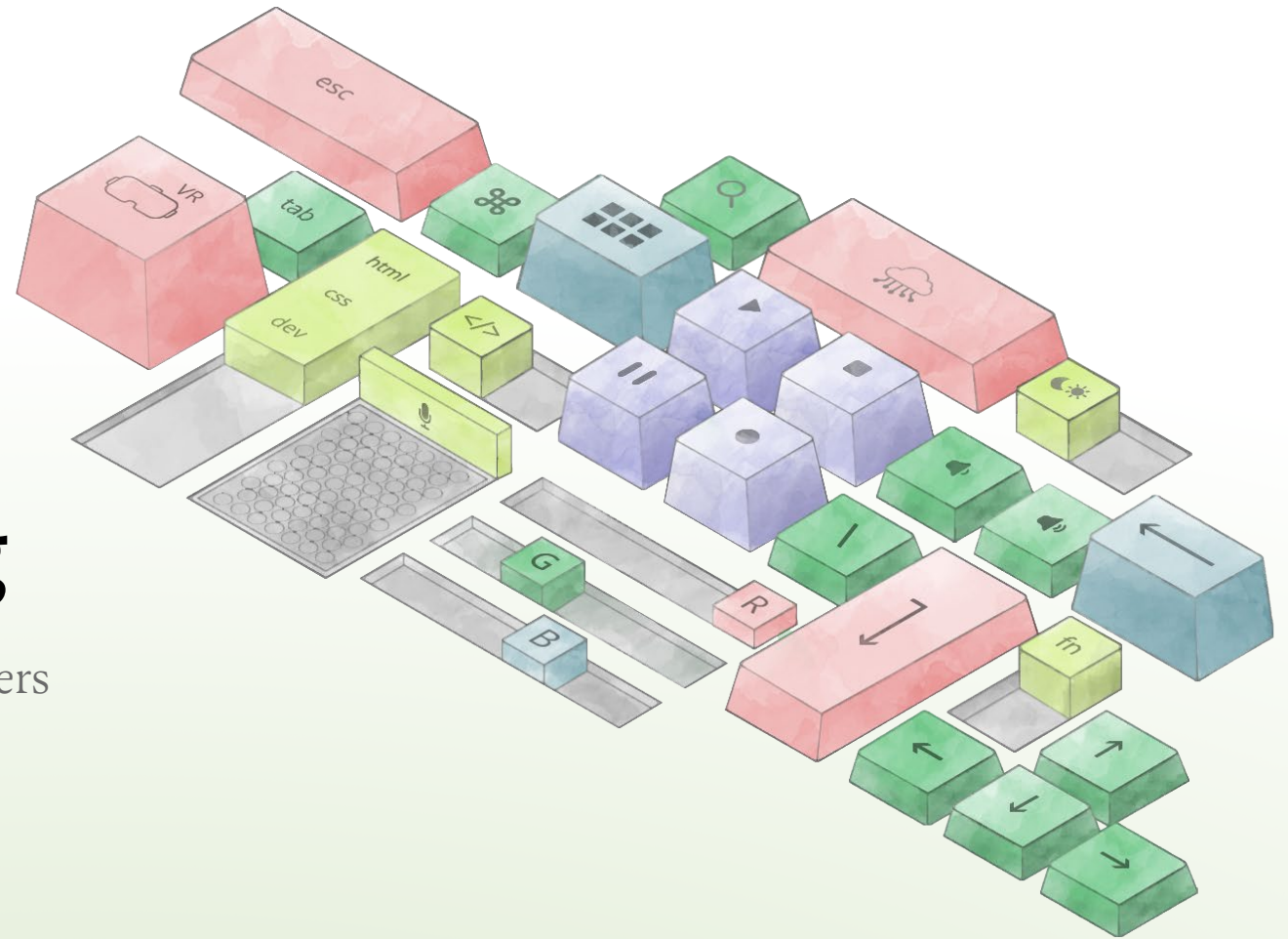March 2024

Engineering Series

The State of Engineering

A deep dive into 2024 priorities for engineering leaders

ICONIQ | Growth

About the research

Explore the series

R&D is increasingly becoming a bigger line item in total spend and **a key differentiator for companies**, yet it is often the function that organizations have the **least visibility into**. Unlike finance or sales and marketing, it is also challenging for engineering leaders to find relevant or publicly available data and insights to benchmark their engineering team performance.

In this series

We use organizational data and industry perspectives to **provide detailed answers to the key R&D questions** we receive from SaaS leaders. Although engineering and product development are closely tied, this series will be focused **primarily on engineering-specific metrics and challenges**. We will examine topics spanning the **state of modern-day engineering orgs, developer productivity, compensation, org structure, and engineering operations**, in order to share best practices and proprietary benchmarks to help you scale your engineering organization.

In this report

We aim to analyze **the state of modern-day engineering organizations in 2024 and provide predictions for the future,** with a particular focus on topics like **R&D spend, developer experience, DevOps maturity, and the impact of AI.**

Chapters in
The Series

ICONIQ Growth's Engineering Series provides detailed answers to **key questions across the following operating and executive hiring topics** utilizing proprietary data[1] and industry perspectives from 200+ B2B SaaS leaders and 100+ engineers at SaaS companies.

Access the Full Engineering Series

The State of Engineering
- The future of engineering
- DevOps maturity
- Developer experience
- Impact of AI

Product Leadership

Engineering Leadership
- Hiring your next Head of Product
- Hiring your next Head of Engineering

Building Engineering and Product Teams
- Org structure and make-up of engineering teams
- Typical headcount ratios
- Diversity in engineering

Compensation & Incentives
- Career paths
- Compensation for engineering and product teams
- Performance evaluation

The Engineering Reporting Guide
- Developer productivity
- Capacity allocation
- Key metrics to report on for various audiences

Template
Engineering Board Slides

Notes: (1) Please refer to page 6 for methodology and data sources
There can be no such assurances that any plans or operational characteristics of a company discussed herein will continue or be realized on the terms expressed herein or at all, and such plans are subject to uncertainties and risks.

ICONIQ Growth Analytics

Seeking to empower our portfolio with proprietary insights and advisory across business operations, hiring, and strategy

Series Lead

Christine Edmonds

Head of Portfolio Analytics

Addison Anders

Portfolio Analytics

Ani Reddy

Portfolio Data Analyst

Caroline Brand

Portfolio Analytics

Claire Davis

Portfolio Analytics

Emre Garih

Portfolio Analytics

Katherine Dunn

Portfolio Analytics

Sam O'Neill

Portfolio Data Manager

Vivian Guo

Portfolio Analytics

Follow our research

Go-To-Market Series
Guides to sales, customer success, marketing compensation – and more

Decoding the SaaS IPO Landscape
The metrics that matter and the market realities of 2024 and beyond

2023 Growth & Efficiency Report
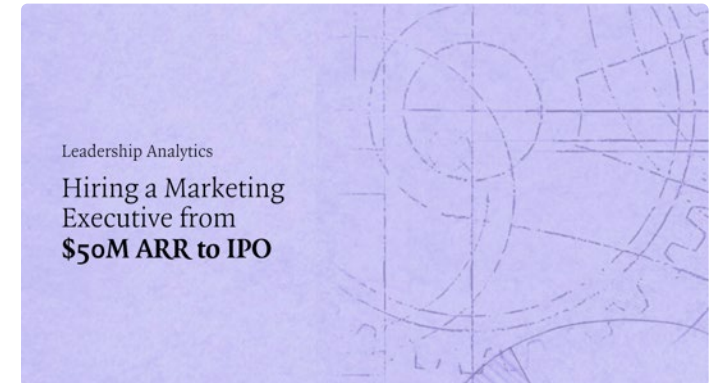Explore our research on best-in-class SaaS growth and efficiency

The ICONIQ Growth Enterprise Five
Key performance indicators of Enterprise SaaS companies

The SaaS Glossary
A guide to understanding and tracking key SaaS metrics

Hiring Your Next Marketing Leader
What to prioritize when hiring a Marketing executive from $50M ARR to IPO
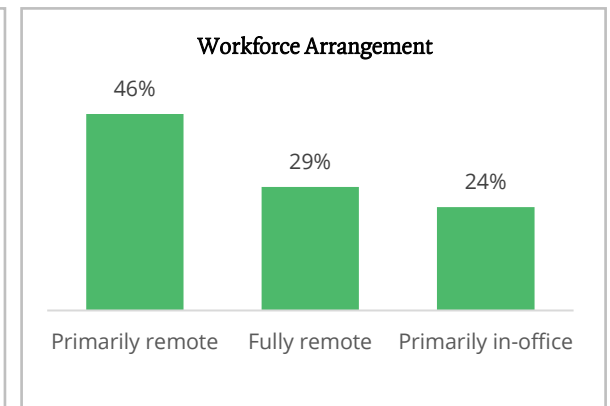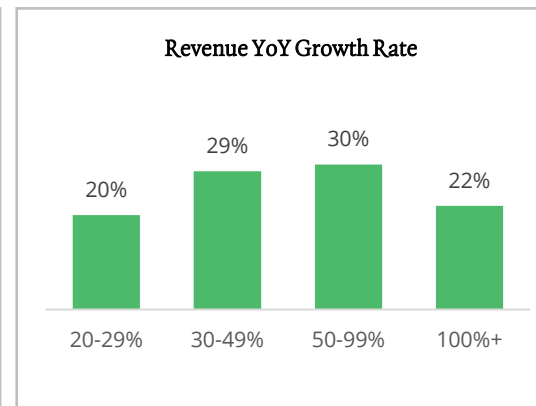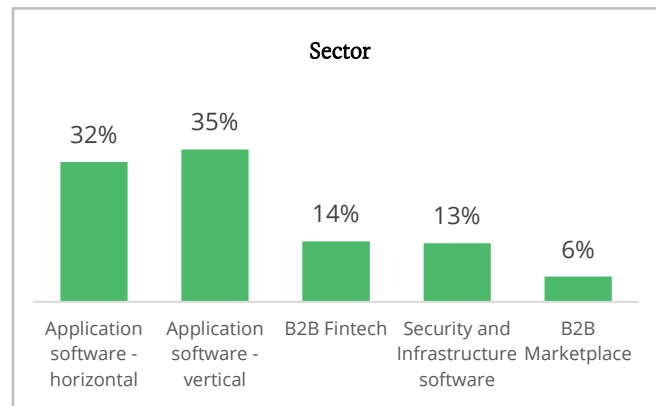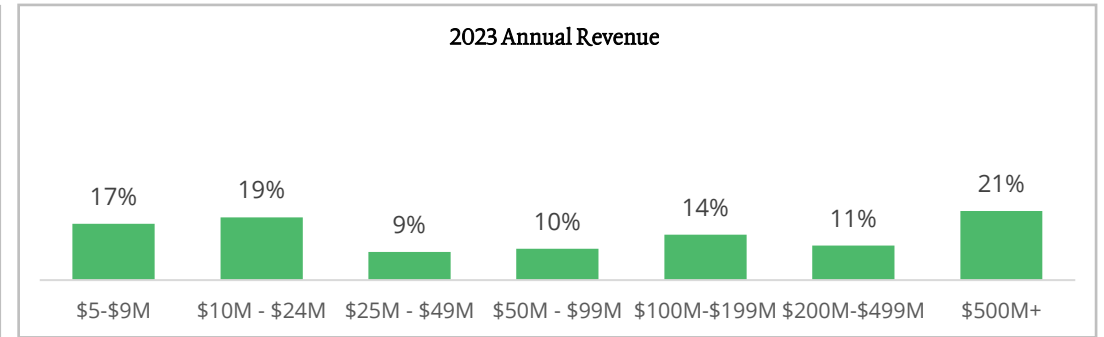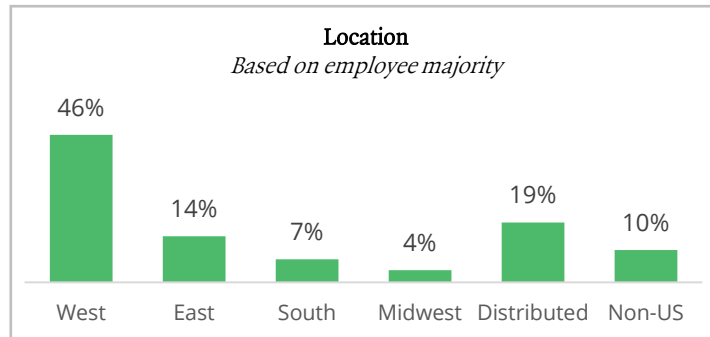
Data Sources & Methodology

This study summarizes data from a December 2023 survey[1] of **200 engineering executives** at B2B SaaS companies, including CTOs, founders, and VPs of Engineering.

Slides leveraging this dataset will be marked with this legend   CTO Survey

Data from Engineering Leaders

Firmographics

Location
Based on employee majority

West	East	South	Midwest	Distributed	Non-US
46%	14%	7%	4%	19%	10%

2023 Annual Revenue

$5-$9M	$10M - $24M	$25M - $49M	$50M - $99M	$100M-$199M	$200M-$499M	$500M+
17%	19%	9%	10%	14%	11%	21%

Sector

Application software - horizontal	Application software - vertical	B2B Fintech	Security and Infrastructure software	B2B Marketplace
32%	35%	14%	13%	6%

Revenue YoY Growth Rate

20-29%	30-49%	50-99%	100%+
20%	29%	30%	22%

Workforce Arrangement

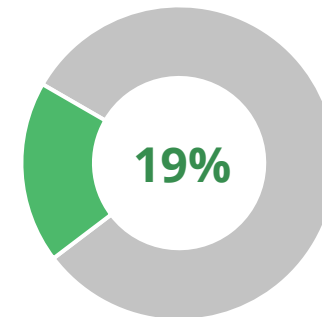| Primarily remote	Fully remote	Primarily in-office
46%	29%	24%

Methodology

In this series, select companies are referred to as "top performers" because they meet the following criteria

➢ **Scale**: Annual Recurring Revenue (ARR) > $10M

➢ **Growth**: 2023 YoY ARR growth >50%

➢ **Retention**: Annual net dollar retention 120%+

Top Performers
% of respondents

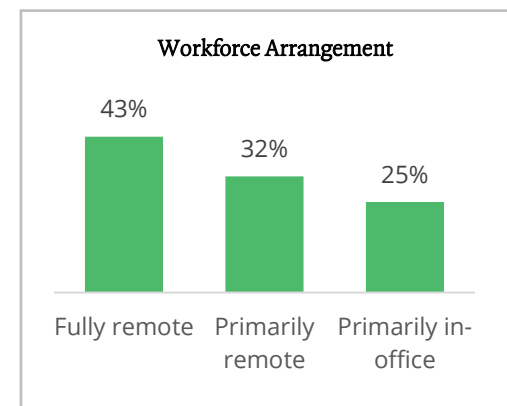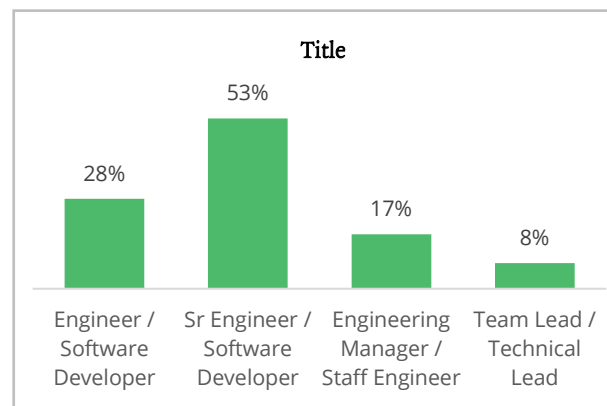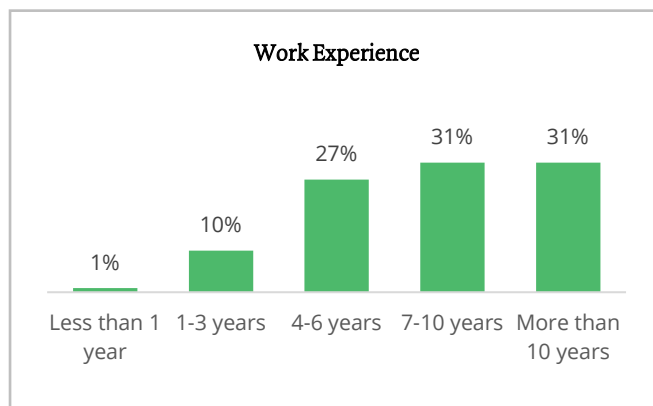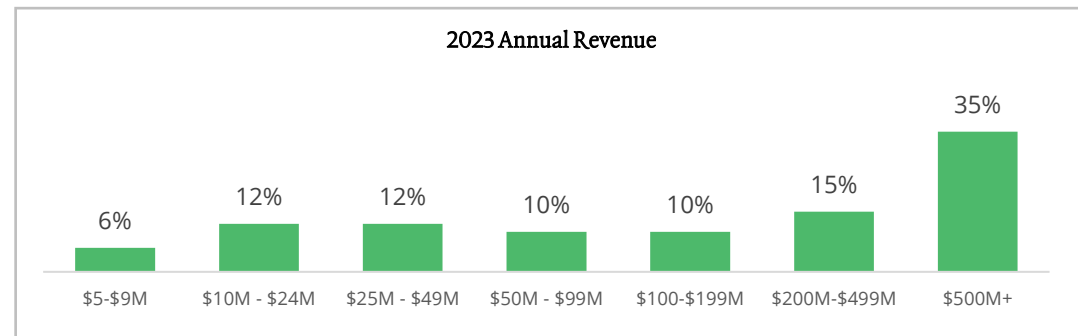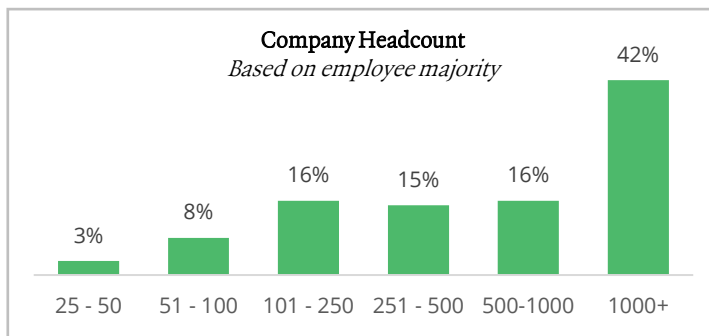**19%**

Data Sources & Methodology

We also include data from a December 2023 survey[1] of **100 engineering employees** at B2B SaaS companies, including engineers, senior engineers, and engineering managers.

Slides leveraging this dataset will be marked with this legend **Engineer Survey**

Data from Engineers

Firmographics

Company Headcount
Based on employee majority

25 - 50	51 - 100	101 - 250	251 - 500	500-1000	1000+
3%	8%	16%	15%	16%	42%

2023 Annual Revenue

$5-$9M	$10M - $24M	$25M - $49M	$50M - $99M	$100-$199M	$200M-$499M	$500M+
6%	12%	12%	10%	10%	15%	35%

Work Experience

Less than 1 year	1-3 years	4-6 years	7-10 years	More than 10 years
1%	10%	27%	31%	31%

Title

Engineer / Software Developer	Sr Engineer / Software Developer	Engineering Manager / Staff Engineer	Team Lead / Technical Lead
28%	53%	17%	8%

Workforce Arrangement

|		
Fully remote	Primarily remote	Primarily in-office
43%	32%	25%

Methodology

In this series, select employees are categorized as having strong job satisfaction if the average self-reported score is above 4 out of 5 for the following questions:

➤ My productivity level is very high

➤ The code, infrastructure, processes, and documentation at my company enable me to maintain a high development velocity

➤ I feel my work is adequately recognized and appreciated

➤ I am satisfied with the compensation (salary, bonuses, benefits) I receive

➤ I am satisfied with the level of autonomy and independence I have in my work

High Job Satisfaction
% of respondents

33%
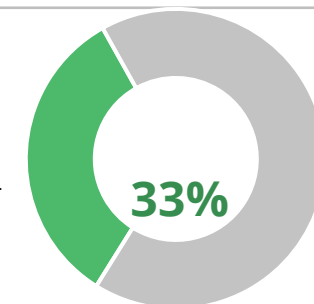
Collaborators & Industry Perspectives

Throughout this series, we also weave in perspectives, insights, and best practices from engineering executives in the ICONIQ Growth SaaS portfolio and network.

Perspectives were gathered via interviews with the following collaborators as well as other generational leaders via ICONIQ Growth communities and events.

All industry perspectives shared in this report have been anonymized to protect company-level information.

1Password
Pedro Canahuati
Chief Technology Officer

BetterUp
Amol Kher
VP Engineering

DRATA
Daniel Marashlian
Co-founder, Chief Technology Officer

ezcater
Erin DeCesare
Chief Technology Officer

Nayya
Arik Gaisler
Chief Technology Officer

recharge
Joseph Mosby
Director of Engineering

virtru
Dana Morris
SVP, Product & Engineering

Wealthsimple
Diederik van Liere
Chief Technology Officer

WRITER
Waseem AlShikh
Co-founder, Chief Technology Officer

And additional insights from the ICONIQ Technical Advisory Board

Aditya Agarwal
Former CTO at Dropbox

Formerly: Co-founder at Cove, Director of Product Engineering at Facebook

Dropbox **facebook.**

Anantha Kancherla
VP ADAS at General Motors

Formerly: Head of AI Platform at Meta, VP Engineering at Lyft Level 5

gm **Meta** **lyft**

Matt Eccleston
Former VP Growth at Dropbox

Formerly: Chief Architect at VMware

Dropbox **vmware**

Introduction

Engineering leaders are focused on key priorities spanning product development, accelerating developer velocity, and improving underlying infrastructure and processes

Top Priorities for Engineering Leaders in 2024
% of Respondents Mentioning in Top 3

Priority	%	Product Development & Innovation	Developer Productivity	DevOps & Infrastructure
Building new features and/or products for customers (including AI add-ons)	89%	✓		
Improving engineering team operations, tooling, and processes	59%		✓	✓
Hiring and retaining talent	46%		✓	
Improving infrastructure	39%		✓	✓
Managing technical debt	32%		✓	✓
Increasing the security posture of the team / organization	23%			✓
Gaining better visibility into the work engineers are doing	11%	✓	✓	✓
Other (e.g., embedding AI)	1%	✓	✓	✓

Key Priorities for Engineering Leaders

Many of the priorities listed by engineering leaders can be grouped into 3 broad categories across developer productivity and experience, the evolution and maturity of DevOps, and driving innovation / efficiency (with the main focus being around embedding AI).

The subsequent pages in this study will dive into each of these priorities in detail including the actions modern-day engineering organizations are taking and relevant benchmarks across different stages of growth and business models.

1 Developer Productivity & Experience

There is no widely accepted definition of developer productivity and even different perceptions across CTOs and engineer ICs based on our research. **We believe developer productivity should be assessed through a holistic framework** that captures business impact, performance and reliability, developer effectiveness, and culture.

> "
> We are keeping headcount flat in 2024, so a big focus for me this year is striking a balance between individual development goals and organization needs with a major focus on efficiency. We need to motivate our engineers to do more, and part of that involves tracking and measuring developer productivity.
>
> *Engineering Leader*
> *Infrastructure & Security*
> *Growth Stage ($100-300M ARR)*

2 Evolution and Maturity of DevOps

A key factor to improving developer productivity and experience is **the state of the underlying infrastructure and processes powering engineering teams**. Modern-day engineering organizations have adopted the DevOps mindset in varying forms and rather being a nice-to-have, embracing DevOps has **now become ubiquitous for engineering organizations**.

> "
> We have a lot of tech debt to clean up this year and are doubling down on refactoring and overall simplification – how do we make it easier and faster for developers to commit features? The goal is to enable the team to spend less time on time-suck / low ROI activities that can be automated.
>
> *Engineering Leader*
> *Fintech*
> *Late Stage ($300M+ ARR)*

3 Driving Innovation & Efficiency via AI

In our conversations with CTOs, the universal questions around AI have been around **where to start, the most impactful use cases for internal productivity, and what are other companies seeing in terms of early ROI**.

> "
> A key priority for me this year is to unlock ML and uplevel our existing engineers. We have not seen measurable results yet with Copilot so we are trying to better understand best practices for embedding AI and getting true ROI from these solutions.
>
> *Engineering Leader*
> *Consumer & Internet*
> *Late Stage Late Stage ($300M+ ARR)*

Executive Summary

1 Developer Productivity & Experience

There is no widely accepted definition of developer productivity and even different perceptions across CTOs and engineer ICs based on our research. We believe developer productivity should be assessed through a holistic framework that captures business impact, performance and reliability, developer effectiveness, and culture.

> " We are keeping headcount flat in 2024, so a big focus for me this year is striking a balance between individual development goals and organization needs with a major focus on efficiency. We need to motivate our engineers to do more, and part of that involves tracking and measuring developer productivity.
>
> *Engineering Leader*
> *Infrastructure & Security*
> *Growth Stage ($100-300M ARR)*

- Developer productivity lacks a standard definition or approach, with **varying opinions among engineering leaders and employees**

- **CTOs prioritize clear goals and requirements for productivity**, while engineers **highlight the need for focused time, a conducive development environment, test automation, and a healthy codebase**

- We believe **developer productivity needs a definitional refresh and should include both perspectives.** We recommend engineering leaders use a holistic framework to monitor and enhance team performance[1]:

  - **Business Impact:** Engineering leaders face a difficult mandate of doing more with less in the current macroeconomic environment. To judiciously use engineering resources and dollars, leaders must have a sense of the **ROI across engineering investments and how much is being spent across people vs. infrastructure**

  - **Performance and Reliability:** Developer productivity also entails **understanding and managing the reliability of what is being shipped**. For example, issues in quality tend to spike with engineers who have 1-3 years of work experience before generally stabilizing to ~18% of commits requiring revisions

  - **Developer Effectiveness:** Factors like work arrangement, job satisfaction, and tenure often have a direct impact on developer effectiveness. In addition to frequent manager feedback, the **underlying code, infrastructure, processes, and documentation** were found in our analysis to have the strongest correlation to productivity

  - **Culture:** Beyond tools and processes, we know that developer satisfaction also has a direct impact on productivity. It's critical to build a **culture across the engineering team that promotes growth and developer fulfillment**

- As engineering teams grow beyond 100 members, **tracking developer productivity becomes more prevalent and often involves developer satisfaction surveys and DORA metrics**

Executive Summary

2 Evolution and Maturity of DevOps

A key factor to improving developer productivity and experience is the state of the underlying infrastructure and processes powering engineering teams. Modern-day engineering organizations have adopted the DevOps mindset in varying forms and rather being a nice-to-have, embracing DevOps has now become ubiquitous for engineering organizations.

"

We have a lot of tech debt to clean up this year and are doubling down on refactoring and overall simplification – how do we make it easier and faster for developers to commit features? The goal is to enable the team to spend less time on time-suck / low ROI activities that can be automated.

Engineering Leader
Fintech
Late Stage ($300M+ ARR)

Roadmap Planning

- In the **early stages of scaling (<$25M), companies analyzed tend to follow a fluid process** of continuous planning and releases. As companies continue scaling and reach critical inflection points, **companies often switch back to a more sequential planning approach** (perhaps to ensure they can meet key requirements as they move up-market). However, as companies scale past $100M, **companies typically settle into a regular planning cadence or adopt scaled agile**.

Release Cadence

- In the early stages of growth, **continuous deployment augmented with experimental releases allows companies to move fast** and iterate quickly on customer feedback. However, this becomes **more challenging to coordinate as companies scale and need to maintain a higher standard of quality and reliability**. In fact, a greater percentage of **top performers use continuous delivery to pre-production or continuous integration** (as opposed to continuous deployment), likely given a focus on maintaining a higher standard of quality.

Testing Automation

- Most companies build out **automated testing processes as early as $25M in revenue**. It is worth noting differences across sectors, with a higher percentage of **respondents in vertical SaaS still relying on manual testing**, likely because certain industries like healthcare which have regulatory restrictions and a higher standard of quality. Most companies allow developers to see the **results of integration / unit testing weekly**, with top performing companies having faster testing processes that show **results as quickly as daily or several times a day**.

CI/CD Tools

- As companies scale, the implementation of tools enabling continuous integration and deployment appear to be critical to allow engineering teams to do their best work, with **76% of companies in the $250M+ revenue range having full implementation and integration of CI/CD tools**. Notably, **90% of top performing companies analyzed have fully implemented CI/CD tools as early as $25M in revenue**.

Executive Summary

3 Driving Innovation & Efficiency via AI

In our conversations with CTOs, the universal questions around AI have been around where to start, the most impactful use cases for internal productivity, and what are other companies seeing in terms of early ROI.

> " A key priority for me this year is to **unlock ML and uplevel our existing engineers**. We have **not seen measurable results yet with Copilot** so we are trying to better understand **best practices for embedding AI and getting true ROI** from these solutions.
>
> *Engineering Leader*
> *Consumer & Internet*
> *Late Stage ($300M+ ARR)*

Building AI-Enabled Products

- Around **70% of companies analyzed have an AI component in their product suite**, with **~90% of companies in the $250M+ revenue range having an AI-enabled customer-facing product**

- Most companies (~60-70% of respondents) are also **planning to embed new AI or introduce AI-related products in the next 12 months regardless of scale.**

- **72% of respondents are planning to hire at least 1 AI-related role** in 2024; top roles specified by respondents include **machine learning engineers, data scientists, and data engineers** in 2024

- Since building new AI products takes significant time and upfront investment, most **companies are first experimenting with leveraging internal AI applications to boost productivity**

Leveraging AI for Internal Productivity

- Early-stage companies seem to be **adopting and using AI tools more frequently compared to growth-stage companies** which often have data sensitivity hurdles to navigate or ingrained ways of working

- The most common functions **using AI for internal productivity include engineering, marketing, product management, and customer success / support.**

- Preliminary estimates of impact reveal notable **productivity gains of 20-30%,** with HR, engineering, marketing, and strategy seeing the biggest gains

    - **Average cost savings are estimated to be around ~17% of organizations,** with HR and customer success / support seeing the greatest cost savings

    - The average total revenue increase driven by AI tools is expected to be around **16% for companies surveyed**[1]

Engineering Predictions for 2024 (and Beyond)

1 The mandate of developer productivity

In today's era of efficient growth where engineering leaders are **pressured to do more with limited resources, understanding and tracking developer productivity will be essential.** However, rather than tracking individual productivity, we believe the focus should be on **driving team-level efficiency and improving developer experience.**

Page 17-37

2 The rise of platform engineering

The push for a better developer experience requires building **an ecosystem that allows developers to be more autonomous.** This means **better interfaces, enhanced integration, and streamlined workflows to reduce friction in the development process.** This could take the shape of mass adoption **of internal developer platforms (IDPs), Kubernetes, or ephemeral environments** allowing for faster experimentation.

Pages 39-46

3 The death of agile

The agile manifesto often **does not work for modern day SaaS engineering organizations who frequently deal with unplanned work, customer needs, and technical constraints.** In fact, the **rise of DevOps and platform engineering may further reduce the need for a full embrace of agile** as they achieve many of the same goals of faster time to market and increased efficiency. Modern engineering organizations will likely adopt a hybrid agile model that **optimizes for iterative releases while leveraging the operating model and processes from the DevOps mindset.**

Pages 39-46

4 The AI multiplier

Incorporating generative AI and large-language models into internal workflows will become **table-stakes for engineering teams, driving both increased efficiency and quality improvements.** While some companies may not see immediate cost savings or revenue impact, leveraging tools like Copilot will allow engineers to **easily code with new languages, speed up workflows like code reviews and testing, and identify bugs and resolutions faster.**

Pages 48-57

Source: ICONIQ Growth Engineering Survey (December 2023) and perspectives from engineering leaders in the ICONIQ Growth network presented on Slide 8

Developer Productivity

How organizations define developer productivity,
perspectives across engineering leaders and employees,
and ways to improve developer experience

Key Priorities for Engineering Leaders

Many of the priorities listed by engineering leaders can be grouped into 3 broad categories across developer productivity and experience, the evolution and maturity of DevOps, and driving innovation / efficiency (with the main focus being around embedding AI).

The subsequent pages in this study will dive into each of these priorities in detail including the actions modern-day engineering organizations are taking and relevant benchmarks across different stages of growth and business models.

1 Developer Productivity & Experience

There is no universally accepted definition of developer productivity and even different perceptions across CTOs and engineer ICs based on our research. We believe developer productivity should be assessed through a holistic framework that captures business impact, performance and reliability, developer effectiveness, and culture.

> We are keeping headcount flat in 2024, so a big focus for me this year is striking a balance between individual development goals and organization needs with a major focus on efficiency. We need to motivate our engineers to do more, and part of that involves tracking and measuring developer productivity.
>
> *Engineering Leader*
> *Infrastructure & Security*
> *Growth Stage ($100-300M ARR)*

2 Evolution and Maturity of DevOps

A key factor to improving developer productivity and experience is the state of the underlying infrastructure and processes powering engineering teams. Modern-day engineering organizations have adopted the DevOps mindset in varying forms and rather being a nice-to-have, embracing DevOps has now become ubiquitous for engineering organizations.

> We have a lot of tech debt to clean up this year and are doubling down on refactoring and overall simplification – how do we make it easier and faster for developers to commit features? The goal is to enable the team to spend less time on time-suck / low ROI activities that can be automated.
>
> *Engineering Leader*
> *Fintech*
> *Late Stage ($300M+ ARR)*

3 Driving Innovation & Efficiency via AI

In our conversations with CTOs, the universal questions around AI have been around where to start, the most impactful use cases for internal productivity, and what are other companies seeing in terms of early ROI.

> A key priority for me this year is to unlock ML and uplevel our existing engineers. We have not seen measurable results yet with Copilot so we are trying to better understand best practices for embedding AI and getting true ROI from these solutions.
>
> *Engineering Leader*
> *Consumer & Internet*
> *Late Stage ($300M+ ARR)*

Spotlight: Tracking Developer Productivity

DRATA

Daniel Marashlian
Co-founder & Chief Technology Officer (CTO)

> We have made a lot of changes to our organization structure and processes as the business has scaled through a period of very fast growth. As our team has grown to 200+ engineers, we have been on a journey to make the development team move faster and are always experimenting. This year, I'm focused on scaling our ephemeral environments in addition to QA automation to further improve developer velocity. I'm also experimenting with a team that meets at least twice per week in-person to test whether a semi in-person team can lead to higher efficiency and ROI than our remote teams.

Operational Changes to Improve Velocity

- Designed engineering organization structure to consist of leaner pods owned by true technical managers (vs. purely people managers). Tech leads will typically spend ~20% of their time on development and provide cover for the rest of team on incidents or backup as needed

- Distilled the mindset that engineers don't have QA to rely on and every engineer should assume the ticket they're writing will not be QA'd. This means that engineers need to test their own code and automate test cases. While this has led to slower features in some cases, this has contributed to less incidents and a better product overall

- The leadership team posts customer releases in the Slack channel to showcase the "why" behind releases of new customer features; this has helped engineering teams understand the direct outcome and revenue impact of what they're building

Metrics Tracked

We track a variety of metrics to understand our activity and developer effectiveness, including:

- Delivery: % of the roadmap delivered vs committed

- Thrashing – ping pong between QA and engineering

- Deployed story point velocity over time

- Engineering time allocation (e.g., time spent on new capabilities, quality improvements, customer enhancements, or KTLO)

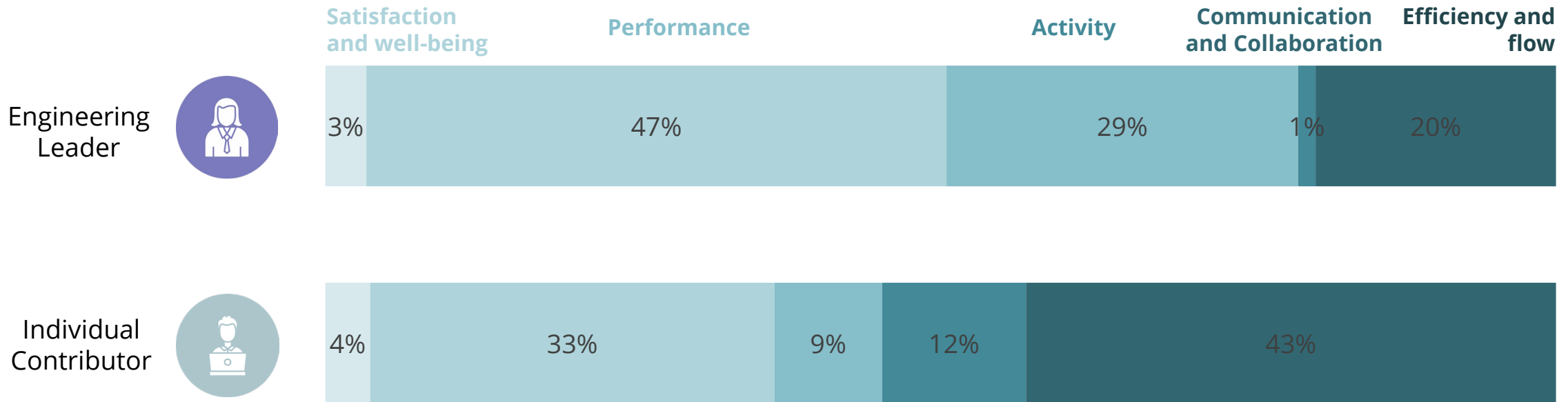- New stories going into sprint vs. carry over from prior sprints

Developer productivity is a topic that is often contentious and hard to define; in fact, even engineering leadership and employees have differing opinions on what constitutes developer productivity

How would you define developer productivity?
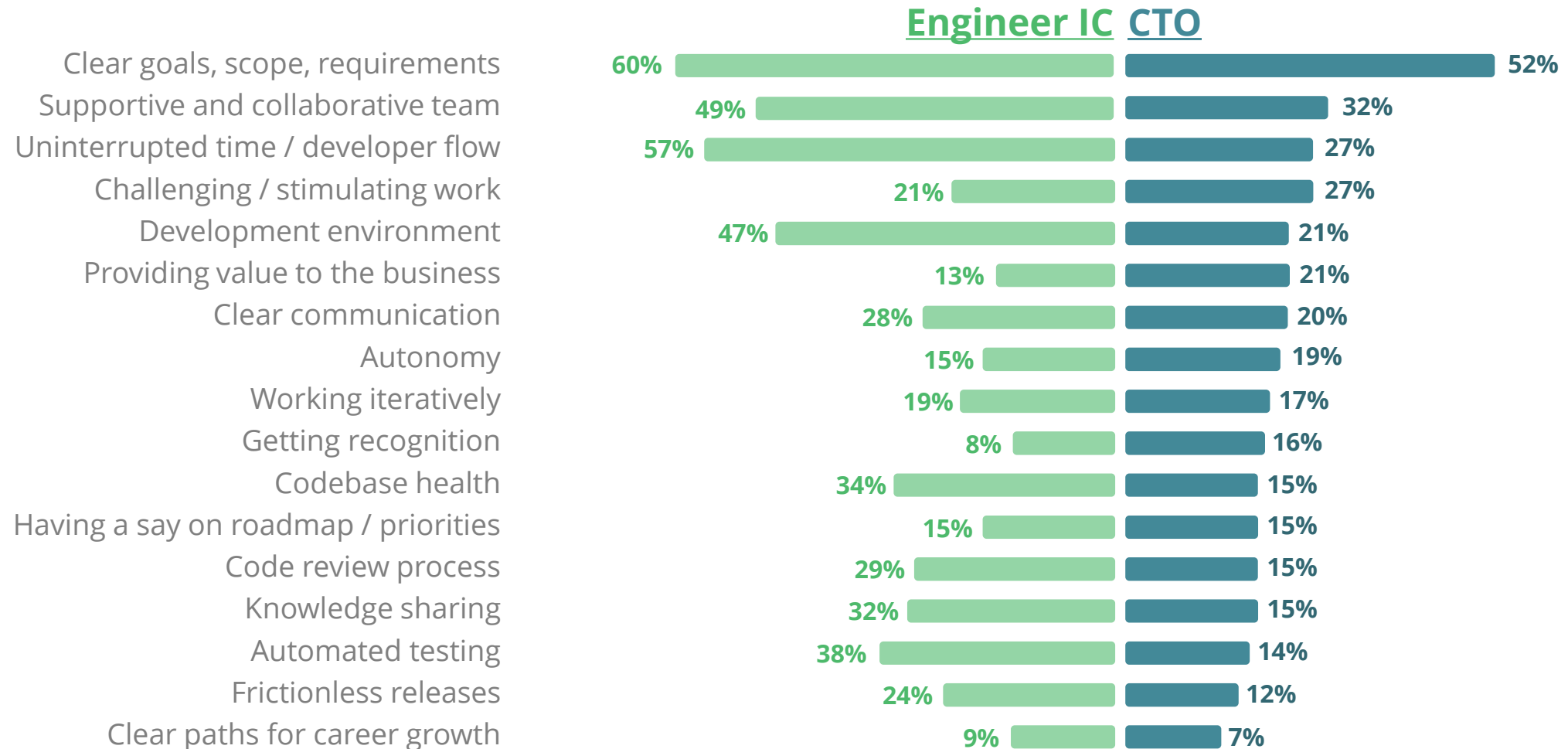
% of Responses

	Satisfaction and well-being	Performance	Activity	Communication and Collaboration	Efficiency and flow
Engineering Leader	3%	47%	29%	1%	20%
Individual Contributor	4%	33%	9%	12%	43%

In this analysis, free-form responses from survey participants were mapped to associated categories under the SPACE framework[1], a research-based framework to developer productivity. Engineering leaders were found to be more **tied to business outcomes with a larger percentage of responses focused on aspects like quality (Performance) or quantitative metrics (Activity)**, compared to engineering ICs who focused on **factors impacting individual experience like developer flow (Efficiency) and teamwork (Communication and Collaboration).**

Engineering leaders and employees also have different opinions on how to improve developer productivity

Which factors do you think are most important to improve developer productivity?

% of Respondents who listed each aspect in top 5 ranking

Engineer IC   CTO

Factor	Engineer IC	CTO
Clear goals, scope, requirements	60%	52%
Supportive and collaborative team	49%	32%
Uninterrupted time / developer flow	57%	27%
Challenging / stimulating work	21%	27%
Development environment	47%	21%
Providing value to the business	13%	21%
Clear communication	28%	20%
Autonomy	15%	19%
Working iteratively	19%	17%
Getting recognition	8%	16%
Codebase health	34%	15%
Having a say on roadmap / priorities	15%	15%
Code review process	29%	15%
Knowledge sharing	32%	15%
Automated testing	38%	14%
Frictionless releases	24%	12%
Clear paths for career growth	9%	7%

Defining Developer Productivity

While CTOs believe the most important factor is setting clear goals and requirements, engineers believe that uninterrupted time, development environment, automated testing, and code base health are also critical

Which factors do you think are most important to improve developer productivity?
% of Respondents who listed each aspect in top 5 ranking

Engineer IC   CTO

Factor	Engineer IC	CTO
Clear goals, scope, requirements	60%	52%
Supportive and collaborative team	49%	32%
Uninterrupted time / developer flow	57%	27%
Challenging / stimulating work	21%	27%
Development environment	47%	21%
Providing value to the business	13%	21%
Clear communication	28%	20%
Autonomy	15%	19%
Working iteratively	19%	17%
Getting recognition	8%	16%
Codebase health	34%	15%
Having a say on roadmap / priorities	15%	15%
Code review process	29%	15%
Knowledge sharing	32%	15%
Automated testing	38%	14%
Frictionless releases	24%	12%
Clear paths for career growth	9%	7%

There are **clear disconnects even between CTOs and engineers around the factors behind developer productivity.**

CTOs believe the most important factor to improving developer velocity is **assigning clear goals, scope, and requirements.** While engineers agree that is important, they also believe **uninterrupted time, their dev environment, automated testing, and codebase health** are significant drivers.

Generally, we **recommend companies focus on performance rather than activity.** However, developers often may **have better insight into potential leverage opportunities** to improve efficiency.

We believe CTOs should **start by understanding the factors called out by developers points with a filter for impact on performance** / outcomes.
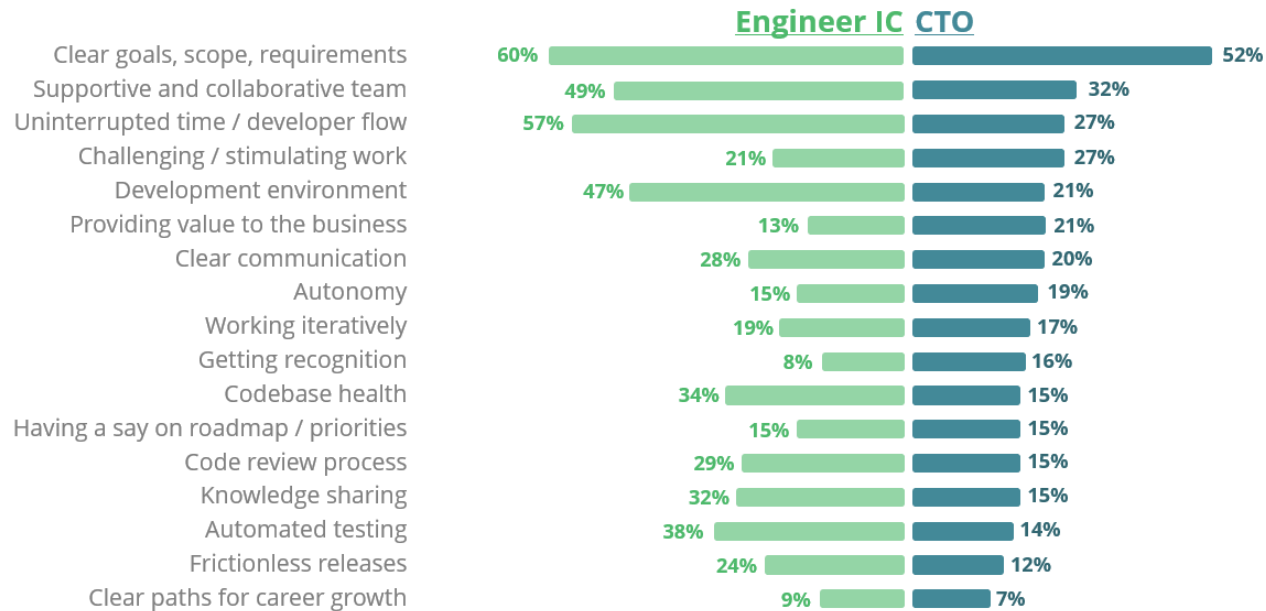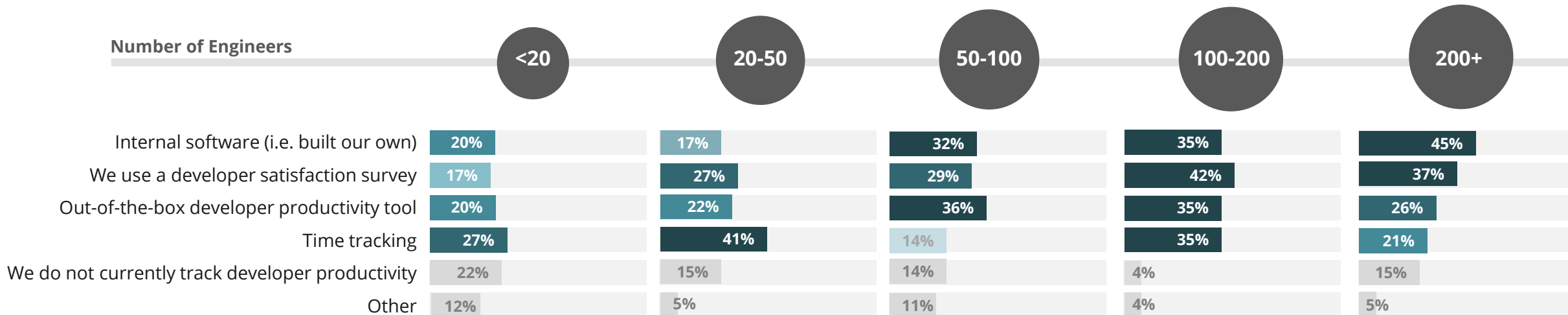
Source: ICONIQ Growth Engineering Survey (December 2023) and perspectives from engineering leaders in the ICONIQ Growth network presented on Slide 8

ICONIQ | Growth

Tracking developer productivity becomes more common as companies reach 100+ engineers, with most companies using some combination of a developer satisfaction survey and DORA[1] metrics

How do you track developer productivity?
% of Respondents

Number of Engineers	<20	20-50	50-100	100-200	200+
Internal software (i.e. built our own)	20%	17%	32%	35%	45%
We use a developer satisfaction survey	17%	27%	29%	42%	37%
Out-of-the-box developer productivity tool	20%	22%	36%	35%	26%
Time tracking	27%	41%	14%	35%	21%
We do not currently track developer productivity	22%	15%	14%	4%	15%
Other	12%	5%	11%	4%	5%

By 50-100 employees, most engineering companies are tracking developer productivity in some form

Tracking developer productivity becomes more common as companies reach 100+ engineers, with most companies using some combination of a developer satisfaction survey and DORA[1] metrics (used by 28% of respondents). This can be done either via in-house tool (35-45% of respondents) or an out-of-the-box developer productivity tool (~25-35% of respondents).
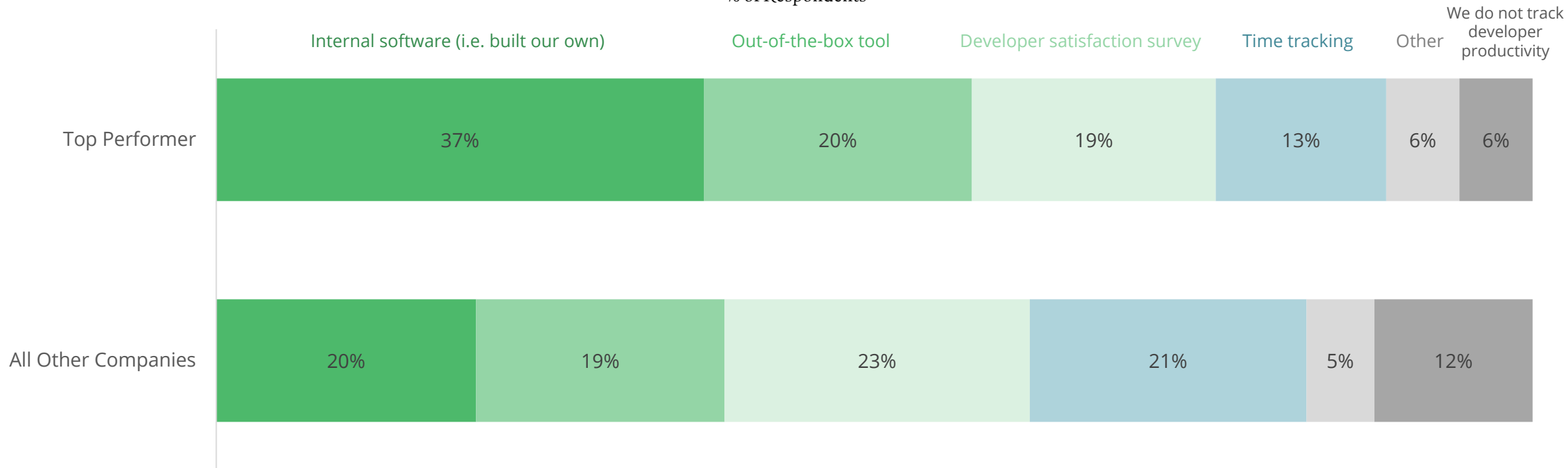
Understanding and reporting on developer productivity can have a direct impact on business impact, with 76% of top performing companies tracking productivity via developer productivity tools or a developer satisfaction survey

How do you track developer productivity?
% of Respondents

	Internal software (i.e. built our own)	Out-of-the-box tool	Developer satisfaction survey	Time tracking	Other	We do not track developer productivity
Top Performer	37%	20%	19%	13%	6%	6%
All Other Companies	20%	19%	23%	21%	5%	12%

Tracking and **understanding developer productivity can have a direct business impact**. A **greater percentage of top performing companies were found to track developer productivity** (~76% of respondents) compared to other companies (~62% of respondents).

Our Approach to Developer Productivity: The Metrics that Matter

At its core, software development is a **team-based activity.** Rather than using developer productivity metrics to evaluate individual performance, we believe engineering leaders should track and understand various factors impacting developer productivity to **improve overall team performance and allow them to be a better steward for dollars spent on engineering.** This means understanding both business outcomes and the factors affecting individual developer experience, such as how feature development is **contributing to overall business outcomes,** the **timeliness and speed of development velocity,** the **performance and reliability of what is being shipped,** opportunities to reduce friction in the development process via tools and processes, and **overall developer satisfaction.**

ICONIQ Growth Developer Productivity Pillars

Business Impact — Performance & Reliability — Developer Effectiveness

Team and Organization Culture

How does what we're working on contribute to overall business outcomes and success?

Example metrics: % delivered vs committed, % time spent on building new capabilities / features, R&D spend as % of revenue

Is what we're shipping high-quality, on-time, and reliable?

Example metrics: Cost of poor quality, % roadmap shipped on time, # critical defects, # defects

Are developers set up with the right tools and processes to minimize friction and efficiently complete work?

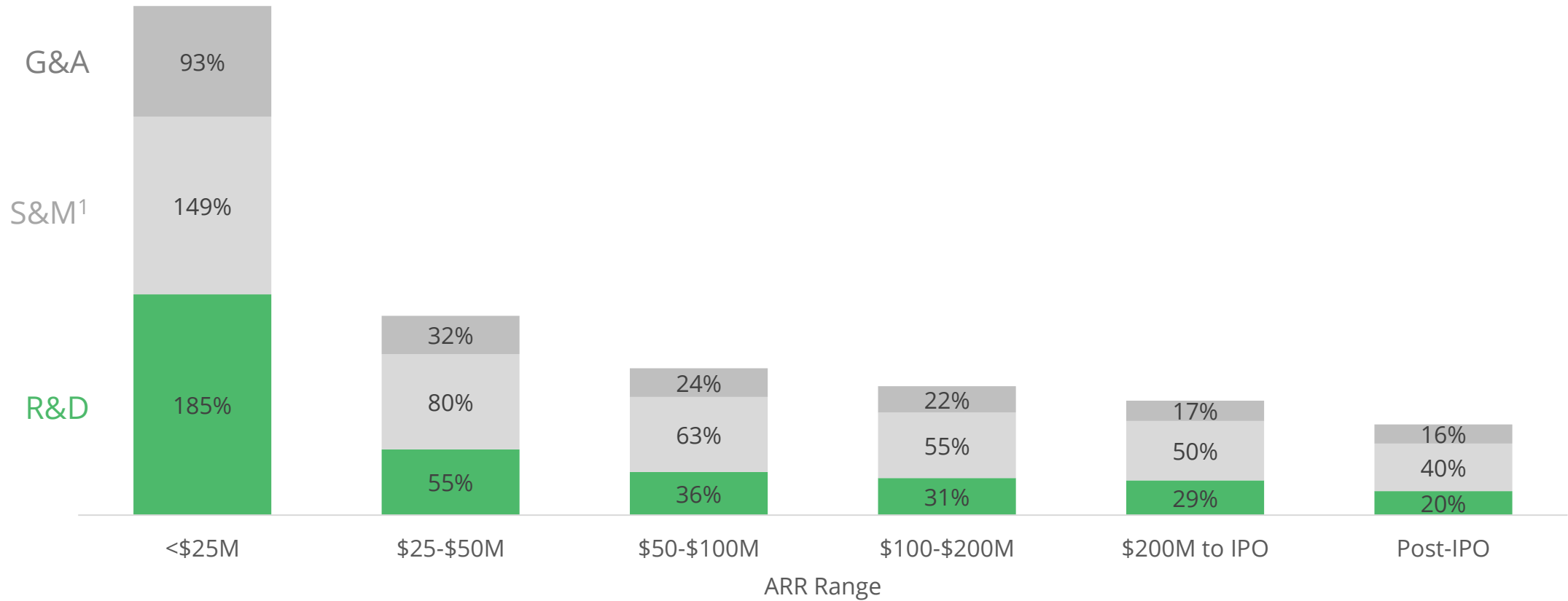Example metrics: PR to Release time, Time spent on code review, DORA metrics

Are developers fulfilled and happy? Is the organization effectively set up to support developers and enable collaboration?

Example metrics: Developer satisfaction, attrition rate

Source: Perspectives from engineering leaders in the ICONIQ Growth network presented on Slide 8

R&D typically comprises the largest portion of spend as companies scale to $25M, before plateauing to ~20%-30% of revenue as companies reach critical scale

OpEx as a % of Revenue by Type
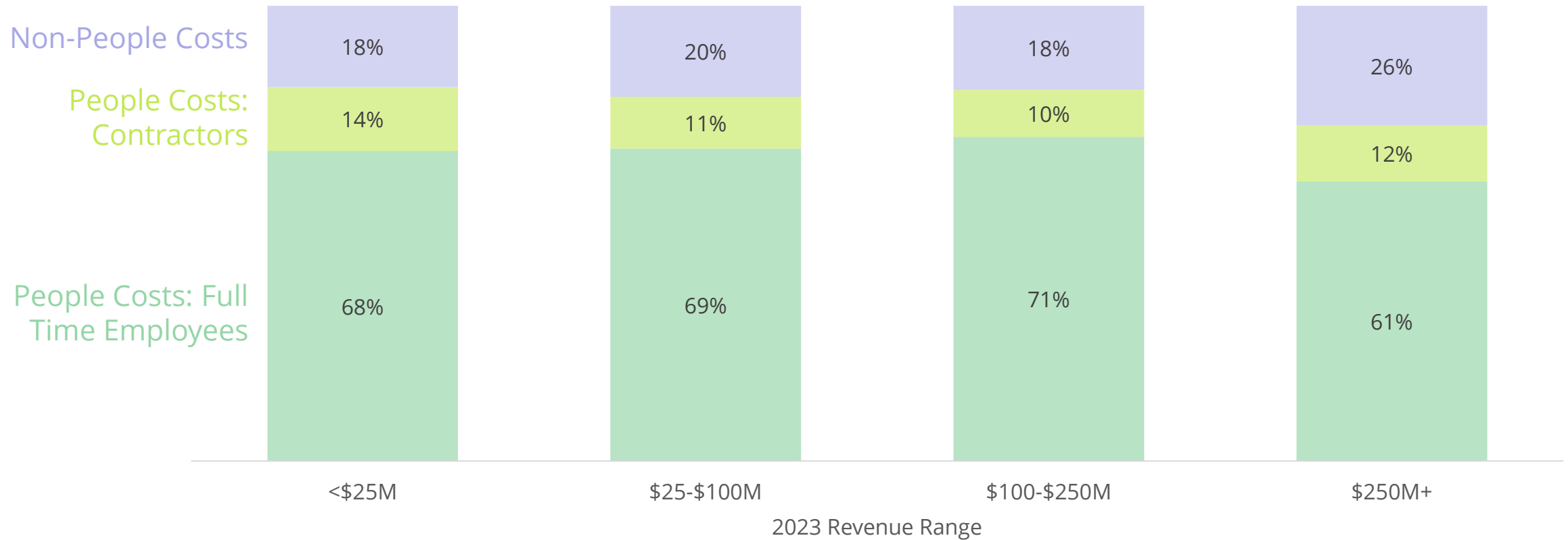### Median by ARR Scale

	<$25M	$25-$50M	$50-$100M	$100-$200M	$200M to IPO	Post-IPO
G&A	93%	32%	24%	22%	17%	16%
S&M[1]	149%	80%	63%	55%	50%	40%
R&D	185%	55%	36%	31%	29%	20%

ARR Range

Notes: (1) Total Sales & Marketing OpEx includes Customer Success
Source: ICONIQ Growth 2023 Topline Growth & Efficiency Report; based on quarterly operating and financial data from ICONIQ Growth companies from 2013 – Q4 2023

Personnel costs comprise the largest portion of R&D spend, usually accounting for ~70-80% of total spend

R&D: People vs. Non-People Costs
Average % of Total R&D Spend

Non-People Costs

People Costs: Contractors

People Costs: Full Time Employees

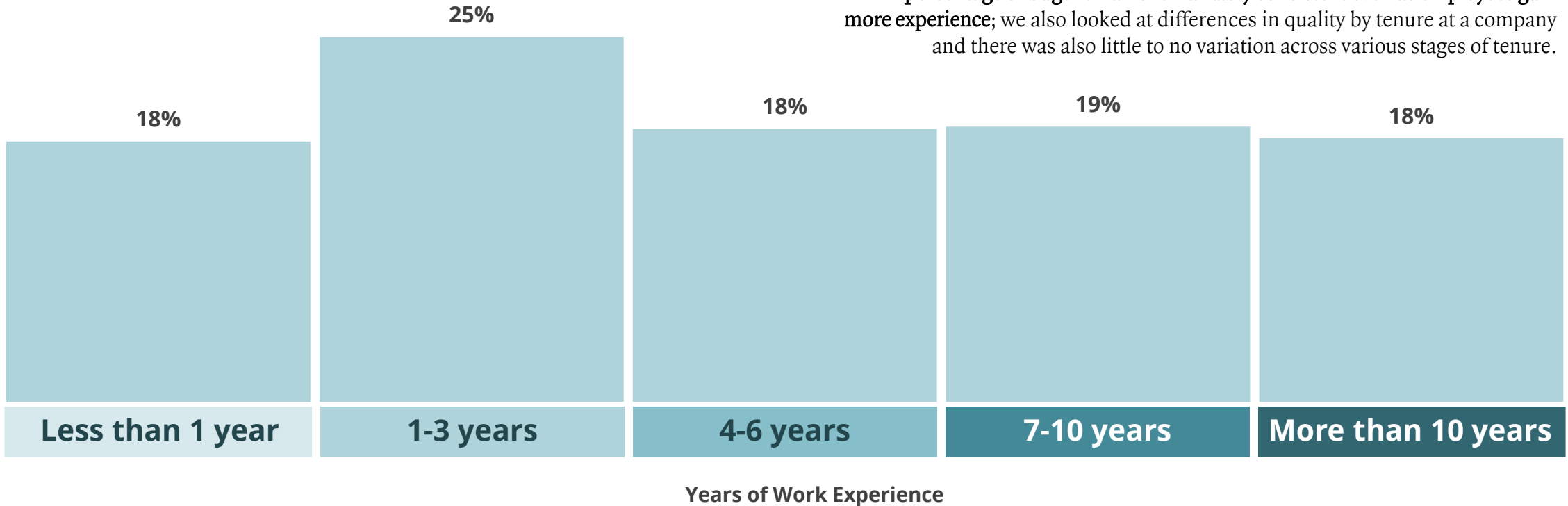| 2023 Revenue Range	<$25M	$25-$100M	$100-$250M	$250M+
Non-People Costs	18%	20%	18%	26%
People Costs: Contractors	14%	11%	10%	12%
People Costs: Full Time Employees	68%	69%	71%	61%

Source: ICONIQ Growth Engineering Survey (December 2023) and perspectives from engineering leaders in the ICONIQ Growth network presented on Slide 8

On average, companies expect to increase R&D spend across OpEx and headcount by ~12-13% YoY in 2024, with top performing companies planning for larger increases

R&D OpEx Expectations for 2024: % YoY Increase
Average % Increase

■ R&D Spend
■ Headcount

Top Performer

Average 2023 Revenue: **$389M**

Average R&D as % of Revenue: **35%**

17%
18%

All Other Companies

Average 2023 Revenue: **$302M**

Average R&D as % of Revenue: **29%**

12%
13%

> " After scaling back engineering in the last few years, we've realized that we've actually cut too much for the stage of growth we're in and are planning to grow the engineering organization significantly this year.

CTO, Infrastructure / Security Company
Growth Stage ($100-300M ARR)
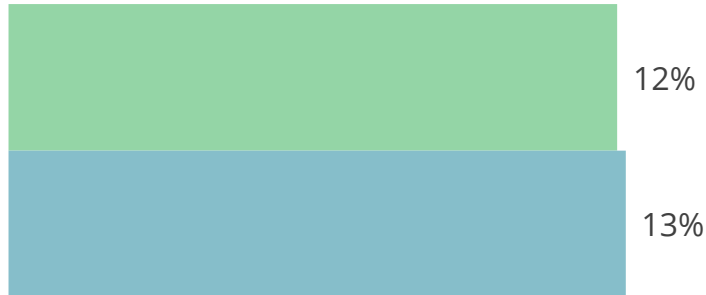
> We are seeing significant cost savings via lower-cost geographies and are planning to grow headcount and backfill in 2024 primarily using offshore resources "

CTO, Infrastructure / Security Company
Early-Stage (<$100M ARR)

Quality is an important component of developer velocity; issues in quality tend to spike with engineers who have 1-3 years of work experience, before generally stabilizing to ~18% of commits requiring revisions

On average, what percentage of your commits require revision due to bugs or errors?
Average % of Commits

Beyond the spike at 1-3 years of work experience, it is interesting to note that the **percentage of bugs remains remarkably consistent even as employees gain more experience**; we also looked at differences in quality by tenure at a company and there was also little to no variation across various stages of tenure.

Less than 1 year	1-3 years	4-6 years	7-10 years	More than 10 years
18%	25%	18%	19%	18%

Years of Work Experience

When analyzing survey responses from ~90 engineer ICs, factors correlated to development velocity beyond those self-reported included the underlying processes / infrastructure, frequency of feedback, and work arrangement

Multivariable Correlation Analysis of Developer Experience Factors to Developer Velocity
Multivariable regression analysis, N=93

☑ **Outcome Variable:** How does your development velocity at your current company compare to prior companies?
(Numerical score 1-5)

Correlation Coefficient to Developer Velocity
Explains the effect on the outcome variable in a multivariable regression, relative to other independent variables

Input Variables

The code, infrastructure, processes, and documentation at my company enable me to maintain a high development velocity	0.58
I frequently receive feedback that helps me grow as a developer	0.19
I am primarily in-office (respondents categorized as primarily in-office if 3+ days in office)	0.10
I am satisfied with the level of autonomy and independence I have in my work	0.06
I often feel overwhelmed by my workload	0.00
On average, I spend X hours collaborating with teammates	0.00
I am satisfied with the compensation (salary, bonuses, benefits) I receive	0.00
I feel my work is adequately recognized and appreciated	-0.12

More detail in DevOps Maturity section

76% of respondents have engineering teams that now operate with a remote-first office arrangement; however, this presents challenges for engineering leaders managing distributed teams

As covered in our 2022 report *Engineering in a Hybrid World*, we believe distributed workforces have fundamentally changed how engineering teams collaborate with each other. The majority of respondents now operate with a remote-first hybrid arrangement.
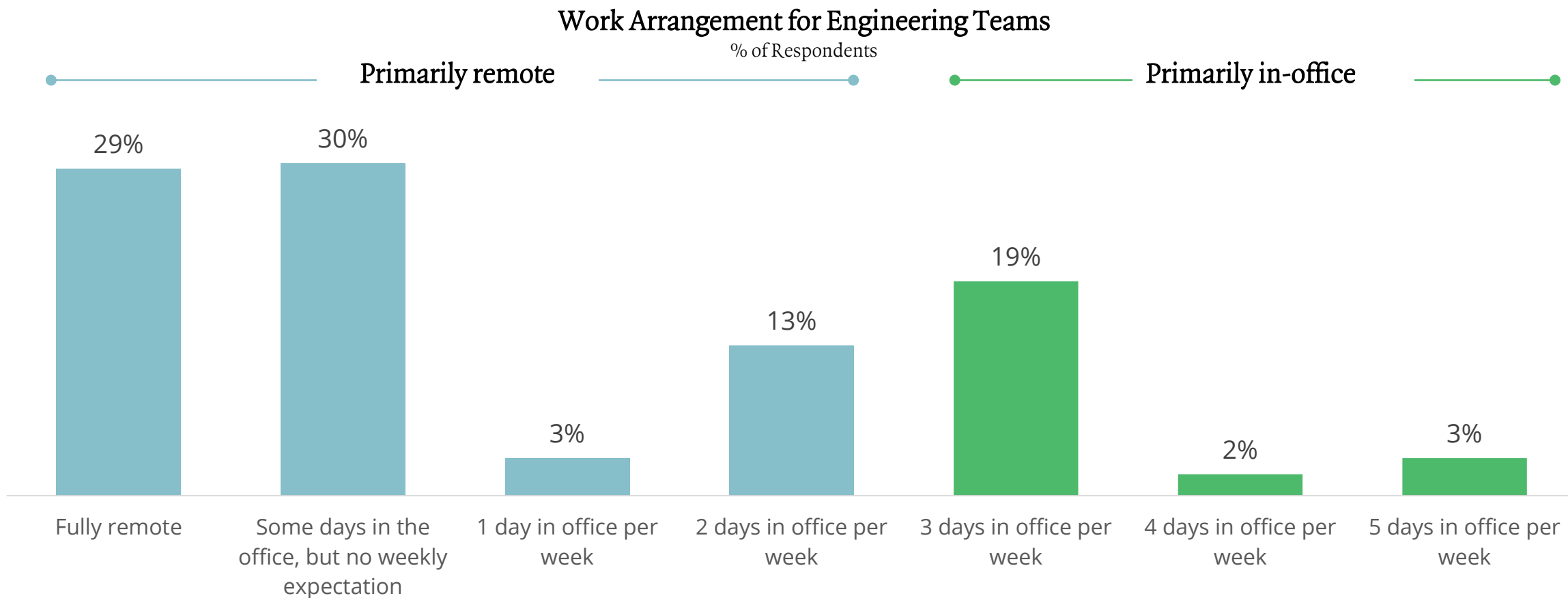
Work Arrangement for Engineering Teams
% of Respondents

Primarily remote   Primarily in-office

29%	30%	3%	13%	19%	2%	3%
Fully remote	Some days in the office, but no weekly expectation	1 day in office per week	2 days in office per week	3 days in office per week	4 days in office per week	5 days in office per week

Engineers who are primarily in-office or work 1-2 days in office each week (primarily remote) actually tend to get more hours of coding done per day compared to fully remote engineers

On average, how many hours of coding do you get done per day?
% of Respondents
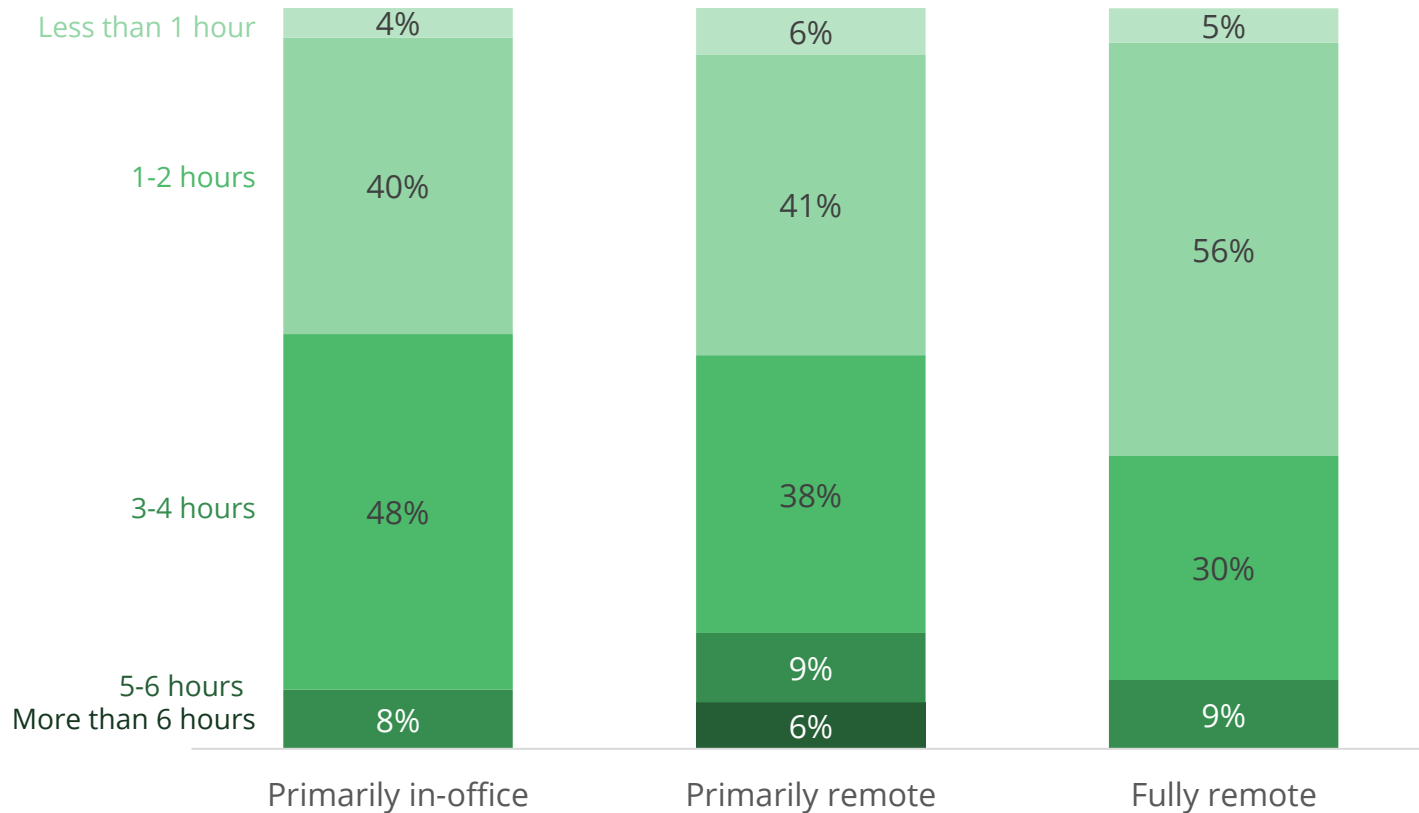
In-person time can contribute to potentially better developer flow, enabling more hours of coding. This is likely because more complicated development tasks require collaboration across different teammates and having in-person time can help engineers address blockers or dependencies quicker.

> I believe being in-office is especially critical when you are in the early stages of building a company. However, as companies scale it becomes important to give employees flexibility. A remote work arrangement also allows you to stay competitive in the current hiring market.
>
> *CTO, Operations*
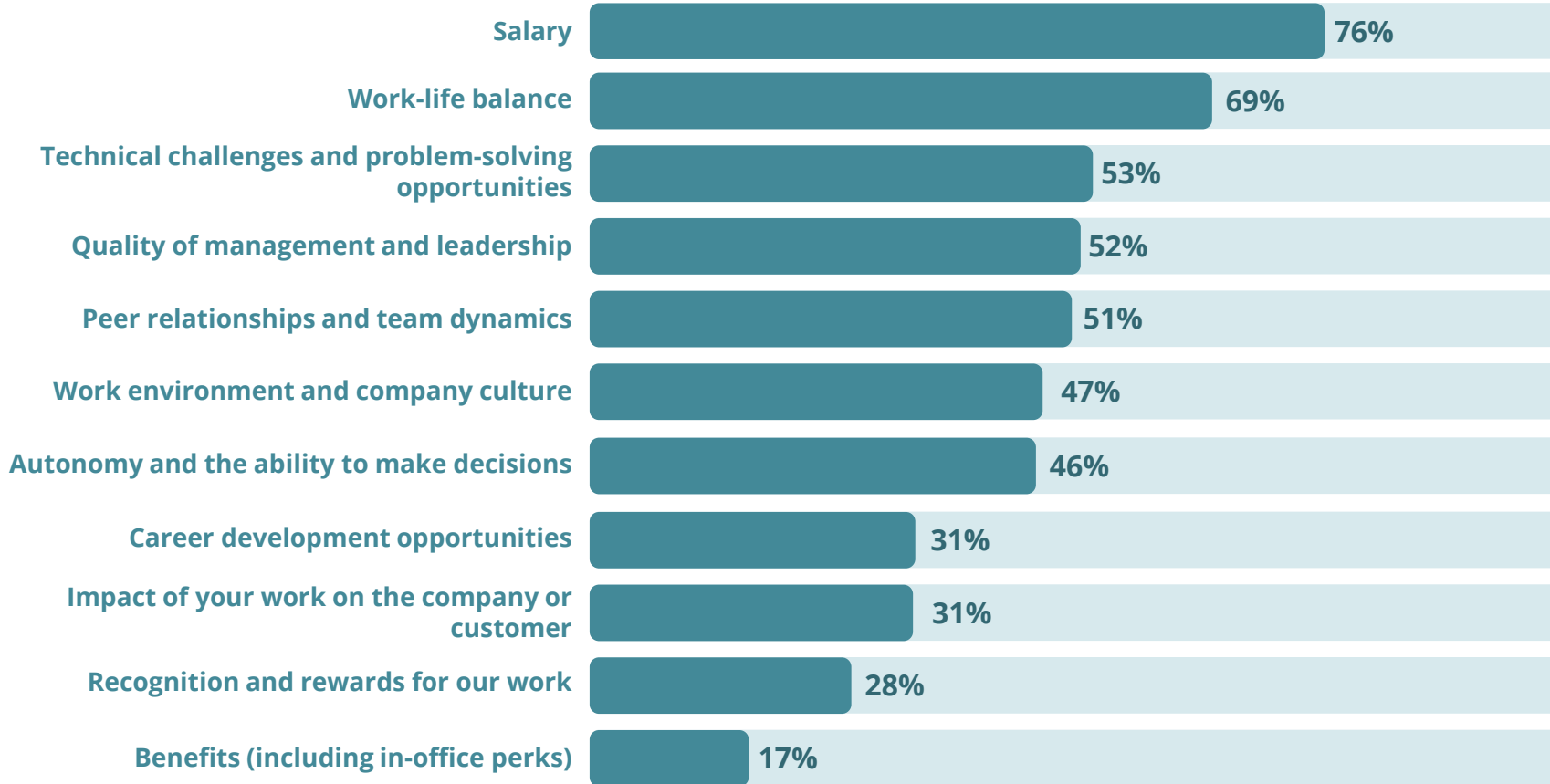> *Early-Stage (<$100M ARR)*

Source: ICONIQ Growth Engineering Survey (December 2023) and perspectives from engineering leaders in the ICONIQ Growth network presented on Slide 8

Beyond hours of coding time, work arrangement was also found to have an impact on a developer's self-reported development velocity

Impact of Work Arrangement on Developer Velocity
% of Respondents

My development velocity is better at my current company
(compared to prior companies)

My development velocity is similar or worse at my current company
(compared to prior companies)

Primarily In-Office
68% | 32%

Primarily or Fully Remote
55% | 45%
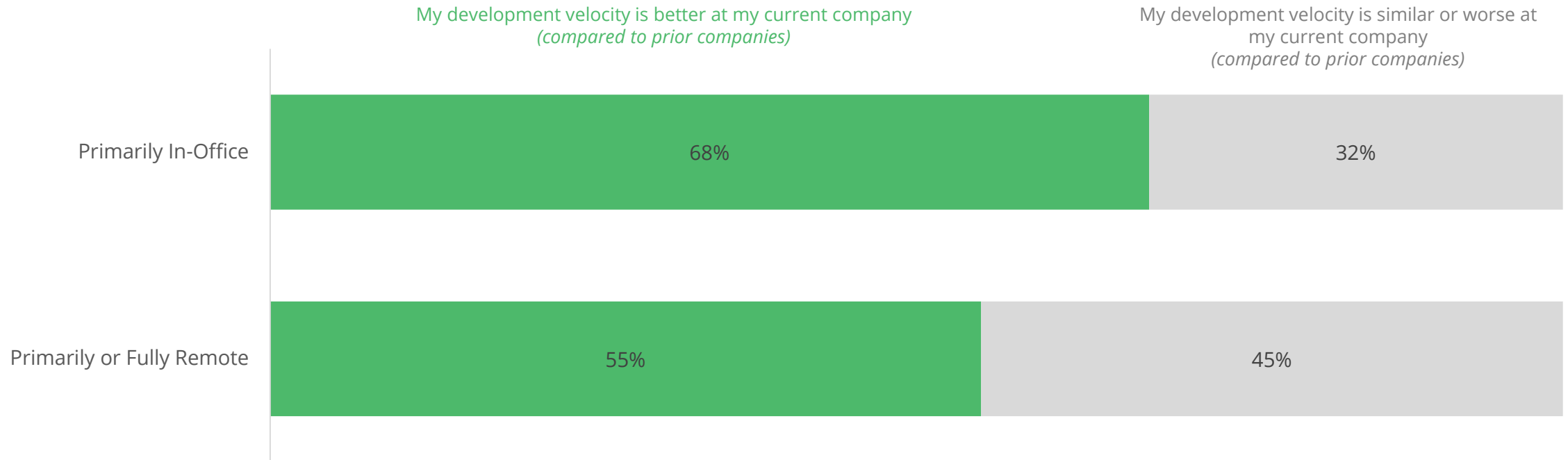
Notably, a **greater percentage** (68%) **of in-office employees reported they have higher development velocity** at their current company, compared to 55% of remote employees.

Business Impact | Performance & Reliability | Developer Effectiveness

Team and Organization Culture

Factors like job satisfaction and tenure at company also have a direct impact on developer velocity

A large volume of commits does not necessarily indicate high code quality. It is important to not fixate on purely tracking output metrics like pull requests submitted at the individual engineer level since these can be **easily gamified and can incentivize the wrong behaviors.** However, it is interesting to note the **impact of factors like work arrangement and job satisfaction on developer velocity as shown below.** Notably, engineers who are **primarily in-office tend to generate a larger number of pull requests (PRs) on a weekly basis compared to remote peers.** Similarly, developers who have higher job satisfaction or are more experienced submit a larger number of pull requests on average.

On average, how many pull requests do you submit per week?
Average pull requests / week

Being in-office while supporting employee job satisfaction can be a difficult balancing act for executives. So which is more important? Notably, in this analysis **being in-office was found to have a stronger impact on developer velocity** (average 8.2 PRs/week) **than job satisfaction** (average 7.5 PRs/week).

Primary Work Arrangement			Job Satisfaction		Tenure at Company			
Primarily in-office	Primarily remote	Fully remote	Lower Job Satisaction	Higher Job Satisfaction	3 - 12 months	1 - 2 years	3 - 4 years	5+ years
8.2	6.3	6.2	6.3	7.5	5.3	6.7	6.3	8.5

Source: ICONIQ Growth Engineering Survey (December 2023) and perspectives from engineering leaders in the ICONIQ Growth network presented on Slide 8

Factors most tied to job satisfaction for engineers include salary, work-life balance, technical challenges and problem-solving opportunities, quality of management / leadership, and team dynamics
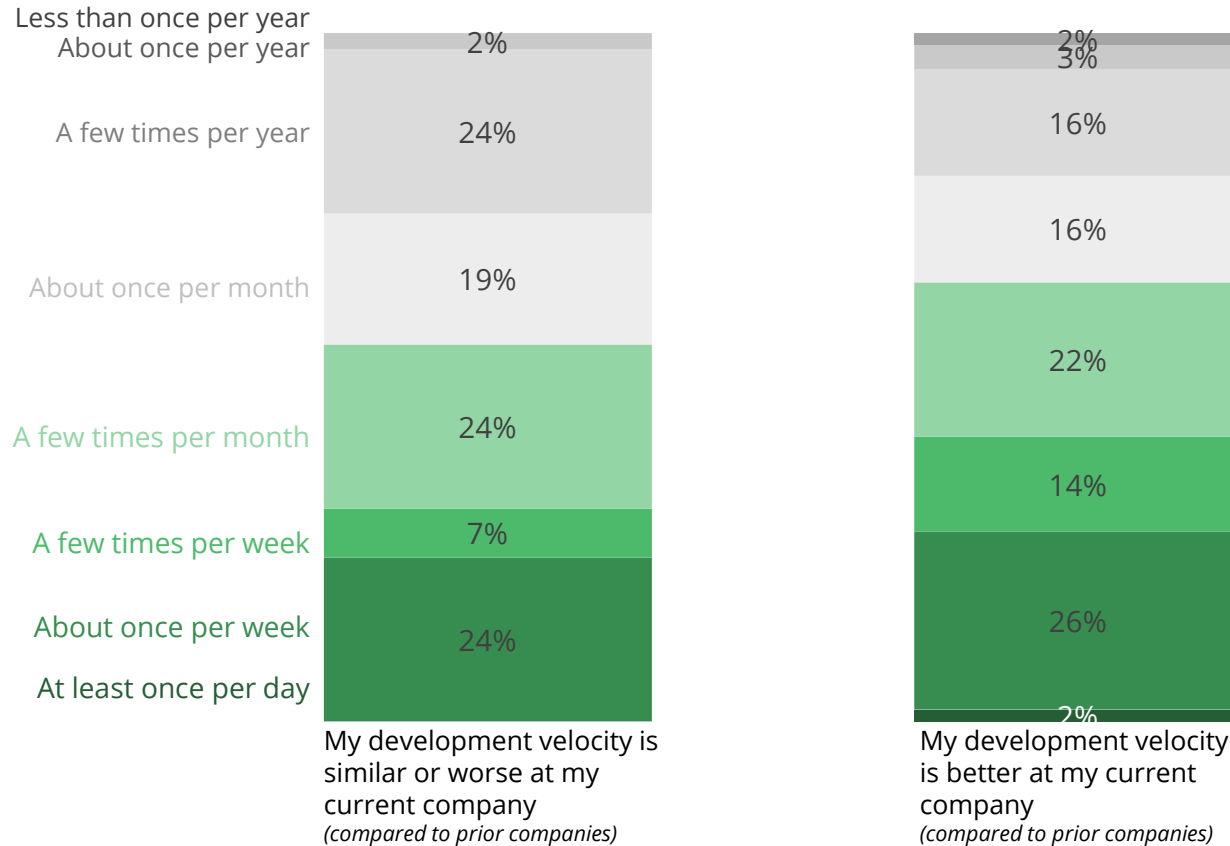
Factors tied to Job Satisfaction
% of Respondents who listed each aspect in top 5 ranking, N = 100

Factor	%
Salary	76%
Work-life balance	69%
Technical challenges and problem-solving opportunities	53%
Quality of management and leadership	52%
Peer relationships and team dynamics	51%
Work environment and company culture	47%
Autonomy and the ability to make decisions	46%
Career development opportunities	31%
Impact of your work on the company or customer	31%
Recognition and rewards for our work	28%
Benefits (including in-office perks)	17%

Existing research shows developer satisfaction has a direct correlation and positive impact on overall productivity[1].

Factors most tied to job satisfaction for engineers include salary, work-life balance, technical challenges and problem-solving opportunities, quality of management / leadership, and team dynamics.

There is also some degree of self-selection in these factors; for example, a greater percentage of remote employees rated factors like work-life balance as important compared to in-office employees.

One immediate and actionable tactic for engineering leaders to improve developer effectiveness is by providing more frequent feedback to developers

How often do you receive feedback from your supervisors that helps you grow as a developer?

% of Respondents

Less than once per year
About once per year
A few times per year
About once per month
A few times per month
A few times per week
About once per week
At least once per day

My development velocity is similar or worse at my current company *(compared to prior companies)*
- 2%
- 24%
- 19%
- 24%
- 7%
- 24%

My development velocity is better at my current company *(compared to prior companies)*
- 2%
- 3%
- 16%
- 16%
- 22%
- 14%
- 26%
- 2%

41% of developers who feel their development velocity has improved at their current company receive feedback from supervisors frequently (as often as daily or multiple times a week).

Source: ICONIQ Growth Engineering Survey (December 2023) and perspectives from engineering leaders in the ICONIQ Growth network presented on Slide 8

Time spent on writing or improving code decreases as engineers move up the ranks, with engineering managers only spending ~22% of their time in the codebase and most of their time on meetings / operations
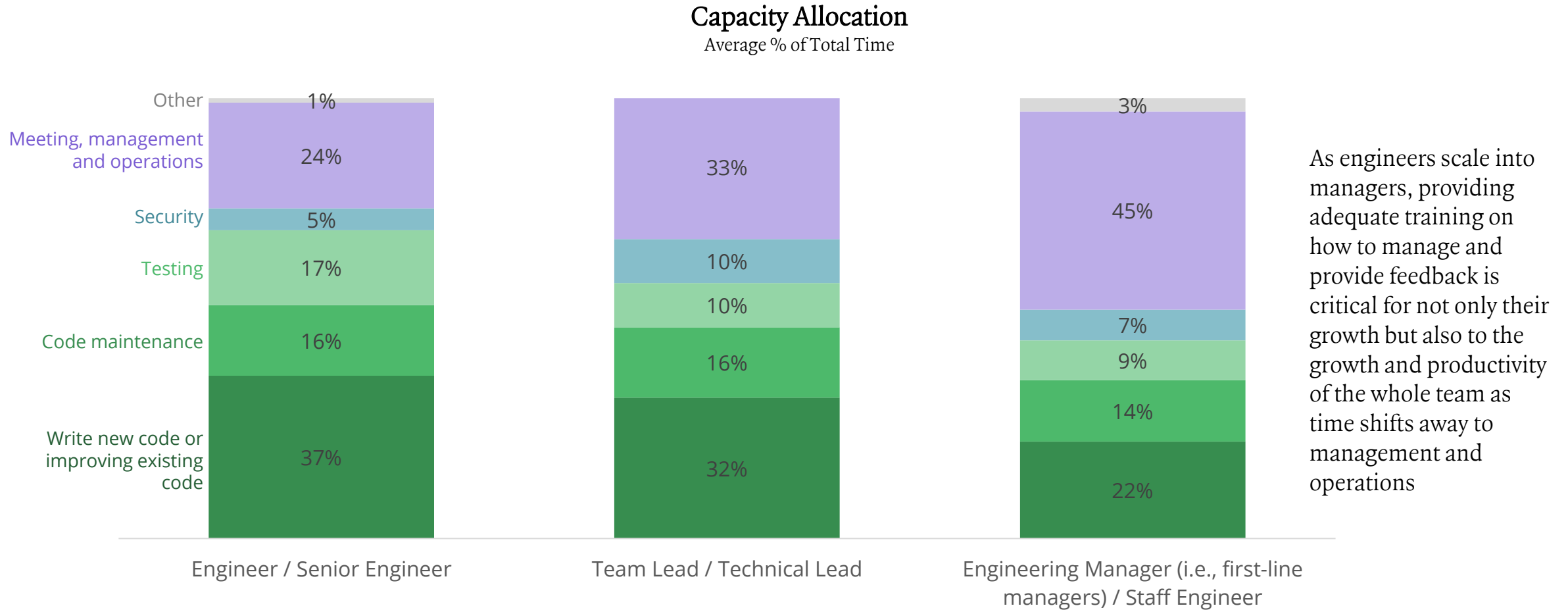
Capacity Allocation
Average % of Total Time

Engineer / Senior Engineer
- Other: 1%
- Meeting, management and operations: 24%
- Security: 5%
- Testing: 17%
- Code maintenance: 16%
- Write new code or improving existing code: 37%

Team Lead / Technical Lead
- 33%
- 10%
- 10%
- 16%
- 32%

Engineering Manager (i.e., first-line managers) / Staff Engineer
- 3%
- 45%
- 7%
- 9%
- 14%
- 22%

As engineers scale into managers, providing adequate training on how to manage and provide feedback is critical for not only their growth but also to the growth and productivity of the whole team as time shifts away to management and operations

In our next chapter, we are excited to dive into all aspects of developer productivity, including best practices for tracking and reporting on key metrics, in addition to benchmarks across common productivity metrics

Key Questions Covered

1 **Capacity Allocation**
How should I prioritize different investments in time and resources and how do I understand the types of projects my team is spending time on?

2 **Developer Productivity Metrics**
What metrics should I start tracking and how do I get started?

3 **Developer Productivity Benchmarks**
How does the performance of my engineering team compare to other software companies?

4 **Improving Developer Velocity**
What actions are best-of-breed companies taking to improve developer velocity?

5 **Engineering Reporting for the Rest of the Organization**
How can I effectively report on engineering priorities and challenges for non-technical stakeholders like my executive team and Board of Directors?

DevOps Maturity

The state of DevOps (infrastructure, people, and processes) across SaaS organizations

Key Priorities for Engineering Leaders

Many of the priorities listed by engineering leaders can be grouped into 3 broad categories across developer productivity and experience, the evolution and maturity of DevOps, and driving innovation / efficiency (with the main focus being around embedding AI).

The subsequent pages in this study will dive into each of these priorities in detail including the actions modern-day engineering organizations are taking and relevant benchmarks across different stages of growth and business models.

1 Developer Productivity & Experience

There is no universally accepted definition of developer productivity and even different perceptions across CTOs and engineer ICs based on our research. We believe developer productivity should be assessed through a holistic framework that captures business impact, performance and reliability, developer effectiveness, and culture.

> We are keeping headcount flat in 2024, so a big focus for me this year is striking a balance between individual development goals and organization needs with a major focus on efficiency. We need to motivate our engineers to do more, and part of that involves tracking and measuring developer productivity.
>
> *Engineering Leader*
> *Infrastructure & Security*
> *Growth Stage ($100-300M ARR)*

2 Evolution and Maturity of DevOps

A key factor to improving developer productivity and experience is the state of the underlying infrastructure and processes powering engineering teams. Modern-day engineering organizations have adopted the DevOps mindset in varying forms and rather being a nice-to-have, embracing DevOps has now become ubiquitous for engineering organizations.

> We have a lot of tech debt to clean up this year and are doubling down on refactoring and overall simplification – how do we make it easier and faster for developers to commit features? The goal is to enable the team to spend less time on time-suck / low ROI activities that can be automated.
>
> *Engineering Leader*
> *Fintech*
> *Late Stage ($300M+ ARR)*

3 Driving Innovation & Efficiency via AI

In our conversations with CTOs, the universal questions around AI have been around where to start, the most impactful use cases for internal productivity, and what are other companies seeing in terms of early ROI.

> A key priority for me this year is to unlock ML and uplevel our existing engineers. We have not seen measurable results yet with Copilot so we are trying to better understand best practices for embedding AI and getting true ROI from these solutions.
>
> *Engineering Leader*
> *Consumer & Internet*
> *Late Stage ($300M+ ARR)*

Spotlight: Building a DevOps Culture

1Password

Pedro Canahuati
Chief Technology Officer (CTO)

" At Facebook, I led the production engineering team which scaled Facebook's infrastructure and ensured our services are available 24/7. I brought this mentality of operations at scale with me to 1Password and when I joined as CTO, I knew that we had to embed DevOps into the engineering mindset and culture. There was no room for argument – this is the way modern engineering organizations are doing it, and we must follow. "

The Transition to DevOps

- Building an engineering organization that is effective requires a change in the cultural mindset and the transition is often very challenging

- It requires buy-in and shared ownership across the entire engineering team. Engineers need to shift their mindset completely and ops teams also need to be engaged earlier in the process with developers

- The only way to implement this is by revamping people processes like performance evaluation, hiring, and onboarding to make this mindset shift a requirement:

  - We worked with developers and operations teams resistant to change – helped them evolve, and if/when change wasn't effective, amicably parted ways

  - We also try to hire for developers with a DevOps mindset

  - We practice "dogfooding" which means developers must consistently use the product they've built just like the end user to figure out what works and what doesn't

  - We implemented developer bootcamps (2 week programs for new joiners) to accelerate onboarding for new hires and coach them on best practices across development, code reviews, testing, etc.

Metrics Tracked

We track a variety of metrics to understand developer sentiment around development processes and effectiveness:
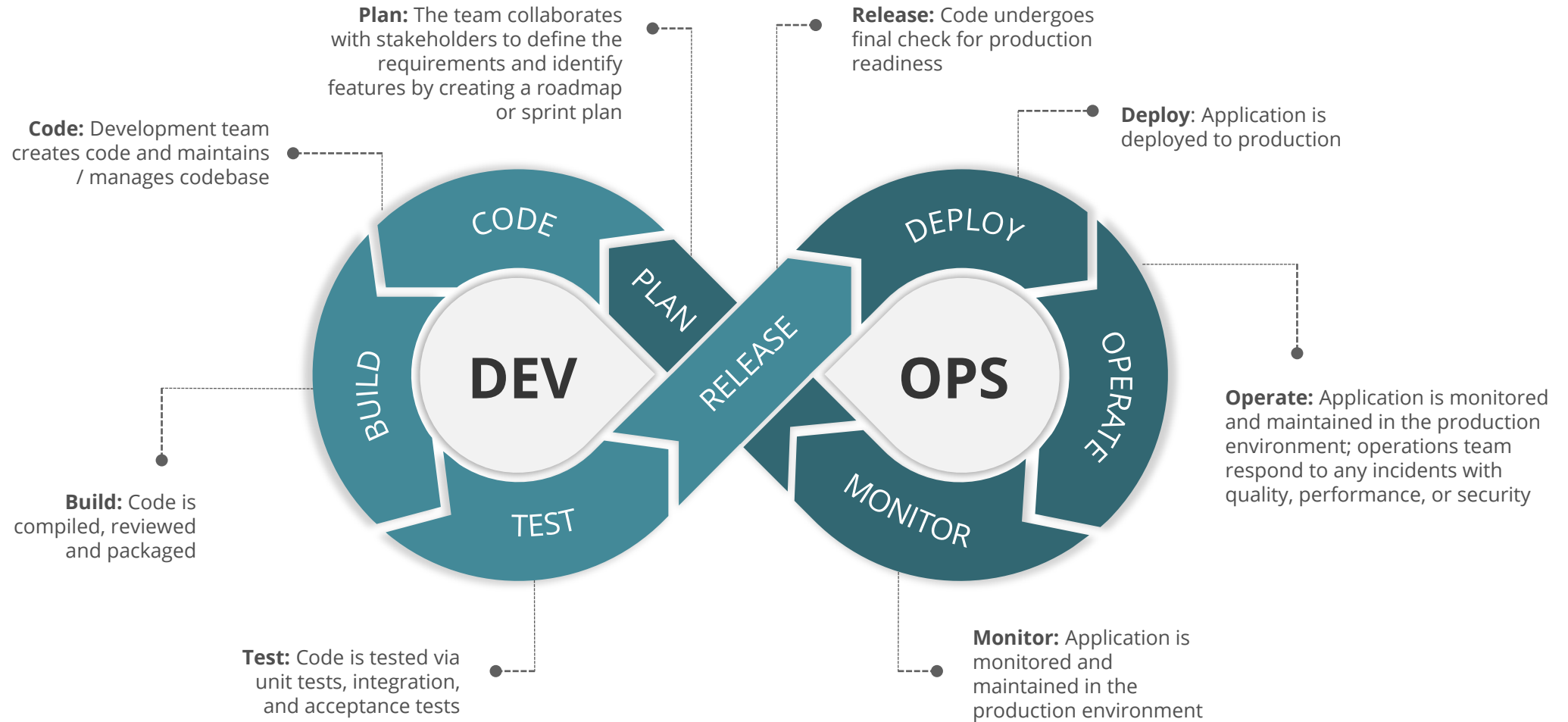
- How easy is it to develop, deploy code, etc.?

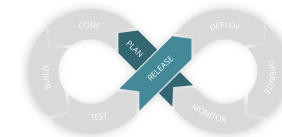- Velocity metrics, including time to delivery and PRs

We review sentiment every 6 months via a developer survey and leverage these metrics to identify team improvements. Nothing is used as a performance evaluation mechanism.

The DevOps lifecycle is an iterative and collaborative process used by modern-day SaaS organizations to delivery high-quality software, tailored to meet business and user requirements

Plan: The team collaborates with stakeholders to define the requirements and identify features by creating a roadmap or sprint plan

Release: Code undergoes final check for production readiness

Code: Development team creates code and maintains / manages codebase

Deploy: Application is deployed to production

Build: Code is compiled, reviewed and packaged

Operate: Application is monitored and maintained in the production environment; operations team respond to any incidents with quality, performance, or security

Test: Code is tested via unit tests, integration, and acceptance tests

Monitor: Application is monitored and maintained in the production environment

CODE

PLAN

DEPLOY

BUILD

DEV
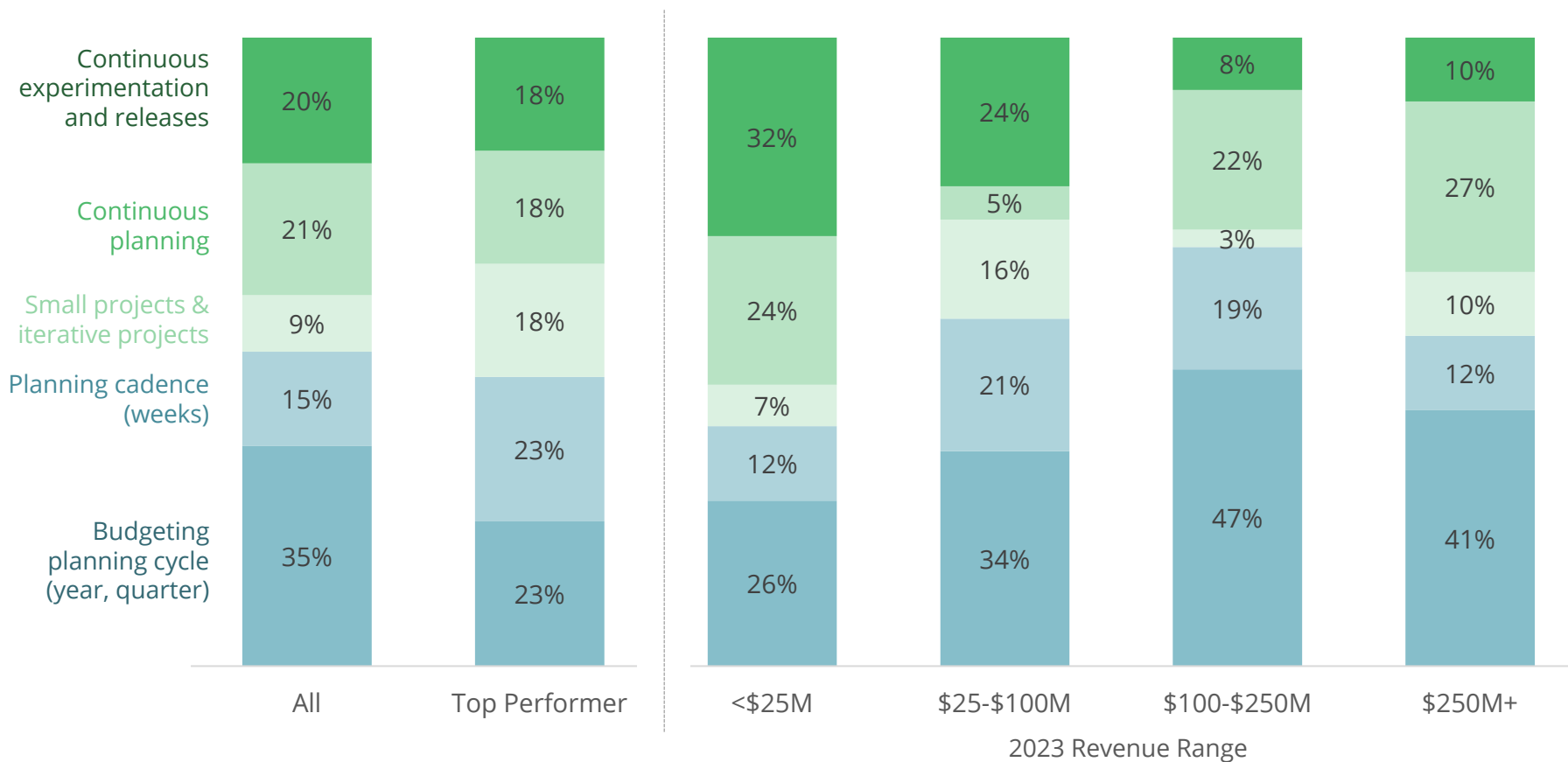
RELEASE

OPS

OPERATE

TEST

MONITOR

Planning cadence evolves as companies scale, with early-stage companies typically using continuous planning before transitioning to a more regular planning cadence as they reach critical scale

## How would you describe the primary R&D project planning process in your company?

% of Respondents

In the **early stages of scaling (<$25M), companies tend to follow an agile** process of continuous planning and releases. As companies continue scaling and reach critical inflection points (e.g., $25M, $50M, etc.), it appears that **companies often switch back to a more waterfall approach to planning** (perhaps to ensure they can meet key requirements as they move up-market).
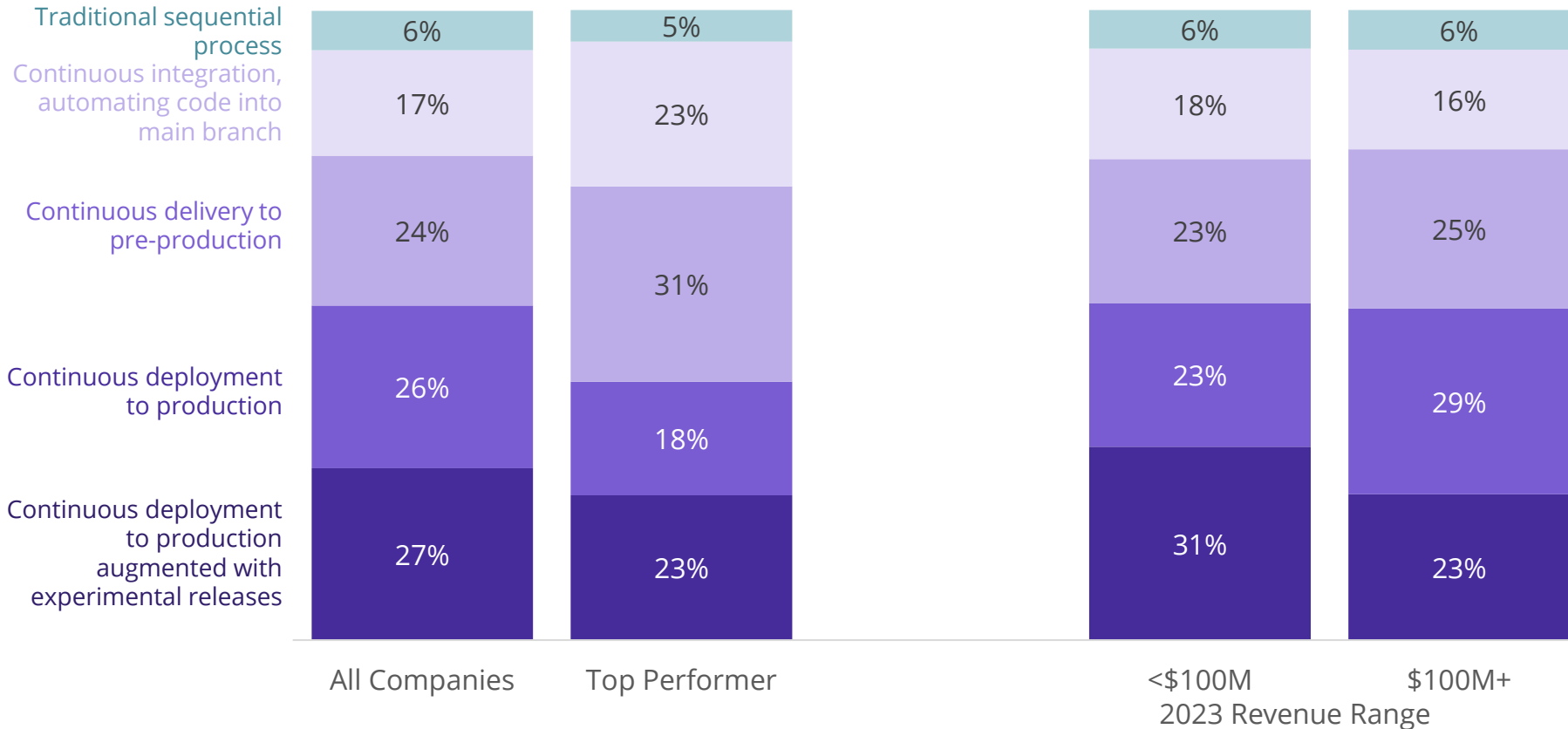
However, as companies scale past $100M, **companies either settle into a traditional regular planning cadence or adopt scaled agile.** Notably, a **greater percentage of top performers utilize a more frequent planning** cadence.
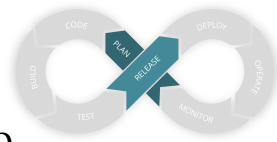
Companies also employ a similar mindset to release schedules, typically transitioning from agile deployments to either continuous delivery to pre-production or scheduled but frequent deployments to production

How would you describe your typical release process?
% of Respondents

	All Companies	Top Performer	<$100M	$100M+
Traditional sequential process	6%	5%	6%	6%
Continuous integration, automating code into main branch	17%	23%	18%	16%
Continuous delivery to pre-production	24%	31%	23%	25%
Continuous deployment to production	26%	18%	23%	29%
Continuous deployment to production augmented with experimental releases	27%	23%	31%	23%

2023 Revenue Range

In the early stages of growth, **continuous deployment augmented with experimental releases allows companies to move fast** and iterate quickly on customer feedback. However, this becomes **more challenging to coordinate as companies scale and need to maintain a higher standard of quality and reliability.**

A greater percentage of top performers **use continuous delivery to pre-production or continuous integration**, compared to other companies, likely given a focus on quality and integrations.
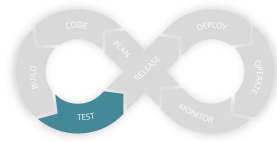
Most companies build automated testing suites as early as <$25M in revenue

How automated are your testing processes?

% of Respondents

No automation in testing

Manual testing with some automated unit tests

Automated testing suite for multiple test types (unit, integration, system)

Fully automated testing across all areas including performance and security

Category	<$25M	$25-$100M	$100-$250M	$250M+
No automation in testing	1%		3%	
Manual testing	32%	21%	14%	15%
Automated testing suite	55%	63%	61%	64%
Fully automated	12%	16%	22%	20%

2023 Revenue Range

Most companies develop automated testing as early as $25M in revenue.

There were some notable differences by sector. 100% of companies in the security / infrastructure sector had automated testing, whereas a higher percentage of respondents in vertical SaaS still relied on manual testing, likely because certain industries like healthcare have certain regulatory restrictions and a higher standard of quality that requires manual intervention.

> By investing in testing automation this year, we expect to improve developer productivity significantly by generating greater test coverage and reducing the time to release.
>
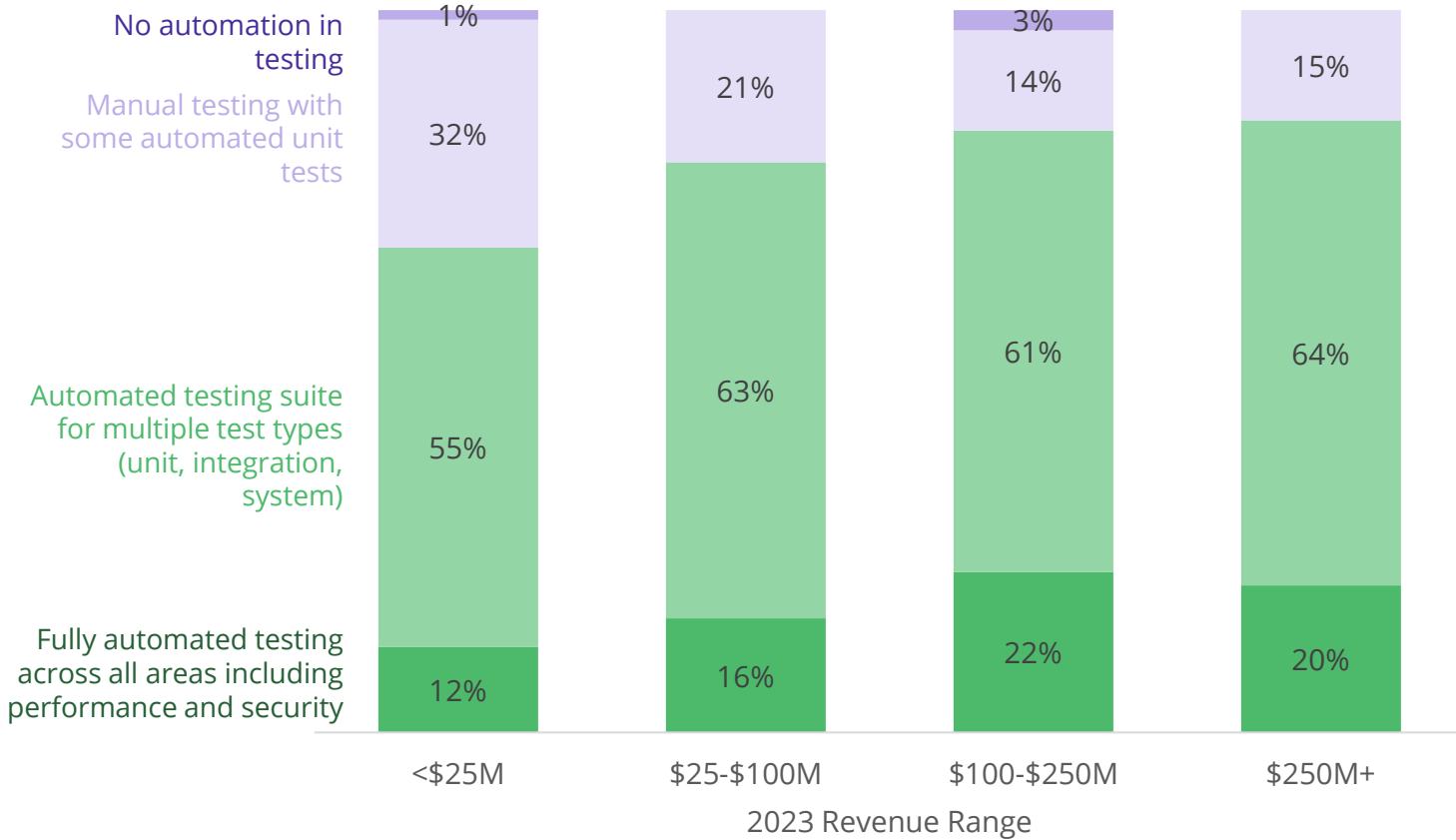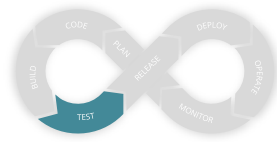> *CTO, Infrastructure & Security Growth-Stage ($100-300M ARR)*

Source: ICONIQ Growth Engineering Survey (December 2023) and perspectives from engineering leaders in the ICONIQ Growth network presented on Slide 8

ICONIQ | Growth   Private & Strictly Confidential   44

Most companies allow developers to see the results of integration / unit testing weekly, with top performing companies having faster testing processes that show results as quickly as daily or several times a day
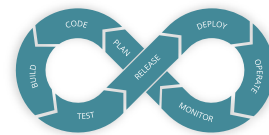
How quickly can developers see the results of the integration / unit testing?
% of Respondents

■ Less than once a month   ■ Monthly   ■ Weekly   ■ Daily   ■ Several times a day
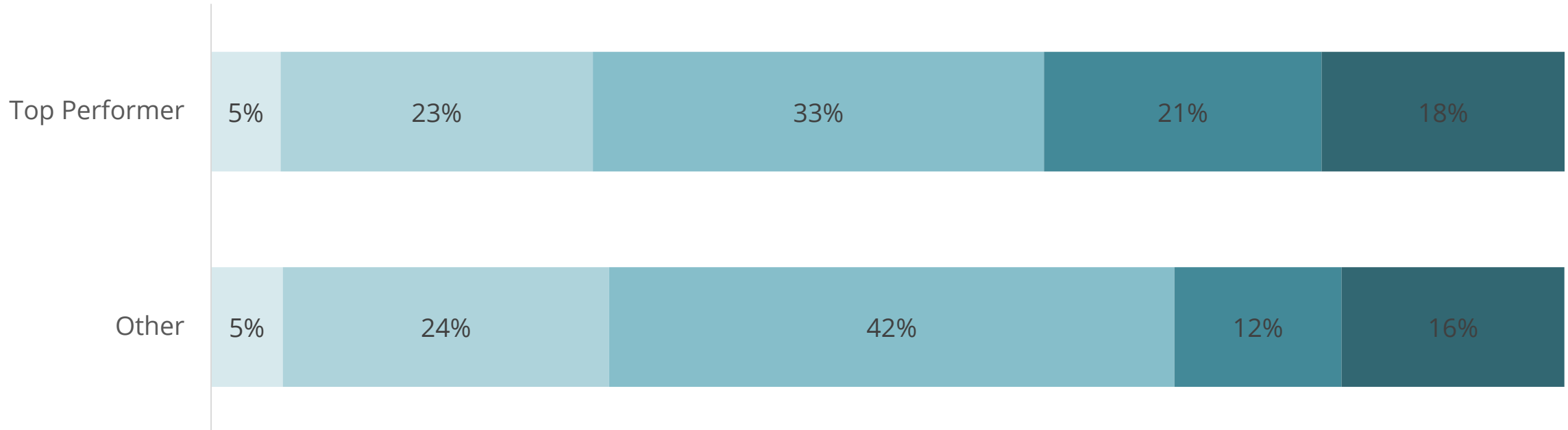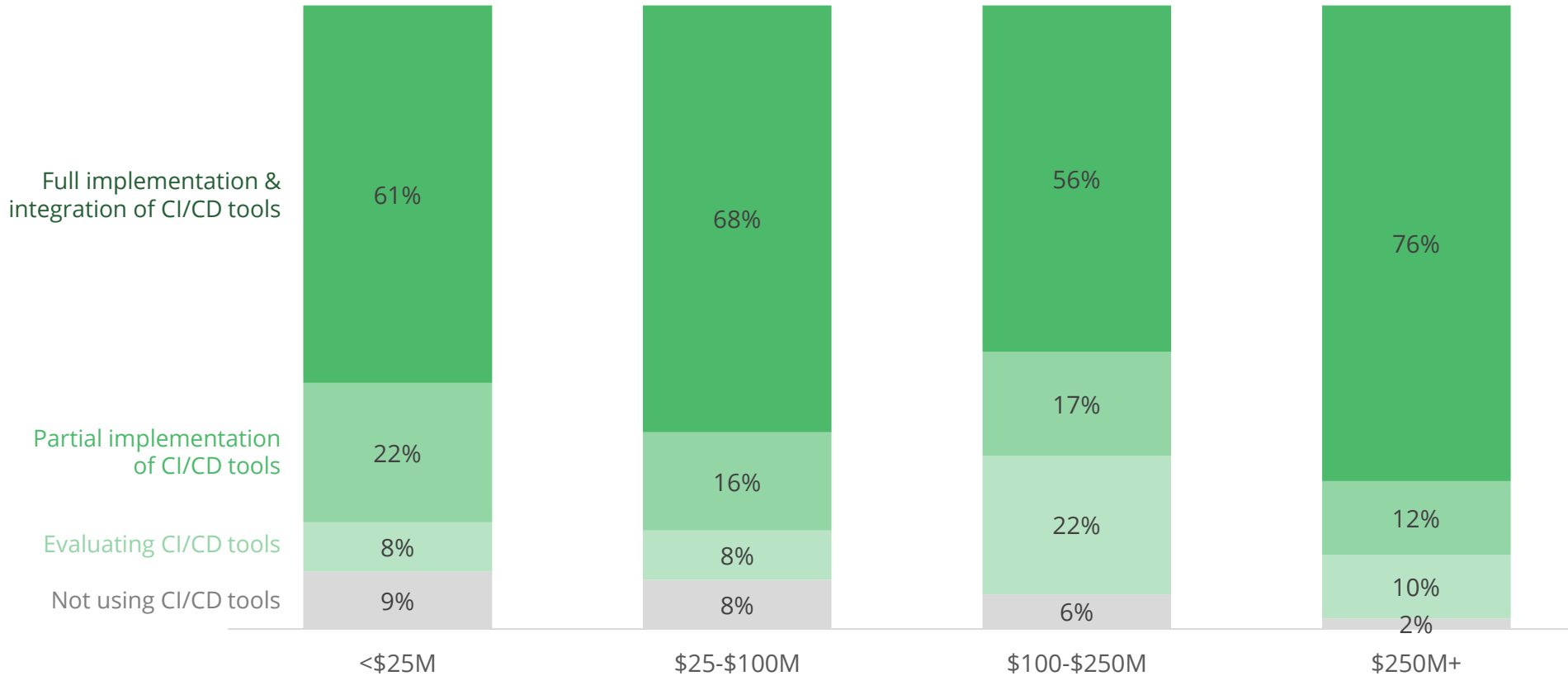
Top Performer
| 5% | 23% | 33% | 21% | 18% |

Other
| 5% | 24% | 42% | 12% | 16% |

Most companies surveyed have full implementation of CI/CD tools regardless of stage, with 98% of companies either evaluating or having implemented CI/CD tools by $250M in revenue

To what extent does your team use CI/CD tools?
% of Respondents

Full implementation & integration of CI/CD tools

Partial implementation of CI/CD tools

Evaluating CI/CD tools

Not using CI/CD tools

	<$25M	$25-$100M	$100-$250M	$250M+
Full implementation & integration of CI/CD tools	61%	68%	56%	76%
Partial implementation of CI/CD tools	22%	16%	17%	12%
Evaluating CI/CD tools	8%	8%	22%	10%
Not using CI/CD tools	9%	8%	6%	2%

As companies scale, the implementation of tools enabling continuous integration and deployment are critical to allow engineering teams to do their best work, with **76% of companies in the $250M+ revenue range having full implementation and integration of CI/CD tools.**

Notably, **90% of top performing companies have fully implemented CI/CD tools as early as $25M in revenue.**

AI Impact

How companies are leveraging generative AI / LLM across product and internal productivity use cases and the initial ROI

Key Priorities for Engineering Leaders

Many of the priorities listed by engineering leaders can be grouped into 3 broad categories across developer productivity and experience, the evolution and maturity of DevOps, and driving innovation / efficiency (with the main focus being around embedding AI).

The subsequent pages in this study will dive into each of these priorities in detail including the actions modern-day engineering organizations are taking and relevant benchmarks across different stages of growth and business models.

1 Developer Productivity & Experience

There is no universally accepted definition of developer productivity and even different perceptions across CTOs and engineer ICs based on our research. We believe developer productivity should be assessed through a holistic framework that captures business impact, performance and reliability, developer effectiveness, and culture.

> " We are keeping headcount flat in 2024, so a big focus for me this year is striking a balance between individual development goals and organization needs with a major focus on efficiency. We need to motivate our engineers to do more, and part of that involves tracking and measuring developer productivity.
>
> *Engineering Leader*
> *Infrastructure & Security*
> *Growth Stage ($100-300M ARR)*

2 Evolution and Maturity of DevOps

A key factor to improving developer productivity and experience is the state of the underlying infrastructure and processes powering engineering teams. Modern-day engineering organizations have adopted the DevOps mindset in varying forms and rather being a nice-to-have, embracing DevOps has now become ubiquitous for engineering organizations.

> " We have a lot of **tech debt to clean up** this year and are doubling down on **refactoring and overall simplification** – how do we make it **easier and faster for developers to commit features**? The goal is to enable the team to spend **less time on time-suck / low ROI activities that can be automated.**
>
> *Engineering Leader*
> *Fintech*
> *Late Stage ($300M+ ARR)*

3 Driving Innovation & Efficiency via AI

In our conversations with CTOs, the universal questions around AI have been around where to start, the most impactful use cases for internal productivity, and what are other companies seeing in terms of early ROI.

> " A key priority for me this year is to **unlock ML and uplevel our existing engineers**. We have **not seen measurable results yet with Copilot** so we are trying to better understand **best practices for embedding AI and getting true ROI** from these solutions.
>
> *Engineering Leader*
> *Consumer & Internet*
> *Late Stage ($300M+ ARR)*

Spotlight: Leveraging LLMs to Drive Efficiency

Wealthsimple

Diederik van Liere
Chief Technology Officer (CTO)

" At Wealthsimple we've found new and innovative ways to use GenAI to better support our clients and empower our employees. That's why we've introduced 'Wealthsimple Booster Packs' which are packages of open-source LLMs built on our own cloud infrastructure to protect PII and IP. We've seen massive adoption among Wealthsimplers – weekly active users (WAUs) include 50% of the company. "

The Wealthsimple Boosterpack

- We've made three types of knowledge bases available to all employees:

  - **Public**: Accessible to all employees, these datasets include source code, public financial data, or product and help content

  - **Private**: A private knowledge base is available to each employee where they can store and query their own personal documents

  - **Limited**: A shared knowledge base available to a limited set of co-workers

- We've seen most of the requests to be related to programming (e.g., debugging, code generation), content / copy generation, or querying and review of customer tickets

Tracking ROI of LLM Initiatives

Using LLMs which auto-transcribe all customer calls and analyzes the sentiment and quality of each call, we built a "Voice of the Customer" dashboard which tracks all inbound customer issues across web, email, chat, and voice classified by topics and sub-topics.

This has significantly reduced ticket queue time and saved an average ~620 days of manual operations annually.

This dashboard has also become the missing link between engineering and customer experience. We are leveraging this dashboard to understand how new features we ship impact customer sentiment and can easily see if new features had a direct impact on reducing the volume for CX sub-topics.

Building AI-Enabled Products

Around 70% of companies analyzed have an AI component in their product suite, with ~90% of companies in the $250M+ revenue range having an AI-enabled customer-facing product

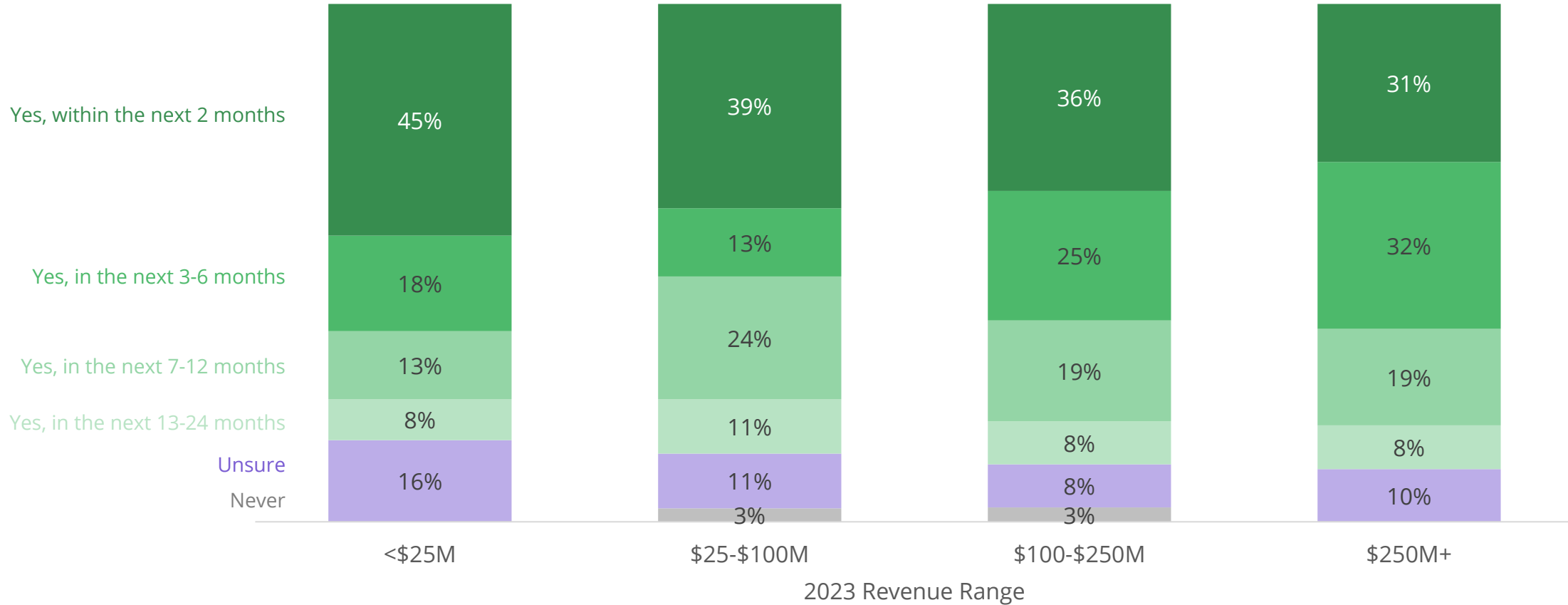## Does your company have an AI-enabled customer-facing product?

% of Respondents

Yes, AI is a large component of our product suite

Yes, AI is a small component / add-on to our product suite

No

All: 42%, 37%, 21%
Top Performer: 49%, 33%, 18%
<$25M: 41%, 33%, 26%
$25-$100M: 32%, 42%, 26%
$100-$250M: 39%, 39%, 22%
$250M+: 34%, 56%, 10%

2023 Revenue Range

AI Future Plans

Most companies are also planning to embed AI or introduce AI-related products in the next 12 months regardless of scale

Does your company plan to embed AI or introduce AI-related products in the future?
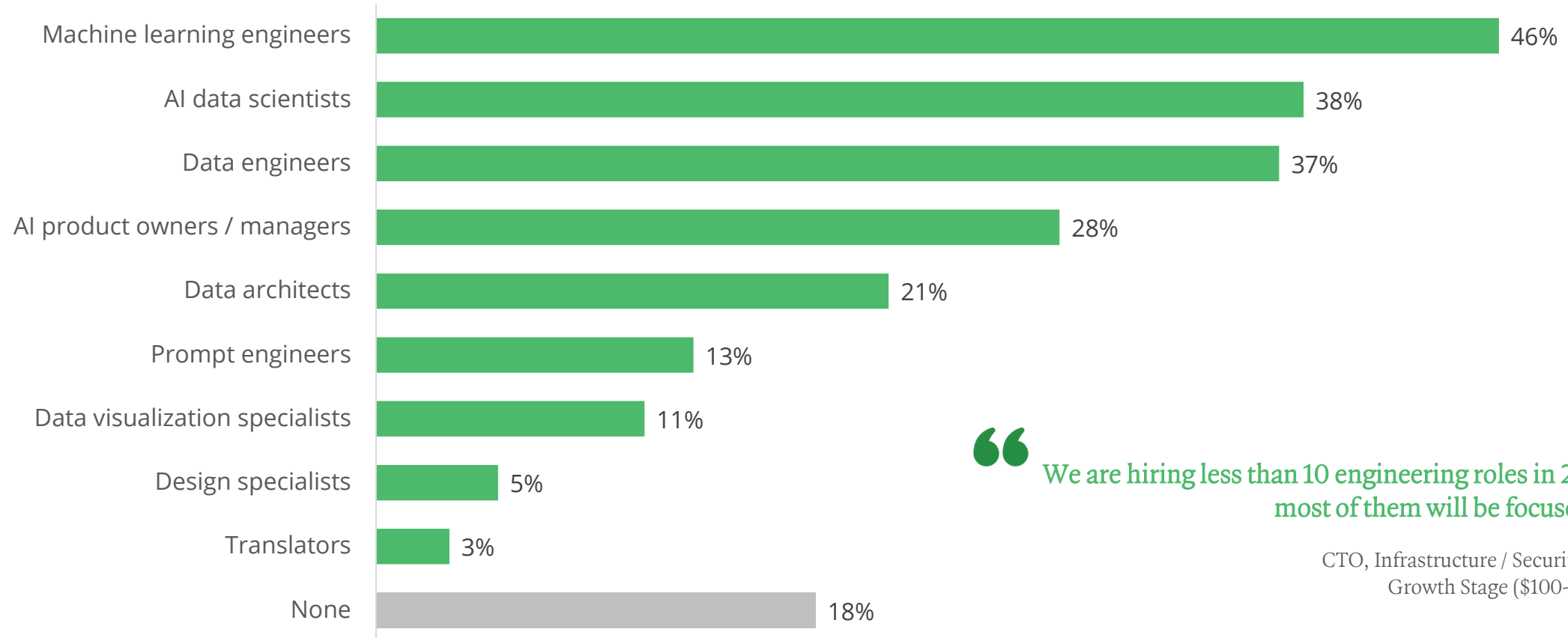### % of Respondents

Yes, within the next 2 months	45%	39%	36%	31%
Yes, in the next 3-6 months	18%	13%	25%	32%
Yes, in the next 7-12 months	13%	24%	19%	19%
Yes, in the next 13-24 months	8%	11%	8%	8%
Unsure	16%	11%	8%	10%
Never		3%	3%	
	<$25M	$25-$100M	$100-$250M	$250M+

2023 Revenue Range

Around 35-45% of respondents surveyed are planning to hire AI-related roles such as machine learning engineers, data scientists, and data engineers in 2024

Is your company hiring any of the below roles specifically related to AI in 2024?

% of Respondents

Role	%
Machine learning engineers	46%
AI data scientists	38%
Data engineers	37%
AI product owners / managers	28%
Data architects	21%
Prompt engineers	13%
Data visualization specialists	11%
Design specialists	5%
Translators	3%
None	18%

" We are hiring less than 10 engineering roles in 2024 and most of them will be focused on AI.

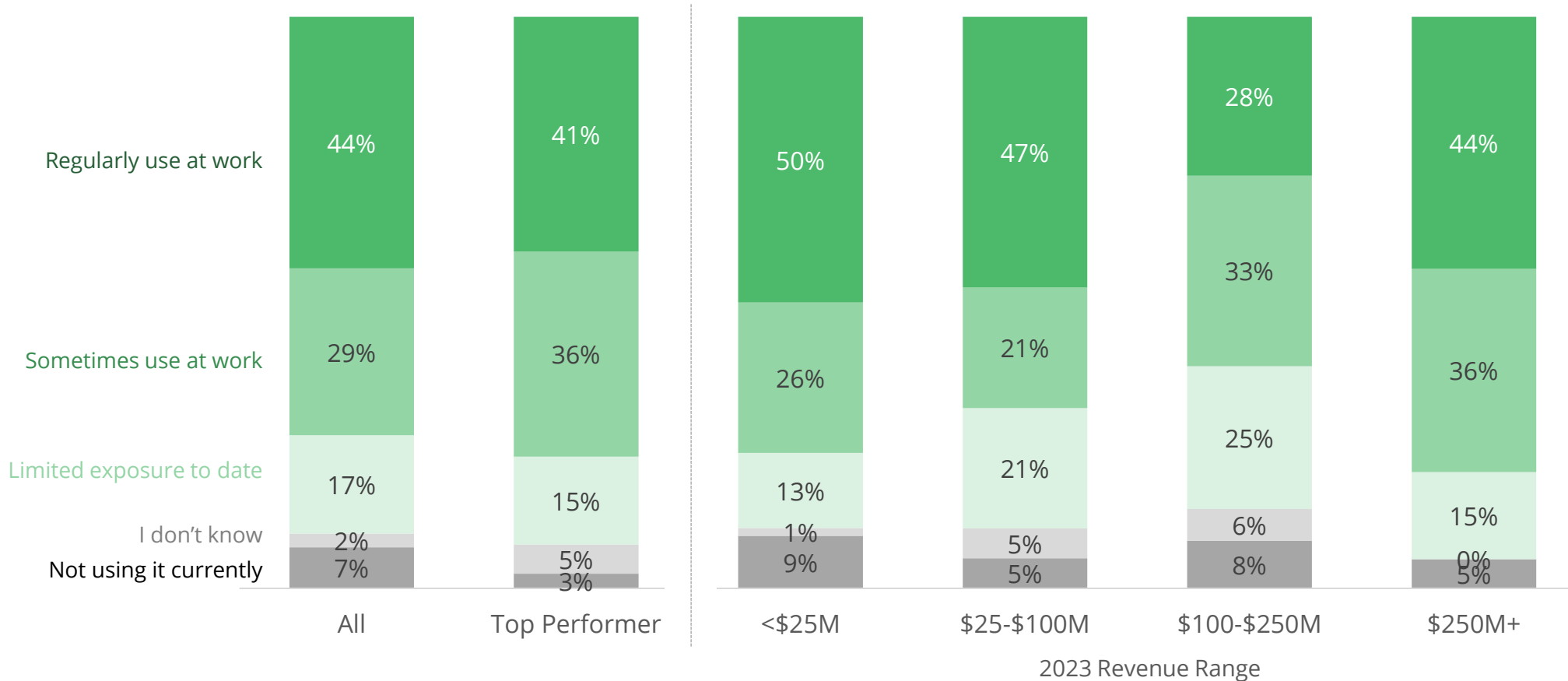CTO, Infrastructure / Security Company
Growth Stage ($100-300M ARR)

Leveraging AI Tools for Internal Productivity

Since building new AI products takes significant time and upfront investment, most companies are first experimenting with leveraging internal AI applications to boost productivity

How often is your company's teams using AI tools at work for internal productivity?

% of Respondents

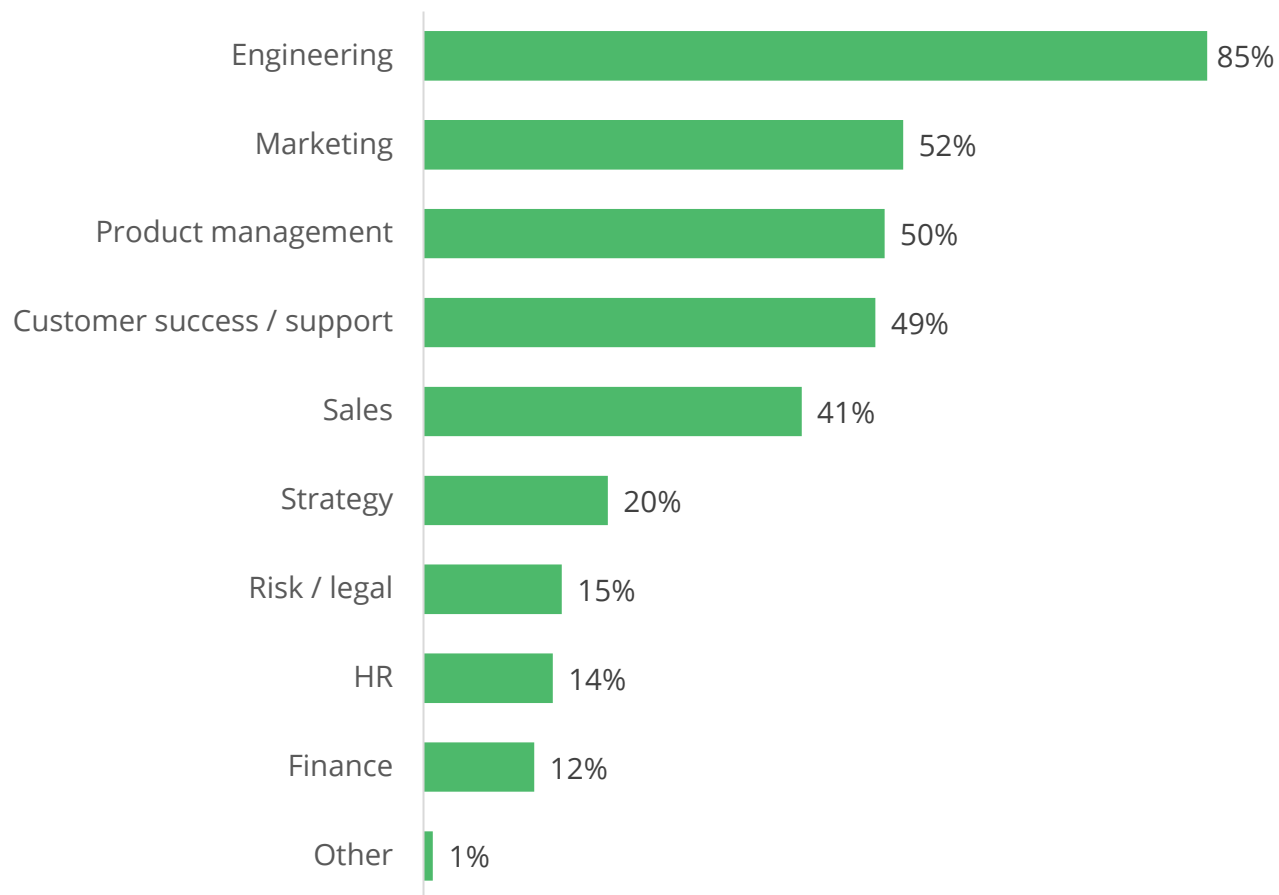| Category	All	Top Performer	<$25M	$25-$100M	$100-$250M	$250M+
Regularly use at work	44%	41%	50%	47%	28%	44%
Sometimes use at work	29%	36%	26%	21%	33%	36%
Limited exposure to date	17%	15%	13%	21%	25%	15%
I don't know	2%	5%	1%	5%	6%	0%
Not using it currently	7%	3%	9%	5%	8%	5%

2023 Revenue Range

Early-stage and late-stage companies seem to be adopting and using AI tools more frequently compared to companies in the growth-stage, likely due to varying reasons (easier path to adoption at early-stage companies and potentially more budget for experimentation at later-stage companies).

Top performing companies were also found to utilize AI tools more frequently than other companies.

The most common functions using AI for internal productivity include engineering, marketing, product management, and customer success / support

% of Respondents Using AI Tools in Function

Function	%
Engineering	85%
Marketing	52%
Product management	50%
Customer success / support	49%
Sales	41%
Strategy	20%
Risk / legal	15%
HR	14%
Finance	12%
Other	1%

Most Impactful Use Cases

Code generation, debugging, test case authoring, automated code reviews

Copywriting, marketing campaign / image creation, social media enablement, press releases

Documentation, shared knowledge base, creation of basic user flows

Chatbots for customer assistance, sentiment analysis, support escalation

Prospect identification, writing emails for SDR outreach, sales script generation, proposal creation

Document summarization, data analytics / extraction, meeting transcripts

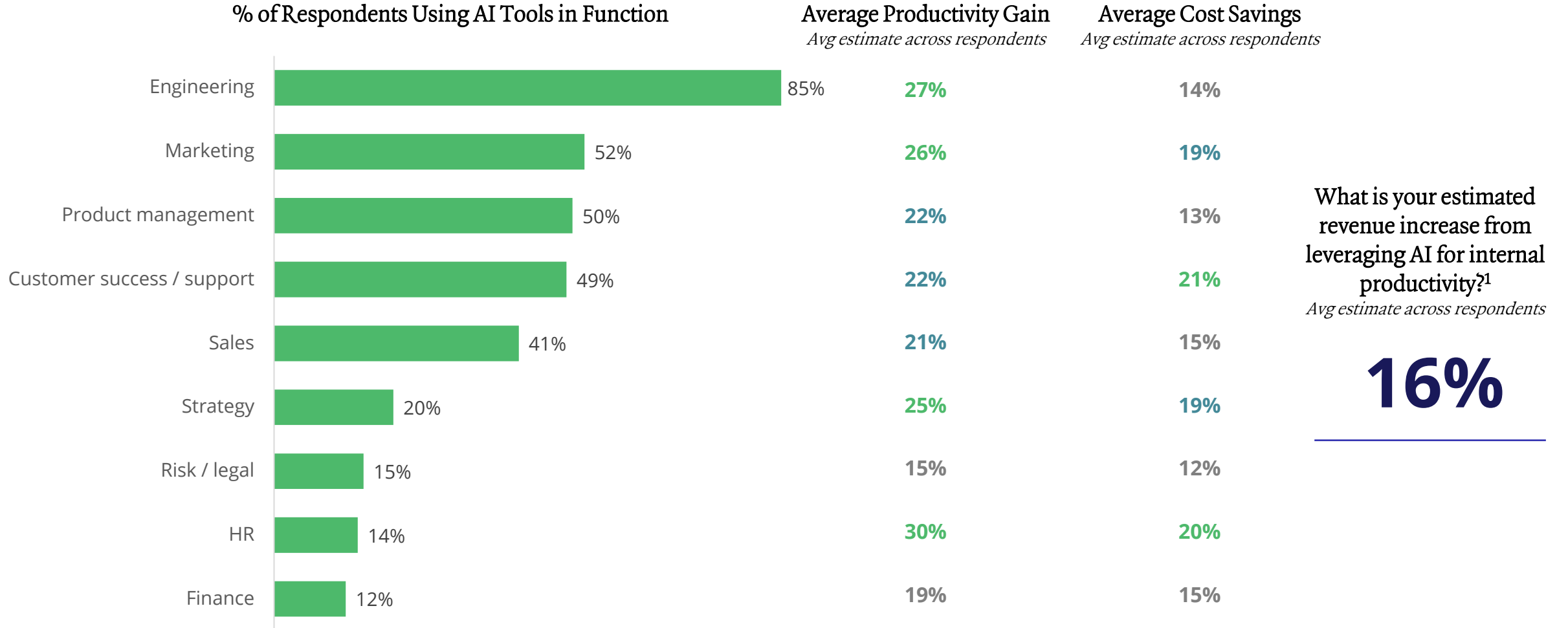Legal documentation, risk assessment

Learning / knowledge base solutions, hiring process enablement

Accounting / reconciliation

Translation, calendar management

Preliminary estimates of AI impact reveal notable productivity gains of 20-30%; notably, HR and customer success / support are seeing the greatest cost savings while finance and engineering are seeing the largest revenue increase

% of Respondents Using AI Tools in Function	Average Productivity Gain *Avg estimate across respondents*	Average Cost Savings *Avg estimate across respondents*
Engineering — 85%	27%	14%
Marketing — 52%	26%	19%
Product management — 50%	22%	13%
Customer success / support — 49%	22%	21%
Sales — 41%	21%	15%
Strategy — 20%	25%	19%
Risk / legal — 15%	15%	12%
HR — 14%	30%	20%
Finance — 12%	19%	15%

What is your estimated revenue increase from leveraging AI for internal productivity?[1]
Avg estimate across respondents

16%

ICONIQ | Growth

San Francisco | Palo Alto | New York | London

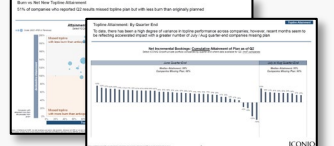**Join our community**

Technology matters. Strategy matters. People matter most.

Meet the ICONIQ Growth team

Other Research from ICONIQ Growth

The ICONIQ Growth analytics mission is to empower our portfolio and network with **proprietary insights that inform business operations and strategy**

SaaS Topline Growth & Operational Efficiency	• Our annual report on the data behind scaling a B2B SaaS business: we answer key questions on how these companies scale quickly and efficiently and explore what we believe to be early indicators of long-term success • *Data source: Quarterly financial and operating data from the ICONIQ Growth B2B SaaS portfolio*	
IPO Preparedness & Performance	• Our annual software, consumer, and healthcare IT IPO reports answer key questions across several major topics related to successfully planning for an executing an IPO • *Data source: Public filings for IPOs from 2013 to now*	
Go-to-Market Series	• Our annual report on the state of go-to-market, spanning topics across building go-to-market teams, compensation, and reporting best practices • *Data source: Proprietary survey of 200+ GTM executives*	
Engineering Efficiency	• Our annual report in collaboration with the ICONIQ Growth Technical Advisory Board on the data behind high-functioning engineering organizations • *Data source: Proprietary survey of ICONIQ Growth portfolio and broader network*	
*Quarterly Recaps	• Real-time insights into performance and attainment across top- and bottom-line forecasts, how key performance metrics have been impacted by the current market environment, and how companies are adjusting plan and strategy in response • *Data source: Quarterly attainment and budget data from and proprietary surveys of the ICONIQ Growth portfolio*	

Select research shown. We invite you to explore additional resources on our [ICONIQ Growth Insights page](.).
** These studies include proprietary information. Please reach out to [iconiqgrowthinsights@iconiqcapital.com](.) to request access.*

Other Research from
ICONIQ Growth
Leadership Analytics

Executive hiring is the final frontier within the modern organization that is yet to see a proliferation of data. Despite having data to guide nearly every other business decision, CEOs and Founders have heretofore been forced to rely on anecdotal evidence. ICONIQ Growth Leadership Analytics helps de-risk hiring decisions by empowering CEOs and Founders with executive hiring data: we study every leadership hire between founding and IPO at high-caliber SaaS companies to create a series of first-of-their-kind playbooks that help guide decision-making across the entire company lifecycle.

➤ **Chief Marketing Officer Study:**
Part 1 & Part 2

- Quantitative analysis of the most prevalent – and most successful – operational backgrounds and qualifications for Heads of Marketing at private SaaS companies, segmented by Growth Stage
- *Data source: Proprietary dataset of >200 marketing leaders at 63 SaaS companies*
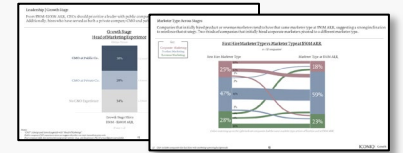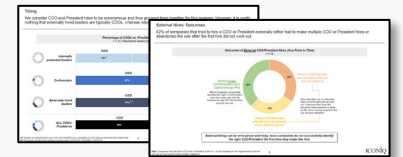

Chief Revenue Officer Study:
Part 1 & Part 2

- Quantitative analysis of the most prevalent – and most successful – operational backgrounds and qualifications for Heads of Sales/CROs at private SaaS companies, segmented by Growth Stage
- *Data source: Proprietary dataset of >180 sales leaders at 72 companies*

*President & Chief Operating Officer Study

- Examination of the advantages and challenges of having a COO and/or President role
- *Data source: Proprietary dataset of every past and current COO/President at 61 SaaS companies*

Chief Financial Officer Study

- Quantitative analysis of the most prevalent – and most successful – operational backgrounds and qualifications for Heads of Finance at private SaaS companies, segmented by Growth Stage
- *Data source: Proprietary dataset of >170 finance leaders at 72 companies*

Chief People Officer Study

- Quantitative analysis of the most prevalent – and most successful – operational backgrounds and qualifications for Heads of People at private SaaS companies, segmented by Growth Stage
- *Data source: Proprietary datasets of >100 people leaders at 59 companies; 2021 Cloud 100 People leaders*

Select research shown. We invite you to explore additional resources on our ICONIQ Growth Insights page.
*Please reach out to iconiqgrowthinsights@iconiqcapital.com to request access.

A global portfolio of category-defining businesses

These companies represent the full list of companies that ICONIQ Growth has invested in since inception through ICONIQ Strategic Partners funds as of the date these materials were published (except those subject to confidentiality obligations). Trademarks are the property of their respective owners. None of the companies illustrated have endorsed or recommended the services of ICONIQ.

Disclosures

Unless otherwise indicated, the views expressed in this presentation are those of ICONIQ growth ("ICONIQ" or the "Firm"), are the result of proprietary research, may be subjective, and may not be relied upon in making an investment decision. Information used in this presentation was obtained from numerous sources. Certain of these companies are portfolio companies of ICONIQ Growth. ICONIQ Growth does not make any representations or warranties as to the accuracy of the information obtained from these sources.

This presentation is for educational purposes only and does not constitute investment advice or an offer to sell or a solicitation of an offer to buy any securities which will only be made pursuant to definitive offering documents and subscription agreements, including, without limitation, any investment fund or investment product referenced herein.

Any reproduction or distribution of this presentation in whole or in part, or the disclosure of any of its contents, without the prior consent of ICONIQ, is prohibited.

This presentation may contain forward-looking statements based on current plans, estimates and projections. The recipient of this presentation ("you") are cautioned that a number of important factors could cause actual results or outcomes to differ materially from those expressed in, or implied by, the forward-looking statements. The numbers, figures and case studies included in this presentation have been included for purposes of illustration only, and no assurance can be given that the actual results of ICONIQ or any of its partners and affiliates will correspond with the results contemplated in the presentation. No information is contained herein with respect to conflicts of interest, which may be significant. The portfolio companies and other parties mentioned herein may reflect a selective list of the prior investments made by ICONIQ.

Certain of the economic and market information contained herein may have been obtained from published sources and/or prepared by other parties. While such sources are believed to be reliable, none of ICONIQ or any of its affiliates and partners, employees and representatives assume any responsibility for the accuracy of such information.

All of the information in the presentation is presented as of the date made available to you (except as otherwise specified),and is subject to change without notice, and may not be current or may have changed (possibly materially) between the date made available to you and the date actually received or reviewed by you. ICONIQ assumes no obligation to update or otherwise revise any information, projections, forecasts or estimates contained in the presentation, including any revisions to reflect changes in economic or market conditions or other circumstances arising after the date the items were made available to you or to reflect the occurrence of unanticipated events. Numbers or amounts herein may increase or decrease as a result of currency fluctuations.

For avoidance of doubt, ICONIQ is not acting as an adviser or fiduciary in any respect in connection with providing this presentation and no relationship shall arise between you and ICONIQ as a result of this presentation being made available to you.

ICONIQ is a diversified financial services firm and has direct client relationships with persons that may become limited partners of ICONIQ funds. Notwithstanding that a person may be referred to herein as a "client" of the firm, no limited partner of any fund will, in its capacity as such, be a client of ICONIQ. There can be no assurance that the investments made by any ICONIQ fund will be profitable or will equal the performance of prior investments made by persons described in this presentation.

These materials are provided for general information and discussion purposes only and may not be relied upon.

This material may be distributed to, or directed at, only the following persons: (i) persons who have professional experience in matters relating to investments falling within article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (the "FP Order"), (ii) high-net-worth entities falling within Article 49(2) of the FP Order, and (iii) any other persons to whom it may otherwise lawfully be communicated (all such persons together being referred to as "FPO Relevant Persons"). Persons who are not FPO Relevant Persons must not act on or rely on this material or any of its contents. Any investment or investment activity to which this material relates is available only to FPO Relevant Persons and will be engaged in only with FPO Relevant Persons. Recipients must not distribute, publish, reproduce, or disclose this material, in whole or in part, to any other person.