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Engineering



Accelerating developer experience

Designing for developers in a digitally fueled economy

This is the first in a series of reports on developer experience, covering topics such as the developer economy, the role of developers in driving competitive advantage, challenges in creating leading developer experiences, and opportunities to maximize developer impact.

Organizations are increasingly recognizing that investing in developers can unlock a wealth of opportunities for product innovation, operational efficiencies, and customer satisfaction. For instance, the Canadian telecommunications provider TELUS streamlined productivity and saved \$17 million by investing in developer tools to better support developer collaboration.¹ The language learning platform, Duolingo, invested heavily in artificial intelligence (AI)-driven developer productivity tools, increasing developer speed by 25% and cutting median code review time by 67%.² Toyota Motors North America drove \$5 million in annual savings and reduced time-to-ship projects to weekly instead of quarterly by building an internal developer portal called Chofer.³ Etsy invested 20% of its engineering budget in developer experience as it scaled its engineering organization from 250 people to almost 1,000.⁴ Developers are a critical stakeholder group in driving business impact and outcomes. In this article, the first in a series focused on developer experience, we'll explore which forces contribute to the rise in importance of developers, what constitutes DevEx, what makes it so challenging, and how business and technology leaders can make their organizations more developer-centric.

Both demand-side and supply-side forces are driving the need for developers

Developers are responsible for the design, engineering, and maintenance of the software that underpins the \$880 billion software economy.⁵ Additionally, the market for products sold directly to, purchase-influenced by, and/or consumed by developers is approximately \$40 billion, expected to grow at a rate of 19% annually (figure 1).⁶ This includes software and application development, digital content creation, website building, and hardware product design, as well as auxiliary services such as developer tools, platforms, and marketplaces.

Our experiences and research suggest that both major demand-side and supply-side forces are driving developer growth.

Demand-side forces:

- **Digitization of operations:** Digitization of internal operations, across front-, middle-, and back-office, is pervasive across all industries and geographies. What's more, the COVID-19 pandemic supercharged the urgency to transform. In fact, according to a recent Deloitte-Fortune global survey, 85% of CEOs indicated that their organizations had significantly accelerated digital transformation during the pandemic.⁷ Developers are the key to building the base infrastructure needed to execute such digitization and, more importantly, unlock efficiency and effectiveness.
- **Rise of platform business models:** As legacy companies have been digitally reinventing themselves, there has been a simultaneous boom in new business models, most prominently platform- and marketplace-based models. Platform businesses are projected to be a \$164 billion market by 2026, growing at approximately 20% from 2020.⁸ By effectively creating a frictionless, two-sided market, platform business models are prompting organizations to prioritize developers as much as they do consumers.

Supply-side forces:

- **Disruptive technology:** The emergence of easy-to-use development tools, such as low-code/no-code (e.g., Appian) and dramatically inexpensive infrastructure (e.g., Amazon Web Services Serverless) has made it significantly easier for beginners to rapidly start coding and launching new products. Additionally, generative artificial intelligence (GenAI) is introducing new complexities to the core role of the developer, reshaping every aspect of software development and the nature of software developers. The significant productivity spike supercharged by GenAI (e.g., automated testing, faster bug detection, quicker code completion) is incubating not just more amateur developers, but a new category of "superdevelopers" as well.

Software development *outside* of the tech industry

It's no surprise that big technology companies employ thousands of developers. However, the tech industry represents only a small portion of the overall developer workforce: Only 10% of new software developer roles are concentrated in tech companies. In the consumer products sector, digital goods and services (e.g., digital health/wellness, virtual learning) already constitute 3% of consumer's total share of wallet, and that number is growing.⁹ Buoyed by a similar need for software development in consumer goods, financial services, health care, and manufacturing, demand for developers in the past decade outside of the tech industry (65% growth from 2013 to 2018) outpaced demand within the industry (40% growth during that same 5-year period).¹⁰

- **Growth of developer communities:** Open-source platforms, such as GitHub and Stack Overflow, have become more expansive and inclusive, providing developers the opportunity to connect with other developers, seek assistance on forums, and participate in online coding communities.
- **Vast number of learning resources:** From web-based courses and tutorials to interactive coding platforms, aspiring developers have a plethora of options to choose from. Additionally, many of these resources are free or available at a low cost, making them accessible for a wider audience.

These demand-side and supply-side forces have led to a notable increase in the number of professional developers, both those employed internally by an organization (referred to as first-party, or 1P, developers) and those external to an organization but building on the organization's products and platforms (referred to as third-party, or 3P, developers). There are an estimated 27 million software developers globally.¹¹ Moreover, jobs in software development, not just across the technology industry but across every industry, are expected to grow by 25% within the next decade, compared to only an 8% average growth rate for other professions.¹²

The influence of developers in organizations are also increasing

As developers rise in prominence, their role and influence in the organization have also expanded. Developers are key influencers when making enterprise IT buying decisions and adopting products. Previously, companies took a top-down approach, with IT leaders determining which tools would be deployed throughout the organization.¹³ Now, individual developers or developer teams are taking the lead in selecting tools to make their work more seamless and productive. If they find a particular tool useful, they generally opt for its paid enterprise version. According to a Stack Overflow survey, 57% of developers surveyed said they influence technology purchases in their organization. Some even said they had the freedom to make their own purchases to get the tools they need.¹⁴

Moreover, developers are playing an increasingly significant role in crafting a company's product road map and customer strategy, helping to drive competitive differentiation for the organization. For instance, at Netflix, developers have a high degree of ownership and responsibility for the products they develop. The organization emphasizes "freedom and responsibility," a guiding principle that empowers developers to be accountable for key product decisions.¹⁵

Generative AI in software development

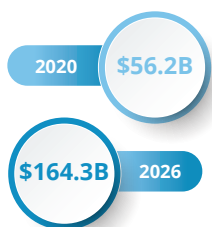
GenAI is a paradigm shift in the world of AI, creating new, never-before-seen data. GenAI can mimic the human creative process by creating novel data like the kind it was trained on, elevating AI from enabler to (potentially) co-creator. GenAI also has the potential to add contextual awareness and humanlike decision-making to enterprise workflows and will radically transform the way developers work, with major impacts across the development life cycle.

AI pair programmers such as GitHub Copilot and Tabnine can provide suggestions and autocompletion for developers while they are writing code, reducing developers' time spent on repetitive tasks, allowing them to focus on more complex and creative programming challenges. By translating natural language prompts into lines of usable code, GenAI can democratize coding, allowing even those without extensive programming experience to participate in development.

Ultimately, GenAI could create a more profound relationship between humans and technology, even more than what the cloud, the smartphone, and the internet did before. Organizations are increasingly challenged to weigh the benefits against the risks of this emerging technology, and nearly all—regardless of industry—will need to proactively develop a GenAI strategy to account for potential disruptions to traditional ways of working.

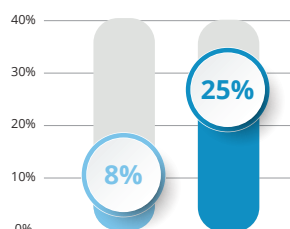
Learn more about Deloitte's perspectives on GenAI at the [Deloitte AI Institute](#).

Platform-as-a-service market will grow at a compounded annual growth rate of 19% till 2026¹

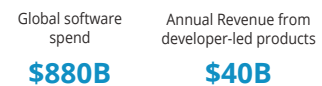


Developer population is now more than 27 million.² Jobs in software development are expected to grow at a much faster pace than other professions³

Expected job growth 2023-2033



Developers underpin the entire software development economy, and drive the rapidly growing Business-to-Developer (B2D) market.⁴



1 MarketsandMarkets, Platform as a service (PaaS) market report, Apr 2021.

2 Lionel Sujay Vailshery, Developers population worldwide 2018-2024, December 6, 2022.

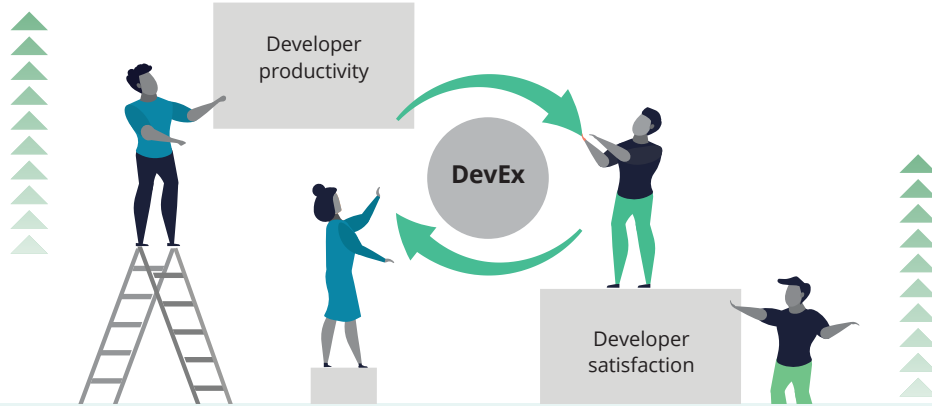
3 US Bureau of Labor Statistics, Occupational Outlook Handbook, February 6, 2023.

4 Tyler Jewell, "The developer-led landscape," Tyler's Musings, September 23, 2020.

Investments in DevEx—not just DevOps—unlock enterprise value

Like customer experience (CX), DevEx as a domain is more than just operational improvement and productivity enhancement. It's a portfolio of end-to-end capabilities that touches all aspects of the developer role.

DevEx consists of the range of mutually reinforcing capabilities that an organization provides to maximize developer productivity and developer satisfaction.



DEVELOPER PRODUCTIVITY

Offers and capabilities that make development-related activities more efficient, directly enabling lower cost and time-to-code:

- Workflow management
- In-flow development accelerators
- Shift left



DEVELOPER SATISFACTION

Supplemental offers and capabilities that increase developer delight and engagement, generating downstream value for the organization:

- Collaboration
- Well-being
- Diversity and inclusion

Elevating DevEx requires venturing beyond developer productivity tools, processes, and frameworks, which is traditionally the scope of DevOps. Every touchpoint a developer has with an organization—whether it be internal development tools and an engineering team lead for internal developers or external software development kits (SDKs) and developer forums for external developers—contributes to the developer's overall experience. Designing developer-centric capabilities with developer outcomes in mind—such as standardized playbooks, well-being resources, easy knowledge sharing, and proactive support—can enable a company to move with greater agility, increase innovation, and improve shareholder value. Developer productivity and satisfaction are, in fact, mutually reinforcing dimensions. As developers are empowered, they often perform better (and vice versa). Pioneering organizations are already proving the DevEx business case: companies focusing on best-in-class developer experiences achieve 60% higher revenue growth than those who don't.¹⁶

Designing a great experience for developers can be challenging

For medium to large enterprises, 75% of the IT, engineering, and business unit leaders agree that developer experience is particularly important to their business.¹⁷ Designing a great experience across the developer life cycle needs to be a purposeful journey and account for five considerations:

- **High professional diversity:** Developers have a wide range of backgrounds, skill sets, and focus areas, leading to a broad spectrum of possible personas to cater to. Even a single developer team can have developers who focus on front end, back end, full stack, DevOps, artificial intelligence/machine learning (AI/ML), or mobile software across multiple platforms and programming languages.

92% Male developers 8% Gender-diverse developers



Source: Stack Overflow Developer Survey, 2020

- **Low demographic diversity:** The abundant professional diversity of the developer community contrasts starkly with its lack of demographic diversity. As a collective, developers are notoriously homogeneous: 70% of the professional software development community is white, and approximately 92% identify as male (figure 3).¹⁸ This may impede the building of inclusive and accessible products and create an unwelcoming environment for developers. Sixty-eight percent of business leaders recognize that the lack of diversity in their tech workforce contributes to high attrition and low morale among team members.¹⁹ According to one survey, 50% of respondents left or wanted to leave a tech job because the company culture made them feel uncomfortable.²⁰ Diversity, equity, and inclusion (DEI) efforts are even more critical for both a satisfying DevEx experience and the organization's overall economic health.
- **Convoluting development environment:** Developers often contend with a complex, ever-expanding world of tools and technical environments that are often poorly integrated. You might say they work in rainforests²¹—not planned gardens—accommodating 250+ Software-as-a-Service (SaaS) applications on average, and integrating those tools and applications into a complex web of application programming interfaces (APIs).²² This fragmented tool landscape and technical environment forces developers to borrow time from writing code and redirect it toward managing operational issues associated with these complex, multifactor toolchains. It also results in fragmentation of required knowledge across product teams, slowing the product development life cycle. As such, developers now spend less than one-third of their time writing code and the rest on maintenance, testing, security issues, incident management, and other tasks.²³
- **Exponential technologies:** As we have discussed before, exponential technologies such as GenAI have the potential to upend software development as we know it. GenAI invites us to imagine a very different development world, one in which documentation, debugging, and even new lines of code are produced almost instantly with a simple, natural language prompt. On one hand, it can dramatically improve day-to-day productivity such as deployment frequency, lead time for changes, and change failure rate. On the other hand, it has the potential to threaten the core identity of developers—who they are, how they work, and what their role is in the organization—directly impacting their satisfaction.²⁴
- **Rising importance of external developers:** Both tech and non-tech organizations are catering an increasing population of external developers in addition to internal developers. For tech organizations, especially platform businesses, the amount of investment needed to serve both external and internal developers individually is high, especially when the product portfolio is broad. For non-tech companies such as Goldman Sachs, external developers represent an attractive market that is relatively uncharted territory for them. Moreover, external developers have broader needs across the journey compared to internal developers and are harder to control for the organization.

Six developer-centric moves to elevate DevEx

As we've discussed, DevEx is increasingly recognized as being highly important for an organization's strategic objectives. However, this is not a trivial challenge. In addition to the challenges we stated above, leaders also face the following complexities:

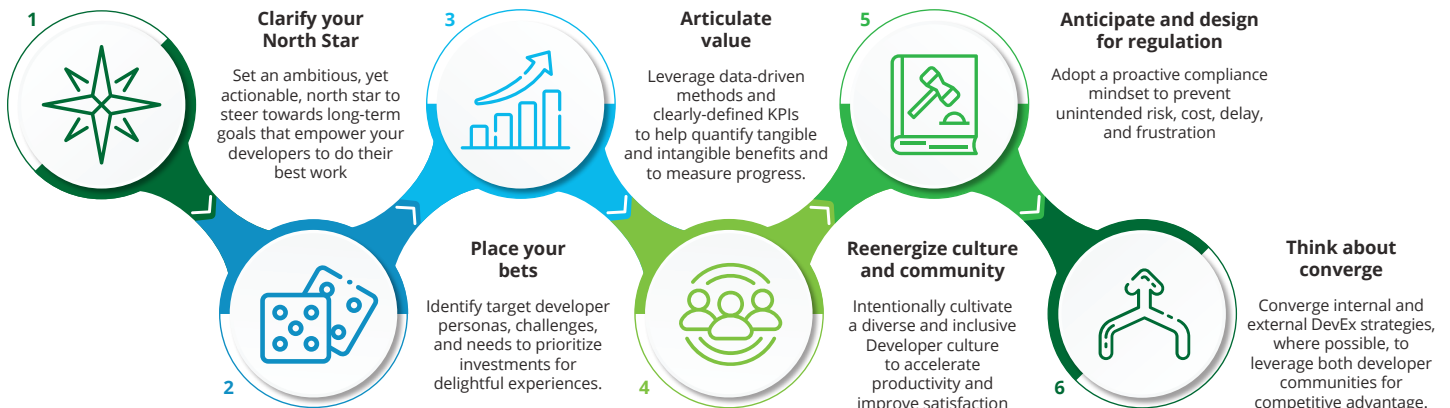
- Adapting to shifting engineering organization priorities and developer preferences, leading to higher technical debt and operational inefficiencies
- Needing to quantify and prove the return on investment (ROI) of DevEx initiatives, both tangible and intangible, to the board and shareholders, especially in today's tight macroeconomic environment
- Navigating constantly changing external factors, such as regulation, customer needs, competitive forces, and new technologies, which impact the entire developer organization and development life cycle

Goldman Sachs invests in developers

In 2019, Goldman Sachs recognized the evolving priorities for their microservices orchestration platform, understanding the increasing demands for enhanced throughput, scalability, and resilience. Simultaneously, the internal payments team acknowledged the significance of additional security measures required. To effectively address these needs, Goldman Sachs embarked on developing a new platform specifically tailored to adapt and cater to these critical use cases.

As part of its technological transformation, the bank introduced "Goldman Sachs Developer," a platform aimed at externalizing solutions and products created by Goldman Sachs engineers. This strategic initiative positions developers as vital contributors in product development discussions. It also offers external developers the potential to collaborate with internal Goldman Sachs developers on specific projects, along with access to APIs and documentation that empower internal developers to execute millions of tasks seamlessly on the platform.²⁵

To design best-in-class developer experiences effectively in response to these complexities, we suggest a six-step approach for DevEx leaders:



- 1. Clarify your North Star.** A clear, well-defined, and universally aligned ambition for your DevEx organization is a critical first step to drive focus, accountability, and action. As such, this North Star is not static and can vary depending on the evolving ambition and maturity of the organization. In our experience, most developer organizations' North Star contain some blend of four archetypes: operator, catalyst, technologist, or strategist.
- 2. Place your bets.** To understand where to maximize probability of success, leaders must (a) understand who their target developer personas and segments are, (b) uncover challenges and needs those developers have across the development life cycle, (c) assess which capabilities should be invested in to create the best experiences for developers, and (d) prioritize investments based on time to value and impact.
- 3. Articulate value.** Estimating the ROI of DevEx investments can be elusive, primarily due to the complexity in quantifying the intangible and indirect value that it drives for the organization and the ecosystem. Developing a structure of data-driven methodologies and developer-centric key performance indicators (KPIs) help quantify the ROI and track progress against the North Star.
- 4. Reenergize culture and community.** As we've highlighted earlier, there is an inherent lack of diversity in the software development community. It is imperative to build a coherent workforce and culture strategy that aligns with the organization's mission and increasing developers' expectations around DEL.
- 5. Anticipate and design for regulation.** Incorporating regulatory concerns in the product life cycle minimizes risk, decreases costs associated with noncompliance, mitigates product launch delays, and avoids developer frustration. An "always-on" product compliance mindset can move a developer organization from being reactive to proactive.
- 6. Think about convergence.** The motivations, challenges, and needs of internal and external developers are often similar, if not identical. In fact, internal developers often transition into the external world, or vice versa. By taking a holistic approach that addresses the requirements of both developer types, organizations can ensure comprehensive and inclusive success strategies.

Organizations are starting to realize that investing in developers can unlock a range of opportunities, including product innovations, operational efficiencies, and improved customer satisfaction. This recognition has made developers a critical stakeholder group in driving business impact and outcomes. Emphasizing DevEx has been shown to drive higher revenue growth and faster innovation for companies. Our six step approach helps leaders elevate DevEx and play a more strategic role in helping their organizations thrive in today's digitally fueled economy. The next article in our DevEx series will explore in greater detail the importance of articulating a clear DevEx North Star, and provide thought-starters on North Star archetypes that we see in leading DevEx organizations across industries.

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