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Improve Productivity And Efficiency With GenAI-Infused Low-Code Development Tools

A FORRESTER CONSULTING THOUGHT LEADERSHIP PAPER COMMISSIONED BY MICROSOFT, FEBRUARY 2025

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Executive Summary

Application development is accelerating. Forrester data shows that that 78% of development leaders say their firm currently empowers non-IT employees via a citizen developer strategy or plan to do so in the next 12 months. These strategies are enabled by technologies like low-code development platforms and generative AI (genAI).[1] Effective use of genAI-infused development tools within low-code platforms is expected to shift organizational development preferences to a more balanced use of pro-code/high-code (e.g., traditional IT developer platforms for writing code) and low-code (e.g., development platforms that use visual and declarative tools).

As development accelerates, it exposes preexisting data security gaps and inefficiencies. These gaps demonstrate the insufficiency of current data access controls and governance structures, which manage how data flows in and out of applications.

IT leaders must be aware of the opportunities and benefits of democratizing development work. By understanding and applying key strategic, technical, and organizational priorities, IT leaders can better prepare their organization to successfully transition to a new paradigm where development skills are a spectrum rather than a specific job.[2]

In October 2024, Microsoft commissioned Forrester Consulting to evaluate organizations' readiness and challenges in accelerating citizen development work with low-code and genAI-infused tools. Forrester conducted an online survey of 661 global IT decision-makers in charge of their organization's development platform decisions.

Key Findings

Low-code and genAI-infused development tools are changing development preferences for organizations. Low-code platforms are used for critical applications, including customer-facing and core business apps, and have significant involvement from citizen developers. GenAI-infused development tools are widely adopted and used within low-code slightly more often than pro-code, which is influencing a shift toward more low-code development.

Expanding citizen development work will require a greater focus on data security and governance. The increased need for new applications is driving increased development from IT pros and citizen developers (i.e., non-IT professionals). This increased development is shedding light on preexisting challenges with data and security, particularly in how data is accessed and used in applications. Understanding and addressing current data security gaps upfront — for example, by using AI-infused low-code solutions with embedded governance functions — is critical as organizations aim to accelerate development efforts.

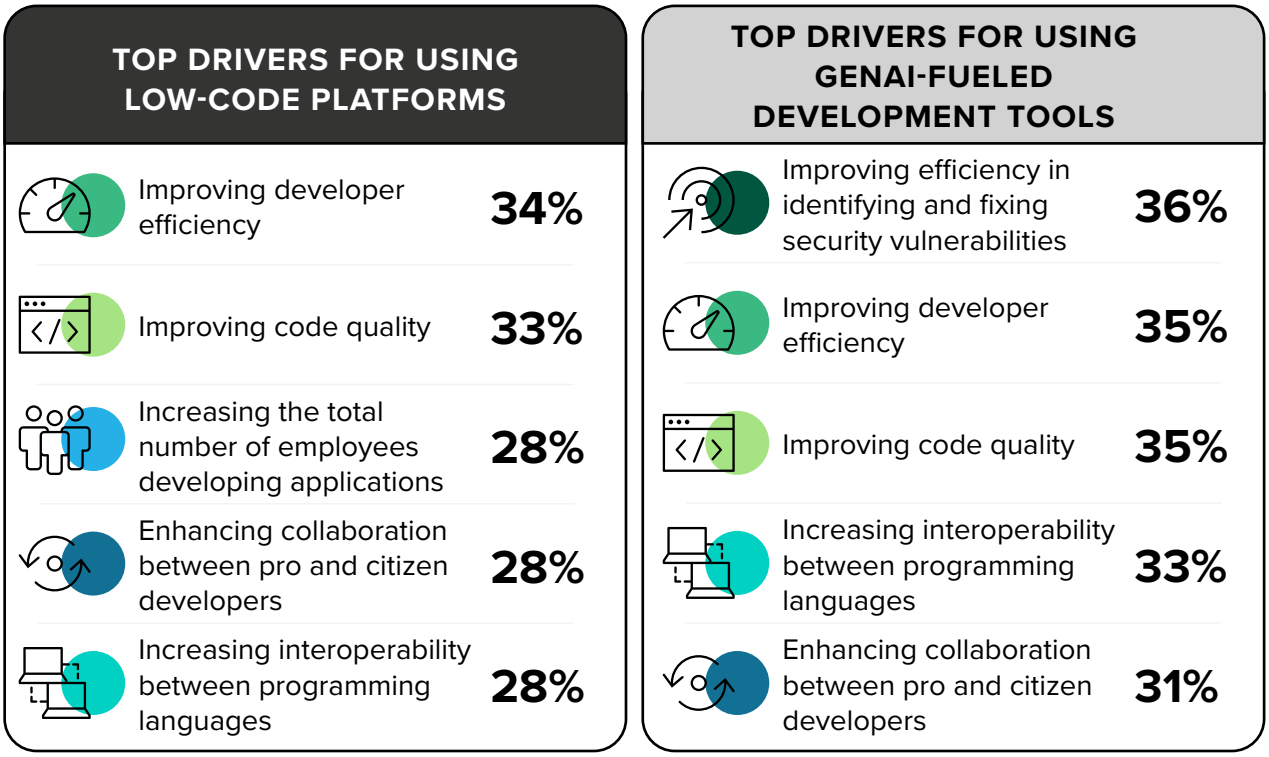
IT leaders are increasing their investment in low-code and genAI-infused development tools. Leaders are supporting citizen development by focusing their investments on improving data curation, security, and training. These efforts aim to mitigate security risks and enhance the quality and efficiency of application development.

Low-Code And GenAI-Infused Development Tools Are Changing Application Development Preferences

The growth of citizen developer work within enterprises is simultaneously enabled by the accessibility of low-code platforms that allow developers to write applications using visual tools in a governed environment and the growth of genAI-infused development tools (e.g., code generators, test case generators). When asked about adoption drivers, all interviewees highlighted the same four in their top five, with developer efficiency and improved code quality being among the top three for all (see Figure 1).

FIGURE 1

The Top Drivers For Using Low-Code And GenAI-Fueled Development Tools Are Very Similar



Base: 661 global IT decision-makers in charge of their organization's development platform decisions
Note: Showing top five responses per driver; multiple responses accepted.
Source: Forrester's Q4 2024 Low-Code and AI Readiness Survey [E-61685]

LOW-CODE IS USED FOR LARGE AND CRITICAL USE CASES

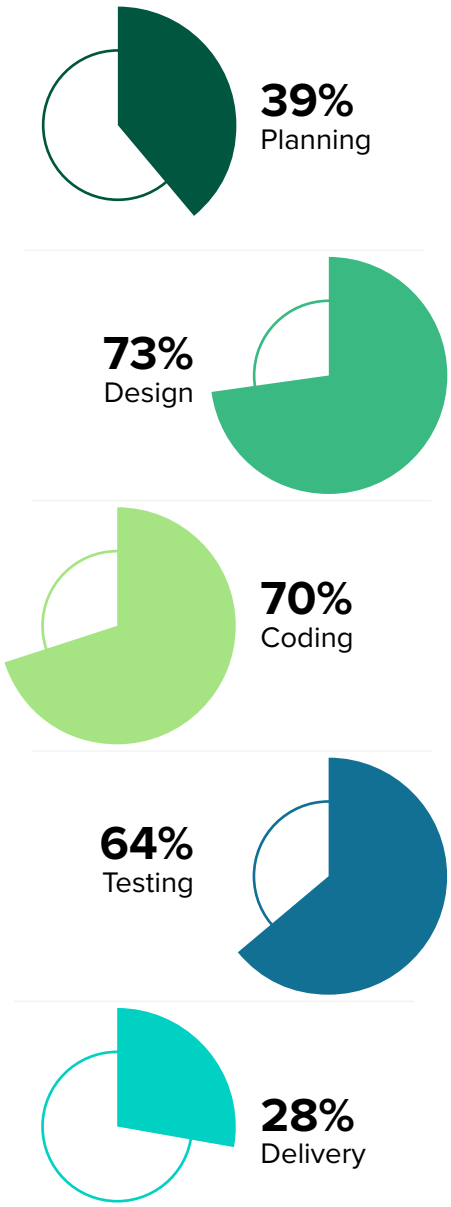
While a common perception is that low-code platforms are used for small, team-based use cases, our survey found that they are actually used for a wide range of application types globally. In fact, among global developers whose firms are adopting a low-code platform, complete customer-facing applications are the most frequently reported use case for low-code (38%), while core business applications are not far behind (34%).[3] Additionally, for each of these two use cases, our survey found that citizen developers are highly involved in the development process, with nearly two-thirds of core and customer-facing applications built by hybrid teams of pro and citizen developers or led by citizen developers with some or no support from pro developers.

GENAI-INFUSED DEVELOPMENT TOOLS ARE WIDELY ADOPTED AND IMPACT DEVELOPMENT PREFERENCES

When asked to what extent their organization uses genAI-infused development tools, 81% of surveyed IT decision-makers reported that most or all their developers are using genAI tools. The most common tasks include design (e.g., automating and pretesting design ideas, coding, and testing use cases), coding (e.g., generating code and documentation, translating code across programming languages), and testing (e.g., suggesting tests to run based on implemented changes, generating automated functional tests) (see Figure 2).

FIGURE 2

"For what development tasks are your employees using genAI-fueled tools?"



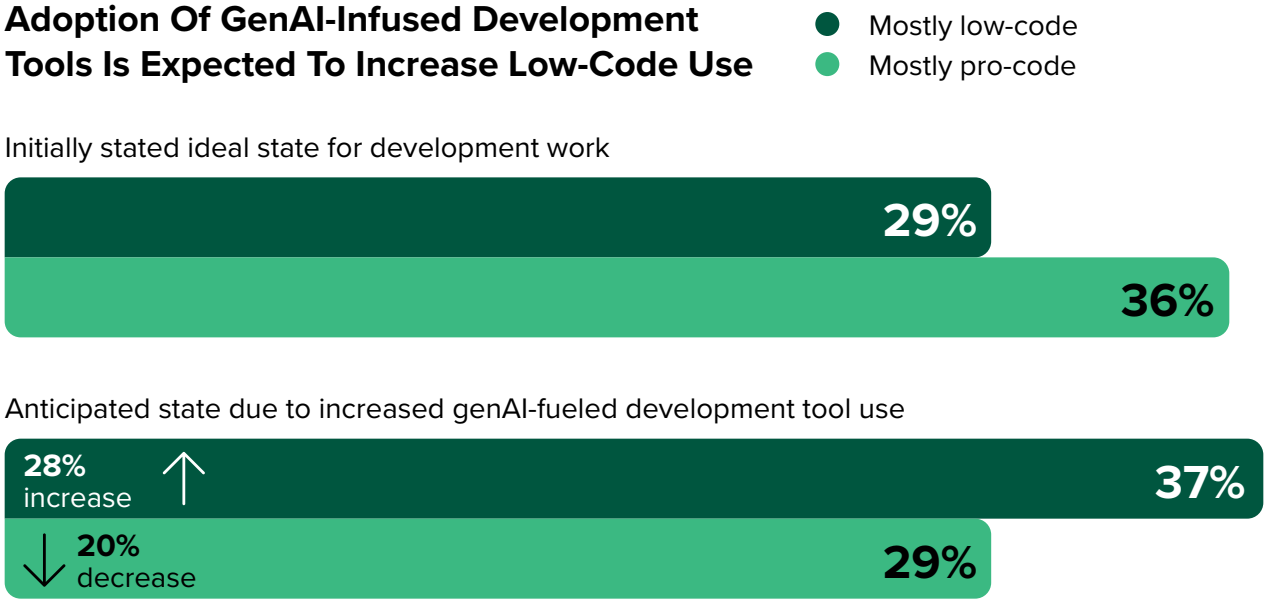
Base: 661 global IT decision-makers in charge of their organization's development platform decisions
Note: Multiple responses accepted
Source: Forrester's Q4 2024 Low-Code and AI Readiness Survey [E-61685]

Globally, 66% of developers said most or all of their firm's custom development portfolio was still done in pro-code, and when IT leaders were asked about their ideal mix of pro-code versus low-code development, 36% preferred more pro-code compared to 30% who preferred low-code.[4] Interestingly, access to genAI-infused development tools is impacting overall development preferences. Current genAI use is higher within low-code development, and our survey found that the increased use of genAI-infused tools is expected to shift development preferences slightly more toward low-code. So, while pro-code might be the preferred choice now, continued growth in using low-code, genAI-infused tools is expected to sway development preferences further toward low-code (see Figure 3).

> Continued growth in using low-code, genAI-infused tools is expected to sway development preferences further toward low-code.

FIGURE 3

Adoption Of GenAI-Infused Development Tools Is Expected To Increase Low-Code Use



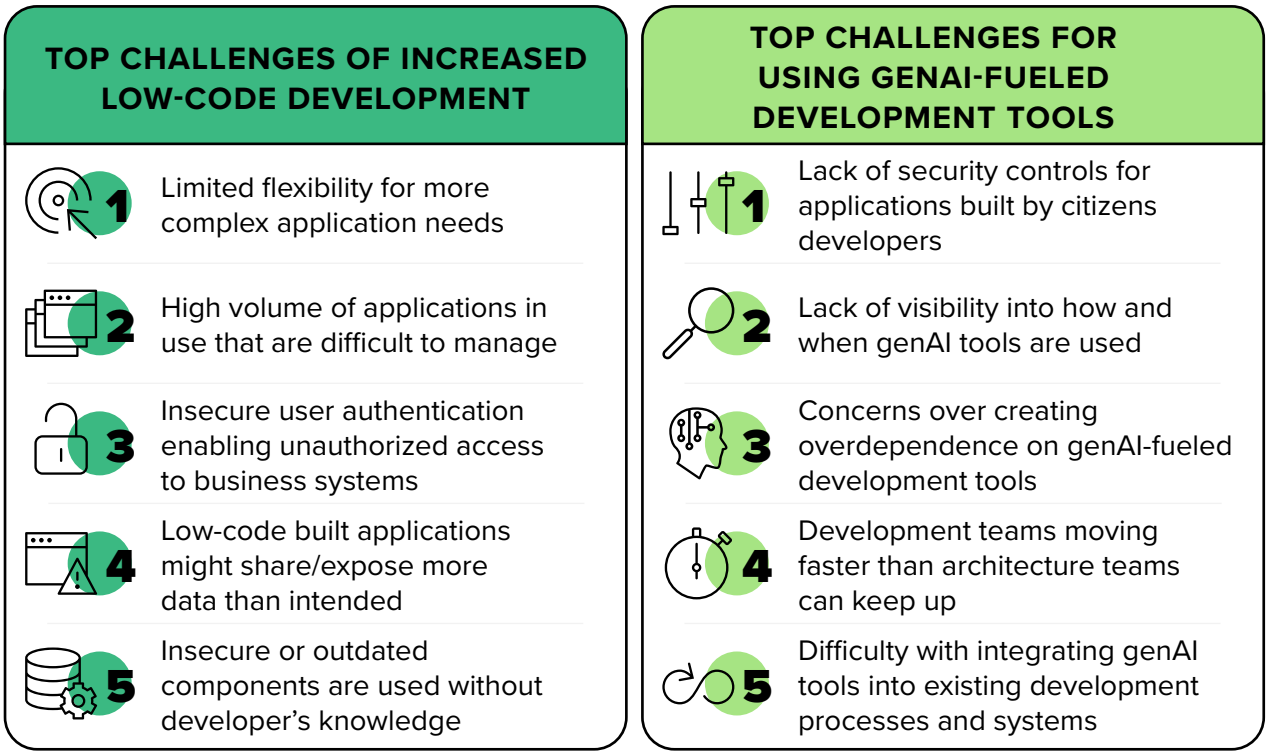
Base: 661 global IT decision-makers in charge of their organization's development platform decisions
Source: Forrester's Q4 2024 Low-Code and AI Readiness Survey [E-61685]

Low-Code Growth Is Exposing Preexisting Gaps In Data Security And Governance

As developers access more data to build and update new applications, leaders are quickly recognizing data security and access control gaps within their organization, including (see Figure 4):

FIGURE 4

Development Challenges



Base: 661 global IT decision-makers in charge of their organization's development platform decisions
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- **Challenges exposed through increased low-code use.** Citizen developers are using available tools to build applications but are unlikely to think deeply about security, nor should they need to. They lack specific security knowledge, and as such, must trust that whatever system data they can access with low-code platforms is appropriately governed and

protected. This challenge results in data oversharing as developers access more data than they need, or even the wrong data. Our survey shows that the increase in the number of applications is a primary challenge as data gets pulled in more directions and low-code-built apps are either sharing more data than intended or unknowingly using insecure or outdated components.

- **Challenges exposed by using genAI-infused development tools.** GenAI-infused tools can simplify the development process for citizen developers, but 30% of IT leaders are concerned about the lack of security controls for applications built outside of traditional development processes. In addition, nearly one-third of respondents feel their organization lacks proper visibility into who is using genAI tools across pro and citizen developers, indicating a need for stronger genAI governance.

Expanding low-code and genAI-infused tool use is fueling development growth but is also revealing significant security gaps that organizational leaders must address. In fact, only one in three IT leaders feel highly prepared from a security standpoint to handle these issues (e.g., they have a formal strategy and governance). If left unaddressed, IT leaders are concerned about potential challenges of developers spending more time reviewing or correcting genAI output and the risk of a new development influx that will further expose data security vulnerabilities in their organization.

However, AI-infused, low-code platforms can also help address common governance issues in several ways. For example, ensuring subjective risk assessments are performed on every application and appropriate governance processes are followed; establishing consistent development or design standards; facilitating efficient application and component reuse; and ensuring that new, sensitive data only accrues in secure locations.[5]

Improving Readiness For Expanding Citizen Development Work Is Critical

IT leaders agree that effective use of genAI-infused development tools, particularly within low-code platforms, will drive valuable business benefits in efficiency and quality. However, the full benefits of these tools can only be realized if companies can mitigate current and potential challenges with democratizing development work and related security challenges.

In our survey, we asked IT leaders to rate their organization on a 1-to-5 agreement scale of how well certain statements describe it. Statements were grouped into two categories: low-code maturity and genAI readiness (see Figure 5).

- **Low-code maturity.** These statements were about strategic, tech/process, and security-related behaviors, which are important to establishing a well-rounded low-code approach. The first questions were about a strategic focus on improving development processes and fostering pro and citizen developer collaboration. Next were technology statements, which referred to providing citizen developers access to the right low-code tools. Last, we included questions about security and governance to ensure proper use of data and related outputs.

- **GenAI readiness.** These statements were designed to test whether organizations have policies to foster safe and responsible genAI use. This includes employee training regarding genAI and capabilities, extensive monitoring processes for genAI use and output, and robust governance of policy and technical controls.

Analyzing responses to these two measures revealed a strong correlation between low-code maturity and genAI readiness. This finding means that companies that are strategically focused on enabling citizen development by providing the tools and safeguards to use low-code effectively are also the same companies that typically have strong training and governance around using genAI within their organizations. This correlation is important

and makes sense, as both low-code and genAI play valuable roles in simplifying and streamlining the development process.

FIGURE 5

Low-Code Maturity And GenAI Readiness Measures

- Organizational/Strategic Measures
- Tech/Process Measures
- Security/Governance Measures
- GenAI Measures

LOW-CODE MATURITY MEASURES
(MEASURED ON A 5-POINT SCALE)

- Pro developers use low-code whenever they can to simplify and speed up the development process.
- Professional and citizen developers frequently work together to build and develop applications.
- The organization has built and scaled multiple low-code-built applications, including those needed for important or critical business functions.
- The organization provides all its employees with access to low-code platforms.
- The organization has fully integrated its low-code development tooling into its software development lifecycle (SDLC).
- The organization has safeguards and controls to ensure citizen developers are secure and compliant when working with high-risk data.
- The organization has a robust, automated governance program for low-code development.
- The organization has digitized and automated most of its access control functions to handle a larger capacity of developer users.

GENAI READINESS MEASURES
(MEASURED ON A 5-POINT SCALE)

- The organization is training all employees to understand how genAI operates (e.g., what data sources they are pulling from and how data is collected, used, and processed).
- The organization's employees understand the business risks of genAI outputs including hallucinations, privacy breaches, and model bias.
- The organization has extensive processes to monitor, manage, and govern the data used in the models for genAI output.
- The organization has robust governance at the policy and technical controls levels to mitigate risks of employees accessing and using genAI.
- The organization encourages all outputs from genAI to include a human review, especially if the output is for a shared or public space.

Base: 661 global IT decision-makers in charge of their organization's development platform decisions
Source: Forrester's Q4 2024 Low-Code and AI Readiness Survey [E-61685]

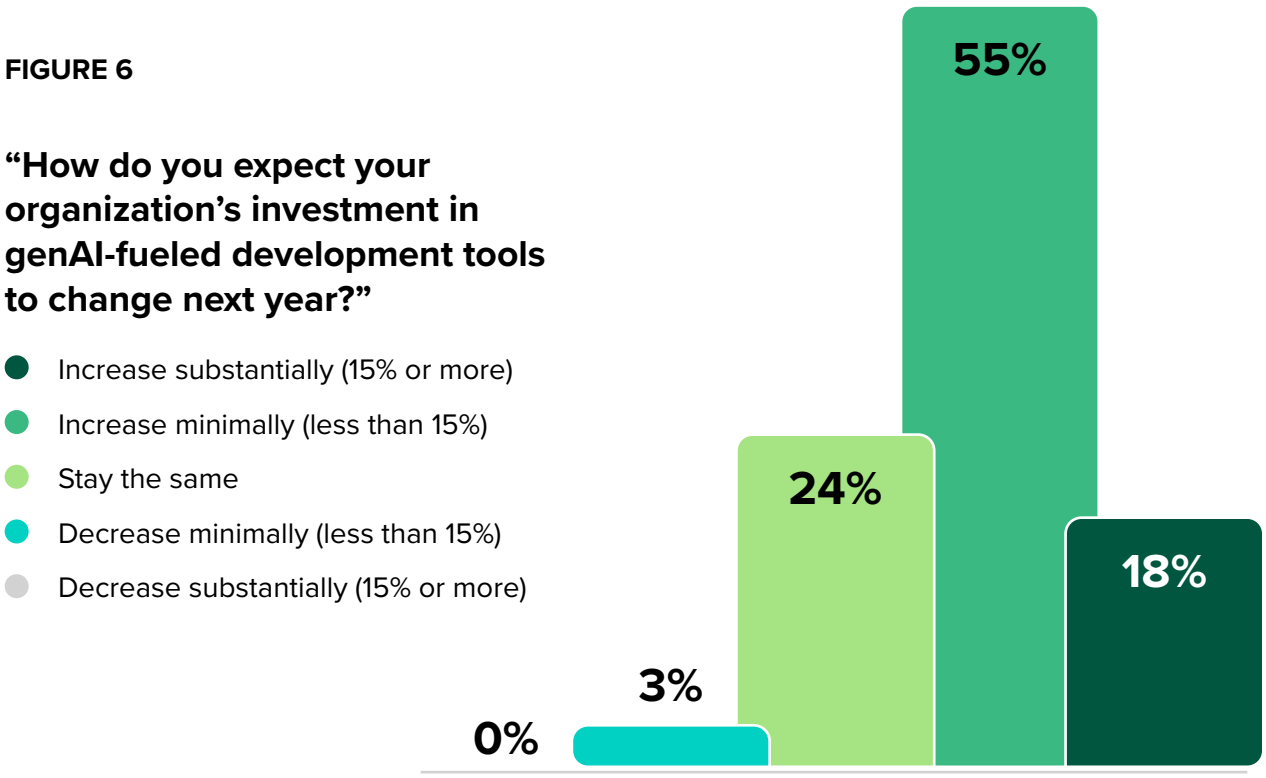
Preparing For The Future Of GenAI-Supported Citizen Development

IT leaders are expecting genAI-infused development tools to drive greater low-code adoption by simplifying the developer experience and helping improve application quality. Additionally, 52% of surveyed IT leaders expect genAI-infused tools to go beyond generating code to providing insights into the development process and helping with optimization.

To support the growth of citizen development work, nearly 75% of surveyed IT leaders expect investments in genAI-infused development tools to increase over the next year (see Figure 6). The ongoing investment and focus on low-code and genAI-infused tools will require vigilant security and governance efforts to alleviate risks. In particular, IT leaders are focused on the following:

FIGURE 6

"How do you expect your organization's investment in genAI-fueled development tools to change next year?"



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Source: Forrester's Q4 2024 Low-Code and AI Readiness Survey [E-61685]

- **Improving data curation.** Fifty-six percent of surveyed IT leaders consider improving data curation an important solution for managing the security gaps in data access and management. Data curation plays a crucial role in data security by ensuring that data is well-organized, properly labeled, and classified based on sensitivity and privacy requirements.

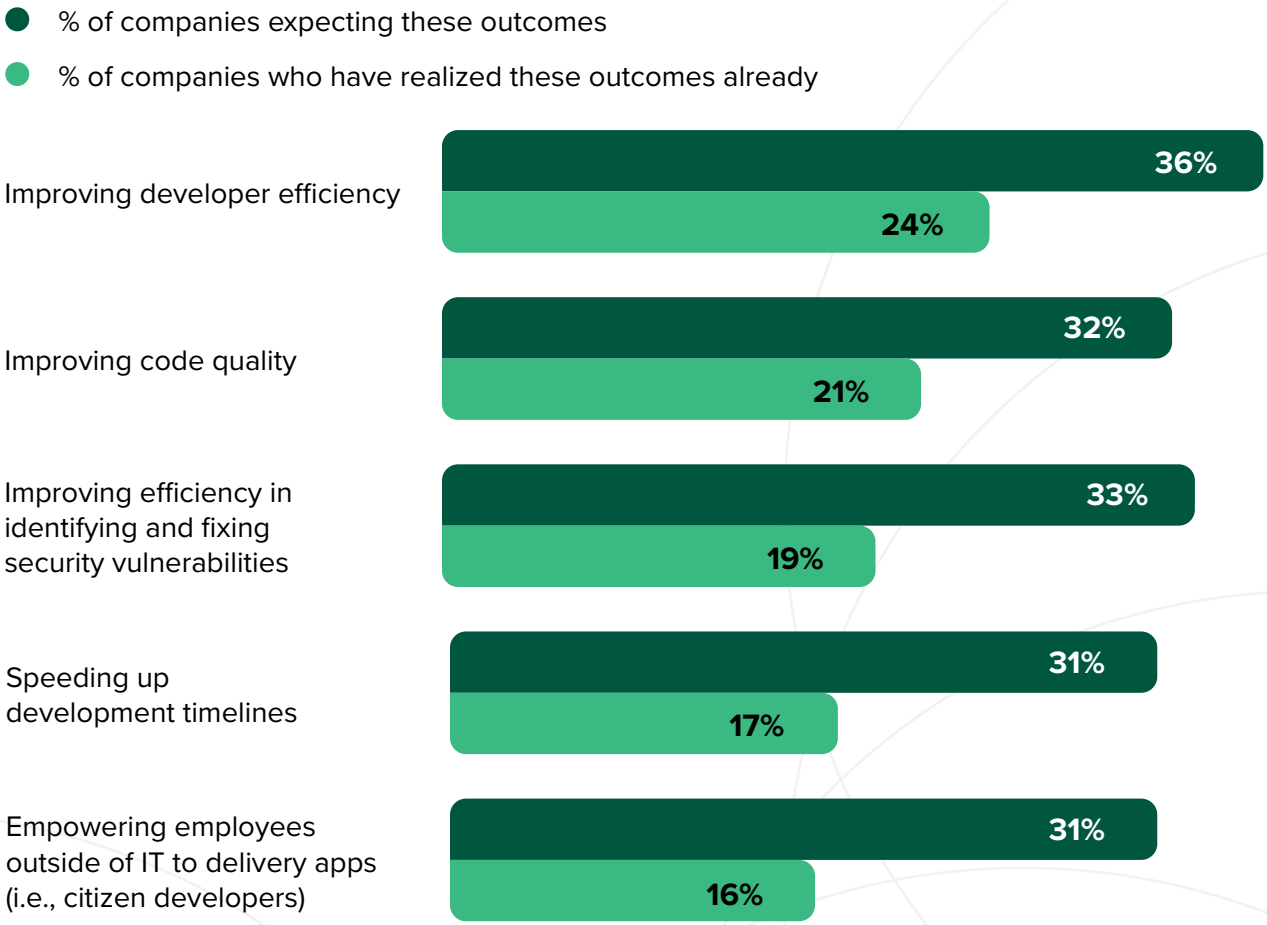
- **Improving data access security.** Once data is properly curated, the next step is enabling access to the right data for authorized users. Improving security for what data is accessible and determining who has access was the most common priority for surveyed IT leaders.

- **Upskilling citizen developers on how to best use low-code and genAI-infused development tools.** While low-code platforms are designed to be more visual and require less technical expertise compared to traditional coding, they still require some level of understanding and learning. Training programs can help citizen developers learn platform features, understand the development process, and become familiar with best practices. Additionally, as genAI tools continue to play a more significant role in low-code platforms, citizen developers will need to be trained in how to effectively use those features and capabilities.[6]

Through better data curation, improved data access controls and security, and ongoing training, IT leaders expect that increasing use of genAI-infused development tools within low-code platforms will yield valuable benefits. The most common expected and realized benefits include improving developer efficiency, improving efficiency in identifying and fixing security vulnerabilities, and improving code quality (see Figure 7). These outcomes show that genAI-infused low-code development tools are expected to not only help with improving the development process but also help with addressing the data security issues that citizen development expansion has exposed.

FIGURE 7

Top Benefits Of Increasing The Use Of GenAI-Fueled Development Tools Within Low-Code Platforms



Base: 661 global IT decision-makers in charge of their organization's development platform decisions
Note: Multiple responses accepted
Source: Forrester's Q4 2024 Low-Code and AI Readiness Survey [E-61685]

Key Recommendations

The integration of low-code platforms and genAI-infused development tools is revolutionizing application development by bolstering citizen developers' ability to create applications and enhance efficiency. Despite the perception that low-code is for smaller applications, it is widely used for significant applications, with citizen developers driving this use. GenAI tools are also widely adopted, impacting development preferences and increasing the shift toward low-code. However, this growth has exposed data security and governance challenges, highlighting the need for improved data curation, access controls, and training — ideally as a precursor to substantial low-code and genAI use. IT leaders recognize the potential benefits of these tools but must address security risks to fully realize their value.

To prepare for the rapid growth of citizen development work fueled by genAI-infused low-code platforms, Forrester recommends the following:

Establish a proactive citizen development program. The most successful citizen developer strategies are not passive. Organizations should establish and fund dedicated teams to support the program (typically a center of enablement); it must be evangelized through practical change management, such as identifying early adopters and allies, plus public events like hackathons and bootcamps. A citizen development program should have concrete, measurable annual growth goals. The democratization of development is serious business and should be treated as such.[7]

Empower developers with AI-powered application generation (AppGen) platforms. AppGen platforms will accelerate the democratization of development, supported by collaboration on powerful shared platforms between citizen and professional developers.[8] There are two benefits of genAI in software development that tip the scales: 1) even more speed and ease throughout the software development lifecycle, and 2) the infusion of business and industry domain knowledge through AI models into the development act.[9] Applying AI on the foundation of a low-code platform enables the generation

of entire solutions in a bounded and quality-enforced context and allows roles such as business analysts and citizen developers — not just coders — to work on and understand them.[10] At a minimum, AI will be a core self-serve training mechanism and reduce adoption friction for citizen developer strategies.

Classify, secure, and expose data and endpoints. Enabling and governing a community of decentralized developers requires data sources and endpoints that are curated, clean, presented, and secured through a common low-code platform. AI use cases require data and content stores to be effective. Part of the center of enablement's goals must be to establish and continuously improve this foundation.

Govern through pragmatic (and automated) risk management. IT governance traditionally scrutinizes every software project before it even begins to optimize resources — it also assumes that IT does the development. But effective low-code strategies recognize some waste is unavoidable. Workers should be able to autonomously deliver applications unless the use case reaches specific designated thresholds of significant risk. The common pattern: a three-zone system of different process requirements based on a specific application's complexity and risk. These rules should also be automated as much as possible through role-based access control, DevOps automations, and configurable guardrails to guarantee success and eliminate friction.

Use citizen development to scale AI experimentation. The true ROI of genAI will be unlocked when three conditions are met: 1) many experiments (hundreds or thousands) are conducted, 2) these experiments take the form of software solutions wrapped around the models (e.g., agents), and 3) this experimentation is led by domain experts (not IT) who enable the necessary scale and have the inspiration to imagine what a genAI solution might look like, effectively prompt large language models, and infuse results into useful, intelligent applications. Forrester's latest data shows the market is also beginning to see that developers who are director-level and above most often selected AI-infused applications as the apps that their citizen developers would be allowed to build with low-code tools.

Appendix A: Methodology

In this study, Forrester conducted an online survey of 661 IT decision-makers responsible for technology decisions and the ongoing use of technology for application development functions, specifically around low-code platforms and genAI. Respondents were from organizations with 1,000 employees or more in the US, and 500 or more in other countries including Canada, Australia, Japan, the UK, France, and Germany. Respondents were in IT leadership roles (director and above) with decision-making responsibility for application development platforms. Respondents were asked questions about their organization's use of low-code platforms for professional and citizen developers and genAI-infused development tools. The study began in October 2024 and was completed in November 2024.

Appendix B: Demographics

REGION	
North America (US/Canada)	**25%**
Latin America (Mexico/Brazil)	**25%**
EMEA (UK/Germany/France)	**25%**
APAC (Australia/Japan)	**25%**

COMPANY SIZE	
500 to 999 employees	**28%**
1,000 to 4,999 employees	**48%**
5,000 to 19,999 employees	**20%**
20,000 or more employees	**4%**

IT DECISION-MAKER ROLES (MULTIPLE ROLES ALLOWED)	
Application development	**91%**
Analytics/Data science	**42%**
Security	**37%**
Operations	**32%**
Enterprise Architecture	**17%**

INDUSTRIES (TOP 5 SHOWN)	
Manufacturing and materials	**18%**
Retail	**14%**
Tech	**10%**
Financial services or insurance	**7%**
Energy and utilities	**7%**

Note: Percentages may not total 100 due to rounding.

Appendix C: Endnotes

[1] Source: The Democratization Of Development Is Accelerating, Forrester Research, Inc., December 21, 2023.

[2] Source: The State Of Low-Code, Global 2024, Forrester Research, Inc., September 6, 2024.

[3] Source: Low-Code Leverages DevOps To Achieve Equal Footing With High-Code, Forrester Research, Inc., August 28, 2023.

[4] Source: The State Of Low-Code, Global 2024, Forrester Research, Inc., September 6, 2024.

[5] Source: The Rise Of Application Generation Platforms, Forrester Research, Inc., May 7, 2024.

[6] Ibid.

[7] Source: The Democratization Of Development Is Accelerating, Forrester Research, Inc., December 21, 2023.

[8] Source: The Rise Of Application Generation Platforms, Forrester Research, Inc., May 7, 2024.

[9] Source: John Bratincevic, AppGen Is An Existential Threat To The Enterprise App Business, Forrester Blogs.

[10] Source: The Rise Of Application Generation Platforms, Forrester Research, Inc., May 7, 2024.

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