

ICONIQ ANALYTICS & INSIGHTS *Engineering Efficiency November 2021*





ICONIQ Capital, LLC

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Executive Summary

Health

Pages 17 - 19

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1 R&D Spend Pages 4 - 7		 Software companies tend to make aggressive investments in R&D in the early stages of growth, with R&D spend on average being ~130% of revenue As companies scale, they are able to get increasing leverage out of R&D OpEx: after achieving ~\$100M in revenue, most companies tend to spend closer to 30% of their annual top-line on R&D On average, 75-80% of a company's R&D spend goes toward headcount, 10% towards infrastructure, and the remainder towards security and other non-people investments
2 Developer Productivity Pages 8 - 11		 As an engineering organization grows, companies must tackle different phases of questions and challenges related to investments in both time and people; it's critical to have a framework in place that allows the company to discuss and prioritize engineering capacity On average, organizations allocate around 60% of engineering capacity to building out new capabilities, with the remainder split across quality improvements, internal productivity, and keeping the lights on Top efficiency metrics tracked by surveyed companies include service uptime, # incidents, # critical defects, PR to release time, % of code delivered vs. committed, among many others
3 Engineering Teams Pages 12 - 16	<section-header><section-header><text><text><text><text></text></text></text></text></section-header></section-header>	 Most software companies tend to have their developer teams organized by product teams (e.g., teams based on a product or persona), with average engineering team size ranging from 5-8 FTEs We also see some companies structure their engineering teams through a matrix model, by technical expertise, or some combination of product and technology Engineering team makeup tends to shift toward more back-end and full-stack engineers as companies scale
4 Organization	Oppraties hardte Stellung Okaway Image: Control of the stellung of the	 Software companies have historically struggled with diversity on their engineering teams. Today, surveyed teams are made up of ~20% women

 Average engineering employee tenure is around 2 years, with most companies seeing average annual attrition for engineering teams of ~10%

• Most companies start tracking developer job satisfaction after reaching \$50M in revenue

Methodology

The following study is based on quantitative surveys from select companies in the ICONIQ Growth portfolio and qualitative perspectives from our Technical Advisory Board

METHODOLOGY AND RESPONDENT MAKE-UP **PARTICIPATING COMPANIES** braze Calendly chime cyber Calendly Chime Proprietary survey of CTOs, CFOs, and Heads of Engineering at ICONIQ Growth portfolio companies conducted in September 2021 data <u>FREEWILL</u> GitLab HashiCorp Perspectives from the ICONIQ Growth Technical Advisory Board *** loom** 📿 highradius 👘 () HIGHSPOT Lucid Moveworks OrCO Restaurant 365 Anantha Kancherla Aditya Agarwal Matt Eccleston Former CTO at Dropbox Former VP Growth at Head of AI Infrastructure at Facebook (Lyft, Dropbox) (Cove, Facebook) Dropbox (VMware) sendbird ServiceTitan Relativity SPOTINIANIA @truckstop 🔰 UNITE US (V) virtru

R&D Spend: % of Top-Line

Software companies tend to invest significantly in R&D in the early stages of growth; after reaching around \$100M in revenue, most companies tend to spend ~30% of their top-line on R&D investments



1 Please note benchmarks on this page are higher than the ones in our 2021 Growth & Efficiency report since the datapoints in our prior report are quarterly averages up to 1Q21, whereas the ones provided here are 2021 year-end estimates

R&D Spend: Headcount as % of Total

R&D headcount tends to make up around 30% of total organization, with slight spikes in the earlier and later stages of company growth

R&D Headcount as % of Total

1

Select Respondents, n=22

What is your approximate technology / engineering organization and total organization (full company) headcount?



R&D Spend: Categories

On average, companies spend around 75-80% of R&D spend on headcount, around 10% on infrastructure and the remainder on security and other non-people investments



R&D Spend: Implied Spend Per R&D FTE

Survey respondents under \$200M revenue spent around \$168-\$200K on R&D per FTE, whereas later-stage companies post \$200M revenue spent up to \$277K per FTE

Implied R&D Spend per R&D FTE

Select Respondents, n=22

Please note the small sample size in the \$200M+ revenue bucket here which is primarily driven by product-led companies who tend to invest more in R&D. We typically would expect to see R&D spend per FTE decline as companies grow in scale. For additional benchmarks on this topic, please reference our annual Top-Line Growth & Operational Efficiency report.



Developer Productivity: Capacity Allocation

Engineering organizations should allocate and prioritize capacity using a standard framework that makes sense for both engineering and the rest of the business

As an engineering organization grows, different types of questions and challenges start to emerge around the investments in time and people your organization is making.

It's critical to have a framework in place that allows the company to talk about and prioritize engineering investments in a way that makes sense for engineering internally and is also understandable for the rest of the business. We recommend the below framework to categorize and track engineering investment.

EEP THE LIGHTS ON (KTLO)	ELECTIVE INVESTMENTS	New Capabilities		
is is defined as the minimum tasks required maintain the current level of service in the es of our customers	 New Capabilities Adding a new product Adding a new feature or sub-feature 			
or example: Maintaining current security posture Maintaining current levels of service uptime Service and ticket monitoring & roubleshooting Addressing functional defects reported by customers Regular/routine internal procedures Staying up to date with external dependencies	 Supporting a new platform or partner application Quality Improvements Customer requested improvements Better performance / utilization Iterations to improve adoption, retention, and quality Improved product reliability or security Internal Productivity Better developer tooling Testing automation Code restructuring 	Keep the Improveme Lights On ¹ Internal Productivity		
Browsers, libraries, platforms, web services, partner changes, hardware, etc.	 Work to reduce size of KTLO bucket in the future 	You can read more about our engineering framework		

1 Keep the Lights On activities should be viewed as in addition to the rest of development activities - hence why the % capacity is incremental to the 100% sum of internal productivity, quality improvements, and new capabilities

Developer Productivity: Capacity Allocation

On average, organizations allocate around 60% of engineering capacity to building new capabilities, with the remainder split across quality improvements, internal productivity, and keeping the lights on activities



Engineering Capacity Select Respondents, n=16

Approximately what % of your engineering capacity is spent on the below categories?

1 Keep the Lights On activities should be viewed as in addition to the rest of development activities – hence why the % capacity is incremental to the 100% sum of internal productivity, quality improvements, and new capabilities

Developer Productivity: Overview

Just as sales teams measure quotas and ramp time, it is important for the engineering organization to measure developer productivity



BEST PRACTICES

- Developer productivity can be compared to a sales funnel, with key **metrics that can be tracked at each stage**
- While specific KPIs will vary across companies, metrics that allow management to understand and track revenue / FTE cost, release time, and developer velocity on a trended basis will be critical
- Start by **picking 3 metrics** that are most relevant and critical for your teams
- Rather than tracking every single metric,
 it's most important to start building the
 muscle of reporting and improving on
 these metrics over time

Developer Productivity: Key Metrics

Top efficiency metrics tracked by surveyed companies include service uptime, # incidents, # critical defects, PR to release time, % of code delivered vs. committed, among many others

Developer Productivity

Select Respondents. n=16 What are the main metrics you look at to track developer productivity and performance? Please rank in terms of importance. % of Respondents Average Score, **Top Efficiency Metrics** Tracking where tracked (1 = Most Important) 2.5 82% **Service uptime** Other metrics mentioned include: 76% 4.2 *#* incidents / outages 2 % customer defect escalations ٠ Latency • 71% 5.7 # critical defects 3 Response time • System performance metrics • 71% 4.0 PR to release time MR (merge request) rate • Ratio of KTLO tasks • % of code delivered vs. committed 65% 4.9 5 CodeClimate's "Impact" score ٠ (estimated difficulty of change to % code coverage 53% 4.2 6 code base) % of roadmap / committed Number of Sev-1 customer tickets • 41% 3.9 development work shipped on time Roadmap / Release date slips ٠ Time from review request to merge 5.8 8 24%

Engineering Teams: Structure

Engineering teams are typically organized by technology, product, some hybrid of both, or in a matrix model



Engineering Teams: Structure

The majority of software companies tend to have their engineering teams structured by product, with average team size ranging from 5-8 FTEs

Engineering Teams: Structure

Select Respondents, n=20

How are your engineering teams structured? What is your average engineering team size (# FTEs)?



2 The opinions expressed on this page solely represent the views of the respective respondents and are not necessarily the views of ICONIQ Growth 14

Engineering Teams: Key Ratios

On average, we see ~6 engineers per manager, ~9 engineers per product manager, and ~11 engineers per QA



These ratios remain relatively consistent regardless of company scale. However, significantly later stage companies with revenue above \$300M will tend to see a higher ratio of engineers to roles across product management, design, and QA

Engineering Teams: Headcount

Engineering headcount naturally increases as companies scale, with engineering IC and manager roles driving most of the headcount growth for organizations

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	Engineer (IC)	Architect	Product Manager	Quality Assurance	Design	Manager / Leadership	Other	Avg Total Engineering FTF	Avg Total Organization FTF	
Revenue Range										Organizational Make-Up
Less than \$50M	45-50	0-5	5-10	5-10	0-5	5-10	5-10	~70	~170	
\$50 - \$100M	75-80	0-5	15-20	10-15	10-15	15-20	15-20	~150	~550	
\$100 - \$200M	160-165	5-10	25-30	45-50	5-10	35-40	30-35	~300	~1000	
\$200M+	280-285	15-20	40-45	25-30	30-35	55-60	30-35	~420	~1400	

Engineering Teams: Split by Developer Expertise

Engineering team makeup tends to shift towards having more back-end and full-stack engineers as companies scale, perhaps due to the increased requirements around scalability and reliability as companies expand



Organization Health: Employee Diversity

Software companies have historically struggled with engineering diversity; today, companies surveyed on average have 20% of their teams made up of women

Organization Health: Employee Diversity

Select Respondents, n=19

Approximately what % of your engineering team are women?

Across the participating companies in this study, teams reported somewhere between **10-50% diversity among their engineers**; however, this number includes Asian and South Asian engineers.

Based on industry averages from the <u>Bureau of Labor</u> <u>Statistics</u>, we typically see **BIPOC engineers making up around 10-20% of the population**.

Diverse leadership attracts diverse talent; respondents with a diverse Founder / CEO were also found to have a **significantly greater percentage of BIPOC employees**.

There was not a significant impact on the % of women (but that is likely because most diverse Founder / CEOs are predominantly male). Executive team diversity did not have a notable impact on the % of women or BIPOC employees.

Average % Women in Engineering Team

Organization Health: Employee Tenure and Attrition

Average engineering employee tenure is around 2 years, with most companies seeing average annual attrition around 10%

Organization Health: Developer Job Satisfaction

Most companies start tracking developer job satisfaction after reaching \$50M in revenue through either custom employee surveys or Culture Amp surveys

The opinions expressed on this page solely represent the views of the respective speakers and are not necessarily the views of ICONIQ Growth or the participating companies shown on slide 3

The Developer Technology Stack Study

A joint study with our Technical Advisory Board on the developer stack ecosystem and decision-making process, with a particular focus on the tools being used by companies at different stages of scale

ICONIQ's Guide to Engineering Reporting

Our guide to engineering reporting best practices, including key frameworks, metrics, and the key topics engineering teams should be discussing in planning sessions or Board reporting

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ICONIQ GROWTH ANALYTICS

Seeking to empower our portfolio with proprietary analytics and insights across business operations and strategy

In-Depth Studies on High-Impact Topics

Comprehensive topical reports featuring proprietary insights and thought-leadership; leveraging rich portfolio and publicly available data to form an evolving, consolidated view of 'best-in-class' performance

Bespoke Analytics & Benchmarking

Ad-hoc analytics to address critical questions; benchmarking on key topics across companies varying in scale, growth and product type

Advisory

Cohesive advisory anchored in objective data-driven work

Topline Growth & **Operational Efficiency**

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COVID-19 Impact Series: Quarterly Attainment Q1, Q2, Q3, Q4, 2021 Budgeting

Recent Studies

IPO Preparedness.

Structure, Process

GTM Organization

Structure

Select Proprietary Companion Tools

The Developer Technology Stack

GTM Compensation & Incentives

Growth & Operational Efficiency Dashboard

GTM Compensation Benchmarking Dashboard

Currently only available to portfolio companies reach out to ICONIQ Growth Analytics for access

TECHNICAL ADVISORY BOARD MEMBERS

PROVIDING DEEP TECHNICAL EXPERTISE TO PORTFOLIO AND PARTNERS

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