Is Your CTO Obsolete?
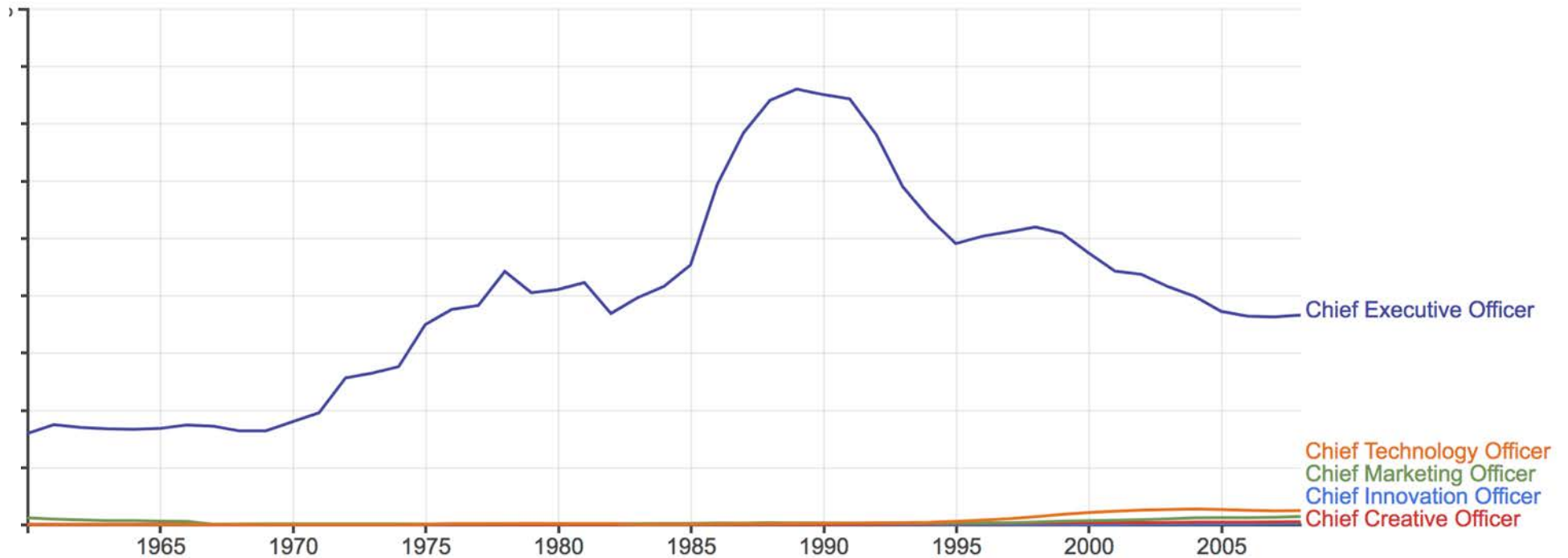## Findings from the MIT CTO Study

| CEO | CFO | CTO | CMO |

Dr. Bruce Cameron

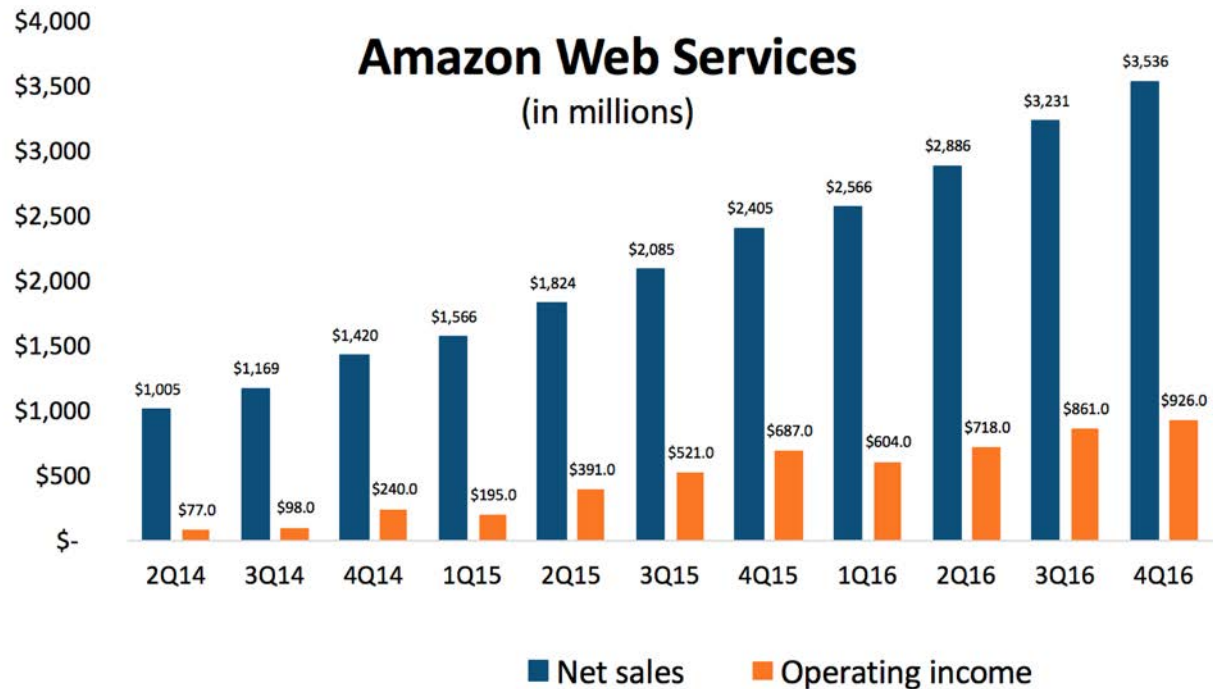Director, System Architecture Lab

With Thanks to Jean-Michel Prouillet Leplat

CIO, CCO, CMO, CTO : Alphabet Soup?

Data : Google ngrams corpus of books

Unicorn Valuations

DATE OF $1B+ VALUATION

Source: CBInsights

What is the CTO's Contribution?

Amazon Web Services (in millions) — Net sales and Operating income, 2Q14 through 4Q16

Werner Vogels — CTO (2005-)

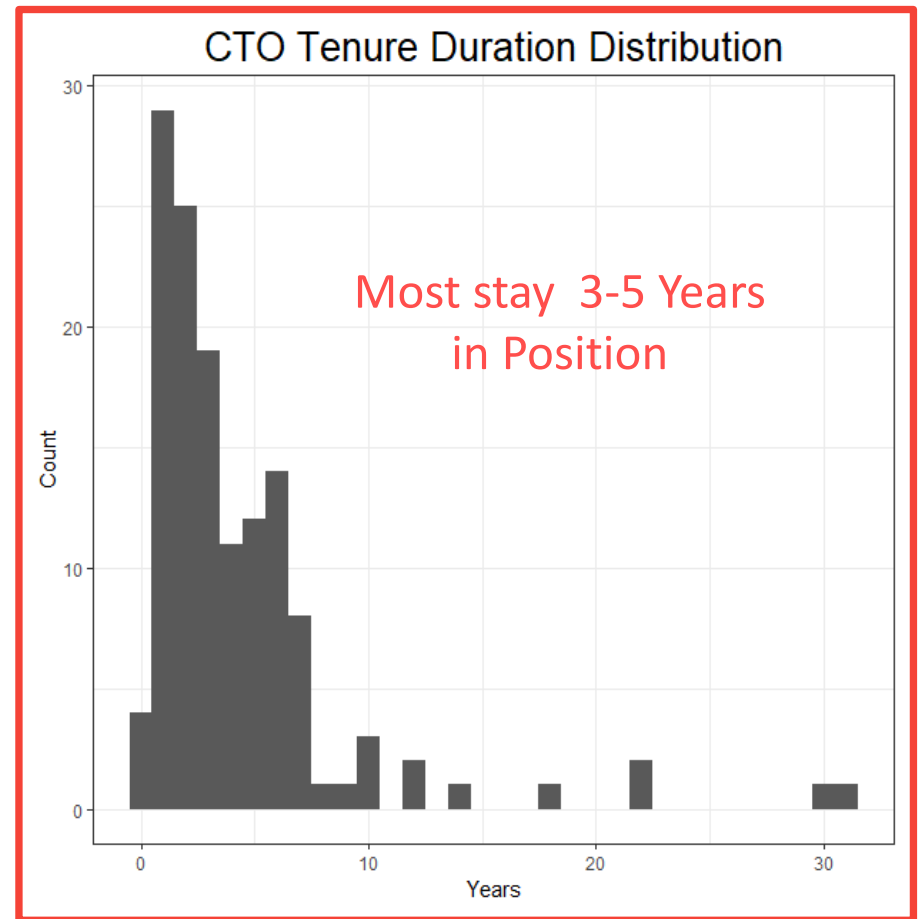Andy Jassy — Founder, CEO (2003-)
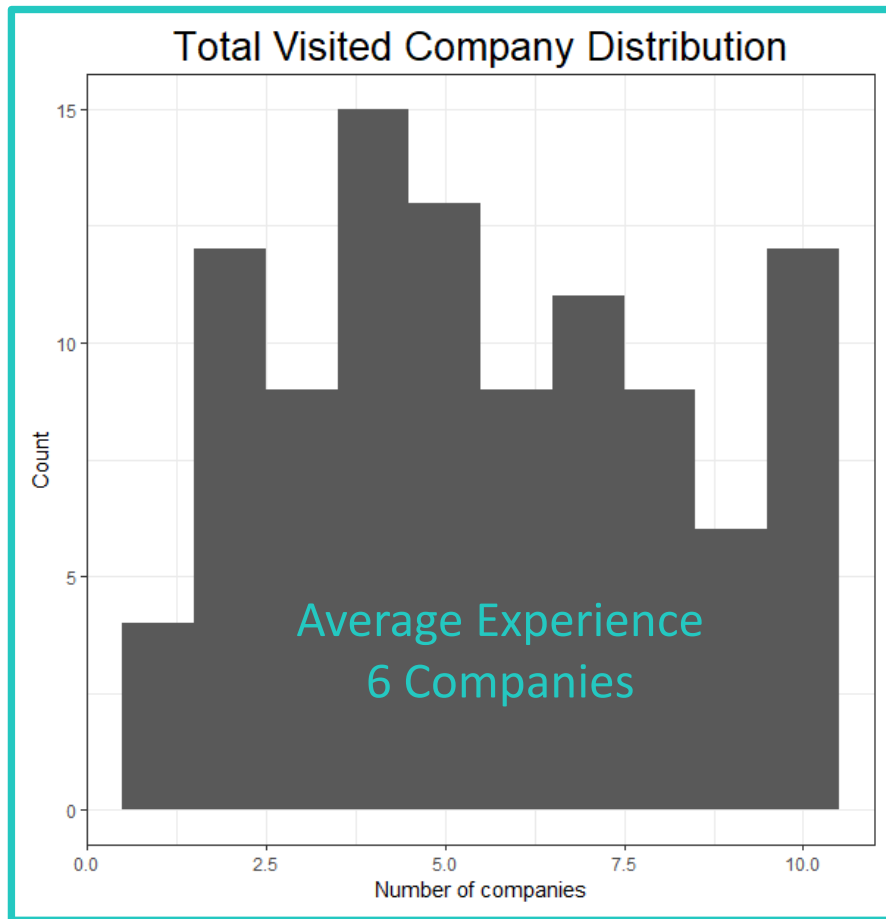
Are CTOs likely to be stale?

14,000 people
3.2B in revenue (2016)

Armistead Sapp
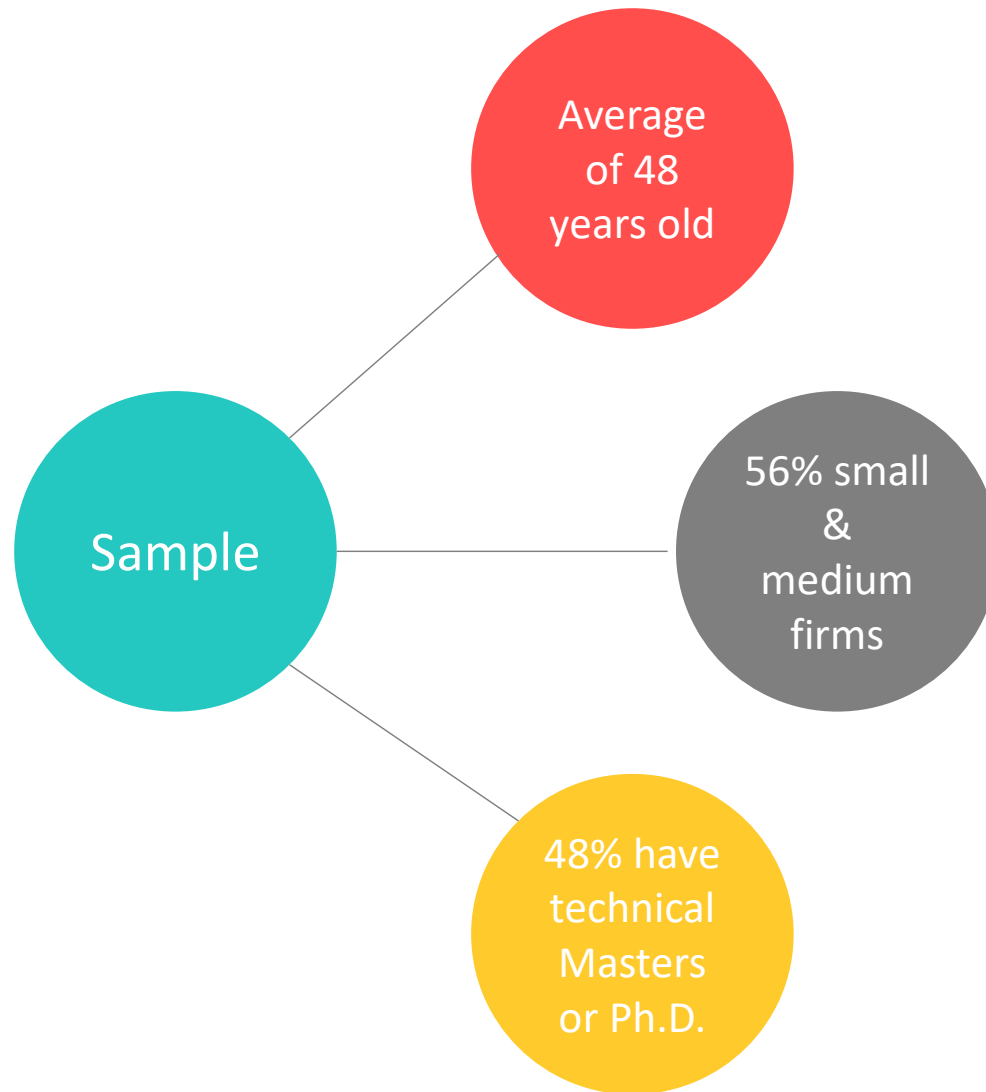SAS CTO & EVP
1989-2016

Are CTOs likely to be stale?
Sample of 100 suggest CTOs are not "lifers"

Total Visited Company Distribution

Average Experience
6 Companies

CTO Tenure Duration Distribution

Most stay 3-5 Years
in Position

Sample: 100 CTOs on Linkedin

Average of 48 years old

Sample

56% small & medium firms

48% have technical Masters or Ph.D.

Chemistry, Hi-tech, Internet, Finance, Banking, Aero, Oil, Telecom, Automobile, Education, Transport, Robotics, Logistics, Utilities, Consulting, Hospitality, Pharmaceutical, Apparel, Food, Consumer Goods, Retail, Media.

CTO Models

Coordination: coordination across business units.

Representation: participation in industry groups, conferences, panels.

Innovation: monitoring technological innovations capable to impact positively or negatively the firm.

CD/PR: participation in corporate development, and public relations for product launch or recalls.

Culture: establishing an engineering culture.

Dr. Greg Hyslop, Boeing CTO, 2016-

Bobby Murphy, Snap CTO, 2016-
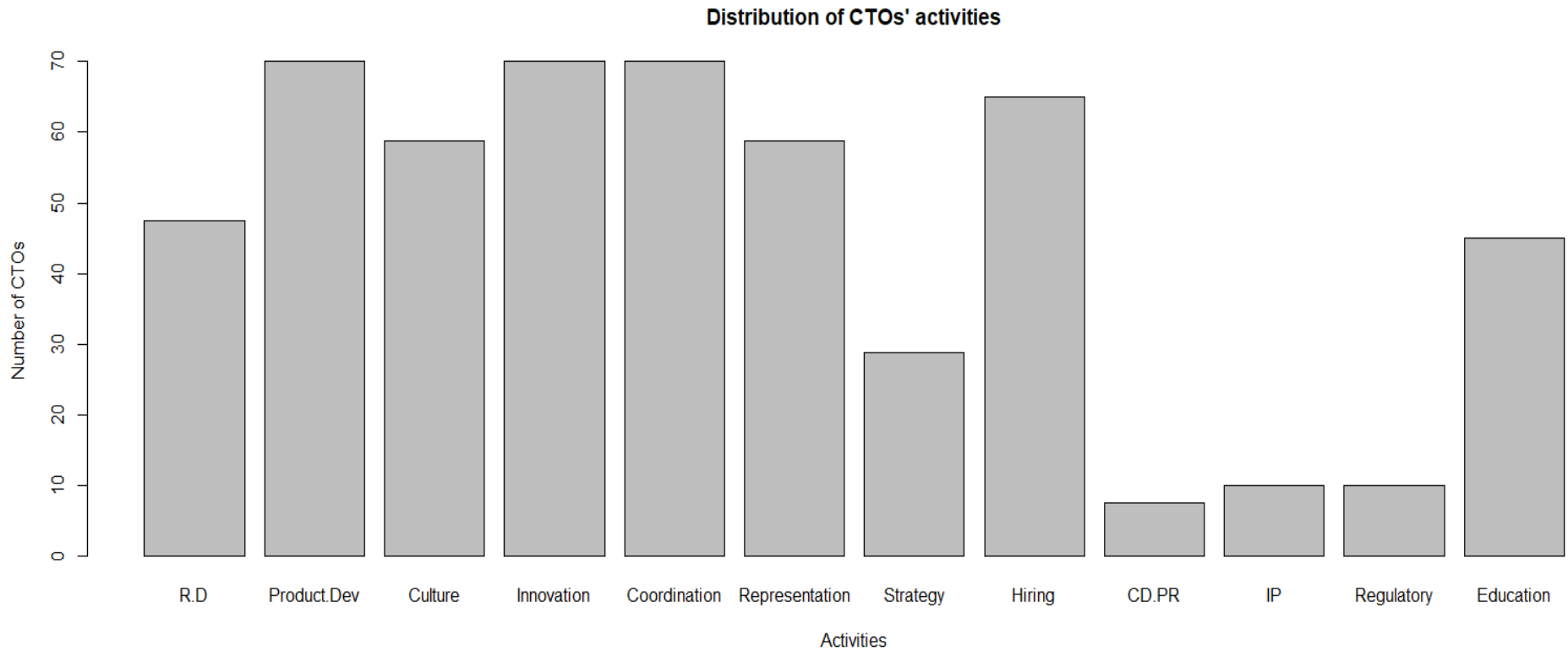
How do CTOs Fill Their Time?

Internal responsibilities :

s.

opment.

s.

Brid

industry groups,

partnerships or
strategy.

development, and
or recalls.

municating with IP

compliancy, driving the

or partners

Where do early stage CTOs spend their time?
Sample of 20 MIT alumni, skewed to early stage companies

Distribution of CTOs' activities

Internal

External

CTO Models

Coordination: coordination across business units.

Representation: participation in industry groups, conferences, panels.

Innovation: monitoring technological innovations capable to impact positively or negatively the firm.

CD/PR: participation in corporate development, and public relations for product launch or recalls.

Culture: establishing an engineering culture.

Dr. Greg Hyslop, Boeing CTO, 2016-

Bobby Murphy, Snap CTO, 2016-

Potential CTO Models

The Anchor

The Coordinator

The Evangelist

The Visionary

The Strategist

Thanks to Neuevector

Potential CTO Models

John Apostolopoulos – Cisco CTO

Greg Hyslop, Boeing

Werner Vogels – AWS CTO

Yoky Matsuoka, Nest CTO

Brad Peterson –Nasdaq CTO

The Anchor: Anchoring the product development organization. Manages product portfolio and steers the strategy for R&D to support company growth in cost friendly way. Engaged in day-to-day business of developing products.

The Coordinator: In charge of rationalizing approaches across the firm, bringing technology from one division to another, serving as the interface between the CEO and the technology organization.

The Evangelist: A public persona. Grows the company's revenue indirectly by leading industry change with partner firms / industry groups.

The Visionary: Anticipates future changes in technology that could have a substantial impact on the firm. Part researcher and part futurist.

The Strategist: Takes corporate strategy and technology forecasts as inputs, and sets which markets the firm will enter, and plays a role in sourcing or evaluating M&A opportunities from synergy perspective

Interactions with other roles

Most likely second title: Co-Founder

VP of Engineering

VP of Product

VP of R&D

40% of CTOs had a second title

CTO

VP of Marketing

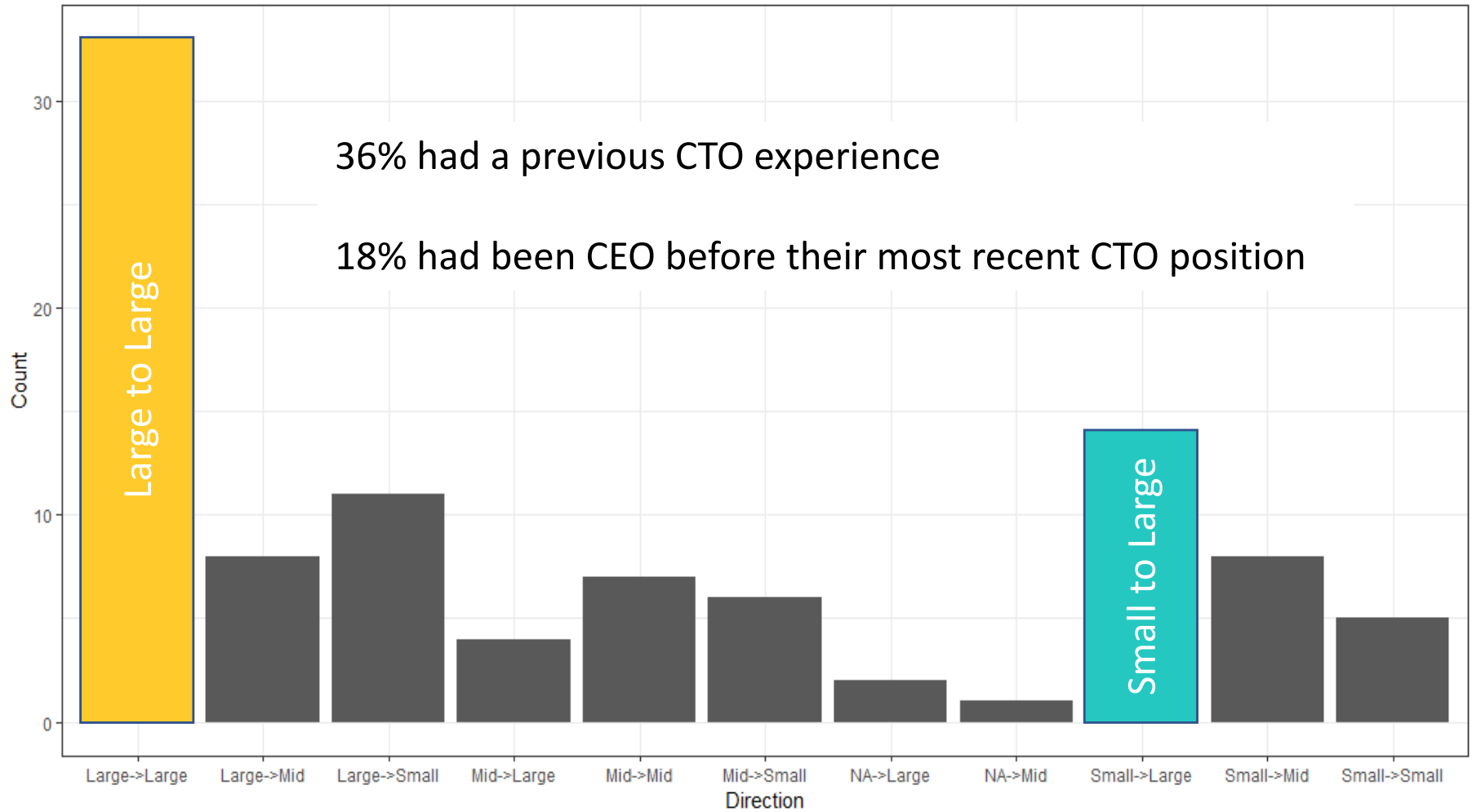VP of Strategy

CTO Career Trajectory?

"Paul is a transformative leader with deep experience in aerospace and commercial technologies, and a record of disruptive innovation."

- Greg Hayes, Chairman UTC

CTO Career Trajectory?

Career Direction : First Company to Last Company

36% had a previous CTO experience

18% had been CEO before their most recent CTO position

What makes an effective CTO?

- CTO skills are strong fit to company mission
  - *"My responsibilities evolved with the growth of the company. Now, I manage and delegate to managers, reviewing the technology work and setting the milestones."*

    - CTO from growing Software startup

- Communications and mediation ability cut across all five personas.
  - *"There is a friction between short-term and long-term [technology] strategy. It's up to the CTO to build the bridge to inform the CEO decisions."*

    - CTO from a large Hardware/Software corporation

- Willingness to take concentrated bets, where appropriate

Is technology really a source of competitive advantage your firm?

FAANG-tastic

Share prices, January 1st 2015=100

FAANG (Facebook, Amazon, Apple, Netflix and Google)

S&P 500

S&P 500 excluding FAANG

250
200
150
100
50

2015   16   17   18

Source: Thomson Reuters

Economist.com

Is Your CTO Obsolete?

- Is technology a source of significant competitive advantage for your firm?

- What functions do you want to accomplish with the role?

- How are you growing talent for your technology, regardless of the CTO title?