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## What is a city, and why?

There has been a lot of talk about smart cities over the past ten years but there is no generally accepted representation of a smart city. Digitalisation will change the way we live together. As cities become smart enough, everyday concerns will be taken care of. But what is actually happening and how should we deal with it?

The world of film and literature offers few inspiring model cities to strive towards, there is hardly any inspiration to be found in the general cultural reference framework. Attempts to concretise great visions into concrete cities usually end up as dystopias, horrendous societies under constant surveillance that make George Orwell's Big Brother society seem mild.

This is of course partly because well-managed utopias do not have the nerve needed for storytelling, and partly because technological development is in itself virtually impossible to predict. Much of the world we are used to at present is based on the mobile phone, which was inconceivable thirty years ago. In the 1960s, science fiction author Arthur C. Clarke tried to predict the world in 2100. He focused on two things; firstly that the imminent moon landing would be a first step towards colonising other planets, and secondly that the hovercraft would replace the car because it was such a superior technology that did not need roads.

We do not know what will characterise a city in fifty years' time, but there is a tangible risk that our imagination will be held back by present-day knowledge.

Yet it is at the same time through imagination that we can attempt to understand the future, to imagine it. It is a problem that our image of the future is so instrumental, that it is so firmly bound to extrapolating current trends in technological development. It does not take exponential technological development into account. If we are to adopt a targeted approach and combine our rational thinking with creative urban development, we need to have a dialogue about goals.

What should a smart dream city look like? It has solved its environmental problems, of course; it has smooth traffic and logistics flows, waste bins that empty themselves, nobody is run over on the street and ambulances drive the quickest possible routes. We are transported in silent, safe, self-driving electric vehicles. Ideally in the air. But what then? Is there any overarching target image that is inspiring rather than scary?

## What should cities be good for?

Cities started to emerge about 5,000 years ago, at about the same time in Mesopotamia, India, China and Egypt, as more and more people abandoned the hunter-gatherer life in order to settle permanently in one place. Over time, cities proved to be effective in a number of ways, as there were enough raw materials and people to make trade possible. New ideas could be passed on when people had more contact with each other. It was possible to share resources, markets made it possible to increase specialisation and the sharing of work. People appreciated having the chance to meet and to exchange things with one another.

In 1800, 90 per cent of the population in Sweden lived in rural areas. There were only 24 cities with more than 2,000 inhabitants, only three with more than 10,000, and it was the same in Denmark and Norway. The Nordic countries were very much agrarian societies. Urbanisation gained momentum with the Industrial Revolution from the mid-19th century, when agriculture was still the dominant sector. Industry was raw material-oriented and production was based locally, close to the rural areas where the raw materials, energy and labour force were still to be found. In the 1880s, cities began to grow in earnest and the industrial society made its breakthrough.

This is a trend that is still continuing. More and more people are being attracted from rural areas to cities. The United Nations estimates that in 2050, 70 per cent of all people on Earth will be living on just three per cent of its surface area. In Sweden and Finland, 85 per cent live in cities, in Denmark the figure is 87 per cent. It should be said that the term 'city' does not have one uniform global definition; different countries can draw the boundary between rural, urban and city applying different criteria, but the trend is still clear. Urbanisation is a macro trend that has been going on for almost two hundred years.

Cities continue to grow as long as the value of living close to each other exceeds the cost, in terms of issues such as congestion, high housing prices, commuting times and crime. A high concentration of people facilitates a thriving cultural life, increases supply and lowers the price of both goods and services. Living close together is efficient.

When cities are ranked, it tends to be based on criteria such as access to international goods, public transport and a wide range of cultural activities that are valued highly. It is not the biggest mega cities that win, but cities such as Vienna, Zurich and Auckland. Nordic cities are usually ranked high on the lists, in rankings of both smart cities and cities with a high quality of life.

Digitalisation does not only, or even mostly, affect cities. Its role will be at least as important for sparsely populated areas. Many of the benefits of living far away from other people – the silence, access to the countryside, the opportunity to be left in peace – remain, but there are new ways of dealing with the drawbacks.

It will quite simply not be as important to live close to people for many kinds of services. It is possible to hold video conversations with a doctor or pharmacist for advice about treatment. You can shop online and have products delivered to your doorstep; in due course maybe by fast drones. 3D printers enable you to do a lot of things yourself, for example small spare parts that were previously only worth keeping in stock where there were a lot of customers nearby. With electric vehicles, and eventually also flying ones, it will become cheaper to transport or deliver goods across longer distances without having a negative impact on the environment.

Even if you are still a long way from your nearest cinema or theatre, technology has made it possible to view films and concerts at home in your living room, with bigger TV screens, better sound systems and with instant access to what the whole world has to offer thanks to digitalisation.

This is even more important in many emerging countries. Mobile phone technology has made it possible to skip a stage of development and a decade in time. Using artificial intelligence to be able to assess and prepare for weather abnormalities, to be able to disseminate knowledge on communicable diseases, or simply to be able to communicate with each other has meant a lot.

## We are the ones who decide

Sometimes one gets the impression that the dialogue about smart cities is being driven by the technology available; that because we can build cameras, we need to use them as much as possible. When artificial intelligence becomes sufficiently advanced, we must use it in every single way possible. This turns smart cities into a simple function of technological development, which is problematic, not least from a privacy perspective.

There will always be advocates for the use of new technological opportunities, regardless of ethical consequences. The faster the pace of technological development and the more tools that can be used for good purposes such as law enforcement, the more important it is to have a clear direction of intent and a framework describing what we want to use this technology for. To use technological development to realise a vision.

However, we must not forget that the ethical dialogue also includes digital exclusion. There is a significant gap between those who understand and appreciate new technology, and those who cannot afford to keep up with it, or do not feel that they understand the new tools.

## About visions and people

In the 1920s, car traffic took off in cities that had been built for pedestrians, trams and horse-drawn carriages. At Slussen in central Stockholm, car drivers had to wait for hours for boats to pass. Technology was transforming the city into something else, which made urban planning necessary. Modernists wanted to draw a line under old urban planning concepts. The roads needed to be diverted. The tramlines had to go, as they were in the way of the expected car traffic. The housing shortage and cramped living conditions were serious problems, and functionalism emerged as a way of producing housing more rationally, ideally on a completely industrial scale. The way forward was mass factory production of standard houses and areas planned from scratch to produce happy citizens.

The historian Åke Abrahamsson describes in Urban planning that is too vision-based and disconnected from inhabitants and their needs involves huge risks. functionalism stood out for many young architects of the time as more than just rational housebuilding, it was a doctrine of social salvation – a utopia. The evangelist for this new generation of salvation architects was the Swiss architect Le Corbusier.

In 1926, a vision of the future was published by Le Corbusier, in which traffic would be moved underground, 85 per cent of the city would consist of parks and the buildings would take the form of 60-storey skyscrapers. Architects queued up to propose large-scale programmes featuring high-rise buildings.

Seven years later, Le Corbusier took part in a major architectural competition announced by the City of Stockholm. He suggested that most of the inner city should be demolished and replaced by a park with five large, one kilometre-long blocks of housing. A five-metre high motorway borne on pillars would connect the North and the South. Gamla stan, the old town, would be levelled and become an open space with tree-lined footpaths, where modern people could stroll around among cafés and restaurants in the terraced side buildings.

Another proposal came from Finnish architect and designer Alvar Aalto, who also wanted to demolish everything and replace it with monotonous rows of tower blocks. The competition attracted 450 proposals, but did not ultimately result in any major changes, which was probably for the best. That is not the way to build a city that people want to live in. A functioning city emerges, step by step, and driven by many different participants and desires.

What the author and urban planning critic Jane Jacobs advocates for cities is the pulse, the people, the diversity, the community, the private and public life that is played out in the streets and squares. She highlights four necessary conditions for what is required for a district to be functional, alive and pleasant.

Firstly, homes must be combined with workplaces. Pure working or dormitory towns do not work. The districts must have more than one function, so that there are people moving around in the streets all day long; otherwise there is a risk that

areas will be closed down when people go home from work. Secondly, the districts must be small, so that there are as many intersections, and thereby potential meetings, as possible. Le Corbusier wanted to avoid intersections, these “enemies of traffic”, which is why he designed his one kilometre-long buildings and moved all traffic underground. Thirdly, the properties in the district should be of a mixed age, because it is important that not all businesses should have to pay the high rents demanded by new construction. Finally, sufficient population density is required; there must quite simply be enough people who can walk around on the pavements and bump into each other.

Urban planning should be vision-based and set the path forward, but ensure that the city is co-created and shared with the citizens, only then can it also be brave. Urban planning that is too vision-based and disconnected from inhabitants and their needs involves huge risks. When Brazil decided in the 1950s to build a new capital city (Brasília) in the jungle, to be closer to the centre of the country, the modernist city was built in 41 months. Viewed from above, the city’s network of streets looks like a butterfly. This was no doubt appreciated on the drawing board, but it is nothing special to live in. It also turned out that one of the characteristics of modernism, large sections of glass, are not suitable for the climate in the jungle. Despite the fact that the city had 500,000 inhabitants on the drawing board, there are now two million people living there.

Kazakhstan’s new capital, Astana, was built in the same way. The country’s ruler, Nursultan Nazarbayev, decided that the capital at the time, Almaty (Alma-Ata), was too close to the Chinese border and ordered a new capital city to be built out on the steppes, 1,000 km to the north. The temperature there varies between 40 degrees and minus 40 degrees Celsius, which presents poor conditions for building houses made of concrete. After only a few years, houses began to crumble.

There are more examples of cities built from start to finish as drawing board products, especially in China. Xi Jinping is designing a new city south of Beijing, which will be three times the size of New York City or Singapore. China has seen several major cities built in this way, such as Shenzhen (currently 12 million inhabitants) and Pudong (5.5 million). Ordos Kangbashi was built on the steppes in Northern China for a million inhabitants, with shiny skyscrapers and high-end facilities. The city had everything – except people. The streets have essentially been empty since the city was inaugurated in 2004. It proved harder than expected to attract people from the villages in the region. There has since been an increase in its occupancy, and there are now just over 100,000 people living in a city built for ten times as many.

It is possible that major cities can be created out of thin air to achieve narrowly defined, measurable goals: to be able to constitute a workplace and a dormitory city for a sufficient number of people. But it is still not a city in the metaphysical sense. A bustling public life cannot be produced out of thin air, not even by well-intentioned urban architects.

## Goals and value creation rather than forecasts

At the end of the 19th century, horse-drawn carriages were common in the world's major cities. There were about 11,000 carriages in London, as well as thousands of horse-drawn buses, each of which required 12 horses. In total, there were 50,000 horses busy transporting people and goods on the streets of London. In New York there were about 100,000 horses.

That number of horses was associated with a number of problems. Each horse produces several kilos of manure every day. This resulted in fairly large amounts of manure being left on the streets, attracting flies, which spread typhoid fever and other diseases. In New York, more than one thousand tonnes of horse manure was produced every day. This was an evil-smelling storm cloud for cities that grew rapidly. "In 50 years' time," speculated *The Times* in a headline in 1894, "every street in London will be buried under three metres of horse manure."

But that is not how it turned out. Instead, motorised vehicles were developed. In 1908 Henry Ford introduced his Model T, which made it possible to build motor cars at affordable prices, and by 1912 cities all over the world had started to replace horses with electric trams and motorised cars and buses. The forecast was based on what was true and known at the time, but did not take technical development into account. That is not the right way to face the future.

Urban development presupposes a certain measure of planning. Functioning cities depend on many independent yet interwoven systems in a harmony that can occur spontaneously, but sometimes only via a painful development process. When an urban environment is being developed, an overall view, taking a number of factors affected by the project into account, is required. Which roads will be affected by increased traffic volumes? Are the conditions in place for public transport to be able to cope with all the new arrivals? How will the air quality be affected? Are there enough schools and preschools?

To live in cities is to compromise. People with different goals and priorities have to co-exist in a limited space. Friction is unavoidable. To plan cities is also to compromise. Many different aspects need to be taken into account and we often have to prioritise. This makes planning a political issue – not always on a left-right scale – but in the sense that we need to decide which interests to give preference. It is therefore essential that urban planning is a democratic process.

Urban planning is by its nature long term and dependent on a perception of what the future will be like. There are two dominant perspectives: forecast control and management by objectives. We need to move from the former to the latter; not to extrapolate those trends we can look at, but to identify goals and work towards them. The challenge is to strike a good balance: goal-driven urban planning focused on people that is visionary without becoming a Brasília or a Shenzhen.

This is not just a mental exercise. The Swedish Transport Administration expects car and heavy goods vehicle traffic to increase by 18 per cent and 28 per cent respectively from 2018 to 2030. At the same time, a reduction of between 10 and 20 per cent is required in order to achieve Sweden's climate goals. "The goals and the forecasts do not add up," confirmed the Transport Administration's national coordinator for climate and energy in March 2018 when the figures were published. We have to make a choice. We either build cities on the basis of increased traffic or build them for reduced traffic.

In Oslo, there is an ongoing shift away from cars in the city centre. Helsinki is converting motorways into urban streets. Copenhagen has been consciously transformed into one of the world's most cycling-friendly cities. In the 1970s, the proportion of cyclists in Copenhagen was no higher than in many other cities, but through strategic, incremental changes, the proportion of cyclists today is now one of the highest in the world. Consciously adding cycling infrastructure to a city is now known as to "Copenhagenise". When New York wanted to make the city more bike-friendly, the Danish Professor of Urban Planning Jan Gehl was hired.

It is estimated that 40 per cent of all inhabitants of Copenhagen cycle every day. The better the cycle paths that are built, the more attractive it will be to cycle. The better the public transport system is, the more people will use it. Forecast-driven urban planning may make do with maintaining existing cycle lanes, buses or commuter trains, but goal-driven planning requires change and improvement in order to change conditions and behaviour. Sustainable travel requires public transport to be perceived as simple, affordable, safe and convenient for people to get to the places they want to go. Home, school, work, service and leisure activities must be close to each other, as they are in a densely populated, diverse city. There must also be good connections. A car-dominated transport system in cities takes up a lot of surface area and builds barriers that counteract these goals.

It is a matter of the fact that the car-oriented city itself emerged as a result of both forecasts and goals. In the mid-20th century there was a consensus that cars were the transport of the future. This was the forecast, and also the goal. The focus was consequently on car traffic, while investments in other modes of transport were much more modest. When cars started to cause problems in terms of congestion and road safety in the 1970s, a number of principles were drawn up for urban and traffic planning, which meant that traffic and housing were increasingly separated, and that large areas of cities were dedicated to car traffic. The central role of the car in urban planning has become ideological. We cannot allow ourselves to be constrained by this. We must set our own goals, based on our era, our knowledge, our technology and our understanding of the world.

## Change as choice or necessity

The climate is changing. Sea levels are rising. Extreme weather is on the increase, with fluctuations between severe rainstorms and equally severe droughts. Climate change has already started to have an impact on the world's harvests and to cause ill health and disease in poor countries. As a consequence of this, migratory flows have already started to increase. It is clear, not least because of the reactions to Greta Thunberg's messages, that awareness of these issues is increasing.

An important part of the development of the city of the future will be driven by necessity. We can set goals that we want to achieve, but we also need to perform a reasonable assessment of external factors such as climate change and rising sea levels. We will need to think differently. Climate change and its knock-on effects are perhaps the single most important factor we need to relate to, but the changes in the world around us are tying our hands in more ways.

As a society we must also take into account the risk of terrorist attacks, hostile action by other states or sabotage. One drawback of a technologically advanced society is that it risks becoming vulnerable to attacks and accidents. This applies, for example, to the backbone of the smart city: the power grid. How long can we cope without electricity? Let us say that all electronic payments are down, how many people have enough food and water at home to survive for one week? What happens then? There may be good reason not to abandon cash completely, even though there are smart, convenient benefits in electronic payments.

Risk management is making a physical mark on the cityscape. Important buildings are surrounded by traffic barriers. Pedestrian streets are physically demarcated to reduce the risk of terrorist attacks by large vehicles, as those in cities such as Stockholm, Nice and Berlin. Important objects, such as the White House, have long been surrounded by closed streets to protect them from large vehicles packed with explosives. These kinds of traffic barriers do not make the city smarter, more inviting or pleasant – but they do make it safer. We make certain changes not because we want to, but because they are necessary.

We must incorporate certain concrete changes into our projections for the future and take them into account in concrete projects. This brings us back to management by objectives. The avoidance of disastrous changes in climate, ecosystems and habitat must be a driving goal in designing the city of the future, a kind of overarching goal to which other goals may be added.



## Sustainability as an overarching goal

On 25 September 2015, the members of the United Nations agreed on 17 global goals and 169 targets for sustainable development. These goals are to be achieved by 2030. The sustainable development goals are universal, integrated and indivisible.

When we talk about management by objectives, sustainability is a fundamental requirement. We can have different goals for the city of the future, but the global goals serve as a foundation upon which other goals can build. Without long term, sustainable urban development, it does not matter whether the city is densely populated, smart, beautiful, whether the retail sector has moved to external shopping malls or online, whether we transport ourselves in the air or in tunnels underground, or how smart logistics flows are.

Many of the global goals are closely linked to the city: sustainable energy, clean water and sanitation, sustainable consumption and production, reduced inequality and peaceful, inclusive societies. There is also one goal, no. 11, dedicated exclusively to 'Sustainable Cities and Communities'. It has been established that urbanisation is transforming the world, that cities are leading development and serving as hubs for innovations and new ideas. Growing cities can create new opportunities, but at the same time contribute to increased social disparities and pressures on ecosystems. One billion people currently live in slum areas, with major deficiencies in everything from clean water and satisfactory sanitation to power supply, waste management and safety for residents.

The global goals form the basis for starting to adopt a goal- and value-driven approach. If we are to achieve the universal and indivisible goals, if we are to reduce the negative environmental impact of cities, expand public transport, secure access to good, affordable housing, reduce the risk of people being hit by natural disasters and promote the link between city and country, then we need to act now and work together.

Sometimes goals are required in order to initiate both thought processes and concrete development work. Many countries have now implemented Vision Zero, a road safety project with the objective that nobody shall be killed or seriously injured in traffic. It was launched in Sweden in 1997. When the Swedish Parliament decided that a vision zero should apply to road safety work, it forced a faster pace of change. There was a goal to relate to, one in which people's lives and health were regarded as absolute, not something that can be exchanged for other societal values such as efficiency. Sweden converted crossroads into roundabouts, built 2+1 roads with cable barriers and set up speed cameras, not with the aim of locking up speeding drivers or collecting fines for the state, but in order to reduce speeds. For this reason not all cameras are active, and they are clearly signed so that drivers have time to reduce their speed. Since then, the number of deaths in traffic has not fallen to zero, but has been reduced by about half.

In the same way, we can use the global goals as a foundation for urban development, and not least for technological development. Technology can solve problems. It is a tool to be used in achieving our goals.

One exciting area of development where we should adopt a goal-driven approach and use the possibilities offered by technology is urban farming. For hundreds of years, food has been produced on bigger and bigger fields in rural areas. As cities have become bigger, transport from rural areas has increased. This is not without problems. One third of all food produced is thrown away, partly as a consequence of the long transportation times from field to shelf in the shop. Food production is now on the increase inside the cities themselves: on rooftops, in tunnels and buildings that are being customised for vertical crop cultivation.

Different methods are being developed and tested in parallel in the United States, Japan, the Netherlands and many other places. It involves everything from aquaponics – urban fish and plant farms – to vertical farming, where plants are grown in vertically positioned shelves. Some cultivation facilities can rely on natural light, others require energy. As long as the electricity comes from renewable sources, it can still be a good deal for the environment. Herbs, for example, are particularly suitable for vertical cultivation; they do not need as much space and have a relatively high value per kilo, while cereals are suitable for cultivation in rural areas and can withstand long transport and storage times.

In London, thirty metres below Clapham High Street, fennel, purple radish and wasabi are cultivated in an old shelter. These products can be harvested and delivered to the shop within the hour, they do not have to be transported long distances, and moving food production into the city reduces its vulnerability. In Brooklyn, in an old car park, basil is being cultivated in vertical systems in ten shipping containers, where climate, humidity and CO2 levels are controlled to the smallest detail.

“Rather than ship food across the world, we ship the climate data and feed it into our operating system”, said Tobias Peggs to the BBC. Peggs founded the company Square Roots together with Kimball Musk, the brother of Elon Musk. The herbs are delivered by bike to local shops.

For the London-based architect and author Carolyn Steele, there is another important point in establishing food production in cities: reminding people of where the food comes from. She describes in *The Guardian* how London's geography reminds us of how it was built up based on its food supply: grain came along the Thames to Bread Street, chicken came from the east to Poultry and beef came to Smithfield. That link to the countryside, to the land, has now disappeared and food is something you find in supermarket chiller cabinets.



## Sustainable Development Goal 11: Sustainable Cities and Communities

### Targets

- 11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.
- 11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.
- 11.3 By 2030, enhance inclusive and sustainable urbanisation and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.
- 11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage.
- 11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.
- 11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.
- 11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.
- 11.A Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.
- 11.B By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels.
- 11.C Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilising local materials.

## Where are we heading?

We must talk about the direction.

Smart cities are inadequate as a concept. The risk of formulating the dialogue in this way is that we become tied to a concept that is only linked to technological development. The words we use affect the way we think about development. The answer depends partly on how we ask the question. Ask how we should make the city smart and you will get technical answers, but ask how we will make it come alive and the answers will be about relationships and social factors.

We want to talk about the cities of the future. That is what this book is all about; giving some answers to what we think is reasonable, but above all to ask even more questions.

The single most important consideration is that the dialogue about the cities of the future is based on their inhabitants' perspective. We must identify what the city is doing best and use new opportunities to make it better. If we avoid the pitfalls, technology has the ability to deliver truly amazing opportunities.