Outsystems and Low Code Digital Platform

An Overview

ENTERPRISE PRODUCTIVIT

Contents

Background

The need for digital transformation dominates business strategy today, and there are two obvious consequences for IT. Demand for application development is at an all-time high, and speed and agility are more important than ever before.

As aptly put by Forrester Research, today "every company is in the software business." Also, fast iterative delivery of high-quality software is the name of the game. If you're in any doubt about these claims, then consider this. The average tenure of companies in the S&P 500 has plummeted from 60 years to less than 20 years since the 1950s and is forecast to be just 12 years a decade from now.

In a world that is changing at breakneck speed, the ability to identify and respond to digital innovation opportunities more quickly than your competitors will determine if your company sinks or swims.

Every company is in the software business because innovation and differentiation don't come from neatly packaged off-the-shelf solutions. And, if you want to get to market first, you need the courage for high-speed experimentation. This is no place for glacial, multi-month ERP-style projects.

Critical Five Points

1. How are organizations' app dev priorities adjusting to this digital age?
2. What are the main challenges to meeting app dev goals?
3. What strategies are IT teams employing to increase app dev capacity and speed?
4. Are these strategies working to overcome resource constraints, and reduce backlogs?
5. Are new app dev practices such as low-code and citizen development making a difference?

About Outsystems

Outsystems is the one of the best platforms for low-code rapid application development. Thousands of customers worldwide trust OutSystems as the only solution that combines the power of low-code development with advanced mobile capabilities, enabling visual development of entire application portfolios that easily integrate with existing systems.

The Fastest Way to Build Enterprise-Grade Applications

- Visually develop full-stack apps
- Integrate with everything
- Deploy to any device
- No lock-in, no boundaries

Key Drivers for Adopting Low Code Platform

Outsystems connected more than 3,500 IT professionals in all kinds of industries and from over 116 countries. The outcome is given below.

- **Demand for App Dev at All-Time High**
  The number of applications slated for delivery in 2018 is higher than ever. Forty-two percent of IT professionals said they had plans to deliver 10 or more apps, 21% plan to deliver 25 or more apps, and 10% said they plan to deliver 100 or more apps in 2018.

- **Excessive Development Time**
  Forty-seven percent of respondents said the average time to deliver a web or mobile application is five months or more.
  Twenty-eight percent described their organization as unhappy or somewhat unhappy with the speed of application delivery.
- **Backlogs Remain Stubbornly High**
  Sixty-five percent of IT professionals said they have an app dev backlog, and for 10% of these respondents, the backlog was more than 10 apps. Only 32% said their app dev backlog had improved in the last year.
- **Development Skills Are Hard to Hire**
  Sixty-five percent of organizations have hired web or mobile developers in the past year. Eighty percent of respondents described app dev talent as scarce, with hiring taking longer and costing more.
- **Slow Returns From Agile and DevOps Investments**
  To increase application delivery, organizations are investing in multiple tools and approaches. Sixty percent of organizations have invested in agile tools and services in the past year. But, the average agile maturity score was a lack cluster 2.6 out of 5.
- **Customer-Centricity Is on the Rise**
  Fifty-two percent of organizations have invested in customer-centric practices in the past year, including customer journey mapping (16%), design thinking (27%), and lean UX (9%). For the new apps slated for development in 2018, those that will be used directly by customers or business partners are most important, outscoring apps for internal use by 14%.
- **Low-Code Is Becoming Mainstream**
  Low-code is no longer just for innovators and early adopters. Thirty-four percent of respondents said their organization was already using a low-code platform, and a further 9% said they were about to start using one. If this is representative of the whole market, then low-code has crossed the chasm and is well on the way to widespread adoption by the "early majority."

Digital Transformation and the Case for Low-Code

Low-Code is Delivering

According to the opinions provided by over 3,500 respondents in this survey, low-code is making a significant difference for those who have adopted it. Compared to those who are not, respondents who are using low-code are:

- 21% more likely to describe their organization as happy or somewhat happy with the speed of application development
- 15% more likely to deliver applications in four months or less
- Less than half as likely to report app delivery times of 12 months or more
- 15% more likely to describe their agile maturity as level 3, 4, or 5
- 10% more likely to describe their DevOps maturity as level 3, 4, or 5
- Nearly three times more likely to say they have no app dev backlog
- Two-and-a-half times less likely to have a backlog of over ten applications waiting for development
- Three times more likely to describe citizen development as tightly governed

Digital Transformation or Disruption?

Digital disruption is an existential threat to all businesses. The average tenure of those in the S&P 500 has plummeted from 60 years to less than 20 years since the 1950s and is forecast to be just 12 years a decade from now.

The world is changing at breakneck speed, and the challenge for all businesses is to identify the threats and opportunities that will come from digital innovation and respond faster than their competitors. Those that fail in this task risk haemorrhaging customers and revenue to more agile competitors, including new disruptors, that aren't weighed-down by complex architectures and legacy-debt.

It's no wonder, then, that digital transformation is the number one concern for two-thirds of Global 2000 CEOs. And yet, far too many businesses are struggling with digital transformation. McKinsey says that many long-established firms are losing as much as half their revenue growth to more digitally-savvy competitors.

Barriers to Digital Transformation

As confirmed in this survey, we see four fundamental barriers to digital transformation:

- **Massive backlogs**.

Sixty-five percent of respondents overall complained of app dev backlogs, and 15% had more than 10 projects backing-up. Sixty-eight percent said this situation was unimproved in the past year.

- **Scarce resources**.

Thirty-eight percent of respondents said their app dev team had grown in the past year. Few (8%) thought theirs had shrunk. Sixty-five percent said their organization had hired web or mobile

developers in the past year, and 80% said it was hard to hire skilled developers, and as a result, hiring was taking longer and costing more. Fifty-five percent of organizations have outsourced some web and mobile development (or both) in the past year.

• **Legacy debt.**

Sixty percent of respondents said the main cause of complexity and delay when developing web and mobile apps was legacy system integration and deficient APIs. Based on survey responses, we estimate that 63% of the app dev projects that organizations have planned for 2018 are replacing and updating applications that they already have and not genuinely new, innovative development.

• **Uncertainty**.

Digital transformation is, by its very nature, uncertain. That's because it involves the creation of new business models, new digital ways of delivering value to customers, and harnessing new digital technologies. This is a million miles from the relative comfort of continuous process improvement.

Capacity Improvement Efforts are Coming up Short

Organizations are investing in approaches and technology to improve the speed and quality of software delivery. However, app dev backlog has not improved in the past year, the capacity improvement efforts are not keeping pace with demand. Investment has done in devops, agile development training or consulting in the past year. Mastering these practices is crucial for increasing application delivery. Further, these capabilities are essential to cope with uncertainty. Experimentation requires a test and learn approach, meaning short sprints, continuous integration, and continuous delivery or deployment.

Breaking Down the Digital Transformation Barriers and Improving Capacity with Low-Code

The exciting reality is low-code can help you overcome every one of these barriers. And, it will help you improve agile adoption, simplify your DevOps "toolscape," and give new impetus to your cloud strategy.

• **Eliminate backlogs**.

With application delivery speeds 5-10 times faster than hand-coding, low-code can help you get on top of your backlog and then spend more time innovating.

• **Overcome resource constraints**.

Instead of joining the increasingly frenetic fight to attract and retain digital developers, you can turn existing developers into full-stack pros. That's because with OutSystems, a single visual IDE is all you need to build beautiful responsive web, native mobile, and hybrid apps. OutSystems is the industry-leading low-code development platform for application development and delivery professionals.

• **Integrate with anything**.

OutSystems includes dozens of out of the-box integrations for systems like SAP and Salesforce. You can visually model and rapidly create back-end services for REST and SOAP consumption and architect flexible, reusable integration that isn't buried in application code.

• **Turbo-charge your innovation**.

OutSystems will help you thrive in the paradigm of digital experimentation and uncertainty. Rapid visual prototyping keeps business users engaged in collaborative design sessions, shortening feedback delay. Minimum viable products are easily scaled into enterprise

apps. You also have the confidence of knowing that if you pivot, you will not be throwing weeks of development effort away, which gives you much more courage for experimentation.

• **Improve agile adoption**.

OutSystems can help you break down specialist developer silos because one skillset and one IDE can be used for all kinds of development. This improves collaboration and gives application development managers newfound flexibility for how they organize and assign work to team members. The essential ingredients for improved agile business engagement, namely high-speed prototyping and visualization, are all there.

• **Simplify your DevOps tool scape**.

Time and again, we hear IT leaders bemoaning the DevOps trap that they've fallen into. The bewildering and complex array of tools required for code validation, version control, continuous integration, test automation, security testing, deployment automation, and performance monitoring is burning too much budget and manpower. Given the risks and potential rewards from digital innovation, IT needs to rebalance its priorities to maximize customer-centric innovation, instead of reinventing the DevOps stack. OutSystems includes multiple DevOps capabilities needed to achieve continuous delivery, as well as one-click deployment, performance monitoring, and user feedback. That said, OutSystems is open and can be integrated with a variety of other DevOps tools, as needed.

Low-Code Fears and Confusion

You Really Can Build the Apps You Need

If you choose the right low-code platform, there is no limit to what you can build. However, with over 76 vendors fighting for your attention, including lightweight business-user and citizen developer tools, specialty mobile development tools, and platforms for application development and delivery (AD&D) pros, there is a risk of choosing a platform that boxes you into a corner. If your primary concern is having the power and flexibility to build everything you need, then focus on a low-code platform for AD&D pros. We're proud to be ranked as a market leader in this most strategic of low-code market categories. Find out more at outsystems.com/platform.

You Can Escape Vendor Lock-In

OutSystems generates standard code and data models that run in standard application server stacks—no runtime interpreters. Unlike other low-code platforms, with OutSystems you will always have your applications and data. Read our Standard Architecture with No Lock-in webpage for the full rundown.

Security OutSystems has an extensive set of built-in security features. Every application created with OutSystems is secure over its entire lifecycle. Get the full lowdown on OutSystems secure architecture here. Find out about our security certifications here. Scalability The OutSystems architecture supports a wide range of options, including vertical scalability and horizontal scalability, adjustable to a customer's specific requirements. A simple departmental application can grow to a large internet-wide deployment supporting millions of users without additional development. Find out about OutSystems scalability here.

OutSystems As a hPaaS Platform

OutSystems offers an hpaPaaS solution that supports cloud deployments including AWS, Microsoft Azure and OutSystems' own options of public cloud, virtual private cloud and on-premises implementations. The OutSystems platform uses a metadata-driven model, where applications are developed using an extensible, low-code visually integrated development environment. OutSystems has a large customer base spanning multiple geographies. Pricing for the OutSystems platform is tiered on the scale of users, and includes a free starter option. The company was founded in
2000 in Lisbon, Portugal, but its current headquarters is located in Atlanta, Georgia, U.S.

Strengths

The OutSystems platform offers a comprehensive visual modeling capability, including business processes, integration workflows, UIs, business logic, data models, web services and APIs. These enable high-productivity development and a faster time to market for relatively advanced applications. The platform also includes many other services, such as project management and analytics.

■ OutSystems' customers have extensibility options, yet can also avoid lock-in by generating application
source code and then deploying and managing it separately. This unique proposition offers a degree of assurance, should the customer find the need to migrate off the OutSystems platform in the future.

■ OutSystems' support for multiple public cloud providers includes subtenancy features. This flexibility
positions OutSystems well for hybrid deployments where enterprises want to migrate applications at their own pace. The platform also supports high-control DevOps stacks, and can deploy to Docker within container platforms such as Kubernetes and Cloud Foundry. The platform also features both horizontal and vertical auto scaling.

■ OutSystems' reference customers scored the platform as above average for productivity and ease of
deployment. They selected OutSystems for its vision and innovation, and OutSystems customers were building more systems of innovation than those of any other vendor in this Magic Quadrant.

Cautions

OutSystems is an independent platform vendor and does not have the resources that larger vendors can leverage. Large PaaS vendors are increasing their investments in hpaPaaS, thereby posing a potential threat to smaller independent vendors.

■ OutSystems' support for AI services is limited to partnerships with third-party AI and ML vendors. This compares with some other vendors that have begun to offer these services as part of their own platforms.

■ OutSystems continues to achieve revenue growth; however, its reported customer numbers have not
increased as much as might be expected. This indicates a transition to larger enterprises, which may allow its competitors to gain a greater foothold in the market.

■ OutSystems' reference customers' aggregated scores were slightly lower than the average for end user
experience. Also, the proportion of references that would like to see an improvement in cost was greater than the average for this Magic Quadrant.

Competence Skill Level Breakdown

For each of the low-code roles described in the talent section, there is an assessment of the required competence on a 5-point scale according to the following chart:

Skill Level: 0 | *Not Applicable*

This competency is not applicable to the role.

Skill Level: 1 | *Basic Knowledge*

There's a common knowledge or an understanding of basic techniques and concepts.

Focus is on learning.

Skill Level: 2 | *Limited Experience*

Able to understand and discuss terminology, concepts, principles, and issues related to this competency.

Has a level of experience gained in a classroom, experimental scenarios, or both—or as a trainee on the job.

Is expected to need help with this skill.

Focus is on developing through on-the-job experience.

Skill Level: 3 | *Intermediate*

Able to successfully complete tasks in this competency.

Has applied this competency in situations successfully and with minimal guidance.

Is expected to use the skill independently with occasional help from a more senior resource.

Focus is on applying and enhancing knowledge or skill.

Skill Level: 4 | *Proficient*

Able to perform the tasks associated with this skill without assistance.

Has consistently provided practical, relevant ideas and perspectives on process or practice improvements that may easily be implemented.

Is expected to coach others in the application of this competency by translating complex nuances into easy-to-understand terms.

Focus is on broad organizational or professional issues.

Skill Level: 5 | *Advanced*

Able to provide guidance, troubleshoot, and answer questions related to this area of expertise and the field where the skill is used.

Has demonstrated consistent excellence in applying this competency across multiple projects and organizations and also created new applications for this competency, lead the development of reference and resource materials for this competency, or both.

Is expected to be considered the "go to" person in this area within and outside the organization.

Focus is strategic.

Competence Breakdown

The following table provides more detail about each of the nine competency areas identified as part of the talent dimension.

Skills	Description
Analysis and Design	
Architecture/Solution Design	• Master good architecture principles and be able to design applications using the 4-layer architecture • Guarantee good performance, scalability, and maintainability • Know how to avoid, detect, and correct circular references • Know how to use tools to monitor project architecture

Requirement Gathering	• Master requirements gathering techniques:
	  ◦ Identify vision and drivers
	  ◦ Clearly understand business context
	  ◦ Identify personas
	  ◦ Define user stories
	  ◦ Develop business process models
	  ◦ Build mockups

Web Application Architecture	

Web Application Architecture	• Understand web application architecture (client/server architecture):
	  ◦ How and when to POST or GET
	  ◦ Page rendering
	  ◦ Database access
	  ◦ Understand session behavior
	  ◦ Understand browser caching
	  ◦ View State
	  ◦ AJAX requests

User Experience	

Understand and Apply Usability	• Understand information architecture:
	  ◦ What it is
	  ◦ Why build it
	  ◦ Organization
	  ◦ Labeling
	  ◦ Cost
	  ◦ Navigation
	  ◦ User location
	  ◦ Auxiliary navigation
	• Understand SCRAP (symmetry, contrast, repetition, alignment, proximity). design principles and be able to apply them when building an application
	• Know the 11 UX Rules for IT Developers
	• Understand the importance of usability tests and be able to execute them
	• Use real sample data or generate realistic test data

Analysis and Design	

SQL Programming	• Able to implement:
	  ◦ Common table joins (left join, inner join)
	  ◦ Exists
	  ◦ Count
	  ◦ Group by
	  ◦ Top
	  ◦ Row number
	  ◦ Aggregate functions (SUM, AVG, MAX, MIN)
	• Able to implement:
	  ◦ In
	  ◦ Between
	  ◦ Outer Join
	  ◦ SQL Case
	  ◦ Subqueries
	• Understand indexes and their impact on performance

Troubleshooting and Debug	
App Troubleshooting	• Able to analyze error logs • Able to analyze monitoring logs • Able to analyze performance logs • Know how to troubleshoot, identify, and fix performance issues • Understand indexes and execution plans • Understand performance tuning tools and how to use them for tuning and monitoring
Development Languages	
Algorithm and Pseudocode	• Understand the problem or requirement • Think through the solution and develop a design - be able to drill-down and explain it
C#, Java, Python, PHP	• Understand language best-practices and most commonly used code libraries • Able to implement a basic algorithm or functionality • Experienced with MS Visual Studio, Eclipse, or other IDE
iOS & Android	• Swift and Java
UI Development Languages	
CSS	• Know CSS syntax • Able to explain the box model • Know what a pseudo element is • Able to troubleshoot an issue in the browser • Know the order of import of CSS in OutSystems • Know how to read and apply selectors • Know the differences between CSS and CSS3 • Know the difference between positioning values • Able to understand the organization of a theme • Able to understand vertical alignment • Able to explain RESS (responsive web design + server side) and RWD (responsive web design) approaches

HTML	• Know what elements are used and how by • Know what APIs were made available in HTML5 • Know how to add HTML standard elements to an HTML file • Understand accessibility
JavaScript	• Understand JS/jQuery • Select an element by id • Select an element by class • Able to show and hide an element • Able to import (and use) a jQuery plugin • Able to troubleshoot an issue in the browser • Know how to create a JS object • Know how to create a jQuery plugin • Know how to do a manual jQuery Ajax request • Has created and shared a jQuery plugin in the community
Integrations	
REST & SOAP	• Able to consume a REST and SOAP API • Able to expose a REST and SOAP API • Know how to test REST and SOAP integrations • Know how to handle null values for SOAP API
Third-party Integration	• Know how to create extensions using the SAP Wizard for Integration Studio • Know how to handle transactions between OutSystems and SAP
Performance	
Assess Application Performance	• Able to drill down into reports and identify bottlenecks . • Use performance reports (understand difference between client-side vs server-side time) • Use the browser performance tools
Optimize Application Code	• Reduce the page size • Reduce the size of page resources to load and cache them • Reduce the data fetched from the database • Cache data from external data sources
Optimize Application Infrastructure	• Avoid database degradation • Use maintenance plans • Tune database file growth • Improve application server and web server memory settings

Setup

Activity	Overview
Choosing and Training the Product Owner	The product owner must be able to interact with the business, translating their wants and needs and mapping them to user stories. The PO needs to be a skilled project manager, responsible for keeping the process going. Experience with low-code is a plus. **Responsible/Accountable:** Adoption Champion **Consulted:** Adoption Expert
Choosing and Training the Delivery Resource	The tech lead and (up to 3) developers should have some previous app development experience and the respective set of skills, and experience with OutSystems is a plus. The Tech Lead has other functions at the foundation level, but will have to have development training. **Responsible:** Product Owner **Accountable:** Adoption Expert
Backlog Analysis and 1st App selection	The first app selection is crucial for demonstrating the advantages of low-code and initiating platform adoption momentum by delivering business value early. This step needs to be made with care because choosing the wrong first application based on superficial reasoning, technical concepts, or a need to please can result in the effort's being abandoned because no value was perceived. **Responsible:** Product Owner **Consulted:** Business User(s) and Adoption Expert
Reference Architecture Design	Understanding integration needs with legacy systems and common nonfunctional requirements (NFRs), like authentication and authorization, audit trailing, or style guides is key to setting a reference architecture that guides future applications to be designed to last and evolve with cost savings. **Responsible:** Tech Lead Acting as Architect **Consulted:** Adoption Expert
Infrastructure Provisioning	With a cloud infrastructure, everything is set up and configured automatically for you. Cloud provisioning involves additional DevOps setup steps, yet simplifies everything. **Responsible:** Tech Lead Acting as DevOps Engineer **Consulted:** The person responsible for the infrastructure at the IT org.
ALM setup	A proper low-code application lifecycle management practice is crucial to assure a project's success and to make sure you can keep up the speed throughout the application lifecycle. Different teams and roles need to be set up in the respective ALM tools, and the deployment pipeline and release management need to be defined. **Responsible:** Tech Lead Acting as DevOps Engineer **Consulted:** Adoption Expert

Adjusting Digital Experience

Activity	Overview
Mobile Application Initiation	After initial functional and nonfunctional requirements, high-level features, and target devices are captured, it is time to define the user stories and build a backlog. **Responsible:** Product Owner **Consulted:** Business User or Users
Mockups - Low and High Fidelity	During the MVP definition phase, ideas should be presented first with low-fidelity mockups. Some of the mockups should be taken to high-fidelity so that project stakeholders can be aligned with the vision for the application. **Responsible:** UX/UI Designer Acting as Customer Journey Designer **Consulted:** Business User or Users
Customer Journey	During the MVP definition phase, it is necessary to define the journey, the multi-touch point mapping, the experience map value, and the business value metrics. **Responsible:** UX/UI Designer Acting as Customer Journey Designer **Accountable:** Product Owner **Consulted:** Business User or Users
Implement Look and Feel	During the MVP definition phase, it is necessary to implement the look and feel based on the high-fidelity mockups. This will give a vision for how the application will look in the future and allow a faster development process. **Responsible:** Front-end Developer **Accountable:** Tech Lead **Consulted:** UX/UI Designer Acting as Customer Journey Manager

Demand

Activity	Overview
Application Ideation	Find innovative solutions to achieve your business goal. Analyze the potential gains and roadblocks. To successfully deliver a project, you need to identify the requirements and high-level features. **Responsible:** Product Owner **Consulted:** Business User(s)
Business Case and Metrics Definition	Based on the ideation, you can define the business case and metrics. This will include why the application makes sense business-wise, and how you can measure if you are on target. Management requires measurement for informed decision-making. **Responsible:** Product Owner **Consulted:** Business User(s)
Application Estimation	After making the business case, you determine the effort and budget required and available to create your app. Consider the requirements and high-level features involved. **Responsible:** Product Owner **Consulted:** Tech Lead and Business User(s)

Delivery

Activity	Overview
Application Initiation	When you start developing an application, the first steps set the pace of the development phase. After the initial requirements and high-level features are recorded, you're ready to define the development requirements and build a backlog. **Responsible:** Product Owner **Consulted:** Tech Lead, Business User(s)
Application Architecture design	To make sure your application is a success, it needs to have a good architecture that allows scalability, performance, and component reusability. **Responsible:** Tech Lead, acting as Architect
Iteration Planning	Every iteration starts with planning so that everything is clear for development. Planning should include recent user feedback to promote user adoption. **Responsible:** Product Owner **Consulted:** Tech Lead

Low-Code Capabilities for Brilliant Digital Experiences Way Forward

- **Enterprise-Grade Security**
  You'll be handling customer and financial data for thousands or millions of customers. Make sure your low-code platform has bulletproof security and the certifications to prove it.
- **Integrate With Anything**
  Delivering digital experiences to your customers will inevitably involve integration with dozens of internal systems. Make sure that your chosen platform not only enables the development of apps that integrate with a wide variety of platforms and offers SOAP and REST APIs, but also allows you to develop your own connections and back-ends for limitless integration.
- **Massive Scalability**
  If you aim to delight thousands or millions of customers, make sure your low-code platform includes enterprise strength for speed, scale, and security. You're also likely to want flexible options for cloud (private or public), on-premises, or hybrid deployments.
- **Enterprise-Strength Governance for Large Developer Teams**
  To support wide-scale digital transformation programs, your low-code platform will need to support large numbers of developers in multiple teams, all building hundreds of applications. Make sure the low-code platform you adopt includes everything that is needed to implement a continuous integration development cycle.

- **Great UX for Web and Native Mobile**
  Providing brilliant digital experiences to thousands of customers requires a fabulous UX. Choose a low-code platform that has the design features you need both for responsive web and full-featured native mobile.
- **Low-code Without Constraints**

Make sure your developers can extend your low-code applications with their own custom code.
The goal: open standards, no vendor lock-in, worry-free, future-proof development.

References

Please refer to the following URLs for further information on Outsystems

1. www.outsystems.com/platform