Shell Scenarios Sketch
The Digitalisation of Society
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Our world is largely shaped by the ongoing interactions between technological developments, human capacities enhanced and enabled by technology and people’s choices – both individually and together as societies.

Pervasive new technologies have the deepest impact. For instance, electricity paved the way to labour-saving devices that relieved domestic drudgery and encouraged women’s emancipation. The internal combustion engine widened human horizons, local economies and trade.

Two of the most all-pervasive aspects of modern life are energy and information. It is impossible to do, build or move anything without energy, and it is impossible to direct any of these activities without information. Together, energy and information technologies will shape our futures. In fact, energy transitions and digitalisation are two of the main driving forces for the 21st Century.

We need cleaner energy to safeguard our environment and climate, and we need more energy for more people around the world to enjoy a decent quality of life. Digitalisation can help enable all this but is also expected to shape so much more in society.

Digitalisation arguably operates at five different levels of action: from basic data...
gathering and organisation, to algorithms, to machine learning and Artificial Intelligence (AI), to digitally-enabled business models, all the way through to societal choices.

At Shell, we have a long tradition of using scenarios to explore future possibilities and to stretch our thinking – and we have applied that approach to the long-term impact of digitalisation. In collaboration with experts from around the world, we have drawn in perspectives on computation, AI, transactional technology, connectivity and productivity, as well as issues such as culture, ethics, legality, health, education, economics, industry, sociology and politics.

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In exploring the possible impact of digitalisation, we have used digital technologies themselves to help us generate multiple outlooks and sort through which combinations are coherent and sustainable.

We found three main clusters of outlooks, sketched out here as three very different worlds: Digital Islands, Open Platforms and Comply and Prosper.

In all three future worlds, we expect to see improvements in the quality of life for many people around the world because of new technologies – in areas such as healthcare and education. At the same time, the things people make and buy often become cheaper, safer and more convenient.

The deeper question, however, is how different developments in society could shape the long-term impact of digitalisation and vice versa. Digital technologies may be developed with good intentions. However, historically at least, humanity has struggled to understand in advance – and therefore manage – the social consequences of the things it has invented. For instance, one of the domains in which technology may play an increasingly important role is safety and security, which also raises issues of privacy and the extent of accepted interventions from others. As much as digitalisation could enable human development and enhance personal safety and security, it also has the potential to undermine it through inadvertent or malicious intent.

These three worlds are distinct from each other in many ways. However, two prominent dimensions are the degree of digital integration in each world and the nature of the societies
in which this becomes embedded and which ‘digital’ helps to shape. In other words, there is a strong technical dimension and a strong human dimension.

The future is moulded by how these elements fit together and drive each other, how technology interacts with social, market and legal drivers and the actions of individuals, businesses and governments. In reality, elements of the three worlds are likely to co-exist – both across the world and within individual communities and governments.

As ever, the choices we make as individuals and societies will be key. These three worlds begin to explore some of those choices.
Digital Islands illustrates a world fragmenting and fracturing as a consequence, in part, of digitalisation and new technologies. It portrays a future in which individualism and autonomy develop as prime social values. Communities, nations and regions eventually cluster along ideological or cultural grounds, driven partly by mistrust of traditional institutions and a degree of scepticism about the value and intentions of new technologies.

In the coming years, influential critics see an open digital network economy as unstable and prone to misuse. Growing incidents of data breaches and misinformation result in suspicion of digitalisation. Corporations antagonise people by profiting from the use of personal data.

Nevertheless, most people continue to use digital technologies to improve convenience and the quality of their lives - but they increasingly require it to be ‘on their own terms’. Protecting privacy becomes a major concern for many. Imposed limits on data sharing hold back advances in machine learning.

Meanwhile, governments struggle to adapt to digitally-enabled ways of working. They, at first, lean towards government-owned platforms. Fear of automation replacing people in the workplace leads to the rise of opposition to new technology. There is a growing belief that local and small-scale systems are more sustainable and just. For some, ‘unplugging’ and ‘opting-out’ becomes a very real lifestyle choice. The importance of local identities, family values, nationalism and ethnicity strengthens.

In the political sphere, resistance grows to globalisation and associated international connectivity. In some cases, populist movements harness digital technology to reach across traditional political intermediaries and constitutional processes to gain power, before regulating that same technology tightly. Regimes and modes of governance vary significantly from place to place.

**DIGITAL ISLANDS: KEY ATTRIBUTES**

- Shaped by social and legal drivers.
- People are sceptical about new technologies and only use them ‘on their own terms’.
- Technology companies are constrained by government regulation.
- Technologies like AI are used to complement human decision-making, but people always make the final decisions.
- The world fragments as communities, nations and regions cluster along ideological or cultural grounds. Resistance grows to globalisation. Collective action on global goals and challenges is limited.
WORLD ONE
DIGITAL ISLANDS

By 2030, so-called ‘Big Tech’ companies have been significantly constrained as a result of widespread government regulation. Governments take action to protect individuals’ privacy through local regulation, taxation, mandates, break-ups and takeovers. More broadly, corporations are often forced to make their data available for official use and are strongly encouraged to hire locally. Due to such regulations, work often remains more traditional than some had anticipated.

Algorithmically-derived insights are used to complement human decision-making, but people always make the final decisions. Robots are used only for tedious or dangerous tasks. Because of privacy and security concerns, there is strict regulation of the sharing and use of personal data including video and speech.

Above all, countries focus on themselves – the result of which is a political patchwork of democracies and autocracies. Specific local needs typically drive innovation. Some countries close their ‘digital borders’ and build their own internal internets, others continue to value conventional international relations and open markets. In some cases, virtual communities with shared interests and outlooks develop across physical boundaries. These transcend traditional national and
ethnic differences and act as a partial counter-balance to the drivers of nationalism and isolationism.

In this world, digital professionals need to adapt to the limitations placed on the larger technology companies and be particularly sensitive to local demands and expectations. The companies reflect on and learn from their experiences. New fields of activity do open up, however, for example in developing local digital infrastructures and local regulatory systems. Individuals and companies able to adapt to these conditions prosper.

From an energy perspective, diminished trade, economic cooperation and fragmented innovation mean slower economic development, and this leads to slower growth in global demand for energy services. Governments focus on ensuring local energy supply in their own countries, making the world more challenging for international corporations. Diminished innovation and international cooperation also impact progress in decarbonising the energy system.

Ultimately, in Digital Islands the digital world has been largely shaped by public and government actions. Despite fragmentation at the macro level, ‘social contracts’ gradually strengthen within societies. A diverse kaleidoscope of governments – some successful, some not so – make up the world.

For some, ‘unplugging’ and ‘opting-out’ becomes a very real lifestyle choice. The importance of local identities, family values, nationalism and ethnicity strengthens.
Shaped by market and social drivers. Technological advances lead to an economic boom – where jobs are increasingly computational rather than manual. People increasingly delegate aspects of their day-to-day lives to algorithms. Technology companies expand their reach. They move into new industries and sectors such as retail, banking, insurance, health, education and energy. There is also a shift to a more circular economy with new platforms supporting sharing and an increased focus on virtual working and communication.

On the one hand, as social interaction becomes ever more digital and virtual, traditional place-oriented social structures continue to weaken. On the other, cultural differences and misunderstandings also wane as improvements in Natural Language Processing and instant machine translation start to erase the language barrier.

Digitalisation also facilitates the creation of new educational models and there is a surge in demand for free, open-source education. With greater access to education comes a fast-changing global labour market. People find they must constantly ‘upskill’ to remain employable.
Meanwhile, digital advances in healthcare begin to lead to more personalised, preventative treatment. Although, it is usually only the most privileged who are able to afford the best treatment. Faced with rising costs, some people choose to sell their anonymised healthcare data in exchange for reductions on their healthcare premiums.

In the years that follow, technological advances lead to an economic boom – one where jobs are increasingly computational rather than manual. Crucially, however, unequal access to technology leads to an increasing divide between the digital ‘haves and have-nots’.

In fact, whether in jobs, health or education, there are growing groups of the ‘left-behind’, resulting in the beginnings of social unrest. There is eventually a growing distrust of politicians and a rising sentiment that they are too lenient on larger technology corporations. The hacking of government institutions and technology companies by crypto-anarchists and non-government actors becomes common.

By 2030, criticism of and resistance to so-called ‘Big Tech’ has become significant. Consumers pressure these larger corporations to adopt more open and inclusive business models.

Digital Personal Assistants become an increasing feature of everyday life, data from which are captured and used by technology corporations often in real-time. In fact, people increasingly delegate basic aspects of their day-to-day lives to algorithms.
Awareness increases of what, how and by whom personal data is used. Individuals support legislation to regain some choice over the use of this data. Later, some of the infrastructure and networks originally constructed by the technology companies are repurposed for the ‘common good’. However, crucially, an integrated international digital network is already established by this time.

In this world, digital professionals enjoy a long boom period, but need to continually upskill to meet accelerating demands and competition, leading to personal stress. They also need to be prepared for the backlash from the ‘left-behinds’ and the need to respond to new privacy and ethical standards.

From an energy perspective, intense digitalisation means rapidly growing electricity demand and new opportunities in power generation, system integration and management. However, there are growing greenhouse gas emissions in the short term as the growth in electricity production from solar and wind struggles to keep pace. Nevertheless, innovation and connectivity enable significant policy coordination and technology deployment over the long term.

Ultimately, in Open Platforms the digital world is largely shaped in the coming years by business and public actions, with government influence in the digital arena only becoming prominent at a later stage.

“People are largely motivated by the desire for prosperity and convenience – something information technology companies see as a continuing commercial opportunity.”
WORLD THREE
COMPLY AND PROSPER
Comply and Prosper is a world where stability, social cohesion and convenience are valued above all else. It is a future in which people ultimately choose stability and prosperity over privacy and unbridled liberty.

In the early 2020s, technological and digital advances continue to boost economic growth. There is a strong public appetite for more innovation which, in turn, encourages the larger technology corporations to roll out new services. New jobs are created, especially in the services industry. Work changes most rapidly in factories – where automation takes over – but also in conventional office and high-skilled jobs.

There are, however, increasing concerns about both cyber-attacks and the role played by modern media in polarising society, provoking unrest and fuelling populist politics. In both democratic and autocratic countries, there is an increased expectation and acceptance of government action to moderate the digital realm.

Over time, governments start to intelligently optimise and control important systems and structures, such as infrastructure and energy grids. They also investigate the optimisation of transportation networks and infrastructures using public and private data. Individuals are required to share their mobility data and vehicles have sensors transmitting data about location and speed.

Initially, partnerships develop between government and technology corporations. Later, governments seek increasing control over technological innovation and deployment.

Data analytics and technologies such as facial recognition are used to strengthen surveillance, justified by the need for stability and security. Low-level crime is reduced, policing becomes more effective and people feel safer. Drones and surveillance cameras enter widespread use, while Augmented and Virtual Reality (AR/VR) are used for educational messaging and advertising. ‘Moral codes’ ensure content is appropriate, while dissident voices are frowned upon and subdued.

**COMPLY AND PROSPER: KEY ATTRIBUTES**

- Shaped by market and legal drivers.
- Partnerships develop between government and technology corporations. Later, governments seek increasing control over technological innovation and deployment.
- Key systems and structures – such as infrastructure and energy grids – are intelligently optimised and controlled by the government.
- From birth, personal data is used to determine individuals’ abilities, and their future lives – including health and education prospects.
- People willingly choose stability and prosperity over privacy and liberty.
WORLD THREE

COMPLY AND PROSPER

From birth, personal data is used to determine individuals’ abilities, health and educational prospects. Basic education becomes universal – although only the privileged get access to higher-level education. In other words, an era of ‘managed prosperity’ partly resembles one of ‘managed inequality’.

Citizens are both rewarded and sanctioned for the way they live their lives. Meanwhile, healthcare increasingly takes advantage of techniques such as genome sequencing to design preventative treatments. Preventative universal healthcare positively impacts the lives of many, but truly cutting-edge, expensive treatments to prolong and augment lives are largely only available to the ultra-wealthy.

Despite the vocal concerns of a minority, society is largely stable and content. Social services are provided effectively, and prosperity rather than liberty becomes society’s common goal in what has by now become a deeply pragmatic world.

In the years that follow, ‘digital autocracy’ becomes accepted as an effective and orderly way of managing society with, for example, embedded rules in apps based on legislation.

“Citizens are both rewarded and sanctioned for the way they live their lives. Meanwhile, healthcare increasingly takes advantage of techniques such as genome sequencing to design preventative treatments.”
By the 2030s, in many countries around the world, the government controls political and digital platforms and ensures predictability, security, safety and access to education, healthcare and other services. In more extreme cases, participation in government-owned or controlled systems and platforms is mandatory.

In this world, digital professionals are required to adapt to different ways of working and objectives. This is particularly the case for those nurtured in the free-flowing technological entrepreneurialism of recent industry booms. Professional competence and contributions to business and government objectives continue to be admired and rewarded.

From an energy perspective, this world challenges businesses to coordinate very closely with governments and their integrated technical operations. Business complies with multiple regulatory environments from multiple authorities, and loses control of some competitive advantages from proprietary information and innovation. But reasonable economic growth and stability means steadily growing needs for energy services.

Ultimately, in Comply and Prosper the digital world is largely shaped by government and business actions. This is a world of ‘managed prosperity’ with reasonable economic growth, but it is significantly less free for individuals. However, this ‘price’ of deep digitalisation is one that most people consider worth paying.

Drones and surveillance cameras enter widespread use, while Augmented and Virtual Reality are used for educational messaging and advertising.
REFLECTIONS

With horizons stretched by these three very different outlooks, people can be in a better position to make resilient choices in a world where digital technology is increasingly important.

The choices we all make, the way we work together or compete and how we apply technology, will shape the quality of all our lives.

In this, the human dimension will undoubtedly be as important as code.
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