

# Megatrends Urban Migration

The speed and scale of the changes affecting both business and society demand new thinking and new solutions. At Fujitsu, we are addressing these challenges in a responsible and sustainable way by exploiting new and emerging technology.



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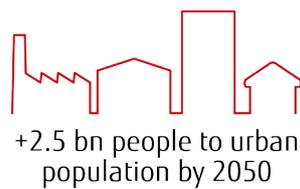
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## Headlines

- More and more people are becoming urbanised – but traditional cities can't meet their needs.
- Technology will help us cope with this growth and ensure a better life for every citizen.
- Much of the IT we need is already well advanced and being applied today.
- The smart cities of the near future will be connected, comfortable – and competitive.

### Urban living implications

By 2050, some 66% of the world's population will be living in cities. That's a big percentage increase on today, when about half of us live in urban areas. And given the growing global population, we can expect to see another 2.5bn city dwellers. While western countries worry about the ageing population, in the east the profile of city-dwellers will continue to be young. Asia and Africa will account for nearly 90% of the increase.



"Urban" is a wide-ranging term, encompassing settlements with fewer than 0.5m inhabitants as well as the current 28 megacities with over 10m people each. There are expected to be 41 such megacities by 2030. These will be the powerhouses of the future – yet their names are barely known.

We've been here before. In the 1850s, spurred by industrialisation, a dot on the map called Chicago doubled in size every three years and was called "the lightning city". Like other cities, Chicago's economy has evolved and diversified over time. Tokyo, Fujitsu's home city, is at least 400 years old and now has a population of over 13m – equivalent to the total populations of Sweden and Denmark combined, or about five times the size of present-day Chicago. Some 120m people already live in the fast-urbanising Pearl River Delta in China.

But we can't assume the new wave of urbanisation will be absorbed smoothly. It's easy to forget the social disruption and health impacts of 19th century urbanisation, as well as the resulting rural poverty. Megacities are not just big cities: they are massively complex, organic entities. The urban future may look at first like more of the same. But it's a very different world.

In this paper, Fujitsu Distinguished Engineer and Account CTO, Marc Finch looks at the role IT is playing in developing the devices, networks and systems that will underpin this transformation by creating smart cities around the world.

### An end to poverty – or a new beginning?

Urbanisation has long been a source of widening prosperity – from the first irrigation societies of Mesopotamia and the Nile to today's economic miracle cities of Guangdong. Managed well, urbanisation can accelerate development while improving the life chances of citizens.

By concentrating people in smaller areas, the standard of living can be driven up through greater economies of scale. Public services can be delivered to all residents at a lower price per person. For example, providing piped water costs \$0.70–\$0.80 per cubic metre in urban areas, but \$2 in sparsely populated areas. Schooling and health care can be delivered at scale in dense environments, close to where people actually live. Cities also act as hubs of prosperity for their regions, driving significantly higher employment opportunities. More than 80% of global economic activity is concentrated in cities.

But there's a paradox. Concentrated populations drive better services, which in turn attract more migrants. If investment in infrastructure and services does not keep up with the inflow of people looking for a better life, then social, economic and environmental conditions decline and slums emerge.

Rapid industrialisation alongside urbanisation can lead to contaminated water supplies, with resulting health consequences. Cities are sourcing water from increasingly distant places, which affects rural agriculture and local ecosystems. At the same time vehicle exhaust and rubbish incineration fumes contribute to smog and acid rain. Inadequate infrastructure and lack of health awareness lead to overstretched sanitation and care systems.

**"Urban migration is increasing but traditional cities can't cope"**

We need to exploit technology shrewdly in order to avoid making these mistakes. IT can help us target resources, connect services and smooth demand patterns – making even the biggest city a great place to live, work and raise a family.

### Making smart cities for a better future

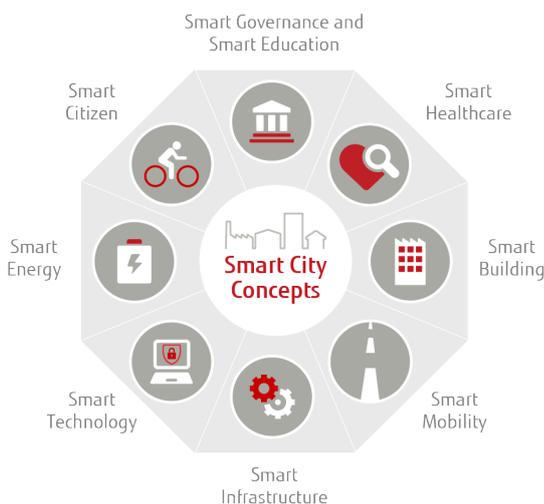
If the cities of the future grow without careful management, they will fail their inhabitants. This doesn't mean a return to the centrally planned "space age" cities of 1950s drawing boards. Instead we can use IT to develop cities that work for all their people, safeguard the environment, optimise investment and drive growth.

A smart city is a city with an intelligent infrastructure. It can be thought of as an ecosystem containing specialised capabilities covering transport, energy, healthcare, water, waste – any service set that needs to be shared widely while meeting individual needs. A smart city can reconfigure its services according to needs and priorities, within a plan agreed by citizens. Such a city evolves intelligently, minute by minute as services are delivered, and over longer periods as the role of the city changes.

The technologies underpinning the smart city are already well advanced. We have the IT capabilities to connect large areas with cable and wireless networks. We can serve, process and store vast amounts of data economically and safely. The analytic capabilities of our computers continue to grow, enabling us to learn more about the environment and respond faster. A new generation of devices, connected as the Internet of Things (IoT), promises ubiquitous, low-cost intelligence in our pockets, homes and streets.

To take a simple example, think of how many cities control traffic flow through intelligent traffic light systems. These systems smooth flow according to the current load on the roads, leading to more predictable journey times and lower driver frustration. Some cities also have connected real-time parking systems, enabling better use of slots, a less anxious driving experience and improved public revenues.

The smart city of the future applies these principles to all aspects of city life – monitoring and responding to key environmental variables so as to maximise resource usage and improve quality of life. The result is a more responsive, sustainable and liveable city – a place which can promise all its citizens a better deal.



By making the urban area smart, costs can be reduced. Energy consumption can be better controlled and services provided at the required time. This means reduced waste and redundancy. At the same time the citizen gains complete control over their environment through smart devices. There is also a democratic benefit in the enablement of a fully inclusive, ongoing conversation about the city's direction. Meanwhile intelligent control systems ensure pollution minimisation, active waste management and creative energy usage – leading to a healthier physical environment.

### Fujitsu's contribution

Fujitsu is involved in several smart city projects. These are exciting initiatives which demand our very best innovative skills. We enjoy working with authorities, partners, agencies – and citizens – to bring the smart vision alive.

For example, we are working to transform industrial estates managed by the Saudi Industrial Property Authority (MODON) into smart cities. The work includes building an environmental improvement system and a cloud system covering industrial estates nationwide as part of steps to bring about environment-friendly eco-cities.

Our on-demand cloud service is being used by Metawater, which supports the water and sewer operations of local governments in Japan. Metawater can now provide regional monitoring, asset management and remote support services so that local governments and their partners can share information and communication infrastructure, delivering superior flexibility at a low cost. This business cloud is forecast to cut lifecycle costs, including system deployment and running expenses, by 30% compared to in-house systems.

However, the smart city movement is much more than just technology exploitation. It's also about global collaboration and competition.

Smart cities are well placed to grow by cooperating to develop systems and standards that can be replicated in different regions. This will enable development costs to be shared while ensuring differentiation for individual cities. So, for example, open data standards for transportation systems can be adopted by any city, thereby reducing the development effort and enabling a global industry in such systems.

The embedded intelligence of a city will rapidly become a major selling point for its industries. Just as access to rivers or ports once drove settlements, so factors such as intelligent energy infrastructure and actively managed

environments will attract investment. Now that capital and labour are becoming truly global, cities need to be smart to survive.

**“IT can help us target resources, connect services and smooth demand patterns”**

### Conclusion: Living in the future

There are going to be more, and bigger, cities. IT has an important role to play in ensuring these cities work – for all their stakeholders. The industry is rising to the challenge and will help to drive the efficiency, flexibility, personalisation and economy needed to make the smart city vision a reality.

The viability of every city lies in the increasingly effective combination of digital telecommunication networks, centralised data stores, sensors and tags, and the use of analytics to drive a cohesive set of centralised services for the urban area as a whole.

It's also about making the most efficient use of physical infrastructure and services, to support a strong and healthy economic, social and cultural environment. Smart cities include local people through open innovation processes and digital participation.

The future is going to be a great place to live.

### About megatrends

This paper is one in a series of megatrends papers written by Fujitsu to help inform organisations of the current and future trends impacting business and society. Highlighting how human centric innovation is responding to these global challenges, they aim to enable you to consider how you can contribute to a more prosperous and sustainable world.

Other papers tackle the challenges and opportunities of population growth, an ageing population, healthcare, energy demand, and the Internet of Things.

#### Three things you can do today – for an urbanised tomorrow

- Explore how urban migration will impact the lives of your customers – what it will mean for your business?
- Investigate new infrastructure and service initiatives in the newly emerging cities
- Build a roadmap to make sure you are positioned to exploit and contribute to the smart city ecosystem.

Fujitsu would be delighted to discuss the megatrend implications for your organisation. Please contact the author [Marc.Finch@uk.fujitsu.com](mailto:Marc.Finch@uk.fujitsu.com)

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