BUSINESS LEADER AS DEVELOPER: THE RISE OF NO-CODE AND LOW-CODE SOFTWARE

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INTRODUCTION

No-code and low-code software is changing how enterprise applications are created and who is creating them. In this special feature, TechRepublic and ZDNet helps IT leaders understand the consequences of non-developers becoming app builders and how to successfully take advantage of this trend.

WHAT IS LOW-CODE AND NO-CODE? A GUIDE TO DEVELOPMENT PLATFORMS

A primer to low-code and no-code solutions, including a review of the leading vendors with low- and no-code offerings.

BY: JOE MCKENDRICK/ZDNET

Is IT possible without IT?

In recent times, there has been a flurry of activity around platform offerings targeted at users with little or development experience -- so-called "citizen developers" -- as well as still serving the needs of professional developers hard-pressed to deliver apps in extremely tight timeframes. This new generation of low-code and no-code platforms are designed to make it relatively easy for people to design, build, and launch applications quickly, without having to worry about the nuances of underlying operating systems or scalability requirements.

Built on extended cloud-based Platform-as-a-service environments and low- and no-code platforms typically employ visual programming interfaces to solve business problems faster and more completely than could be accomplished with traditional software development. In the process, the productivity of professional developers will be enhanced as they are freed up to worry about more strategic infrastructure concerns affecting their enterprises.

The widespread dispersal of organizations that took place over the past year accelerated the low- and no-code movement, a survey by KPMG finds. Since the onset of the COVID-19 crisis, the number of executives naming low- and no-code development platforms as their most important automation investment has nearly tripled, from 10% to 26%. In addition, KPMG finds, 100% of enterprises who have implemented a low- and no-code development platform have seen ROI through these initiatives.

Within the next two years, Gartner predicts, more than half of medium to large enterprises will have adopted low-code application platforms. A survey of 324 organizations by Unisphere Research/Information Today, Inc., found at least 76% already had at least some portion of applications developed outside of traditional IT

departments or service providers. They turn around their required applications in a matter of weeks, and only 17% report turnaround times exceeding three months. Non-IT developers come from a range of backgrounds, the survey found, but are, for the most part, power users and developers embedded within line-of-business departments building the applications. Challenges to low- and no-code development include data security and trouble learning proper programming techniques, and handling of data, the survey also showed.

Low- and no-code often get used interchangeably, but there's a shade of difference between the two categories. Low-code solutions, typically target users with some development experience, or developers needing to quickly build apps, employing visual development environments and automated linkages to back-end systems, databases, web services, or APIs. No-code solutions take this abstraction a step further, introducing visual drag-and-drop interfaces that involve no coding at all.

Low- and no-code approaches have been ideal for startups that need to quickly get apps to market, but they are just as suitable to larger, established enterprises as well, "No-code allows you to take your idea, using minimal time in your resources, to launch a live product very quickly," says developer advocate Mike Williams. This offers a less-costly alternative to "building a team internally of designers and developers, or outsourcing it to an agency, making it very costly to take your idea to a live product. Using no-code allows you to jump ahead of that, and use minimal time and resources."

Capgemini identifies low- and no-code as a top enterprise technology trend. Classic, code-intensive software development and delivery "based on manual work, complex programming languages and more mythical man-months will only get you so far," relates Desiree Fraser, designer in residence in a Capgemini report. Thanks to today's low- and no-code platforms, "it is now easier than ever to construct applications without huge coding efforts. The secret is in powerful, AI-enabled tools that leverage API catalogs, prebuilt templates, and automation to the fullest extent."

Factors to consider in the adoption of low- and no-code platforms include the following:

- **Return on investment:** Investments in low- and no-code solutions and approaches require new approaches to return on investment. The most important metric is "speed to value," according to Daniel Fisher, principal with KPMG US. Because low- and no-code introduces a building-block approach, it enables "even complex projects to be accomplished quickly, sometimes in a little as a few weeks, often in stages. Accordingly, low code has the potential to deliver value quickly -- whether that's improving the customer experience, providing the ability to launch new products or services more quickly, or boosting compliance capabilities -- and dramatically accelerate an organization's digital transformation agenda."
- **Costs:** "While time and reduced resource remain the biggest draws for those adopting low-code applications, cost is a cause for concern in many cases," Gartner analyst Paul Vincent writes. "A high proportion

of customers do not realize that subscription models require a great deal of care and attention for the first contract. If a company starts small, as is advisable, it should ensure that its low-code contract has provisions for ramping up as needed. If each team in an organization can build a new application every month or two, application leaders will quickly find themselves with dozens of apps, all of which can come to be considered business-critical in a relatively short period of time."

- **Infrastructure fit:** Low- and no-code are not separate client-side tools that patch into the main infrastructure at a later time. It is a bona fide enterprise strategy. "Low-code makes it easy to connect software siloes together-from legacy mainframe systems to modern technologies like artificial intelligence/machine learning and blockchain-and everything in between," says Fisher.
- **Security:** When it comes to security, IT departments still need to remain active, providing and maintaining the guardrails that assure the security of low- and no-code implementations. While applications built with low- and no-code solutions may be non-threatening if they serve internal purposes, they are also increasingly seen with outward-facing apps as well. This requires that user-built apps be deployed within a framework that supports best practices such as authorization and authentication mechanisms and data encryption services, Vincent advises.

These are some leading vendors with low- and no-code offerings:

SALESFORCE

An all-business platform

Salesforce has a long history of introducing platforms targeted exclusively to non-technical business users, and its low- and no-code solution offerings are no exception. The Salesforce Platform now incorporates the company's range of tools designed to help business-side application development, including Salesforce Lightening, Force.com, and the Salesforce App Cloud Platform. The company's Mobile Publisher enables developers to publish apps to the Apple and Google app stores.

The vendor's Force.com platform was first launched in 2008 to enable third-party development of Salesforce applications. Tools such as Flow Builder help users create and automate end-to-end digital workflows. The tool features components and services that can be selected and reused by users. The company also has a large, well-supported community of app builders.

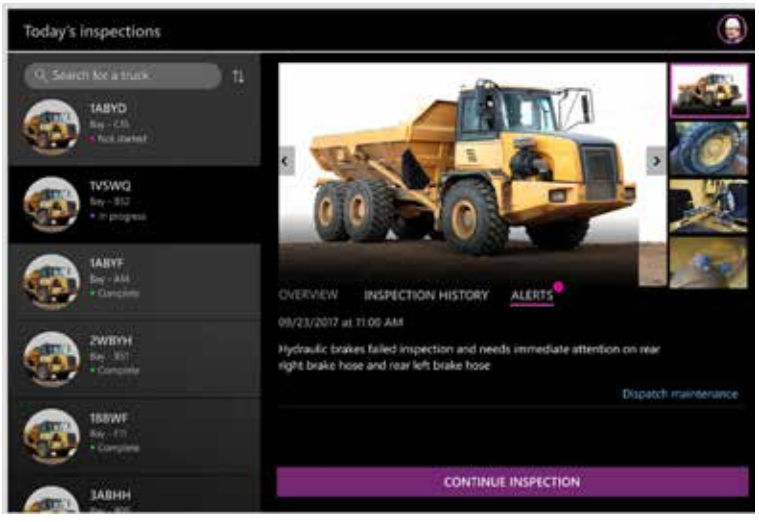
Recent additions include Dynamic Forms & Actions, which transform static data entry forms into intuitive experiences; Einstein Automate Einstein Automate, which delivers automation capabilities designed for every business function and industry; and Code Builder/Functions/DevOps Center, a web-based developer environment optimized for Salesforce.

OUTSYSTEMS

AI-enhanced development

OutSystems is looking at the rising demand for continuous delivery, offering a solution that employs AI to help developers build applications through a visual, model-driven development environment. User access is persona-based, enabling development at users' comfort levels, ranging from professional to citizen developers. Platform services, also enhanced by AI, provide automation to enhance the application lifecycle. The solution employs templates as well as customizable apps.

The vendor offers access to a library of UX components, and a drag-and-drop UI, business processes, logic, and data models to create cross-platform apps. OutSystems' TrueChange feature automatically checks dependencies and handles deployment processes.



MICROSOFT POWER APPS

Building on a low-code heritage

Microsoft Power Apps, the software giant's primary low- and no-code development platform, is designed to help users build rich web and mobile applications. The solution is tightly integrated with the range of Microsoft products, built on the vendor's Common Data Service that connects to business data stored either in the underlying data platform (Microsoft Dataverse) or in various online and on-premises data sources (SharePoint, Microsoft 365, Dynamics 365, SQL Server). A design-time tool, Power Apps Studio, is available

for building canvas apps. Microsoft's goal with this tool is to make creating apps feel more like building a slide deck in PowerPoint.

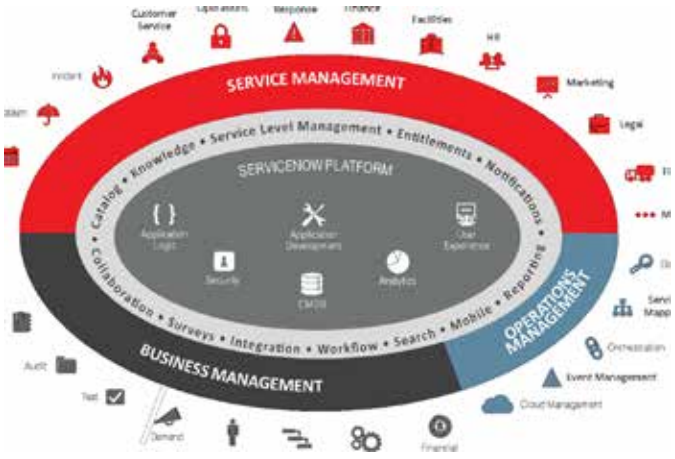
Power Apps also is designed to enable more experienced developers to use code to create data and metadata, apply server-side logic using Azure functions, plug-ins, and workflow extensions. The platform also enables developers to apply client-side logic using JavaScript, integrate with external data using virtual entities and webhooks, build custom connectors, and embed apps into your website experiences to create integrated solutions.

APPIAN

Emphasis on automation

The Appian Low-code Automation Platform is a unified environment that emphasizes automation to manage complex processes, including robotic process automation, business process management, case management, artificial intelligence, and decision rules. Applications developed through Appian are designed to be cloud-aware, able to integrate with AI from AWS, Azure, and Google. Appian delivers real-time AI guidance within its process modeler, harnessing AI as a low-code development accelerator. The platform employs machine learning to recommend the next steps in app development, avoiding calls to third-party services.

Appian also provides access to process automation datasets, based on anonymized data are derived from hundreds of person-years of knowledge from enterprises running complex workflows. The solution also runs automated test cases.



SERVICENOW

Expanding beyond the developer realm

ServiceNow apps, as well as its own infrastructure, are built on its Now Platform, which is open to developers at all levels. Originally targeted at IT operations management and services, ServiceNow provides a turnkey application structure intended to enable

development for a variety of business functions. The vendor has also extended its reach beyond the data center with a Guided Application Creator for non-technical business users, intended to help them set up applications on the Now Platform. The tool enables the creation of apps that enhance user experience, employee experience, or mobile experience. ServiceNow's IntegrationHub, intended to support prebuilt connectors to external systems, is a no-code integration environment.

SURVEY: LOW-CODE AND NO-CODE PLATFORM USAGE INCREASES

47% of respondents' organizations currently use the technology.

BY: MELANIE WOLKOFF WACHSMAN/TECHREPUBLIC

Low-code and no-code platforms offer the promise of solving business problems and expediting digital transformation initiatives. And organizations both large and small can't seem to get enough of them.

TechRepublic Premium surveyed 414 respondents across a range of disciplines, company sizes, industry verticals, and job functions to find out how their organizations are using LCNC platforms, or why they are not using them, and what they think this all means for the future availability of developer jobs.

IMAGE: GETTY IMAGES/ISTOCKPHOTO

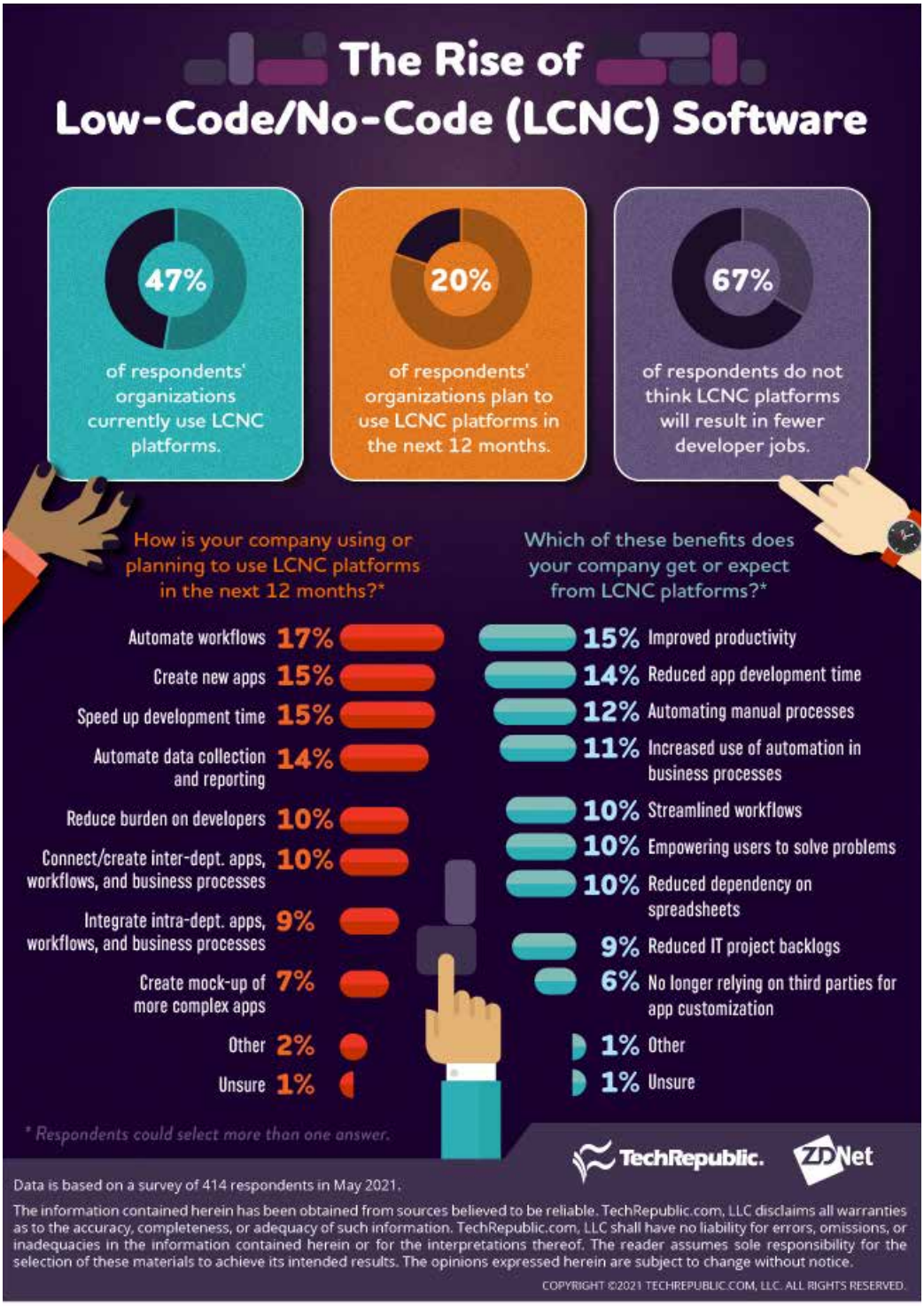
Nearly half (47%) of those surveyed currently use LCNC in their organizations. Of the 35% who are not currently using LCNC, one in five (20%) said they intend to adopt the technology in the next 12 months.

Most respondents are using LCNC to automate workflows (17%), create new applications (15%), speed up development time (15%) and automate data collection and reporting (14%). Another 10% of respondents implement the platforms to reduce the burden on developers and to connect and create inter-departmental applications, workflows and business processes.

The survey revealed that the ability to utilize LCNC to provide business solutions provides many benefits to organizations. The top benefit survey respondents receive or expect to receive from LCNC platforms is improved productivity (15%), followed by reduced application development time (14%), and automating manual processes (12%). Rounding out the list of top benefits for the platforms are increased use of automation in business processes (11%), and at 10%, streamlined, easier-to-use workflows, empowering users to solve problems, and reducing dependence on spreadsheets.

The majority of survey respondents (67%) do not think low-code or no-code platforms will result in fewer developer jobs. However, 16% of respondents do. Their reasons include that developers are too slow to help the business respond to fast-changing market conditions and opportunities and that developers will feel under-valued and will quit instead of working on these platforms.

The infographic below contains selected details from the research. To read more findings, plus analysis, download the full report: Research: Increased use of low-code/no-code platforms poses no threat to developers (available free for TechRepublic Premium subscribers).



3 LOW-CODE AND NO-CODE TRENDS IN THE YEAR AHEAD

What's ahead for low-code: merging with collaboration platforms, pushing automation to new levels.

BY: JOE MCKENDRICK/ZDNET

Over the years and even decades, there have been many efforts to make the lives of professional developers easier, with low-code (or at least lower-code) solutions from fourth-generation languages to CASE tools to mashups to serverless computing. Lately, there have been renewed efforts and solutions to broadened this concept, to put some form of abstracted development tools in the hands of non-technical users. How's that going?

IMAGE: MICHAEL KRIGSMAN

The prospects for low-code and no-code software development over the coming year are mixed, according to chief technology officers participating in a recent roundtable organized by The Software House. As reported by Dennis de Vriesin in Silicon Canals. "I don't believe that everyone can suddenly create software," says Bastiaan de Ruiter, CTO of Blanco. "Putting low-code platforms in the hands of everyone will create problems with governance."

Lately, vendors have been pushing forward with low-code and no-code solutions, recognizing that demand for applications is far exceeding the supply and time of professional developers. In a recent post, Dona Sarkar, principal cloud advocate at Microsoft, makes the case for low-code approaches, noting that professional developers benefit as much as the business types who have access to such tools.

She points to three strong cases to be made for low-code:

Low-code merges with collaboration platforms to bring the most valuable and commonly used apps where workers are collaborating. "Something we are hearing from customers is the need for data-driven insights on their business, a self-service way to have those insights available to them anytime they want, and being able to easily communicate the actions they could take on those insights," Sarkar states.

Automation will help resolve the hiccups it takes to run organizations. "If you work in IT or know someone who does, you know there is a lot of manual work on a day-to-day basis. There are updates to install and

configuring to do for various servers, machines, and apps. Once our IT friends discover that they can automate many of these tasks, their life becomes much easier."

"Fusion" developer teams will collaborate to create tomorrow's apps and tech solutions, from the top down and bottom up, Fusion developer teams are teams "of code-first developers, citizen developers, and IT developers working together to solve business problems. We have observed two interesting ways that fusion developer teams are working together. The first one is where the code-first dev writes backend APIs and connectors and realizes they can help others in their company use these in Power Apps. They store their API in tools like Azure API Management so low-code devs can use them to build what they need. The second way is where the code-first dev acts as an architect to plan all of the app-building work so that app building projects are more strategic and planned rather than one-off solutions."

CTOs participating in The Software House roundtable agree that low-code is promising, but there will always be a need for professional developers as well. Over the coming years, "creating software will certainly involve 'putting blocks together' and less custom code," says Jasper Laagland CTO of Factris. Another panelist, Remco Jorna, CTO of Fintech OS, foresees growth of the fusion developer approach. "I think I will be writing less custom code. But you are always dependent on what the low-code platform provider puts in place. If they restrict the calls on your APIs or put licensing in place, that could impact usability. But something like a [Know Your Customer] process? It is not necessary to create it from custom code."

92% OF IT LEADERS COMFORTABLE WITH BUSINESS USERS USING LOW-CODE TOOLS

A survey of IT leaders reveals that innovation is at risk as IT demands rise. However, IT leaders view business-led low-code/no-code application development as prudent and inevitable with the right protocols.

BY: VALA AFSHAR/ZDNET

IMAGE: SHUTTERSTOCK

A survey of 100 U.S. information technology (IT) leaders with application development responsibilities, sponsored by Salesforce, revealed trends in application and process development trends in the past 12 months, pain points for developers as demand for services increased, interest in low-code development tools and shifting responsibilities for development to business users. There survey also highlighted the perceived benefits of the use of low-code tools by business users. Process automation and greater demand for business application development will continue to serve as a necessary capability to accelerate digital business transformation.

Here are some of the key findings of the IT leadership 2021 survey:

IT WORKLOADS HAVE INCREASED DURING THE PANDEMIC.

88% of IT leaders say workloads have increased in the past 12 months. 60% of IT leaders who said their workload increased have noted an increase of more than half. I believe the pandemic served as a 5-10 year accelerant for digital business transformation. The adoption of e-commerce is an example of 10 years of acceleration. The demand for IT to accelerate innovation is greater now than perhaps ever before. The CIO's 2025 technology roadmap suddenly became a priority in 2020 and the present day. The only viable method of scaling application development and process reinvention is by the adoption of more frictionless processes and tools. The need for IT innovation takes on new urgency in the post-pandemic world. The pandemic created a tipping point for IT. Business demands on IT increased as remote work replaced office norms, and the majority of IT teams failed to deliver on all project commitments. Today, IT is under tremendous pressure to transform in order to move faster. Just 37% of organizations say IT completed all the projects asked of them last year.

INNOVATION IS AT RISK AS IT DEMAND RISE.

92% of IT leaders say their work increasingly impacts the business. Another 96% of IT leaders say there is increased demand from the business for new apps and processes. 70% of IT leaders are concerned that increased workloads will curb their ability to innovate. Most customers expect companies to accelerate digital initiatives due to COVID-19. Digital-first behavior is here to stay as customers develop new habits that will last for the long term. As digital engagement grows, customers expect companies to digitize their operations for multichannel, high-touch interactions. This relies in no small part on the use of personal information, and customers are calling for enhanced transparency and stewardship. According to recent 2021 research, 88% of customers expect companies to accelerate digital initiatives due to COVID-19. Customers expect companies to accelerate their digital transformation. An important 2020 lesson: every company must become a digital company. 78% of customers said that this year's crises should be a catalyst for business improvement.

TOOL PROLIFERATION AND DISCONNECTED DATA MAKE DEVELOPMENT MORE DIFFICULT.

72% of IT leaders say the number of tools needed to build apps/processes slow down production. The median number of tools/programs used to build a single app or process was five in 2021. More than eight out of 10 IT leaders said that disconnected data and apps make their jobs more difficult. Data silos and legacy IT complicate integration. Data silos and existing IT infrastructure, including point-to-point integrations, make it difficult for organizations to become more agile. But, those who can transform see increased customer engagement and innovation and improved project-delivery speed. Only 18% of organizations say they can integrate end-user experiences.

APPLICATION REDEPLOYMENT AND LOW-CODE DEVELOPMENT ARE VIEWED AS THE WAY FORWARD.

95% of IT leaders are interested in tech that helps build apps/processes that can be reused multiple times. Another 83% of IT leaders plan to increase their use of low-code development tools. More organizations are deploying self-service tools to empower their business teams to integrate apps and data sources. Data scientists and projects focused on big data and analytics are a significant focus for the year ahead. Some 36% of organizations have a mature approach to API-led integration for non-technical business users, and 44% are developing a strategy.

WITH THE RIGHT PROTOCOLS, IT LEADERS VIEW BUSINESS-LED APPLICATION DEVELOPMENT AS PRUDENT AND INEVITABLE.

81% of IT leaders believe business users at their organization would build their own apps and processes if permitted. Further, 83% of IT leaders believe responsibility for some app and process development will increasingly shift to business users. And 92% of IT leaders are comfortable with the use of low-code tools by business users, assuming proper training, governance, and processes.

IT PERCEIVED MANY BENEFITS OF BUSINESS-LED DEVELOPMENT WITH LOW CODE TOOLS.

Here is the list of benefits (percentage of IT leaders that agree on benefits):

- Provide new ways for IT to partner with the business (92%).
- Increase process automation (92%).
- Bridge business requirements and technical execution (91%).
- Increase development speed (92%).
- Increase IT staff productivity (89%).
- Allow technical staff to concentrate on complex tasks (89%).
- Increase ability to redeploy apps (87%).
- Reduce the backlog of IT projects (82%).
- Reduce shadow IT (79%).

Previous Salesforce research highlighted the 8 digital transformation trends in 2021, strongly emphasizing the need for organizations to adopt a digital-first culture. Organizations are under greater pressure to digitize services quickly at scale to meet rising customer demands, scale innovation, and create new revenue channels.

The pandemic has served as a significant accelerant for digital business transformation and the demand for advanced applications across all lines-of-business, in every industry. Unfortunately, the demand for application development far exceeds the delivery capabilities of most IT organizations. Technology leaders must embrace business-led development of low-code/no-code applications with stronger partnerships and support in order to be able to deliver value at the speed of stakeholder -- employees, customers, partners and communities -- need.

You can learn more about the survey results here.

LOW-CODE AND NO-CODE PREPARE ENTERPRISES FOR AN 'UNKNOWABLE FUTURE'

'Low code is dramatically different than a decade ago, even a year or two ago, because of Covid-19, and it's trending at a feverish pitch. Over the course of 2021 and beyond, we'll see a significant re-evaluation of tools and platforms.'

BY: JOE MCKENDRICK/ZDNET

An IT talent crunch -- exacerbated by last year's great corporate dispersal -- has pushed more application responsibility to end users. Now, it's time to take a look at the long-term implications of the low-code and no-code movement as we move into the resurgent '20s. In this Q&A, Brad Freitag, CEO of Claris International, explains what to watch for in the months and years ahead.

IMAGE: HUBSPOT

Q: There's been talk of "low code" for decades now. How are things different nowadays for the low-code movement?

Freitag: "Low code is dramatically different than a decade ago, even a year or two ago because of Covid-19, and it's trending at a feverish pitch right now. It's really a confluence of long-brewing trends. In the midst of the digital transformation trend, we saw an increase in low-code adoption because of the widening IT talent gap. As more companies rapidly took on digital initiatives, the demand for IT professionals increased while the supply of computer science graduates still fell short. Then the pandemic hit and all of these methodical, digital transformation initiatives needed to happen immediately -- literally overnight."

"Many companies flocked to low-code solutions due to agility and ability to quickly react to dynamic needs. Low code provided fast relief and offered immediate response to the ever-changing business environments and processes forced by the pandemic. Now, as we move beyond the initial, rapid, and reactive shift, many companies will take a step back and look at the solutions chosen during the pandemic. Over the course of 2021 and beyond, we'll see a significant re-evaluation of tools and platforms. Since the market is currently saturated with various low-code platforms."

Q: IT professionals tend to be skeptical about low-code and no-code solutions - they say the software creates issues to clean up later. How can users and these tools be properly guided?

"If companies invest in a low-code platform that scales across their organization, the platform will grow with them for the long haul. Historically, low code was perceived as enabling shadow IT and data silos, which often didn't comply with security regulations and required developers to clean up issues. However, today's low-code platforms are designed to enable quick, customized app development, while being API-driven and conforming with security and policy standards. These low-code solutions simply become a seamless extension of the overall IT infrastructure, as business users and the IT team support each other more closely to deliver better value faster than ever before."

Q: Do low-code or no-code solutions offer new ways for IT professionals to work as well?

"Of course, low code isn't just about enabling non-tech users to create custom applications. It's also proven to increase developer productivity since IT teams can produce higher quality solutions more quickly with low code. You'll find low code dramatically improves collaboration between IT professionals and business leaders. Often, IT teams struggle when communicating with non-technical leadership, and low code provides a way to invite leaders into the development process."

"I'd strongly encourage developers to embrace the low-code movement and train themselves on the more robust platforms to expand their skill sets and integrate low code seamlessly with their work. Doing so will increase developers' value with their employers and customers. Finally, for trained developers, low code lets them offload much of the busy work to drag-and-drop, freeing up their time to focus on innovation."

Q: What kinds of applications are typically built with low-code platforms?

"We've seen our customers build custom apps for every function, in every industry, in businesses of all sizes - from SMBs to Fortune 500 corporations. There really aren't limits. The solutions we've seen range from rapid deployment of personal protective equipment across major cities during the pandemic, to a record manufacturer completely reinventing their production process. We've also seen construction companies equip their service professionals with custom iPad apps that can work at job sites with zero connectivity."

"Low-code tools are generally used for delivering systems of customer and employee experiences where the work gets done, or lines of businesses within enterprises. Low to mid-scale software deployments can have material business impact even with small budgets and limited timeframes. Additionally, low code is perfect for teams who require software that adapts quickly to ever-changing business or customer needs -- it's tailor-made for urgent response. Even before the pandemic, we've seen our platform used for disaster response. In these situations, customers face unique challenges and usually find there's 'no app for that.' Since immediate solutions

are crucial, low code provides the ability to create and customize applications and avoids the need of long development cycles."

Q: What kinds of low-code applications do you see five years from now?

"Low code will have an even larger role to play in the next five years. Of course, all software will become enhanced from app experiences to experiences augmented by machine learning and artificial intelligence. But the future for low code is unique in one important way: it's purposely created to adapt to an unknowable future. This is the very reason why we saw such a low-code boom recently, and there's certainly no going back. No one can predict the needs and technologies of the future, but low code clearly cemented itself as the agile, flexible, and scalable solution."

Q: How has the growth of cloud computing -- and perhaps serverless computing -- accelerated low code?

"Cloud computing helped accelerate the recent low-code explosion since the cloud enables businesses to use less-expensive technology to rapidly deploy their low-code solutions. Most large organizations with legacy applications in the cloud will use external service providers for some portion of tech management and support. Forrester predicts that in 2021, 75% of application development will use low-code platforms. We see these two trends happening in parallel -- cloud computing is the perfect complement to low-code development. If low code is expected to provide higher productivity, lower cost, and faster development, cloud computing essentially delivers the same benefits for deployment, especially for virtual teams. Cloud computing and low code are also made for each other in terms of agility and scalability. If you invest in agility, your requirements probably dictate the need for scalability as well. A modern business strategy simply must include both cloud and low code."

Q: Does the availability of pre-built components in cloud services, APIs and from open-source communities accelerate more involvement from business-side users?

"Yes, absolutely. The growth of low code is, at least in part, heavily dependent on the expansion of cloud services, APIs, and open-source communities. The more sophistication we can provide without requiring the non-technical user to learn sophisticated coding, the more we can make the software more accessible to everyone. Businesses of all sizes can empower employees to use low code to eliminate time-consuming, manual processes and improve efficiency. Templatization of code, cloud services, and API create a better social ecosystem that allows non-technical employees to resolve nagging business problems and allow the IT pros to better focus on tech innovation."

Q: What do you foresee happening with developer jobs and roles as low-code and no-code approaches become more commonplace, as non-technical users are more involved with building their own apps?

"Trained developers will always be in high demand, and they will always be the ones who can unlock new innovations -- whether developers start with a low-code platform or a line of hard code. Low code will never replace an IT team. It simply allows business users to interject their ideas and create custom apps, resolving tedious issues that the IT team may not have dedicated time to fix. Currently, developers often fear losing their jobs because of the increasing use of automation and AI. But that isn't what we are experiencing - there's still a huge IT talent gap and not enough trained professionals to fill vacant jobs. Companies simply need both IT specialists and non-technical generalists for immediate low-code solutions and future digital transformation. Low code offers a significant opportunity for the generalists while enhancing the capabilities of the highly skilled IT specialists."

HOW LOW-CODE DEVELOPMENT IS SUPPORTING THIS GROWING BUSINESS, FROM BEEHIVES TO BOTTLES OF GIN

Michael Williams bought some beehives to keep busy. Now, he is selling honey-based products all over the country.

BY: DAPHNE LEPRINCE-RINGUET/ZDNET

When Michael Williams bought a few beehives as a retirement hobby, little did he expect that his casual new project would eventually turn out to become a fully-fledged business selling millions-worth of honey-based goods.


IMAGE: BRITISH HONEY COMPANY

With the help of low-code solutions, the British Honey Company has made a name for itself by producing a range of honey products and spirits.

But what is now known as the British Honey Company (BHC) has made a name for itself for producing 13 different honey products and 16 types of spirits, and is currently processing an average 1.5 million bottles of honey-infused gin, vodka, rum and whisky a year.

To track everything from beehives to bottles the company is using software built on low-code platform Filemaker, now re-branded Claris.

Williams was first keen to use Claris to help secure a food standard certification called the Safe and Local Supplier Approval (SAFE), which requires tracing and testing the product from the beehive to the jar, to guarantee a certain level of quality.

Alex Maurice had made this traceability problem the topic of his university dissertation, and using Claris, he built a cloud-based system for BHC connecting beekeepers, laboratory testers, production teams, as well as sales and logistics departments, into a single platform tracking the quality of the honey throughout the product's lifecycle.

BHC's beehives now have barcodes, and products come with batch numbers, all linking to a central database that is updated with every movement that occurs during different stages of production.

"Some other companies, including a distillery, were keen to buy this software from us," Williams told ZDNet. "It got us thinking – why don't we make our own honey gin?"

Managing a distillery comes with another host of administrative headaches – not the least of which is a tax system that is specific to spirits, and requires different calculations based on bottle volume and alcohol content.

What's more, BHC functions with bonded warehouses that have suspended duty, which means that tax is only due once the product ships. "The difficulty is tracking all this through and paying the right amount of duty for each bottle," explains Williams. "When you're selling hundreds of bottles a day, that becomes an enormous task."

In other words, BHC was faced with another traceability problem – but one that could be resolved by adapting the software already in place for honey production. Maurice duly prototyped new features for the platform to track the manufacturing process, but this time for bottles of spirits.

To visualize exactly which components and ingredients end up in which product, every department across the business has access to the software, from those producing honey to the teams dispatching orders. Staff can access the app with mainstream devices like iPhones or iPads, and input the required data to make sure that the product is tracked at every stage of production.

Digitising the process onto a central platform presented huge advantages over conventional pen-and-paper methods, and enabled BHC to scale quickly to meet the demands of spirit distributors across the UK.

"We built a system that did all the tracking," says Williams. "If you've got a bottle of gin, you can go onto the system with a batch number and within three minutes find out where it came from, what components went into it and who it was dispatched to."

Critics view low-code as a helpful tool to help small businesses with digital transformation, but one that is still limited, and far from a catch-all solution that can match the work of a fully custom-built, in-house piece of software.

It remains that for some, low-code services still cannot compete against the work of a programmer designing a piece of software from the ground up. Developers have repeatedly expressed doubts that low-code's Lego block-like processes might achieve the same outcomes as a fully qualified coder, who can take ownership of every line of programming that goes into an application – enabling a higher level of customization, flexibility and problem-solving.

They argue that low-code and no-code services hit a wall once a business starts scaling up and exploring more diverse models, because the tools are not capable of adapting in the same way that a creative in-house developer would.

But for Maurice, who built BHC's software, it is quite the contrary: low-code, he argues, is becoming to programming what templates are to website design. "It's the same thing that happened with websites. At the time, you'd start them from scratch, and it would cost a lot more money than it would now to take a template and have a website running in two days," Maurice tells ZDNet.

"Similarly, why would you spend thousands on an app built in native software that will take you six months to be up and running and integrated with your staff, when you can use Claris, build a prototype in one or two days, see if your staff is happy and then just build on top of it?" he continues. "Now, you can have an in-house developer that will be cost-effective and have solutions that work for the business."

Low-code and no-code services, in fact, have recently been the focus of renewed interest, with many new companies emerging to tempt individuals with little, and sometimes no, coding experience at all, into developing their own custom-made apps.

Large players like Microsoft and Salesforce are releasing new collections of low-code tools; and BlueFinity, Airtable or Bubble are only a few examples of the myriad startups that are following suit with the promise of developing software without the need for coding expertise.

Tech analyst firm Forrester has predicted that the low-code market will grow 40% annually to reach $21 billion by 2022, while Gartner forecasts that low-code application platforms will account for 65% of all app development by 2024.

Claris does require some basic understanding of development concepts, as the company's vice president Peter Nelson explains. "We are not a no-code platform," Nelson tells ZDNet. "If we break down the user spectrum from zero to 100, with zero being someone who has never seen a computer, and 100 being the most seasoned developer, our sweet spot has been serving people between 40 and 80 on that spectrum."

"We plug into users with some basic understanding of development concepts, all the way to pretty savvy developers," he continues. "So it's not the right tool for everything – but where it is, it's as resilient and extendable as something you would write in Java."

An example of that flexibility: BHC started off with a platform designed for a honey company, was able to quickly adapt the technology to produce spirits, and even pivoted to producing denatured alcohol to cope with hand sanitizer shortages at the height of the COVID-19 pandemic.

With denatured alcohol being duty-exempt, the change could have caused another flurry of paperwork and legal accounting; instead, BHC changed the manufacturing process in less than a week, adapted the software, and started shipping hand sanitizer within 14 days.

The company continues to modify the software, for example adapting the platform to incorporate more listings with online retailers, implementing partnerships with Ocado and Amazon directly into the software to simplify the processing of orders.

Although most emerging low-code and no-code platforms are yet to convince all developers that they are capable of providing the depth and sophistication of a program designed entirely in-house, the BHC example shows that it might only be a matter of time before the buzz reaches them, too.

LOW-CODE AND NO-CODE IS SHIFTING THE BALANCE BETWEEN BUSINESS AND TECHNOLOGY PROFESSIONALS

'With no- and low-code, business domain experts can sit alongside professional developers and share the same visual representation of business logic. The very definition of a developer is changing.'

BY: JOE MCKENDRICK/ZDNET

The Covid-19 crisis has accelerated digital transformation, and in the process, pushed more tech-driven work well beyond the bounds of data centers -- into executive suites, marketing departments, human resource offices, and even into the front lines. Business-side professionals with a minimum of development experience -- beyond creating spreadsheets -- suddenly had to become IT departments within their own home offices, not only troubleshooting network issues, but creating or downloading front-end apps and applications to help them in their jobs.

This new phase we've entered -- low-code and no-code, 2020s style -- shifts the relationship between IT and business professionals. In this Q&A, Sheryl Koenigsberg, head of global product marketing at Mendix, provided her insights on where the low-code and no-code movement has taken and will be taking us.

Q: In this time with most knowledge workers and managers working remotely, are end-users getting the IT support they need? Are end-users essentially on their own when it comes to leveraging IT capabilities? Are the IT professionals they depend on more consumed with remote infrastructure support issues?

Koenigsberg: "I don't envy anyone who is an IT worker right now. You're right, they are consumed with numerous challenges nobody planned for. We do see a rising interest among end-users to take matters into their own hands and solve some of their own digitalization problems. At the same time, IT has less time to

help evaluate solutions for the business to use, less time to coach novice developers, and less time to oversee best practice deployment of new technologies. It's a pretty bad Catch-22 for IT teams right now."

Q: What's the professional developer perspective on low-code and no-code through this? Are they proactively urging greater end-user empowerment?

"IT departments are trying to balance two things. On one side, they see a growing interest from business experts to solve their own workgroup-level problems themselves. On the other hand, they want to maintain control and governance over any software created in the organization. It's often the application development managers, struggling with never-ending backlogs and short-staffing who are most bullish on enterprise low-code -- they see a way to address both of these sets of demands. With low-code and no-code, they can give business units skill-appropriate tools to solve some of their own problems, while ensuring that anything they build goes through a centralized process for quality and security - the same process their enterprise software development goes through."

Q. What are the main development tasks that are now within reach for non-technical or non-developer personnel?

"This is an interesting question, because the definition of 'who is a developer' is changing as no- and low-code become more prominent. People who just five years ago would have opened a ticket to request the creation of a dashboards or workflow are now empowered to create those things themselves. People who would have had no visibility into how to connect to a core system like SAP or Oracle can drag-and-drop data sources like that into applications today. People who we would have thought of as just BI data analysts are creating custom software today. Given all this, I'd say it's less about what development tasks are accessible to non-technical people, and more about what capabilities individuals can create on their own through software, and that universe just keeps growing every day."

Q: Historically, only a small percentage of technically skilled people were able to create software - No-Code is changing this drastically. What groups of people do you think are benefiting most from that development?

"We are seeing adoption of low-code across many different job titles, from people with obvious adjacent skill sets like data analysts and electrical engineers to perhaps more surprising roles like attorneys and underwriters. People with this kind of very specific domain expertise can meaningfully contribute to the delivery of software. Not only are they able to create their own workgroup apps for things like forms and simple workflows, but they can also co-create enterprise solutions alongside professional developers. As we discussed previously, our platform's thoughtful governance model allows for this type of work, which is otherwise difficult to foster."

Q: What are the gaps you are seeing in the abilities of organizations to deliver products and services? And how is no-code helping to adapt to these?

"A year ago, the floor was pulled out from under all of us and everything needed to become digital. From paper forms that couldn't be walked over to HR, to scanners that sat idle in darkened offices, to customers who couldn't be greeted in person, everything had to change. What no- and low-code has done in the past year is not just allowed people to replace paper forms with online forms, but enabled organizations to re-think what it means to digitalize, and easily incorporate advanced capabilities like AI, or text-to-speech, into smart solutions."

"Prior to the pandemic, though, there was a different gap organizations were facing, and as we return to some normalcy, this gap will still exist. One of the key reasons software development takes so long, and is the biggest bottleneck in most digital transformation, is that traditionally, business domain experts and professional developers don't communicate very well. Developers get requirements through several layers of bureaucracy, and develop software that, once it's done, is shown to stakeholders who see how their requirements are interpreted and adjust them at that point. With no- and low-code, business domain experts can sit alongside professional developers and share the same visual representation of business logic. This enables organizations to deliver products and services significantly faster, and iterate far more quickly."

Q. What do you see as the future for professional software developers? How will their roles change? Would you advise young people to pursue programming careers?

"This wave of low-code adoption is nothing but good news for traditional software developers. In our customer base, developers get to deliver solutions faster, avoid rework and technical debt, and elevate the problem space they operate in. That is, they get to work on harder, more interesting software problems - say software architecture, or working through the creation of complex logic."

"My advice to young people would be to look for education programs and opportunities that teach them how to think about developing software, a much larger concept than 'programming.' The days of someone's most valuable skill being C++ are dwindling. But schools are finding valuable ways to incorporate software design and architecture concepts into all sorts of different programs, from MIS to applied math to engineering. Students and young professionals who learn how to approach different kinds of problems with software will be in high demand, regardless of how much abstraction low-code and no-code platforms bring to software development."

Q: Do you have data or anecdotal reporting on how end-users working from home are faring with their application needs? Have those who are already using low-code or no-code platforms been able to make the transition in a more seamless way?

"Certainly, employee engagement is a key area of focus in the past year. However, where we're really seeing the power of low- and no-code is in organizations' ability to quickly create digital systems to interact with external users. For example, municipal governments from the City of San Antonio to the City of Dubai to Knowsley Council (UK) to the City of Rotterdam have all used low-code in the past year to digitalize things like parking ticket payments, pandemic aid distribution, real estate taxes, and identity verification. Some of these solutions were up and running in just weeks - making citizens' lives transition to quarantined and locked-down life that much smoother. Furthermore, other customers such as Trane Technologies, Innovapost, and eXp Realty are seeing substantial time and cost savings, some as great at 30%. eXp Realty has seen their agent pool grow from 18,000 to nearly 100,000 since deploying the Mendix architecture."

DEVELOPERS? WHAT DEVELOPERS? MOST TECH BUILT BY PEOPLE OUTSIDE OF IT BY 2024, ANALYSTS PREDICT

The future of IT in the enterprise will not be dominated by the IT department.

BY: LIAM TUNG/ZDNET

Tech analyst firm Gartner reckons 80% of IT products and services will be built by non-developers by 2024.

IMAGE: GETTY IMAGES/ISTOCKPHOTO

Low-code or no-code software development appears to be having its moment now thanks in part to moves by Amazon Web Services with Honeycode, Microsoft's Power Platform, Google's Appsheet, and products from the likes of Appian, ServiceNow and Zoho.

The pandemic and a shortage of developers has propelled the trend towards low-code development, which gives business users the tools to create business-specific mobile or web applications that connect to spreadsheets or databases.

- Demand for developers is soaring - and employers are struggling to hire

It goes beyond low-code though and a continuing shift towards business users rather than IT departments buying software from SaaS providers. Gartner estimates that IT spending from business groups now averages up to 36% of the total formal IT budget.

"Digital business is treated as a team sport by CEOs and no longer the sole domain of the IT department," said Rajesh Kandaswamy, distinguished research vice president at Gartner.

"Growth in digital data, low-code development tools and artificial intelligence (AI)-assisted development are among the many factors that enable the democratization of technology development beyond IT professionals."

It's unlikely that low-code will kill demand for professional developers who know how to write code in C++, JavaScript and Python. And indeed, demand for these professionals continues to be extremely high - part of the reason why companies are turning to alternative options.

Gartner notes that the pandemic has created demand for products and service outside of IT departments. It's predicting that by 2023, $30 billion in revenue will be generated by products and services that didn't exist before the pandemic.

It reckons faster adoption of cloud services, digital transformation and remote work support has opened up new possibilities in integrations and optimization.

The pandemic also created more opportunities for "business technologists", such as so-called citizen developers, data scientists and AI systems that generate software.

"The availability of business technologists provides new sources of innovation and the ability to get work done. Thus, technology and service providers will need to extend their sourcing of ideas and technology development into new communities, whether they are based on citizen development, their own customer communities or other sources," says Kandaswamy.

LOW-CODE AND NO-CODE DEVELOPMENT IS CHANGING HOW SOFTWARE IS BUILT - AND WHO BUILDS IT

Low-code and no-code platforms are multiplying, and the first to reap the technologies' benefits will be entrepreneurs with a good idea.

BY: DAPHNE LEPRINCE-RINGUET/ZDNET

IMAGE: GETTY IMAGES/ISTOCKPHOTO

Spring has always been a busy time for plant nurseries. This year, "busy" has been an understatement: amid a months-long lockdown, there has been unprecedented enthusiasm for more greenery. For US-based nursery Classic GroundCovers, the sudden deluge of orders that the COVID-19 crisis brought about certainly kept the business busy – but also came with unforeseen consequences.

The sheer volume of requests overwhelmed the company's small-scale, manual order processing system. But in only one month, despite limited technical knowledge and the little time available to brainstorm ideas, Classic GroundCovers' team found itself using a brand-new app that automates the entire process, integrating orders from the company's e-commerce website with in-house business applications.

Classic GroundCovers used a low-code app development platform, Evoke, which is designed by technology company BlueFinity to help businesses easily deploy apps across various devices, with no need to code.

Classic GroundCovers office manager Amy Milton explains that when the volume of orders was particularly high, up to 12 hours were spent every day manually processing orders.

Leveraging Evoke, the plant nursery created an app that integrated with the company's order management system. "Orders are now sent into the system directly and verified with the customer. A shipping date is then assigned, saving a huge amount of administration time, and eliminating any errors from the process," says Milton. "Streamlining these processes has halved our administration time and made the whole order process much less stressful."

Low-code development platforms are on the rise, and they are letting companies like Classic GroundCovers access sophisticated tools regardless of their track record in digital tools. Often named alongside "no-code" platforms, low-code tools consist of cutting, as much as possible, the hands-on knowledge that is necessary to build software.

Instead of writing every single line of code for a given application, users of a low-code or no-code platform can build their project with point-and-click interfaces. Non-coders can, in theory, assemble Lego-like blocks of pre-defined code to create customized software, rapidly and at a much lower cost than hiring a professional programmer.

BlueFinity is only one example of a company offering low-code and no-code services, and the biggest tech players are competing in this fast-evolving space. Analyst firm Forrester has predicted that the low-code market will grow 40% annually to top $21 billion by 2022, while Gartner forecasts that low-code application platforms will account for 65% of all app development by 2024. It's easy to see why the technology holds great promise, especially for companies that, like Classic GroundCovers, have little resources to allocate to high-end programming.

Custom programming was discarded by the plant nursery for a number of reasons, including the lack of IT specialist skills in-house. "We needed a solution we could implement immediately using our existing staff," says Milton. "As far as we are concerned, Evoke's low-code business app generator was the only viable solution for us."

Low-code and no-code platforms, of course, have their limits. Developers tend to see the tools as an extension of methods they already practice, such as relying on pre-built frameworks or Javascript libraries, rather than a downright replacement of their work. For Richard Wang, the CEO of coding boot camp Coding Dojo, low-code and no-code are useful to help small businesses with some digital operations, but they are not a catch-all solution.

Sophisticated applications will always require a professional programmer's skills. For that reason, Wang is confident that medium and larger enterprises will continue to opt for custom-built applications that come with more flexibility and customization options.

"While it can help with the speed of development and allocation of resources, low-code and no-code restrict customization of digital assets, have limited integration with existing core digital infrastructure, and depend too heavily on the low-code and no-code vendors or platforms for configuration and delivering refined user experiences," says Wang.

Where low-code and no-code platforms might make the biggest difference is rather with businesses that have no legacy technology, and are starting from a clean slate; think start-ups and small companies with budding

ideas. Where would-be entrepreneurs could have previously been put off from starting a business for want of technical skills, the technology effectively offers DIY solutions to create software with readily available tools.

DSP Concepts is a low-code platform provider that specializes in audio software. The company produces Audio Weaver, a drag-and-drop audio development tool that can be used to create sound products of all kinds, whether for a TV, a car, or a smart speaker. For non-technical inventors, explains Paul Beckmann, the company's co-founder, the platform's appeal is growing.

"A lot of audio engineers have golden ears more than they have a heavy maths background," he tells ZDNet. "They know what sounds good and to date they've been prevented from working on products because they don't have the coding capabilities to do that. We offer easy-to-use tools that people, without heavy-duty coding expertise, can contribute to."

From building mask-fitted mics and speakers to clarifying muffled speech in pandemic times, to developing a digital stethoscope that filters out external noise for doctors working in an ambulance: Audio Weaver is servicing a host of companies which have new ideas – but not necessarily with coding skills.

One of them, Milo, creates walkie talkies 2.0 that let a group of users communicate through a wearable hands-free device in settings ranging from working in a factory to hiking up a mountain. Enabling a multi-voice service over an ad-hoc wireless network that performs well despite external noise being as difficult as it sounds, the start-up CEO Peter Celinski picked DSP Concepts' platform for the audio processing part of the job.

Audio Weaver enabled Milo's team to have a prototype ready in days, which would have been near-impossible without low-code tools. "This has been critical to us as we were able to quickly prototype in Audio Weaver and then run the audio processing models on our hardware and make adjustments in real-time to quickly validate our approach," Celinski tells ZDNet.

"By implementing low-code tools within our systems, our developers can work quickly and efficiently to bring new devices to market, reducing time to production."

As enticing as the prospect may sound to small companies with restricted budgets, the trend might also come as a threat to programmers. More money spent on automated coding platforms, after all, means that less investment will go towards hiring human developers.

But while the profession will change, it is not at risk of disappearing. Even if non-developers start playing around with Lego blocks of code to build applications, a degree of programming will still be required to create those blocks in the first place; and it is likely that a human coder will also be necessary for higher levels of sophistication, even when using low-code tools.

Ritam Gandhi is the founder of Studio Graphene, an app development platform that works with start-ups to build digital products and services. "We're heading towards a more specialist development community," he tells ZDNet.

"We'll have either developers that are good at low-code, who have basic engineering skills and are better at solving problems by using the existing tools that are there. And on the other extreme, we'll have complete specialist developers working on those re-usable components to be leveraged by non-specialists."

Just like the past decade has seen a divide between back-end developers and front-end developers, the next few years will provide, therefore, the next iteration of coding. The process, according to Gandhi, is only the natural evolution of the profession as new tools come along.

The current sentiment among developers, when it comes to low-code platforms, is one of cautious welcoming. For Coding Dojo's Richard Wang, for example, the technology's restrictions might ultimately limit its widescale adoption. "The technology industry is always changing and it's impossible to predict which new technologies will become common, and which will die off," stresses the coding boot camp CEO.

Gandhi argues that the technology has too many benefits to be dismissed. Studio Graphene's main customer base consists of start-ups; Gandhi has stopped counting the number of founders he has met who can't code and need the technology to get their ideas off the ground.

"Every day, you walk around and get an idea about a platform or an app you could use, but you don't have the skills, or the budget to build it," says Gandhi. "That barrier to entry is now lowering. We should welcome it because it will enable more ideas to come to life, more products and services to make things more efficient. That's a positive thing."

As more and more non-technical entrepreneurs gain access to low-code and no-code tools, so will the number of useful applications multiply; and the technology's ramifications for the start-up ecosystem could be significant. Turning that good idea into an actual product could be about to get a lot easier.

EVEN IN LOW-CODE SOFTWARE DEVELOPMENT, IT DEPARTMENTS STILL NEED TO HOLD USERS' HANDS

No matter how little code is involved, nine times out of 10, IT managers need to stay on top of what users are doing with application development.

BY: JOE MCKENDRICK/ZDNET

Give a user software, and you feed them for a month. Teach a user to build software, and you feed them for at least two months.

IMAGE: JOE MCKENDRICK

Even with the proliferation of low-code and no-code tools in today's market, it looks like IT managers will have to stay tuned into what users are doing with the technology. Low-code and no-code are seen as the tools and platforms that enable business users to build and launch applications without the involvement of IT departments. However, in more than nine out of 10 cases, IT does need to stay involved.

That's the word coming out of a survey of 1,000 IT executives, of which 60% point to lack of experience as their prime obstacle. The survey, sponsored and released by Creatio, finds low-code/no-code as key enablers of digital transformation, but users are still stymied by a lack of experience with the solutions. Sixty percent of respondents see this as a barrier to low-code adoption.

IT departments need to provide guidance and monitor low-code situations. Only six percent of low-code development is done by business users without any IT involvement, the survey shows. "While the adoption of no-code tools by business users is higher, the low-code development approach still requires a basic understanding of underlying technologies and IT acumen," the Creatio report's authors observe. "While empowering everyone to become a developer, companies need to ensure IT staff takes ownership in security and system administration, complex integrations and overall consistency of the IT landscape."

Of course, professional developers are also consumers of low-code and no-code tools themselves. The survey also documents a trend "towards erasing the distinction between simple no-code tools for citizen developers

and more comprehensive low-code tools for developers with IT backgrounds. Low-code will shift to a no-code development approach, offering no-code platforms with powerful capabilities for enterprise applications development of any complexity without coding skills or specific training."

The key benefit companies are finding in low-code adoption is accelerated time-to-market (38%), which points to direct business benefits being realized. A secondary benefit is reduced app development costs (34%) associated with low and no-code development. The areas of the business most associated with low-code tools include sales and marketing, service, human resources, and finance.

How much faster is low-code and no-code development over traditional IT-centric development? Only five percent say it moves at the same pace or slower that IT-centric development. Close to one-third, 32%, say low-code is more than 50% faster than traditional development.

How much faster is low-code development comparing to traditional development?

- Slower than traditional development 2%
- Equal to traditional development 3%
- 1-20% faster 11%
- 21-40% faster 27%
- 41-60% faster 29%
- 61-80% faster 18%
- 81-100% faster 5%
- More than 100% 9%

In a related matter, the survey also finds only 10% of business processes are full automated. Another 30% of process are not automated at all yet. "Given complex legacy workflows in organizations from industries such as financial services, manufacturing, or professional services, the path to full-blown automation requires more intelligent solutions capable to extend the responsibility for process automation across both front and back-office teams," the report's authors state. Of what is already automated in the respondents' organizations, a majority used out-of-the-box capabilities within existing applications such as CRM, followed by out-of-the-box applications with some custom coding. "With the rise of low-code platforms for process management and CRM, we expect this trend to change in the upcoming years as more organizations will be able to manage complex process automation projects self-sufficiently."

THE ROAD TO LOW-CODE AND NO-CODE DEVELOPMENT NEEDS STRONG GUARDRAILS

Survey finds widespread adoption of low-code and no-code approaches. However, IT still needs to be a full partner.

BY: JOE MCKENDRICK/ZDNET

Low-code and no-code approaches are now ubiquitous -- just about everyone is doing it or intending to do it. But what happens if large numbers of employees are pumping out their own applications via different platforms and services, dumping it all on operations teams who have to make it work?

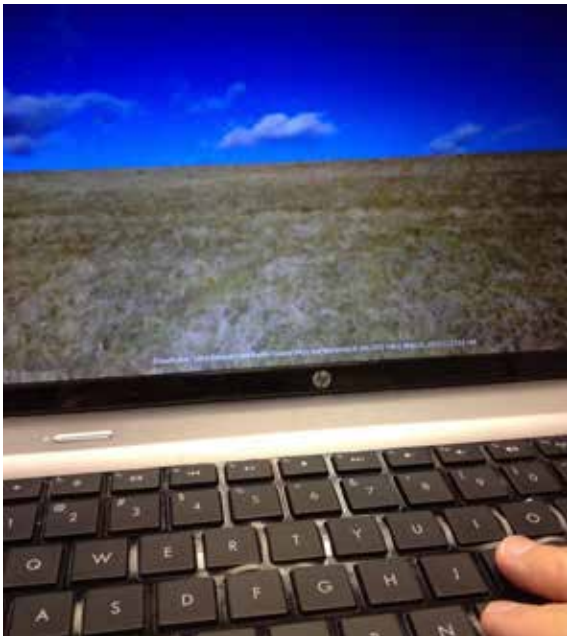


IMAGE: JOE MCKENDRICK

That's the question raised by Tonkean, which released a survey of 500 IT and business operations professionals, finding at least 86% of respondents said their projects at least occasionally get delayed because of a lack of technical resources, and only 24% believed their current toolset satisfies all their needs. While Tonkean, a no-code automation platform provider, has a stake in this survey, the results point to the organizational issues that accompany efforts to extend development powers to end-users. Namely, everyone is coming from with different directions, with different tools and perspectives.

Overall, 33% of respondents have already invested in no-code/low-code tools, and 45% are actively seeking no-code/low-code tools. Another 16% say they expect to seek these tools within the next 12 months.

A meager five percent said they don't expect their organization to adopt no-code/low-code tools anytime soon. (I'd love to find out more about this group -- are they highly rigid, hierarchical organizations? Or security fortresses?)

So, in most cases, people agree no-code and low-code is a good thing for their organizations. However, the survey's authors say they find "a certain degree of ideological separation among IT and operations teams. Non-technical operations teams feel technologically unsupported." They talk about "operational debt" that comes from using too many applications and toolsets for specific functions.

IT and operations teams seem aligned on the benefits of low-code and no-code -- majorities of both IT (88%) and operations (75%) professionals express optimism that no-code/low-code tools "would empower their operations team to get more work done," the survey's authors report. "The average enterprise reports using around 1,295 separate SaaS apps or services, the vast majority of which don't provide the kind of strategic value needed. Operational debt, meanwhile, contributes to inefficiency, creating obstacles such as bottlenecks and technology gaps."

Collaboration, then is the key to enabling successful low-code and no-code development, and an important piece of this story is enabling the collaboration that is essential to build, run and share applications, This is particularly acute in today's remote, work-from-anywhere environments, Jennifer Cadence, product marketing manager at Google, writes in a recent post. "Once an app is shared with another person, whether it be a fellow creator or an end user, collaboration becomes something different," she explains. "For a creator-to-creator relationship, it means ensuring the data source in use is designed for manageability, iteration, security, and friction-free access. For an end user-to-creator interaction, the relationship is more complex: app creators typically engage with an application in a development capacity on a desktop while end users typically engage with an application on their mobile devices."

IT managers need to step up and provide guardrails for governance and security, Cadence adds. "When an IT team can set policies and provide oversight for non-technical teams within the organization, employees on the ground can problem solve quickly without creating management and governance liabilities. Enterprises want to empower employees to innovate and move fast-but they cannot afford to play fast-and-loose with data security. Neither no-code technology nor the citizen developers who leverage it are meant to replace traditional development practices within an organization."

AS LOW-CODE AND NO-CODE APPROACHES RISE, DEVELOPERS BRACE FOR NEW CHALLENGES

'People rapidly create things, rapidly deploy things and rapidly regret things. Each subsequent generation of technology makes it easier to build bad solutions fast.'

BY: JOE MCKENDRICK/ZDNET

IMAGE: EMILIJA MANEVSKA / GETTY IMAGES

The Covid crisis accelerated many things digital, and among them, the drive to open up relatively simple interfaces that enable non-technical users to build their own applications, as well as speed up the work of professional developers -- known as low-code or no-code solutions. At the same time, some industry observers point out that citizen developers aren't going to be taking the reins of IT anytime soon.

There's no question that the Covid situation accelerated the low-code/no-code movement out of necessity. And with it, came the platforms. While "use of prepackaged software components and frameworks to accelerate custom development is not new... the quick response of development platform vendors as solutions providers during the early Covid-19 crisis will be seen as a signal event in emergence of prescriptive low-code platforms," according to an analysis issued by Forrester analysts John Bratincevic and John Rymer. (Available as a free download from Ultimus.)

The emphasis is on *prescriptive,* as these platforms aren't just tools, as they offer, through highly visual components, "Lego-like blocks of business functionality" to configure and compose enterprise applications. "They abstract business functions through business components that manage invoice processing, ledgers, timesheets and schedules, onboarding, and other business functions."

Still, as Bratincevic and his co-authors caution, low- and no-code progress is dependent on how far vendors are willing to go. "Most advocates of prescriptive low-code are small vendors requiring deep customer commitments. And vendors must deliver both business-domain and development-platform expertise."

In many ways "low-code" and "no-code" are forever a promise that are just a couple of years away. As Steve Jones, CTO of Capgemini, pointed out in a recent post, "the number of developers in IT only continues to increase, and is forecast to keep increasing... how come if 'no-code' is going to be the future?"

Jones recalls how certain Windows environments in the 1990s served as "low-code" platforms, later to be followed by Java platforms -- "I remember using a tool such as VisaJ which enabled you to visually model your Swing GUI and have the Java code generated, no-code," he relates. "Roll forwards to BPEL and BPMN and vendors talked about it being a no-code as everything was meta-data, then we had 'Mashups' that enabled people to quickly create data driven applications and combine them together."

Jones has a simple, one-question test to determine the viability of low-code or no-code applications: "Do you have an 'if' statement or equivalent?" If so, those conditions need to be tested, he adds, noting that low- and no-code environments should be referred to as "no-test" environments. "People rapidly create things, rapidly deploy things and rapidly regret things, if there is one thing for certain it's that each subsequent generation of technology makes it easier to build bad solutions fast."

Ideally, what low-code and no-code environments need is a way to automatically manage the mistakes users will make, he adds.

At the same time, while low-code and no-code platforms are on the rise, professional developers aren't going to see their employment prospects dim anytime in the near or distant future. "These tools are getting better, but they won't replace developers any time soon," relates Tatum Hunter in a recent post at the Built In community. For starters, "low-code and no-code won't siphon jobs from developers because those platforms don't facilitate the work devs do in the first place," she writes. "Large companies already have developers on staff for custom software needs, while the small and medium companies would probably never consider hiring developers for internal tooling."

The roles of developers are elevated, as they are less mired in low-level coding and integration tasks. "No-code and low-code platforms have the potential to boost the business value of programmers and non-programmers alike. Thanks to abstraction, non-technical employees can quickly spin up common types of applications and mold them to their immediate needs," Hunter says. "Thanks to automation, devs save time on repetitive tasks like data entry or reporting."

But "there are still plenty of ways for no-code and low-code to go awry," she adds. "Both programmers and non-programmers can quickly lose track of the architecture of what they're building, which makes for jumbled, poorly performing software." She quotes Alex Hudson, a CTO advisor, who notes that while low-code and no-code systems "work very well on the small scale -- that functional-level process where you're looking at small pieces of logic -- but when you're trying to piece it all together and see how all these things interact, it just becomes really, really difficult."

For their part, Forrester's Bratincevic and his team observe that no matter how advanced low- and no-code solutions get, IT professionals will still need to do plenty of hand-holding. "Don't confuse 'no code' with

'no work,'" they advise. "Prescriptive low-code vendors promising solution delivery without any coding are promoting quicker solution delivery and evolution as well as potentially reduced technical debt. They're not promising that business experts can deliver substantial projects without attention to good development and delivery practices. Discipline still matters."

Ultimately, software development is a high expression of creativity that can't be automated. As Mary Rose Cook, an engineer with Airtable, also quoted in Hunter's article, put it: "If programs are just a means to get things done, then sure, developers should be worried about automation's growing capabilities. But if programs are a means for humans to creatively tackle new problems, explore new philosophies and even make art, the need for programmers will never go away."

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