The New Frontier of Software Development
How trends in low code, no code, and education are rebooting the workforce
<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>The Fourth Industrial Revolution Redefines Tech Standards</td>
<td>4</td>
</tr>
<tr>
<td>Innovation Is IT's Ideal, but Not Always Its Reality</td>
<td>5</td>
</tr>
<tr>
<td>The Developer Shortage Overshadows Companies' Ambitions</td>
<td>6</td>
</tr>
<tr>
<td>Skill Gaps Pose an Existential Threat in a Technology-Driven World</td>
<td>7</td>
</tr>
<tr>
<td>Companies Embrace the Role of Educator</td>
<td>8</td>
</tr>
<tr>
<td>New Educational Platforms Put Diversity in Tech within Reach</td>
<td>9</td>
</tr>
<tr>
<td>Low- and No-Code Development Democratizes Technology</td>
<td>10</td>
</tr>
<tr>
<td>Citizen Development Sparks Speed, Innovation, and Business Partnerships</td>
<td>11</td>
</tr>
<tr>
<td>Related Resources</td>
<td>12</td>
</tr>
</tbody>
</table>
Welcome to the Fourth Industrial Revolution, a time in which technology is evolving so rapidly that it’s daunting to keep up. As the pace increases, individuals and businesses are grappling with monumental implications. This dynamic is readily apparent when it comes to educational curricula, particularly in technical fields.

While companies seek a steady stream of highly skilled developers to innovate and compete, the supply falls well short of demand. What’s more, many lack skills in key technologies such as artificial intelligence (AI) and mobile applications that underpin modern customer expectations.

To bridge skill gaps in their current and future workforces, companies are taking a vested interest in educating traditional developers — in addition to a new crop of “citizen developers” with diverse perspectives, roles, backgrounds, and education levels.

There is stuff you will learn in your first year of college that will be outdated by your fourth year.

— Thomas Friedman

This research brief explores:

- The forces ushering in an era of unprecedented change
- The challenges IT organizations face in meeting demands
- How low-code and no-code development is revolutionizing software development
- How new approaches to education can expand the developer workforce
Driven by incredible and consistent advances in AI, automation, networking, and a myriad of other technologies, today’s customers expect capabilities that few could have fathomed just a decade ago. Every business, regardless of whether it caters to consumers or business buyers, must now deliver more innovative products, services, and experiences than ever before, and at a mind-boggling cadence. Technology is so critical to winning and keeping customers that nearly half of IT projects are now funded by nontechnical business stakeholders like sales, marketing, and finance. And it’s not just customers’ expectations that they must satisfy; employees need advanced capabilities, too. In fact, seven in 10 employees now expect the same level of technology at work that they enjoy on personal time.  

58% of consumers

say technology has significantly changed their expectations of companies

77% of business buyers

70% of IT leaders say the role is in the midst of its biggest historical shift

81% of IT leaders say the role is entering an era driven by customer expectations

Salesforce Research
Innovation Is IT’s Ideal, but Not Always Its Reality

Although IT organizations strive to bring forth leading-edge innovations, they spend less than half of their time doing so. Understandably, innovating for the business is also their top challenge. Saddled with more projects from multiple business stakeholders, developers are constantly underwater and struggle with project speed.

As a result, IT is often stuck sifting through project backlogs instead of harnessing new technologies that drive innovation. Few IT teams excel at keeping pace with the evolutions that are redefining their industries, let alone transforming their organizations with the digital capabilities to compete.

“The organization demands that IT do more with less. They say, ‘We want you to do a lot more stuff, and we want you to innovate, but we also want you to cut your budget.’”

Michael Krigsman, Industry Analyst, CXOTalk

Top 2 IT Challenges

- Innovating for the business
- Project speed

IT teams spend an average of only 46% of their time innovating for the business3

Only 26% of IT orgs rate their ability to implement digital transformation across their company as excellent3

Only 29% of IT orgs rate their ability to keep pace with technology trends as excellent3

Salesforce Research
The Developer Shortage Overshadows Companies’ Ambitions

To the layperson, the solution to IT’s backlog problem is simple: hire more developers. But IT leaders know that’s easier said than done. The reality is that there are not enough trained software developers to meet demand.

It’s estimated that in 2017, the number of U.S. computer science (C.S.) graduates would have filled less than 9% of the country’s open developer positions. Another study foresees a gap of 500,000 developers by 2024 in the U.S. alone — a figure that could be in the millions worldwide.

“Years ago, you could build a workforce of talent over a few years. Now, technologies emerge so quickly that it’s becoming difficult to educate people quickly enough. This isn’t getting any easier; it’s going to get more complex.”

Jonathan Reichental, CIO, City of Palo Alto, California

In 2017, there were 500,000 open developer jobs in the U.S. and <50,000 C.S. graduates.4

By 2024, there will be a gap of 500,000 developers in the U.S. alone.5

Salesforce Research
Skill Gaps Pose an Existential Threat in a Technology-Driven World

IT’s staffing problem isn’t just a matter of pure numbers. As the Fourth Industrial Revolution drives demand for innovative, connected, and intelligent capabilities, developers’ skill sets must evolve at an unprecedented rate. Data shows, however, that workforce skills aren’t keeping pace with technology advancements.

Nearly half of IT leaders report inadequate knowledge of traditional software development, mobile app development, the Internet of Things (IoT), and AI. Within two years, these figures are projected to cross a critical threshold and impact the majority of IT teams.

The potential consequences of inadequate technical skills is nothing short of an existential threat for companies seeking to compete – let alone lead – in today’s discerning customer landscape.

52% of IT leaders say skill gaps are a major challenge at their organization.

### IT Organizations That Are Experiencing (and Projecting) the Following Skill Gaps

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<thead>
<tr>
<th>Skill</th>
<th>2017</th>
<th>2019 (Projected)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional software development</td>
<td>44%</td>
<td>58%</td>
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<tr>
<td>Mobile app development</td>
<td>48%</td>
<td>54%</td>
</tr>
<tr>
<td>IoT</td>
<td>48%</td>
<td>57%</td>
</tr>
<tr>
<td>Data science/AI</td>
<td>46%</td>
<td>55%</td>
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The need to bring more people into the world of software development — and to reskill those already in developer roles — has never been more apparent. The solution, however, may not lie in traditional education.

As Thomas Friedman notes, university curricula aren’t keeping up with the pace of technological change, and students are graduating without the necessary skills to drive their companies – and themselves – forward.

Companies increasingly recognize not only the necessity for new approaches to workforce education, but also that they, themselves, must play an active role in providing them.

To date, few companies have taken steps toward equipping new hires and current employees with the skills to thrive in a new technological landscape, but this is positioned to change in a big way. In fact, the number of organizations with formalized training and retraining programs, online educational resources, and even apprenticeships is poised to double.

87% of companies say universities aren’t adequately preparing students for today’s jobs.⁶

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<th>Hiring Managers Who Say New Technology Transforms or Substantially Impacts the Following</th>
<th>Companies That Do or Are Planning the Following⁷</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our company’s approach to workforce training/development</td>
<td>Currently do this: 18% Planning as high priority: 29%</td>
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<td>Our company’s responsibility to retrain current employees</td>
<td>Retraining programs for current employees</td>
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<td>Training programs for entry-level talent</td>
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<tr>
<td>Our company’s responsibility to train new employees</td>
<td>Apprenticeships</td>
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<td></td>
<td>Online training/educational resources</td>
</tr>
<tr>
<td></td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>17%</td>
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</tr>
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<td>16%</td>
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New Educational Platforms Put Diversity in Tech within Reach

Only one in five software developers in the U.S. is female, and a mere quarter of IT organizations rate the diversity and inclusivity of their workforce as excellent. Inequitable access to new technologies – coupled with educational shortcomings – would likely exacerbate the problem.

As companies seek to expand the developer ranks, they’re likely to fish familiar waters and default to groups who’ve historically filled these roles. In the midst of overdue conversations about inequality, technology organizations in particular have the opportunity to expand their talent pool.

Workforce development programs for tenured and new employees – when planned with inclusion in mind – can help curb historical injustices and foster a more equal future.

Only 26% of IT organizations say their workforce diversity/inclusivity is excellent.  Only 1 in 5 U.S. software developers is female.  

IT Leaders Who View Workforce Development Programs as Transformational or Substantially Beneficial to the Following

- 57% Workforce diversity
- 53% Income equality
Low- and No-Code Development Democratizes Technology

New educational platforms, coupled with the rise of low- and no-code development tools, hold the promise of not only opening the world of software development to a more diverse crowd, but also broadening the definition of what it means to be a “developer.” Citizen development — the practice of empowering end users to create business applications under IT governance — is gaining traction.

IT leaders’ interest in low-code development has skyrocketed over the last two years, from 52% to 76%, with further climbs projected. Low code empowers IT’s nontechnical partners to solve their own business problems, perhaps contributing to its rising popularity.

“...We asked ourselves, ‘How do we educate folks about the capabilities we have? How do we bring them to the platforms we have?’ Shadow IT is no longer a shadow.”

David Riggan, AVP of Solutions Delivery, BMC Software

74% of IT leaders plan to shift some application development to business units.

IT Leaders Who Are Extremely or Very Interested in Low-Code Development

52% 76% 81%
2015 2017 2019 (Projected)
Citizen Development Sparks Speed, Innovation, and Business Partnerships

By using low- and no-code development techniques to shift responsibility of relatively simple – but nonetheless critical – projects, stakeholders with the closest knowledge of business needs can realize benefits more quickly. More than three-quarters of IT leaders believe citizen development will transform or substantially impact their partnerships with business units.

One study found that low-code development increases project speed by 50%.

While some developers may initially shudder at the idea of handing over application development to business partners, the benefits are two-sided. Along with learning platforms that foster new skills, a lightened project load can help developers realize their full talents by freeing their capacity for complex projects.

“Citizen developers focus on what’s going to give the highest output or highest efficiency gains for the team – because they’re oftentimes on that team that’s going to use the tool.”

Anna Rodriguez, Consultant, Slalom
Related Resources

Organizations face unprecedented challenges in meeting technology-driven customer expectations. But breakthroughs in development methodologies and education can help. Here are a few resources to help you and your team reboot your workforce in the Fourth Industrial Revolution.

Sources:

Check out Trailhead – the fun way to learn Salesforce – and get inspired.

See how IT can embrace citizen development without compromising standards.

Get the inside scoop on low-code development from IT leaders around the world.