knowledge transfer by curating personalized development plans, improving process quality and reducing the need for human efforts.	Technical Feasibility: 3 Organizational Readiness: 1 There are adaptive AI solutions available in the market, but organizational resistance still exists because of fear of replacing human instructors with machines.
Use cases are scored on a 0 to 4 scale for each dimension, with 0 being the lowest and 4 being the highest.		

Source: Gartner

Evidence

These use cases have been selected, positioned and averaged out based on an assessment by Gartner analysts and customer feedback. Their applicability may vary across organizations and industries. For detailed customization, use Gartner's [Prism Toolkit](#).

¹ 2023 Gartner Changing Role of the CTO Function Survey: This study was conducted to understand the CTO function design and how CTOs and their organizations are changing their operating models and enabling digital business model innovation and transformation. The research was conducted online from 15 May through 6 July 2023 among 404 participants from North America (n = 204), Europe (n = 147) and Asia/Pacific (n = 53). Participants were leaders in their organization who were knowledgeable about the roles and responsibilities of the CTO. Respondents were screened for industry, job title, company size (at least \$500 million in annual revenue), knowledge on organizational structure and their reporting level away from the CTO. Industries surveyed include banking/investment services, manufacturing, healthcare providers, insurance, natural resources, government, services, energy, retail, utilities, health payer, communications service provider, transportation, education provider and wholesale.

Disclaimer: Results of this survey do not represent global findings or the market as a whole, but reflect the sentiments of the respondents and companies surveyed.

Recommended by the Authors

Some documents may not be available as part of your current Gartner subscription.

[Toolkit: Discover and Prioritize Your Best AI Use Cases With a Gartner Prism](#)

[Uncovering Artificial Intelligence Business Opportunities in Over 20 Industries and Business Domains](#)

[Understanding Use Case Prisms for Prioritizing Artificial Intelligence Investments](#)

[Use-Case Prism: Generative AI for Banking](#)

[Use-Case Prism: Generative AI for Energy and Utilities](#)

[Use-Case Prism: Artificial Intelligence for Supply Chain](#)

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Table 1: Use-Case Dimension Explanations

Dimension ↓	Explanation ↓
Operational Efficiency	The ability to meet or exceed performance goals with equal or fewer resources, such as capital investments, staff, technology or time duration.
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Business Value ↓

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8. Customer Segmentation <i>The process of dividing customers into groups of individuals with similar characteristics in terms of behaviors, needs and preferences. AI can be used to optimize and personalize customer targeting, by using data-driven algorithms to identify and create segments.</i>	Operational Efficiency: 2 Revenue Growth: 3 Cost Optimization: 1 Provides business value by gaining insights to create customer behavior models. Targeting customer profiles will aid in better positioning of products and services, as well as maintaining proper inventory levels, which will ultimately improve sales.	Technical Feasibility: 3 Organizational Readiness: 3 Organizations need to make sure they have the right data in place to make the technology work. Additionally, business processes need to be improved to make them more customer-centric.
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Table 5: Scoring Breakdown: Low-Value, Low-Feasibility Use Cases

Use Case ↓	Business Value ↓	Feasibility ↓
10. Customer Journey Analytics <i>The process of understanding customer behavior across touchpoints and measuring the impact of every customer interaction on your business outcomes. AI systems can help analyze how prospective customers behave, engage and are converted into current customers.</i>	Operational Efficiency: 2 Revenue Growth: 3 Cost Optimization: 2 Enables faster tracking of customer interactions and feedback across business transactions. Facilitates proactive identification and resolution of customer issues thereby improving customer experience and providing more personalization.	Technical Feasibility: 3 Organizational Readiness: 2 There can be challenges in getting access to data across each customer touchpoint. Also, customer journeys are spread across different business transactions, requiring cross-functional collaboration to ensure organization readiness.
13. Trendspotting <i>A purposeful and targeted set of techniques to explore and analyze current and future changes that may impact the enterprise. AI can help in initial trend information gathering and analysis.</i>	Operational Efficiency: 3 Revenue Growth: 2 Cost Optimization: 2 Improves process efficiency by automating data-gathering and filtering stages, freeing up trend scouts for the other important tasks of business impact analysis and decision making.	Technical Feasibility: 2 Organizational Readiness: 2 Gathering correct data and distilling insights from it is a challenge in this process. Additionally, organizations may have resistance regarding human intervention versus machine contribution for important technology strategy decisions.

Use Case ↓	Business Value ↓	Feasibility ↓
14. Competitive Intelligence <i>Involves gathering and analyzing information on competitors, markets and customers to identify competitive advantage opportunities for the business. AI can be used to collect and analyze that information to generate data-driven insights for decision making.</i>	Operational Efficiency: 2 Revenue Growth: 2 Cost Optimization: 1 Enables faster competitive analysis by identifying peer businesses, opportunities and threats. This can help in creating new business models or improving current processes to contribute to revenue growth.	Technical Feasibility: 3 Organizational Readiness: 2 Many AI interfaces are available to gather and analyze the information, but organizations might find human intervention necessary for strategic business decisions dependent on competitive advantage.
15. Market Segmentation <i>The practice of dividing your target market into distinct groups. Market segmentation creates subsets of a market based on demographics, needs, priorities, common interests and other psychographic or behavioral criteria used to better understand the target audience.</i>	Operational Efficiency: 2 Revenue Growth: 3 Cost Optimization: 1 Faster identification of subsets of customer priorities, behaviors and sentiments leads to competitive advantage and contributes to greater sales and revenue.	Technical Feasibility: 2 Organizational Readiness: 2 Data availability is the main challenge for adoption, due to the privacy concerns of customers. Companies may find some insights superficial and not related to specific customer requirements.
17. Intelligent Automation <i>Combines robotic process automation (RPA) with AI to automate end to end complex business processes, and optimize and streamline workflows to accelerate business transformation.</i>	Operational Efficiency: 4 Revenue Growth: 1 Cost Optimization: 2 Enables faster automation and decision making to improve business workflow efficiency and reduce dependency on manual efforts for mundane tasks.	Technical Feasibility: 2 Organizational Readiness: 1 The organizational hybrid technology landscape is complex, so it can be challenging to arrive at the scope of the automation. We don't see widespread adoption because organizations are still struggling to migrate their legacy infrastructure to advanced versions (like cloud), which is required for intelligent automation.

Use Case ↓	Business Value ↓	Feasibility ↓
18. Adaptive Learning Platform <i>A technique to deliver custom learning experiences based on data-driven instruction and tailored to unique individual learning needs. AI-based adaptive learning systems can offer personalized learning and development plans, depending on an individual's learning pace and strength.</i>	Operational Efficiency: 2 Revenue Growth: 1 Cost Optimization: 2 Facilitates effective training and knowledge transfer by curating personalized development plans, improving process quality and reducing the need for human efforts.	Technical Feasibility: 3 Organizational Readiness: 1 There are adaptive AI solutions available in the market, but organizational resistance still exists because of fear of replacing human instructors with machines.
Use cases are scored on a 0 to 4 scale for each dimension, with 0 being the lowest and 4 being the highest.		

Source: Gartner