MACRO
TRENDS

Macro*Trends* provides perspective and insight into the influential economic and technological developments of our time. It comprises a few key messages that aim to enhance informed decision making by business leaders.

AI TOOLS
SEARCH FOR
MEANING IN
BIG DATA ▶

ENJOY A CAREER
FOR LIFE AS
A SOFTWARE
ENGINEER ▶

THE NEW WORLD
OF WORK ▶

BITS

SMARTPHONE SALES DOWN

International Data Corp reports that smartphone shipments worldwide fell by 3% to 1.42 billion in 2018, the first annual drop after growing by an average of 16% annually from 2012 - 2017.

This is more incremental than revolutionary – the "innovation boom" of the early 2010s appears to have hit a speedbump. Many markets are now becoming saturated, with demand (and mindsets) shifting from "new smartphones" to "replacements". Consumers are holding onto their phones for longer. Apple customers now upgrade every 33 months on average, longer than the 24 months three years ago. Analysts expect very slim growth in 2019.

PROFILE OF REMOTE WORKERS IN THE US

In the US, 52% of remote workers are male and 48% female. Their average age is 46. They have at least a bachelor's degree, and earn a higher median salary than someone working at the office.

-15%

Apple's retail stores are among the most profitable in the world. Average sales per square foot in Apple's 500 stores have risen from $4,640 in 2013 to more than USD 5,600 today. The company did, however, report a 15% decline in iPhone sales during Q4 2018, compared with the same quarter the previous year.

A French regulator has fined Alphabet's **Google USD 57 million** for failing to get appropriate user consent to gather data for targeted advertising purposes.

THE COUNTDOWN HAS BEGUN

Windows 7 has been one of the most widely used operating systems ever, only recently being overtaken by Windows 10. Microsoft has announced that extended support for Windows 7 will end on 14 January 2020. This means that, while Windows 7 will still work, it won't receive essential updates. To continue receiving the latest feature and security updates, Microsoft recommends moving to Windows 10.

149 YEARS OF QWERTY

QWERTY is a keyboard design for Latin-script alphabets. The QWERTY layout was devised and created in the early 1870s by Christopher Latham Sholes, a newspaper editor and printer. The names comes from the arrangement of the first six letters in the top alphabet row of a standard keyboard.

Neurable, a startup in Cambridge Massachusetts, is working on a way to type with your thoughts and in the future we might say goodbye to the QWERTY keyboard.

Personal data is *valuable*

Seven of the world's ten most-valuable companies, by market capitalisation, are founded on tying data to human beings.
(Economist)

ETHICS IN TECHNOLOGY

Written by Bernard van Biljon

In 2018 we saw the tip of the iceberg in the complicated relationships that exist among technology companies, lawmakers and the public. Two of the most prominent examples were Theranos and Cambridge Analytica.

THERANOS BLOOD-TESTING SCANDAL

Theranos was founded in 2003 by a Stanford University dropout, Elizabeth Holmes. They claimed to have developed disruptive technology for diagnosing disease by testing very small amounts of blood. Theranos dubbed its blood collection vessel the "nanotainer" and its analysis machine the "Edison". The company was once valued at USD 10 billion.

In 2015 the *Wall Street Journal* ran an article reporting that Theranos was using traditional blood testing machines to perform its tests instead of the company's Edison devices. They had to dilute the blood as they had only a droplet to use, and traditional blood-testing machines required higher volumes.

> *"The dilution of blood tests resulted in inaccurate tests results issued to 167 000 customers"*

CAMBRIDGE ANALYTICA DATA SCANDAL

In early 2018 it was revealed that Cambridge Analytica, a British political consulting firm, had collected the personal data of millions of people's Facebook profiles without their consent and used it for political purposes.

The data was used to (very accurately) determine the user's personality according to the traits of the "Big 5" model. Political advertisements for Donald Trump's campaign were then tailored to appeal to a Facebook user's specific personality.

> *Cambridge Analytica claims that its use of private data in Facebook gave Trump the advantage to win the election*

TECHNOLOGY COMPANIES AND THE ETHICS DILEMMA

The rapid evolution of technology means that regulations always lag the application of new technologies. Managers of technology companies can be tempted to exploit the lack of regulation and violate the trust of their users to make profit.

In the case of Facebook, unethical behaviour continued. According to *Wired* magazine, there were 21 scandals at Facebook in 2018. The CEO of Theranos, Elizabeth Holmes, was eventually indicted on multiple counts of wire fraud in June 2018. Several other scandals during 2018 made it clear that the temptation to trade ethics for profit is not easily overcome.

WHAT CAN USERS DO TO PROTECT THEMSELVES?

Our first line of defence should be a deeper understanding of the technology we use, and how technology companies store, use and share our personal data.

The second line of defence is third party certification. When using new technologies such as self-driving cars or new blood tests, we should look for products that have third party certification.

As technology becomes an even more inescapable part of our lives, we will have to take ownership of how we interact with technology and technology companies. We can no longer blindly trust technology companies or rely on government to have adequate laws in place to protect us.

THE NEW WORLD OF WORK

Written by Niel Fourie

Economic folklore has it that the first building dedicated to centralised office work was founded in London in 1726 – a mere three centuries ago. Thousands of years before that, work was what people did, where they were; it was not a place they went.

The design of the workspace we and our parents knew, took its leaf from the industrial economic forces that shaped the world in the 1700s. However, the increasing dominance of a knowledge-based economy and advances in connectivity in the 1990s started raising questions about the validity of this 'factory-floor' design. There's been an increasing shift towards remote work – breaking with the idea that work has one address.

THE RISE OF THE CO-WORKING SPACE

Undesignated workspace – or the co-working model – has taken off in a big way. The concept of offering scalable shared and private workspaces to people, without high upfront costs or long-term commitments, started in 2005 and quickly grew to 70 global spaces within two years. Today there are more than 19,000 such spaces around the world.

Co-working giant WeWork is currently the largest corporate occupier of commercial real estate in London (second in size only to the British government), and the second-biggest private-office tenant in Manhattan.

REMOTE WORK: AN INCREASINGLY POPULAR OPTION

> *Currently, 53% of full-time professionals in the US work remotely for at least half the week.*

Industry surveys show that more than 90% of employees, from all generations, take advantage of their companies' remote-work policies, although Millennials (18 to 34) are more likely to use all their available remote work time. Given the option, 85% of this cohort would work from a remote location most of the time.

Many leading companies, including Microsoft, Facebook and Starbucks, have pivoted heavily towards co-working spaces. Research by West Unified Communications Services found that the number of remote workers is set to triple by 2020.

THE BENEFITS OF REMOTE WORK

With some exceptions, remote work has proven to be an extraordinary contributor to general wellness. Research by DeskMag and Indeed found that more than 50% of remote employees take fewer sick days, 42% eat healthier (and exercise more), 68% say they have better focus, and 71% report an increase in creativity.

According to Owl Labs' *State of Remote Work report*, companies that allow remote work experience 25% less turnover than companies which don't support it. A study by Mom Corps found that 42% of working adults said they would give up some salary if they are allowed to work from home more often.

- ▲ NUTRITIOUS MEALS
- ▲ CREATIVITY & INSIGHT
- ▲ FOCUS & ATTENTION
- ▼ SICK DAYS
- ▼ STAFF TURNOVER
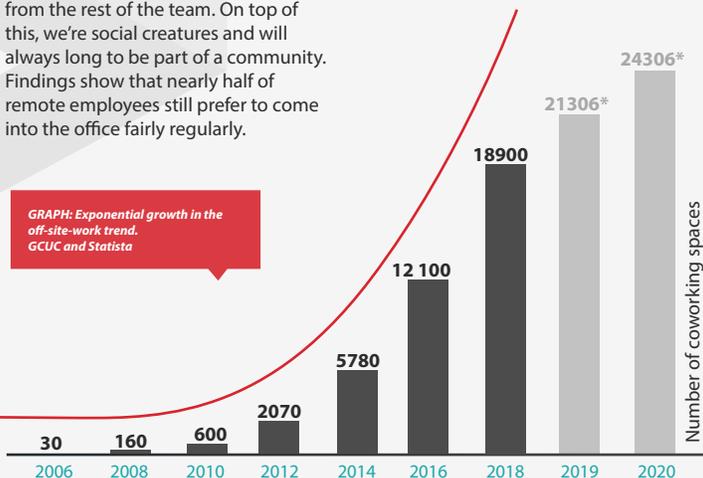- ▲ EXERCIZE & HEALTH
- ▲ RISK OF ISOLATION

SOME ISSUES TO BE ADDRESSED

One of the limitations of remote work – believe it or not – is the very same thing that enables us to work remotely: technology.

Numerous studies have shown that one of the first problems most businesses have when employees start working remotely is a drop in the **quality of communication**. Companies are therefore faced with a new challenge: to ensure they are equipped with communication methodologies and technology that foster collaboration among employees working in either a physical or virtual workspace.

It's also a challenge to make sure that remote workers stay in tune with a company's identity and ways of doing business, and don't become alienated from the rest of the team. On top of this, we're social creatures and will always long to be part of a community. Findings show that nearly half of remote employees still prefer to come into the office fairly regularly.

A two-year remote-work study by CTrip, China's largest travel agency, found an incredible productivity boost among employees – the equivalent of almost a full day of work every week – thanks to their remote work policy. However, after the study, more than half the participants asked to be rotated between the office and remote-work more often. Isolation was cited as their biggest grievance.

NEW CHALLENGES FOR A NEW WAY OF WORKING

It's important to note that industries and individuals differ, and remote work isn't a catch-all solution. That said, the idea that mind-work doesn't depend on having a permanent floor space in a building, or working between specific hours of the day after struggling through traffic for hours, is gaining momentum.

Any working conditions that obstruct quality output will be questioned ... and with this comes the new challenge of managing the output of a dispersed workforce effectively, and doing good work without a manager looking over your shoulder.

GRAPH: Exponential growth in the off-site-work trend. GCUC and Statista

Number of coworking spaces

2006	2008	2010	2012	2014	2016	2018	2019	2020
30	160	600	2070	5780	12 100	18900	21306*	24306*

THE HIGH COST OF THE COMMUTE

On average, motorists around the world spend 700 hours (**29 days**) a year commuting to work, with most spending approximately one hour going to or from work. One month a year just to get there!

South African motorists spend an additional 140 hours stuck in traffic every year, on average – close to **6 days**.

=35 days

ENJOY A CAREER FOR LIFE AS A SOFTWARE ENGINEER

Written by Pieter Mouton

Software engineers are in demand worldwide, and will be for the foreseeable future. If you have a passion for digital technology and love creating things that improve people's lives, software engineering could be a fulfilling and lifelong career for you.

DEMAND FOR TALENT SEEING UNPRECEDENTED GROWTH

The world of digital technology is growing by leaps and bounds and businesses in every industry are constantly finding new ways to apply these technologies. The Internet of Things (IoT), virtual reality and artificial intelligence provide exciting opportunities to take businesses to their next frontier.

Software engineers understand the fundamentals of these technologies and combine this knowledge with business acumen to design and develop software that fulfils business goals. For these reasons, the demand for software engineers is seeing significant growth.

HOW TO START YOUR CAREER

The road to becoming a software engineer starts at school. Software engineers typically excel at analytical thinking, problem solving and creativity. School subjects like mathematics, physical sciences and computer science help lay a foundation for these skills and prepare you for tertiary education.

After matriculating, consider a degree in engineering, computer science or information science.

> ## "24 of the 100 best-performing CEOs in the world, measured against the value they have created over a long period of time, have an engineering degree."
>
> *(Harvard Business Review)*

NEVER STOP LEARNING

To enjoy a successful, prosperous career as a software engineer, you must have an attitude of continuous learning. It's important to stay abreast of the latest technology and keep improving your technical, people and business skills throughout your career.
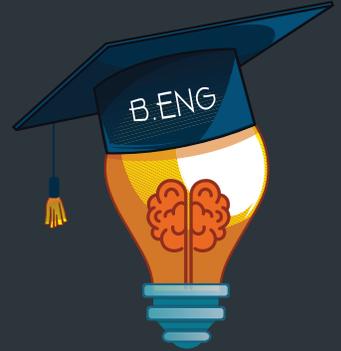
Your education and first few years as a software engineer will lay the foundation for the technical skills you need to build software products. But you also need to be able to work in a team, understand the business value of the software you are working on, and communicate and sell your ideas to team members and clients.

By focusing on improving these skills, you will have more options to further your career. For example, you may become a specialist in a specific technology, manage people and businesses, or consult with companies on their technology needs and strategy.

When starting your career, consider joining a company that provides training and mentorship for all these skills, as this will help you enjoy a career for life as a software engineer.

SA HAS THE HIGHEST CYBER-BULLYING RATES

A new study by Ipsos Global Advisor shows that South Africans experience the highest rate of cyberbullying in the world: 25% of parents reported that their child had been bullied online and 45% said they knew a child who had been a victim.

ONLINE SHOPPING GROWTH

Economists expect local online sales for 2018 to exceed R18 billion, making up 1.8% of SA's total retail spend (UK: 19%, US: 10%, Australia: 7.2%), up 25% from 2017. Online spending in SA has more than tripled over the past five years.

CYBERCRIME ON THE RISE

According to the South African Banking Risk Information Centre (SABRIC), South Africa has the third-highest number of cybercrime victims worldwide, resulting in a loss of about R2.2 billion each year due to cyberattacks. The bulk of these attacks come in the form of identity theft, merchant and corporate data breaches, phishing and ransomware. A report by Kaspersky Lab also revealed that more 50% of South Africans have had their financial credentials compromised (41% of whom never got their money back).

BORING AI TOOLS SEARCH FOR MEANING IN BIG DATA

Written by Hugo Human

Sifting through terabytes and terabytes of data to find meaning and trends is boring – and that's where the real value of machine learning and artificial intelligence (AI) lies for enterprises.

Market interest in AI and big data has increased in the last few years. In a survey by *NewVantage* Partners, more than 96.4% of participants believed that AI or machine learning will have the greatest business impact over the next decade, up from 68.9% in 2017.

GREATER INSIGHTS AT A LOWER COST

Databricks Incorporated, a company that provides "boring AI" software to clients, raised USD 250 million in funding from Microsoft Corporation, and was valued at USD 2.75 billion. This is a big move from Microsoft in advancing the field of artificial intelligence.

If used correctly, these technologies will allow enterprises to process large amounts of data using machine learning techniques, and get valuable insights into their business and clients at a fraction of the cost. They could also add immediate business value to an existing cloud-based solution

hosted on Azure, as Databricks will be incorporating its AI solutions into these existing Microsoft services.

This kind of investment in "boring AI" and big data is a clear indication to all businesses that they need a well-defined strategy to advance in this field. Finding a good partner that understands these value-added services is vital.

AI AT HEATHROW

London's Heathrow airport will start trialling a new AI (artificial intelligence) system that could dramatically reduce delays caused by low visibility on runways.

When visibility is low, air-traffic controllers rely on radar to know if an aircraft has left the runway, and add extra time between each landing to ensure safety. This results in a 20% loss of landing capacity, delays for passengers, and knock-on disruption for the rest of the operation.

Now, 20 ultra-high-definition cameras installed across the airport will feed images into an advanced neural network framework called Aimee. Aimee will track aircraft movement and inform controllers when an aircraft has cleared the runway. To ensure accuracy, the system will study the behaviour and patterns of more than 50,000 aircraft landing at Heathrow.

PEOPLE, (NOT TECH) ARE THE BIG-DATA BOTTLENECK

Business adoption of big data and AI continues to challenge most organisations, according to NewVantage Partners' 2019 survey.

The bottleneck is not technology, but people. Business spending is focused on technology – few initiatives are devoted to developing employee behaviours and attitudes that will establish the culture required for a data-driven organisation.

BIG DATA STRUGGLES

"Although 97.2% of firms are investing in big data/AI initiatives according to last year's survey, we see that firms are struggling to treat data as a business asset, become data-driven, and compete on data and analytics."

(NewVantage Partners Big Data and AI Executive Survey 2019)

CREATING DIGITAL LEADERS

WE INNOVATE VALUABLE SOFTWARE FOR CLIENTS IN DIVERSE INDUSTRIES ACROSS THE GLOBE.

Our development approach covers the full product life cycle of software, from inception and construction to maintenance and support and includes Business-, Mobile- and IoT-software.

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