

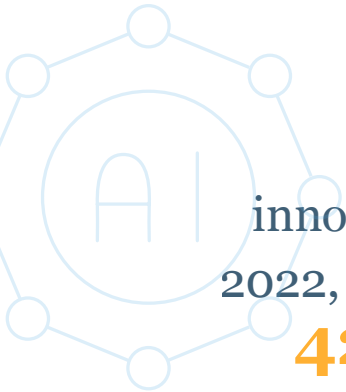


InData Labs

Technology trends 2023-2024:

# **AI AND BIG DATA ANALYTICS**

From COVID-19 to political turbulence to a recession, organizations have reeled from unpredicted winds of change over the last few years. However, uncertainty has always backdropped the business landscape. Therefore, rather than revamping businesses' goals, the world agenda has simply put an exclamation mark on IT initiatives of global businesses. Thus, automation, data analytics, and forecasting capability have gained ground as strategic enablers of business resilience and longevity.



Artificial intelligence stands at the forefront of global innovation as a beacon of certainty and data excellence. In 2022, **35%** of companies reported using AI, while another **42%** are looking into the technology. It means that the adoption of artificial intelligence is accelerating, up four points from 2021.



'Digital transformation took a big step forward when AI and machine learning became pillars of business strategy. With the advent of Big data, AI-based technologies have become essential to automate and elevate data processing, data visualization, predictive modeling, and other complex analytical tasks that would otherwise be time-consuming if at all manageable for businesses.

By adopting machine intelligence, companies can simulate what-if scenarios, support performance monitoring, amplify decision-making, and predict market shifts. All of these enable organizations to respond proactively to the rising challenges and minimize the risks of business transitions.'



**Alexander Marmuzevich**

CTO at InData Labs

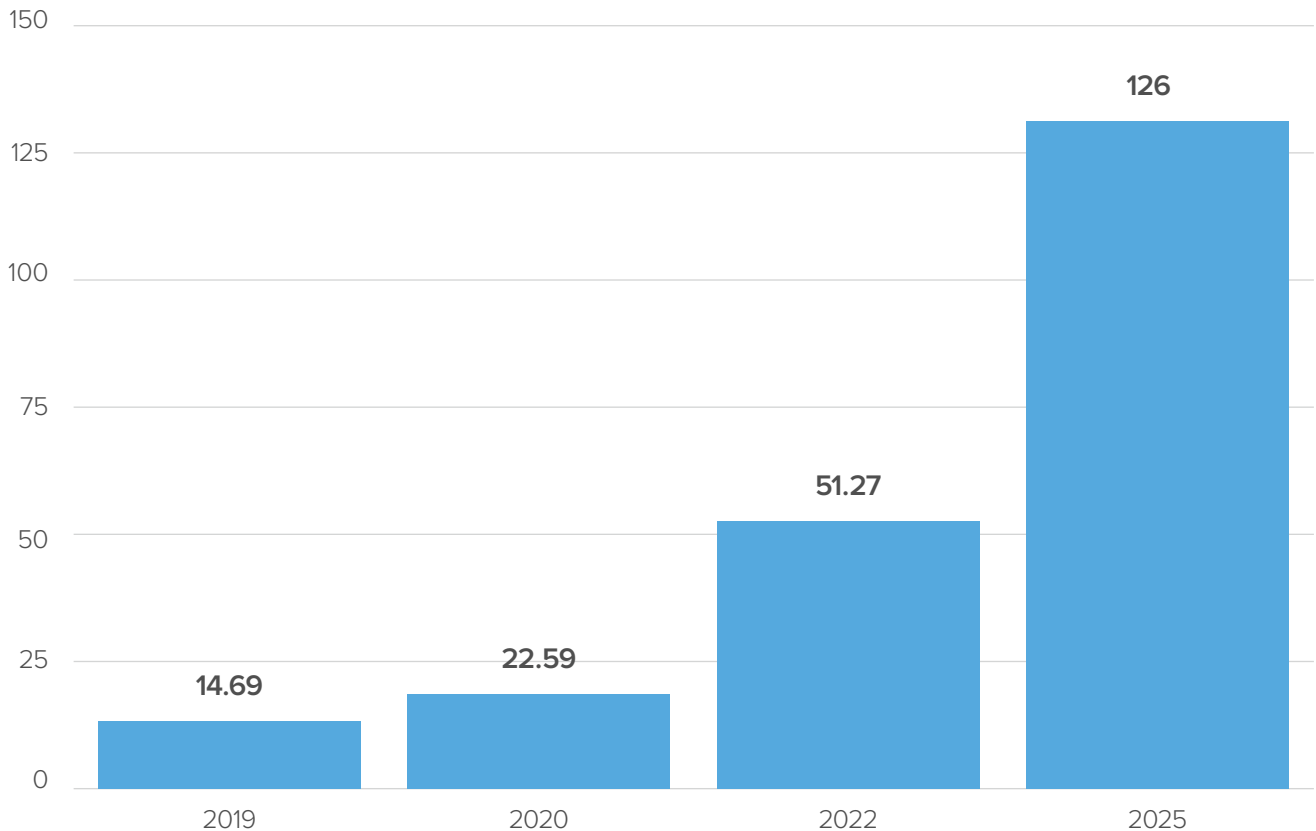
# AI AND BIG DATA ANALYTICS: Then. Now. Future

The COVID-19 tailwind tends to steal all the glory when it comes to the accelerated adoption of artificial intelligence and data analysis. Indeed, we can see a sudden upward trajectory since 2020 when the AI

market was valued at \$22.59 - a YoY increase of \$7.9 billion. In 2022, the market for computer intelligence has grown twofold - \$51.27 billion. The rapid growth is projected to pertain well into the future.

## Revenues from the artificial intelligence (AI) software market worldwide from 2019 to 2025 (in billion U.S. dollars)

*Statista*



However, the sudden swell in demand was a long-anticipated outcome not because of the pandemic, but due to a whole range of AI and Big data market

drivers. These have gradually fast-forwarded an uptick in AI-enabled services and solutions driven by the pandemic-induced automation.

## Accelerated innovation, cloud proliferation, cybersecurity attacks, and a surge of data

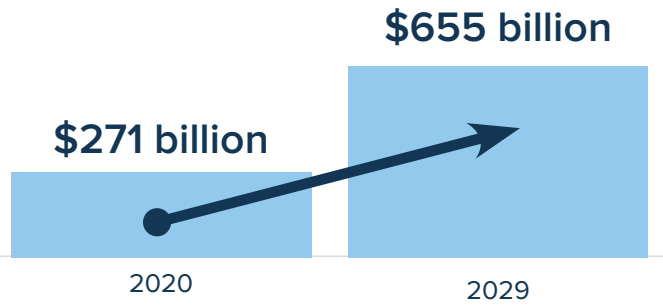
- all have chimed in with the adoption of AI and analytics.

TODAY

# MAIN DRIVERS OF AI AND BIG DATA ANALYTICS

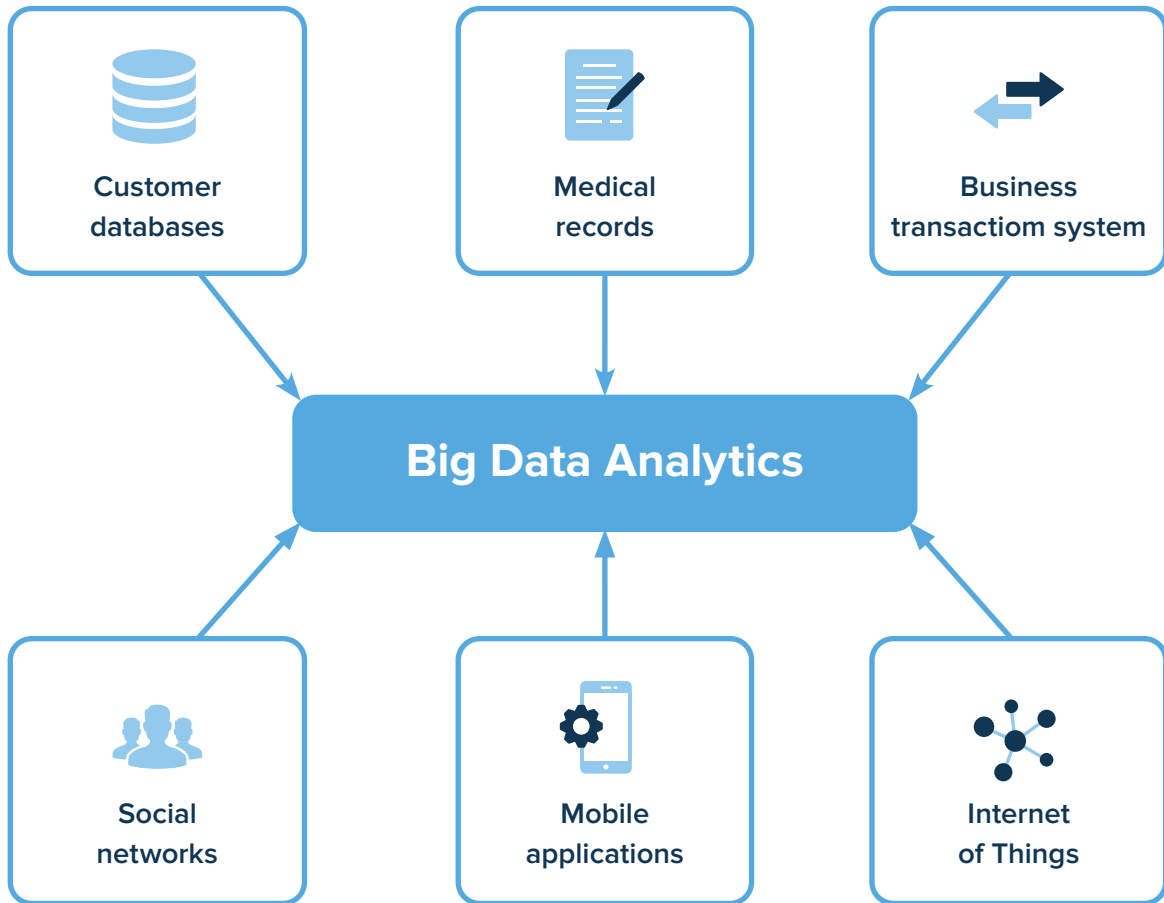


The causality between smart automation and Big Data industry has ushered in a tremendous growth of the data analytics market. The global big data analytics market is projected to leap from \$271 billion in 2022 to over \$655 billion by 2029.



Spearheaded by wearables, connectivity, and operational input, the market is inundated by unstructured data. This type of input is the most

challenging to make sense of, unless intelligent algorithms are employed. As of today, the average IT enterprise has around 80-90% of unstructured data.



Big data and artificial intelligence have a synergetic relationship. To learn and enhance decision-making processes, AI needs a vast amount of data, and big data analytics uses AI to improve data analysis.

With this convergence, companies can swiftly glean insights from large stockpiles of data and more readily use sophisticated analytics capabilities like predictive analytics.

# AI adoption by application

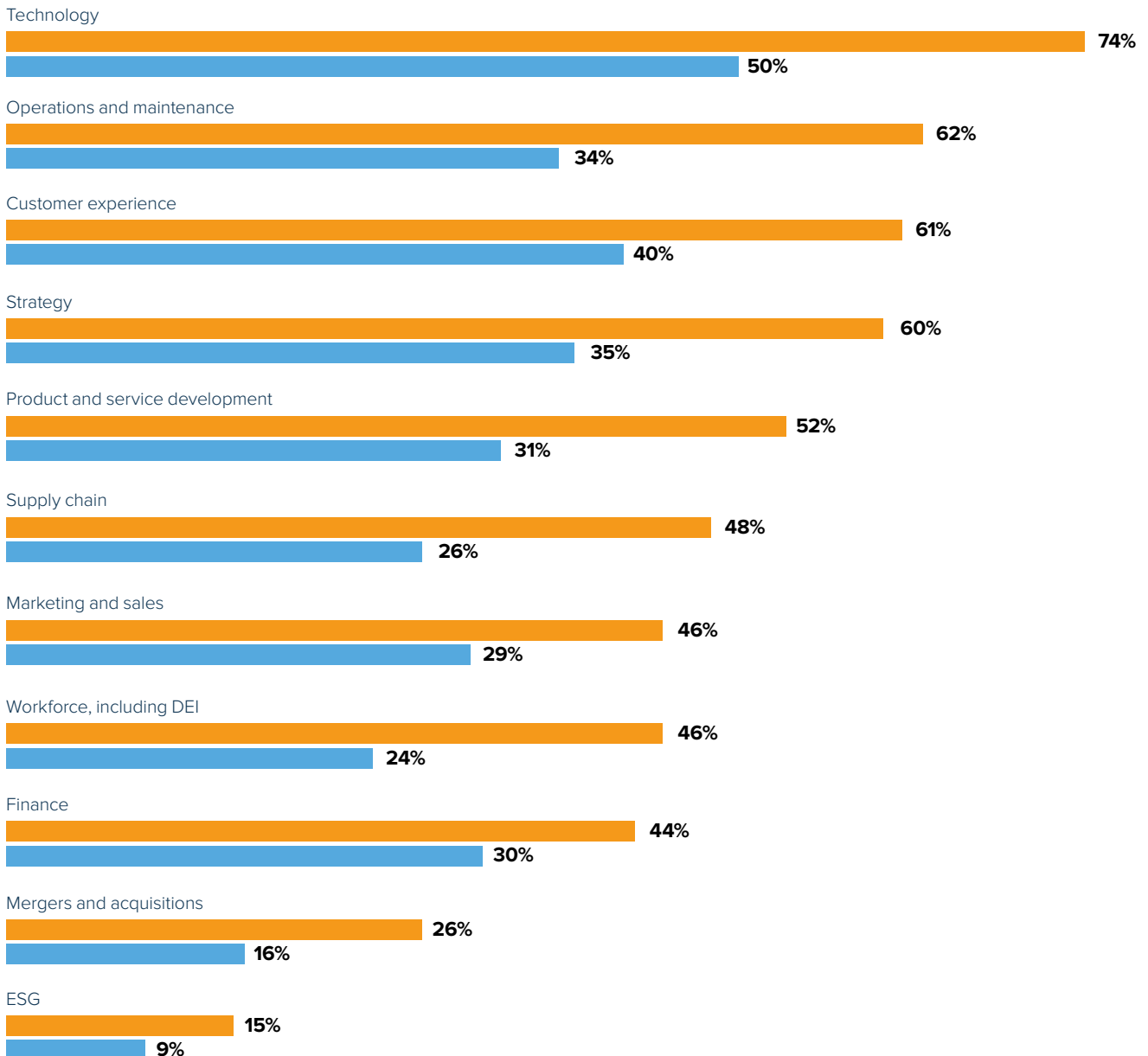
Companies seem to leverage the potential of AI-enabled analytics to support technology innovations and back up operational processes. According to [PwC](#), 61% of enterprises also make data actionable to elevate customer experience, while 60% of mature companies turn to smart algorithms for strategic decision-making.

Applying expert systems for non-financial analysis hasn't gone full out yet with only 15% of leading companies employing AI for the environmental, social, and governance investing.

## Who's deciding what with AI

[PwC](#)

● Leaders ● Others

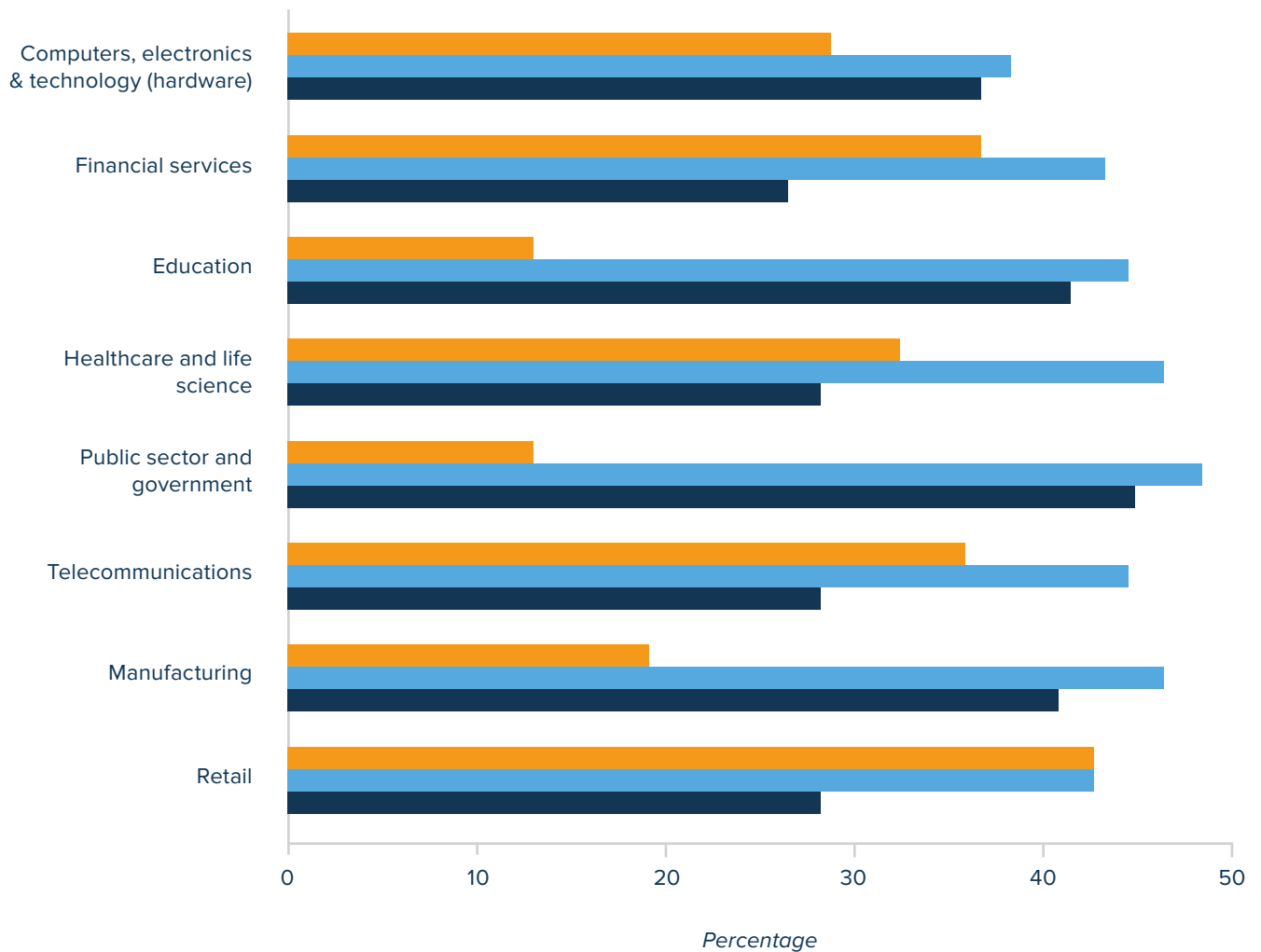


# AI adoption by industry

The distribution of respondents by industry hardly changed in 2022 since 2019. The computer and electronics sector seems to accrue the biggest benefits with over 30% of respondents reporting AI

value in production. Financial services, education, and healthcare have surfaced at the top as well, which is the collective result of the pandemic, industry disruptions, and rising investments.

● In production ● Evaluating ● Not using



# Finance



Ninety-one percent of financial services companies are driving critical business outcomes with investments in AI. Fraud detection, conversational AI, and algorithmic trading have become top

priorities for the finance industry with the highest YoY increase. Another 23% of organizations apply smart analytics to handle ever-growing KYC and AML challenges.

## Application matrix of AI analytics in finance, 2021-2022

Use Case	2022	2021	YoY Change
Fraud detection: transactions and payments	31%	10%	310%
Conversational AI	28%	8%	350%
Algorithmic trading	27%	13%	208%
Fraud detection: AML and KYC	23%	7%	329%
Recommender systems/ next-best action	23%	10%	230%
Portfolio optimization	22%	14%	157%
Default prediction	19%	6%	316%
Marketing optimization	19%	7%	271%
Compliance	17%	6%	283%
Underwriting and acquisition	12%	3%	400%
Creating synthetic data for model creation	11%		n/a
Claims processing	10%	4%	250%
Other	10%	3%	333%
Robo-advisory	9%	4%	225%
Don't know	7%	4%	157%

# Healthcare



The healthcare industry has never been among early innovation adopters due to stringent regulations.

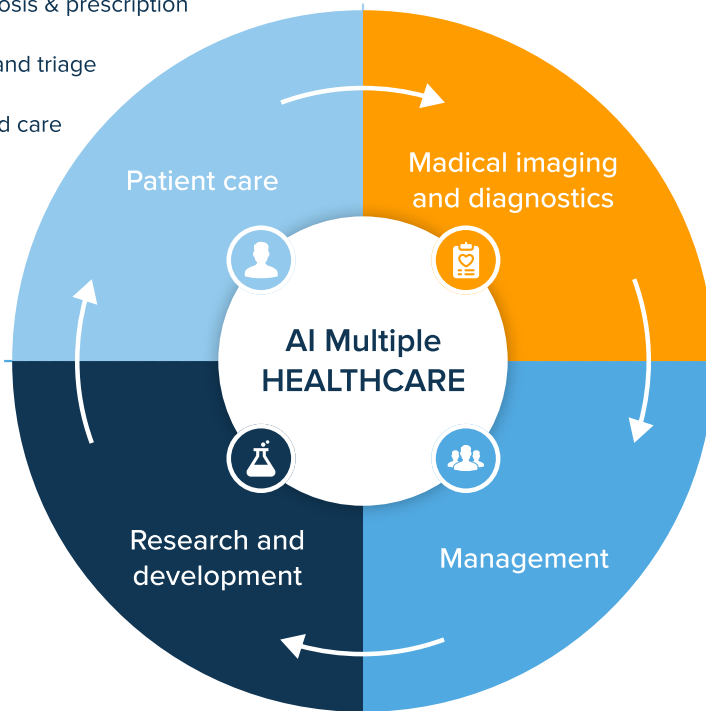
However, the AI in the healthcare market is projected to skyrocket by 2030 - from **\$8.23 billion** in 2020 to **\$194.4 billion** by 2030.

The pursuit of digitalization and the COVID-19 pandemic strain have emphasized the need for proactive response and automation. In 2022 and beyond, healthcare providers are planning to double their AI initiatives across all healthcare-related areas - from patient care to operational workflows.

## AI multiple

- Assisted or automated diagnosis & prescription
- Real-time case prioritization and triage
- Personalized medications and care
- Patient data analytics
- Pregnancy management

- Diagnostic error prevention
- Medical imaging insights
- Early diagnosis



- Drug discovery
- Gene analytics and editing
- Device and drug comparative effectiveness

- Market research
- Pricing and risk
- Brand management and marketing

# Manufacturing

In manufacturing, precursors like the Internet of Things create an enabling environment for the seamless advent of intelligent systems.

By 2030, the global Artificial Intelligence in manufacturing market size will reach over \$78 million, compared with \$2,963 million in 2021.



# Retail



In retail, the shift to E-commerce has fast-forwarded the crunch of effective customer data processing, thus speeding up the proliferation of smart analytics.

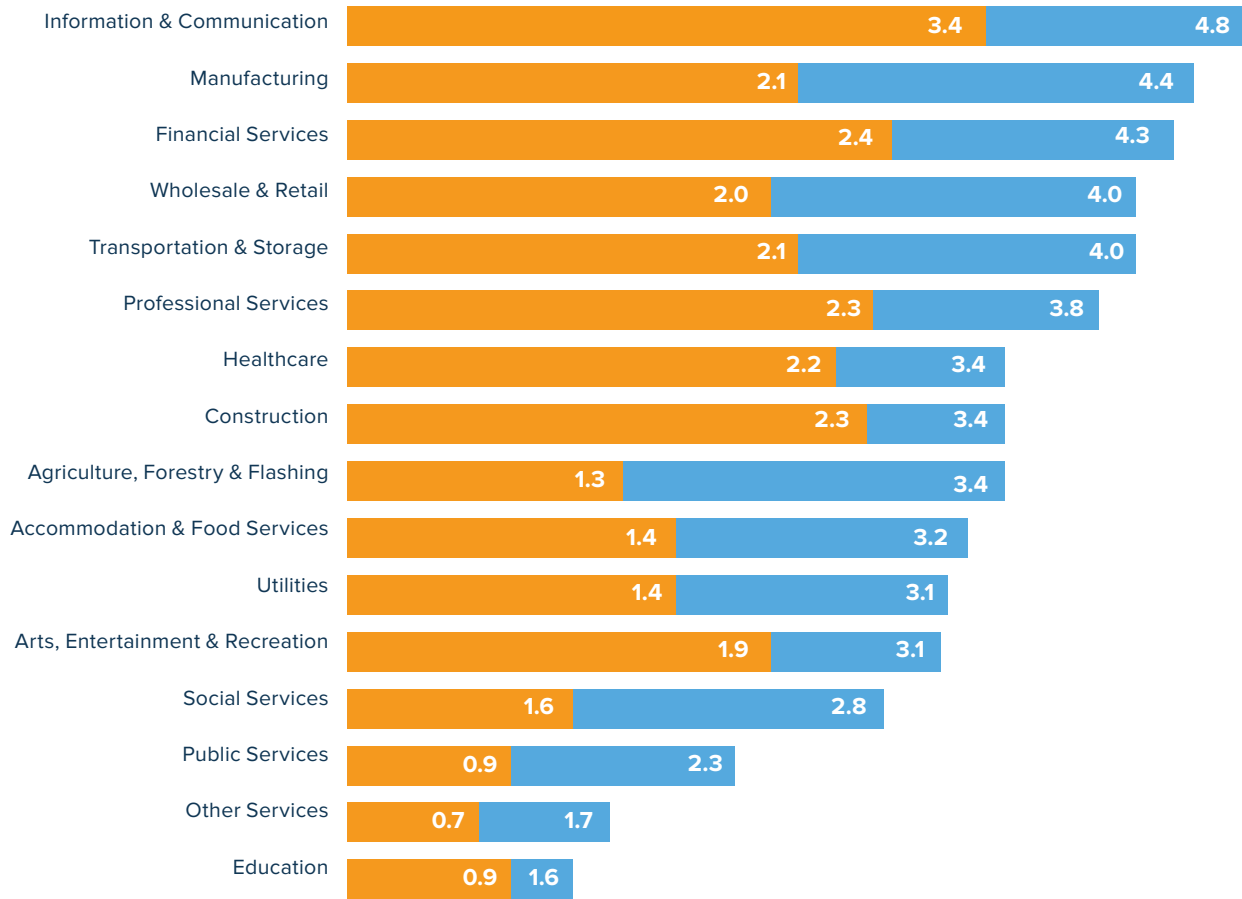
The global AI in retail market size is expected to grow at a CAGR of 23.9% from 2022 to 2030, starting from \$5.79 billion in 2021.

Overall, AI is slated to ramp up economic growth rates by an average of **1.7 percentage points** by 2035 across 16 industries.

## The impact of AI on industry growth

Accenture

● Baseline ● AI steady state

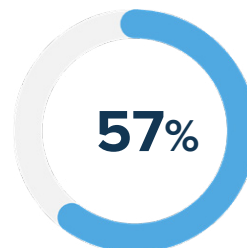


## AI adoption by maturity

Over the last few years, organizations have been scaling their AI maturity curve. Today, [57% respondents](#) in emerging economies report AI

adoption. The dynamics isn't fast, yet significant - up from 45% in 2020. The pandemic has been the main catalyst, according to adopters.

Decreasing costs of algorithm development and favorable legislative landscape also promote the more broad commercial deployment of AI technology.



of respondents in emerging economies report adoption, up from 45 percent in 2020.

McKinsey

**63.6%** - drop in the costs of image classification systems  
**94.4%** - improved training times.

**18** - AI-related laws passed by 2021.

Stanford University

## FUTURE

# ANTICIPATED DRIVERS OF AI ADOPTION

In the decade, experts expect artificial intelligence to come of age with over \$15 trillion of potential contribution to the global economy by 2030. This unprecedented contribution is predicted to stem from product enhancement and stimulated consumer demand as a result of the personalization and automation capabilities of smart systems.

The technology maturity of artificial intelligence is expected to be largely influenced by a wide range of facilitators. Growing AI investment, innovative hardware as well as burgeoning operational data, and Industry 4.0 are projected to expedite the broad applicability of smart analysis.

## 4 FACTORS TO DRIVE WIDE AI ADOPTION IN FUTURE

AI is rapidly revolutionizing nearly every industry. Its effect is being felt in sectors as diverse as healthcare, retail, finance, and manufacturing. But what exactly is driving automation into the future?

### CAPITAL

Investors are predicted to inject more money into AI initiatives. Over the next 8 years, the industry value is projected to increase by over 13x.

### DATA

5G and AIoT encourage the evolution of a fully connected world, allowing AI to generate more accurate models.

### HARDWARE

Growing semiconductor technologies and the advent of commercial quantum computing foster new ways of fast and complex data processing.

### 4TH INDUSTRIAL REVOLUTION

Manufacturers will fully integrate IoT, cloud computing, analytics and AI to enhance productivity, boost quality, and ensure workplace security.





# How will the recession impact AI adoption?

In the coming years, the speed of the technology transition is projected to be greatly influenced by a significant decline in economic activity. But does it mean that companies will pull back on their AI initiatives and resort to survival mode? Quite the opposite, in fact. According to a survey, over three-quarters of tech leaders expect their organizations to spend more on technology.

Automation, machine learning, and cloud computing will remain the focus areas for companies, as executives search for innovative business drivers. Technology investment is no longer seen as the casualty of a potentially recessionary environment. Instead, it is considered one of the most effective enablers of positive business outcomes and a company's revitalization.

But although artificial intelligence is deemed a linchpin to improved business process management,

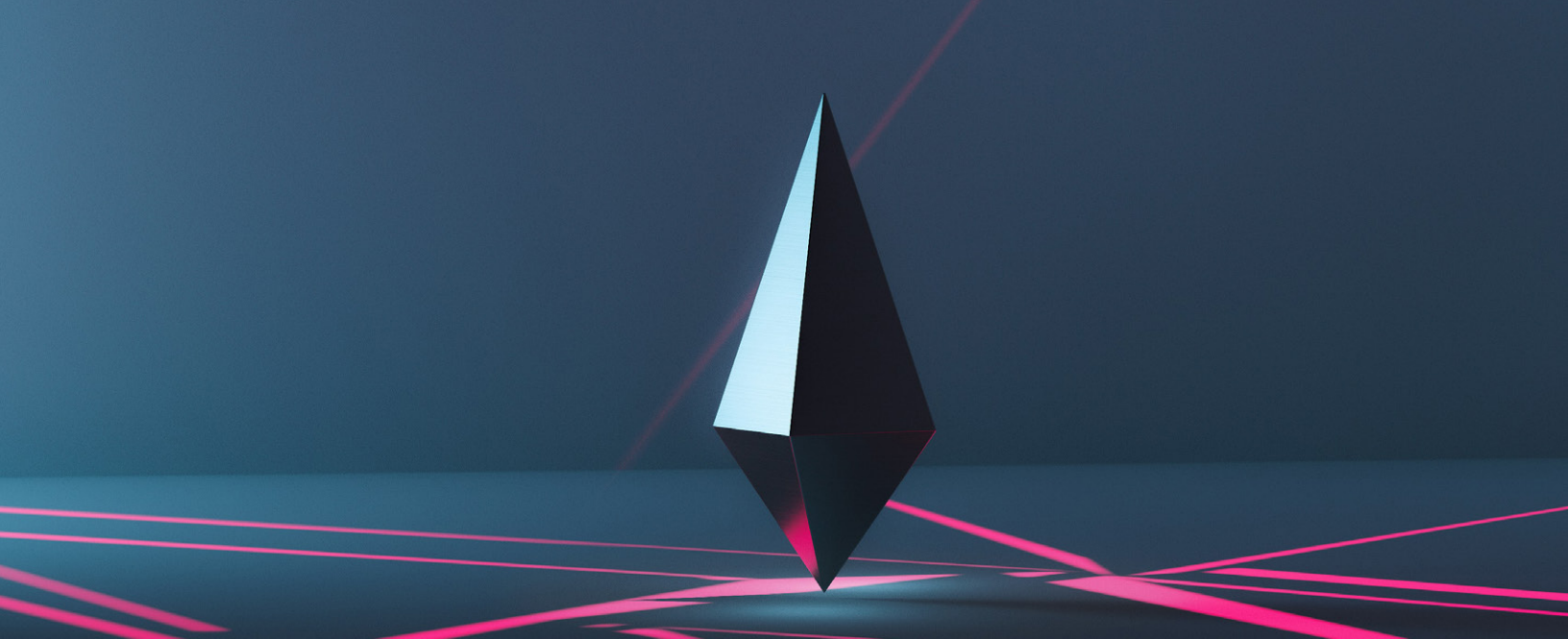
the majority of companies are reluctant to invest in automation. The rising costs of innovation and talent crunch hamper AI initiatives of global organizations. To reduce development costs, companies tend to tap into global AI talent and delegate their AI project to offshore destinations.

The outsourcing economy, in turn, allows for more cost-efficient software development and supports global businesses during these turbulent times.

The global Business Process Outsourcing market is expected to reach a value of over \$492 billion by 2028.

*[GlobeNewswire](#)*

The trend of third-party development can be rightly seen as the core success factor of AI adoption for small-to-medium companies.



# TRANSFORMATIONAL TECHNOLOGY: a look ahead

Although AI and analytics are likely to orchestrate the majority of innovations, it remains difficult to predict the exact form and shape of intelligent transformation and plan ahead accordingly. We've curated the main technology trends to play out in the coming years with varying magnitude so that you can make strategic technology decisions.

## TRENDS

 Applied AI	 Advanced Connectivity	 Web 3.0	 Metaverse	 Edge Computing
 Augmented Analytics	 Engineered Decision Intelligence	 Data Fabric	 Quantum Computing	 Hyper- automation

# Applied AI

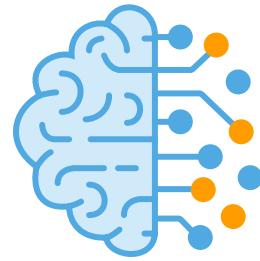
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Applied AI is the use of artificial intelligence to solve real-world problems. It involves the development of algorithms and models that can iteratively process and automatically learn from data to make predictions or decisions.

Applied AI is different from general machine intelligence in that it is focused on specific tasks or problems such as increasing sales, reducing costs, or improving customer satisfaction rather than hypotheses.

## The state of technology today:

Applied AI is the lifeblood of data analytics, statistics, machine learning, deep learning, artificial neural network, and NLP, with each having its wide application area across industries.



Applied AI will continue to unfold with an investment of \$165 billion made in 2021.

*McKinsey*



The number of connected IoT devices is to triple from 9.7 billion in 2020 to over 29 billion by 2030.

*Statista*

# Advanced connectivity

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Advanced connectivity refers to the various ways in which devices can connect and share data. It includes technologies like 5G, the Internet of Things, edge computing, wireless low-power networks, and other innovations that facilitate seamless and fast data sharing.

With an increasing number of devices, it is crucial to ensure connectivity to operate customer-centric markets, track supply chains, conduct proactive maintenance, and improve business processes.

## The state of technology today:

The global IoT connectivity imperative has been driven by cellular IoT (2G, 3G, 4G, and now 5G) as well as LPWA over the last five years. Growing usage of medical IoT, IoT-enabled manufacturing, and autonomous vehicles have been among the greatest market enablers so far.

# Web 3.0

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Web 3.0 is the new iteration of the Internet that aims to make the digital space more user-centered and enables users to have full control over their data. The concept is premised on a combination of technologies, including blockchain, semantic web, immersive technology, and others. The user-friendliness of Web 3.0 is supported, among other things, by granular content distribution.

Artificial intelligence and AI-enabled analytics are among the core building blocks of Web 3.0 as they will help users access relevant data faster. Thus, a website will rely on AI to sift through and provide the data it thinks a specific user will benefit from.

## The state of technology today:

Web 3.0 is still in its infancy due to the limited adoption of its technology components. However, as blockchain, cryptocurrency, and connectivity have gathered speed, the hypothesis of Web 3.0 begins to take more shape. Therefore, we can say that some aspects of Web 3.0 have already gone beyond theory.



The total market for the metaverse economy is projected to hit \$13 trillion by 2030 with five billion users worldwide.

*Citi Group*



The global Web 3 market size is to grow by 44.9% by 2030 from \$1.36 billion in 2021.

*Grand View Research*

# Metaverse

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Metaverse generally refers to an integrated network of virtual worlds accessed through a browser or headset. The technology is powered by a combination of virtual and augmented reality.

Unlike Web 3.0, it doesn't prioritize user ownership over data. Instead, it aims to create a shared digital reality where users can connect, build economies and interact in real time.

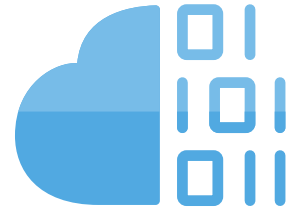
Computer vision, natural language processing, and facial recognition add lifelike experiences to the digital worlds and enable multilingual accessibility.

## The state of technology today

Currently, Metaverse hasn't taken its full form yet. The majority of companies are aspiring to develop the Metaverse, including Roblox, Decentraland, Meta, and others. However, those platforms aren't interoperable. Leading companies are executing metaverse strategies to establish their presence in the existing proto-Metaverse spaces.

# Edge computing

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Edge computing takes cloud data processing to a new level and focuses on delivering services from the edge of the network. This technology allows organizations to process data at the periphery of the network, reducing overall infrastructure costs, improving data sovereignty, and enhancing data security.

The technology will enable faster local AI data analytics and allow smart systems to deliver on performance and keep costs down. Edge computing will also back up autonomous behavior for Internet of Things (IoT) devices.

## The state of technology today:

Industries already incorporate devices with edge computing, including smart speakers, sensors, actuators, and other hardware. These collect data from the real world and process it locally.

75% of enterprise-managed data will be generated and processed outside the data center or cloud by 2050.

*Gartner*



# Augmented analytics

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Powered by ML and natural language technologies, augmented analytics takes an extra step to help companies glean insights from complex data volumes. Augmented analytics also relies on extensive automation capabilities that streamline routine manual tasks across the data analytics lifecycle, reduce the time needed to build ML models, and democratize analytics.

The global augmented analytics market is expected to surpass \$29 million by 2025.

*Allied Market Research*

Augmented analytics can lead to better decisions, faster product development, increased profitability, and accelerated knowledge-sharing. The technology also takes data from multiple channels to achieve a broader perspective.

## The state of technology today:

Large-sized organizations often rely on augmented analytics when scaling their analytics program to new users to accelerate the onboarding process. Leading BI suites such as Power BI, Qlik, Tableau, and others have a full range of augmented analytics capabilities.

# Engineered Decision Intelligence

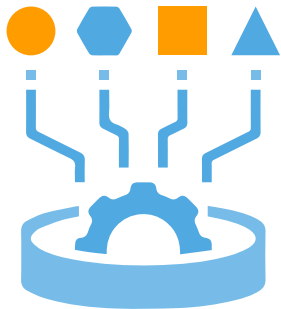
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The field of decision intelligence is a new area of AI that combines the scientific method with human judgment to make better decisions. In other words, it's a way to use machine intelligence to make decisions more effectively and efficiently in complex scenarios.

The goal isn't just to identify patterns but also to understand why those patterns exist and how they can be used as part of an overall strategy. The technology is supplemented with AI-based capabilities and data fabrics, combined with social science and decision theory.

## The state of technology today:

Decision intelligence assists companies in identifying risks and frauds, improving sales and marketing as well as enhancing supply chains. For example, [Mastercard](#) employs the technology to increase approvals for genuine transactions.



The data fabric market will grow to \$6.97 billion by 2029 at a CAGR of 22.3%.

*Fortune Business Insights*



By 2023, over a third of large organizations will have analysts using decision intelligence.

*Gartner*

# Data Fabric

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Being a holistic data strategy, data fabric leverages people and technology to bridge the knowledge-sharing gap within data estates. Data fabric is based on an integrated architecture for managing information with full and flexible access to data.

The technology also revolves around Big data and AI approaches that help companies establish elastic data management workflows. Data Fabric is usually referred to as an autonomous ecosystem used to maximize access to corporate data, rather than a specific platform from a particular software vendor.

## The state of technology today

Around [26.4%](#) of businesses incorporate data fabrics to enhance business process management. The demand for this architecture is growing in the BFSI sector, retail, ecommerce, and healthcare due to the presence of huge data volumes from multiple sources.

# Quantum computing

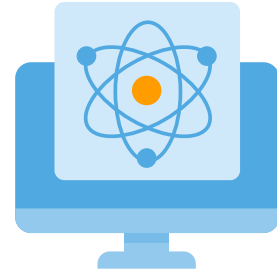
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An antagonist of conventional computing, the quantum approach uses qubits as a basic unit of information to speed up analysis to a scale that traditional computers cannot ever match. The speed of processing translates into potential benefits of analyzing large datasets - faster and at finer levels.

In their commercial stage, quantum computers hold great potential in improving intelligent systems by making them more granular and accurate. After COVID-19, a few companies are focusing on the adoption of QCaaS.

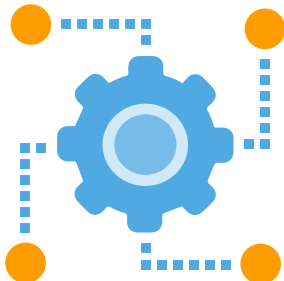
## The state of technology today:

The technology is in its early stage, yet the adoption is spearheaded by increasing funding, proliferating start-ups, and QCaaS offerings. Four industries—pharmaceuticals, chemicals, automotive, and finance—could implement the earliest use cases, according to [McKinsey](#).



The quantum computing market size is projected to reach \$1,765 million by 2026 from USD 472 million in 2021.

[Markets and Markets](#)



The global hyperautomation market size is predicted to surpass \$26 billion by 2028.

[Zion Market Research](#)

# Hyperautomation

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This concept makes the most of intelligent technologies to help companies achieve end-to-end automation by combining AI-fuelled tools with Robotic Process Automation. Hyperautomation strives to streamline every task executed by business users through ever-evolving automated pathways that learn from data.

Thanks to a powerful duo of artificial intelligence and RPA, the hyperautomated architecture can handle undocumented procedures that depend on unstructured data inputs - something that has never been possible.

## The state of technology today:

Hyperautomation is currently in the ideation state with classic automation promoting its future growth. Therefore, this trend is now manifested in traditional RPA software that adheres to rule-based tasks and acts on structured data only.

# ARTIFICIAL INTELLIGENCE AND DATA: the great enablers of innovation

Although the technology forecast may seem like a motley crew of disruptors, there is one linking element inherent in all of them - data. It is the language of technology that can only be deciphered by artificial technology and its offshoots.

Therefore, both artificial technology and data analytics have become indispensable building blocks of innovation and future-proof initiatives. They are now paving the way for new digital transformations we've mentioned above. Let's look at the AI technology canvas in use today.

	Predictive analytics	Natural Language Processing	Business Intelligence	Computer Vision	Internet of Things
What is...?	Statistics + modeling techniques that make prediction about future performance	The ability of computers understand human language	Tech-driven process of data analysis and insight generation	The ability of computers derive information from digital images	Network of connected devices or sensors
How does it work?	Based on current and historical data	Relies on deep learning and algorithms	Data is stored and analyzed in data warehouses + visualization tools	Based on deep learning algorithms and visual stimuli	Based on real-time data collection and sharing
Data types	Structured & unstructured (deep learning)	Unstructured data (text and voice)	Structured data from multiple sources	Unstructured	Status data, automation data, location data
Application examples	<ul style="list-style-type: none"> <li>• Predictive maintenance</li> <li>• Fraud detection</li> <li>• Risk modelling</li> </ul>	<ul style="list-style-type: none"> <li>• Speech recognition</li> <li>• Sentiment analysis</li> <li>• Market analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Performance management</li> <li>• Sales intelligence</li> <li>• Scenario planning</li> </ul>	<ul style="list-style-type: none"> <li>• Autonomous vehicles</li> <li>• Pose tracking</li> <li>• Biometrics</li> </ul>	<ul style="list-style-type: none"> <li>• Smart homes</li> <li>• Connected vehicles</li> <li>• IoT payments</li> </ul>
Business Value	<ul style="list-style-type: none"> <li>• Forecasting</li> <li>• Enhanced decision-making</li> <li>• Fewer risks</li> </ul>	<ul style="list-style-type: none"> <li>• Improved analysis</li> <li>• Higher customer satisfaction</li> <li>• Reduced costs</li> </ul>	<ul style="list-style-type: none"> <li>• Enhanced performance</li> <li>• Minimized risks</li> <li>• Increased profits</li> </ul>	<ul style="list-style-type: none"> <li>• Improved security</li> <li>• Reduced operational costs</li> <li>• Automation</li> </ul>	<ul style="list-style-type: none"> <li>• Equipment monitoring</li> <li>• Increased productivity</li> <li>• Better safety</li> </ul>

As it is clear from the technology chart, artificial intelligence has evolved as a powerful general-purpose technology that opens up multifaceted opportunities. Smart systems can augment almost every business function, promote better business outcomes, and reduce the cost of laborious tasks. Today, intelligent algorithms underlie the majority of cutting-edge technologies and act as a bridge between humans and software.

In the upcoming years, predictive analytics, business intelligence, and NLP will play a paramount role in shaping enterprise decision-making, with augmented analytics and engineered decision intelligence picking up the baton. Computer vision and IoT devices, in turn, enable an autonomous data-sharing ecosystem that connects everything with no human assistance.



# How AI and Big data analytics can benefit your business today

Companies that take a piecemeal approach to adopt computer intelligence tend to miss out on opportunities.

Conversely, a holistic strategy of AI implementation sets up organizations for greater success.

*PwC*

Although each company pursues its unique business needs, the value of AI and analytics usually anchor in four areas. Thus, organizations advance their automation initiatives to supplement decision-making (41% of companies), innovate digital estates (40% of companies), and personalize customer success (40% of companies).

## Four areas across the value chain where AI delivers results



## Five elements of successful AI transformations





# How to prepare your business for innovation?

In a bid to deliver organizational value from analytics, leaders often focus on short-term gains, rather than following a consistent, long-term strategy. As a result, around 85% of data projects fail to deliver expected results.

Without a well-founded adoption strategy, businesses risk suffering from the negative effects of misallocating resources and money. The outcome? An agile digital

organization gets the opposite of optimization and eventually poor ROI elements.

Therefore, it is essential to create a strategic roadmap for rapid AI adoption that digitally advanced firms can use to guide their implementation and reap the rewards.

**Here are some milestones that should lay the ground for your pursuit of automation.**



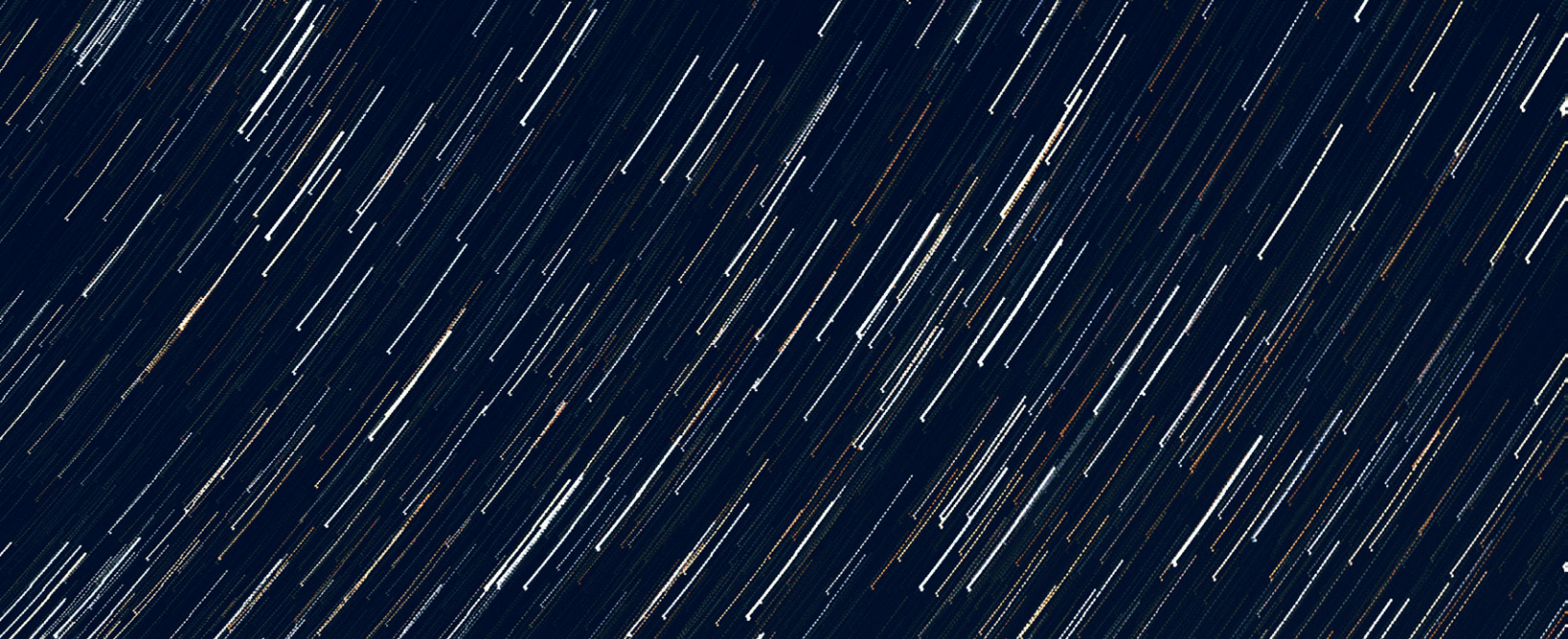
**Identify current business problems.** A strong business case for automation is the shortcut to quicker executive buy-in and higher ROI. To embed intelligence and analytics, leaders need to prioritize the exact problem to solve. Be it product growth, customer success, or decision-making, projects should be undertaken not for the sake of innovation, but rather to solve a critical business challenge. Moreover, young adopters should start from a few business cases, instead of embracing all departments.



**Get control over your data.** The feasibility of AI applicability depends on the amount and quality of operational data you act on. Siloed and incomplete data does not provide the correct bases for model development, and, therefore, does not suffice adoption needs. Conversely, a unified data infrastructure, such as data warehouses, stores information readily available for analysis and gives a 360-degree understanding of the business performance.



**Invest in data-driven people.** Data and AI talent are the key enablers of successful implementation. Due to the talent crunch, around [36%](#) of companies prefer to source capabilities from dedicated AI&data partners where they can find the skills and expertise needed. Moreover, an internal culture shift should nurture high levels of organizational trust, data fluency, and agility, as workers segue from disparate data tools.



# Afterword

After the pandemic, the automation craze has passed the tipping point. Today, data analytics and algorithms are an industry standard for high-yielding projects across different verticals. This combination enables global leaders to predict, automate, and optimize processes, reducing time to value. Most importantly, a data-driven strategy fosters integrated business planning, allowing companies to swiftly adapt to new realities.

As we're stepping into the new era of automation, AI readiness is integral to embracing new technology trends and getting a head start on new initiatives.

Be it data fabrics, edge computing, or advanced connectivity, automated workflows and data control will facilitate your leap to a new level of enterprise success.

## About InData Labs

InData Labs is a leading data science firm and AI-powered solutions provider with its own R&D center. Having a mission to bring the power of AI to every business, we help organizations of any size create intelligent products and services or shape intelligent business processes.

Since 2014, our solutions and consulting services help our clients to get valuable insights into data, automate repetitive tasks, enhance performance, add AI-driven features, and prevent cost overruns.

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