

Cognizant Reports

## Investing in AI: Moving Along the Digital Maturity Curve

Digitally mature businesses are more likely to consider themselves at an advanced stage of AI adoption, according to our recent study, enabling them to turn data into insights at the scale and precision required today.

# Executive Summary

In the years since the term “digital business” first emerged, so has our understanding of digital maturity. And, it turns out, you don’t get to the right-hand side of the maturity curve just by collecting and using operational data to make business decisions. That was fine in the days of data warehouses and reporting, but now, companies have access to entirely new categories of more meaningful data: unstructured data, Internet of Things (IoT) data, images, social data and more.

Still, high data volumes do not equal digital maturity. At some point, it’s a case of diminishing returns — too many trees, not enough forest; too much noise, too little signal, not to mention not enough data scientists. Businesses need to know which data matters, and they need to be able to access and use it to operate with precision.

To identify the data that’s most relevant to meeting their business goals and make these data types actionable, organizations today are turning to advances in artificial intelligence (AI) and deep learning, and they’re using new data architectures to allow all that data to come together for the first time.

To learn more about what it takes to attain digital maturity and achieve business success, Cognizant and ESI ThoughtLab conducted a worldwide survey of 2,491 executives from April to July 2019. We devised a framework to calculate a digital maturity score, based on three criteria: self-assessed maturity across 13 digital capabilities, (see Figure 1, page 5, for the full list), percentage of revenue impacted directly or indirectly by digital technologies, and current benefits from technology (revenue, savings, market share, valuation impact, etc.). We assigned respondents to one of four maturity stages: “beginner,” “implementing,” “advancing” or “leading” (see page 12 for more on our methodology).

We found that even as AI is arguably the most difficult of digital technologies to master, it’s also the most rewarding and the most indicative of digital maturity. In this report, we focus on the use of AI, its critical role in enabling businesses to churn through data at the scale and precision required today and how organizations can prepare themselves for AI adoption to achieve digital maturity.

For the full report, please visit [www.cognizant.com/digital-transformation-report](http://www.cognizant.com/digital-transformation-report).

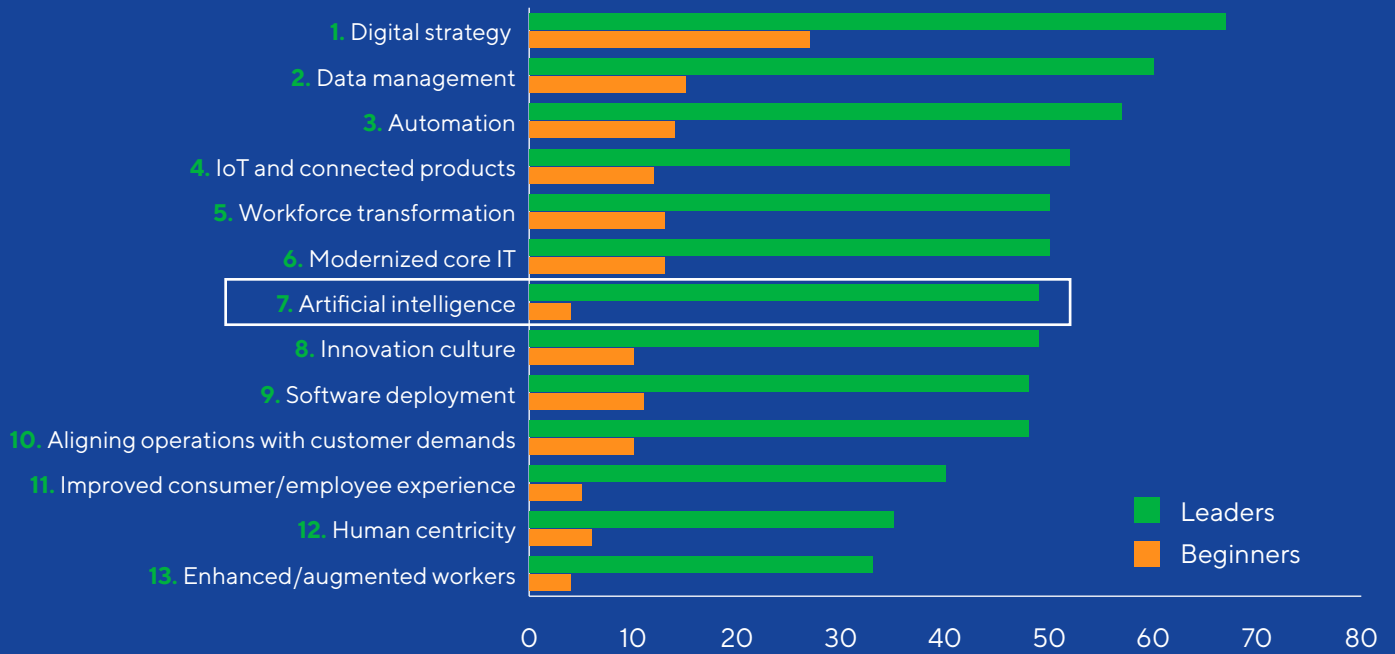
## Moving up the curve with AI

In our study, we discovered a distinct correlation between digital maturity and use of AI. Respondents lower on the maturity curve (those categorized as “beginners”) were far less likely to consider themselves as advanced in AI vs. more digitally mature organizations, or “leaders” (see Figure 1, next page). Use of AI signals a shift in focus from the data collection phase (i.e., initiatives like IoT to generate data) to the data insights phase (i.e., AI). In three years’ time, not even half of beginners think they’ll have achieved AI maturity, while half of leaders already do so today. And where are leaders increasing their investment vs. beginners? You guessed it: AI (see Figure 2, next page).

What this suggests is that businesses lower on the maturity curve are more likely to focus on what we consider to be the prerequisites or drivers of AI — initiatives like IoT, cloud adoption, etc. Involvement in these types of initiatives is a positive sign, maturity-wise, as it signals a shift to collecting data that matters. However, full maturity means integrating data, analyzing content, understanding what data matters most, and using AI to predict and prescribe the best actions. Who cares about IoT devices generating real-time data unless there’s a system that uses that data to predict and prevent failure, to protect frozen food quality, to recommend the best actions to maintain health, etc.? Businesses need to figure out which data will result in the best outcomes, what it means, and how to translate that into actions that will increase shareholder value.

## Digital leaders much more advanced with AI

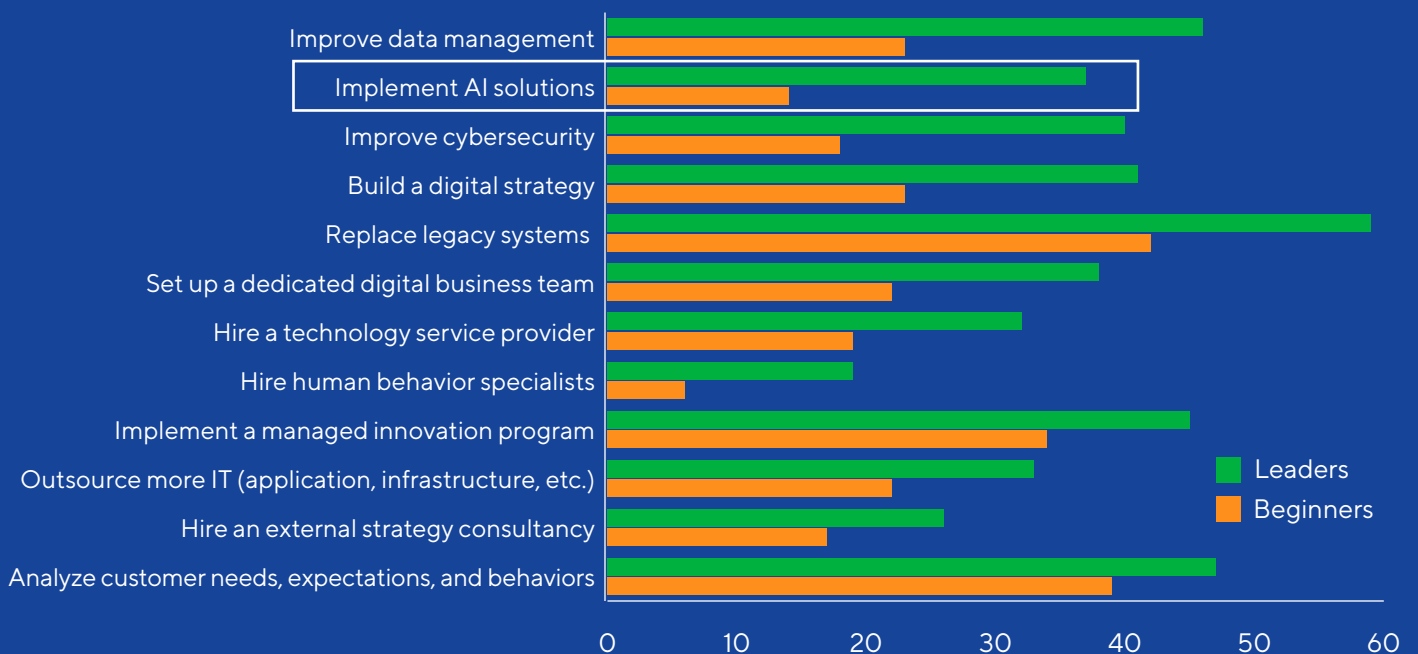
Percent of organizations in the maturing or advanced stage of each area of the digital maturity framework



Response base: 2,491 business and technology leaders  
 Source: Cognizant  
 Figure 1

## Tactics that lead the pack

Percent of respondents planning to invest significantly in the next three years. The biggest delta between beginners and leaders was in improving data management and implementing AI.



Response base: 2,491 business and technology leaders  
 Source: Cognizant  
 Figure 2

## An inhuman job


These capabilities, however, are beyond human scale — businesses need to make decisions continuously, often based on incomplete or inaccessible information, and always based on limited bandwidth. According to our estimates, most businesses only see 20% of the data that matters, and a good deal of the rest is in formats that are difficult to use or even comprehend. Look at Uber or any of the FAANG companies (Facebook, Amazon, Apple, Netflix, Google) — no human can keep up with and process all that data.

Further, business decision-making itself often exceeds the number of parameters that humans are capable of mulling over. Research suggests that when humans need to consider optimizing across five variables, their decision-making is not much better than chance.

This is where AI comes in. Today, most companies apply AI and data to automate menial tasks. Where they'll see outsize results, however, is in applying AI to specialized decision-making roles, such as video analytics and radiobiology, where these tools can perform at a scale that's 10, 100 or even 1,000 times greater than human capabilities. AI and machine learning algorithms don't get overwhelmed with data volumes, they can detect patterns we can't, they don't get fatigued in the late afternoon, they can use simulation instead of real-world experiments to test decisions faster, and they don't have an opinion (though they may develop biases just as people do).

The latest advancements in AI, like evolutionary AI,<sup>1</sup> allow AI to scale with significantly fewer data scientists, and they enable business users to optimize algorithms across hundreds of parameters, which is well beyond human limits. AI mechanisms also exist that can take hundreds or even thousands of parameters and find the 10 that are most worth focusing on — the data that will move the needle on any particular business goal, whether it's driving revenue or improving customer satisfaction. Why is revenue off by 5%? Why are customers not completing transactions? This requires an understanding of the data with the highest causal relationship to an outcome — “the data that matters most” — and how that information impacts our goals.

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## AI: more specialized than originally thought

First, however, this will require a reset of expectations where it comes to AI. AI is far more specialized than companies expect. AI is more like a neurosurgeon than a general practitioner. And, that means you need to know where to apply it and what it's good at (and not good at) to get the best business results.

Think of robots in manufacturing — only now are companies making the product design changes required to take advantage of this specialized equipment. Tesla just changed the way car wiring is done to optimize for robotic assembly.<sup>2</sup> Companies should have done that years ago, but it takes time to adapt to the specialized roles of new technology.

Businesses need to apply this same precision mentality when it comes to their data. They can't apply AI to data in its as-is state. What is causal within the data? What are the problems? What is influencing engagement and a decision to buy? The goal is to extrapolate causal data to understand what impacts human behaviors that, in turn, affect business outcomes. The first part of that involves figuring out and then focusing on those behaviors (reflected in data) that drive true business value.

As it turns out, evolutionary AI is very good at not only establishing causality but also incorporating it into a continuous loop that is followed by prediction (determining the outcome of decisions, even in contexts that have never been seen before) and prescription (identifying actions that will achieve the best outcomes).

Evolutionary AI informs business decisions by providing optimal solutions to incredibly complex problems. It's like having thousands, or even millions, of people brainstorming, prototyping and testing ideas. It takes what works and builds out a new version, discarding those with subpar results. By doing so, it discovers possibilities that lie outside the knowledge of any one person or team of individuals. It enables businesses to simulate every possible choice, even the ones we would never even think to try, to find the best choices for the very best outcome.

This branch of artificial intelligence leverages two powerful concepts:

- Creating a virtual representation of your business. While modeling is not new, using evolutionary computation to generate and optimize models of the business is, and it's a very powerful way to create a model without requiring large numbers of data scientists to design it.

This approach uses business performance data and past decisions to create a model and refine it to reflect the most accurate view of the business. And because it evolves, the model changes as businesses change. Adaptable models are required to accommodate new regulations, modifications to bills of materials, demographic shifts and all the other factors that impact future decisions.

- Optimizing your business through simulation. Most business decision-making today is really an experiment on real people, machines and customers. What if you could test every decision on a virtual copy of your business and see the impact on revenue, retention, conversions and other important metrics? And, what if you could test the decisions you never even considered to generate better outcomes?

Together, modeling and simulation deliver the power of evolutionary computation. Using large numbers of parallel simulations of the business and possible decisions, organizations can find the best possible outcomes. And by learning from these simulations — in parallel as they play out — they can uncover optimal outcomes more quickly and cost-effectively than any other method.



## Big challenge with big returns

While the impact of AI is great, it's also among the most difficult of digital disciplines to master. Not only does it require a modern data foundation that brings together all the data that matters, but it also requires new skills to extract meaning from that data.

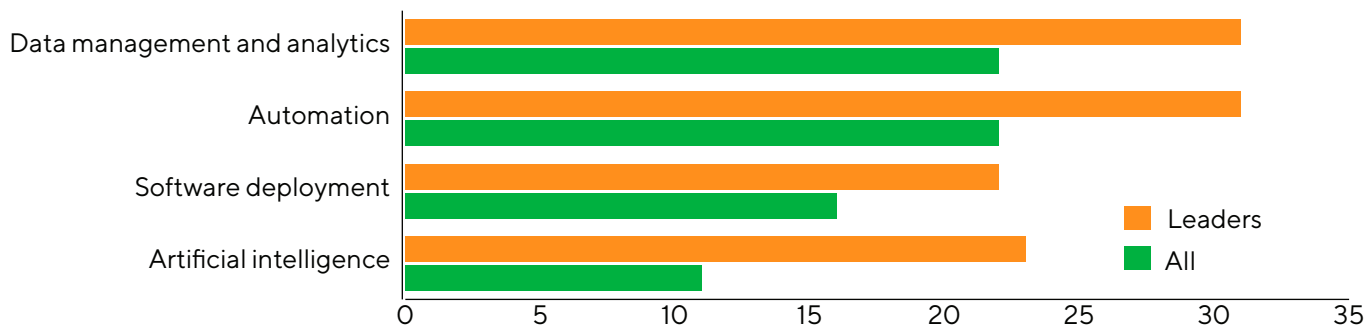
This explains the higher adoption rates among leaders vs. beginners. Generating business insights is complex, and AI usually requires human transformation as it changes existing roles and eliminates some roles as it is successful. AI also has big human impacts on consumers who interact with it.

But respondents in our study who have taken on the complexities of AI are reaping benefits from their investments (see Figure 3).

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### High-impact areas of code and data

Percent of respondents realizing high positive impact on revenue.



Response base: 2,491 business and technology leaders  
 Source: Cognizant  
 Figure 3

Consider the retail client that has been trying to compete with online companies with a 13-week fixed forecasting model. The company couldn't localize its model or adapt in real time to changing local conditions. The retailer is now embracing evolutionary AI to optimize its supply chain and retail store operations to balance staffing, pricing, inventory and shelf placement against cost, revenue, profit and customer satisfaction, all localized to the store in near real-time. That is easier to do in a pure online business, and it is becoming possible with any business.

To succeed, outperformers in the digital space must understand what data matters most and get that data into a modern data architecture to enable AI teams to unlock new insights. Data without AI is just 1s and 0s, and AI without data is just wasted potential.

## Increasing AI maturity

Businesses today need digital tools that can surpass human abilities to keep up with the complexity, velocity and scale of change. That's where AI comes in. To move further along the digital maturity curve, businesses should:

- Start thinking beyond data warehouses and cloud migration and start to focus on modernizing data: integrating and virtualizing the data that matters and using new tools to assess data quality and causality.
- Embrace AI (including evolutionary AI) to get predictive and prescriptive analytics driving the business. It's critical to enable data and AI to scale beyond the limits of what's been possible with reporting and data warehouse technologies.
- Establish new roles and governance for data, including the formation of a chief data officer as part of the leadership team.
- Assess your data and create a data modernization roadmap.
- Establish an AI center of excellence and an AI strategy, identifying needed skills, prioritizing use cases, initiating AI projects, and setting AI standards and governance.
- Scale AI as part of your digital initiatives and programs.

To ascend the digital maturity curve, organizations will need new ways of working and new skills. This starts with new leadership styles that seek value not just in tools or people but also in how data can be applied for competitive advantage.

Great business leaders have historically been able to call upon a variety of leadership styles — from coaching to visionary to laissez-faire — to drive product improvements and motivate people to perform. But as AI becomes a part of the organization's decision-making processes, it effectively becomes a part of the team.

This will require leaders to challenge AI systems to achieve results, by translating business goals into data science and managing AI performance as they would any critical organizational role. They will also need to consider that data is a source of value, and that not all data is equal. To succeed, outperformers in the digital space must understand what data matters most and get that data into a modern data architecture<sup>3</sup> to enable AI teams to unlock new insights. Data without AI is just 1s and 0s, and AI without data is just wasted potential.

With AI, the best time to have planted a tree was 10 years ago. The second best time is now. Armed with new skills and technologies (and new top-down leadership styles), encourage your teams to start small with test cases that identify data weaknesses. Only then can your organization's new AI skills pay dividends.

*[Learn more](#) about what AI can do for your organization.*

## Methodology

To learn what companies are doing to succeed in the digital economy, Cognizant and ESI ThoughtLab conducted a worldwide survey from April to May 2019 of 2,491 C-level executives and their direct reports across regions and industries and from a mix of enterprise functions. In addition to the survey, ESI ThoughtLab conducted interviews with senior executives in more than 20 companies across industries and world locations. Our main research objective was to help organizations develop an evidenced-based roadmap to digital leadership, validated by performance metrics already achieved by companies and enriched through valuable executive insights.

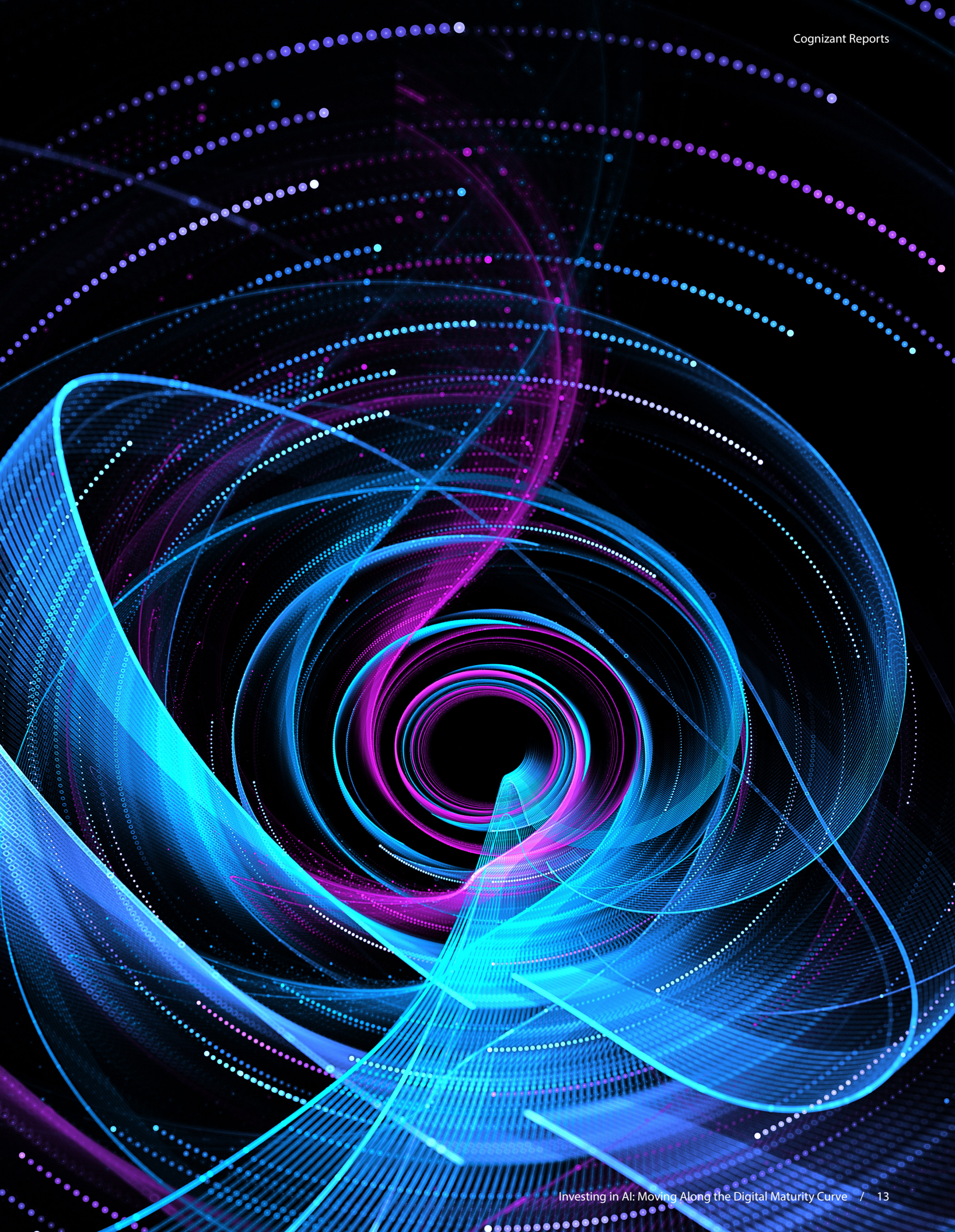
The digital maturity score was derived from three criteria:

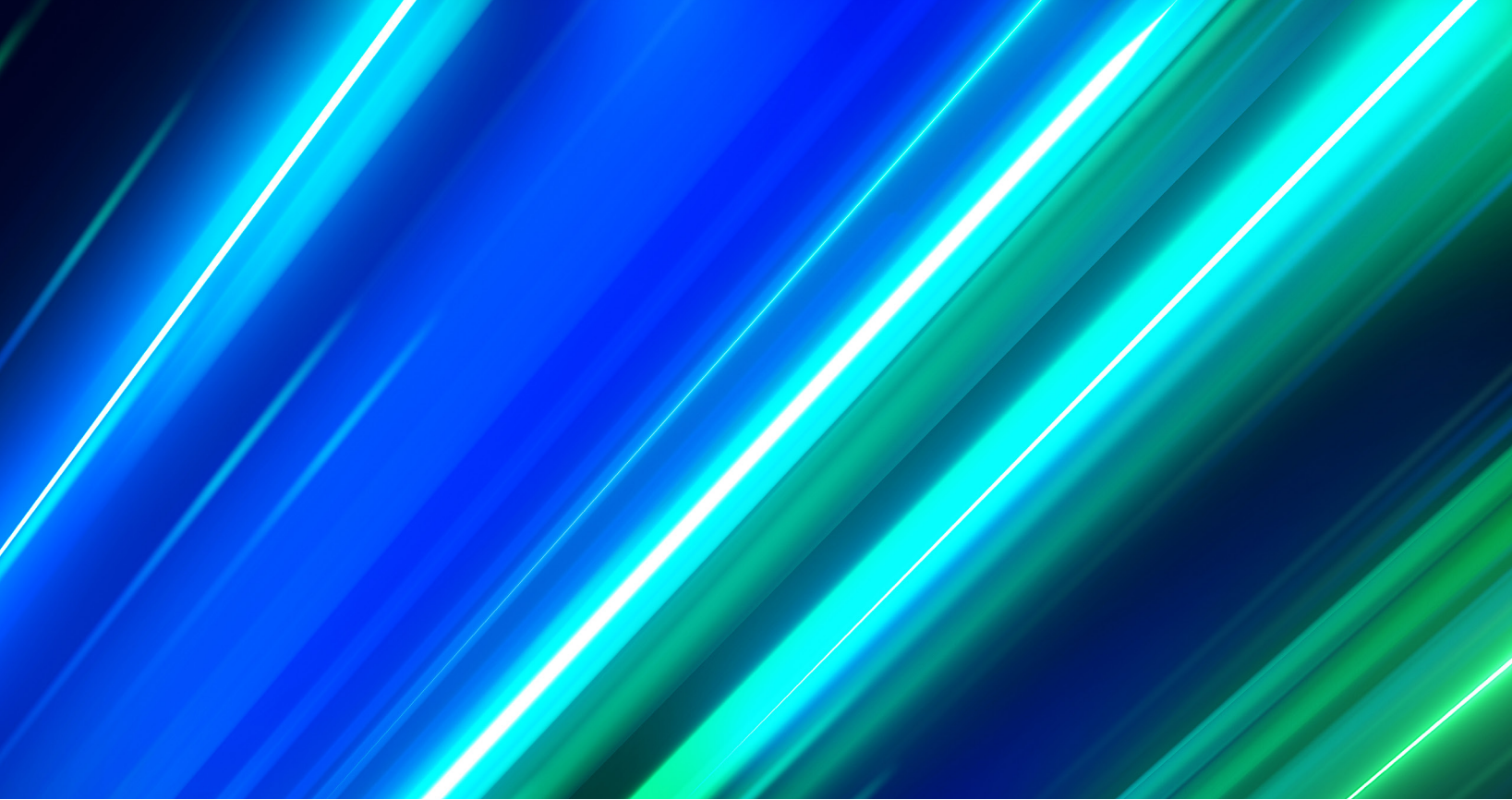
- **Ranking on a digital transformation framework:** Created by ESI ThoughtLab, this framework scored companies across 13 key areas of digital transformation (digital strategy, automation, data management, IoT, workforce transformation, innovation culture, software deployment, modernized core IT, artificial intelligence, aligning operations with customer demands, improved consumer/employee experience, human centricity, enhanced/augmented workers)
- **Ability to influence revenue through digital methods:** Drawing on self-reported data, we analyzed the level of revenue influenced directly or indirectly by digital channels.
- **Range of benefits generated through digital transformation:** This included operational benefits, such as speed to market and improving cost efficiencies, and more strategic ones, such as greater shareholder value and market share.

We calculated an index score of “digital maturity” for each respondent and assigned each to one of four maturity stages: beginner, implementer, advanced and leader.

## Endnotes

- <sup>1</sup> For more on evolutionary AI, see our website [www.cognizant.com/ai/evolutionary-ai](http://www.cognizant.com/ai/evolutionary-ai).
- <sup>2</sup> Alam Khalid, “Tesla Modifies the Wiring to Help Robots Build Cars Like Model Y,” Techacker, July 24, 2018, [www.techacker.net/tesla-modifies-the-wiring-to-help-robots-build-cars-like-model-y/](http://www.techacker.net/tesla-modifies-the-wiring-to-help-robots-build-cars-like-model-y/).
- <sup>3</sup> Arun Varadarajan, “Lessons from the Front Lines of Data Modernization,” Digitally Cognizant, Sept. 10, 2019, <https://digitally.cognizant.com/lessons-from-the-front-lines-of-data-modernization-codex4972/>.





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## Cognizant Digital Business

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## About Cognizant

Cognizant (Nasdaq-100: CTSH) is one of the world's leading professional services companies, transforming clients' business, operating and technology models for the digital era. Our unique industry-based, consultative approach helps clients envision, build and run more innovative and efficient businesses. Headquartered in the U.S., Cognizant is ranked 193 on the Fortune 500 and is consistently listed among the most admired companies in the world. Learn how Cognizant helps clients lead with digital at [www.cognizant.com](https://www.cognizant.com) or follow us [@Cognizant](https://twitter.com/Cognizant).

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