GP. Bullhound

Dealmakers in Technology
CONTENTS

04 THE VIEW FROM GP BULLHOUND
    Per Roman & Alec Dafferner, GP Bullhound

06 RECAP OF GP BULLHOUND'S 2017 PREDICTIONS

08 TECHNOLOGY PREDICTIONS 2018

10 TREND 1: AN UNEASY FUTURE FOR POLITICS AND TECHNOLOGY

12 TREND 2: CYBER SECURITY - EXPOSURE AND ADOPTION

14 EXPERT VIEW
    Ben Brabyn, Level39

16 TREND 3: MOBILE TRUMPS TV IN CHINA

18 TREND 4: TRANSLATION TECHNOLOGY TAKES HOLD

20 TREND 5: OVER AND OUT, EMAIL

22 TREND 6: INTERNATIONAL LABOR ARBITRAGE FLOURISHES

24 EXPERT VIEW
    Utpal Bhatt, Neo4j

26 TREND 7: THE UNLIKELY COMEBACK OF THE SOFTWARE SUITE

28 TREND 8: INDUSTRY 4.0

30 EXPERT VIEW
    Aidan Quilligan, Accenture

32 TREND 9: REGULATORS RULE ON BOOM AND BUST OF ICOs

34 TREND 10: AUGMENTED REALITY ADAPTS FOR EARLY ADOPTION

36 EXPERT VIEW
    Martin Herdina, Wikitude

38 METHODOLOGY
Some commentators have argued that the technology industry’s vision of optimism and openness has turned to anxiety and antagonism. From the world’s largest technology companies through to the latest generation of innovators, the role and responsibility of the digital economy has increasingly come under scrutiny in the past year.

And yet, the opinion of our leading team of analysts and dealmakers is clear: technology will continue to break down barriers in 2018. Advances in the ability of computers to recognize, comprehend and translate any language mean that we stand on the brink of universal understanding. We believe these advances will see one billion people use technology for translation in 2018, bringing us closer to a fundamental shift in human-to-human communication globally.

The rise of workplace messaging platforms such as Slack and Messenger are also radically transforming the way we communicate. In fact, we believe that the efficiency and simplicity of these platforms will mean that 2018 will be the first ever year where we see a decline in the total number of emails sent in the US.

Meanwhile, augmented reality’s ability to break down the barrier between the physical and the digital will increasingly transform the way we interact with the world around us. The rise of AR platforms from Google and Apple will see vast user adoption of the technology in 2018.

At GP Bullhound, we are a champion of technology entrepreneurs. It is our belief that a mission to create world-leading companies provides tomorrow’s economy with the energy and purpose to address fundamental social, industrial, and commercial challenges. It is this positive take on the potential of technology that first inspired us to create our annual Technology Predictions report. In its eleventh edition, this year’s report is no less optimistic.
In 2018 smart technologies and digital transformation take hold also in manufacturing and the industrial sector. Smart factories are projected to lead to a sevenfold increase in overall productivity by 2022.\(^1\) Related to this trend, we also view the expansion and consolidation of the enterprise software sector as a major trend for 2018.

We have also examined two trends with important economic consequences. In China, it is no secret mobile is king – the scale of this mobile-first economy saw mobile payments reach $5.5 trillion in 2016.\(^2\) However, an unexpected consequence of the explosion in usage of smartphones is that we expect 2018 will be the first year that time spent on mobile devices in the country exceeds television usage.

On a global scale in 2018, with the ever growing hunger from fast growing technology companies to suck up talent, we expect more and more companies to expand their presences outside of current hubs such as Silicon Valley, Shenzen, Berlin and Stockholm, where the cost of living and employment have spiralled. Technology itself is making it ever-easier for digital companies to have distributed rather than concentrated staff. This trend makes for a flatter world with more employment opportunities globally.

There is, then, plenty of scope to be optimistic about the year to come in tech. However, some areas of the digital economy remain problematic and we have sought to understand their impact in the coming months. The interaction of politics and technology will continue to unsettle voting populations around the world, as the scale and complexity of regulating digital campaigning hinders progress. Likewise, consumers will increasingly seek protection against growing cyber threats, particularly with the rapid rise in connected devices. Finally, the lack of understanding and uncertainty surrounding initial coin offerings will attract significant scrutiny from the world’s financial institutions and regulators.

These challenges are significant, but they do not outweigh the vast potential for the digital economy to positively transform business and society. We hope this report provides a useful roadmap to bring order to the complexities of the coming year in tech and set us on a path to opportunity and growth.

Sources: 1. Capgemini Smart Factories: How can manufacturers realize the potential of digital industrial revolution; 2. Npr, In China, a cashless trend is taking hold with mobile payment.
Before we dig into 2018, here is a brief recap of last year’s predictions and how we saw their development throughout the year.

### 1. THE NEXT GENERATION Of Artificial Intelligence

Artificial intelligence continued its rapid growth in 2017 through increased fundraising, acquisitions and widespread adoption. The first half of 2017 saw total investment in AI firms hit a record $22.9bn. Key deals included Cisco’s acquisition of MindMeld for $125m, and Facebook’s acquisition of Masquerade and Zurich Eye, and Microsoft’s acquisition of conversational AI startup Maluuba. AI-powered Virtual Personal Assistants also continued to develop. Nuance Communications released a virtual assistant targeted at patients and healthcare providers in September of this year. Further, Amazon and Microsoft partnered to allow communication between Alexa and Cortana.

**Accurate prediction**

### 2. CORDLESS CONTENT Anywhere and Everywhere

As expected, cord cutting became even more popular in 2017. Younger audiences’ preference for over-the-top (OTT) services is continuing to drive the rise in cord cutting. Another key driver is the consumption of user-generated content spurring marketers to focus on digital media campaigns. As predicted, more cable companies have started to develop their own OTT services to retain market share. Verizon plans to launch an OTT service soon, Disney is launching an ESPN OTT package in 2018, and A+E Networks, Viacom, Discovery, Scripps Networks Interactive and AMC Networks entered a partnership to launch a streaming bundle of cable programming.

**Accurate prediction**

### 3. E-SPORTS TAKES Center Stage

As predicted, the eSports industry grew rapidly in 2017; the market is expected to reach $941.4m by 2018, paving the way for a billion-dollar market. Major brands including NBC, ESPN, and Coca-Cola increasingly view the industry as a vital channel for reaching millennials. While these brands have sponsored major finals, other notable partnerships include YouTube’s investment in Faceit and Sony’s partnership with tournament organizer ESL to power PlayStation Vue. New eSports leagues have also thrived, with Blizzard’s Overwatch attracting 12 global sponsors at a costly $20m each per franchise spot.

**Accurate prediction**

### 4. THE DAWN OF VR/AR Content

The AR/VR market has seen continued growth with a heightened focus on software development. 2017 saw the launch of key AR software development platforms including Apple’s ARKit, Google’s ARCore and Facebook’s AR ecosystem. The launch of these platforms will help drive the development and adoption of AR content. However, while the AR market has made great strides, the VR market is not meeting expectations and we are seeing less activity in the sector, resulting in the closure of some leading VR content studios including CCP Games.

**Inaccurate prediction**

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Sources: 1. Statista: eSports market revenue worldwide from 2012 to 2020
Consumer acceptance has continued to pose a barrier to broader adoption of autonomous vehicles in 2017 – one recent MIT study showed that 48% of consumers would never purchase a car that completely drives itself. We also predicted that there would need to be greater clarity in the regulatory framework to spur adoption of driverless technology. In the US, Congress has made progress towards creating clearer regulations and is currently in the process of passing the first federal law governing autonomous vehicles. We continue to believe in the potential benefits of autonomous vehicles but we are not quite there yet.

While blockchain has shown its ability to transform several industries, our view on the consolidation of P2P lending companies remains unrealized. Blockchain technologies have impacted key industries including finance, legal, and IoT, with notable examples of companies offering blockchain solutions in 2017 including PwC’s Vulcan blockchain, Microsoft’s Project Bletchley and IBM’s blockchain solution. Although the pace of P2P lending consolidation has not happened this year, the struggles faced by leaders like Lending Club, On Deck, and Prosper suggest consolidation, primarily by banks, is not far off. PayPal’s acquisition of Swift Capital is an early sign of the things to come.

US and Asian social media offerings have converged in 2017. Facebook for one launched a payments platform, deployed messenger bots to automate conversations, and expanded its marketplace to include housing rentals and used car listings – it is now approaching the full-service platform prominent in Asian social media. The year also saw notable deals and launches by Asian social media giants, hinting at Western expansion and replication of American competitors. Line, for instance, launched an AI platform including a voice-powered assistant Clova akin to Amazon Echo or Google Home and increased its stake in Snow, an Asian Snapchat clone, to 50%.

Our prediction that 2017 would see a growth in investment in European SaaS companies was proven true, with $3bn invested in the first half of the year compared to only $1.7 billion during the same period in 2016. Furthermore, European SaaS companies proved attractive acquisition targets with the top five transactions in the first half of 2017 accounting for a combined value of €3.1 billion. Globally, there has been continued consolidation with notable deals including Cisco’s acquisition of Viptela for $610m, Oracle’s acquisition of Moat for $850m, and CA Technologies’ acquisition of Veracode for $614m.

2017 was a tough year for tech IPOs in the US and high volumes of public debuts masked a number of rocky performances. Highly anticipated listings from Uber and Airbnb did not materialize and the marquee IPO of 2017 – Snap – has struggled significantly since going public. Nonetheless, the volume of IPOs has risen in US, Europe, and Asia with four unicorns going public in the second quarter alone, equal to the equivalent volume in 2015 and 2016. Solid IPOs from CarGurus, MongoDB, and Qudian in the closing months of 2017 also indicate favorable conditions for the future.
TECHNOLOGY
Predictions 2018

Over the past ten years, GP Bullhound’s Predictions report has established a reputation as an industry-leading analysis of the trends and innovations shaping the global technology sector. What follows are the ten trends we believe will define tech in 2018.

1. AN UNEASY FUTURE
For Politics and Technology

Following a number of hacking scandals related to national elections, 2018 will see tech firms coming under greater scrutiny for the content they allow on their platforms. With giants such as Facebook already increasing their security budget, this trend will shape the relationship between political bodies and technology in the coming year.

2. CYBER SECURITY
Exposure and Adoption

As recurring data breaches continue to break the news and users worry about the safety of their personal information, security will see widespread consumer adoption in the coming year. The rise of connected devices in the home will only add fuel to the fire of consumer concern for digital security.

3. MOBILE TRUMPS TV
In China

While mobile activity has been growing steadily in China, the past year has seen the biggest increase in the use of mobile in the country yet. 2018 is set to be mobile’s peak year, accelerating to overtake TV usage within the next two years.

4. TRANSLATION TECHNOLOGY
Takes Hold

As machine learning perfects language recognition, translation technology will see a boost in user adoption in 2018. Using neural networking, computers will be able to understand not just words but also grammar, resulting in a more natural, flowing translation and booming consumer usage.
5. OVER AND OUT

Email

Traditional workplace communications will be increasingly replaced by instant and more informal messaging tools. 2018 will be the year the volume of corporate emails sent in the US will cease to grow and begin to decline as instant messaging platforms such as Slack continue to gain traction.

6. INTERNATIONAL LABOR

Arbitrage Flourishes

As the cost of living in key tech hubs soars and competition for talent becoming increasingly tough, the new year will see smaller tech companies looking to base their operations in up and coming tech hubs around the world.

7. THE UNLIKELY COMEBACK

Of the Software Suite

As the corporate world continues to embrace digital transformation, businesses seeking to optimize their product offering will return to spending on large IT platforms. 2018 will see growth in the adoption of software suites and increasing competition amongst leaders in the field.

8. INDUSTRY

4.0

As factories embrace the benefits of artificial intelligence and robotics, the fourth industrial revolution has finally taken hold of the manufacturing and production sector. These technologies will see increasing adoption in the coming year, resulting in a dramatic increase in quality and productivity.

9. REGULATORS RULE ON

Boom and Bust of ICOs

The use of blockchain and Initial Coin Offerings has exploded in 2017. We predict regulatory agencies will intervene in 2018 and create definitive guidelines and regulations on the capital raising method. However, innovation in ICOs will not lose momentum and the volume of transactions will continue to grow.

10. AUGMENTED REALITY

Adapts for Early Adoption

The last six months have seen significant developments in augmented reality, with tech giants such as Apple and Google entering the field. As smartphones become increasingly compatible with the technology, 2018 will be AR’s biggest year yet as more consumers adopt the technology.
AN UNEASY FUTURE
For Politics and Technology

COMPANIES TO WATCH
The domination that certain large technology companies have over digital advertising and content is not new. However, the way lobbying organizations and allegedly nations are (ab)using the reach of these digital ad platforms to influence important events is shining a fresh spotlight on the poster children of the technology industry.

The percentage of US digital ad spend on Facebook and Google is 63%, and the granularity with which certain demographics can be targeted has lawmakers asking: how do we prevent unwanted and malicious meddling in political affairs? And whose responsibility is it to regulate and police such activity?

The history of digital political spending is relatively short. Even as recently as 2014, digital advertising was expensive, inaccurate and ineffective. Three years later, we are seeing a transformative and paradigmatic shift in the influence that digital political advertising has on the outcome of elections. For example, in the 2016 election cycle Facebook took $4 out of every $5 of political digital ad spend.

Many people are attributing the victory of Donald Trump in the US Presidential election to the use of Facebook by his campaign and, more controversially, groups linked to the Russian government.

There are two key considerations here: first, unaffiliated actors with malicious motives are able to advertise undetected on behalf of a chosen candidate. Second, due to the nascent nature of the industry there is a distinct lack of robust and effective regulation.

It is well documented that Russian internet groups sought to influence US voters through online “troll” campaigns. They were able to do this undetected and unregulated because the ads often highlighted social issues without an overt political agenda, and they operated on a large but diffuse scale, spending small amounts of money on each ad. It is thought these ads reached 126 million Americans.

This is clearly not the first time that governments, including the US, have tried to influence outcomes of elections in other sovereign states. However, it is important to understand the numbers to grasp why this is such an important issue. In the 2012 US Presidential election, $1.59m was spent on digital advertising. By 2016 that had grown 800% to $1.4bn and it is projected to grow to $1.9bn by the 2018 mid-term elections, and $2.8bn by 2020.

Some argue it is the focus with which these ads can target specific people that makes them effective, while others argue that this digital lobbying does not have the impact that the media wants to portray.

In any case, this debate has put a spotlight on the internet companies: are they open neutral platforms, or should they filter and select the content that gets published? The issue is further complicated by the fact these platforms now also actively engage in their own content creation, arguably compromising any claim to neutrality.

The consensus seems to be that collaboration between tech and government is the way to regulate political digital advertising. But, increasingly the burden is shifting onto corporates, who have previously advocated for no regulation and reluctantly, they are enacting policies to tackle the issue.

We predict this challenge will continue to attract widespread popular and political scrutiny and the need for greater responsibility will be a significant operational and financial burden on tech firms. Facebook has announced profitability will take a hit, with their operating expenses rising from 45% to 50%, mostly due to increased security spending, a portion of which is to prevent future political meddling on their platform.

The domination that certain large technology companies have over digital advertising and content is not news. However, the way lobbying organizations and allegedly nations are (ab)using the reach of these digital ad platforms to influence important events is shining a fresh spotlight on the poster children of the technology industry.

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As the list of major cyber security breaches grows longer by the day, consumers are increasingly being affected. Uber recently announced it had concealed a data breach affecting a staggering 57 million accounts, while the hacking of Equifax, one of the three largest credit agencies in the US, may have exposed the social security numbers and driver’s license numbers of up to 143 million consumers. Further still, in May a sophisticated phishing scam fooled one million Gmail users. While all this has served to raise awareness – at least 75% of consumers are concerned about security, privacy, malware or websites tracking them – few consumers are educated on how to limit their exposure to these kinds of incidents.(1)

A major factor in the shift towards adoption of consumer cyber security is the fact that consumers and households have never been as connected, and exposed, as they are today. Nearly one in five American households contain 10 or more internet connected devices, with the median household containing five such devices.(2) With each new device comes another entry point for cyber criminals, and people know it, with close to 50% of connected US households very concerned someone can access their devices or data without their permission.(3)

To plug this gap, connected home providers like Google and Symantec are selling security software that detects and protects against breaches of home networks. Features like parental controls and visibility into the number of devices accessing a network, usage time, URLs visited and more, are increasingly putting the power back into the consumer’s hands. Other companies like Yubico are trying to address this issue with secure token solutions for smartphones and laptops.

Providers of home network security software, consumer fraud protection and device security are set to benefit and will see a large increase in the number of consumers actively seeking and using third party solutions to protect their devices and personal information.

It is hard to imagine a year when cyber security will not underpin a huge trend. While we have previously discussed the security challenges facing businesses, the cyber threats facing the exploding numbers of connected devices mean 2018 will see the widespread adoption of cyber security measures by ordinary consumers.

Number of connected devices globally (millions of units)*

<table>
<thead>
<tr>
<th>Year</th>
<th>Consumer</th>
<th>Business: Cross-Industry</th>
<th>Business: Vertical-Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>1,316</td>
<td>2017</td>
<td>8,380</td>
</tr>
<tr>
<td>2018</td>
<td>11,196</td>
<td>2020</td>
<td>20,415</td>
</tr>
</tbody>
</table>

Sources: 1. Arbor Networks, New consumer survey shows high anxiety about online security does not translate into action; 2. Pew Research Center, A third of Americans live in a household with three or more smartphones; 3. Parks Associates, Nearly 50% of US broadband households are very concerned about unauthorized access of their connected devices or personal data

* Gartner: IoT units installed based on category
50% worry about data breaches
75% want tight control over personal information
1/3 have 3 or more smartphones

COMPANIES TO WATCH
EXPERT VIEW

Ben Brabyn
Head, Level39

If 2017 was the year cyber security entered the public consciousness, 2018 will be the year when consumers start demanding protection, action and change. Cyber security has made international news headlines with a consistency we’ve never seen before.

From revelations about Kremlin-sponsored influence in the US election, the proliferation of fake news and major attacks on major organisations in both the public (NHS) and private (Uber) sphere – the conversation has changed from one of potential risks to very real attacks, international diplomatic incidents and share-price threatening vulnerabilities.

At the start of 2017, Level39 – the largest concentration of cyber security start-ups in London – convened a group of industry experts to discuss the biggest challenges facing British cyber security. The group included figures from Government and the fastest growing cyber companies in the UK – Darktrace and Digital Shadows. What came up time and time again in our discussion was a lack of awareness and education about cyber risks. From CEOs to employees at all levels – people didn’t know enough to protect themselves, weren’t taking the risks seriously and leaving themselves and their companies at risk.

The one positive result of the deluge of high profile cyber attacks experienced around the world is that the lack of awareness is starting to change. Reading about cyber security on a daily basis or, more importantly, realising your Yahoo, TalkTalk or Uber account has been compromised, acts as a quick wake up call.

As such, there is an opportunity for more consumer-focused cyber security companies looking to serve a newly enlightened, and fearful, market. This has already started to play out from a B2B perspective. Level39 member Digital Shadows recently raised $26m in a round led by Octopus Ventures, with investors realising businesses around the world are increasingly looking for a service that monitors online corporate cyber threats.

If money is already flowing into corporate cyber security, 2018 will see a similar appetite for consumer-facing cyber protection. With the proliferation of connected devices, hardware and gaming, my prediction is that a major cyber attack is coming aimed specifically at consumer technologies. As soon as this happens, the floodgates will open for consumer cyber security and existing players will have to scale rapidly to meet demand.

Fintech will also drive investment into cyber security. The technology now exists for a wide array of mobile payments, online remittances and challenger banks to grow and thrive. However, two elements are at play that fintechs need to consider. Banks are now looking to cyber security, not digitally-enabled services, as their biggest challenge, and they are investing accordingly. Secondly, the cyber security of some fintech companies has never been truly tested. The fintech start-ups and scale-ups themselves need to be investing in their own cyber services to continue their recent success. In both situations, the real winners are the growing cyber companies.

For the UK, there is a real opportunity to become the most secure place in the world to do business. The Government has clearly outlined its commitment to this industry in the recent UK Cyber Security Strategy and we can expect to see significant public investment into fast-growth start-ups and scale-ups.
MOBILE TRUMPS TV

In China

COMPANIES TO WATCH

GP.Bullhound
It is no secret that mobile is king in China. Increasingly cheaper smartphones and a rising middle class have enabled mobile to become central to Chinese consumer activity. Whether shopping with Alibaba or JD.com, travelling with Didi or Ofo, or using mobile media platforms, we believe that consumers’ time spent on mobile devices in China will be very similar to TV usage in 2018, and will exceed it within a couple of years.

A much shorter and less pervasive history of television culture and usage has contributed to the dominance of mobile. Meanwhile, the smartphone has revolutionized the role mobile devices play in consumer’s everyday lives. As a result, unlike the USA or Europe, the Chinese population is mobile first.

WeChat for one has 494m active users, equivalent to 79% of all smartphone users in China. The app is used in every aspect of people’s personal and professional lives, from mobile payments, which reached $5.5 trillion in 2016, to hailing taxis, booking flights and much more. As a result, users spend on average 66 minutes in the app every day. Similarly, Alibaba generated $25.3bn in sales on Singles Day 2017, of which about 90% were done via mobile.

A changing media consumption and video streaming landscape in China will accelerate this trend. Paying for streamed video and music is proving increasingly popular and available content is moving audiences from TV to mobile. Tencent Video has 15.2% of the 435 million mobile video users, while Baidu’s iQiyi, which recently partnered with Netflix, is in a close second with 14.7%.

Online video content, live streaming, and short videos combined grew 35.6% year-over-year in March 2017 to almost 920m monthly active users, leading to activity in the market by the Chinese internet giants. Alibaba acquired Youku Tudou – China’s answer to YouTube – in 2016 and is doing a major overhaul of its service, including the finance, production and distribution of films and TV programs for the platform.

While this is a global trend, the advent of new media in Chinese consumers’ lives will continue to squeeze the traditional TV industry and grab market share. We believe that TV will be secondary to the smartphone in the next 24 months, with mobile content being the catalyst for this transformative shift.

### TV vs. mobile usage in China (minutes)*

<table>
<thead>
<tr>
<th>Year</th>
<th>TV</th>
<th>Mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>162</td>
<td>66</td>
</tr>
<tr>
<td>2013</td>
<td>162</td>
<td>90</td>
</tr>
<tr>
<td>2014</td>
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<td>116</td>
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<tr>
<td>2016</td>
<td>159</td>
<td>124</td>
</tr>
<tr>
<td>2017</td>
<td>158</td>
<td>133</td>
</tr>
</tbody>
</table>

Sources: 1. Emarketer, WeChat users and penetration in China, 2016-2021 (millions, % of mobile phone messaging app users and % of smartphone users); 2. Npr, In China, a cashless trend is taking hold with mobile payments; 3. China Channel, 2017 WeChat user behavior report; 4. Bloomberg, Alibaba’s singles’ day goes global with record $25 billion in sales; 5. Emarketer, Competition heats up in China’s mobile video sector

*Emarketer, Digital overtakes traditional media in China, but TV consumption holds strong
Machine learning has left language translation on the cusp of an explosion in user adoption. While Google throws its weight behind earphones that translate language in real time, widespread activity in this technology leads us to believe that in 2018 over one billion people will use language translation tools on desktop, mobile and headphones.

As is increasingly the case in the technology industry, proof of concept by early innovators is followed by a technology giant entering the market to produce a better product, with large cash reserves to solidify its position. Google’s Pixel Buds will put significant pressure on early entrants, while Bragi’s Dash Pro earbuds and Waverly Labs’ Pilot headphones are also making waves. All of these players will propel a revolutionary software into the mainstream, and transform the way we converse with each other in different languages.

The most recent Google Translate statistics from mid-2016 showed roughly 500 million people use translation software. Although many of us have been using this for years, most can agree that the translations supplied were not awe-inspiring. This is all changing as machine learning technology improves to contextualize sentences, either spoken or written, and provide a much more meaningful output than the often-literal translations we received in the past.

Using neural networking, computers harness huge data sets to understand not just the words being translated, but grammar rules, and exceptions to these rules, helping provide a more natural translation. It is by no means perfect, and current technology is limited when topic specific jargon is used, but it will advance to a point of widespread utility. Being able to translate entire conversations in real time opens huge possibilities that will affect industries ranging from education to humanitarian aid, travel to tourism and beyond.

Imagine working for an international organization responding to a natural disaster in a country whose language you do not speak. Building trust and connections with the population that you are trying to help is incredibly difficult on its own, more so if also dealing with a language barrier. Once this is eliminated, the logistical challenges of such an exercise become easier, and more lives can be positively affected. The possibilities are truly limitless and as the technology is perfected we will all benefit in our daily lives.

With the backing of influential technology companies, leveraging ground-breaking neural network machine learning, as well as 4.9 billion mobile users, expect language translation to grow rapidly in 2018 and beyond.

Sources: 1. Barak Turovsky, Ten years of Google Translate; 2. We Are Social Special Report, Digital in 2017: global overview
COMPANIES TO WATCH

- Babelfish
- BRAQI
- Google
- Babbel
- Deepl
- Linguee
- Maviway Labs
- Webinterpret
- Yandex
OVER AND OUT

Email

75% workers greatly value teamwork

43% of Fortune 100 use Slack
2018 will represent the year that use of email will cease to grow and begin to decline in the US. This decline will be caused by the rapid rise of communication tools like Slack and Messenger, the entrance of dominant and cash-rich tech giants, and an increasingly common understanding that email marketing is largely inefficient and insufficient.

Slack has pulled off one of the most difficult transitions in tech – from hype to traction, to the fundamental transformation of an entire industry. Slack isn’t just beating email, it is beating their much larger competitors. It has grown to six million daily active users and provides 50,000 businesses with internal communication tools. Its users spend 2 hours actively using the tool, and have it open for ten hours a day.(1) As the enterprise market wakes up to the utility of these tools, email usage will drop significantly.

Growth in email usage is projected to slow to 1.7% in the US in 2018.(2) We think this figure is optimistic, and expect a decline very soon. Workplace by Facebook, its answer to enterprise messaging and networking, launched in October, Google already has G Suite, and Microsoft is rolling out Teams as part of Office 365. Facebook alone has already signed up 14,000 businesses including Starbucks and Walmart, which employ a combined 2.4m people, and we expect them to accelerate the rate of change and adoption.(3) Add to this the rumor that Amazon is looking to enter the collaboration and messaging market and you have all the largest technology companies in the world betting on messaging.

Not as often discussed, but no less important is the rise of project management platforms. These are software tools built to help teams work on specific projects in the most efficient way possible. Companies like Asana or Trello provide time tracking, resource planning, project allocation to streamline processes and remove ineffective uses of internal and external email. The potential value of this market was reflected in Atlassian’s acquisition of Trello this year to build out its collaboration technologies. Similarly, Asana has raised a total of $90m since foundation and Slack has now raised a total of $788m in further demonstrations of the growth potential of this market.

Often appearing an outdated annoyance, email marketing is still a large proportion of sent emails. Questions about the efficiency of this tactic means that email usage will suffer dramatically. From 2016 to 2017, average email monthly send rates dropped from 9.8 to 8.1, and while engagement increased marginally, email marketing has been overtaken as an effective marketing tool.(4)

Though not the flashiest topic in tech right now, we believe this is a transformational time in enterprise communications. With the irresistible rise of mobile, increasingly mainstream project management software, and collaboration tools like Workplace, email will see a decline in the US beyond 2018.

Companies to watch

Amazon, Asana, Facebook, Basecamp, Hive, Huddle, MessageBird, Slack, Stride, Talkspirit, Kialo.

INTERNATIONAL LABOR

Arbitrage Flourishes

COMPANIES TO WATCH
Yet the market is now turning on this notion as the cost of living in these tech hubs has skyrocketed. The Bay Area has now become the most expensive city in the US, with average one-bedroom apartments reaching up to over $3,600 per month.\(^1\) Salaries have also ballooned in the area as competition for technical talent from large public and highly valued private companies has increased; in 2016, the average salary for a software engineer in the Bay Area was $134k (not including competitive equity incentive packages),\(^2\) compared to just $71k in the UK.\(^3\) This has made Silicon Valley a particularly tough environment for small technology companies, putting pressure on them to hire talent they often can’t afford or being forced to risk sourcing second tier talent which might eventually be poached by the lure of high flying IPO candidates.

But the trend is now beginning to change: startups lacking resources will now most certainly begin to distribute their technical teams to lower cost cities, both in the US and abroad. The development of cloud collaboration tools in the areas of video and chat has made it much easier to build distributed organizations. For a generation that is completely in tune with social and digital communications, working together while being apart has never been so easy; Slack, Zoom and Asana are just a few of the next generation collaboration tools increasingly prevalent in startups.

These tools allow companies to harness the advantages of these up and coming tech hubs. Smaller cities have higher living standards while still maintaining reduced company costs due to lower salaries and lower operating costs. Competition is also not as fierce, leading to higher employee retention. We are now beginning to see talent leave tech hubs and successful startups rapidly growing in cities that were previously not known for their tech ecosystems. As talent spreads, more and more cities are closing in on the talent gap every year.

Many successful companies have thrived on a distributed organization model, including Neo4J, UserZoom, Ecovadis, Prezi, and last but not least, Github - a company founded and run by four individuals who lived in separate cities from the very beginning. Many of these companies have latched onto the potential of maintaining a footprint and go-to-market strategy in a major tech hub, while also lowering their burn rate to a much more modest level than their peers by spreading their tech teams around the world. With many players in the venture capital community now promoting this concept within their portfolio companies, tech talent is set to continue spreading around the world.

Number of rounds and total funding in global enterprise collaboration software market*


EXPERT VIEW

Utpal Bhatt
VP Global Marketing, Neo4j

While Silicon Valley is a springboard for companies to expand and grow, Europe remains a leading hub for tech talent. By adopting a dual model – with headquarters in Silicon Valley and operations in Europe – Neo4j has harnessed the potential of tech talent across the world and placed itself at the forefront of developments in graph technology.

Neo4j was founded in Europe in 2007; having moved our headquarters to the United States in 2011, we now operate both in Silicon Valley and on the European continent, where most of our engineering operations are still based.

From a perception standpoint, being in Silicon Valley is crucial. The Valley remains at the forefront of tech developments, and companies in the area flourish on the environment of innovation and the ecosystem that it provides. It is in fact by moving that we first managed to acquire our current COO Lars Nordwall, a senior Silicon Valley executive.

The Valley also attracts influencers and investors, providing businesses with the tools they need to reach a wider audience and push the business forward. It is simply the ease of interaction and the ability to have a face-to-face meeting with these critical people that has enabled us to grow to the point we are at right now.

However, talent in Silicon Valley can quickly run low: one of the key challenges in our early days in the US was attracting and retaining top technical talent. For smaller start-ups, having employers like Facebook, Google, Amazon and Microsoft competing for talent makes it hard to recruit. Competition has driven salaries higher and higher, making the Valley one of the most expensive locations for tech companies to be based in – and increasingly tough for smaller companies to thrive in.

These developments have allowed other tech hubs around the world to flourish. In North America alone, the New York area and Boston are great examples of this – but also newer and rapidly growing hubs such as Austin, Portland and Toronto.

Europe is next on the list: as the tech scene on the continent grows, European countries will be an increasing source of tech opportunity. Having Neo4j’s engineering team based out of Europe has allowed us to hire a wealth of talent. Our experts have acquired qualifications ranging from Masters to PhDs, and we now have some of the best graph minds in the industry working for us, making our technology a leading platform for businesses around the world.

But 2018 is set to bring uncertainty for many: wider political issues such as Brexit or Donald Trump’s election could have an impact on how – and where – businesses source talent. Talks on immigration and visa applications will incur additional scrutiny – both in the US and the UK, which could make talent sourcing even more competitive.

As developments continue in the tech sector, it will be essential for businesses to hire talent that is ready to embrace and adapt to innovation. Not only will GDPR change the way businesses can access data, but the rise of AI will disrupt the way they handle it. The technology is set to help organizations extract value from data and leverage it for competitive advantage – it will be essential for businesses to source and train their workforce to embrace the developments that will shape 2018.
THE UNLIKELY COMEBACK
Of the Software Suite

COMPANIES TO WATCH

Hootsuite, Adobe, McAfee, Salesforce, Li, Tiller, TIS, Workday, SAP
Historically, enterprise software was a concentrated industry dominated by large players, with the likes of IBM, Microsoft, Oracle and SAP offering broad and horizontal software solutions. The growth and adoption of on-demand cloud computing has enabled an increasingly fragmented market of point solutions, cluttering the market for enterprise users.

In the days when on-premise solutions were the norm, integration across cloud vendors required painstaking custom integrations. In the current software environment, integration between cloud platforms has changed immensely, allowing companies to integrate diverse applications with ease.

The migration to the cloud has also created a vast increase in the number of vendors by enabling companies to choose best-of-breed solutions and essentially plug-and-play through the use of APIs. The average medium size enterprise often now has a vendor list of over 100 cloud applications. Over the past several years, we have watched this dynamic develop with additional new entrants specializing in functionally focused solutions such as Zendesk in customer service, Hootsuite in social media marketing, and Expensify in HR.

In 2018, while best-of-breed solutions will still be prevalent for leading SaaS companies, we will see an increase in IT spend to large platforms and suites over point solutions. In an attempt to reign in their ever-increasing vendor list and increase visibility on their data and excess costs, decision makers are no longer delegating the IT buying process. In the recent past, software sales cycles have shortened and C-level decision makers have been less involved due to the lower risk nature of SaaS models. This has created a lack of visibility into their vendor lists.

Often to their surprise, they realize the number of vendors is much more than expected and there is a lack of efficiency in terms of license utilization and bargaining power from mass license purchases. The equilibrium has shifted where the costs of a best-of-breed approach can, in many cases, now outweigh the benefits. The promise of specialized functionality within each business unit has created unintended complexity to the overall IT strategy and now there is a movement to more centralized planning.

Two particular sub-sectors where we are seeing a movement to platforms and suites are: human resources and marketing software. Dominant players - Adobe, Oracle, Salesforce, SAP and Workday - are in a position of strength compared to their competitors as suite offerings in their markets require less integration and the procurement of the software is much more transparent. In addition, the suites have become very price competitive as a result of their scale.

Ultimately, we believe the winners in the space will be the software suites as seamless procurement, integration and competitive pricing will weigh into the decisions of IT spend. Moreover, the suites will increase their market share dominance through acquiring targeted products, as we have seen in Cisco’s acquisition of Jasper, Salesforce’s purchase of Steelbrick and Hootsuite’s acquisition of AdEspresso.

$85bn cloud software revenue in 2016*
$200bn cloud software revenue in 2021*
18.5% projected CAGR*

INDUSTRY 4.0

COMPANIES TO WATCH

GP.Bullhound
We are in the midst of a fourth industrial revolution. Technology has finally made its way to manufacturing and it plans to completely transform the industrial sector as we know it. While the first industrial revolution was powered by steam, the second was fuelled by the division of labor, and the third driven by electronics, today’s revolution is driven by connected machinery.

Manufacturing improvements since the 1990s have been minimal and the manufacturing industry has been largely left behind in the data boom. Aging factories, increased capital expenditures and harsh profit margins have inhibited any ability to invest in digital transformation. Manufacturing is said to be at the very early stages of this transformation but its potential is now much clearer and companies are hiring to develop smart factories.

The benefits to manufacturers in going digital are expected to be substantial. In 2018, we will see a transformation of the traditional industrial manufacturing plant to a smart factory powered by the internet of things (IoT), big data analytics, artificial intelligence, and advanced robotics. The potential gain in overall productivity is significant and smart factories are expected to create a sevenfold increase in overall productivity by 2022.\(^1\)

Historically, operating efficiency in manufacturing has come through specialization, scale, and repetitive task robots. The factory of the future will not achieve efficiency by scale, but through dynamic robotics and technology. Advanced robots will perform tasks far beyond the repetitive tasks of robotics today. Data and connectivity will enable advanced robotics to communicate with each other and lead to directions for assembly being made at the product level rather than a central hub. This points to a future where the cost to produce customized items will be on par with the cost of mass production.

Accenture has coined this opportunity “Industry X.0” and the implications are big. Industry X.0 intends to transform the entire supply chain from “top floor to show-floor” through the use of data and advanced technologies. The end result is a dramatic increase in quality and productivity.

Consulting agencies have made significant acquisitions to act on this trend and we expect this to continue in 2018. For example, Accenture acquired Cimation, providing industrial IoT consulting company specializing in process automation and The Boston Consulting Group acquired Inverto, specializing in supply chain optimization and procurement. Consultants are expecting that many industrial companies will require their expertise as they transform the factories of old into efficient, automated, data-driven smart factories.

\(\text{Manufacturers distribution according to smart factory investments globally}\)

\(\text{> More than half of global manufacturers analyzed have invested $100m+ in smart factories}\)

\(\begin{array}{c|c|c|c|c|c|c}
\text{Investment Range} & \text{Greenfield} & \text{Brownfield} & \text{Both Greenfield & Brownfield} & \text{Yet to be decided} \\
\hline
> $100m & 5% & 16% & 18% & 18% \\
$50m-$100m & 6% & 4% & 5% & 5% \\
$250m-$500m & 5% & 6% & 6% & 5% \\
$100m-$250m & 7% & 5% & 6% & 6% \\
< $50m & 11% & 5% & 56% & 7% \\
\hline
\end{array}\)

Sources: 1. Capgemini Smart Factories: How can manufacturers realize the potential of digital industrial revolution
* Capgemini Smart Factories: How can manufacturers realize the potential of digital industrial revolution
**EXPERT VIEW**

**Aidan Quilligan**

Global Lead Industry X.0, Accenture

2018 will see digitalisation and machine learning transform industrial production. Widely known as the fourth industrial revolution, digital transformation and the rise of connected, intelligent systems is set to have a seismic effect on all industries. Manufacturers and industrialists that adapt and invest in developing technologies will win out.

At Accenture, we have termed this revolution as Industry X.0 to explain how businesses need to engage in a continuous process of innovation in order to survive and thrive amid this transformation. There is no single formula or masterplan for how you go about the scale of this disruption: it is a constant succession of moves and pivots and initiatives.

When taking steps to automate manufacturing, it is important to acknowledge we are dealing with the fundamentals of industry. Innovating manufacturing and production is arguably the most important – and complicated – change that will take place in the modern economy. While automating processes in finance systems can also go wrong, imagine the consequences of having nuclear generators shut down following a computer fault.

That said, the potential of automating the manufacturing industry is huge. Suites of software products from tech leaders such as Siemens, Dassault Systèmes, PTC and many others are emerging that will – and are already – helping to build the foundations of Industry X.0. By overlaying these with an industrial internet of things, businesses will be able to harness new data to unlock new levels of efficiency (“below the line”) that were previously trapped in machines and sensors. Moreover, this data and intelligence will enable new “above the line” service offerings that were previously inconceivable, so new revenue streams are emerging to drive superior business performance.

Workers will also find their tasks changing alongside technological developments – the production of aircraft at Airbus is a clear example of this. The company has now been working alongside Accenture to develop an augmented reality solution for the following step within their production process: Workers fitting the seats have a headset showing them exactly where to bolt the seats in real time, based on the configuration of the aircraft they are fitting. Historically, this has always been a challenging task, as any mistake often didn’t even get noticed until the workers got further along the work. The productivity improvement brought by this augmented reality solution has been dramatic and production has dropped to zero defects – the potential of similar solutions for other businesses will allow productivity numbers to soar.

However, it will be important for businesses in the manufacturing and production industry to understand the horizontal and cross-functional nature of digital transformation in order to fully embrace it. Adopting digital skills will require a significant shift in mindset in order to achieve a fusion between the skills workers already have and the understanding of how the company will work in the new digital world. Either of those in isolation is not sufficient, and getting the right combination of both is the most important challenge businesses will face.

Through a combination of all actors in the industrial sector, digital transformation in manufacturing and in wider industry will transform this vital sector of the modern economy. It is the combination of firms like Accenture, manufacturers/OEMs, big tech firms and start-ups, that will together shape the industrial world of tomorrow.
REGULATORS RULE ON
Boom and Bust of ICOs

COMPANIES TO WATCH

CNOSIS
Filecoin
Uniti
KIN
The recent boom in capital allocated to blockchain is a direct result of an innovative capital raising method known as an Initial Coin Offering (“ICO”). As with any new technology, regulators are playing catch-up, particularly due to the scale of capital being poured into these relatively unknown fundraising schemes.

Similar to an initial public offering, an ICO enables a company to raise capital from a range of investors, but rather than issuing equity, the company issues “tokens” or a representation of a tradable asset or utility. To the dismay of many investors, regulators and lawyers alike, ICOs create a regulatory gray area allowing a company to raise capital with little registration paperwork and without passing any control of the company onto investors. The rise in popularity of ICOs over the last 24 months has placed pressure on regulators. More than 250 ICOs have taken place since 2016, growing at a much faster clip than traditional equity deals and dollars.¹

It is clear that ICOs will become the financing method of choice for blockchain startups, but why do ICOs enjoy regulatory freedom when other financing sources do not? The gray area for the United States is whether or not a “token” offering meets the criteria of a security and is therefore subject to U.S. federal securities law. Token offerings serve as a utility or access to a future service rather than an economic windfall and therein lies the regulatory gray area.

In the SEC’s review of DAO Tokens, the tokens met the definition of a security and were required to register the offer.² However, the SEC failed to take a stance on all ICOs, and depending on how the offer is marketed an ICO can still get around federal regulation. In other markets, there have been different measures taken to protect non-accredited investors. For example, China and Korea banned ICOs completely.

Private capital is now flowing into blockchain companies at an unprecedented rate, raising more than $2bn in 2017 and raising well above historical averages in early stage rounds.³ It is our view that an influx of capital combined with loose regulations has created a bubble that will ultimately experience a shock during the upcoming year. In 2018, we expect to see definitive guidelines and regulations on ICOs from regulatory agencies that take a much stronger view.

Nonetheless, we will continue to see successful ICOs regardless of regulation. Further, we continue to believe distributed ledger technologies will proliferate as the capital raised today will continue to drive innovation. While cautious on the current state of cryptocurrencies, we remain staunch supporters of using blockchain-like technology for distributed, robust, independent, non-centralized information systems and historic data holders.

Sources: 1. CB Insights: Blockchain Investment Trends in Review; 2. SEC.gov; 3. CB Insights: Blockchain Investment Trends in Review
AUGMENTED REALITY
Adapts for Adoption

1.89bn
Smartphones by 2021

2.1bn
Invested in AR/VR in 2017

11
AR/VR startups have raised $100m+

COMPANIES TO WATCH

GP Bullhound
Huge strides in the computing power of smartphones has enabled augmented reality to break down the barriers between the physical and digital world. The transformation of the cognitive ability of mobile phones, along with their display, sensor, and power technologies will lead to the rapid consumer adoption of augmented reality in 2018.

Phone sales have recently plateaued at around 2bn units and are expected to grow at a modest 1% CAGR through 2021. Many handset manufacturers are looking at augmented reality as a catalyst for growth. Manufacturers have tended to pass their rising component costs onto consumers, but are looking to the future as margins compress in an increasingly price competitive market.

An example of this is the introduction of depth-sensing camera handsets in parallel with augmented reality software development kits, namely ARCore by Google and ARkit by Apple. These software development kits use smartphone cameras to map and understand the surrounding world and enable users to overlay digital information on the physical world.

Smartphones are driving widespread consumer adoption with all day battery life and network connectivity. Crucially, an emerging developer ecosystem is proving vital to the rise of augmented reality. Computer vision and machine learning technologies are also advancing to ensure that 2018 will be a breakthrough year for augmented reality.

Mark Zuckerberg recently stated that “the phone is probably going to be the mainstream consumer platform that a lot of these AR features first become mainstream rather than a glasses form factor that people will wear on their face”. To date, this opinion has proved correct and many market researchers are reversing their stance on VR vs. AR. While many previously predicted that VR would be the primary market driver, many now believe AR will be the key catalyst taking the lion’s share of the near-term market opportunity.

This has led many leaders in VR to exit their operations due to the slow developing pace of the market, with examples including Nokia shutting down the development of its Ozo VR camera and CCP games closing of their VR studio. In contrast, augmented reality technology has harnessed smartphone hardware to accelerate consumer adoption and we are now seeing mobile phones specifically manufactured to enable advanced augmented reality applications, such as with the recent launch of the iPhoneX.

Global AR/VR Revenue*

<table>
<thead>
<tr>
<th>Year</th>
<th>Mobile AR</th>
<th>Smartglasses</th>
<th>Premium VR</th>
<th>Mobile VR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>4.8x</td>
<td>1.3x</td>
<td>1.5x</td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>3.9x</td>
<td>4.8x</td>
<td>9.6x</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>3.9x</td>
<td>4.8x</td>
<td>9.6x</td>
<td></td>
</tr>
</tbody>
</table>

Sources: 1. CCS Insight Mobile Phone Forecast; 2. Facebook Q2 2016 earnings call
* Digi-Capital, Augmented/Virtual Reality Report Q4 2017
2018 will be the year of augmented reality: with tech giants such as Apple and Google entering the stage, the AR landscape is set to rapidly grow. The technology is set to scale from an emerging innovation to a fundamental technology for businesses around the world. In ten years’ time, AR will be just as mainstream as smartphones are today.

At Wikitude, we enable augmented reality by developing tools and offering tech platforms that allow our customers to create their own universal AR experiences. Augmented reality has long been on the cusp of becoming mainstream technology, yet a lack of awareness and understanding has often held it back from widespread adoption.

The launch of Apple’s ARKit and Google’s ARCore will now educate consumers and allow hundreds of creators around the world to design AR experiences. From an enterprise perspective, software giants such as SAP, Oracle or Cisco entering the industry also provides critical infrastructure required to manage and deliver successful AR services.

It is important to keep in mind that AR does not solve a problem on its own, and has to be embedded in a wider ecosystem in order to fully develop. 2018 will continue to see this augmented reality ecosystem grow, with the creation of supporting technologies that will allow AR to reach its full potential.

Augmented reality has already made its first steps into the workplace and its revolutionary impact will accelerate over the next year. AR can, for example, be used for remote maintenance, enabling engineers to view and understand a problem at a distance, reducing costs and driving efficiency. AR has also begun to have a significant impact on retail. Walmart is one of the leaders in this area, using augmented reality in both stock management and online shopping. Ultimately, augmented reality will show its worth through creating a more engaging – and simpler – experience in day to day tasks.

Yet different markets will see the technology develop in different ways. Europe is particularly focused on the way AR can improve workplace efficiency, whereas the US is leading the way in social media – with the likes of Facebook and Snapchat as prime examples of this. Asian firms in turn look to these European and North American pioneers to push their own capabilities in AR forward.

This shift in the industry will lead to a race for talent. Here, Europe is a vital player: the best universities for these technical fields are European, from King’s College London and Trinity College Dublin in the UK to ETH in Switzerland and the Technical University of Graz in Austria. Many leaders in the sector are also originally European, such as Andreas Wendel, an Austrian by birth and Google’s computer vision lead for its self-driving car. This pipeline of talent will be critical to developing the global ecosystem required for AR to thrive.

While adoption, awareness, and acceptance of augmented reality will accelerate in 2018, it will take time for the technology to reach its full potential. It remains a disruptive technology that requires a significant change in approach, investment, and talent. The biggest challenge of the next few years will, therefore, be how, and when, this disruption will settle down and become an essential part of our day to day lives.
This report was compiled through the expert insights of GP Bullhound’s worldwide team alongside detailed analysis of investment trends in the global technology sector in recent years.

It is intended to provide our predictions for growth, investment, and impact in the digital economy in 2018. Each year, we provide a transparent assessment of our predictions from the previous report to maintain a high level of scrutiny on our own research.

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