

# Knowledge and the Technological Revolution

**Exponential growth in the creation of information and computing power, ever more advanced technologies and growing access to them, are driving fundamental societal changes.**

Incredible growth in computing power, cost reductions and internet access over the past 30 years has revolutionised how information is generated, stored and used. Information has gained huge value as a commodity. Billions of connected devices<sup>2,3</sup> and social networking sites that host millions, even billions, of users are leading to 'always-on' lifestyles and new economic and social uses for information. Organisations can now access data on our spending habits, social groups, health and locations, posing fundamental challenges to personal privacy. How this data is used for governance and by businesses will fundamentally reshape society. With access to this vast online world, marginalised people can be empowered to benefit from this knowledge - well-intentioned or not. Trust will become as important as transparency. New service models and potential for activism are challenging traditional governance structures. The economic potential is considerable, as are the opportunities to tackle major social issues, but the challenges in managing such rapid change are great and disparities between access for the rich and poor remain<sup>3,4</sup>.

Many advanced technologies are experiencing exponential change, akin to "Moore's Law"<sup>10</sup>, that could bring even more profound economic, social, cultural, environmental and geopolitical change. These include robotics, artificial intelligence, solar and energy storage, mobile internet and internet of things, smart cities and big data, 3D printing and autonomous vehicles<sup>5,6,11</sup>. Each is potentially disruptive and transformative, and can be platforms for positive change; from social equality to combating climate change. Understanding the cumulative impacts of new technology is critical to defining this driver as a positive influencer.

## Challenges

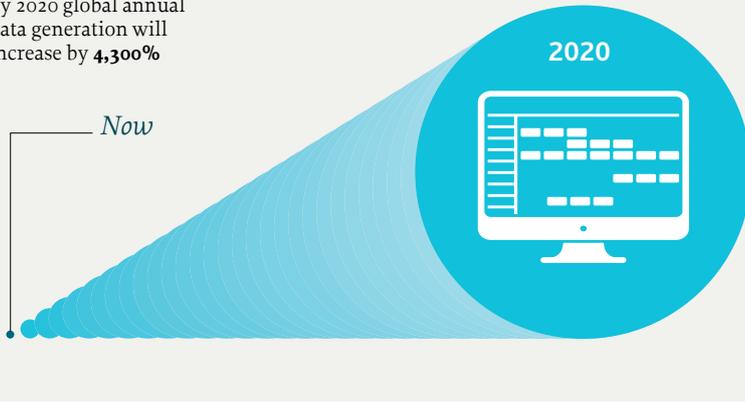
- ★ Can the 'internet of things' and 'big data' benefit society, enhance future development and influence the way we interact with buildings, infrastructure and the landscape?
- ★ How might the introduction of artificial intelligence and further automation of work impact on the labour market, and what could be the implications for employment?
- ★ Can emerging technologies, such as 3D printing and smart city infrastructure, be incorporated into new developments and how might they shape how we approach city planning?



## Key Facts:

- 1. The number of internet users worldwide has grown from 360 million in 2000, to 2.8 billion in 2014<sup>1,9</sup>.**
- 2. The number of devices connected to the internet is at 20 billion and projected to rise to 40 – 100 billion by 2020<sup>2,3</sup>.**
- 3. Over 98% of the world's information is now stored digitally (Global Strategic Trends), with 90% of today's digital data generated in the last two years<sup>7</sup>.**
- 4. The 'internet of things' has the potential to create economic impact of \$2.7 – 6.2 trillion annually by 2025<sup>4</sup>.**
- 5. 75% of the global population has access to a mobile phone<sup>8</sup>.**
- 6. The potential economic impacts of automating knowledge work by 2025, ranges from \$5 – 7 trillion<sup>4</sup>.**

By 2020 global annual data generation will increase by **4,300%**



## LDA Design Insights:

The UK is technologically advanced, with much of the population online. Broadband and mobile internet is available almost nationwide, superfast speeds are expanding rapidly and more than 31 cities have at least one smart initiative<sup>7</sup>. Investment in the ‘internet of things’ (networks of physical objects) and ‘big data’ (very large, complex and expanding data sets) can help shape spatial plans, infrastructure priorities and design solutions.

★ Internet and mobile internet access is near-universal in the UK<sup>8</sup> and demand for services continues to grow with the advance of smart phones, social media and online business. Infrastructure must expand to match this growth, with areas of poor access prioritised alongside improvements in already well served centres. This will form an important part of economic planning and regeneration.

★ Smart city initiatives are common and becoming more sophisticated. Data-led solutions can improve services and infrastructure<sup>7</sup>, and can shape the design of public spaces and transport networks by building knowledge of how people interact with spaces and places. One-size fits all smart-cities solutions are not always appropriate. The respective delivery roles of public and private sectors need to be understood and then translated into strategy and action, with the benefits clearly communicated.

★ Smart energy grids are a key part of the energy transition. The ability to dynamically manage supply and demand across thousands of customers and energy assets is leading to new business opportunities. The scalability of these technologies and the ability for communities to directly benefit can transform how we think about neighbourhoods and plan development, regeneration and public realm projects. Local authorities are important as planners, but can also benefit from delivering and operating networks themselves.

★ The generation and analysis of user-generated data in sectors like transport and utilities is of major economic and social value, and is being used to maximise service value and efficiency. Discerning useful trends from vast amounts of data will challenge planners, developers and investors alike. Concerns over personal privacy and security will need to be achieved without stifling use of data.

★ Advanced technologies will catalyse major economic and social disruptions. The impacts of driverless cars on cities, artificial intelligence and robotics on jobs and the potential for 3D printing to transform the relative economics of local manufacturing, for example, are uncertain but likely to be revolutionary. Economic and spatial plans should accept the uncertainties, maintain up-to-date knowledge and build in flexibility to accommodate new technology.

## What is LDA Futures?

The world is changing in response to a set of environmental, economic, social and technological drivers, and these are shaping the types of infrastructure and development we need and the way we use land.

*LDA Futures* explores these drivers and their implications to enable us to make appropriate responses through our projects and the advice we give to clients.



## References

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