WHAT'S NEXT IN TECH?

HOW WILL
EMERGING TECHNOLOGIES
INFLUENCE
YOUR BUSINESS LANDSCAPE
OVER THE NEXT
5
YEARS?

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AROUND THE WORLD

The spread and influence of technology over the next five years will be a key driver of change across the globe. However, there will be regional differences and some countries will leapfrog traditional cycles of development.

In this paper we discuss these regional factors and consider how technology changes will impact consumers, retailers and consumer-facing brands.

We identified 14 technology shifts in play over the next five years. The top four rankings included:

> **THE SPREAD OF EXISTING TECHNOLOGY AND INFRASTRUCTURE**
>
> **MACHINE LEARNING AND DECISION MAKING**
>
> **BIG DATA AND ARTIFICIAL INTELLIGENCE**
>
> **CASHLESS PAYMENT TECHNOLOGY**

We also ranked the likelihood of future scenarios and outcomes that the convergence of technologies could bring to consumers, retailers and suppliers. The top ranked outcomes globally were:

- **Consumers:** Technology for convenience; and consumers willing to accept suggestions from devices will likely see a rise in programmatic consumption – tied in first place in the consumer field.

- **Retailers:** Instant payment – as baskets are captured and paid for as consumers walk out of the store.

- **Consumer-facing brands:** Using technology for brand building and public relations purposes.

Technology adoption and impact will not be homogenous and there are a number of regional differences that are explained by our experts in terms of consumer, economic, political and other considerations. These factors provide insights to which technologies in which markets may be important to focus on during the next five years.

WHAT'S NEXT IN TECH?

Over the past decade we have seen technology accelerate change in society and create a connected world like never before. An event, product or story starts in one place and spreads across the globe at a staggering speed. New and emerging technologies are constantly reshaping our lives – the way we do business, interact socially, learn about the world, or are entertained is completely different today than it was 10 years ago. We do not always see these technologies coming, or the changes that they bring. The evolution of technology raises a number of questions to be explored:

> WHY DO SOME TECHNOLOGIES FIND FERTILE GROUND AND FLOURISH WHILE OTHERS WITHER AND DIE? WHAT EMERGING TECHNOLOGIES WILL INFLUENCE SOCIETY MOST IN THE NEXT FIVE YEARS? AND WHAT WILL THIS MEAN FOR CONSUMERS, RETAILERS AND SUPPLIERS?

It is important to consider the barriers and opportunities that will impact wide-spread adoption of technology as this is critical to understand how technology will scale across regions.

We can't predict the future, but the insights we gained shed light on how technology might take shape and influence the everyday lives of consumers around the world.

> THIS REPORT IS INTENDED TO BE A "CONVERSATION STARTER" – A FIRST STEP TO HELP COMPANIES PREPARE TO BENEFIT FROM THE FAST-APPROACHING TECHNOLOGY FUTURE, RATHER THAN BE BLINDSIDED BY WHAT THEY DID NOT SEE COMING.

Over the coming years, it is important to stay attuned with technology trends. The development, spread, and use of technology varies around the world due to the influence of the vast economic, cultural, political and social differences that are at play. A technology trumpeted as a game changer for the world, may in reality only take root in specific mature markets. A technology designed for a specific use in one market might end up being used for a completely different application somewhere else. Some emerging technologies may be "game changers," but with a considerably longer lead time beyond the next five years.

Here are the 14 technology shifts we have considered. Read on to learn more about each shift: what it is, how it is being used and a forecast of its likely impact in the future.

TECHNOLOGY SHIFTS WITH BIGGEST IMPACT

SPREAD OF EXISTING TECHNOLOGY AND INFRASTRUCTURE

BIG DATA AND ARTIFICIAL INTELLIGENCE

MACHINE LEARNING AND DECISION MAKING

ALL RANKED FIRST

CASHLESS PAYMENT TECHNOLOGY

THE SHARING ECONOMY

ROBOTICS, DRONES AND AUTOMATED SERVICES

THE INTERNET OF THINGS (IOT) – CONNECTED HOMES AND CITIES

NEW ENERGY TECHNOLOGIES – RENEWABLE, EFFICIENT, CHEAP

AUTONOMOUS TRANSPORT SYSTEMS

WEARABLE INTERNET DEVICES

VIRTUAL AND AUGMENTED REALITY

3D PRINTING – CONSUMER, MEDICAL AND MANUFACTURING

MEDICAL TECHNOLOGIES – IMPLANTABLE, REPLACEMENT, DNA

NANOTECHNOLOGY AND SMART MATERIALS

14 TECHNOLOGY SHIFTS >>

SHIFT 1*: SPREAD OF EXISTING TECHNOLOGY AND INFRASTRUCTURE

This shift involves the scaling up and utility of existing technologies that are already mainstream in much of the world. One key example is the Internet and related improvements (bandwidth and speed) that support many other technologies. Another is the growing penetration of mobile and smartphone subscriptions and products, including apps. These types of technology are becoming more affordable and accessible and the increased connectivity provides a gateway to evermore social and consumer interactions. The scaling up of these technologies is rapidly unlocking banking and e-commerce services and creating deeper consumer engagement with products and brands. Consumer adoption of smart phones is also radically changing their consumption of media content and advertising to be more personal and available than ever before.

Forecast: 1 billion more Internet users globally 2015–2020

Source: www.warc.com

SHIFT 2*: BIG DATA AND ARTIFICIAL INTELLIGENCE

This shift includes technologies that are gathering and processing increasingly huge amounts of data to enhance macro-scale or big system management. Rapidly improving computer processing and memory capability are now enabling governments to have real time insights on traffic flows, energy use, pollution and much more. Increasingly, these technologies will have automated responses built in to seek out efficiencies and act on them via dynamic learning, for example adjusting traffic flow systems and maximising energy use. Large companies, particularly multinationals, are already looking toward big data and artificial intelligence technologies to better understand consumer behaviour, enhance logistics, and for financial trading.

Forecast: By 2020, big data and the business analytics market will grow to $203 billion, double what it was in 2015

Source: IDC

SHIFT 3*: MACHINE LEARNING AND DECISION MAKING

These technologies include software, programs and devices that learn and assess the behaviour of households and individual consumers. They are increasingly making decisions, offering advice and taking actions. Smartphones are one example of where these technologies are being integrated. In the coming years, smartphones will become more and more like a personal assistant by offering automatic prompts, reminders and suggestions. They will become an ever more vital tool to help people with basic tasks and decisions - including consumer purchases - as lifestyles become more hectic.

Forecast: By 2020, 20% of delivered purchases will come from suggested or prompted services on devices

Source: Nielsen Scenarios
N.B These are not forecasts but estimates used in exercises to create directional positions.

All three shifts were ranked first.

SHIFT 4: CASHLESS PAYMENT TECHNOLOGY

These technologies provide non-cash payment solutions such as "swipe and pay" retail purchases with your phone, the non-cash currency and payment system of Bitcoin, and highly secure "blockchain" databases for business and international transactions. In half a dozen countries, 50–70% of consumer transactions are already cashless. The convergence of secure payment technologies with the often insecure currency systems in many developing countries will likely drive a massive upsurge of cashless payment technology and usage.

Forecast: By 2020, 30% of global retail sales will be made through an app or software

Source: Nielsen Scenarios

SHIFT 5: THE SHARING ECONOMY

These include platforms that leverage technology to connect private buyers and sellers in non-traditional ways. They provide individuals an online "marketplace" that links small pockets of supply and demand and over increasingly broader geographic areas. Examples include online platforms for short-term accommodation rentals, peer-to-peer financial lending, crowd-sourcing, car sharing, and general trade. A number of companies that develop platforms to facilitate such connections and exchange are doing extremely well. As these technologies further develop and expand, they will drive entrepreneurship and in developing countries in particular, provide opportunities for rural producers to connect directly with a market, without going through a "middle man."

Forecast: By 2020: the global sharing economy will be worth $100 billion

Source: www.GreenBiz.com

SHIFT 6: ROBOTICS, DRONES AND AUTOMATED SERVICES

This grouping includes automated and "smart" machinery and systems that can take over human tasks. For example we are seeing the emergence of automated warehouses and distribution centers as well as huge advances in healthcare robots. Global companies such as DHL, Amazon and Dominoes are investing heavily in developing and testing delivery drones for their products. Other companies are looking at manufacturing robotics and machinery to cut down on production costs and automate their supply chains. Governments too are exploring opportunities, like in Singapore where drones are being tested for mail delivery. In remote areas, such as rural Africa, drones could become an efficient way to deliver medicinal products.

Forecast: By 2019 major logistics companies will have 100% automated supply chains

Source: Nielsen Scenarios

SHIFT 7: THE INTERNET OF THINGS (IOT) – CONNECTED HOMES AND CITIES

New technology is creating "smart" networks within homes or cities. Sensors that communicate with each other pick up and relay information which is then processed to make automated decisions for efficiency gains and other benefits. Increasingly these technologies are creating systems that are self-examining and self-adjusting. Cities utilising such technologies can generate data to find optimal solutions for pollution control or address traffic congestion. For households, these technologies will enable a myriad of benefits. For example, automatically turning on or off heating and cooling systems depending on whether you are about to arrive at home or have just left. Or perhaps automatically ordering staple foods that fridge sensors detect are running low.

Forecast: By 2020, 34 billion devices will be connected to the Internet; $6 trillion will be spent on IoT solutions in the next five years

Source: www.Forbes.com

SHIFT 8: NEW ENERGY TECHNOLOGIES – RENEWABLE, EFFICIENT, CHEAP

Cost reductions of existing energy technologies as well as emerging new materials and forms of energy technology will provide more competitive options for energy use. Some high profile and big corporations have made it a priority to use 100% renewable energy over the next few years and will benefit via improved sentiment from consumers interested in sustainability issues. Companies that successfully use these technologies will reduce their energy costs and increase their competitiveness. For households, cheaper and more efficient energy use will provide more disposable income.

Forecast: By 2020, 26% of the world will run on renewables

Source: IEA

SHIFT 9: AUTONOMOUS TRANSPORT SYSTEMS

This shift includes autonomous vehicles along with the supporting infrastructure to operate them and reduce congestion, accidents, energy use and pollution emissions. Already self-parking cars are on the market and companies such as Uber are investing heavily in research and development for autonomous vehicle technology. The development of technologies in this group is happening more quickly than expected. The next wave in the majority of the materials viewed will be connected transport systems.

Forecast: By 2020, 10 million self-driving cars on roads

Source: www.BusinessInsider.com

SHIFT 10: WEARABLE INTERNET DEVICES

These include any type of device, clothing or product worn that has sensors to record, send and receive data. These wearable Internet devices will interact with apps and other technologies. Some of this technology is already found in smartphones or watches, and will soon be integrated directly into clothing and accessories. For example, sports gear with inbuilt sensors to track performance, or other wearable technology tailored for personal security management or health and wellness. These technologies are becoming increasingly personalised to more effectively track and understand behaviour.

Forecast: By 2020, most new fitness wear will come with connected apps

Source: Nielsen Scenarios

SHIFT 11: VIRTUAL AND AUGMENTED REALITY

The virtual and augmented reality technologies focus on touch, motion and smell. They include technologies for training and education, entertainment and guided retailing. For example, displays and teaching aids that are incorporated into eye glasses, windscreens, phones, screens, or headsets will immerse people in a different virtual reality or enhance the environment they are in. Technology companies are looking at overlaying data points and visualisations displayed on phones and glasses to give users additional information they want on the scene being viewed. Retailers could use such technologies to provide consumers with a deeply immersive and interactive visual display of their products.

Forecast: Augmented reality will grow 108% per year until 2020

Source: IDC

SHIFT 12: 3D PRINTING – CONSUMER, MEDICAL AND MANUFACTURING

This group includes the development and application of 3D printing technology. Potential new products could be printed ranging from medical products such as human tissue, prosthetic limbs and organs, to consumables such as customised sneakers, to the construction of houses. There are emerging examples of 3D printing technology being employed to customise food with an exact mix of nutrient types and quantities. As the cost of these technologies come down, the range and frequency of use will grow considerably.

Forecast: By 2020, the 3D printing market will be worth $35.4 billion

Source: IDC

SHIFT 13: MEDICAL TECHNOLOGIES – IMPLANTABLE, REPLACEMENT, DNA

Advances in technology has also seen the emergence of a new wave of medical solutions. Medical implants can monitor human data to improve health, identify disease and ultimately prolong life. More sophisticated DNA testing and sequencing is enabling pre-emptive treatment, while technology that interacts with outbound brain activity (including nerve waves) facilitates direct control and engagement with devices.

Although developed for medical application, these technologies are quickly leveraged across broader industries such as entertainment (toys, devices) and automotive.

People are becoming more and more connected to devices, and those devices are increasingly becoming connected to their bodies. Devices are not just being worn, but also being implanted into bodies, serving communications, location and behaviour monitoring, and health functions.

There is discussion in innovative circles that one day these implants could serve as our "internal" identification, payment and communication tools and redefine the way we think of ourselves in a connected system.

Forecast: By 2020, computer-brain interfaces will be functional

Source: Intel

SHIFT 14: NANOTECHNOLOGY AND SMART MATERIALS

Nanotechnology - engineering of functional systems at a molecular scale - has long been heralded as the next big breakthrough in tech-enabled capabilities. It includes technological innovations in smart medical delivery systems for drugs and the improvement of current materials and liquids to enhance their properties. For example, slow release healthcare creams, liquids that have sensors, and smart building materials such as bricks and tiles that have solar capability. It also includes the development of almost entirely new materials that have transformative impacts such as tissue mimicry.

The fusion of sensors into materials in items such as packaging could revolutionise the way we track products or gain information on storage conditions as just one example.

Forecast: By 2021, the nanotechnology market will generate $12 billion in revenue

Source: Global Newswire

WHAT ARE THE TECHNOLOGIES MOST LIKELY TO IMPACT OUR WORLD IN THE NEXT 5 YEARS?

GLOBAL TAKEAWAYS

Four technology shifts were seen as having the most impact:

- Existing technology and infrastructure

- Machine learning and decision making

- Big data and artificial intelligence

- Cashless payment technology

The spread, evolution and greater utility of existing technology will be just as important, if not more, than the emergence of "cutting edge" technology.

The top four technology shifts have two key aspects in common: connectivity and data.

By 2020, 1 billion more people will have access to the internet, and this will be a game changer not only for them, but also for retailers and suppliers through the sheer volume of connected consumers.

This connectivity will drive the development and utility of machine learning and decision making. Our devices will increasingly learn our personal behaviours, understand our needs and suggest purchases, actions and options for us to instantly accept or decline.

Big data and artificial intelligence already exists but as data availability increases and capability evolves, companies and countries will be able to utilise it to gain greater consumer and societal insights and manage complex systems at a macro level.

Cashless payment technology is already widespread in many mature markets, but has great potential in developing countries to facilitate the wheels of commerce, including entrepreneurial endeavours and consumer convenience.

Technology shifts such as autonomous vehicles, virtual and augmented reality, nanotechnology and smart materials, and 3D printing technology command a great deal of media coverage but did not rank highly in our assessment. This is likely because adoption and impacts will be outside the five year timeframe, costs and other barriers are high, or they are not particularly relevant in all industries.

The convergence of technology shifts combined with external factors such as governance will determine the real world outcomes for consumers, retailers, and suppliers.

One major outcome of technology shifts over the next five years will be the rise of programmatic consumption. This will be driven by a convergence of technologies such as machine learning, cashless payment systems and drones. Based on the consumer's behavioural data, phones and other devices will suggest purchases or actions and redefine convenience through automated delivery or pick up options.

A likely outcome for retailers will be instant payment systems within stores that provide consumers with a more enhanced and convenient shopping experience. The integration of cashless payment technologies with machine learning and artificial intelligence will enable retailers to automatically assess what products consumers have selected and receive instant payment as they walk out of the store.

For suppliers, a likely outcome will be the utilisation of cutting edge technology for brand-building exercises. As virtual and augmented reality and 3D printing technologies become more affordable, a growing number of companies will look to leverage this technology to showcase their products and connect with consumers in new ways.

9 TRENDS SHAPING YOUR BUSINESS LANDSCAPE

THE GLOBAL PERSPECTIVE

The rapid evolution of technology will bring about several important shifts in the consumer landscape. By recognising and understanding these shifts, retailers and consumer-facing brands can anticipate future need-states and shape their strategy to tap into the opportunities that unfold in the years ahead. **>>**

CONSUMER SCENARIOS

SCENARIO 1:
TECHNOLOGIES FOR CONVENIENCE

DESCRIPTION:

Consumers will trade-off between price and convenience for time-saving benefits. Delivery technology will facilitate the rise of programmatic choice and delivery consumption.

TECHNOLOGIES LEVERAGED:

ROBOTICS

INTERNET OF THINGS

MACHINE LEARNING

ARTIFICIAL INTELLIGENCE

WEARABLE INTERNET

SCENARIO 2:
PROGRAMMATIC CONSUMPTION

DESCRIPTION:
Consumers will accept recommendations on everything from where to eat, what to wear, what to watch and where to vacation.

Recommendation-based purchasing will increase significantly.

TECHNOLOGIES LEVERAGED:

INTERNET OF THINGS

MACHINE LEARNING

ARTIFICIAL INTELLIGENCE

WEARABLE INTERNET

SCENARIO 3:
TECHNOLOGY FOR AGEING CONSUMERS

DESCRIPTION:
Ageing consumers will rely on technology in their daily lives for services such as shopping, health services as well as consumption choices.

TECHNOLOGIES LEVERAGED:

INTERNET OF THINGS

MACHINE LEARNING

ARTIFICIAL INTELLIGENCE

WEARABLE INTERNET

RETAILER
SCENARIOS

SCENARIO 1:
INSTANT PAYMENT

DESCRIPTION:
Checkout and payment processes will give way to technologies "capturing" basket data and payment on exit.

TECHNOLOGIES LEVERAGED:

MACHINE LEARNING

CASHLESS PAYMENT TECHNOLOGY

SPREAD OF EXISTING TECHNOLOGIES

SCENARIO 2:
RETAILERS CONNECTING TO DEVICES

DESCRIPTION:
Retailers will be able to connect and communicate with consumers in store, automatically connecting via devices to loyalty data offering customised experiences and offers in real-time.

TECHNOLOGIES LEVERAGED:

INTERNET OF THINGS

CASHLESS PAYMENT

WEARABLE INTERNET

SCENARIO 3:
AUGMENTED REALITY FOR IN-STORE TOURS

DESCRIPTION:
Consumers will be given a customised, guided store tour with augmented reality; alerting them to certain specials and information based on past purchases.

TECHNOLOGIES LEVERAGED:

VIRTUAL/AUGMENTED REALITY

CASHLESS PAYMENT

WEARABLE INTERNET

CONSUMER-FACING BRAND SCENARIOS

SCENARIO 1:
BRAND BUILDING THROUGH TECHNOLOGY

DESCRIPTION:
Brands will capitalise on the digital environment created by virtual and augmented reality to connect with consumers in new and exciting ways.

TECHNOLOGIES LEVERAGED:

NEUROSCIENCE

3D PRINTING

VIRTUAL/AUGMENTED REALITY

SCENARIO 2:
AUTOMATED CONSUMPTION

DESCRIPTION:

In-home operating systems will keep stock of supplies, usage patterns and product preferences and automatically order products directly from suppliers.

TECHNOLOGIES LEVERAGED:

SPREAD OF EXISTING TECHNOLOGY

INTERNET OF THINGS

MACHINE LEARNING

SCENARIO 3:
NEW COMMUNICATION PLATFORMS

DESCRIPTION:

Consumer-facing brands will adjust to and generate a number of interactive platforms. Proximity marketing will bring consumers in-store and online. Augmented and virtual reality will be used to build customised offerings based on a consumers' past purchasing behaviour.

TECHNOLOGIES LEVERAGED:

WEARABLE INTERNET

SPREAD OF EXISTING TECHNOLOGY

INTERNET OF THINGS

BIG DATA

VIRTUAL/AUGMENTED REALITY

HOW WILL THESE SHIFTS PLAY OUT BY REGION?

While there are numerous common trends occurring across the world, the development, adoption and impact of technology is far from uniform. Economic development, culture, religion, infrastructure and other factors play a huge role in shaping the technologies that will be embraced and embedded in society.

Here we break down the major technology shifts by geography to illustrate the predicted outcome across 10 key regions: Southeast Asia, Pacific, China, India, Middle East, Sub Saharan Africa, Eastern Europe, Western Europe, North America and Latin America.

SPOTLIGHT ON SOUTHEAST ASIA

TECH SHIFTS WITH BIGGEST IMPACT

SOUTHEAST ASIA

THE SHARING ECONOMY (4)
SPREAD OF EXISTING TECHNOLOGY AND INFRASTRUCTURE (3.8)
BIG DATA AND ARTIFICIAL INTELLIGENCE (3.6)
CASHLESS PAYMENT TECHNOLOGY (3.2)

In a region as diverse as Southeast Asia with both emerging and mature markets, it is no surprise that the extent to which various technology shifts impact on local markets varies significantly. Markets dominated by rural unconnected populations will gradually be transformed by large investments in nationwide infrastructure and development. Urban centres will blossom into high density living where consumers will move at a more frantic pace and become increasingly focused and involved with technology. Urban Southeast Asian consumers are some of the most connected in the world and their reliance on personal devices (phones) suggests that they will be more open to programmatic consumption, either in-store or via in-home systems connected with automatic ordering. As nearly half of Southeast Asia's population will still be living in rural areas in 2025, the spread of existing technology and infrastructure and cashless payment technology will have significant implications for rural consumers, retailers and suppliers.

FUTURE OUTCOMES

TOP CONSUMER SCENARIO
- PROGRAMMATIC CONSUMPTION

TOP RETAILER SCENARIO
- IN-STORE CONNECTION TO DEVICES

TOP CONSUMER-FACING BRAND SCENARIO
- BRAND BUILDING THROUGH TECHNOLOGY

Nicole Corbett
Director
Thought Leadership
Nielsen Growth Markets

Without Internet connection and device ownership, the impact of technology is limited. While it may play a stronger role in developed digital markets – evolution in developing markets with a heavy rural population and reliance on traditional trade and lower purchasing power will slow the rollout of technology in the retail space.

Yongyut Ongwattanapat
Executive Director
Southeast Asia
Nielsen Emerging Markets

Although automation, AI and robotics are hot topics, I believe technology will always require human direction and expertise. While it will take some of the heavy lifting out of certain tasks, its effectiveness will be determined by the direction and expertise of skilled people. In Southeast Asia, while wages remain competitive, it will be harder for companies to justify huge upfront costs and investment into automation.

SPOTLIGHT ON PACIFIC

FUTURE OUTCOMES

TOP CONSUMER SCENARIO

TECHNOLOGY FOR MORE CONVENIENCE

TOP RETAILER SCENARIO

INSTANT BASKET CAPTURE

TOP CONSUMER-FACING BRAND SCENARIO

BRAND BUILDING THROUGH TECHNOLOGY

TECH SHIFTS WITH BIGGEST IMPACT

PACIFIC

- ROBOTICS – DRONES AND SERVICES (5)
- MACHINE LEARNING AND DECISION MAKING (5)
- BIG DATA AND ARTIFICIAL INTELLIGENCE (4.5)
- THE INTERNET OF THINGS – CONNECTED HOME AND CITIES (4)

In the comparatively mature technology markets such as Australia and New Zealand, the implementation of new technologies like robotics and drones, the Internet of Things and autonomous transport systems is becoming more viable. These technologies can be integrated with existing infrastructure and the investment costs are realistic.

While examples of drone deliveries and automated services could be considered pure marketing, they have received significant media attention and along with machine learning and decision making, have the most potential to affect significant technology shifts. Convenience is a key priority for consumers in this region and these visible technologies showcase how technology may continue to improve consumer lives.

Stefan Nordbruch
Senior Manager,
Client Service Lead
Nielsen New Zealand

Artificial intelligence and decision support systems will eventually replace middle management and workers over time. Particularly in financial services, already AI engines analyze tweets and trade automatically based on machine learning. In retail, Amazon's Dash Button while only a trial, still has big implications. For example, what if only the biggest brands are on consumers' consideration list? But e-commerce represents the contrary view where virtual shelf-space is unlimited, small brands can be on equal ground with the big players. New Zealand is already predominantly a cash-free society and while jumping out of an Uber without "paying" is convenient, it is not changing what we buy and do.

Nathan Crum
Associate Director,
Media Industry Group
Nielsen Australia

It's inevitable that almost every retailer and supplier, in some way, will adopt technology to either improve or streamline their proposition to consumers. However, Australians have grown to expect a seamless or frictionless experience. The biggest challenge for retailers and suppliers will be how they can deliver the best possible experience. Technology will enable it, but the question is which brands will invest the resources to improve their consumers' experience.

SPOTLIGHT ON CHINA

TECH SHIFTS WITH BIGGEST IMPACT

CHINA

- CASHLESS PAYMENT TECHNOLOGY (4.3)
- NEW ENERGY TECHNOLOGY (4.3)
- MEDICAL TECHNOLOGY – NEURO (4.3)
- MACHINE LEARNING AND DECISION MAKING (3.7)

During the last 20 years, there has been massive investment in infrastructure and technology in China. Along with urbanisation, economic growth and government investment on a sustainable and cleaner future, we have witnessed a transformation in consumer uptake of technologies.

Chinese consumers have shown an appetite for embracing a future driven by technology and are leading certain technological advancements, putting them on a sharp trajectory ahead of other regions. The government's support and desire to lead the world in new energy and medical technologies will be a strong enabler for mainstream rollout, Meanwhile, increasing urbanisation and fast paced lifestyles within China's megacities explain the likelihood that cashless payment technology and machine learning and decision making will have a significant impact in the near future.

FUTURE OUTCOMES

TOP CONSUMER SCENARIO

PROGRAMMATIC CONSUMPTION

TOP RETAILER SCENARIO

IN-STORE CONNECTION TO DEVICES

TOP CONSUMER-FACING BRAND SCENARIO

BRAND BUILDING THROUGH TECHNOLOGY

James Gong
Vice President
Telecom and Technology
Nielsen Greater China

I think artificial intelligence, nanotechnology, energy tech and medical technologies will make a fundamental difference to the well-being of Chinese people so will be a focus in the next five years.

Some of the technologies discussed here are focused on giving more time back to the consumer such as machine learning and AI, but what will consumers do with this time? Will there be more time and willingness for brand engagement?

Del Levin
Vice President
Digital Ad Rating
Nielsen Greater China

Green technology and interconnected cities will move at a far greater pace than anywhere else in the world as it can only occur in a country with strong, clear central government policy and investment. It's the same with medical advancements. China is leading in gene editing and other controversial but important areas. China will also lead in interconnected homes, AI, and automation of services via drones. It is not because China is any better than the rest of the world in innovation, but the centralised, regulatory structure facilitates development.

SPOTLIGHT ON INDIA

FUTURE OUTCOMES

TOP CONSUMER SCENARIO

| TECHNOLOGY FOR MORE CONVENIENCE

TOP RETAILER SCENARIO

| IN-STORE CONNECTION TO DEVICES

TOP CONSUMER-FACING BRAND SCENARIO

| BRAND BUILDING THROUGH TECHNOLOGY

| AUTOMATED CONSUMPTION

TECH SHIFTS WITH BIGGEST IMPACT

INDIA

- SPREAD OF EXISTING TECHNOLOGY AND INFRASTRUCTURE (3.8)
- THE SHARING ECONOMY (3.5)
- BIG DATA AND ARTIFICIAL INTELLIGENCE (3.5)
- CASHLESS PAYMENT TECHNOLOGY (3.5)

Over the past 15 years, India has been considered an emerging giant with its huge population and the structural, social and economic development unfolding. Investment in infrastructure has been a primary focus and has significant implications for technology. This is driving the spread of existing technology which enables the sharing economy to emerge as rural areas gain access to technology solutions. The government's recent demonetisation policy has led to increased calls for cashless payment technology. With its huge population generating more and more digital touchpoints, big data and AI is a logical technology progression. These conditions, although not unique to India, provide the perfect backdrop for technology shifts to have a significant impact in the consumer, retailer and supplier environments.

Prashant Singh
Digital Retail Leader
Nielsen India

> Digital IDs and payments powered by biometrics will be available in most smart devices in the near future. This will lead to secure identity management and increased digital payments, especially in developing markets with low credit card penetration. The card as we know it will become redundant, as identity will be established by biometrics rather than a piece of plastic.

Sumit Rastogi
Vice President
Digitalisation, Global Consumer Insights and Innovation Operations
Nielsen India

> Country demographics need to be considered in regard to the uptake of technology. Young people account for 35% of India's population and they are more likely to adopt relevant technology than regions such as Europe where populations are older and more resistant to embracing change and technology. However, we must consider what is most important to consumers. How conveniently and effectively are their problems being solved? They may not even realise they are interacting with these technologies. When shopping on Amazon.com, many consumers are oblivious that Amazon is using AI, big data analytics to deliver them a better experience.

SPOTLIGHT ON MIDDLE EAST

TECH SHIFTS WITH BIGGEST IMPACT

MIDDLE EAST

- THE INTERNET OF THINGS – CONNECTED HOME AND CITIES (3.7)
- CASHLESS PAYMENT TECHNOLOGY (3.7)
- BIG DATA AND ARTIFICIAL INTELLIGENCE (3.2)
- SPREAD OF EXISTING TECHNOLOGY AND INFRASTRUCTURE (3.3)

Many countries in the Middle East region are aggressively looking to establish technology development hubs, such as Dubai with its focus on smart transport systems. This investment in technology innovation is in pockets however and is focused on global leadership rather than just regional consumers.

The Internet of Things, cashless payment technology, big data and AI, along with the spread of existing technology and infrastructure will all play a role in reshaping the region's consumer landscape in the next five years.

With consumers adopting a more modern, convenient lifestyle technology is a key enabler as well as having a role to play in societal change. The retail landscape features modern large shopping malls and these are an excellent environment for suppliers to use technology as a brand building platform.

FUTURE OUTCOMES

TOP CONSUMER SCENARIO

- TECHNOLOGY FOR MORE CONVENIENCE
- TECHNOLOGY ASSISTING AGED CONSUMERS

TOP RETAILER SCENARIO

- INSTANT BASKET CAPTURE

TOP CONSUMER-FACING BRAND SCENARIO

- BRAND BUILDING THROUGH TECHNOLOGY

Danny Mendonca
Innovations Lead
Nielsen Emerging Markets
(Africa and Middle East)

Technology will play a big role in traditionally conservative countries like Saudi Arabia and will open whole new channels and brand experiences for females via e-commerce and virtual reality. Government agendas will also influence technology development such as in the UAE, where their 2030 vision is to have 25% of all transportation in Dubai to be smart and driverless.

Sue Temple
Head of Shopper Practice
Nielsen Growth and
Emerging Markets

The technology solutions that enable brands and retailers to meet both shopper needs as well as deliver operational benefits will be the game changers. Virtual Reality will enable the customer to experience brands across a range of industries like never before from supermarkets, fashion, electronics, cars and homes.

SPOTLIGHT ON SUB SAHARAN AFRICA

FUTURE OUTCOMES

TOP CONSUMER SCENARIO

| PROGRAMMATIC CONSUMPTION

TOP RETAILER SCENARIO

| IN-STORE CONNECTION TO DEVICES

TOP CONSUMER-FACING BRAND SCENARIO

| BRAND BUILDING THROUGH TECHNOLOGY

TECH SHIFTS WITH BIGGEST IMPACT

SUB SAHARAN AFRICA

CASHLESS PAYMENT TECHNOLOGY (4.4)
SPREAD OF EXISTING TECHNOLOGY AND INFRASTRUCTURE (4.2)
BIG DATA AND ARTIFICIAL INTELLIGENCE (3.2)
NEW ENERGY TECHNOLOGY (3.2)

Sub Saharan Africa, building from a traditional low base in terms of infrastructure, technology and consumer spending power, is expected to accelerate and offer enormous opportunities for organisations across all consumer industries in the future. Basic technology drivers need to be implemented such as the spread of existing technology and infrastructure, new energy technology and cashless payment technology. With some of the lowest rates of Internet penetration in the world (22%*), an improvement in existing technologies would have a fundamental impact for this region. New energy technology is needed to facilitate other technology advancements. There are examples of startups across the region providing off grid solutions for $7 a month through solar energy while other larger scale projects are also racing ahead. Africans are also keen for cashless payment technology to alleviate traditional challenges with currency fluctuation, fraud, and limits to business and personal needs. As technology and infrastructure converge, it will transform the consumer, retail and supplier landscape by introducing opportunities for big data and AI, programmatic consumption and even in-store connection from retailers to devices. However, the extent of mainstream adoption will be limited until infrastructure and consumer spending power improves.

Source: http://www.thestar.com.my

Ato Micah
Commercial Director (RMS)
Market Lead
Nielsen Nigeria/Ghana
(East West Africa)

In Ghana and Nigeria, where traditional trade is dominant (90%), the retail landscape will be transformed within the next five years with the adoption of loyalty cards – which offer a way to aggregate consumer purchase data across scattered channels.

QR codes and smartphone technology are enabling loyalty programs with retailers/outlet owners in urban areas. The widespread use of mobile money enables prompt settlement of redeemed coupons or discounts, eliminating the fear of not being paid. Location-based targeting and deal offering sites provide the convenience and time-saving that the emerging class seeks.

Ailsa Wingfield
Thought Leadership
Nielsen Emerging Markets
(Sub Saharan Africa and
South Africa)

In the consumer packaged goods sector, suppliers will be the first adopters of game-changing tech (production, operations, efficiency, automation), followed by retailers (where Modern Trade exists it will evolve into retail experience, efficiency, convenience, replenishment, payment) followed by consumers.

African consumers today are still in the engagement phase of e-commerce. They do not know what to ask for and don't know what they need. The technology evolution needs government participation and intervention to ensure all new commercial and domestic construction uses renewable and sustainable power technology and allow for cross-border trading communities to be set up.

SPOTLIGHT ON EASTERN EUROPE

TECH SHIFTS WITH BIGGEST IMPACT

EASTERN EUROPE

- MACHINE LEARNING AND DECISION MAKING (4.5)
- CASHLESS PAYMENT TECHNOLOGY (3.5)
- ROBOTICS – DRONES AND SERVICES (3)
- SPREAD OF EXISTING TECHNOLOGY AND INFRASTRUCTURE (2.5)

In Eastern Europe, developed urban areas are heading for data-focused technology while in developing areas the spread of existing technology and infrastructure is likely to have a dramatic impact. Investment and cost restraints may push Eastern Europe consumers, retailers and suppliers to adopt technology that is seen in updates and evolution of smart phones such as machine learning and decision making and cashless payment technology.

Robotics, drones and automated services are a potential factor although the uptake may be impacted by comparatively low labour costs.

FUTURE OUTCOMES

TOP CONSUMER SCENARIO

- PROGRAMMATIC CONSUMPTION

TOP RETAILER SCENARIO

- INSTANT PAYMENT

TOP CONSUMER-FACING BRAND SCENARIO

- BRAND BUILDING THROUGH TECHNOLOGY

Alexander Kotsuba
Managing Director
Nielsen Russia

In Russia we believe there will be big demand for technologies that enable real-time data analysis for retailers, manufacturers and consumers. Real-time data about product availability in stock, on shelf and at distributors will help retailers to eliminate losses from out of stock and cut costs on logistics, merchandising and excessive stock. Real-time information about competitive pricing and forecasted promotion effectiveness will enable more efficient and personalised promotions for shoppers and will increase retailer sales and profit.

On the consumer side, increased e-commerce penetration and purchase history data will help to automatically build ideal baskets for minimal price, plan efficient shopping routes and enable quick delivery of products to homes.

For all this to happen, there needs to be increased connectivity and collaboration between manufacturers, retailers and consumers and utilisation of machine learning capabilities.

Marcin Penconek
Vice President Innovation Practice,
Nielsen Growth and Emerging
Markets (Eastern Europe)

Artificial intelligence will be the single most impactful tech factor, as it will be the engine of any new tech solution and hence influence many aspects of our lives (say autonomous transport is enabled by AI). In terms of the regional impact and likelihood there are some conditions in Eastern Europe especially when compared to Western Europe that are particularly influential. The cost of labor is comparatively low which may challenge high investment for autonomous transport, robotics and other automated services. The consumer spending power is also a factor as Eastern Europeans will not have the same clout while low trust in institutions may slow machine learning and the sharing economy. Government policies and a dependence on traditional energy sources are also factors moving forward that could influence direction in energy tech.

SPOTLIGHT ON WESTERN EUROPE

FUTURE OUTCOMES

TOP CONSUMER SCENARIO

▌ PROGRAMMATIC CONSUMPTION

TOP RETAILER SCENARIO

▌ IN-STORE CONNECTION TO DEVICES

TOP CONSUMER-FACING BRAND SCENARIO

▌ IN-HOME SYSTEMS ORDER AUTOMATICALLY

TECH SHIFTS WITH BIGGEST IMPACT

WESTERN EUROPE

MACHINE LEARNING AND DECISION MAKING (4.5)
AUTONOMOUS TRANSPORT SYSTEMS (3.8)
BIG DATA AND ARTIFICIAL INTELLIGENCE (3.6)
ROBOTICS – DRONES AND SERVICES (.63)
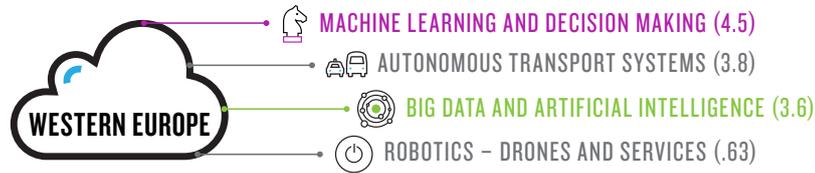
In Western Europe, autonomous transport systems, big data and AI, and robotics, drones and automated services are seen as having the highest impact during the next five years. That these technology shifts ranked higher than machine learning and decision making is likely a reflection of the mature markets and advanced investment capability that is present in Western Europe. This is in contrast to Eastern Europe where cost and investment barriers for advanced technologies are more challenging to overcome.

Despite this difference, the most likely outcomes for consumers and retailers are the same in both Western and Eastern Europe, namely an increase in programmatic consumption and in-store connection to devices. For Western European suppliers however, a likely outcome is that they will receive orders automatically from in-home operating systems.

Paul Smith
Buy CTO
Enterprise Architect,
Technology research
Nielsen Lead Markets
(United Kingdom)

▌ Artificial Intelligence powered from increasingly digitised interactions with consumers, generating more data and offering more engagement points will be critical. Smart, mobile devices (phones or wearables) with location and activity sensors will be the enablers. IoT in home will lag, taking some time (possibly more than five years) to have significant impact. But it will lead a move to marketing and merchant platforms becoming more programmatic like advertising has. Virtual reality will likely remain dominated by gaming and specialist use cases until a time it is possible to lose the bulky headset.

Alessandro Zolla
Program Lead Vice President
Technology – Machine Learning
Nielsen Italy

▌ Over the past four years we have seen an exponential investment in machine learning. Mergers and acquisitions in this space are doubling year after year and there is clearly a race from the big tech firms to secure the best resources and skills.

Retailers are working hard to optimise the buying experience in both online and brick and mortar. Automated recommendations systems and search engines are already a key enabler for online retailer success.

SPOTLIGHT ON NORTH AMERICA

TECH SHIFTS WITH BIGGEST IMPACT

NORTH AMERICA

- BIG DATA AND ARTIFICIAL INTELLIGENCE (4.4)
- MACHINE LEARNING AND DECISION MAKING (4.2)
- ROBOTICS – DRONES AND SERVICES (3.6)
- CASHLESS PAYMENT TECHNOLOGY (3.6)
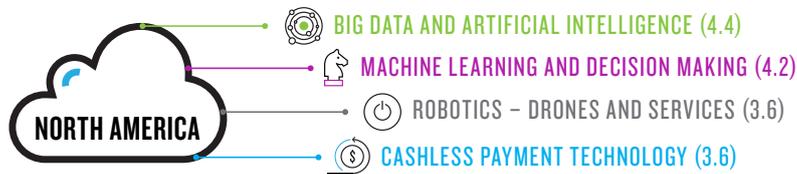
North America has traditionally been a major technology investor, innovator and adopter and some of the biggest technology companies in the world originate and operate from this region. For this mature market, big data and artificial intelligence will have the biggest impact, followed by machine learning and decision making, robotics, drones and automated services and then cashless payment technology.

Big data and artificial intelligence will enable new levels of insight and capability for retailers and big businesses while machine learning will drive predictive consumption for individuals and households. Robotics, drones and automated services are likely to change how product orders are processed and delivered while cashless payment technology will enhance shopper experience both in-store and through e-commerce.

The most likely outcome in the consumer space will be technology for convenience while for retailers instant basket capture and payment through in-store connectivity to consumer devices. In the near future, suppliers are likely to be meeting orders that are generated automatically by in-home operating systems. They will also likely look toward technologies such as virtual and augmented reality and 3D printing to build their marketing and brand assets.

FUTURE OUTCOMES

TOP CONSUMER SCENARIO

- TECHNOLOGY FOR MORE CONVENIENCE

TOP RETAILER SCENARIO

- INSTANT BASKET CAPTURE
- IN-STORE CONNECTION TO DEVICES

TOP CONSUMER-FACING BRAND SCENARIO

- BRAND BUILDING THROUGH TECHNOLOGY
- AUTOMATED CONSUMPTION

Liana Lubel
Senior Vice President
Global Client Lead
Innovation
Nielsen North America

Nic Covey
Vice President
Nielsen Ventures

From an innovation perspective, we are seeing companies under pressure to constantly change and evolve to grow. This speed means that technology adoption is a must and moving forward, companies will utilise new data sources that allow them to understand and connect with consumers in new ways.

Unlimited new data – from social media to in-store data – will provide a better understanding of consumer groups and unlock new insights. Companies who redefine and reimagine their approach to the consumer world, will win.

The automation we'll see in the consumption trend line will be matched, I think, by greater automation in the relationship between retailers, manufacturers, agencies and media companies, all grounded in a more person-level understanding of the consumer. I don't want to get carried away on this, however, because I believe a tandem of privacy concerns/regulations and the inertia of business models will slow the pace of adoption on these fronts. Similar to consumer adoption, the total value chain will look largely similar to how it looks today for most retailers and manufacturers, save for a meaningful percentage of early adopters who will have demonstrated what a more automated and personalised CPG innovation, distribution and marketing program will look like.

SPOTLIGHT ON LATIN AMERICA

FUTURE OUTCOMES

TOP CONSUMER SCENARIO

PROGRAMMATIC CONSUMPTION

TECHNOLOGY FOR MORE CONVENIENCE

TOP RETAILER SCENARIO

IN-STORE CONNECTION TO DEVICES

TOP CONSUMER-FACING BRAND SCENARIO

IN-HOME SYSTEMS ORDER AUTOMATICALLY

RANKING OF TECH SHIFTS WITH BIGGEST IMPACT

LATIN AMERICA

SPREAD OF EXISTING TECHNOLOGY AND INFRASTRUCTURE (4.3)

THE SHARING ECONOMY (4)

BIG DATA AND ARTIFICIAL INTELLIGENCE (3.3)

WEARABLE INTERNET DEVICES (2.9)

Latin America is one of a number of regions where there is a dual nature to consumers and industries. The spread of existing technology and infrastructure will bring about the biggest shifts in the next five years, followed by the sharing economy. Increased access to the Internet and smart devices will facilitate greater consumption and entrepreneurialism in many geographic areas.

Big data and artificial intelligence and wearable Internet and devices will also play a role. Over the next five years big business and government systems will leverage technology to build greater understanding and insights from huge populations while individuals and households adopt gadgets and technology that deliver data at a more personal level. The latter aligns well with the rise of programmatic consumption and technology for convenience being the most likely consumer outcome. For retailers, the most likely outcome in the near future will be stores connecting directly to consumer devices. For suppliers, it will be connections with in-home systems that enable automated ordering and delivery.

Pablo Iglesias
Business Leader
Consumer Neuroscience
Nielsen Mexico

The most influential technology shifts will be big data, virtual reality (for media and marketing purposes) and apps related to cashless payments and convenient purchasing.

In LATAM, these shifts are likely in the next four to five years due to their lower costs compared to the other technologies.

Fabiola de la Portilla
Thought Leadership and
Knowledge Management
Nielsen Latin America

In LATAM, the growing youth population alongside mid–high income group are globally connected consumers who are open to technology and willing to pay for innovative propositions. As the consumer is not brand-loyal, manufacturers and retailers need strategies to retain them in the long term, through high consumer involvement and collaborative initiatives.

Technology can help businesses meet evolving consumer expectations. Manufacturers are moving to sell directly to consumers, while brick and mortar retailers are going online; both are leveraging technology to develop winning loyalty plans.

CONCLUSION

It is clear that technology will have a big influence on our world over the next five years and we need to understand how consumers, retailers and suppliers will respond to, and drive, technology change. To do so, we must look beyond just technology features to consider the potential effects technology will have on capability, outcomes and behaviour. Geographical nuances and characteristics will play a pivotal role in how technology driven change will unfold.

Put simply, some technologies will have a greater adoption and impact in certain regions than in others.

It is a worthwhile exercise for organisations to evaluate the elements that will influence technology likelihood and impact in the regions they operate in. This will provide a considered approach to not only the technologies that might be most relevant but also a number of future scenarios that enables them to engage in planning that has them better prepared for a range of future outcomes, challenges and opportunities.

HOW WILL THE FUTURE OF TECHNOLOGY PAN OUT?

IT DEPENDS ON...

- "AFFORDABLE" IS SUBJECTIVE
- CONSUMER BACKLASH
- COST AS A BARRIER
- CYBER SECURITY
- LEGISLATION YAY OR NAY
- DEMONSTRATED SUCCESS VS. FAILURE
- MACRO FACTORS BY COUNTRY
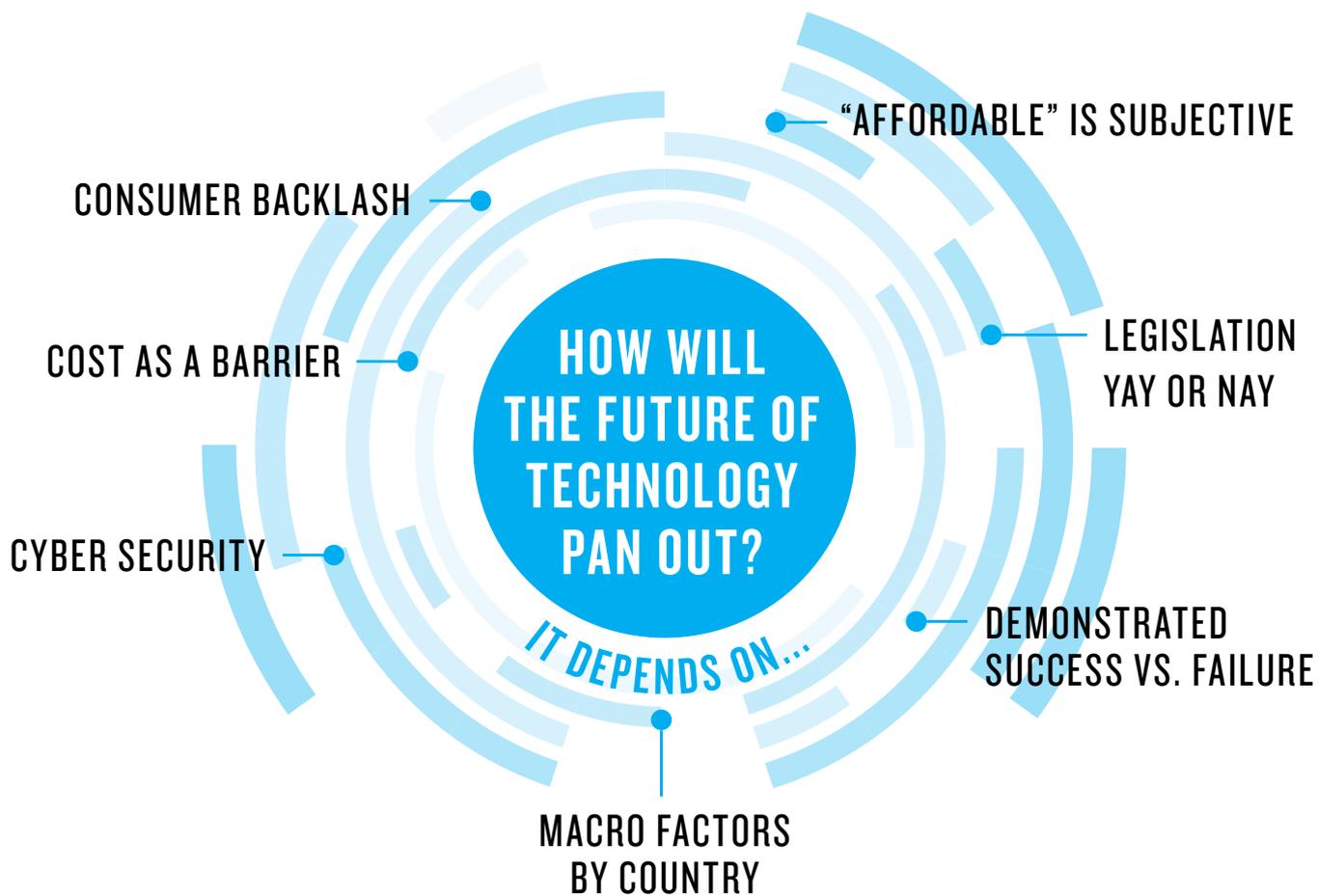
ABOUT THE STUDY

As a starting point, desk-based research was used to identify 14 key existing and emerging technologies.

Leveraging foresight processes and tools, we then asked a panel of nearly 50 Nielsen experts from across the business to rank the impact that each technology might have in their region and the potential outcomes these technologies could have across the consumer, retail and supplier landscapes. Experts were asked to consider the opportunities, challenges and barriers for these technologies to become mainstream during the next five years. These "drivers of change" included:

Macroeconomic factors How could population, demographic and economic change influence technology being developed and adopted in each region?

Government policy and intervention How will governance and regulations control or promote technologies such as data privacy, artificial intelligence, autonomous vehicles and drone deliveries?

Social challenges and demonstrated success Will the adoption of technologies that address social challenges like aged care, pollution, obesity and traffic congestion accelerate more quickly?

Financial barriers How will the adoption of expensive technologies such as virtual reality be impacted in regions where consumer buying power is relatively low?

Changing attitudes and values Could there be a consumer backlash toward technologies that are perceived as invasive, controlling or seen as diminishing lifestyle?

Cybercrime and security Will people and entities shy away from using technologies if cybercrime and other security threats increase?

With these considerations in mind, Nielsen's panel of experts were asked to rate the likelihood of each technology having an impact on society and in particular the retail landscape.

We also developed nine future scenarios that represent potential outcomes for consumers, retailers and suppliers over the next five years. These scenarios seek to understand and describe how the convergence of certain technologies could change the way things are done or represents a shift that is very different than what we see today. Some of these future scenarios are close to predictions seen in industry discussions or forecasts developed by analysts and commentators. They can help us to anticipate how this change can happen and what strategies we can employ to negotiate the unfolding future.

Our experts also ranked the nine technology outcome scenarios by their likelihood of occurring during the next five years.

Finally we invited experts to share their opinions and insights on how major technology shifts could impact their region and area of expertise. The combination of technology impact assessment, scenario likelihood and expert commentary is broken out by region.

SCENARIO SUMMARY

CONSUMER

- TECHNOLOGY FOR MORE CONVENIENCE – PREMIUM PRICES FOR TECH-DRIVEN DELIVERY SYSTEMS

- CONSUMERS ACCEPTING SUGGESTED PURCHASES BASED ON BEHAVIOURAL DATA (PROGRAMMATIC CONSUMPTION)

- TECHNOLOGY TO ASSIST AGEING POPULATIONS

RETAILER

- RETAILERS CONNECTING TO CONSUMER DEVICES IN-STORE FOR CUSTOMISED EXPERIENCE

- AUGMENTED REALITY TO GIVE A GUIDED AND ENRICHED IN-STORE EXPERIENCE

- CHECKOUTS TO BE ELIMINATED WITH TECHNOLOGIES "CAPTURING" BASKET DATA AND PAYMENT ON EXIT

SUPPLIER

- NEWEST TECHNOLOGY MOSTLY USED AS BRAND-BUILDING PLATFORMS BY SUPPLIERS

- IN-HOME SYSTEMS ORDERING DIRECTLY TO RETAILERS OR SUPPLIERS

- SUPPLIERS HAVING TO LEVERAGE MULTIPLE TECHNOLOGY PLATFORMS TO COMMUNICATE TO CONSUMERS

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Regan Leggett leads Nielsen's thought leadership and foresight initiatives in Nielsen's Growth Markets. Prior to joining Nielsen he studied strategic foresight and worked as a foresight consultant. He is passionate about encouraging forward focused conversations with clients and colleagues.

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Thought Leadership
Nielsen Growth Markets

A veteran in consumer research, Nicole has over 20 years of experience using the power of analytics to help organisations understand emerging trends and the areas their organisations should focus on for profitable growth.

She has worked extensively with clients across markets globally, most recently focusing on thought leadership and foresight in Asia Pacific.

Nicole is passionate about helping clients see the big picture, looking beyond traditional boundaries to discover the opportunities that lie ahead.

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ABOUT NIELSEN

Nielsen Holdings plc (NYSE: NLSN) is a global performance management company that provides a comprehensive understanding of what consumers watch and buy. Nielsen's Watch segment provides media and advertising clients with Nielsen Total Audience measurement services for all devices on which content — video, audio and text — is consumed. The Buy segment offers consumer packaged goods manufacturers and retailers the industry's only global view of retail performance measurement. By integrating information from its Watch and Buy segments and other data sources, Nielsen also provides its clients with analytics that help improve performance. Nielsen, an S&P 500 company, has operations in over 100 countries, covering more than 90% of the world's population.

For more information, visit www.nielsen.com/apac.

THE SCIENCE BEHIND WHAT'S NEXT