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Low-code addresses the fast-paced go-to-market needs of accelerating Digital

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Foreword

Software is everywhere.

However which way we look at things, we're becoming realists and the old days of technology hype and fear of change are receding into the past. Over the past year and a half, we've gradually let go of the many shackles of the past and started to realize we're in a new reality, a wholly new environment, where we're all trying to focus on achieving real business outcomes, on values that are important to us, and a new work reality where it's intense, high-touch and very real.

Today's focus is about understanding and discovering the data we must have to win in our markets – right now in real-time – and in the future – as the market environment keeps changing. Then we need to make our data ubiquitously available, accessible, and mineable – embedding a mindset into our leadership to inspire our people to work together to create organizations that can flip their business models to exploit these seismic market changes. You can't get the data you need if your critical data is not in the cloud and you don't have the people, partners, processes, technology – and desire to change – to make this possible

The change in the enterprise mindset towards technology has gone through a genuinely pragmatic revolution over the past year and a half. The realization that being able to function in a virtual model has gradually drained the remnants of hype of the technology value propositions.

For most of us, our data journey is well underway but still a long way from reaching our desired end-state. We know the data we need is residing in multiple places, digitally delivered to any device, but too often requiring us to connect all the dots to do our jobs effectively.

Simply put, too much of our data is locked up in somebody else's code. Our partners and employees struggle to integrate their existing workflows into software-based solutions that deliver role-based insights into business processes, and customer offerings.

These are all things we are told Low Code can help address, for ourselves, my teams, and our customers.

Low Code addresses our rapidly changing work environment as we embrace innovation at speed to stay competitive in the uncharted waters of the new virtual economy.

We care about connecting data and workloads across systems, Clouds, and databases. We need tools that reflect how we work and how we satisfy customer needs and experiences. And we need tools that can address the needs of legacy systems and the most modern microservices.

Low Code is tied to automation, something we know a fair bit about. Using visual objects, software programmers, business analysts, and citizen developers, we can 'drag and drop' data, workflows, APIs, and applications to configure software in a way that creates business or software logic. Executables can take minutes rather than weeks. And results can be compared to desired outcomes before committing time and money to project, initiatives, or changes.

Low Code is about faster creation, testing, and experimentation. But done well, Low Code may finally bring rapid application delivery and agile methodologies out of the technology closet and into mainstream use and become part of every company's digital DNA.

It was with these topics in mind that we undertook this research in partnership with Infosys to understand how enterprises were adopting and benefiting from Low Code and No-Code tools and experiences. We emerged with essential insights into how the journey to Low Code is just beginning but is accelerating rapidly.

Happy reading!

Phil Fersht
CEO and Chief Analyst,
HFS Research

Foreword

The paradigm has shifted. We are at an inflection point when we must prepare for business with the ability to adapt our core as rapidly as our customers shift their needs; where our workers are not all employees, and our workplaces are a network of remote locations operating as workspaces along with our offices. It will also be key to not just innovate in a sandbox but scale ideas into real world solutions.

The need of the hour is for the entire team to be able to:

- React quickly to changing needs by using aids like visual design components and pre-built templates to build new solutions to new market challenges before the competition does.
- Work smarter, efficiently and more effectively leveraging the power of hyper-automation and smart applications built by business users, citizen developers, employees and gig workers together in intuitive, interactive and inclusive ways.
- Build scale into innovation with open APIs and DevOps tools that allow us to integrate with more technologies. And at the same time fall back on centralized, role-based authoring tools to set guardrails around our work even as it scales.

Add to this the rapidly accelerated clock speed of business putting digital

transformation in overdrive along with a critical shortage of digital talent – and the challenge gets harder. Clearly, we need a dramatically new approach to becoming digital. Low-code solutions hold the promise of a way out.

But only when done right.

Along with the agility they bring, low-code solutions can also increase IT complexity if not managed effectively. A governance structure with adequate security oversight and documentation is, therefore, vital. Checks and standards to ensure the solution integrates well with other systems in the landscape is also key. When low-code solutions work in tandem with a robust, solid enterprise core that enterprises already have in place, they can quickly bring highly differentiated solutions to the most complex challenges – sometimes delivering as much value as a long-drawn digital transformation project might.

The time is ripe to explore the possibilities around low-code solutions and tap into its true potential. We believe there's immense value in progressing the low-code conversation.

Ravi Kumar S,
President, Infosys

With rapid pace of technology advancements and changing customer expectations, organizations are looking to harness new possibilities from Data, AI and Automation building blocks from Hyperscalers. Low-code platforms have gained significant momentum and are becoming mainstream application development platforms driving massive simplification and agility. However, CIOs today are treading with caution on low-code, on how to incorporate right levels of governance to complement creativity and speed that low-code unleashes. Leveraging our digital fluidity framework, we accelerate adoption of low-code, making it easier and manageable by bringing together people, platforms and processes. The business impact of this shift spans across key dimensions of customer experience, work efficiency, and process effectiveness, thereby accelerating digital fluidity.

– Srinivas Kamadi
SVP, Enterprise Application Integration and Services – Infosys

Speed, investment, training, collaboration, and partnerships make up the five factors driving the adoption of low-code and no-code

In mid-2021, HFS partnered with Infosys to survey 150 professionals involved in adopting low-code and no-code solutions. Five themes emerged indicating how successful enterprises can adopt low-code solutions:

- **A “need for speed” is accelerating low-code adoption.** Ninety-five percent (95%) of enterprises surveyed have either adopted or are trialing low-code or no-code solutions. The need to respond and develop quickly for changing business needs is the primary demand driver.
- **IT spending on low-code development is likely to double in the next three years.** In the next three years, investments in low-code development platforms will grow from less than 10% to nearly 25% of software budgets. Spending will shift from Microsoft, Oracle, Salesforce, and SAP to firms like Appian, Agilepoint, Kintone, Unqork, and Betty Blocks.
- **The “no code” in low-code/no-code is a misnomer.** While low-code adoption is about simplicity, it still requires investments in training. Among decision makers for investment in low-code development, 62% cited training as the most significant adoption inhibitor.
- **A OneOffice mindset is a critical success factor to drive low-code success.** In addition, low-code development requires strong IT and business collaboration. From an investment perspective, software teams drive 62% of low-code investments.
- **Low-code adoption is a driver, not a death knell, for IT services.** However, services partners must bring business and design skills to support adoption. Enterprises expect partners to play an essential role in the adoption of low Code; these include business consulting (79%), software development (76%), and data management strategies (69%).

Low-code development promotes agility, ease, and responsiveness on co-innovating and co-developing software applications for the business

As enterprises are adopting software to automate workflows that compose, capture, and connect information they become more market and customer focused. Yet, the downside has been the time it takes to practically develop, implement, and optimize information delivery. As illustrated in Exhibit 1, accelerating innovation, and becoming more responsive to business needs are how low-code solutions are supporting digital transformation efforts.

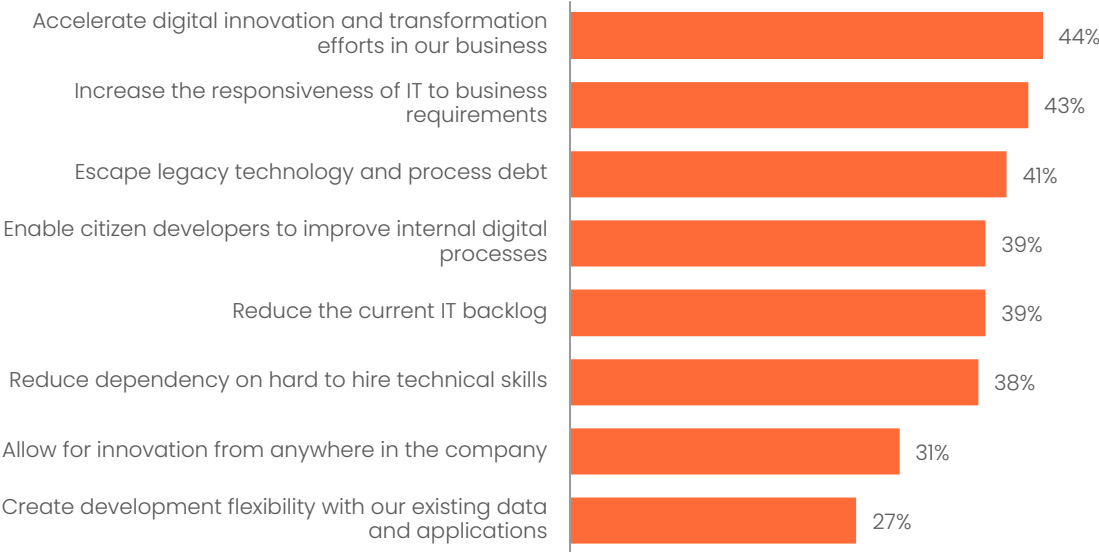
The adoption of Agile methodologies and rapid application development (RAD) tools accelerated development

by changing the mindset of software development. Low-code development releases teams from the need to craft text-based code and accelerates software development lifecycles (SDLC) needed as enterprises embrace the cloud and digital transformation efforts. Reducing their dependency on traditional coding with low-code makes it easier to engage non-technical teams in requirements gathering and co-creation more effectively. Firms can finally escape technology and process debt that has limited their ability to innovate at the rate the market desires.

Exhibit 1

Enterprises adopt low-code and no-code solutions to accelerate digital transformation efforts

What are the drivers for adopting of Low Code and No Code Solutions in your firm?
Percentage of response



Sample: 150 executives across Global 2000 enterprises
Source: HFS Research in partnership with Infosys, 2021

Low-code platforms change how we develop software and can ease the frustration with the time it often takes to develop or customize applications the business uses. This easing of implementation is clearly shown as a primary driver for low-code adoption in Exhibit 2. With low-code, business users can have more input with software development teams throughout the SDLC, making implementation more successful the first time it is released, resulting in more responsive partnerships and better decision making.

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We use low-code solutions to implement new software quicker and cheaper. This leads to increase value, and our teams are more responsive to what the business values.

– **Software development manager**

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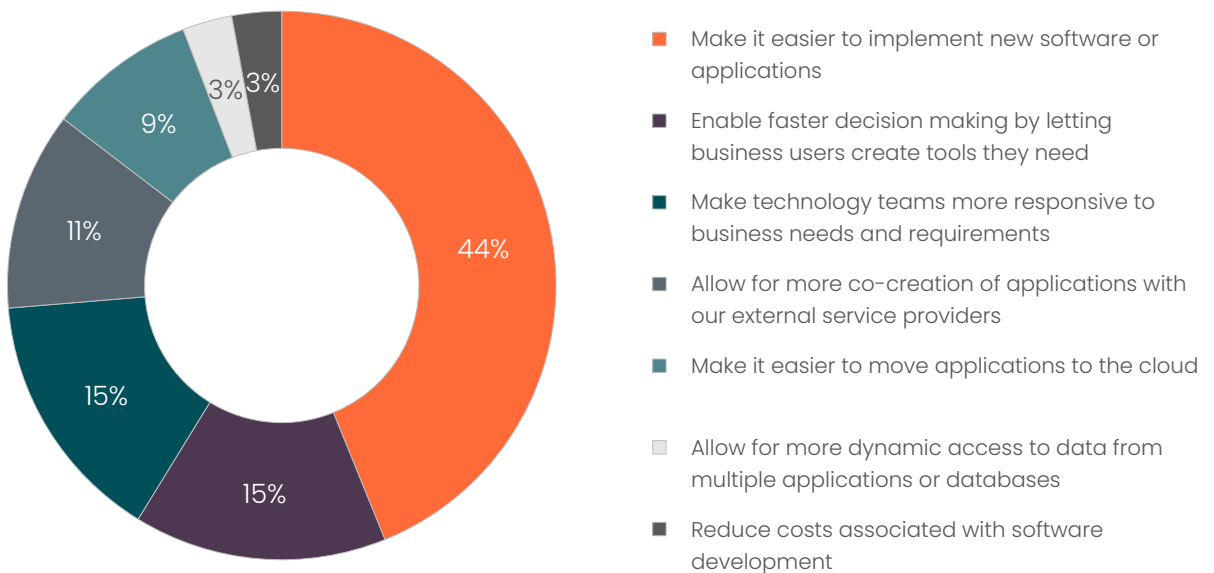
The ability to speed application development finally can unleash pent-up innovation by reducing the development backlog that also hampers how technology teams can better serve the business.

Exhibit 2

Decision makers see low-code development as a tool to make it easier for their teams to implement solutions

What is your primary object for adopting Low Code or No Code solutions?

Percentage of response



Sample: 150 executives across Global 2000 enterprises
 Source: HFS Research in partnership with Infosys, 2021

Low-code is a “new” tool supporting legacy and modern software development practices within the enterprise

Increasingly, businesses are seeing technology as *a lever for relentless innovation*. And to be competitive, all parts of an organization want to improve their digital fluency and contribute to software development. The growing willingness to co-innovate is an accelerator for the adoption of low-code development. As Exhibit 3 shows the demand for rapid software development has resulted in **42% of organizations currently using low-code tools** and another 53% actively exploring how they can implement these solutions.

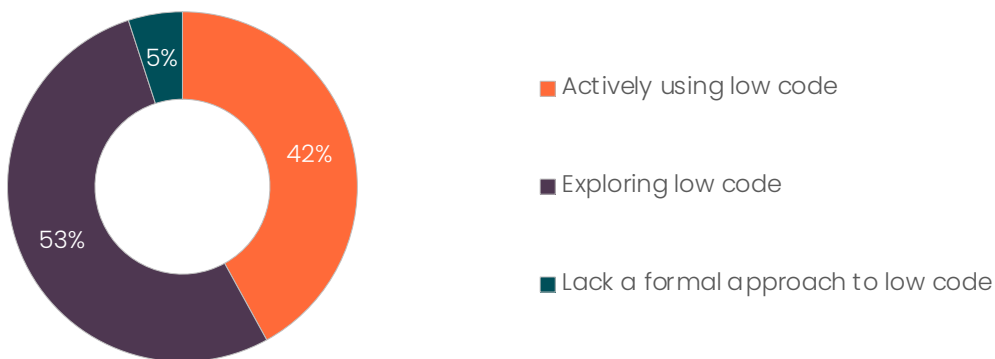
As software migrates to the cloud, software development will increasingly embrace a “cloud-first by design” mindset, and they need tools that reflect these needs. Low-code development allows enterprises to take advantage of this shift by using a graphical input with

process flow diagramming to link applications and data across architectures. The tools render results in common desktop applications, web browsers, and mobile devices, facilitating adoption and everyday usage.

Developing cloud-based applications is an essential part of a company’s strategy; it is worth noting that CTOs see low-code as adding immediate value by unleashing value locked in existing applications. The need to modernize core applications from vendors like SAP, Oracle, and Microsoft results in these vendors embedding low-code into new releases to make adapting their systems to modern delivery models easier.

Exhibit 3

Low-code is on the precipice of mass adoption with 95% of companies reporting they are actively using or exploring these solutions



Sample: 150 executives across Global 2000 enterprises
Source: HFS Research in partnership with Infosys, 2021

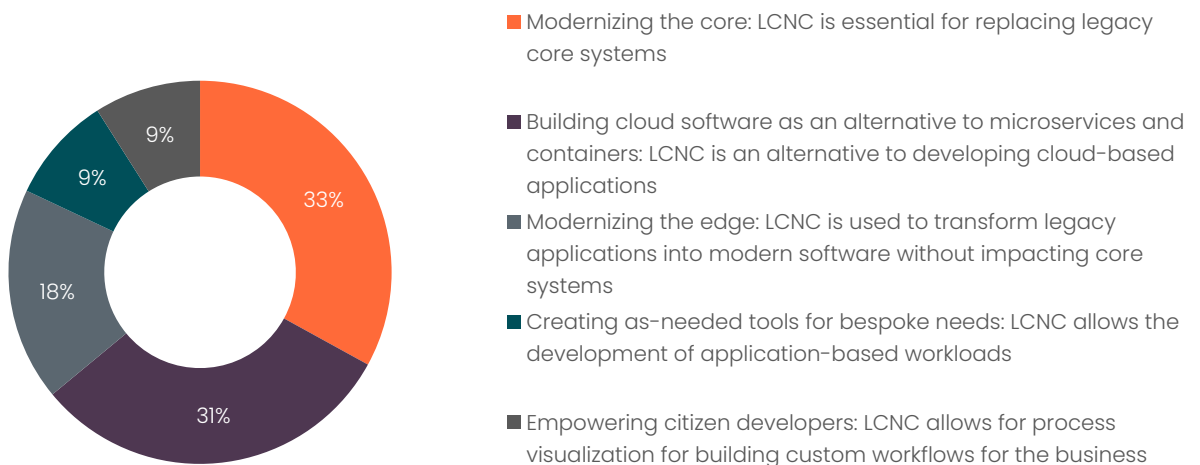
By adopting low-code and no-code development for legacy software, many companies are addressing talent and skills gaps. With few coders working in SAP ABAP, COBOL, or C++, delays in fixing deficiencies in these programming languages have plagued many business requests for new features. With low-code platforms, software teams can focus on the objects and data that deliver value—not thousands of lines of custom code in core applications.

Adopting low-code development in core systems builds comfort with coding with low-code tools. However, the lasting value will result from adopting low-code development across applications, data,

and workloads. As businesses adopt low-code development to support legacy software, the benefits will translate into using low-code tools for new application development, data integration, and connecting the many software-as-a-service (SaaS) applications across the business. Our survey shows software development teams are increasingly looking at acquiring stand-alone tools from Appian, Agilepoint, Kintone, Camunda, and Unqork to boost developer capabilities. We expect all of these to have double-digit growth potential in the next 12 to 24 months.

Exhibit 4

Low-code is an effective means to modernize the core and build for the cloud



Sample: 150 executives across Global 2000 enterprises
 Source: HFS Research in partnership with Infosys, 2021

Low or no-code does not mean “no coding required” and training is essential to adoption

While low-code and no-code tools are visually more pleasant to use than traditional coding green screens, both often require setup and fine-tuning. Given the growing number of solutions, the need to extract and edit raw code, and integrate with existing solutions, the consensus among companies is that training is still required. The leading impediment to low-code adoption shown in Exhibit 5 is a lack of training. Without training, low-code tools may still become shelfware.

Sixty percent (60%) of firms are looking to services partners to assist with technical and domain experience with these solutions, and 82% expect these partners to bring business consulting skills to refine how to deploy these solutions beyond the technology team.

Co-training partners, software teams, and business users on tools can ensure a shared development methodology and better prepare each team for co-development and continuous innovation efforts.

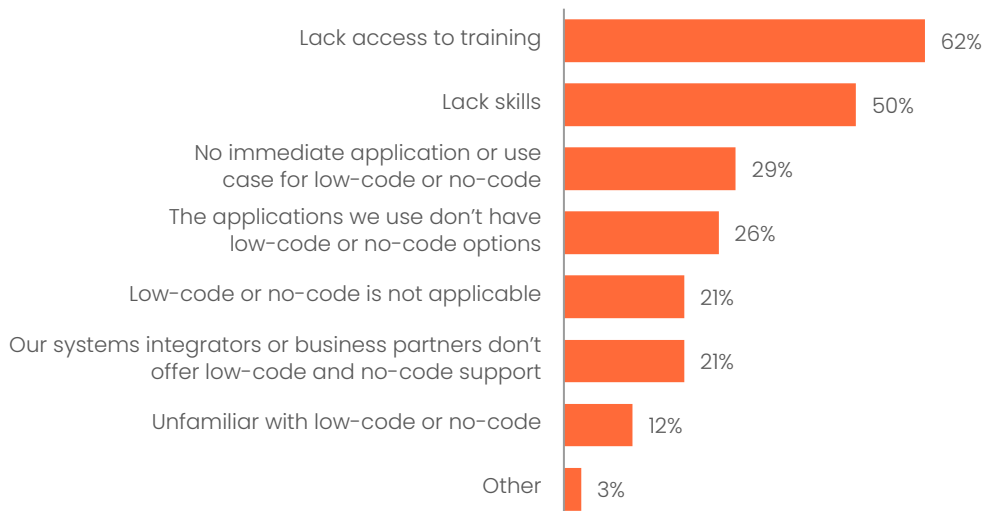
Software teams will limit their success if they do not work with their partners. Teams can overcome skill development challenges by working with partners to bring in best practices suited to their domain specific coding challenges. In addition, partners can play an essential role in supporting the business user interests in scaling applications faster and off-loading many software development tasks.

Exhibit 5

The lack of training on how to use low-code or no-code solutions is the biggest inhibitor to adoption

What challenges does your company face in adopting low-code and no-code solutions?

Percentage of response



Sample: 150 executives across Global 2000 enterprises
Source: HFS Research in partnership with Infosys, 2021

Adopting and scaling low-code development requires more than skill development; structured rollout and democratized, citizen-developed apps also require governance, operations, and monitoring. Role-based visualization of operational plans ensures everyone uses low-code development appropriately, preventing mushrooming of unmanageable apps.

Beyond training, CTOs should focus on choosing the right tool for the right job. For example, requirements to update a ledger in core financial systems differ from accessing data needed for holiday marketing and sales programs. To develop programs for staff, CTOs should be pragmatic about which tools can be used for which purpose and work with the software vendor and their partners to ensure both training and compliance are honored.

Companies executing due diligence while introducing low-code tools can expect strong adoption. But, more importantly, by using the tools consistently, both businesses and development teams can collaborate on the low-code environment and go deep into raw code outputs to fine-tune and sustain their efforts over time.

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To be successful, our company built a decision tree that ensures all teams use the same low-code tools to solve the same problem. This is essential for long-term support and survivability of the solutions built with low-code.

– Applications lead, North American financial services firm

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Successful low-code adoption requires a OneOffice™ mindset for collaboration, partnering, and outcome-based activities

In our research, HFS has documented an uptick in low-code and no-code solutions with companies like Goldman Sachs and Liberty Mutual, the cities of New York, Chicago, and Washington, DC, and Maimonides Medical Center adopting low-code development to enhance their DevOps teams. By removing the need for complex code, their teams report fewer defects than traditional code-based approaches, faster delivery, and reduced costs.

These firms are using low-code and no-code solutions to make access to data easier for everyone in the company. The emergence of the citizen developer is currently a pleasant benefit rather than a planned outcome. As more workers are comfortable assembling workflows and using a project mapping style tool, we expect both usage and rewards to increase.

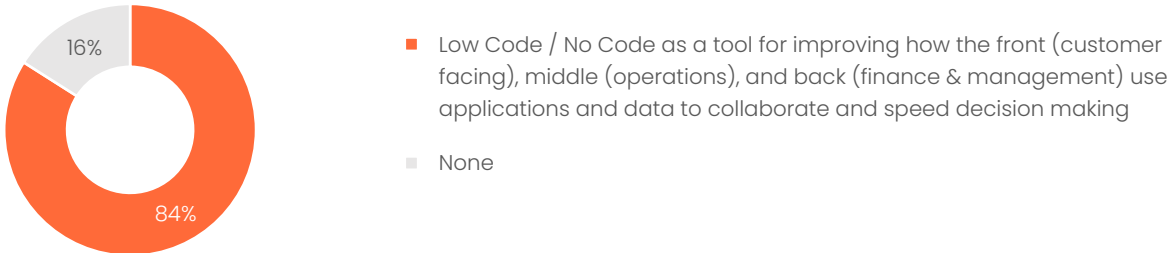
Low-code development and the HFS OneOffice™ mindset are a good pair, as shown in Exhibit 6 low-code tools are designed for everyone to use to manage and improve the flow of data and information. Furthermore, as digital fluency improves, users are becoming more comfortable using standard productivity tools and web browsers to search, shape, and contextualize information. Therefore, the low-code solutions focus on several critical features to ensure user adoption, including a simple user interface (UI), integration with standard productivity software tools, and web-deployment architecture.

Exhibit 6

While citizen developers may not be an early adopter of low-code, the ability to collaborate with visual coding elements and tools is very important

LCNC as a tool for improving how the front (customer facing), middle (operations), and back (finance and management) offices use applications and data to collaborate and speed decision making

Percentage of response



Sample: 150 executives across Global 2000 enterprises
Source: HFS Research in partnership with Infosys, 2021

Low-code tools should improve the human experience working with applications, data, and systems. These tools should be simple to use and ideally integrated with standard tools like Microsoft Office or Chrome as highlighted in Exhibit 7.

With low-code tools, teams can increase the relevance of applications to end-users and customers by making them more contextual or usable in their daily tasks. Through better experiences, low-code development enables closer collaboration across the organization and helps everyone involved create solutions that discover explicit and implicit needs.

“

Low-code and no-code solutions accelerate data and workflow contextualization for business users and citizen developers while helping software development teams reduce backlogs and turn rapidly changing business requirements into continuous sustainable integration and continuous delivery (CI/CD) pipelines.

— Joel Martin, HFS Research, May 2021

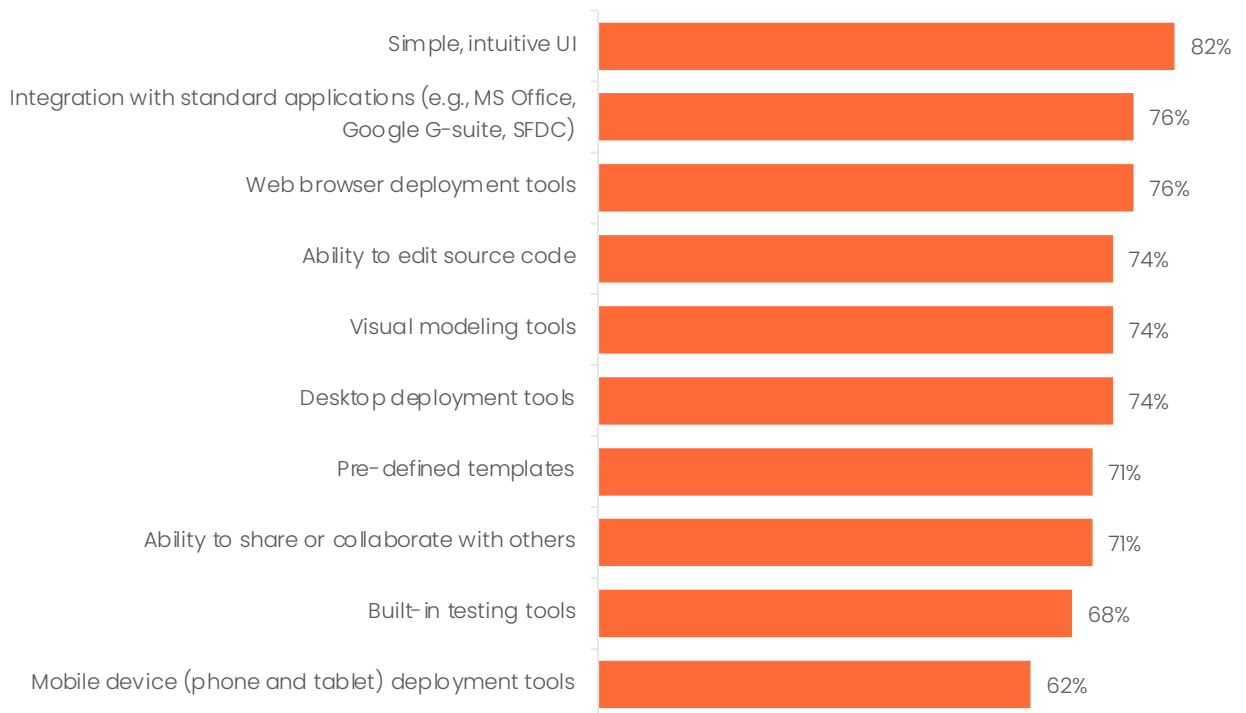
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Exhibit 7

User experience is a hallmark of adoption for low-code solutions

What features are important in LCNC solutions?

Percentage of response



Sample: 150 executives across Global 2000 enterprises
Source: HFS Research in partnership with Infosys, 2021

Services partners will play a key role in the adoption of low-code solutions as they bring tools, domain experience, and capabilities that software development teams can use to accelerate adoption

Co-development is a crucial part of adopting a digital-first strategy and will change how enterprises develop software. As Exhibit 8 shows, 73% of enterprises expect their partners to play a central role in addressing the changes needed to redesign their software development process. In addition, the demand for a faster turnaround from technology teams means CTOs must look to business partners and technology partners to co-innovate at a much higher rate of change while addressing backlogs and supporting a growing number of systems.

CTOs must take the good with the bad as low-code and no-code development still require governance to sustain their benefits for the long term. To address the growing demand for solutions built on Low-code solutions, **73% of firms**

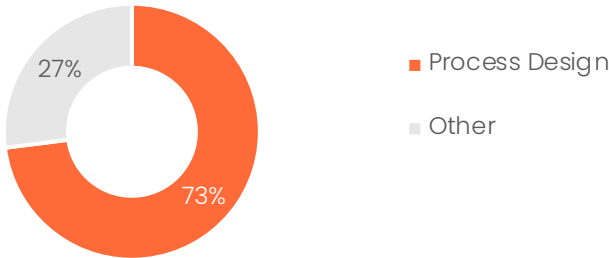
indicated they would seek input from their software and services partners in adopting, training, and developing these solutions. Businesses must not overlook the need for governance and planning when adopting, deploying, and supporting low-code, or else too many solutions may result in the business become woefully encumbered with multiple solutions to the same problem.

While **78% of respondents to our survey feel low-code will aid in building partnerships across business and technology teams to co-innovate**, 61% of funding will continue to come from the technology team. Given the high rate of IT investment, we expect enterprises to lean on their services partners to help shoulder some of the costs.

Exhibit 8

Most firms are seeking input, training, and expertise in their low-code journey

Partners need to help design software development process
Percentage of response



Sample: 150 executives across Global 2000 enterprises
Source: HFS Research in partnership with Infosys, 2021

— The Bottom Line: Training, partner support, and a focus on modernization legacy software are the keys to unleashing the potential of low-code development

Speed and responsiveness are table stakes required to be a leader in today's markets. In our survey, 95% of companies cite increasing their responsiveness to business requirements as the most important objective of adopting low-code and no-code solutions. While co-creation between the business and technology teams is the end goal, we now see experienced developers realizing the value of these tools.

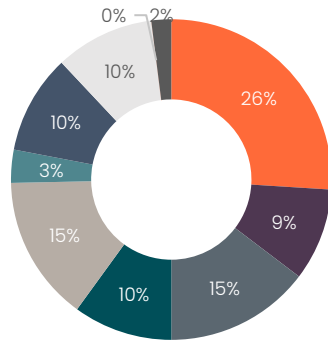
While adopting low-code begins with the software development teams, as enterprises strive to become customer and market-centric, low-code solutions will engage others throughout the business. As requests from the business come in, both technology teams and services partners can quickly spool up a test environment, create workflows visually, and place test environments in front of the business at an accelerated rate. As low-code development adoption increases, citizen developers in business units will increasingly be able

to use these tools to fine-tune and co-innovate processes. The opportunity to create value by moving development out of technology silos and across the business may not be too far off for many firms.

A word to the wise on low-code development, the attractiveness of developing applications quickly and effectively for the business will require support. To succeed, look to your partners for best practices and augment your staff with training resources and talent. While the draw toward low-code tools' simple UI and ease of integration is powerful, not all developers are experienced with the visual project planning tools these solutions mimic, and not all business users understand that they need data and process mapping to create bespoke applications. If you don't put the time into planning how you use low-code for modernization, solution delivery, or application creation, many significant benefits may go unrealized.

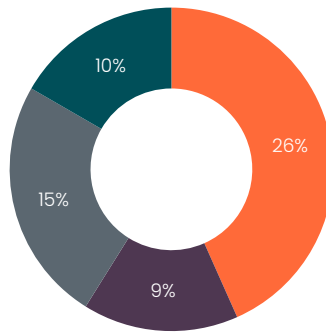
Study demographics

Industry



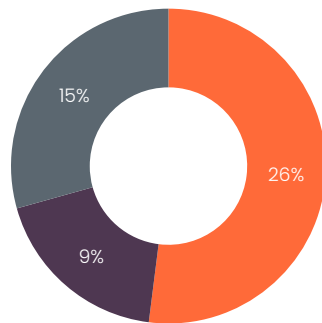
- Banking and financial services
- Insurance
- Healthcare and life sciences
- Manufacturing
- Telecom, media, and high-tech
- Travel, hospitality, and logistics
- Energy and utilities
- Retail and consumer packaged goods (CPG)
- Government or public sector
- Others

Revenue split by respondents



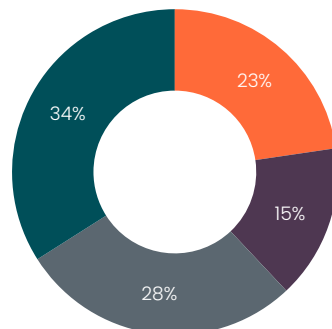
- Banking and financial services
- Insurance
- Healthcare and life sciences
- Manufacturing

Location



- Banking and financial services
- Insurance
- Healthcare and life sciences

Role in decision making process



- I am the decision maker (with visibility into investments and/or understanding of deployment)
- I am the internal advisor (with visibility into investments and/or understanding of deployment)
- I am an influencer (with visibility into investments and/or understanding of deployment)
- I am involved in the execution (with visibility into investments and/or understanding of deployment)

Research authors

HFS Research



Joel Martin **Research Leader**

Joel Martin is a Research Leader, Cloud Strategies at HFS. Joel's role is to aid organizations in making crucial decisions on designing, adopting, managing, and governing their growing portfolio of as-a-Service solutions. Executives and business leaders will benefit from concise research on harnessing cloud-based solutions to support the workplace's rapid, fundamental changes.



Saurabh Gupta **President, Research and Advisory Services**

Saurabh Gupta is the President Research and Advisory Services at HFS. He oversees HFS' global research function managing the international team of analysts and operations across the US, Europe, and Asia-Pac. He works closely with the CEO to set the HFS vision and ensure we deliver unmatched insights, impact, and inspiration to our clients. He sets the strategic research focus and agenda for HFS Research, understanding and predicting the industry's needs and ensuring that HFS maintains its position as the strongest impact thought leader for business operations and services research. Saurabh is also HFS' lead analyst for business services such as F&A, procurement, supply chain, horizon three emerging technologies such as blockchain, and energy and utilities.

Infosys



Ashok Kumar C S **Senior Industry Principal, Head of Consulting – Digital, Automation & Low Code, Infosys**

Ashok Kumar C S leads Strategy and Consulting for Low-Code, Digital Automation, Business Process Architecture at Infosys. He works with customers across the lifecycle from 'ideation to Implementation' for digital challenges related to Backoffice transformation, customer experience reimagination and process simplification.

About Infosys

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Infosys is a global leader in next-generation digital services and consulting. We enable clients in more than 50 countries to navigate their digital transformation. With over four decades of experience in managing the systems and workings of global enterprises, we expertly steer our clients through their digital journey. We do it by enabling the enterprise with an AI-powered core that helps prioritize the execution of change. We also empower the business with agile digital at scale to deliver unprecedented levels of performance and customer delight. Our always-on learning agenda drives their continuous improvement through building and transferring digital skills, expertise, and ideas from our innovation ecosystem.

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About HFS Research: Insight, Inspiration, Impact

HFS is a unique analyst organization that combines deep visionary expertise with rapid demand side analysis of the Global 2000. Its outlook for the future is admired across the global technology and business operations industries. Its analysts are respected for their no-nonsense insights based on demand side data and engagements with industry practitioners.

HFS Research introduced the world to terms such as "RPA" (Robotic Process Automation) in 2012 and more recently, the HFS OneOffice™. The HFS mission is to provide visionary insight into the major innovations impacting business operations such as Automation, Artificial Intelligence, Blockchain, Internet of Things, Digital Business Models and Smart Analytics.

Read more about HFS and our initiatives on www.HFSresearch.com or follow [@HFSResearch](https://twitter.com/HFSResearch).