

**The one number you
need to increase ROI
per engineer**



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Abi Noda, Laura Tacho

The Developer Experience Index (DXI) is a measure of key engineering performance drivers that are linked to financial impact.

One thing that CEOs, CTOs, and CFOs can agree on is this: software engineering is both a critical investment and an expensive one. And, compared with other critical business functions such as sales or operations, measuring and optimizing the efficiency of software engineering feels like a black box.

When talking to CXOs, we hear two repeated challenges when it comes to conventional metrics like lead time and mean-time-to-restore (MTTR). First, while useful in certain contexts, these metrics capture a narrow and limited view of software engineering. Second, these metrics can't be translated into financial terms (i.e., dollars), making it difficult to understand their business impact.

At DX, we've helped solve this problem for leading tech companies including Dropbox, Etsy, and eBay, as well as traditional enterprises like Pfizer, P&G, and Tesco. Along the way, we've pioneered research on what actually drives productivity and how to measure it.

Deriving from these efforts, we have developed a measure of software engineering effectiveness we call the Developer Experience Index (DXI) which pinpoints the most critical factors in achieving higher software development efficiency and quality. The DXI is a predictive measure developed by our researchers, with over four million benchmark samples from hundreds of organizations across the world.

Developer Experience Index (DXI)

The path to higher productivity lies in a company's ability to remove friction for their developers, enabling faster delivery and innovation. The DXI therefore measures engineering effectiveness through the lens of the developer, providing first-hand insight into engineering processes and workflows.



The DXI measures actionable areas of software delivery that are most predictive of outcomes such as development speed, ease, and quality. Other sources may tell you to measure developer experience differently – but no other measure is proven to link to business outcomes like the DXI. In fact, the DXI is the only validated measure of developer productivity that can be directly tied to dollars.

Each one-point gain in DXI score correlates to 13 minutes per week of developer time saved.

The development of the DXI is based on years of accumulated quantitative and qualitative research conducted on data from over 40,000 developers across 800 organizations. Analysis has included cognitive interviews, descriptive statistics, criterion-related validity analyses, reliability analyses, regression analyses and predictive modeling.

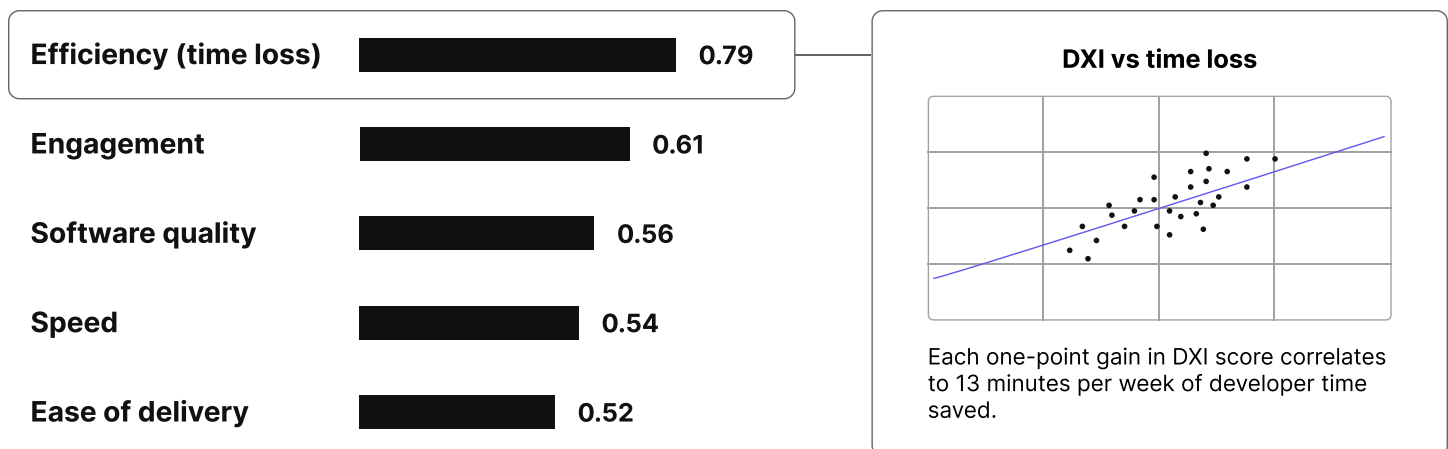
Our research reveals that top-quartile DXI scores correlate with engineering speed and quality that is 4 to 5 times higher than bottom-quartile DXI scores (Table 1). In addition, top-quartile players are more engaged, scoring 43% percent higher on employee engagement than bottom-quartile teams.

Most notably, DXI scores strongly correlate with time loss: each one-point gain in DXI score translates to saving 13 minutes per week per developer, equivalent to 10 hours annually.

Figure 1: Developer Experience Index (DXI) predictive model



Correlation between Developer Experience Index (DXI) and key business outcomes n=514



The DXI is thus the first validated measure of developer productivity that can be directly linked to dollars, enabling leaders to concretely understand and communicate the ROI of improvements.

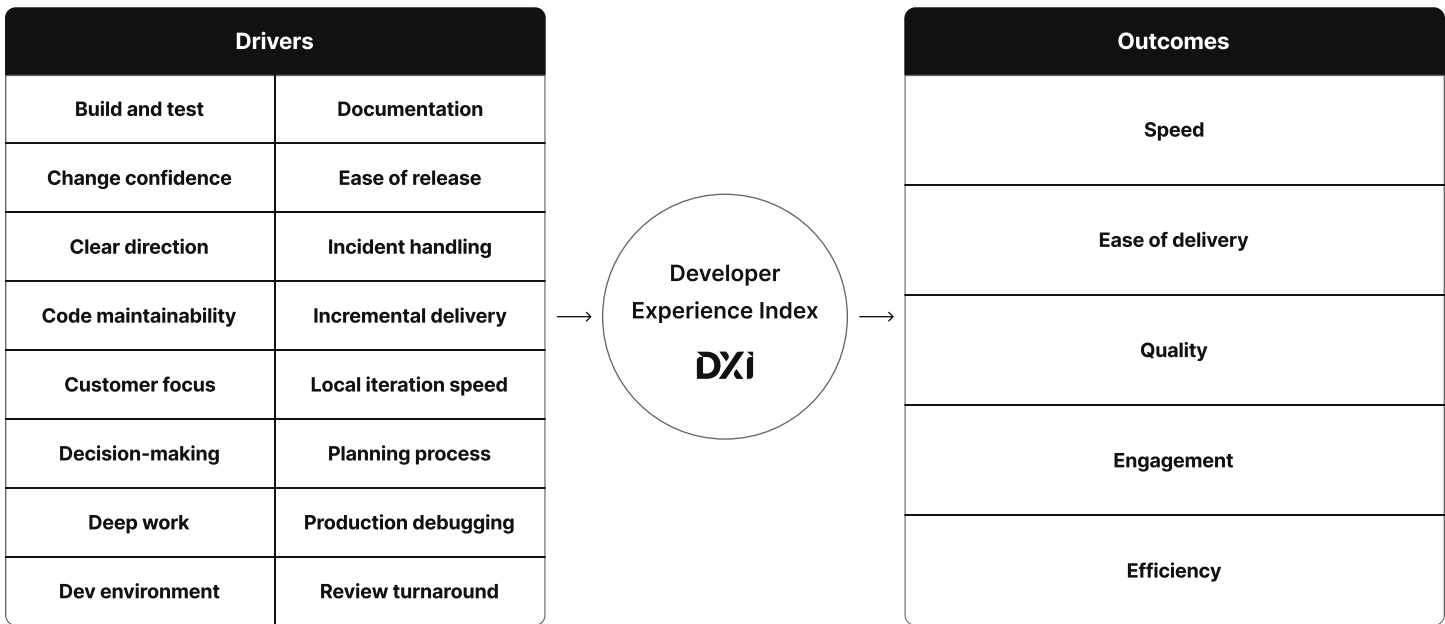
Past research by DX identified a comprehensive set of factors underlying developer experience¹. In designing the DXI, our researchers took into account both the actionability of issues for management and predictive power against key outcomes such as engineering velocity, quality, and efficiency.

The DXI is a formative measure of how, and to what extent, the right conditions exist for developers to be able to deliver effectively.

The DXI measures 14 dimensions (Table 2) found to be actionable (and changeable) at both the manager and organizational level, such as deep work, local iteration speed, release process, and confidence in making changes.

The 14 dimensions are combined into a single overall score, providing a balanced and transparent indicator of developer experience that is protected from the volatility of individual metrics. Each of the 14 dimensions is also scored and tracked individually, allowing for deeper understanding of specific drivers impacting performance.

Figure 2: Developer Experience Index (DXI) overall model



¹ Greiler, M., Storey, M., Noda, A. 2022. An actionable framework for understanding and improving developer experience. IEEE Transactions on Software Engineering.



The DXI is measured through self-reported data collected through surveys on a quarterly or semi-annual cadence. To help contextualize data, DX has developed industry benchmarks for the DXI – leveraging over four million data samples – that are tailored to specific industry sectors, regions, and company sizes.

Turning data into action

The DXI gives leaders at all levels of the organization – from C-level executives to frontline managers – clear signals to identify improvement opportunities, spot trends, and understand the impact of investments. Data is just the starting point, however. Turning data into action and improvements requires diligent strategy and execution.

One common trap is the misconception that improving developer experience is primarily about better tools. Our research shows that cultural and structural factors such as product management, team culture, and cross-team collaboration have outsized influence on developers' performance.

Similarly, leaders must recognize that issues must be tackled at all organizational levels. Problems such as excessive build times or infrastructure often crosscut an organization, requiring attention from leaders or dedicated teams. More local concerns, by contrast, such as minimizing interruptions or clearly defining work, require improvement efforts driven by frontline managers.

Below, we list several key recommendations for utilizing data to drive maximum impact. These recommendations derive from our experience in helping hundreds of organizations measure developer experience and leverage data to drive transformational change.

Provide reporting to all leaders and managers.

None of the metrics or data an organization collects has any value unless it's put in front of leaders where they can use it to make decisions and take action. It's critical that organizations provide reporting to leaders and managers as soon as possible after data is collected. Reporting should be delivered through easily consumable dashboards as well as readouts, slide presentations, and executive summaries.

Enable teams with best practices and recommendations.

With access to data and reporting, teams are able to identify key opportunities for improvement. Organizational leaders can enable self-directed improvements by providing teams with recommendations and best practices. These best practices can include those identified in high-performing teams within the organization, as well as outside industry examples.

Integrate DXI into a broader measurement strategy.

There is acceptance among technical leaders that good developer experience enables more effective software delivery.

Yet, at some organizations, proposed initiatives and investments to improve developer experience struggle to get buy-in as less technical business stakeholders question the value proposition of improvements. "What is developer experience?", many of them challenge. "And why does it matter?"

To overcome these challenges, it's critical to frame developer experience within the context of broader engineering productivity and performance measures that executive leaders are familiar with and place importance on. The DX Core 4 framework (Table 3) is a unified approach that combines DORA, SPACE, and DevEx into a set of standardized metrics¹. The DX Core 4 helps organizations achieve alignment around developer productivity across the business, leading to faster action and change.

Analyze data by team and persona

A common mistake made by organizational leaders is to focus on organization-wide results instead of breaking data down by team and persona (e.g., role, tenure, seniority). Metrics are highly contextual and can differ significantly across teams or roles.

Focusing only on aggregate results can lead to overlooking problems that affect small but important populations within the company, such as mobile developers.

Compare results against benchmarks

Comparative analysis can help contextualize data and help drive action. For example, developer sentiment toward tech debt is commonly negative, making it difficult to identify problems or gauge their scale. Teams with lower sentiment scores than their peers and organizations with lower scores than their industry competitors, however, flag notable opportunities for improvement.

Figure 3: DX Core 4



	Speed	Effectiveness	Quality	Impact
Key metric	Diffs per engineer* (PRs or MRs) <small>*Not at individual level</small>	Developer Experience Index (DXI) <small>Measure of key engineering performance drivers, developed by DX</small>	Change failure rate	Percentage of time spent on new capabilities
Secondary metrics	Lead time Deployment frequency Perceived rate of delivery	Time to 10th PR Ease of delivery Regrettable attrition* <small>*Only at organizational level</small>	Failed deployment recovery time Perceived software quality Operational health and security metrics	Initiative progress and ROI Revenue per engineer* R&D as percentage of revenue* <small>*Only at organizational level</small>

¹ Noda, A., Tacho, L., Storey, M.-A., Forsgren, N., Greiler, M., & Westerhold, C. "Measuring Developer Productivity with the DX Core 4."



Getting started

Companies are feeling increased pressure to measure and improve developer productivity as markets are putting greater emphasis on efficient growth and ROI. Yet, compared with other critical business functions such as sales or operations, getting good data on performance is difficult.

The DXI provides leaders with a comprehensive measure of engineering effectiveness to help lead with confidence and drive higher value delivered per engineer. Additionally, the DXI's link to financial impact enables business leaders to concretely understand and communicate the ROI of improvements.

Organizations should get started with measurement as early as possible, even if they have not yet established or planned a formal developer productivity investment. Measurement can help organizations understand trends, decide the right time and place to make investments, and navigate macro shifts such as remote work and AI-powered programming.

The DXI has been adopted successfully at hundreds of organizations across tech, financial services, consumer goods, and pharma. To learn more about the DXI and DX platform, please get in touch with a representative from DX.

About the authors

Abi Noda is co-founder and CEO of DX where he leads the company's strategic direction and R&D efforts. Laura Tacho is CTO at DX and leads the company's executive advisory practice.

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