

The power of exponential growth

While our minds are stuck in linear thinking, digital technology has the ability to follow an exponential growth track. This creates a huge gap between what we intuitively think to be possible and what technology is actually making possible.

The 6 D's of Diamandis and Kotler

- **Digitalization** – Once a technology becomes digitalized, the door is opened to an exponential growth curve (e.g. doubling price/performance every x months).
- **Deceptive** – In the early stages of the technology, it takes a while to get up to speed. In this phase, growth patterns look deceptively linear. In this phase, the technology can be seen as a hype.
- **Disruption** – In the next phase, and often unexpectedly, the technology plays a role in disrupting established industries.
- **Dematerialization** – Many technologies that were expensive in the 1980s or 1990s now come for free in the form of an app on the smartphone. People do not buy a camera, GPS device, music player anymore because it is already available on their smartphone. Physical devices are dematerializing into digital apps.
- **Demonetization** – As a consequence of the D's before, money is taken out of the equation as technologies become cheaper and cheaper and cheaper. Existing business models evaporate as established revenue stream disappear.
- **Democratization** – As technology becomes cheaper and cheaper, access becomes available to anyone. Powerful technology is not only available for the wealthiest, but is democratized as large parts of the population gets their hands on it.

3D printing
Robotics
Artificial Intelligence
Nanotechnology
Medicine & Neuroscience
Bio technology & informatics
Energy & environmental systems
Networks & computing systems

How to move from a linear to an exponential growth trajectory



Question

When a bacteria colony in a container is doubling in size every minute, and the container is completely filled in 1 hour, when is the container half full?

Answer

Exactly after 59 minutes

59 minutes to fill the first half and 1 minute to fill the second half

Smart cities emerge as the result of many smart solutions across all sectors of society

Enabling disruptive technologies & social innovations (see next slide)



Smart Mobility

Smart Safety

Smart Energy, Water & Waste

Smart Buildings & Living

Smart Health

Smart Education

Smart Finance

Smart Tourism & Leisure

Smart Retail & Logistics

Smart Manufacturing & Construction

Smart Government

Goals



Economic growth



Quality of life, a good city to live in



Ecological footprint, sustainability ("planet")

Challenges



Controlled transition of the labor market due to automation



Winning the war on talent between metropolitan areas



Social cohesion, inclusiveness, solidarity



Secure digital environment, privacy



Resilience

	Smart Mobility	Smart Safety	Smart Energy, Water & Waste	Smart Buildings & Living	Smart Health	Smart Education	Smart Finance	Smart Tourism & Leisure	Smart Retail & Logistics	Smart Manufacturing & Construction	Smart Government
Economic growth	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Quality of life, a good city to live in	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Ecological footprint, sustainability ("planet")	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Controlled transition of the labor market due to automation	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Winning the war on talent between metropolitan areas	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Social cohesion, inclusiveness, solidarity	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Secure digital environment, privacy	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Resilience	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue

... fueled by a combination of disruptive technologies and social innovations ...

Most new technologies and social innovations are disruptive on their own. The combination of them is even more powerful and creates a 'perfect storm' of disruption.



... and combine changing human behavior with the use of data and innovative technology

True smart solutions combine disruptive technological capabilities with changes in human behavior. The latter can only be achieved by simple, intuitive solutions that appeal to real human needs.

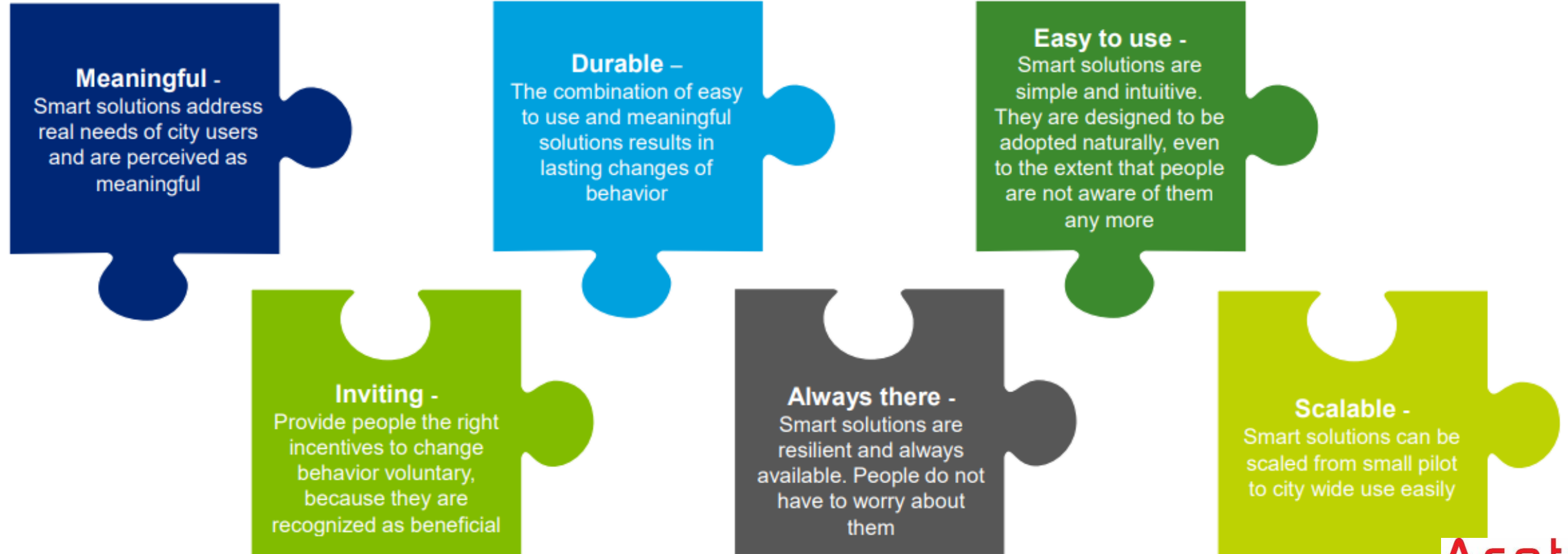
Human Behavior



Data

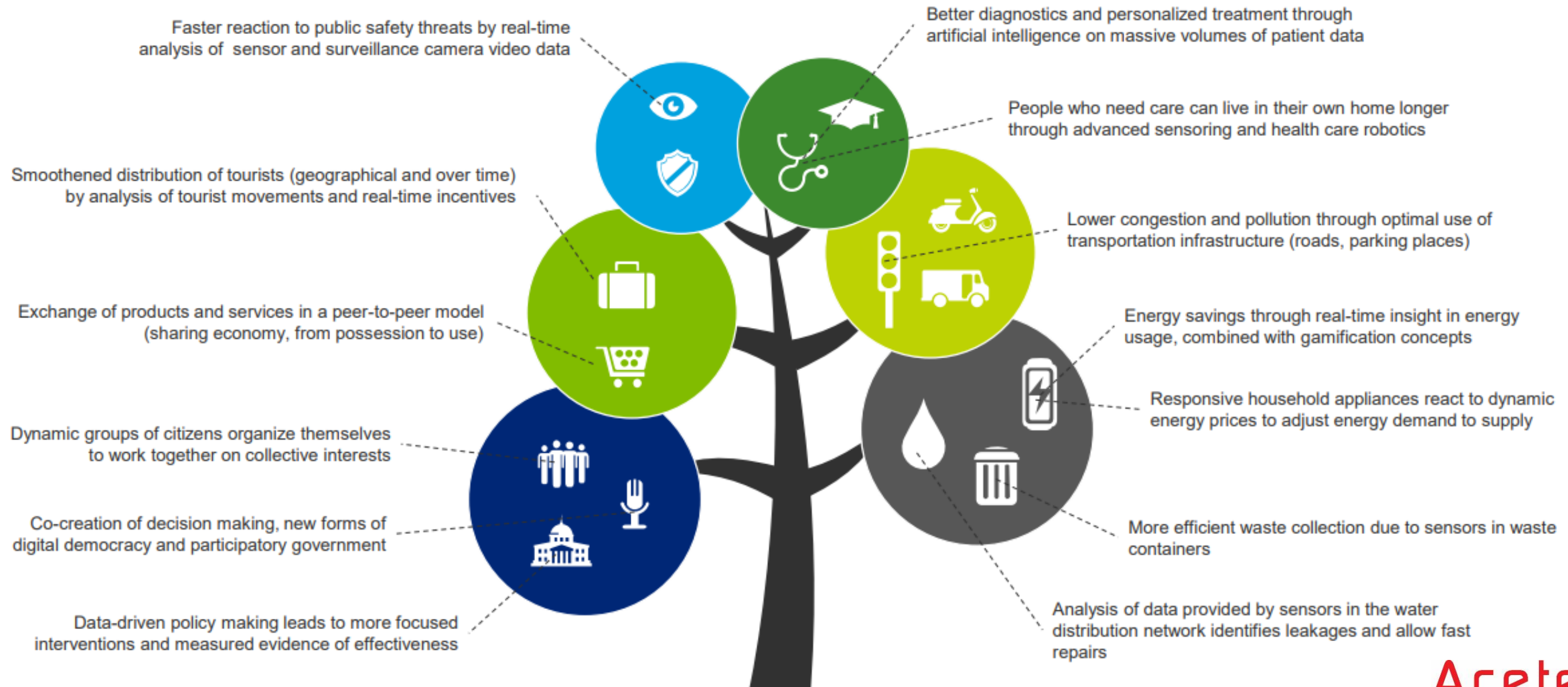


Technology



Typical smart city benefits are already becoming visible ...

Each sector contributes with its own unique innovations to the overall success of the smart city. Harvesting the potential benefits from all relevant sectors is the challenge of the city.



... but the imminence of change and the size of impact differs per industry

Major disruptions in industries like Retail, Media and Banking are already happening. Other industries are expected to follow later. Ultimately, our entire economy will be disrupted.

Digital Disruption Map compares 16 industries on their vulnerability to disruption from two perspectives: the size of the impact and the imminence of change. The assessment considers factors including:

- The extent to which products and services are delivered physically
- The propensity of customers to use digital channels
- The importance of broadband and computing infrastructure in business operations
- How mobile a company's customers and workforce are, and their average age
- The significance of social media and innovations like cloud computing
- How digital innovation might be inhibited by government regulations or other factors.

Companies that stand to experience significant digital disruption within the next three years are said to be on a 'short fuse'. Those that can expect major change in four to ten years are on a 'long fuse'.

The size of the impact, or 'bang', is described as the expected change in percentage terms across a range of key business metrics. Companies that can expect to see a 15–50 per cent change in their metrics, such as mix of revenue channels or cost structures will experience a 'big bang'. Below 15 per cent, companies will feel a smaller 'bang'.

