Couchbase

CIO SURVEY

Digital Modernization in 2025

Are Data Strategies Ready for the AI Age?

A Couchbase research report: Investigating how digital modernization strategies are adapting to the rise of artificial intelligence

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EXECUTIVE SUMMARY

As digital modernization continues unabated, the rise of generative AI (GenAI) is creating new opportunities and challenges for IT teams. Alongside extra demands for resources and security guardrails, AI is unlocking new types of applications that can transform the end-user experience and help boost productivity at a time when the demands on enterprises are ever-increasing.

Couchbase's seventh annual survey of IT decision makers explores how IT functions are reacting to the rapid growth of GenAI, and AI in general. Has it shifted their investment decisions? Are they having to make sacrifices in other areas to keep pace with this new technology? Are they confident that their infrastructure, and particularly their data architecture, is future-proofed against rapid technological evolution? And what potential do they see in the new intelligent, adaptive applications that AI enables? We asked enterprises with 1,000+ employees for their answers.

Looking at digital modernization as a whole, this is definitely a time of change. The average investment in digital modernization was $28 million in 2023. Yet this is set to climb – respondents expect investment to soar by 27% to $35.5 million in 2024. And while factors such as over-reliance on legacy technologies, or an unacceptable perceived risk of failure, are still causing projects to fail, suffer delays or be rejected before they begin, there is a clear understanding that IT needs to do more with the resources at its disposal. On average, enterprises need to increase productivity by more than one-third year-on-year to remain competitive.

At the same time, GenAI is a clear priority for enterprises. 98% of respondents have specific goals to use GenAI in 2024, and AI will account for almost a third of all digital modernization spending in 2023 and 2024 – the equivalent of $21 million per enterprise. While most enterprises have been able to balance the books with this investment, 26% have had to divert spending from areas such as IT support and security to meet their AI goals.

The biggest question for many IT departments is whether they can support unconstrained AI growth. On average, respondents believe their IT infrastructure as-is will be incapable of supporting GenAI applications run in-house within 19 months. Because of this, enterprises are looking at other methods to access the necessary computing power. For instance, most organizations say edge computing will be "critical" for enabling new GenAI applications, as it allows computing power to be delivered most effectively where it's needed.

Finally, there is the question of what types of applications IT teams create using GenAI. With developers consistently under pressure to create new, improved end-user experiences, creating generalist applications that act as a "jack of all trades" but master of none is not an attractive option. Instead, enterprises are exploring adaptive applications – that perform a single task but can use AI to add intelligence based on user profiles, enterprise data, and real-time events and situations.

PART ONE: THE DIGITAL MODERNIZATION LANDSCAPE

On average, enterprises spent $28 million on IT modernization in 2023 – 10% less than they predicted they would spend on digital transformation in last year's survey. However, the long-term outlook is positive. Investment is predicted to rise by 27%, to $35.5 million, in 2024 – the single highest year-on-year increase recorded **(Figure 1)**.

Figure 1

$28M
average spend on IT modernization in 2023

$35.5M
average predicted spend on IT modernization in 2024

27%
year-on-year rise in IT modernization spend

This positivity extends to organizations' progress toward meeting their IT modernization goals. Overall, fewer IT departments are behind in their expected progress than in last year's survey, and more are ahead of progress or have already completed their goals **(Figure 2)**.

Figure 2: Chart of progress toward IT modernization goals

44%
organizations behind expected progress – 8% improvement

24%
organizations ahead of expected progress – 9% improvement

While there are positive signs, enterprises are still facing challenges. Every single enterprise has been prevented from pursuing a new digital service or other IT modernization project because of issues with technology, resources or organizational buy-in. Similarly, every enterprise has had an active digital project fail, suffer a significant delay or be scaled back for similar issues – representing on average $4 million in wasted spending **(Figure 3)**.

Figure 3

$4M
average spend on failed, delayed and/or scaled back projects

14.54%
proportion of IT modernization budget spent

There are many similarities in issues that cause projects to fail, or prevent them from being started in the first place. For instance, reliance on legacy technology that cannot meet new requirements is the most common reason for either blocking a new project or for an ongoing project suffering. And perception that the risk of failure is too high will often cause organizations to turn down or abandon projects. However, there are also contrasts: a lack of buy-in or support from the C-suite is more likely to derail an existing project, whereas a lack of support across the whole organization is more likely to block a project from ever happening. The inability to secure budgets or control spending is a greater issue when beginning a project, and a lack of skills is an issue when attempting to deliver a digital project **(Figure 4)**.

Figure 4: Issues affecting digital projects

Issues preventing new digital projects		Issues affecting active digital projects	
Reliance on a legacy technology that could not meet the new digital requirements	42%	Reliance on a legacy technology that could not meet the new digital requirements	41%
Perception that the risk of failure was or had become too high	39%	Perception that the risk of failure was or had become too high	37%
Problems accessing or managing the required data	36%	Inability of our development team to meet the goals set for them	35%
Inability to secure the necessary budget or stay within budget	33%	Lack of resources/funds	33%
Lack of buy-in or support from across the organization	30%	Lack of knowledge of available technologies	30%
Lack of resources/funds	28%	Lack of skills to deliver the digital project	27%
Inability of our development team to meet the goals set for them	26%	Lack of buy-in or support from the C-suite	24%
Lack of knowledge of available technologies	23%	Problems accessing or managing the required data	24%
The complexity of implementing technologies	20%	Lack of buy-in or support from across the organization	19%
Lack of skills to deliver the digital project	17%	The complexity of implementing technologies	16%
Lack of buy-in or support from the C-suite	14%	Inability to secure the necessary budget or stay within budget	14%

Figure 5

18
weeks average delay suffered by enterprises

Ultimately, in an increasingly competitive environment, perhaps the most serious consequence for enterprises is losing time. 63% of organizations have suffered delays longer than three months because of IT modernization issues. Addressing issues and reducing these delays should be a priority **(Figure 5)**.

There is a clear incentive to reduce these delays. Businesses as a whole, and IT teams in particular, are under pressure to increase productivity and do more with less. This is not an isolated issue: the consensus is that the productivity crisis is across entire industries. At the same time, solving the issue seems impossible for many – with the inevitable pressure on IT teams contributing to worsened mental health. With enterprises needing to increase productivity by more than a third each year just to remain competitive, IT needs a new answer **(Figure 6**). And AI may be able to provide this.

Figure 6: The productivity challenge

33.37% amount enterprises need to increase productivity each year to remain competitive

72%
of IT departments are under increasing pressure to do more with less

71%
of IT teams whose productivity will be outstripped by business expectations within three years

66%
of IT leaders are concerned that increased productivity demands will have a detrimental effect on teams' physical and mental health

65%
of businesses need to do more with less to remain competitive

62%
of enterprises' industries undergoing productivity crises, with organizations and employees unable to meet demands

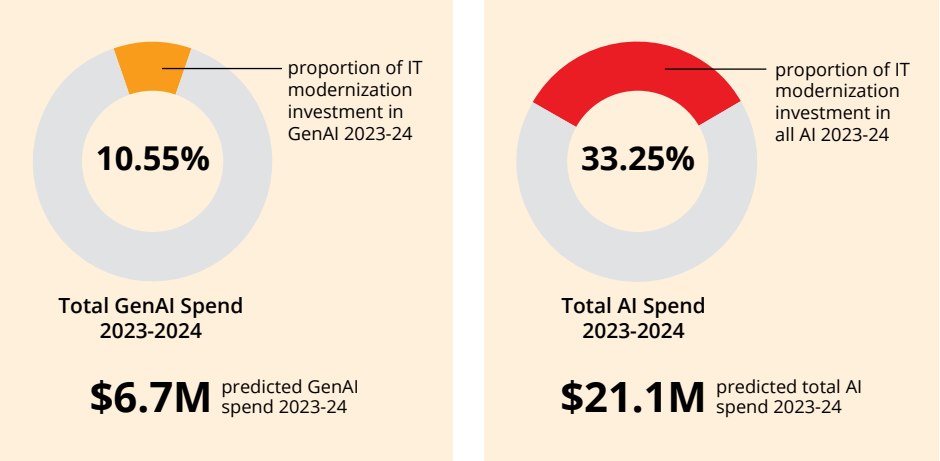
59%
of organizations feel less productive than ever, even when doing the same amount of work

57% of IT leaders say it's impossible to meet productivity demands purely through recruitment and training

PART TWO: THE ARTIFICIAL INTELLIGENCE AGE

AI's ability to support more accurate, intelligent automation is a major attraction for enterprises looking to address their productivity crises. However, its potential stretches much further than this, and organizations are investing appropriately. 93% of enterprises are investing in GenAI, spending on average 10.55% of their IT modernization budgets on the technology. This suggests that enterprises are still getting to grips with the technology, and we expect this to increase in the coming years. Overall, AI accounts for almost one-third of enterprises' IT modernization investments in 2023 and 2024 **(Figure 7)**.

Figure 7



Perhaps unsurprisingly, this has been reflected in enterprises' changing priorities for digital projects. By far the most common change in digital projects in the last 12 months is becoming more focused on taking advantage of breakout technologies – such as GenAI **(Figure 8)**.

Figure 8: Most common changes in digital projects

Become more focused on taking advantage of breakout technologies (e.g., generative AI)	54%
Become more ambitious in scope and budget	42%
Become more reactive to external factors (such as the economy)	41%
Become more customer experience focused	40%
Become more targeted on specific business outcomes	37%
Become business-wide initiatives	34%
Become more creative in scope	26%

With 47% of IT decision makers saying they will struggle to secure corporate finance or undergo a successful IPO, and 42% saying they will lose valuable staff to more innovative competitors, if they do not successfully digitally innovate – e.g., by taking advantage of GenAI – it is again unsurprising that 98% of respondents have specific GenAI goals for 2024 **(Figure 9)**.

Figure 9: Consequences of failing to digitally innovate

Struggle to secure corporate finance or undergo a successful IPO	47%
Lose valuable staff in other areas of the business to more innovative competitors	42%
Lose valuable IT staff to more innovative competitors	37%
Become less relevant in the market	32%
Go out of business or be absorbed by a competitor in the next three years	23%
Lose my job	10%

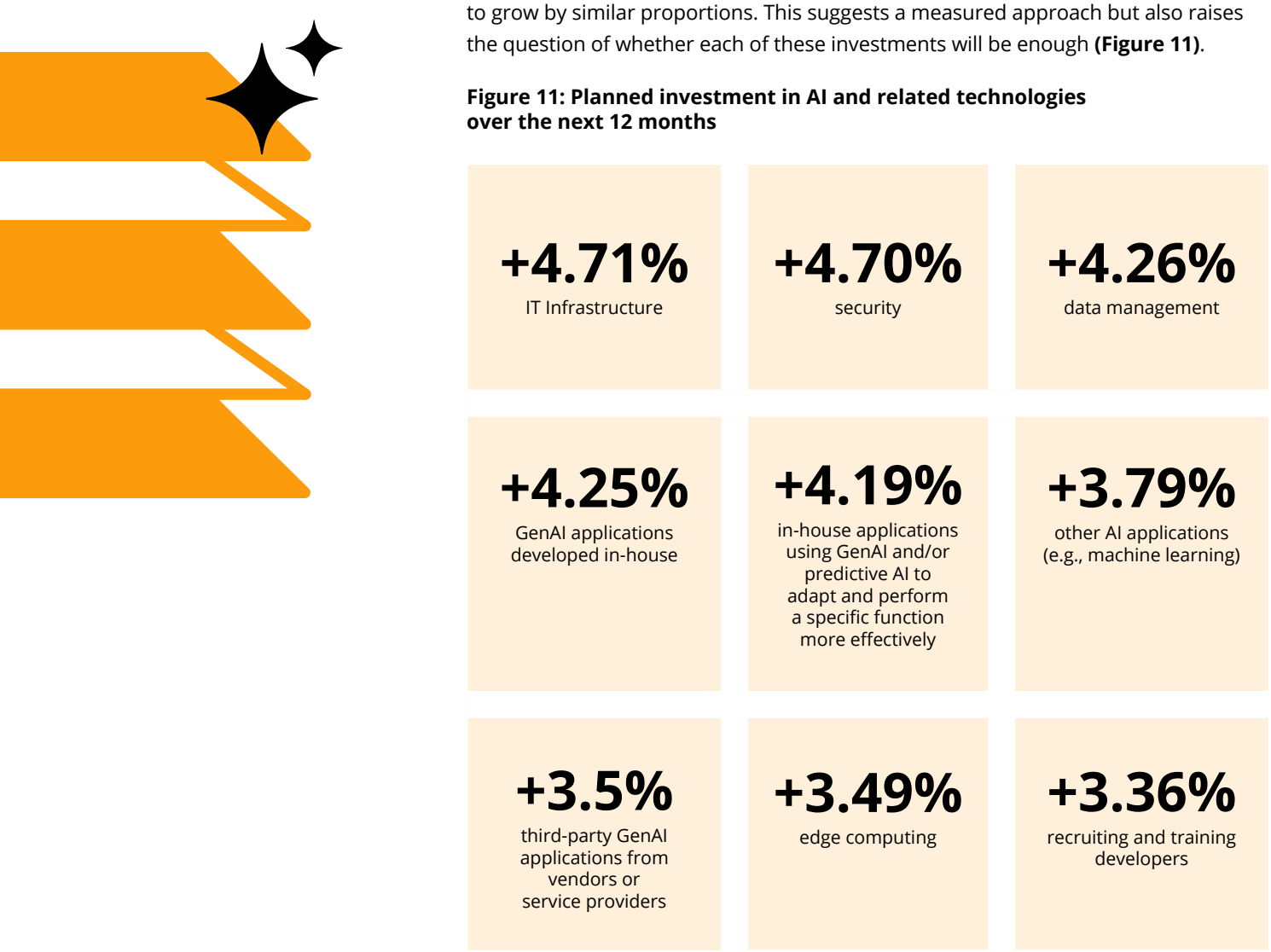
Respondents were also clear on the positive reasons to invest in GenAI. Productivity was a clear goal – from rapidly prototyping and testing new ideas, to capitalizing on new business trends more quickly, to making specific employees such as developers more effective **(Figure 10)**.

Figure 10: Top reasons for investing in GenAI

Rapid prototyping and testing of new ideas – e.g., for business strategy, marketing and sales materials, product designs	40%
Making employees in other business units more efficient by performing manual tasks for them	39%
Identifying and combating rapidly evolving security threats	38%
Identifying new business trends and capitalizing on them quickly	37%
Increasing developer productivity through coding assistance like Copilot	35%
Improving customer experiences to meet or exceed expectations	35%
Maintaining parity with competitors who have invested or are investing in GenAI	33%

There is a clear incentive for enterprises to invest in AI, and have seen that AI is already responsible for a large proportion of IT modernization spending. However, over the next 12 months, investment seems set to grow steadily but not significantly. At the same time, investment in those areas that will be crucial to supporting further AI growth – such as edge computing, IT infrastructure and data management – is set to grow by similar proportions. This suggests a measured approach but also raises the question of whether each of these investments will be enough **(Figure 11)**.

Figure 11: Planned investment in AI and related technologies over the next 12 months



One potential concern with AI is that in rushing to embrace the new technology, enterprises will have to reduce investment in other critical functions. The good news is that most organizations have been able to balance the books and meet GenAI goals without reducing investment elsewhere. However, 26% of enterprises have had to divert spending from other areas – most often IT support and maintenance, and security. Without careful planning, this creates the risk that, in the race to adopt new technology, enterprises could expose themselves to increased security risks, less reliable IT or infrastructure that doesn't meet the organization's needs **(Figure 12)**.

Figure 12: Balancing the books?

26% diverted planned IT spending from other areas to meet GenAI objectives

12% diverted spending from IT support and maintenance

10% diverted spending from security

9% diverted spending from infrastructure

7% diverted spending from other business software

6% diverted spending from networking

5% diverted spending from recruitment and training

PART THREE: PREPARING FOR THE AGE OF AI

The race to understand and use AI is not limited to the IT department. Across the business, employees are using GenAI applications that are either developed in-house or provided by a third-party vendor or service provider **(Figure 13)**. The challenge will be ensuring that all parts of the business can use AI effectively, intelligently and safely.

Figure 13

35.84% percentage of the average enterprise using in-house GenAI applications

40.86% percentage of the average enterprise using third-party GenAI applications

64% IT decision makers who believe the majority of organizations have rushed to adopt GenAI without fully understanding what they need to do to use it effectively and safely

One risk of AI use expanding beyond the IT team is that non-specialist users may not be prepared for the challenges AI can create. Even looking purely within the IT team, 100% of respondents said their development team had encountered issues when using GenAI tools to support their work creating new applications **(Figure 14)**. For an experienced user, GenAI accessing or sharing proprietary data, or producing "hallucinations" instead of an accurate conclusion, might be expected, and so something the user is alert for. However, to successfully expand AI across the organization, enterprises will need to ensure they are using the right tools and techniques such as retrieval-augmented generation (RAG) to minimize hallucinations or accessing sensitive information.

Figure 14: AI challenges encountered by development teams

GenAI sharing another organization's IP or other proprietary information as part of an answer	43%
GenAI using or accessing proprietary data from your organization	40%
AI "hallucinations" – i.e., AI presenting a false conclusion as the truth, that developers acted on before they recognized it as such	37%
AI "hallucinations" – i.e., AI presenting a false conclusion as the truth, that developers could identify and avoid acting on	32%
GenAI operating in a way that works contrary to established best practices	28%
Losing the efficiency benefits of GenAI through having to double-check its conclusions	23%

IT decision makers recognize that they face both cultural and technical challenges in making sure their organization can use GenAI safely and effectively **(Figure 15)**. On the cultural side, CIOs need to set realistic goals and expectations of what the technology can do, to ensure projects have the greatest chance of success and buy-in. At the same time, they need to be able to share and access data quickly enough to ensure peak performance – as any lapse will mean AI is no longer "real time," and so increases the risk of hallucinations or, at best, providing outdated advice. As a result, enterprises need to ensure they have the right architecture in place to support GenAI; together with education and training for end users, and controls to ensure data cannot be lost or misused.

Figure 15: Top 9 challenges to achieving effective, safe use of GenAI

1. Setting realistic goals and expectations of what the technology can do
2. Sharing and accessing data quickly enough to ensure peak performance
3. Preventing inadvertent IP theft or security issues
4. Monitoring and managing GenAI application use
5. Ensuring access to computing and storage resources
6. Maintaining and improving on GenAI capability through investment without reducing investment in other areas
7. Effective data management
8. Ensuring architecture is high-performance and flexible enough to support GenAI
9. Training end users

On the technical side, the right data strategy and the right architecture will be critical to enabling GenAI. For instance, without complete control over where data is stored, who has access and how it is used, enterprises cannot guarantee safe GenAI. And without the ability to access, share and use data with minimal latency, organizations will not meet GenAI's performance demands. At present, at least 54% of enterprises do not have all the elements in place to ensure an all-encompassing data strategy that is built for GenAI **(Figure 16)**.

Figure 16: The essential elements of a GenAI data strategy

59% IT decision makers worried their organizations' ability to manage data will not meet GenAI demands without significant investment

Control over where data is stored, who has access and how it is used so data cannot be accessed or used inappropriately.

46% of enterprises have complete control over data storage, access and usage

Accessing, sharing and using data with minimal latency is essential to enabling GenAI to operate in real time.

41% of enterprises have the ability to access, share and use data with minimal latency

Having tools to prevent the sharing of proprietary data outside the organization reduces the risk that GenAI will inadvertently share sensitive data or IPs.

37% of enterprises have tools preventing proprietary data from being shared outside the organization

To prevent AI applications from accessing and becoming confused by multiple versions of data – increasing the risk of hallucinations – enterprises should consolidate their database architecture.

31% of enterprises have consolidated database architecture so applications cannot access multiple versions of data

Developers should be given clear, thorough best practices that allow them to use data safely and effectively.

30% of enterprises have clear and thorough best practices

Managing unstructured data at high speed using a high-performance database is key to enabling real-time GenAI that is not limited in how it queries data.

25% of enterprises have a high-performance database that can manage unstructured data at high speed

GenAI will often require different levels of data processing. The ability to scale this to meet immediate needs without attracting unnecessary spending is vital to maximizing performance while controlling budgets.

23% of enterprises have the ability to scale data processing to meet immediate needs without unnecessary spending

GenAI performance is greatly improved if an organization can use high-dimensional vector data.

18% of enterprises have a vector database that can store, manage and index vector data efficiently

GenAI relies on analytical capabilities. The faster it can analyze data, and the more it can analyze at one time, the closer to real time it will be, and the more accurate its conclusions.

17% of enterprises have the ability to perform real-time analytics on large amounts of data

Respondents also recognize that to fully make use of GenAI, they will need to meet its considerable demands for computing power. Ensuring there is sufficient computing power and data center infrastructure in place to support GenAI is a concern for the majority of respondents. This is not only a financial and performance issue. As organizations become more aware of environmental issues, there is a very real need to minimize the energy and water infrastructure powering GenAI.

Ultimately, reviewing their existing architecture and ensuring it is modernized in order to meet GenAI's needs will be a priority for enterprises. Otherwise, they will find their architecture is not fit for purpose within two years **(Figure 17)**.

Figure 17

60%

IT decision makers worried about ensuring their organization has sufficient compute power and datacenter infrastructure to support GenAI

61%

IT decision makers whose organizations' commitment to CSR and environmental initiatives mean they cannot fully adopt GenAI unless based on more efficient infrastructure

19

months time until enterprises believe their IT architecture will be unable to support GenAI

This is not in itself negative news. Instead, the majority of respondents don't only recognize the challenges they face. They also recognize the solutions to these challenges, and in several cases are already taking action **(Figure 18)**.

Figure 18: Taking action on AI

One of the greatest assets when creating new GenAI tools is GenAI itself. AI-powered coding tools can accelerate the development process: guiding developers through best practices and helping test and iterate code to create working applications more quickly.

73% of enterprises are increasing investment in AI tools to help developers work more effectively and create new GenAI applications faster

A crucial asset in creating and supporting GenAI applications is the database. Traditionally, enterprises have used multiple databases to perform different functions – with legacy databases performing transactional inquiries operating along newer NoSQL databases supporting more complex applications. The concern with updating databases to support GenAI is that this would need to happen across multiple databases and be prohibitively expensive. However, modern databases that support multiple data access patterns including vector search and high-speed analysis are more than capable of fulfilling multiple functions at once, from transactional inquiries to complex GenAI calculations.

66% of enterprises want to update databases to better support in-house GenAI applications but believe they would need to invest in multiple databases to get all necessary capabilities

Accessing and sharing data at high speed and with minimal latency does not rely solely on compute power. Instead, enterprises can architect their environments to maximize their potential. For instance, edge computing platforms now have the compute power to support GenAI applications. Performing more calculations at the edge instead of relying on central servers will greatly improve speed – as well as reduce the costs and security risks of transmitting data back and forth.

65% of enterprises say edge computing will be critical for enabling new AI applications

PART FOUR: THE DAWN OF ADAPTIVE APPLICATIONS

An equally important question for GenAI is not only how enterprises will enable it, but what they will create. In the popular imagination, it's easy to see GenAI applications as completely open-ended "jacks of all trades" that can use text or other interfaces to offer anything the end user wants. The question is whether this is what many users truly want or need.

There is no argument that enterprises cannot stand still. Failure to deliver new or updated end-user experiences will result in dissatisfied customers or employees, and a real risk that the enterprise will lose business or staff to their competitors. Inevitably, there will come a point where an organization's existing applications will not be fit for purpose **(Figure 19)**.

Figure 19

61%
enterprises under pressure to continually deliver improved experiences for end users

18
months time after which enterprises' customer-facing applications will no longer meet end-user expectations

20
months time after which enterprises' employee-facing applications will no longer meet end-user expectations

46%
enterprises who will lose business to competitors if applications no longer meet expectations

35%
enterprises who will lose staff to competitors if applications no longer meet expectations

41%
enterprises facing a real risk of going out of business in three years if applications no longer meet expectations

To meet expectations, enterprises need to understand what makes a "good" end-user experience. However, often neither a tightly controlled application that only permits a limited number of functions nor a completely open GenAI-powered application will meet end users' or businesses' needs **(Figure 20)**.

Figure 20: Potential issues with the application extremes

"Open" GenAI-powered applications		"Closed" limited applications	
"It is very unlikely end users will be able to use completely open-ended GenAI applications safely and effectively."	60%	"It is inevitable end users will expect generative AI to be integrated into applications in some fashion."	65%
"An application designed for a specific purpose can always deliver better user experience for that purpose than one designed to be a 'jack of all trades'."	71%	"The nature of modern businesses means almost every application needs some degree of analytic capability and adaptability."	67%
"Demands for improved end-user experience mean applications are becoming more complex to develop, and so need more time and resources."	68%	"Ideally applications should be able to react 'on the fly' to changing circumstances without human intervention."	66%

Instead, respondents are clear that the most important attribute in a consumer-facing application that meets end-user expectations is adaptability – or the ability to change what the application offers the user as needed **(Figure 21)**. Based on these factors, it is clear that in most cases enterprises – and users – do not want a "jack of all trades" GenAI-powered application, nor one that can only perform a single, tightly defined task, even if it does so flawlessly.

Figure 21: The most important attributes of a consumer-facing application

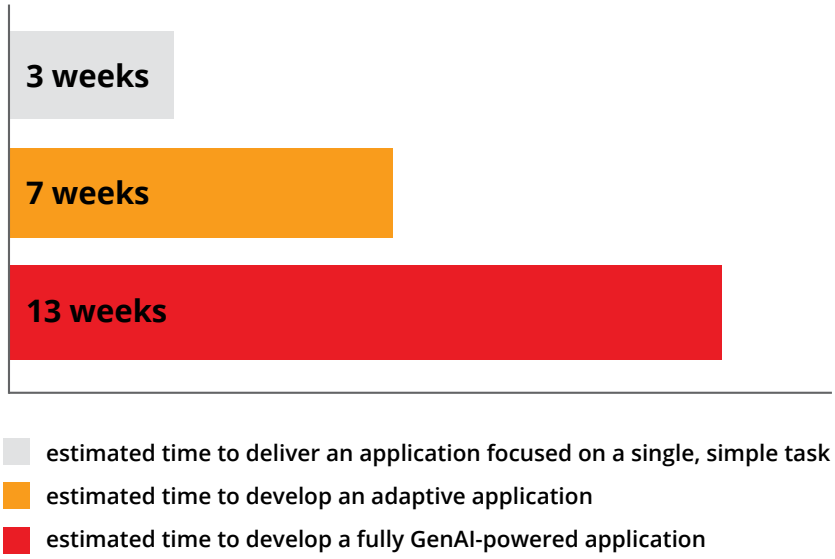
Adaptability – the ability to change what the application offers the user as needed	45%
Simplicity – the ability to perform a single task with maximum effectiveness	39%
Flexibility – the ability for the user to perform multiple functions	39%
Agility – the ability to constantly offer the user new services in real time	36%
Familiarity – the ability to maintain an unchanged user interface and experience	34%

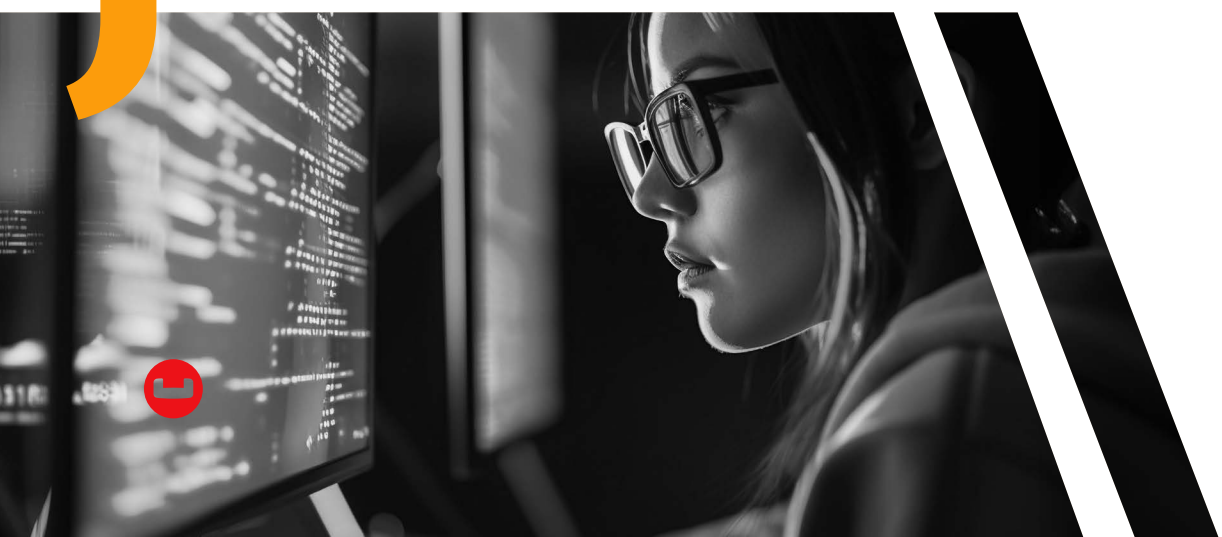
Instead, many enterprises see the value of "adaptive applications" – adaptable applications that perform a single task but can use AI to act intelligently and adapt to user profiles and ongoing events. For instance, a ticket booking application might react to current and known travel conditions, ongoing events and the individual users' history to suggest journeys and offer personalized deals.

These applications have the benefit of offering more control to the organization and being less overwhelming for the end user, with less risk of making a mistake. Because the application adapts to the user automatically, rather than the user being responsible for controlling the entire experience, it can be much more focused on users' needs.

There is also the benefit that these applications are simpler to develop and roll out than a "jack of all trades" application – making it easier for enterprises to keep pace with end user expectations **(Figure 22)**.

Figure 22: Time Required to Develop an Application





CONCLUSION: HARNESSING AI

We are still at the dawn of the AI era, and exploring the full potential of this technology. While AI has the potential to add to the challenges around reliance on legacy technology and perceived risks that enterprises already face, it also has the potential to solve them.

There will be challenges. Enterprises need to ensure their infrastructure and data management strategies can meet GenAI's demands. And they need confidence that they are not unwittingly putting their sensitive data, or their reputations, at risk because they don't have the right controls in place.

Adopting the correct multipurpose database will give many enterprises a significant boost in their ambitions to harness GenAI. Contrary to the beliefs of many, this shouldn't mean investing in multiple databases to gain every single capability the organization needs. Using a modern database that offers control over data storage and access; can manage both structured and unstructured data at high speed; uses the edge to reduce latency; can scale on demand; and supports technologies such as vector-based search and real-time analytics will help enterprises meet their data management needs without unnecessarily increasing infrastructure demands.

Organizations that can successfully modernize their data management strategies to give themselves the control over high-speed data analytics and processing that AI demands will find themselves in an ideal position to make full use of GenAI. And this does not need to be in vast, complex applications, but in adaptive applications that use AI to enhance the user experience while speeding up time to market.

METHODOLOGY

The report is based on an online survey conducted in February-March 2024 by Coleman Parkes (https://colemanparkes.com/), an independent market research organization, of 500 senior IT decision makers, such as CIOs, CDOs and CTOs, in organizations with 1,000 employees or more in the U.S., U.K., France, Germany and Turkey.

Couchbase

Modern customer experiences need a flexible database platform that can power applications spanning from cloud to edge and everything in between. Couchbase's mission is to simplify how developers and architects develop, deploy and run modern applications wherever they are. We have reimagined the database with our fast, flexible and affordable cloud database platform Capella, allowing organizations to quickly build applications that deliver premium experiences to their customers – all with best-in-class price performance. More than 30% of the Fortune 100 trust Couchbase to power their modern applications. For more information, visit www.couchbase.com and follow us on X (formerly Twitter) @couchbase.