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The State of Application Development 2017 Research Report

App Dev in the Age of Digital Transformation, Low-Code Platforms and Citizen Developers

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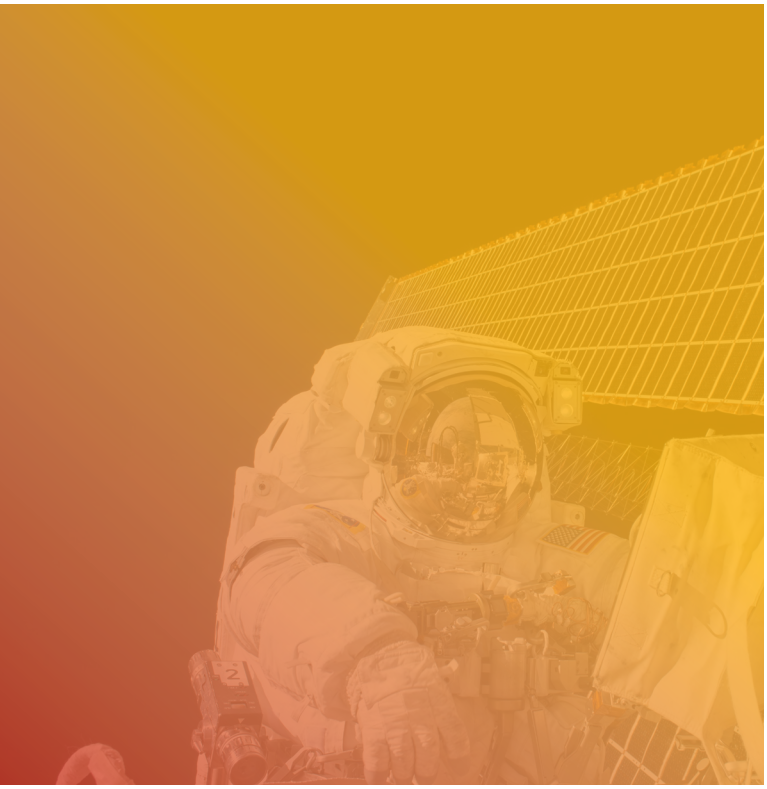
Executive Summary

Digital transformation is the single most critical issue facing organizations today. It's disrupting industries, transforming businesses, and creating new competitive differentiation that will last for years. Underscoring the point, Accenture CEO Pierre Nanterme recently suggested that digital is the main reason why more than half of the companies on the Fortune 500 have disappeared. [1]

As a result of this digital imperative, the demand for application development has skyrocketed, creating a crisis within most IT organizations. In fact, Gartner predicts that market demand for app development will grow at least five times faster than IT's capacity to deliver it through 2021[2] and that one out of every three new B2E mobile apps will fail within six months of launch by 2019.[3]

To better understand these challenges and the overall state of application development, we conducted our fourth annual survey of IT professionals with the goal of answering five critical issues:



1. What are the major challenges facing IT managers, architects and developers today?
2. Is the demand for applications growing, and what are the implications of that growth?
3. What are the highest priority application types (mobile, IoT, etc.), systems (ERP, CRM, etc.), and development approaches that make up the digital transformation landscape?
4. How are organizations dealing with the rise of citizen developers and the developer skills gap?
5. Are organizations embracing new approaches, like low-code platforms, to accelerate digital transformation?

Our research took us around the globe, connecting us with more than 3,200 IT professionals from over 40 countries and 28 industry segments. Our insights from that research are captured in the pages that follow.

[1] Pierre Nanterme, "Digital Disruption Has Only Just Begun," World Economic Forum, January 17, 2016.
[2] "Gartner Says Demand for Enterprise Mobile Apps Will Outstrip Available Development Capacity Five to One," June 16, 2015.
[3] "Predicts 2016: Mobile Apps and Development," Gartner, October 27, 2015.

Key Findings

Backlogs are large

Well over half of IT professionals (62 percent) reported having a large app development backlog, some of whom have more than 10 apps waiting to be developed.

There's a serious skills gap

Although 88 percent of respondents said that mobile functionality is either a requirement or very important, 37 percent of organizations reported facing a shortage of mobile developers and 44 percent reported a knowledge gap in the skills needed to undertake mobile.

Development times are excessively long

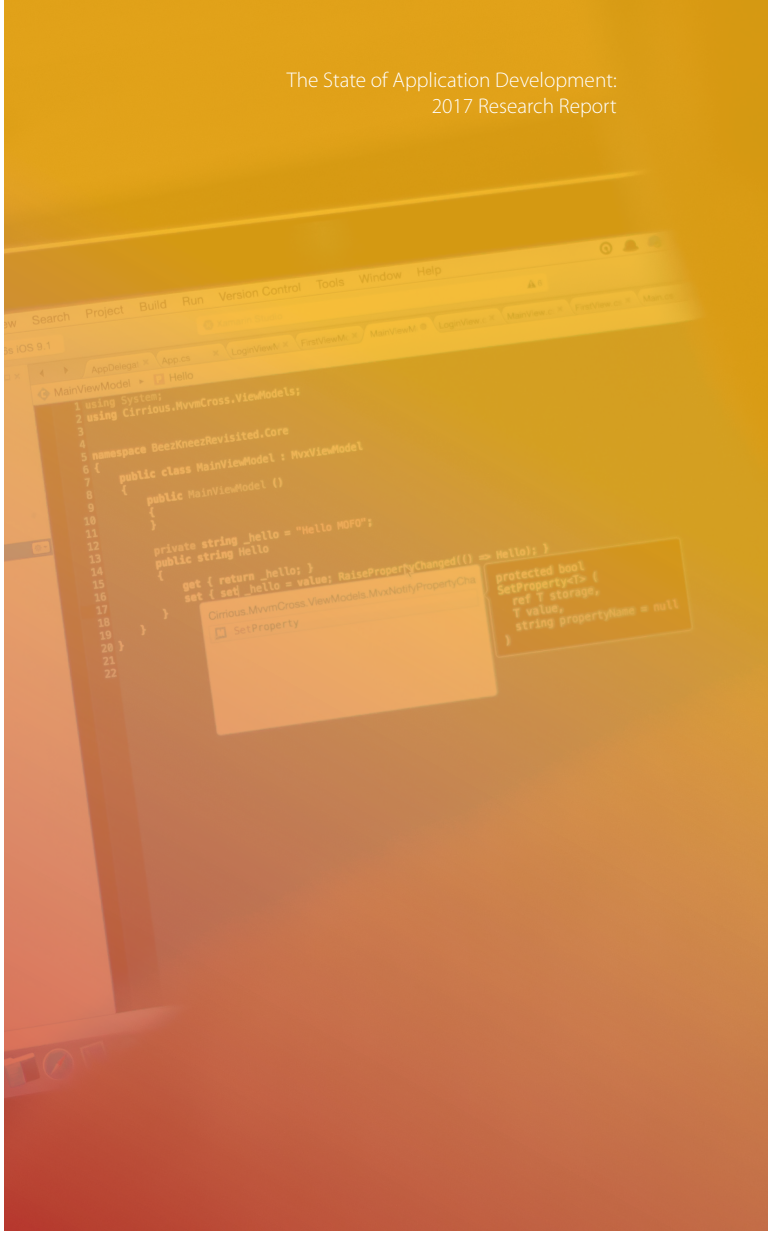
More than three quarters (76 percent) of IT professionals said that it takes over three months, on average, to develop a custom application. For 11 percent of respondents, the time required stretches out to over a year. Not surprisingly, this is leading to considerable dissatisfaction, with nearly half (44 percent) of respondents saying that they're not happy with the current velocity of their application development team.

Barriers are everywhere

IT managers face all kinds of challenges when it comes to mobile development. Time and budget constraints were the biggest barriers cited, followed by a gap in skills, an onslaught of competing priorities, and a lack of mobile developers.

Mobility requirements are soaring

Mobility was the most common business requirement for apps, up from sixth place in our 2015 survey. In addition, 88 percent of respondents noted that it was either a requirement or very important to incorporate mobile functionality into their current and future applications.



Experimentation is on the rise

Organizations are focused on finding the right technical approach to building their apps, which has led to significant experimentation. In fact, 43 percent of the IT professionals we surveyed said that they're either using or considering using low-code or no-code platforms to support their IT strategy. The same percentage also said that their organization is enabling citizen developers to take advantage of this technology.

Low-code is growing

Companies that have adopted low-code development platforms are starting to see improvements in terms of faster mobile app development times. They are also less reliant on third parties for delivery.

Survey Demographics

In December 2016, we surveyed over 3,200 IT professionals from 40 different countries.

It's important to note that none of the respondents were OutSystems customers. They were developers, CIOs, IT managers, and other professionals representing thousands of companies from around the world who agreed to share objective feedback based on their experiences.

There were roughly equal numbers of participants from Europe and the Americas, while approximately one in five respondents was from the Asia-Pacific region. The greatest number of participants were from large organizations with thousands of employees, but there were also a significant number of responses from smaller businesses. In addition, the participants spanned a variety of industry segments - 28 in total - ranging from technology and financial services to travel and leisure to nonprofit and advertising.

Fig.1 - Primary Job Function

- **36%** - Manage People Who Build Apps (CIO, IT Manager)
- **28%** - Build Applications (Developer, QA)
- **10%** - Architect
- **26%** - Others

Fig.2 - Geography

- **40%** - Europe
- 38% - Americas
- 22% - Asia-Pacific Region

Fig.3 - Company Size

- **49%** - < 500 Employees
- **29%** - 500 to 4,999 Employees
- **22%** - > 5,000 Employees

Fig.4 - Industry

- **31%** - Computer & Technology
- **12%** - Financial Services
- **7%** - Corporate (Business) Services
- **7%** - Government
- **6%** - Education
- **5%** - Healthcare
- **4%** - Energy & Utilities
- **4%** - Transportation and Logistics
- **4%** - Retail & Wholesale
- **3%** - Telecom
- **3%** - Consumer Goods, Food & Beverage
- **3%** - Non-profit
- **2%** - Travel, Leisure & Entertainment
- **2%** - Advertising/Media/ Publishing
- **2%** - Pharma & Biotech
- **5%** - Others

The Challenges of App Development

Demand for Apps Is Exploding

To see just how much the demand for apps is increasing, you don't have to look any further than to the ambitious plans many IT teams have for 2017. While all of the IT professionals we surveyed said that they will build apps this year, nearly half (44 percent) indicated they will be developing more than 10 apps and 9 percent expect to deliver over 50 of them. Large enterprises in the Asia-Pacific region had the most ambitious plans. Roughly one in seven IT professionals there said that they plan to build a staggering 100 apps or more in 2017.

Not surprisingly, large organizations generally plan to build more apps than smaller ones. In fact, 34 percent of companies with more than 5,000 employees said that they intend to build at least 25 apps in 2017. In many cases, these are indeed very lofty goals that not only demonstrate high levels of demand, but also put tremendous pressure on today's IT teams.

Fig.5 - How many applications does your organization plan to build in 2017? - Companies with 5,000+ employees

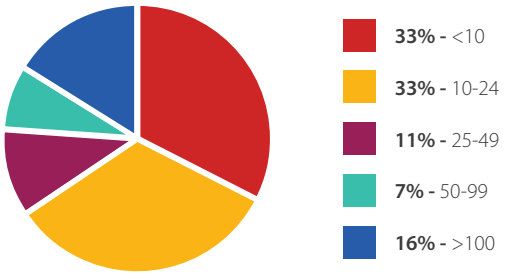
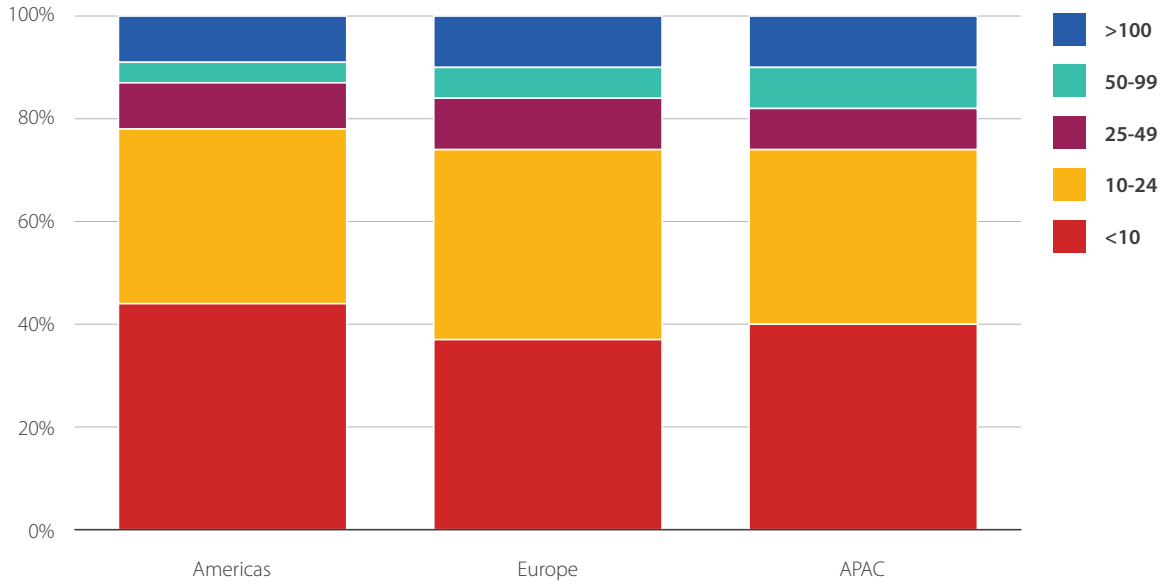


Fig.6 - How many applications does your organization plan to build in 2017? - By Region



Types of Apps Being Built in 2017

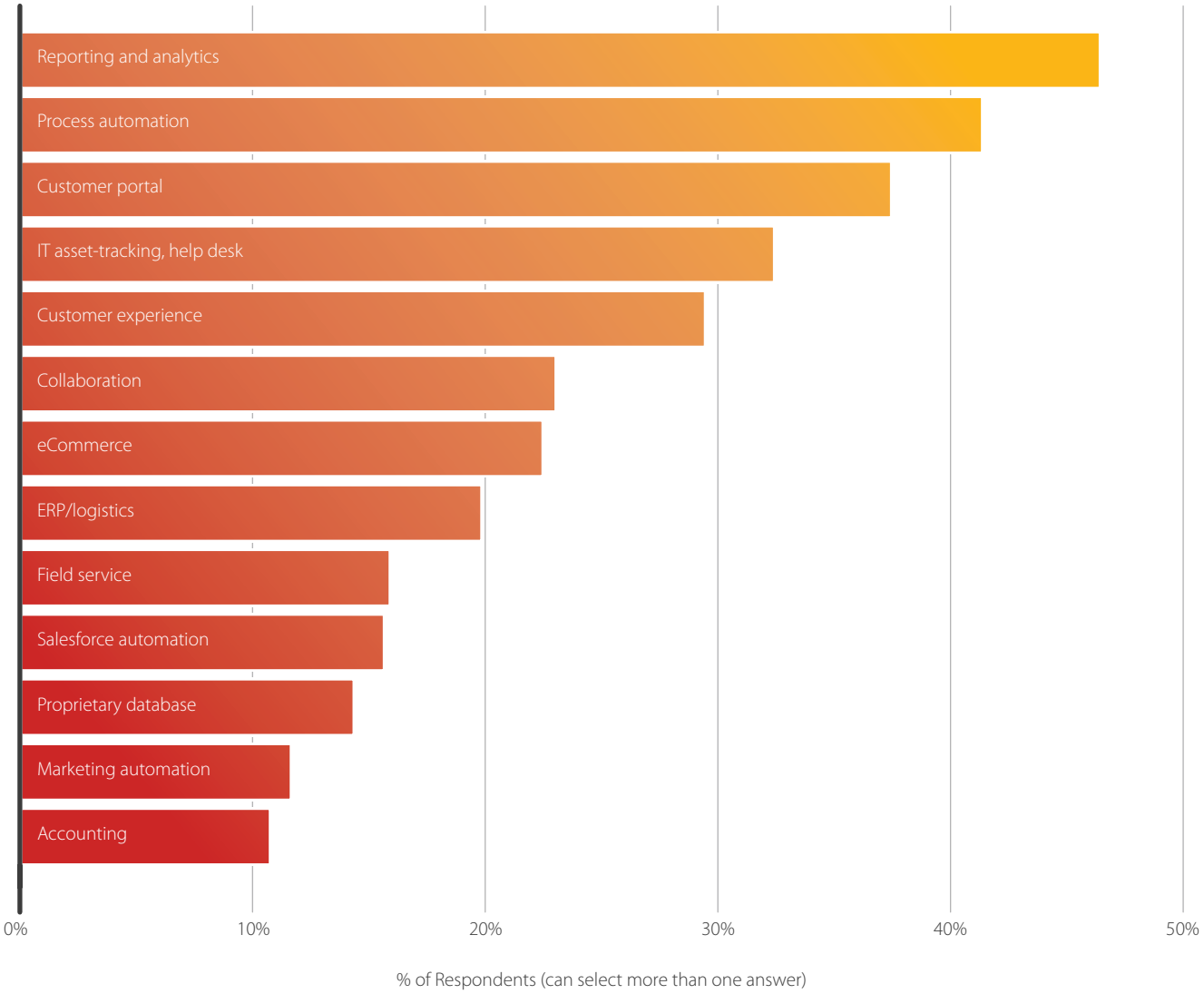


Fig.7 - What are the main applications you plan to build in 2017? (select all that apply)

When we asked what types of apps companies plan to build in the coming year, reporting and analytics apps topped the list. This isn't surprising considering the explosion of big data initiatives from the last few years. Companies recognize that this data is critical to gaining an understanding of customer engagement and usage patterns — what Forrester refers to as the "age of the customer." These insights are shaping the products and services that organizations need to offer to remain competitive.

The next most common apps our respondents said that they plan to build this year revolve around process automation and customer portals. Given the competitive importance of customer experience (CX) projects, it wasn't surprising these rated near the top of the list. Interestingly, there was very little deviation from these priorities, regardless of industry, company size, or geography.

Development Times Are Long

More than three quarters of respondents (76 percent) say that it takes them three months or more to build mobile apps, with 11 percent indicating it takes more than one year. When it comes to mobile apps, which are significantly more complex, development times are even longer. Not surprisingly, given their typical levels of bureaucracy, government, healthcare and financial services all experience the longest development cycles, with less than 20 percent of their mobile apps developed in fewer than three months.

Development times like these are a problem. According to research from Gartner, 32 percent of businesses say that they need weekly releases, yet of those, 48 percent say that IT delivers more slowly than needed. Of the 28 percent of businesses that need monthly releases, 75 percent say that IT isn't fast enough.[4] The majority of IT professionals we surveyed report that they're not satisfied with the velocity of application development in their organization. Of note, however, is the fact that dissatisfaction levels are much higher among architects and IT managers than developers. In fact, architects are nearly twice as likely to be dissatisfied with the current velocity of app development than developers. This may be a case of not being able to see the forest for the trees, with developers feeling that they are already operating as efficiently as they can with their current tools and processes.

Fig.8 - How long, on average, does it take your organization to deliver a web application?

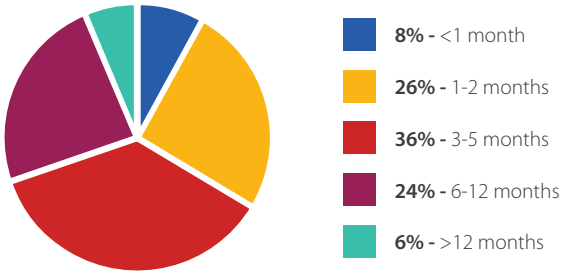


Fig.9 - How long, on average, does it take your organization to deliver a complete mobile application?

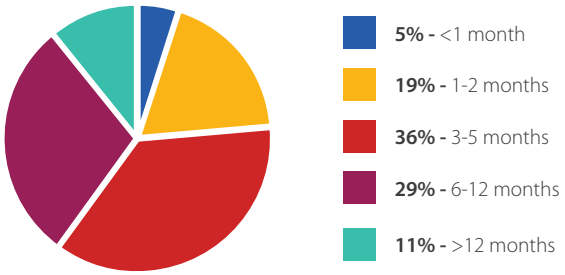
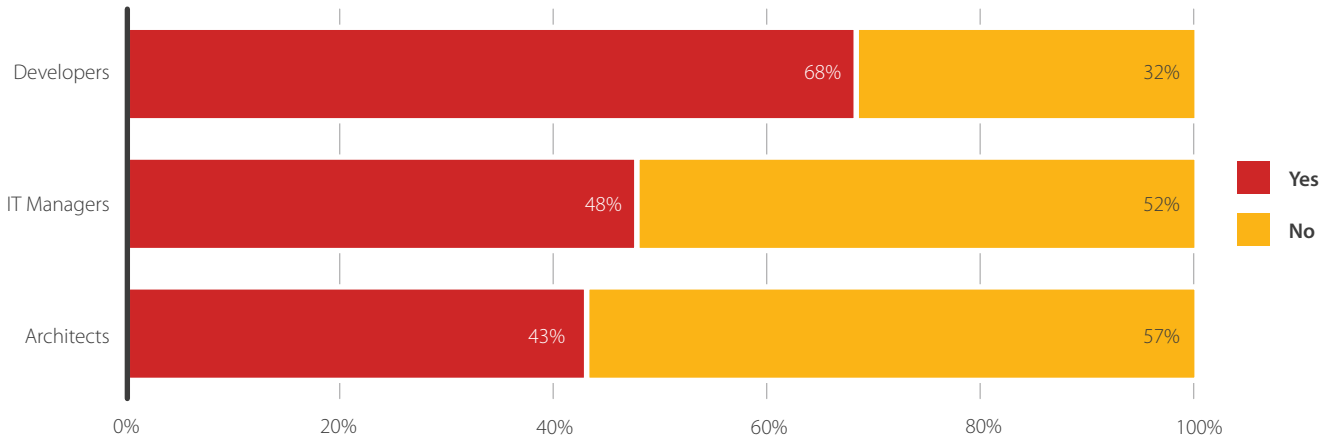


Fig.10 - Are you happy with the current velocity of your application development team?



[4] Jeff Schulman and Katherine Lord, "Supersession: Applications, and Infrastructure, and Operations: When Worlds Collide," Gartner Applications Strategy and Solutions Summit, December 6-8, 2016.

Integrations Add Complexity

Integrations are an important issue that companies need to consider when thinking about application development. Integrating your applications with existing systems can dramatically increase the complexity of application development and delivery. When we asked IT professionals how many cloud-based, packaged on-premises, and custom developed systems they have to integrate with, the most common answer was between one and five. While that may not seem like many, keep in mind that's per type of system. In other words, most organizations have anywhere between 3 and 15 integrations to worry about. And, of course, that's the best case scenario. About one quarter of respondents (24 percent) noted having many more integrations to deal with, well in excess of 100 in some cases when all three systems are taken into account.

The bottom line is that the potential for having a large number of integrations to deal with is very real. With the rise of microservices and even serverless architectures this problem is only going to become more acute, leaving IT teams with no choice but to find a way to address the issue.

Fig.11 - How many cloud-based systems do you need to integrate with when building your apps?

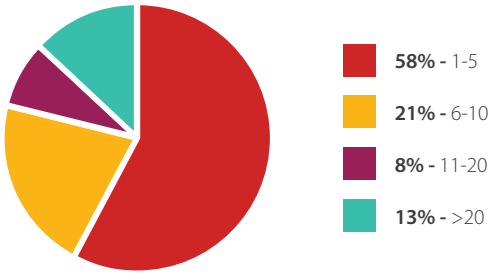


Fig.12 - How many packaged on-premises systems do you need to integrate with when building your apps?

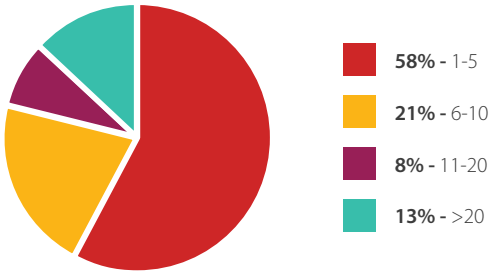
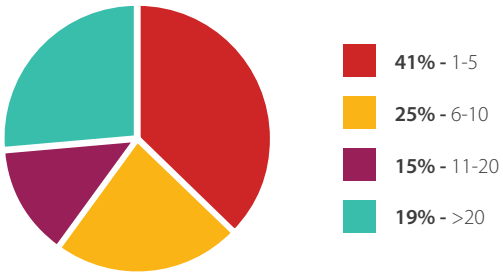


Fig.13 - How many custom developed systems do you need to integrate with when building your apps?



Mobile App Requirements Are Soaring, Backlogs Remain a Problem

Today's apps need to be mobile.

Mobility — whether we're talking about apps or responsive web — was the most frequently cited response when we asked IT professionals what business functionality would be most critical for the apps they build in 2017. That's up from number 6 in 2015 when we asked the same question in our survey. Not only that, 88 percent of IT professionals said that incorporating mobility into their existing and future applications is either very important or a requirement.

The problem is that creating mobile apps is both time-consuming and difficult. As a result, backlogs are often an issue. When we asked IT managers, 62 percent noted that they have a backlog of projects stacking up because they can't meet the current level of demand, with 9 percent of them stating they have more than 10 projects to complete. It's also worth pointing out that IT professionals in the tech and financial services industries were the most likely to report having a backlog.

Fig.14 - How important is it to incorporate mobile functionality into current and future applications within your organization?

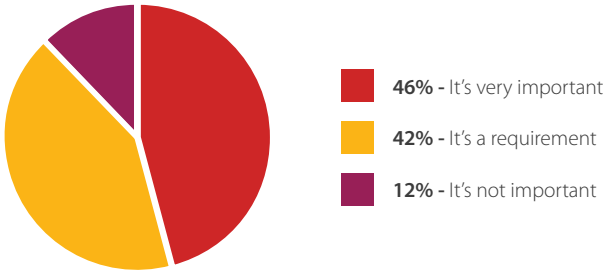


Fig.15 - Do you have a backlog of mobile projects stacking up because you can't meet the current level of demand?

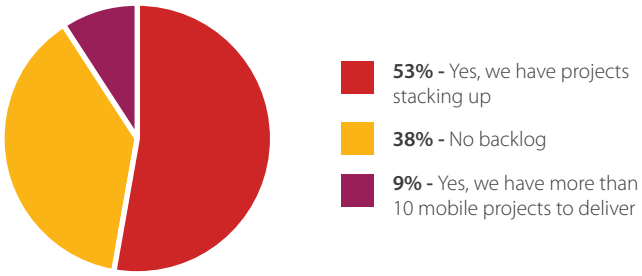
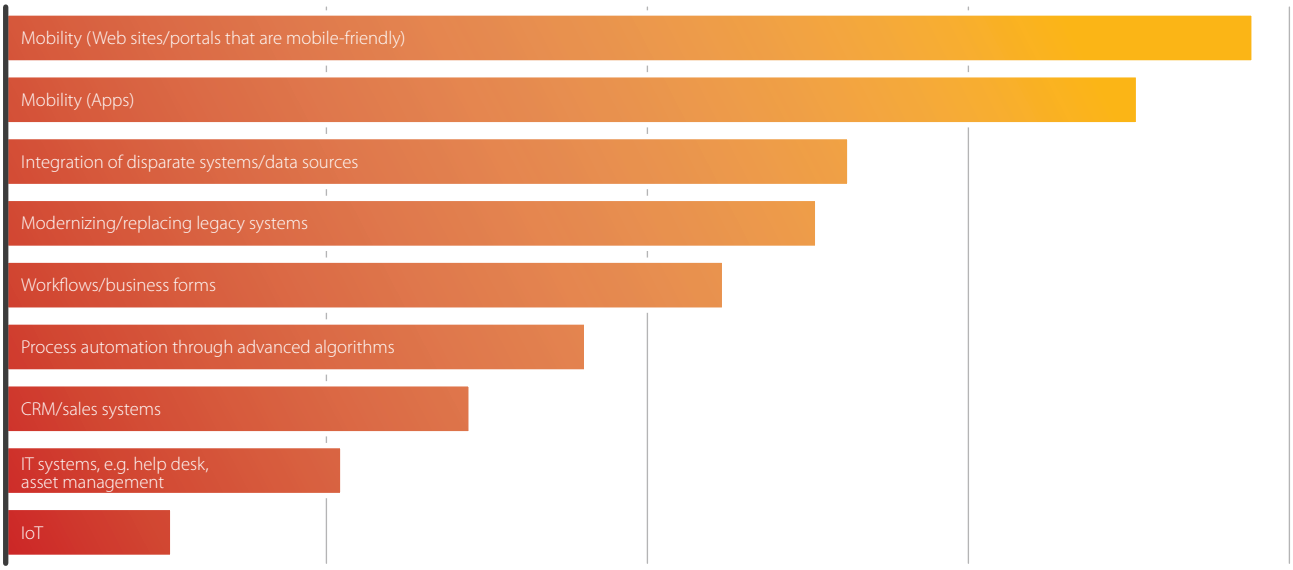


Fig.16 - What's the top business functionality for apps you will develop in 2017? (rank in order of importance)



Barriers to Mobile App Development Abound

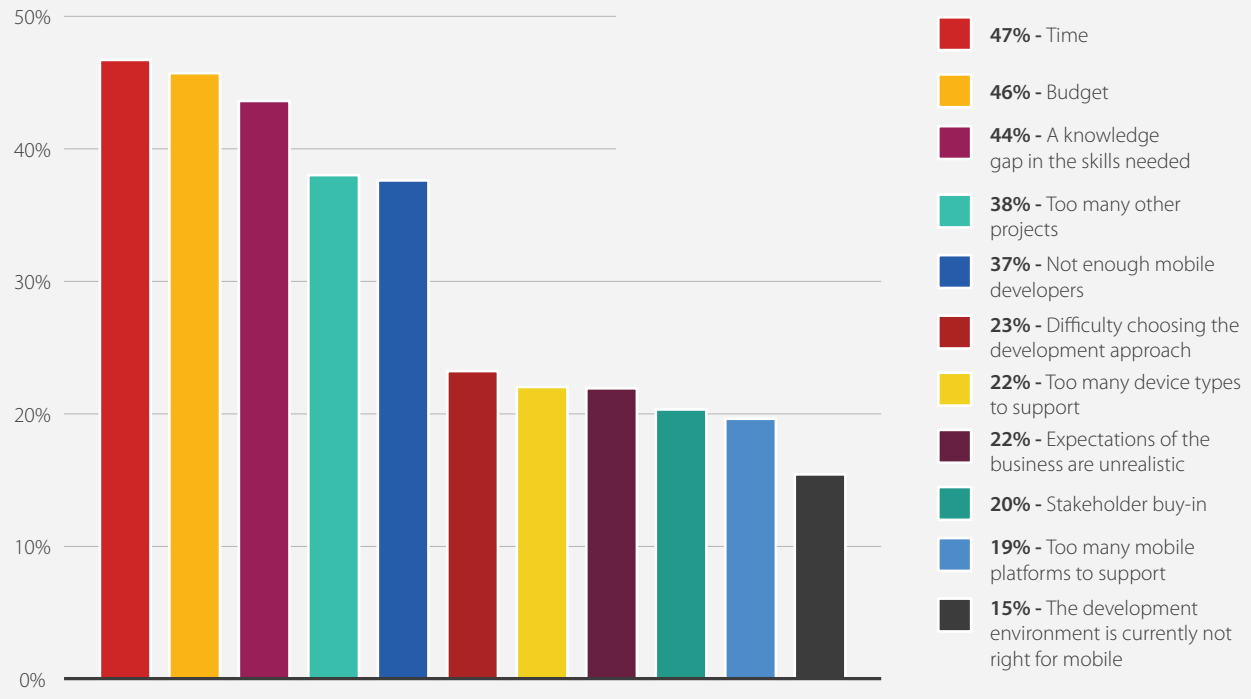
Although many IT teams may have at one point assumed that building mobile apps would be easy, in reality that's not the case. In fact, most IT professionals often fail to take into account just how difficult creating effective mobile apps actually is. Among the top development challenges that they cite are a lack of time, budget, and necessary skills. Very few of our respondents said that they didn't face any challenges. That's important because it reflects the fact that mobile app development is a moving target and one that most haven't figured out yet.

Time is a major challenge because applications are taking longer to build due to increasing complexity, yet businesses expect them faster and faster. Budgets are a problem because app development can be an exceedingly expensive proposition.

In fact, according to research from Forrester, 62 percent of companies report spending more than $500,000 to create just one to three apps.[5] Thirteen percent said that they spent $5 million or more to do so.

Skills gaps are another major issue with 44 percent of organizations reporting a knowledge gap in the skills needed to undertake mobile. Because app developers with highly sought after skills can be difficult to find and expensive to hire, most organizations don't have all of the skills that they need in house. In our survey, 37 percent of respondents said they face challenges hiring the right people to address the mobility skills gaps within their teams. As we'll see later in this report, by finding alternate ways of addressing the skills gap, companies can have a material impact on the time and cost associated with mobile app development.

Fig.17 - What are your main challenges delivering mobile applications? (select all that apply)



[5] Jeffrey Hammond, "Closing the App Gap with Mobile Low-Code Platforms," Forrester, October 4, 2016.

New Approaches That Yield Results

The lines surrounding app development are blurring. What is and isn't mobile is no longer clear, and as a result, the solutions and approaches to app development are becoming less specific. Not that long ago, mobile app development was a siloed function within IT.

Mobile app developers had unique skills, followed their own rules, and for the most part, operated independently of the rest of the IT function. More recently, however, as technology has matured, app and mobile app development have begun to overlap. Plus, companies have begun to discover that they no longer need to take a native-only approach to mobility. Instead, they're experimenting with a variety of other options, and as we'll see in two specific cases, finding that they can get the same or better results.

On top of this, companies have quickly realized that delivering a mobile app is much broader than just setting up a good front-end. Most of the complexity comes from needing to have the right supporting back-end services available, adding additional difficulties when it comes to data orchestration as well as the integration and management of a portfolio of services or APIs.

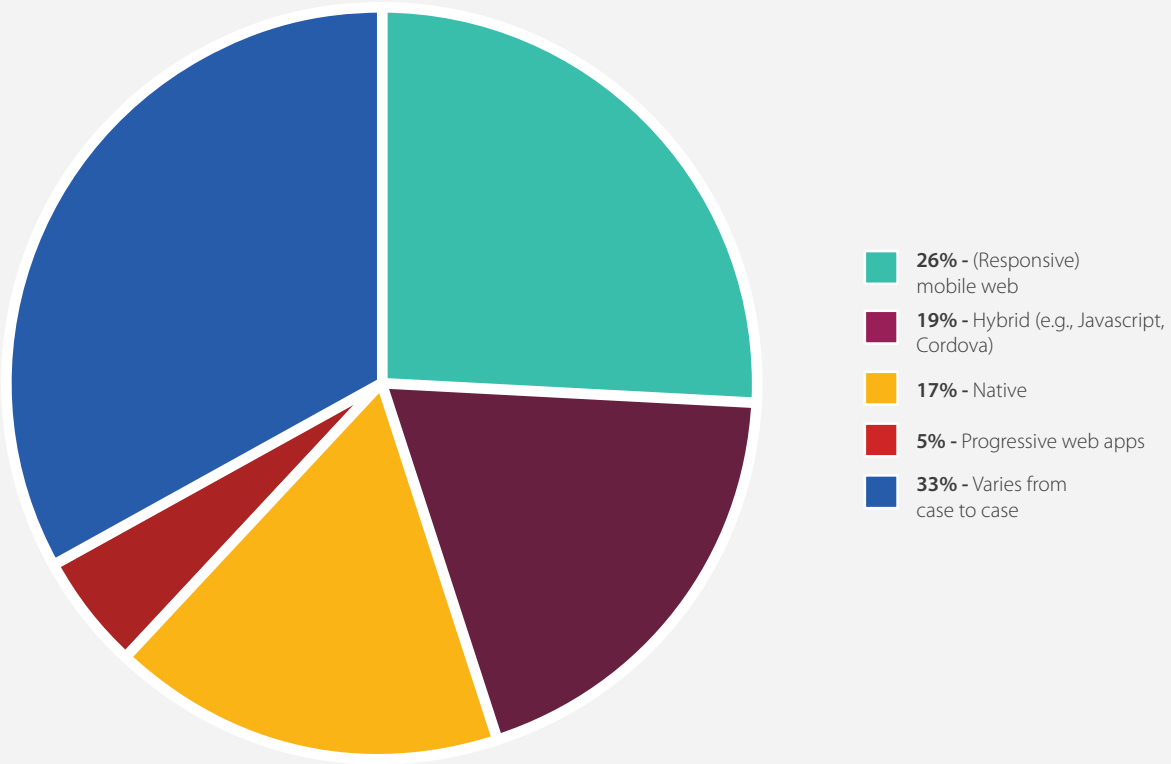
As some companies have proven, the key to cracking the mobility challenge is bringing in the right technology to enable more developers to build solutions. By empowering organizations with the right technology, app development work can be spread among more people. That in turn eases pressure on IT teams, freeing them up to meet business needs. This reality is having a widespread impact on a variety of factors, including hiring practices and, more specifically, the types of skill sets today's companies are seeking.

The Rise of Alternatives to Native App Development

Companies are looking for new ways to tackle the challenges of mobility. They recognize that different situations call for different solutions. And, they also have more viable options than ever before. Progressive web and responsive web are all examples of alternative approaches that are becoming increasingly mainstream. A growing number of companies are migrating to approaches like these because they not only meet their needs, but are also faster and cheaper. Plus, they don't require the same specialized skill sets that native app development does. In fact, mobility is about much more than simply developing mobile apps. It's important to be able to reach users through all channels, especially mobile browsers, as users often don't bother to install an app.

As a result, we have seen a steady decline in IT professionals' preference for native app development, with just 17 percent of respondents citing it as their preferred approach this year. That's down from 26 percent in 2015 and 29 percent in 2014. Of note is the fact that this is a fairly universal shift. Regardless of industry, company size, or geography, alternative approaches to mobile app development are increasingly taking hold.

Fig.18 - What is your preferred type of mobile app development?

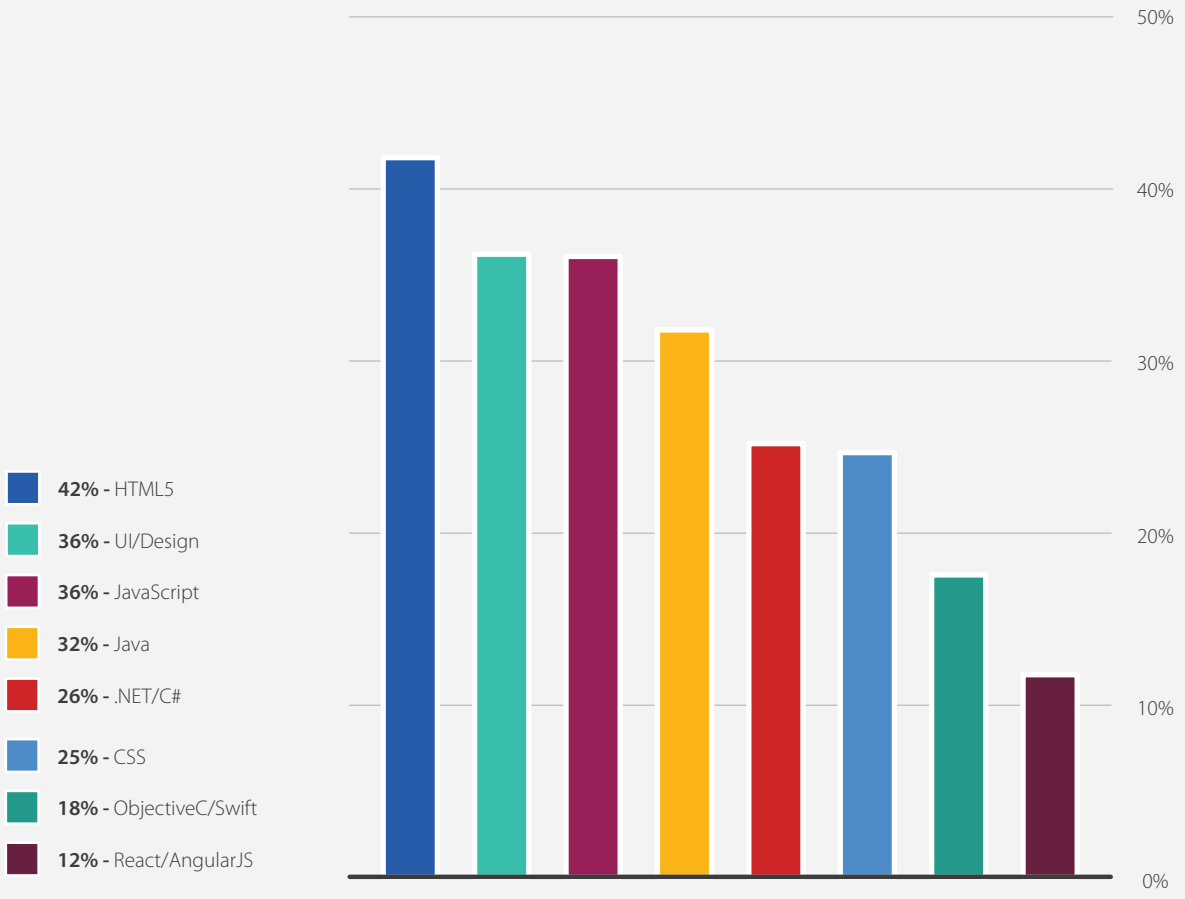


A Focus on Less Specialized Skill Sets

Companies are seeking different skill sets these days when hiring developers — ones that are tied to experimenting with newer approaches to mobile app development, such as HTML, user interface design, and JavaScript. These skill sets are less technical and easier to find, particularly for companies not in major metropolitan areas. They are also cheaper to bring in-house. Those may be some of the reasons why the IT professionals we surveyed are two to three times more likely to hire people with skill sets that are suitable for alternative approaches to mobile app development than they are to hire people with more traditional skills.

Interestingly, a lot of hiring is focused on front-end development, which makes sense given the heightened focus so many companies are putting on customer experience. In fact, to paraphrase Forrester, we're living in an age when customers are looking for consistent, high-value digital experiences.[6] Their expectations are exceedingly high and they want apps that not only deliver function, but that also look and feel amazing.

Fig.19 - If you have open mobile application developer vacancies, what are the key skills you have challenges hiring for? (select all that apply)



[6] "Lead the Customer-Obsessed Transformation," Forrester.

Citizen Developers Offer a Viable Alternative

To ease the skills gaps and budget constraints they face, a growing number of companies are relying on citizen developers to help. And while the precise definition of what a citizen developer is and isn't varies, there are some common things that everyone seems to accept about them. For instance, they're generally agreed to be non-professional developers who are sanctioned by IT.

Regardless of definition, more than two-fifths of all IT professionals (43 percent) say that their organizations are either already supporting citizen developers or that they're considering doing so. And it's a trend that's on the rise. According to Gartner research, by 2020 at least 70 percent of large enterprises will have established successful citizen development policies.[7] For now, citizen developers are most prevalent in certain industries. In education and corporate services, for example, 51 percent of organizations allow or are considering citizen developers, followed by technology. Meanwhile at the other end of the spectrum you'll find that only around one-third of companies in the pharmaceuticals and biotech, financial services, and nonprofit industries use them. In general, the smaller the size of an organization, the more likely it is to take advantage of citizen developers.

Fig.20 - Does your company enable employees who are not developers by trade (citizen developers) to create apps?

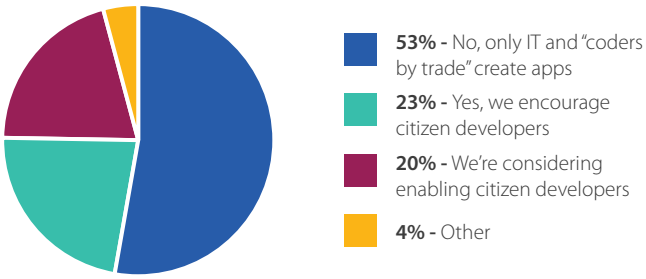


Fig.21 - Industries most/least likely to use or consider using citizen developers

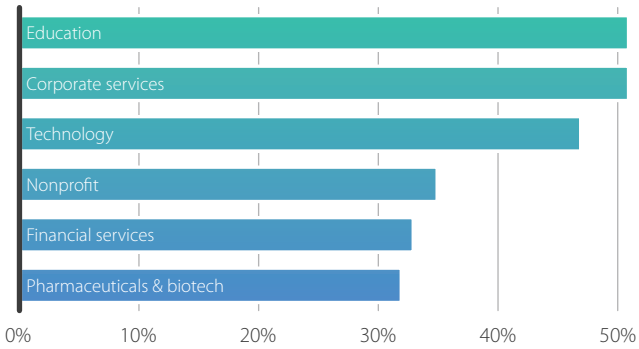
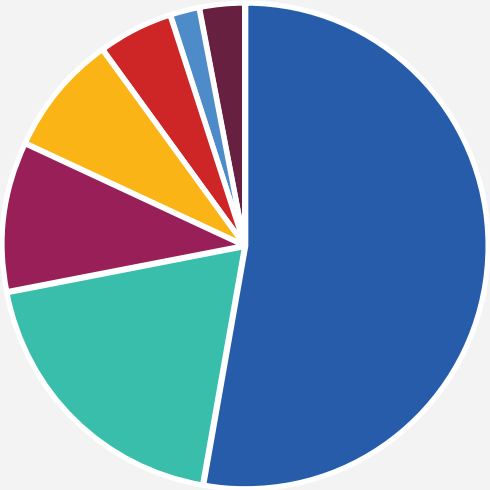


Fig.22 - How would you define the term citizen developer?



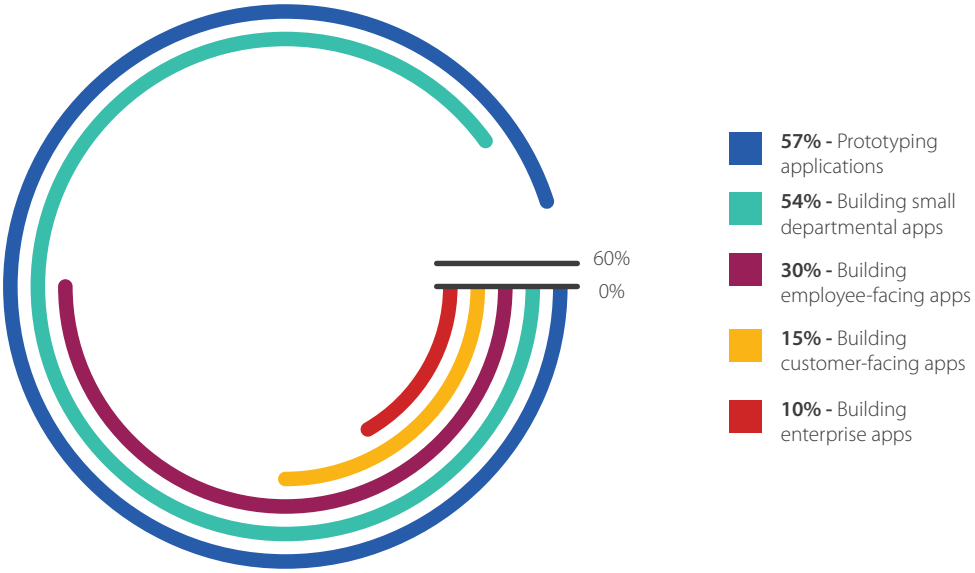
[7] "Citizen Development Is Fundamental to the Digital Workplace," Gartner, August 17, 2015.

The Scope of Citizen Developers' Work

The beauty of citizen developers is that they help companies get things done without the need to hire people with difficult-to-find or expensive technical skill sets.

In fact, citizen developers can accomplish quite a lot. To find out just how much, we asked the IT professionals we surveyed, who support citizen developers, what projects they set aside for them to work on. While a handful (10 percent) allow their citizen developers to go so far as to build enterprise apps, the most common uses cases were prototyping applications (57 percent), building small departmental apps (54 percent), building employee-facing apps (30 percent), and building customer-facing apps (15 percent). This speaks to a relatively high level of comfort and trust at most organizations. Yet despite all of this, usually there's only so far that citizen developers can take things on their own before they hit a wall.

Fig.23 - To what level have "non-professional coders" (citizen developers) been able to build apps using a low-code or no-code platform? (select all that apply)



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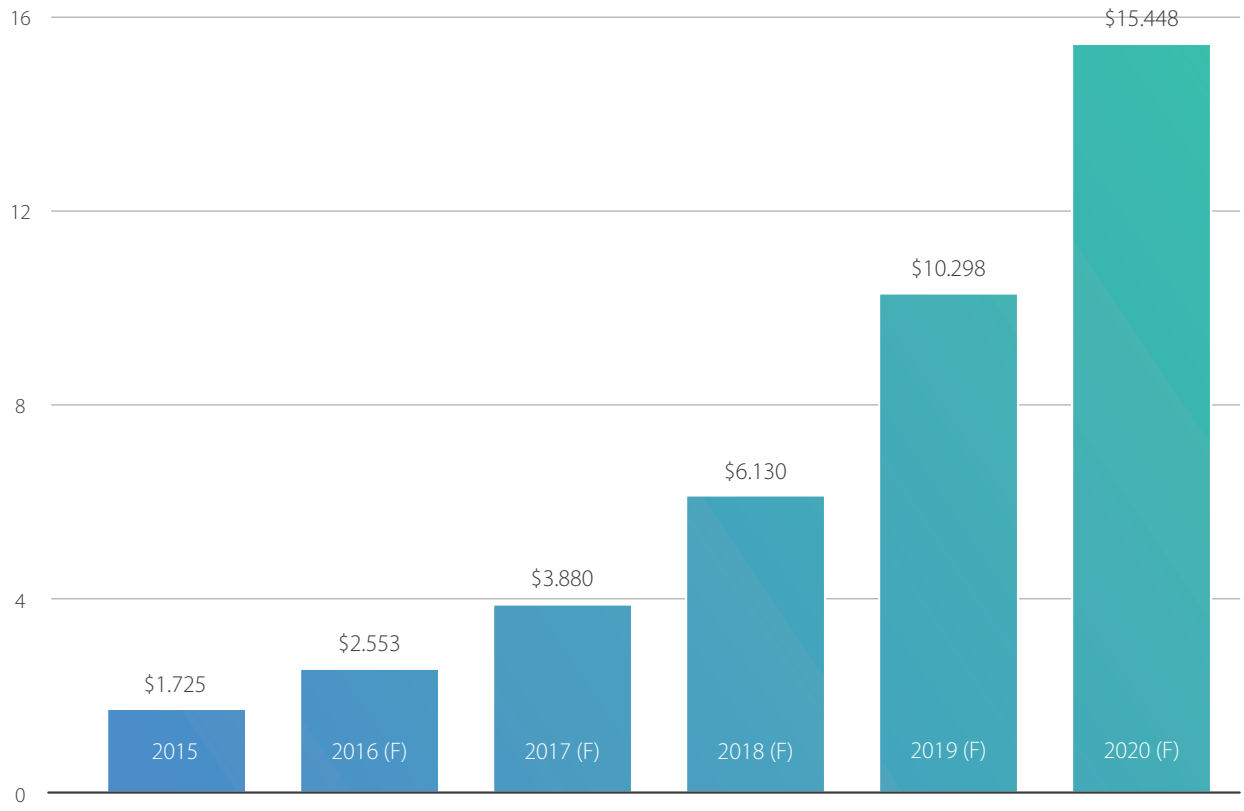
The Rise of Low-Code Platforms

Forrester defines low-code platforms as those that "enable rapid delivery of business applications with a minimum of hand-coding and minimal up-front investment in setup, training, and deployment."[8] Low-code platforms increase the productivity of the entire development organization. They dramatically increase their ability to create effective, high-quality apps in very short periods of time. More than two fifths (43 percent) of the IT professionals that we surveyed say that their organization uses low-code platforms to support their IT strategy. Adoption is most prevalent in Europe, where 47 percent of respondents indicated that they are already using the platforms.

These adoption numbers are significantly higher than previous years and, as the market matures, we expect them to increase.

Forrester projects that the market for low-code software platforms will increase by a factor of nine to over $15 billion over the next five years.

Fig.24 - Forrester's Q4 2015 Global Low-Code Platforms Vendor Landscape Online Survey



(F) = Forrester Forecast
Note: The figure for 2015 is estimated

[8] John R. Rymer, Clay Richardson, Christopher Mines and Claudia Tajima, "The Forrester WaveTM: Low-Code Development Platforms, Q2 2016," Forrester, April 14, 2016.

Among the reasons why companies use low-code-platforms, increasing responsiveness to the business (i.e. agility) was the most common answer, cited by just over half of respondents. This was followed by a desire to reduce their current IT backlog. Further evidence of this increased adoption is the types of enterprise applications being delivered with low-code platforms. The top use cases for low-code platforms include portals, web-based applications, and mobile applications.

Fig.25 - Are no-code or low-code development platforms currently part of your IT strategy?

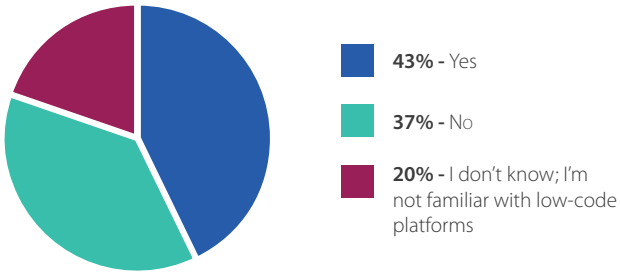


Fig.26 - What types of projects are being delivered using low-code platforms? (please select all that apply)

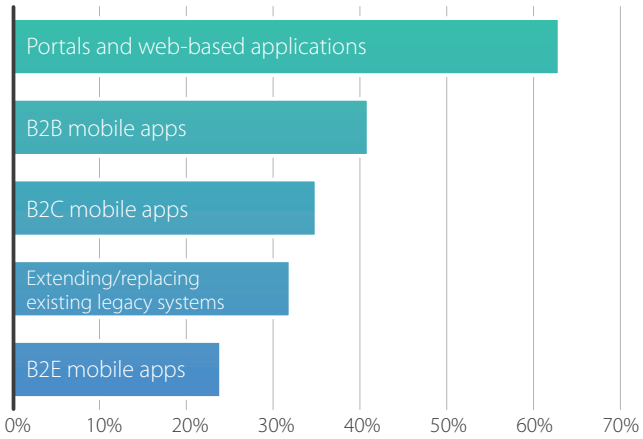
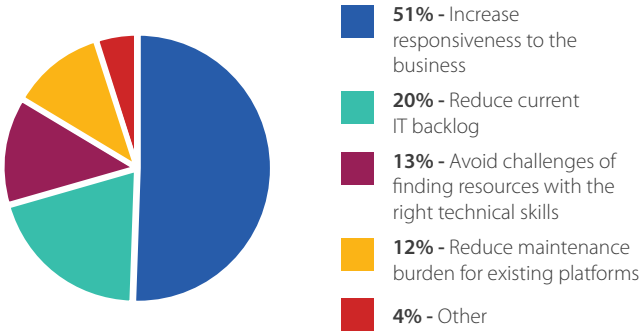


Fig.27 - What is the primary driver for using low-code platforms within your organization?



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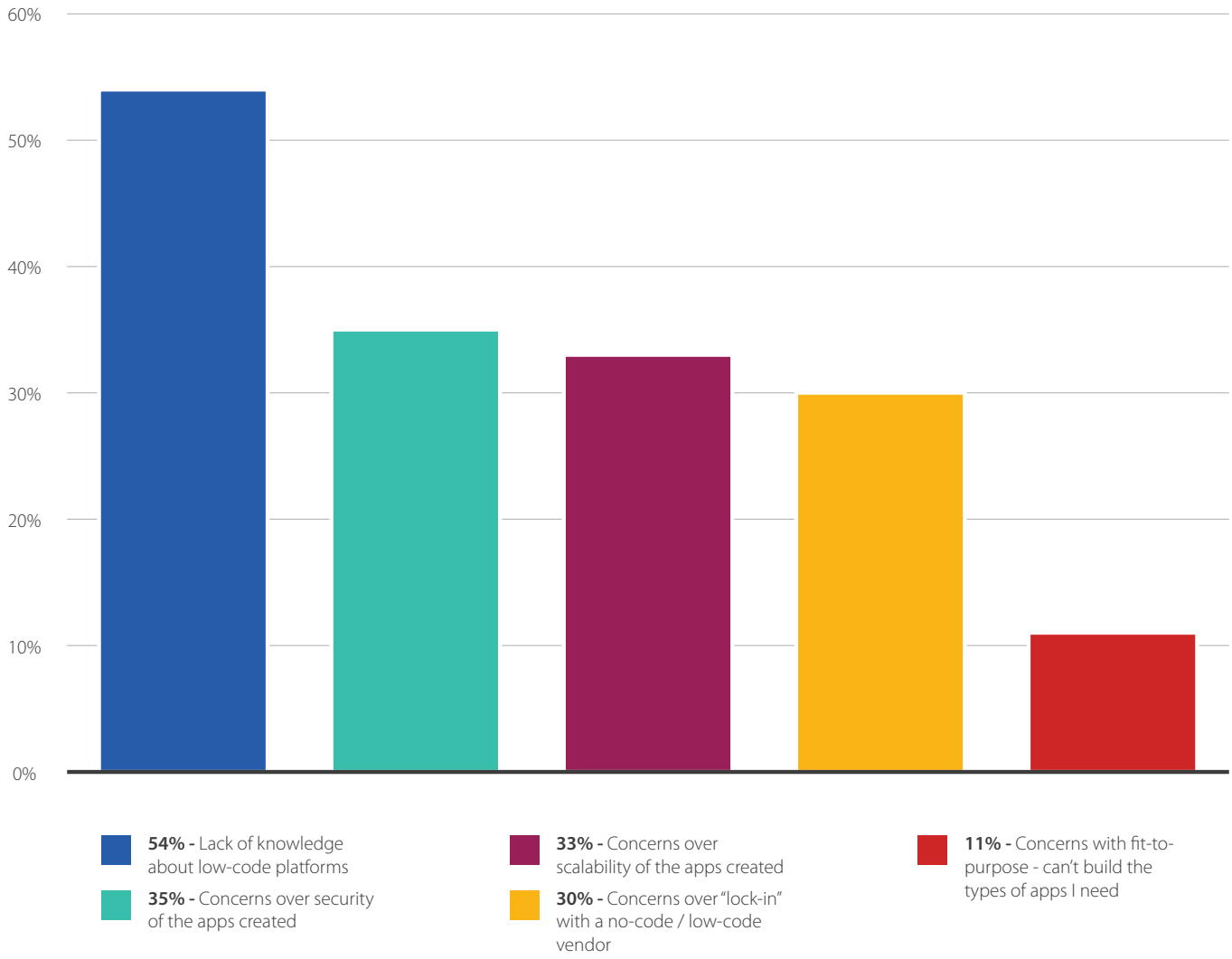
The biggest reason organizations cited for not using low-code platforms is industry knowledge.

As Forrester notes in the "Vendor Landscape: The Fractured, Fertile Terrain of Low-Code Application Platforms,"[9] the low-code market is evolving and maturing rapidly and there is much work to do educating the market.

Fig.28 - What is preventing your organization from using low-code application development platforms?



[9] Clay Richardson, John R. Rymer, "Vendor Landscape: The Fractured, Fertile Terrain Of Low-Code Application Platforms, Forrester, January 15, 2016"

The Benefits of Low-Code Development

While low-code development is still in its early days of adoption, the companies that have been using it are seeing noticeable differences in two key areas: both their app development times and their reliance on outsourced IT have gone down. Companies that use low-code platforms were 20 percent more likely to develop their mobile apps in less than six months. They also report close to a 10 percent reduction in their use of outsourced IT. While these may not seem like dramatic numbers, we believe that they are indicative of a greater trend that we'll see play out in the months and years ahead. We expect to see companies that embrace low-code technology will dramatically accelerate their app development, allowing them to do more and save money by becoming less reliant on outsourced IT. We've already witnessed this with a variety of our own customers.

Fig.29 - How long, on average, does it take your organization to deliver a complete application?

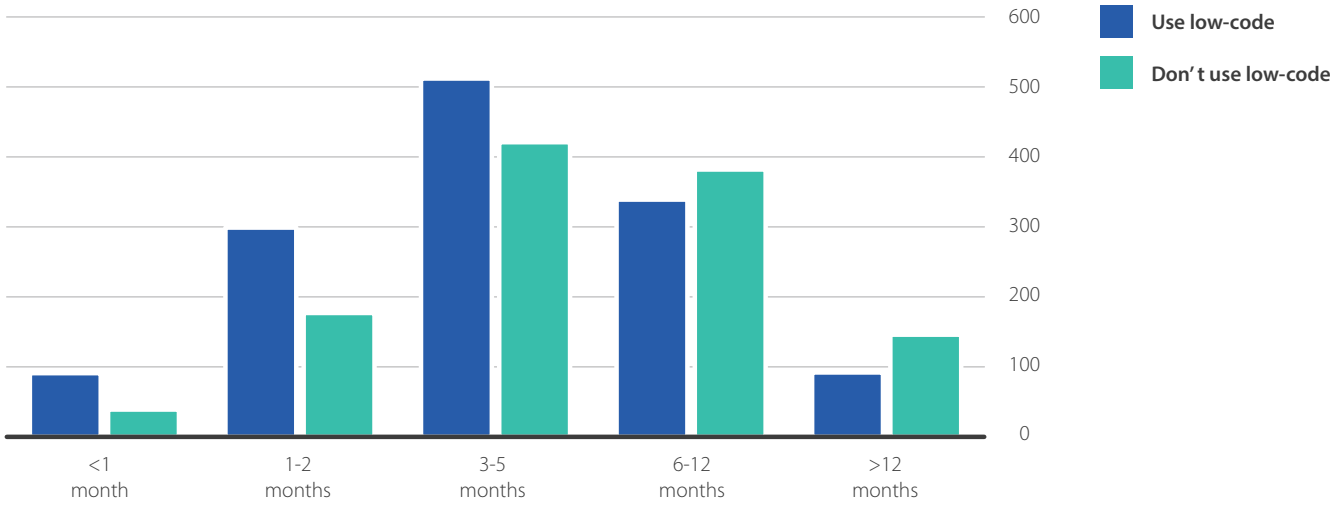
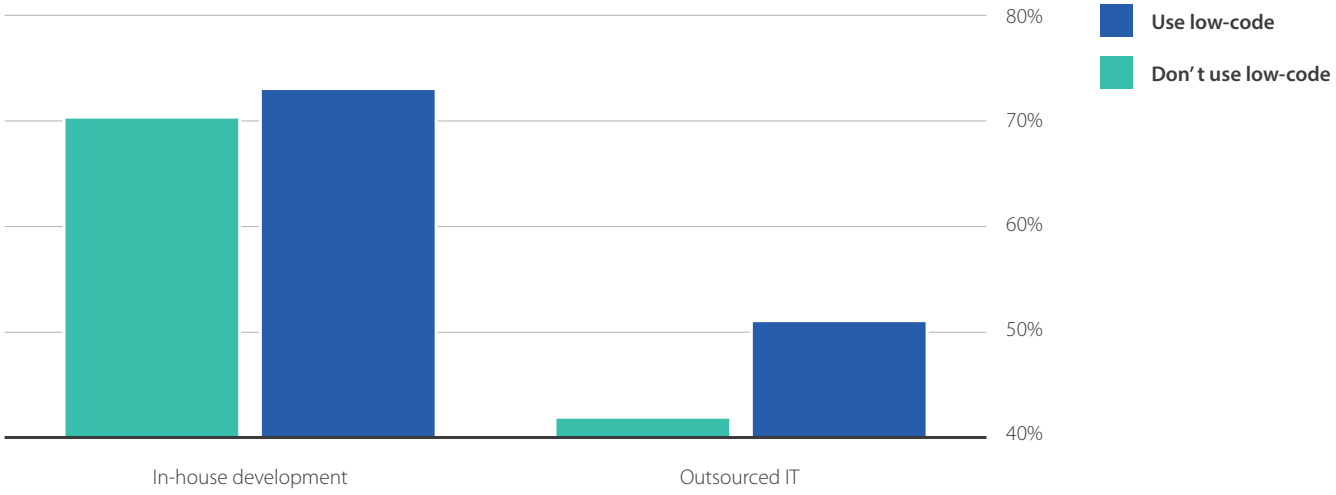


Fig.30 - What are the different approaches you use to develop mobile apps?



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The Future of App Development

Digital transformation remains a significant challenge for organizations, and at the heart of that challenge, lies app development.

Our findings in this report validate the predictions of research houses like Gartner and Forrester and paint a picture of a difficult road ahead as demand for apps continues to exceed development capacity. The substantial backlogs and skills gaps that many companies have to deal with only complicate matters further.

Yet in the face of challenges like these, a growing number of organizations are starting to experiment with alternative approaches to app development. As technology matures and the lines between mobile and web app development continue to blur, IT professionals are looking beyond native development to other options. Those companies that are experimenting with low-code development are seeing early benefits, including faster app development times and lower levels of outsourcing.