The Use of AI and Data Mining to Maximize Business Efficiency

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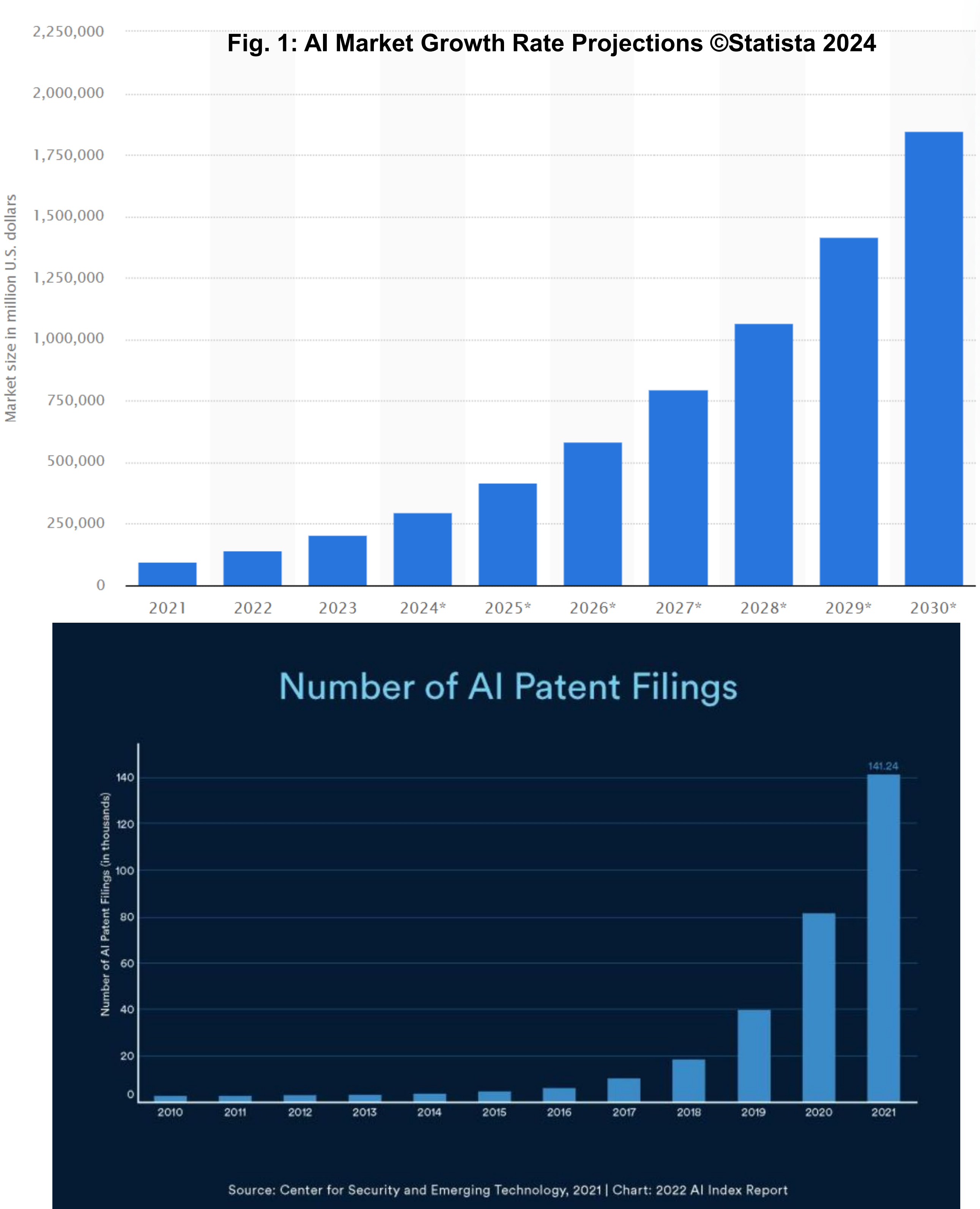
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ABSTRACT

The research done by our team focuses on the realm of ever-evolving technology and how it interacts and contributes to strategy and personalization for businesses across the globe. Our work looks to illustrate the ways in which AI and data mining can serve as groundbreaking tools for generating greater profits through highly tailored business strategies and marketing initiatives. AI has quickly lent itself the title of the "boardroom genius," in other ways, data mining is also making quite the name for itself given its incredibly useful nature. The topics of AI and data mining are quite extensive topics, so our analysis has a focus on providing insights and potential frameworks that businesses can utilize in order to harness the true power of these technologies in the realm of data-driven decision making and customized customer experiences.

AI GROWTH IN BUSINESS

- Chatbots responded to 85% of customer service interactions.
- More than 4 billion devices already work on AI-powered voice assistants.
- 56% of businesses are using AI to improve and perfect their operations.
- 46% are using AI for customer relationship management.
- 40% are turning to AI for inventory management.
- More than 1 in 4 dollars invested in American startups in 2023 went to an AI-related company.

Fig. 1: AI Market Growth Rate Projections ©Statista 2024

Number of AI Patent Filings
Source: Center for Security and Emerging Technology, 2021 | Chart: 2022 AI Index Report

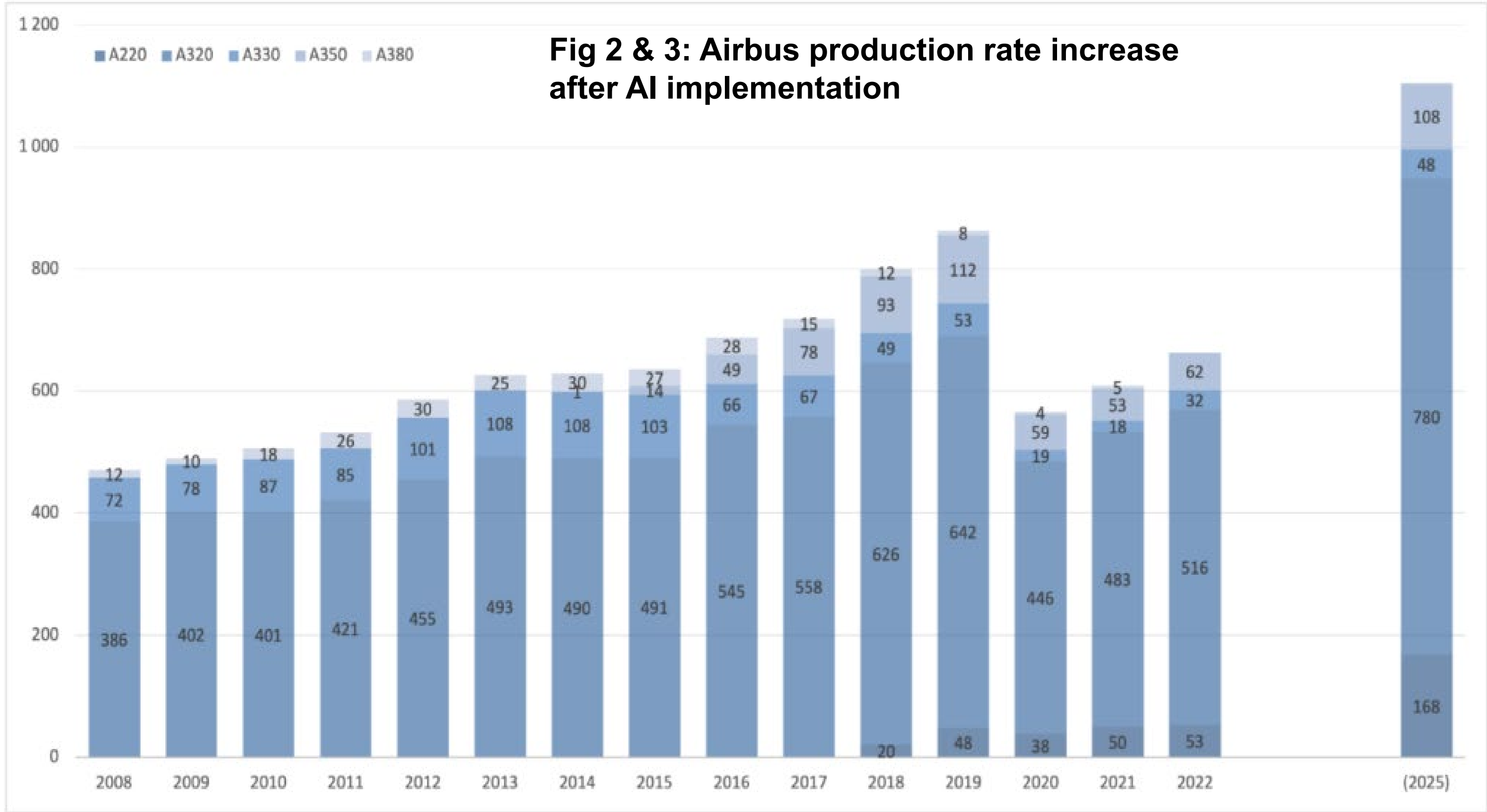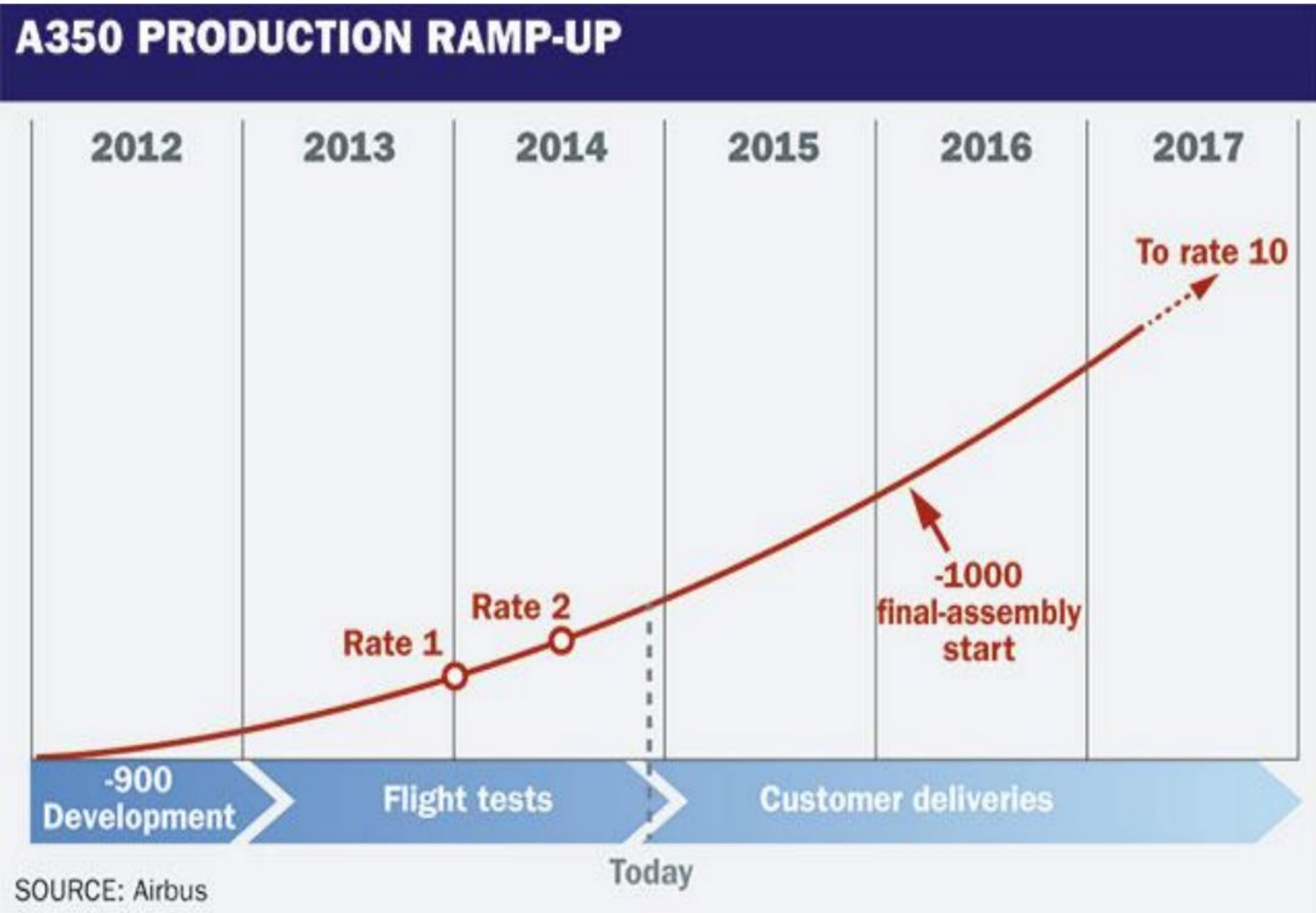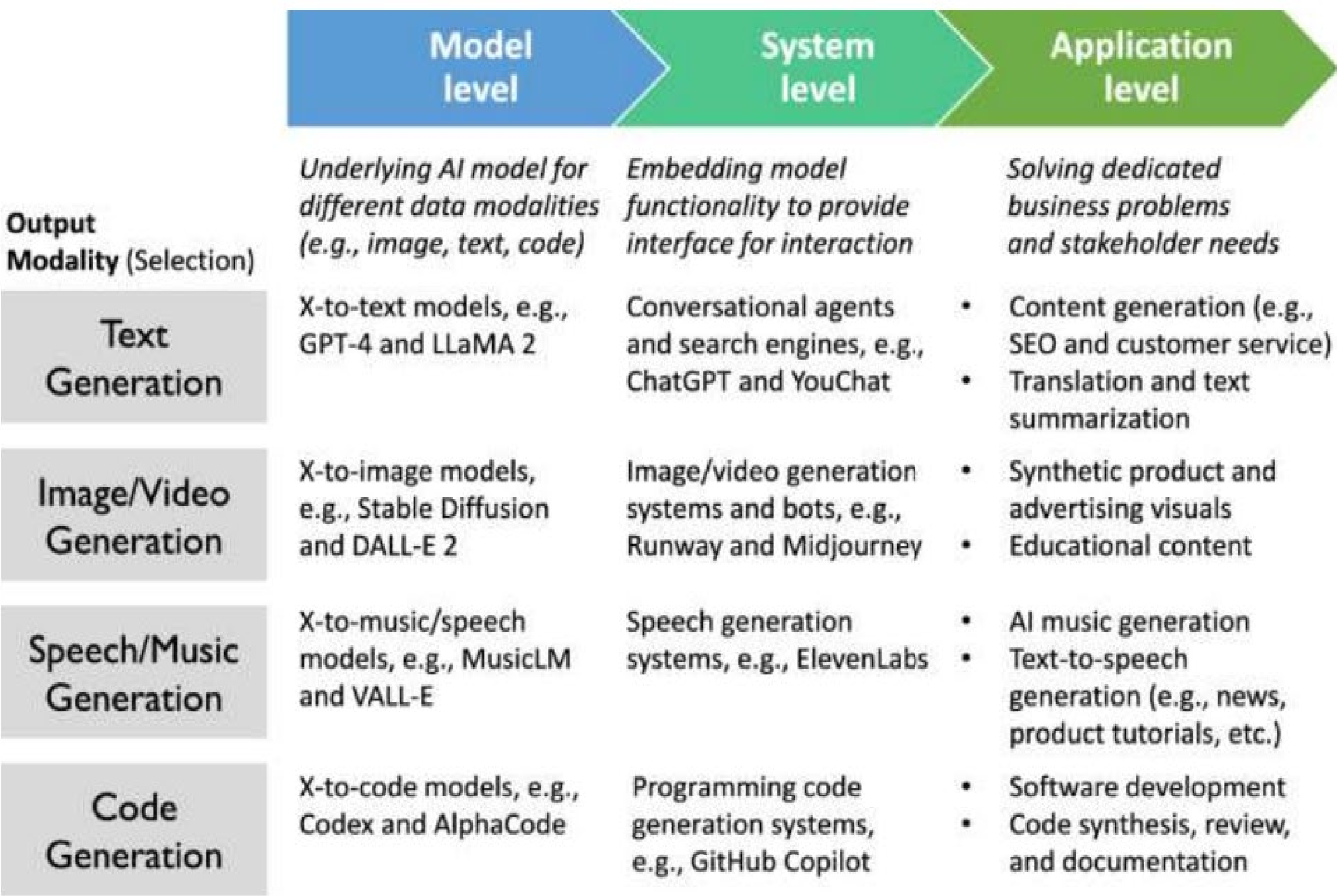## HOW AI INCREASES BUSINESS EFFICIENCY

- AI systems can analyze vast amounts of data at speeds impossible for humans
- Identifying patterns and insights that drive operational improvements.
- Random Forests, SVMs, and Neural Networks are the most widely used.
- natural language processing has been completely transformed by the advancement of large language models (LLMs) such as GPT
- Brings about efficient unsupervised learning methods for producing relevant text that is easy to understand.

AI IN DATA MINING FOR TREND ANALYSIS

- BDA can improve customer service and operational efficiency
- Large corporations such as American Express and General Electric have experienced success when leveraging BDA for strategic planning and marketing.
- BDA facilitates problem-solving and adaptability.
- BDA techniques significantly enhance supply chain demand forecasting accuracy.
- Machine learning and BDA are helping organizations transition from traditional forecasting models to precise, data-driven models.

BENEFITS AND USES FOR AI IN BUSINESS

- AI could boost business productivity by up to 40% by 2035.
- 63% of executives believe that AI and machine learning are the most important technologies for analyzing data
- AI-driven predictive maintenance can result in a 10%-40% reduction in maintenance costs.
- AI can boost production rates by finding and solving problems in the production chain

Output Modality (Selection)	Model level — Underlying AI model for different data modalities (e.g., image, text, code)	System level — Embedding model functionality to provide interface for interaction	Application level — Solving dedicated business problems and stakeholder needs
Text Generation	X-to-text models, e.g., GPT-4 and LLaMA 2	Conversational agents and search engines, e.g., ChatGPT and YouChat	• Content generation (e.g., SEO and customer service) • Translation and text summarization
Image/Video Generation	X-to-image models, e.g., Stable Diffusion and DALL-E 2	Image/video generation systems and bots, e.g., Runway and Midjourney	• Synthetic product and advertising visuals • Educational content
Speech/Music Generation	X-to-music/speech models, e.g., MusicLM and VALL-E	Speech generation systems, e.g., ElevenLabs	• AI music generation • Text-to-speech generation (e.g., news, product tutorials, etc.)
Code Generation	X-to-code models, e.g., Codex and AlphaCode	Programming code generation systems, e.g., GitHub Copilot	• Software development • Code synthesis, review, and documentation

Fig 2 & 3: Airbus production rate increase after AI implementation

CONCLUSION

Artificial Intelligence is not going anywhere, anytime soon. The use of AI in business can not only help drastically but may be seen as necessary in the very near future. AI can make running inventory, marketing your product, or even timing product launches for the best sales, a breeze. Using AI will not only be able to maximize the efficiency of your business but maximize profit as well, which all in all is the end goal of any business.

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