to be debated

the digitized city

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The first volume ‘to be debated SPILLOVER’ (authored by Dr Jonathan Vickery) is available on the ecce website.

content

preface

Prof Dieter Gorny

‘The more digitized a commune, the better its (...) prospects for the future’, as stated by the study ‘Deutschlands Städte werden digital’ (Germany’s cities becoming digitized), published by the University of Bonn and PwC in 2015. According to this paper, digitization is an important strategic instrument for cities competing for locational advantages; even their sustainability depends on their ability and willingness to accept the challenges presented to the digitized society. You do not have to subscribe to this assessment – but it is impossible to deny the fact that digitization also does alter urban life more than people thought possible just a few years back.

Smartphones and tablets have become our constant companions. We are already in a position to use apps to regulate energy consumption in our apartments and to control the contents of our refrigerators, to do our groceries and to plan even the shortest of our trips through apps. There are street lamps and traffic lights that are tuned to activate by the flow of pedestrians or vehicles, and dustbin collections start only when the bins are full and send a signal to the city’s public waste service. Use of digitization and its technological innovations within urban space promises a better utilisation of resources and an improvement in urban quality of life; they facilitate a better access to information, emancipate the individual and enable more participation. Technological, economical and social innovations change the cities and their inhabitants. So cities become ‘smart cities’ and citizens turn into ‘smart citizens’.

Despite, or maybe even because of this, digitization is a contentious issue. According to a 2016 survey conducted by the Allensbach Institute for Public Opinion Research, for 42 per cent (of all Germans), the word ‘digitization’ evokes positive associations – it is plain to see how deeply at odds we are. Regardless of positive or negative thoughts: it has to be clear that digitization is not better by default. Yet we do not nearly know enough about it: digital developments and their effects on present and future, their opportunities and challenges require comprehensive broaching of the issue in all areas – be they politics, economy, science or society.

This discrepancy between uncertain evidence and the current state of research as well as a steadily accelerating urban and technological change through digitization is the reason why the second ‘to be debated’ volume is dedicated to the ‘digitized city’. Urban researcher Charles Landry, internationally renowned since the nineties, authored the second volume at hand. He formed the concept of the creative city like no other and became one of the most influential consultants for metropolises worldwide with his book ‘The Creative City: A Toolkit For Urban Innovators’. Through his work, Landry has been shaping the way cities think and also, what kind of influence they have been granting to culture and creativity within their development in the last twenty years.

ecce initiated the ‘to be debated’ series of publications in 2014 to insert trends within the Creative and Cultural Industries into public debate more than before, but also to question (self-)critically. This volume, just like the previous one, does not necessarily mirror the editor’s opinion. In 2015, ecce shed light on the digital revolution’s opportunities and risks for culture within the Forum d’Avignon Ruhr under the heading ‘Kultur ist Digital – Digital ist Kultur’ (Culture is digital – digital is culture). ecce launched a fact-based debate with selected European examples, talks on economical principles and ethical premises for digitization. With ‘to be debated THE DIGITIZED CITY’, ecce wants to start further debate, make scientific and political contexts discernible and to mediate information on the practice of the digitized city. A debate on the digitized city is needed more than ever. First and foremost, according to the author, it should be activated as fast as possible because ‘the digitized city is already with us, but it needs a jointly created vision of where next’.

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Charles Landry works with cities around the world to help them make the most of their potential. He is widely acclaimed as a speaker, author and innovator, and he facilitates complex urban change projects.

An international authority on using imagination in creating self-sustaining urban change Charles has advised cities or given talks in over 60 countries. He helps shift how we harness possibilities and resources in reinventing our cities, and his Creative City concept has become a global movement. His book ‘The Art of City Making’ was recently voted the 2nd best book on city-making ever written by the planning website Planetizen (http://www.planetizen.com/node/66462). Other books cover the measurement of urban creativity, the digitized city, urban fragility and risk, the sensory experience cities and interculturalism. For further information visit: www.charleslandry.com

introduction

Charles Landry

The digitized city is already with us, but it needs a jointly created vision of where next. Digitization represents a tectonic shift providing computing with an immense force. Its impacts and influence will be as powerful as the climactic changes that swept through our world with the industrial revolution 200 years ago. We are in the midst of redesigning the world and all its systems for a digital age including our built environment which was designed for how we lived and worked 50 years ago and more.

The digitized city is not written for those well versed as experienced aficionados of the Internet, mobile technology or smart-city thinking. It is targeted not at the tech savvy but instead at the rest of us interested in the emergent world of digitally driven and enabled cities and how these cities will evolve and affect us as citizens, businesses and the public sector.

Its origin lies in a symposium called 'Harnessing Knowledge for the City' held in Helsinki in a project jointly conceived and implemented with Helsinki City's research department called Helsinki Urban Facts. It focused on how we will experience, navigate and understand the digitized, sensorized city whose deeper impacts are yet to unfold as the power of big data and intelligent objects emerges with greater force.

> Citizens and city leaders must be collaborative to ensure collective benefits ensue.

Citizens and city leaders cannot avoid being involved to ensure we collectively harness the benefits of technology, as disruptive user-driven business models supplying a constant cascade of information have changed the way cities work. Airbnb is in effect a hotel chain without hotels, where Uber allows everyone to be a taxi driver and where daily commentary on facilities and places allows TripAdvisor to be a constant companion. Many of these innovations are immensely helpful and popular, yet they challenge existing interests.

These are of special interest to public entities whose public data providers and statistical offices have for a century held a near monopoly on information. That monopoly no longer exists, and ironically, their desire to open up their data is helping to break down their own strong positions as activists, as the business world and others embrace the resulting digital opportunities.

Meanwhile, much of the public sector does not benefit from or even bother to understand these new opportunities. Neither do they understand the value their own activities and data might be enabling. Two different worlds are emerging that presently do not match, yet there are mutual opportunities if both parties were clever enough to explore options together.

overture

Remember the world not long ago without digital connectivity. Consider these days doing research without the vast electronic library that is the Internet, without instant messaging, without social media, without feedback loops. Remember how fixing a date had to be firm and specific rather than flexible and fluid, or the query that took you to the local library where searching the card catalogue. Life did not run as we currently know it.

Stark reminders of this quite recent and very different world come to us from crises and from our awareness of restrictive regimes. Hurricane Sandy caused Internet outages lasting days and brought to mind the iconic images of bereft people trying to connect or even just to recharge phones and laptops. Visiting China if your account is Gmail or Hotmail effectively disconnects you from your world. The instant transactions are gone. Things are no longer ubiquitous and immediate.

Consider, too, the contrast in life experience and perception between those born native into the digital world, the Generation Z kids[1], and those older people – who still make most of our decisions – who have had to adapt to it.

Gutenberg 3.0 At the core of the vast changes affecting every facet of our lives lies digitization and its power to connect, to communicate and to manipulate data. It is the Gutenberg of our era and has engendered similarly powerful effects. It has transformed how we work, how we manage and organize, what we do, how we create, and even how we think.

Our culture is digital, and it is the digital that shapes our culture. The digital allowed a revolution in the use of information and is now like the air we breathe and the electricity that flows – it is omni-present. It shifts people's understanding of time, space, and place. Who would have thought that one set of discoveries would create a new world shaped through electrical signals of zeros and ones, ons and offs, or trues and falses?

> Digitally driven tools and technologies shape how and what we produce and consume and how we experience the world.

The move from an analogue to a digital world at first took time to unfold, and while both continue to co-exist, the digital gathered speed and has been quite sudden, all-pervasive and climactic in its effects.

A third platform The digital now rides on its third platform. The first was the era of mainframes and terminals, and the second was the period of laptops driven largely by a client/server relationship, where messages are exchanged in a request-response pattern. The combination of the cloud, mobile devices, social media and big data technologies working together are creating a new platform. Here, mobile devices and apps extend capabilities, here, the cloud acts as an outsourced mechanism, here, big data enables ultra-fast analysis to interpret data and to gain insights, and social technologies bring interactive human dimensions into digital, automated processes. It is the mashing of these disparate technologies and breaking the silos that is turbocharging digital commerce, information analytics and the development of intelligent infrastructures. Google, Amazon or Facebook, Uber, Airbnb and Twitter have used these to

[1] *Generation Z (also iGeneration, Post-Millennials, Centennials, or Plurals) are the cohort of people born after the Millennials*

powerful effect. These digital winners as well as the myriad of start-ups institutionalize their disruption-seeking radars and antennae[2,3]. It is the scope, scale, pervasiveness, the ubiquity and speed that the evolving technologies enable that is astonishing. And remember there were only a few million mainframe users in its time while now nearly 4 billion people are connected to the Internet.

The Internet – with its connective effects powered by the World Wide Web's ability to help share information – created the terms in which we talk about the world and its projects like 'smart cities', 'open data movement' or 'Internet of Things' (IoT). Work and its processes and collaborations could not have been so easy or smooth without the existence of these networks.

[2] *Accenture Strategy (2015)*

[3] for more information visit: http://triplehelix.stanford.edu/3helix_concept

Transformations and simulations Paradigm shift is a concept to be used sparingly. Yet there are moments and movements when the idea is apt, and full-blown digitization and its capacity to simulate and virtualize experience is one. Indeed, it is the most crucial topic in contemporary culture – the mental and social transformation created by our new electronic environment that allows us too to blend and mix the 'virtual' and the 'real'. Simulated products, services and augmented reality experiences are extending everywhere even creating virtual social networks, relationships and feelings.

Our data drenched world enables transformation on a scale that changes the foundations of business and public service and even our lives sweeping the ground from under their feet. Its effects are all-embracing, touching every function and process from how to communicate, to engage, to market, to sell. It is more than business as usual with a bit of tinkering. Dramatic transformation does not happen by choice, mostly. That is too difficult since attitudes, behaviours and systems entrench, and the tried and tested dominates over what could be. It is forced upon us by crisis, by opportunities being missed, by technological potential, by others doing better. Discovered by science, further explored and exploited by industry, the digital opened untold opportunities as business searched for new ways of staying competitive and getting ahead of rivals. In this process, a new market was discovered for digital solutions and products and services – the city.

The city an actor

Consider the effect on and possibilities for cities and how they feel and are experienced from how we navigate space, the impact of responsive, interactive digitized screens, to how we shop and how we transition from the virtual to the real and back again, and what this does to our behaviour. You know when the next bus or metro is coming to where a free car parking space is, yet more powerfully self-regulating mechanisms help us find where we are, enable us to control our energy use or monitor levels of pollution and much more. It creates easier feedback loops between citizens and the city decision makers and so in principle can help us reinvigorate local democracy. It allows the idea of the 'sharing economy' to be possible, which is built around sharing human and physical resources, it fosters swapping, exchanging or joint purchasing. Car sharing technology is a prime example.

At some level, as Dan Hill notes, 'the past is the future' as the technology allows us to recapture the lost threads of locality.

We can become more local with the power of distributed systems from energy to mobility, to decision making in urban planning and development.

Such dramatic changes affect us viscerally. At times, they engender fear that the world is racing ahead of us, uncontrolled. At others, it spawns excitement about the manifold opportunities unfolding. Remember that great places have some important key features: they are places of anchorage with a sense of stability; places of possibility; places of connection; of learning; and of inspiration. Some of this the digitized city provides, and some it does not.

Section conclusion:

- Digitization is the most crucial topic in contemporary culture – the mental and social transformation created by a new electronic environment that allows us too to blend and mix the 'virtual' and the 'real'.
- Consider the effect on and possibilities for cities and how they feel and are experienced from how we navigate space, the impact of responsive, interactive digitized screens, to how we transition from the 'virtual' to the 'real' and back again and what this does to our behaviour.

aims and intent

The city of humans The digitized city is already with us, but it needs a vision of where to next. This emergent city needs bigger values and an urban culture to anchor its actions, to drive its technologies and to solve old problems with new economic possibilities, such as addressing inequality or creating quality jobs.

It should never start with technology on its own. Its directions, its research agendas, the problems its sets out to solve are determined by private and public choices, which are ultimately about values and politics, as is what data we archive and what data we expose to new uses or scrutiny.

> Technology fever and innovative apps make one forget that it is the enabler and the servant of our objectives and bigger goals. We need to ask who technology serves and for what purposes. It is never neutral.

The Power of BlindSquare

Ilkka Pirttimaa invented BlindSquare – a potent tool for the visually impaired in reverse order. He started by pondering how to put existing open data reserves together with the new features of smartphones. His idea was to combine the huge geodata resources of Foursquare and the Open Street Map with possibilities offered by the speech synthesis functions of smartphones. He had no end user in mind and had not yet met a single visually impaired person. Then it clicked, and Pirttimaa realized the potential of bringing GPS and sound together for the visually impaired and created an accessible GPS-app that describes the environment as you travel, announcing points of interest and street intersections.

Thanks to its global data sources, BlindSquare can be used anywhere and has users in over 50 countries. In Helsinki, the application has added the city's service map, such as the accessibility of libraries and the region's real time transport information, in addition to Foursquare and the Open Street Map. Other cities are starting to follow this example in using local public data. Anecdotes best express BlindSquare's usefulness, such as the feedback Pirttimaa received from a Canadian user who said he can now go somewhere alone for the first time in 64 years.

> We have a once in a lifetime opportunity to build our cities in a different way.

We now have a once in a lifetime opportunity to build our city in a different way, but this cannot happen with a business-as-usual approach. It will take time to emerge fully and it needs to be grounded in principles, intent and aims, married to a paced and purposeful approach. We are redesigning the world and all its systems – legal, moral and political, and infrastructures for a digital age with information and communications technology (ICT) as one backbone. Yet the focus must be on the human, as this change should be for more than only efficiency or to save money and to deal with the effects of austerity. At its heart lies openness, an empowering stance that helps unleash untapped talents and capabilities as well as potential locked in silos in both public administrations, private businesses and across sectors.

This central intent can help harness the collective imagination of people, to assist them to be the best they can be; so improving their chances of mobilizing their intellectual resources. It should be an empowering process. An engine for this is openness. This is why the open data programme of cities from Helsinki to Washington, DC, to Amsterdam to Berlin was driven largely by the democratic impulse to be transparent, since data, our data, was closed and made people feel subservient, passive and even ignorant. 'Give back data to the people themselves for them to be wise or smart' was a clarion call, and its vast and powerful side-effects enhanced both the problem-solving capacities of communities and also of businesses adding value to products and services. This is what people mean by wanting 'smart citizens' in a 'smart city'.

Technology is that double-edged sword with advances often creating and posing binary dilemmas, such as does it facilitate or control, does it open things out or close them off, do its commercial conveniences and its voracious data gathering and continuous tracking invade my privacy or provide public opportunities, does it encroach or engage, does its all-embracing connectivity enhance my relationships and depth of understanding or flatten them and make them shallow. The trajectory of travel and its journey is clear towards the more open, the more public, more enabling, but it needs a social stance buttressed by a legal and regulatory framework to match in order to protect its benefits.

Technology is that double-edged sword

> New technologies always pose dilemmas. Does the digital engage or encroach?

Policy priorities Cities, and their public entities, must be active players in this emergent city, both shaping it and being shaped by it. They need to balance regulating with enabling, and the setting of promotional standards with incentivizing. They need to be pioneers and experimenters and to encourage development by procurement. They need to assess the public interest issues at stake and lobby for the balance between privacy and openness. Yet their default position must be openness, as from this transparency the innovative dynamics grow. This highlights the priority for public policy jointly conceived and co-created including:

MyData: The privacy agenda is rising in importance and, here a 'Mydata' infrastructure is required to enable the individual to manage their own data. This moves the default position on making data gathering choices away from corporates.

Balancing interests: Cities have to be continually alert to ensure the balance of public and private benefits. As the search for new markets saw the city as a target for digital solutions, a new risk has emerged as companies realize the value and close data again.

Co-creating the city: A new city is emerging that superficially looks the same – there are streets, pavements, buildings and parks –, but its operating dynamic is different. This changing context makes us ask what purpose do public administration and city institutions serve, and question what they should be providing for citizens, especially when some services are created and driven by the very citizens themselves. This requires a different bureaucracy that is deeply enabling, seeing its citizens and businesses as partners in a joint city making endeavour.

This new 'civic city' will have a new form, including a slimmer administration as well as new departments currently unknown to us. Indeed, the departments handling data interpretation or interactions may rise dramatically in importance. Classic silo working becomes redundant in this context, as information and interactions are horizontal issues affecting every sphere.

A central role for public entities is to monitor, interpret and balance these interactions and transactions, which mostly embody power relations, between the public entities, its community, companies and individuals as interactions with citizens can be lost. There are vast opportunities to both

> Some say the city is a 'concentration of dense human interactions in place and time'.

> Codes are also needed for digitally enabled visual pollution.

improve and recreate the city, but like with all innovations, the answer is unknown in advance. This implies an organizational ethos that enables an experimentation culture, and the city and its citizens are the big arenas to test this out. Just like the R&D departments of companies, the city needs one with strategic principles about the kind of place it wants to be, and it has to be tactically flexible in trying to get there. Living Labs allow you to practice a more innovative society in reality without stopping you in its tracks when some things inevitably go wrong. These labs can be buildings, streets, neighbourhoods or even the complete city, as with the City of Things project in Antwerp. This professional and managed testing culture requires tools and processes of experimentation to harness community power and business creativity. A culture of experimentation is a good bridge between these actors. With digitalization, there is something more they could do such as being a neutral interpreter or thinking brain for the city.

> There are vast opportunities to get the digitally enabled city right if the policies are in place.

Standards and codes: Rules and standards are needed for the sensorized city. The city of interactive surfaces and immersive digital environments where everything is malleable can overcommunicate and overload the senses. Much is useful information, but at a critical point it can turn into visual pollution. Think here of what is already happening in theme parks, in the casinos of Las Vegas, in retail environments and on the billboards in our cities, which, when left unchecked, can consume the visual landscape with cities 'suffocating under a smog of signage'. First São Paulo and then Chennai banned billboards, and now Grenoble is developing areas for public expression and has replaced 326 advertising signs with community noticeboards and trees, while others like Paris are following in their footsteps. The movements to control our visual environments are escalating, raising questions about our collective urban experience. Yet the city provides endless opportunities to satisfy the thirst for commercial communication such as tracking devices hidden in recycling bins. [4]

And think of shops as they turn into experience centres because they need to offer something extra over online purchasing, which is of course cheaper, as it cuts out the middleman. The concept stores like Ferrari or Audi or Abercrombie and Fitch are a mere harbinger of things to come. Remember, too, that the Internet shifts and exports the hard labour onto you. You buy the ticket, not the travel agent, you explore and purchase the fridge rather than someone helping you, all in the name of choice. And 'contact us' means electronically as it becomes increasingly difficult to speak to a human voice. This is why personal service and advice is at such a premium.

[4] *Kadhim Shubber (09.08.2013)*

The API economy and seamless connectivity[5]

Connectivity needs connectors; and interfaces between differing software were historically the blockage. Application Programming Interfaces (APIs) unlock the obstacles, and they are like a door or a window. They have become more than a piece of technology got elevated to being a driver of the business models and roadmaps of the digital economy. They are the catalyst and backbone that is force feeding the next wave of opportunities as products in themselves not just enablers, and they are a fundamental building block for the Internet of Things. APIs integrate programmes and define how they interact with the rest of the software world, so creating competitive advantages and leveraging possibilities.

API allow the mix and match to enable sprawling web-services from Google to Facebook to talk to each other, thus defining the web experience with their convenience and ability to save time. When you search for a restaurant in the Yelp app, it plots its location on Google Maps instead of creating its own maps. Yet the openness API provide is under threat as Twitter or Google, for instance, are limiting third party applications' use of their API, forcing users to use their sites. Twitter aims to monetize clicks by displaying ads and promoted tweets, insisting this is necessary to provide a 'unified' Twitter experience.

[5] *George Collins and David Sisk (Deloitte Consulting LLP) (2015)*

Digital literacy

Digital literacy: This is a sine-qua-non for a competent citizen in the digital age, and these e-skills include the ability to find, evaluate, utilize, share, and create content using information technologies and the Internet. Equally, there is a need to understand the digital universe and its history, its drivers, its key terms from APIs to the slippery smart city idea as well as digital economics and its social impacts.

Algorithmic control: Finally, the digital is opaque. It needs to explain itself, and one role of public entities is to make its processes transparent as well as find ways to make the invisible visible as only then can people participate and engage as capable, empowered citizens. Algorithms behind the scenes control everything we do on the web and they are closely guarded commercial secrets. Getting a loan – an algorithm looks at your bank records and decides without human intervention. Dating – an algorithm sifts through characteristics to give you a perfect match. What books you might read or films to watch, what you might buy, all can be calculated and it is cookies that help this process. These algorithms help sift through data ultra-fast to determine whether you are a security threat, while they also can be used to spy on you. They are 'the maths that help computers decide stuff'[6]. They are invisible computations that increasingly determine how we interact with the electronic world. No wonder we need to know as a matter of public policy.

> Our lives being controlled by algorithms is one of the great dangers to freedom in our era.

[6] *Jane Wakefield (23.08.2011)*

Section conclusion:

- The digitized city is already with us, but it needs a vision of where next. Digitization represents a tectonic shift, providing computing with an immense force. Its devices are changing society and social life, culture, levels of connectivity, the economy as well as cities.
- Technology fever and innovative apps make one forget that it is the enabler and the servant of our objectives and bigger goals. We need to ask who technology serves and for what purposes. It is never neutral.
- We now have a once in a lifetime opportunity to build our city in a different way, but this cannot happen with a business-as-usual approach.
- The trajectory of travel and its journey is clear towards the more open, the more public, more enabling, but it needs a social stance buttressed by a legal and regulatory framework to match in order to protect its benefits.

the digital universe

Connectivity and data are the new forms of capital, supplanting material resources, finance or location, and they have enabled and fast tracked the digital revolution and the disruption of established business models.

Its twin engines are the Internet's massive networks of networked computers rapidly accelerated by the widespread adoption of browsers and World Wide Web technology. This allows users an easy access to information linked throughout the globe.

'The cultural landscape is skewed at all times by the gravitational pull of certain ideas, themes, tendencies or individuals... and the one which is gradually bending everything into its orbit as well as throwing up phenomena made in its own image, is digitization' – this landscape Alan Kirby calls 'Digimodernism'[7]. It is becoming the dominant cultural force of the 21st century and is displacing the empty shell and exhausted ideas of post-modernism, which, by now, offers little in terms of explanatory power or innovation potential. Digimodernism's meaning centres on the impact of computers on all forms of culture and art and on how words and texts are written, used and placed – such as in the web 2.0 of blogs, chat rooms, message boards, Wikipedia, Facebook or Twitter. Here, technology is like oxygen and increasingly easy to use. This in turn affects our mindscape, our perceptions, our ways of analyzing and thinking and ultimately what we do and how we behave. This reminds us that writing a letter or using an atlas to find your way or booking a ticket at an office are rarities and that researching, learning and education have transformed as have making payments, entertaining oneself, dating and searching for a job.
This digital landscape is apparently a free for all and open though furtively patrolled by what Dan Hill calls the 'Urban Intelligence Industrial Complex' led by IBM, Cisco, General Electric, Siemens, Philips and search engines like Google or Yahoo.[8]

Digimodernism

[7] *Alan Kirby (2009) and Andrew Purvis (23.03.2008)*

Dynamics of digitization Within this digital universe, the three big game-changers are: big data, the Internet of Things, and intelligent objects. Crucially for city decision makers, the power of big data and its associated algorithms lies in its capacity to move from a 'descriptive to predictive and prescriptive analytic' and doing data analysis in real time.[9] Seen as the 'final frontier of analytical capabilities' it automatically synthesizes data with mathematical and computer sciences to make both predictions, and then to make recommendations for decision-making. Descriptive analytics looks at past performance and trends, and predictive analytics tries to assess the likelihood of what will happen. How much room is there then for autonomous judgement based on more subjective factors?

Volume, velocity, variety

Add to this the defining dimension of big data and its 'volume, velocity, and variety' enabled by the Internet and a powerful resource is being unleashed. Having eliminated the classic trade-off between the amount of information shared and the number of people you can share it with, the Internet makes all those public entities and companies, which are stuck in closed environments, vulnerable.

The vast information mass that makes up the evolving digital universe is made up of texts, images and videos on mobile phones, YouTube uploads, digital movies, banking data swiped in an ATM, security footage, recordings on highway tolls, calls zipping down digital phone lines. It is predicted to grow by 40% each year over the next five years, and it is barely charted and evaluated, with only 3% tagged and 0,5% analyzed, according to International Data Corporation (IDC). [10]An immense task lies ahead for cities, companies, communities and citizens to find the data, to analyze it and to extract value from the seeming chaos, of as many bits as there are stars in the universe, and then to apply it to solving problems or to create opportunities.

> Vast data mountains are being tapped, yet even vaster ones remain to be explored.

The Internet of Things

The era of the Internet of Things concept brings software and 'intelligence' or artificial intelligence to objects and will reach critical mass within the next five years. Devices are beginning to detect gesture, voice and emotion, and they become more contextually aware. The body itself can become an 'Internet of Oneself' monitored 24/7. The concept of the 'quantified self' incorporates technology and aims to provide data streams on most aspects of a person's daily life, such as food consumed, the quality of air, the state of mind such as

[8] *Alan Kirby (21.11.2009)*

[9] *International Data Corporation (2014)*

[10] for more information visit: https://www.idc.com/

moods or oxygen levels and the body's performance, such as tracking insulin. This self-monitoring and self-sensing enabled by wearable computers goes by different names, such as lifelogging, self-tracking, autoanalytics or body hacking. The Economist amusingly entitled one of its articles 'the quantified serf'.[11]

[11] *Peter Drucker (07.03.2015)*

The City of Things[12] A unique quadruple helix based partnership has been set up by iMinds, the Flemish government's ICT research institute; the City of Antwerp; Mobile Vikings, an innovative mobile provider, and citizens. This local innovation platform aims to bring the Internet of Things to life. It seeks to create an enabling environment to link open data provided by the city and others as well as open innovation processes that rely on sharing insights and knowledge and that stimulate co-creation. Together, the city of Antwerp and its citizens then act as the living lab and real-life test bed. Here, users, service providers and producers can jointly develop innovations in a trusted, open ecosystem that spurs business innovations. This closely networked system provides instant feedback loops to research behaviour and to monitor results as well as the technological capacities to respond to issues and to innovate along the way. To drive the process, the partnership together provides awards and sets up challenges.

The city is treated as a shared resource by the partners, with each providing rich data sets; the city, for example, does this through its open data policies, and Mobile Viking customers via their daily smartphone usage. In addition, there is the technological capacity to gather and analyze user and sensor data with an infrastructure to involve, track, and interact with users at a very large scale (1000s upon 1000s). The target groups are broad, including the City itself, start-ups and SMEs who can use Antwerp as an experimentation lab as well as researchers in academia, technology, business and the social domain.

[12] *Davor Meersman (30.11.2015)*

> The city is a vast canvas where billions of these sensorized devices will communicate eco-information, traffic, where parking spaces are free, crime hotspots, service options or urban maintenance issues to data or research centres.

Practically this means that citizens and the city can check the health of the environment, mobility patterns, lighting systems or physical problems in a street in real time, and, through rewards systems, direct behaviour towards stated goals. These could be to use more bikes and less cars to reduce congestion or pollution. These possibilities will allow new forms of interaction and new levels of personalization, both of which a city could track. Even though this sensorized city largely looks the same, it operates and performs differently, and it changes how it is experienced and constructed and how we act within it. Think of Airbnb, Zipcar or Uber and how they have re-conceived hospitality or urban mobility. This connectivity adds up to convenience.
The IoT takes this one step further and is made up of billions of sensorized objects from tractors to fridges or dog collars and is forming part of an ever-expanding digital universe feeding the creation of untold new apps with an intelligence that monitors, evaluates and acts upon data received. Of the estimated 200 billion larger 'things', currently 14 billion are connected and communicating via the Internet, and this is estimated to nearly triple by 2020[13]. These 'live' objects can be manipulated, maintained and managed from a distance, opening up potential for public and private entities, particularly given the agility they offer and their ability to track progress, say, in logistics, or to check the health of the system itself. The challenges include that the IoT is intrinsically global, and this ease of access requires international operational standards in dealing with security issues.

The city is software

The slogan 'software is eating the world'[14] resonates, since every firm or public department is in the software business and is a socially-empowered web-centric entity as the global economy will shortly be fully digitally wired. Photography is software-enabled through mobiles that upload to the digital universe; Amazon is a software company, as its core capability is its software engine able to sell practically everything online. With its reach, it hoovers up competitive possibilities, and the middleman or retail stores like Borders have gone and with Kindle, even books are software.

Netflix crippled Blockbuster, and its software can keep track of every one of its 40 million subscribers. Both Apple's iTunes and Spotify, the biggest music stores, are software-driven; the video game makers are software-focused; Pixar too. Logistics companies like Fedex or DHL are software companies with trucks attached who can monitor everything in real time and adjust to needs along the way; cars are largely software that runs engines, safety features and connect the car to mobile, satellite and GPS networks, and hybrid and electric cars will be largely computer controlled; practically all financial transactions are executed in software; the success of the oil, gas and mining industries is determined by software. Consider their data visualization and analysis tools needed in exploration and exploitation, which explains why they were the inventors of big data. In short, the value chain is shifting from the physical to the software world.

The decline of the physical is causing a counter-reaction and the revolt is seen in the makers' movement, in which the physical makes a comeback partly because we cannot make or maintain most objects with their high software content. Significantly, this requires new expertise and a new generation of information analyzers, decoders and curators are needed. Are the vocational schools and universities providing the skills?

> The question then is not 'what are computers for, but what are they not for', and equally not 'what is digital, but what is not digital'.

Cognitive load and sensory overload

There is a shadow side to this potentially glowing picture – the experience of over-stimulation from crowding, noise, media, technology, information bites. Estimates vary[15], but we receive between three to five times as much information as we did 25 years ago, and this pales into insignificance with the 100+ fold increase in what we churn out. 295 exabytes of data are floating around the world – that is 29,500,000,000,000,000,000,000 pieces of information representing apparently 315 times the number of grains of sand on Earth.[16] This includes everything from the attention grabbing 'brandscapes' increasingly inhabiting our cityscapes to e-mails, mobiles, Twitter and other social media or the video ads on the backs of taxi seats, on the bannisters of escalators or uprights of steps in airports or metros to animated ad floor coverings.

[13] *The Government Office for Science (2014)*

[14] *Mark Andreessen (20.08.2011)*

[15] *J. Walker Smith (n.d.)*

[16] *Richard Alleyne (11.02.2011)*

› The FOMO phenomenon – the fear of missing out – exacerbates this potential frenzy to be ever-present.

There is the burden of choice. On my mobile I can use WhatsApp, texting, calling, Facebook messenger, e-mail, Vine, Snapchat, Instagram, or Twitter, Flickr and LinkedIn. In this world of snippets and facts there are many factoids – items of unreliable information; reported and repeated, they become accepted as fact, to add to the confusion. A consequence is that we can get over-excited, restless, lack focus and concentration, fiddle, be irritable and ultimately shut out the sounds, impressions and stimuli of flickering lights or mindless white noise much of which is meaningless. In sum, this can stretch our processing capacity and make us appear bewildered, unfocused and fragmented and unable to have fine grained interaction.

The visual and the verbal

The world is in the midst of a dramatic transformation from the relatively recent dominance of word and text based communication to the visual. This is profoundly significant for our experience of the city. Digital advances have played a vital part in accelerating this shift, with their astonishing capacity to manipulate and bring visual imagery to life, while new image, word and text detecting software enhances possibilities – John Berger noted: 'Seeing comes before words'.[17]

Indeed, since the beginning of our known history, the vast majority of our communication was through drawings – think here of cave paintings. Visual symbols were invented 30,000 years ago, and writing approximately 5,000 years ago. Imagery is embedded in our primeval brain. Yet the invention of Gutenberg's movable type printing press in 1450 allowed text to take centre stage as the elements making up pictures and graphics were too complex to systematize. It is only in the 19th century that new printing techniques made it possible for imagery to resurface on a mass scale with signs, maps, instructions, posters, icons, symbols, all kinds of product packaging, hazard warnings, and today, it is all-pervasive.

Imagery is omnipresent and its use is mounting with unprecedented growth from mobile pictures to Pinterest. Why? Our minds react differently to visual stimuli as we understand and remember them more easily, and images enhance the emotional response, affecting our decision-making. Visuals are perceived in simultaneous chunks whereas the written word is decoded in a sequential linear way.

The 'picture superiority effect' shows that concepts are much more likely to be remembered experientially with imagery. Not surprisingly, the educational and advertising world has grasped this. Apparently over 80% of what humans learn is visual and more than 50% of mobile users watch videos on their device, and over half of all Internet users share self-generated visual content. There is also the often quoted apparent 'fact' that we process the visual 60,000 faster than text.[18,19]

The importance of visual literacy[20], being able to read, decode and understand the visual is crucial as is word based literacy, since verbal associations are better at understanding abstract concepts such as ethics and values. This narrative communication takes longer to grasp, but once grasped, it sits more deeply.

› The visual is beginning to dominate our sensory landscape and merging image and text via infographics will become more pervasive.

[17] *John Berger (1972)*

[18] for more information visit: http://www.citedudesign.com/fr/home/

[19] for more information visit: http://www.salonedelgusto.com/en/

[20] *Anne Bamford (2003)*

Section conclusion:

- Digimodernism describes the impact of computers on all forms of culture and art and on how words and texts are written, used and placed. Here, technology is like oxygen and increasingly easy to use. This, in turn, affects our mindscape, our perceptions, our ways of analyzing and thinking, and ultimately what we do and how we behave.
- The volume, velocity and variety of instantly available data streams combined with the 'anytime, anyplace, anywhere' phenomenon changes how we interact with space, place and time.
- The redesign of the emergent city needs bigger values. A human perspective should drive technologies rather than technologies shaping our potential.
- Cities, citizens and the variety of urban leaders have a once in a lifetime opportunity to rebuild our cities in a different way, including harnessing the capabilities of social media, interactive platforms or open data to deepen democracy and to make it more engaging and responsive to people's desires and needs.
- The era of the Internet of Things concept brings software and (artificial) intelligence to objects and will reach critical mass within the next five years. Devices are beginning to detect gesture, voice and emotion and become more contextually aware. The body itself can become an 'Internet of Oneself' monitored 24/7.
- The decline of the physical is causing a counter-reaction.

the urban experience

The seductive city There is a seductive quality and compelling narrative to this digitized city that sucks you softly into its interactive web where, with a swipe and a click, you can be gratified – mostly instantly. It can trigger desires so you want more. This is a place with ubiquitous wifi, where we move easily between the worlds of 'here and there', that is the local, the global, the physically real and the virtual. Mobile devices give us this mobility so we can work on the fly, be up to date, and in which our vast library, the Internet, provides untold knowledge resources. This city communicates through every fibre of its being. It is dynamic: signs move, billboards tell stories, info boards inform. It has a filmic quality, you sense you are floating – somewhat. It does not feel static, and the buildings still have solidity even though their surfaces might move and their textures are more transparent as glass proliferates. There is a conscious orchestration of serendipity as meeting places and third places grow, from the park bench to the café. This changes our work environments, with portfolio working becoming more dominant. The classic office feels constrained by comparison.

The digital spreads like oxygen with every social group participating, yet those operating 'on the move' and on a global scale remain the minority, with one large segment, the portfolio worker, representing just over a third of the workforce. Bus and truck drivers, nurses, shop staff, dentists, museum attendants or construction workers might have digital resources at hand but still conform to traditional work patterns.

Everyone and everything is supported by an invisible infrastructure of 'smart city' ICT that enhances the quality, performance and interactivity of urban services, from mobility to environmental monitoring and maintenance with self-regulatory systems. These mostly reduce costs and resource consumption and when done well, they improve contact between citizens and government.

The sensescape of cities

The digitally enabled cityscape has provided the global brands that are present in all larger cities with the ability to dominate our sensescape and visual experience, as they seek to embed their distinctive identities on place. This has emotional and psychological effects on urban dwellers that are only beginning to be charted, given the dangers of sense overload, clutter and over-stimulation. So some cities like Sao Paolo, Paris and Tokyo are now seeking to control this proliferation in the public interest. Artists have developed many of the innovations that define our urban experience and are increasingly used to create the installations and pop-up events that define our contemporary city. Night-time is where this overall urban branding process has special power. In this overwhelming digitally driven sensory landscape, public entities struggle to compete especially in projecting useful information from transport timetables, pollution monitoring, weather conditions, events or alerts. Other public interest issues concern questions such as:

› How sustainable is the energy consumption of luminous facades? To what extent are they obtrusive and contribute to visual pollution, and what should the guidelines and standards be?

The smart city The 'smart city' notion has a powerful rhetoric and involves using information and communication capacities to the full to increase performance, reduce resource use and increase connections between the city and citizen. It was initially promoted by big tech companies who identified the city as a major market and bulk purchaser of products and services to make life more convenient, efficient, secure, self-regulating and predictable. Companies were criticized as they did not initially focus on citizen engagement. [21]

Ubiquitous wifi is a basic starting point, and we now find in many cities embedded sensors tracking movements, pollution or energy use. Numerous experiments exist including: Albertslund lighting lab[22] in a Copenhagen suburb or Eindhoven's intelligent lighting strategy that creates responsive streets and even helps dementia patients to find their way. The city seeks to be a global model of experimenting with light – not surprising, since Phillips is based in the city. There is Amsterdam's 'social sensing on demand' that allows citizens to provide feedback to the city on any emerging condition, from potential flooding to broken pavements. Barcelona's 'smart bins' project helps garbage trucks only pick full bins as sensors communicate to drivers. Or the strategy of Paris to develop community and design challenges to rethink urban furniture from bollards to bus shelters, which are interactive. There is Vienna's creation of a holistic 'Smart City Wien Framework' targeted towards the year 2050 and cutting across all dimensions from education to the economy.[23] Nesta's 'Smart Cities from the Ground Up' is a good summary of initiatives from across the globe. [24]

The smart city includes the buildings within them, which are being reconceived from consumers of energy, water or electricity and producers of waste to a position where buildings contribute positively by dramatically reducing consumption but also giving back to grids and the system. This may be by solarizing buildings, creating roof top gardens including growing foods or inserting bio-reactive façade elements filled with water and green algae. Here, CO2 is pumped into the system so the green algae multiply by consuming sunlight and CO2. A processing facility in the bottom of the building gathers the algae and allows them to be siphoned off and used. This is cradle to cradle thinking in action.

The citizen centre-stage

The 'smart' word is slippery, in danger of over-use and exhaustion with cities twisting definitions away from its corporate origins in order to redefine how the 'smart city' debate is conducted. 'Smart' immediately became contentious as it conjured up a potentially dystopian flipside of the watchful eye monitoring both things and people. Many cities reacted strongly in trying to put the human being rather than technology at the centre, emphasizing the 'smart citizens' and their abilities, aspirations and anxieties.

[21] *Steven Poole (17.12.2014)*

[22] for more information visit: http://www.edn.com/design/led and http://www.salonedelgusto.com/en/

[23] for more information visit: https://smartcity.wien.gv.at/site/en/initiative/rahmenstrategie/

[24] *Tom Saunders and Peter Baeck (2015)*

In essence, 'smart city' now means making the most of a city's human, technical and ecological resources to increase the quality of city life or 'doing more with less' and being clever in the process of using ICT.

Here, Eurocities' CITYkeys[25] project is illuminating. It is an attempt to create a performance measurement framework to monitor and compare how smart city solutions have been implemented. It conducted a significant survey to assess citizens' needs from a smart city. Interestingly the scope seen by citizens is far wider than ICT solutions, and the most important goal was 'the creation of innovation and knowledge' in general. Importantly, only 11% of cities fully monitor their smart city progress, with 39% doing this partially. [26]

The inherent promise of digitization and GPS technology is that we can recreate some of the social bonds, connections and interactions at a more local level. Eurocities summarizes well the perspective from a public interest view: 'Becoming a smarter city is not an end goal, but a continuous process to be more resource efficient whilst simultaneously improving quality of life'. Smarter cities are part of a shift towards openness in terms of data, interfaces, platforms and open smart city standards.

There are no one-size-fits-all solutions: becoming smarter will mean different things to different cities. 'Smarter cities should be inclusive places that use technology and innovation to empower, engage with and capitalize on citizen participation. Engaging citizens goes beyond the uptake of technology: it extends to the co-creation of ideas and solutions. Smarter cities can encourage this using new governance and transparency tools such as living labs, tools to integrate citizen input in urban planning, and spaces and support for start-ups. Successful smart cities will facilitate this participation, co-creation and co-production with citizens and other local partners.'[27]

› It is crucial to involve people in the process: there can be no smart city without smart citizens.

The next word off the block will be 'equitable'. Most conferences, led by business or public entities are using the term as witnessed, for instance, by the Smart Cities Expo 2016.[28]

[25] for more information visit: http://www.citykeys-project.eu/citykeys/project

[26] *CITYkeys (2015)*

[27] *EUROCITIES (2015)*

[28] for more information visit: http://www.smartcityexpo.com/program

The pioneer

Many cities have for years looked to ICT to make management processes smoother, more efficient and effective. There is nothing special about that. The first city to grasp the potential of the connectivity and data revolution was Washington, DC, with its 'Apps for Democracy' project of 2008. This was a game-changer and in effect launched the open data movement. Its Office of the Chief Technology Officer, Vivek Kundra, was the pioneer by asking iStrategyLabs a simple question: how could the city make its vast data catalogue useful for citizens, visitors, businesses and government agencies in Washington, DC? The catalogue containing all manner of open public data featuring real-time crime feeds, school test scores, and poverty indicators was the most comprehensive in the world.

The old way – the Web 1.0 way – they thought would cost several million dollars by outsourcing it to a single supplier and would probably not deliver a very good product. Combining with citizens' talents would be far more effective, they thought. Indeed, the first edition contest of the 'Apps for Democracy' challenge cost the local authority $50,000 and returned 47 iPhone, Facebook and web applications with an estimated value in excess of $2,600,000 to the city. They included: a carpooling organizer, new biking maps, a 'We the People Wiki' peer-led community reference website that anyone can edit based on the public data, an application called 'Aware Real Time Alerts' on crime reports, building permits and the like. Many of these apps might seem obvious now, but were path-breaking then.

Foresight and weak signals Cities need to remain alert to ensure their priorities and values are acknowledged as the digital industrial complex seeks to try to insert itself into urban agendas. Cities thus should create a 'thinking brain' put together from a mixed partnership and an agile organizational form that learns to understand weak signals on the horizon as well as nearer term predictions. What this strategic grouping and its relations might be, locally and globally, will differ in varied settings. Within the public sector, the research and statistical departments could take the lead role, acting like reinvented super-librarians, decoding, analyzing, interpreting, curating and explaining the evolving world. Their core knowledgebase includes data number crunching capabilities aligned to both analytical intelligence and research competencies. But more is needed, namely the ability to think vertically – within a safe, deep knowledge-base – and horizontally, at the same time, so being able to cut across disciplines and forms of knowledge. That is to understand the essence of other disciplines so shaping the capacity to think comprehensively. But even more is required: an open mind that acts like a listening post and allows for the unexpected, whose feelers are tuned into 'weak signals'.

Shaping the capacity to think

› The pioneers are often seen as mavericks, but take care, they may be onto something.

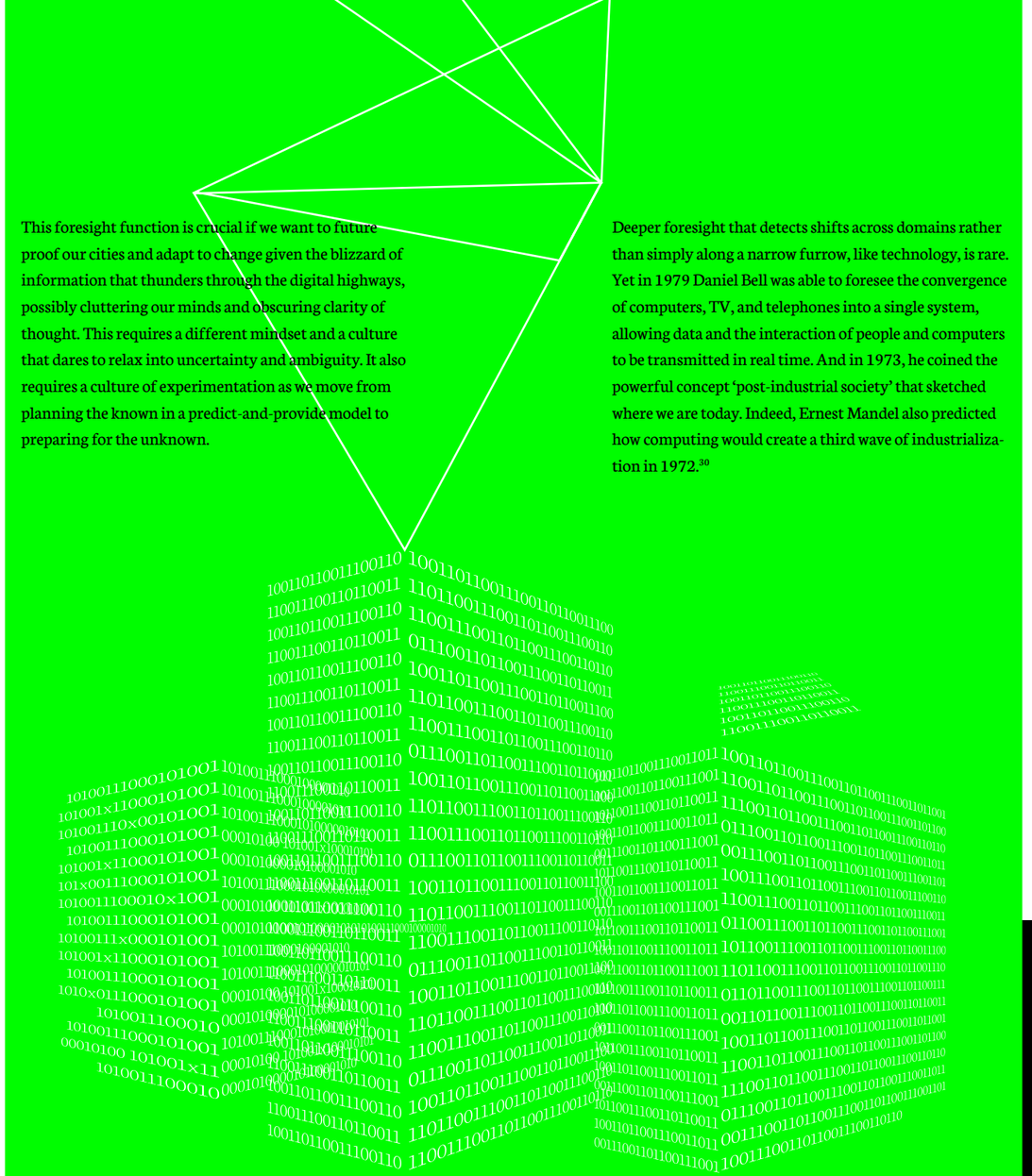
These signals, often hidden from view, may be snippets rather than clear, strong alerts. The process of thinking ahead is changing. In the past, our foresight was based on expert opinion and then on secondary sources such as published materials, data or market research. Now there is a third layer, social intelligence, where sharp antennae are needed to detect and interpret the flows of social media noise and conversations including buzz volume, discussion topics and crucially qualitative insights. This can give real time knowledge, radically changing the older pattern where 80% of time and effort was spent on gathering information with only a remainder on analyzing it.[29]

[29] Martin Harrysson, Estelle Metayer, and Hugo Sarrazin (2012)

› Remember, many things seem different but are the same in new technological clothes. Crowdfunding is a version of what once was called public subscription or building an investor community.

The power of new forms of insight, including data analytics and visual clues, but, equally importantly, cultural and visual literacy or business dynamics, change typical approaches to foresight and future-casting such as SWOT, scenario planning or Porter's 5 forces. These are now inadequate. The overall aim is to search for grand patterns of social change and being able to distinguish between fads and fashion or noise and deeper-rooted shifts and the occasional change that uproots the tectonic plates.

Some things we can predict with relative certainty, such as that artificial intelligence will have forceful impacts or robots a greater presence, with driverless cars just the beginning. Yet have we collectively assessed their influence on jobs and unemployment and how whole classes of work will disappear? What then will our future job profiles be? Are we training the young for maths and sciences, but also are we considering whether we need more humanities in a techno fixed era?



This foresight function is crucial if we want to future proof our cities and adapt to change given the blizzard of information that thunders through the digital highways, possibly cluttering our minds and obscuring clarity of thought. This requires a different mindset and a culture that dares to relax into uncertainty and ambiguity. It also requires a culture of experimentation as we move from planning the known in a predict-and-provide model to preparing for the unknown.

Deeper foresight that detects shifts across domains rather than simply along a narrow furrow, like technology, is rare. Yet in 1979 Daniel Bell was able to foresee the convergence of computers, TV, and telephones into a single system, allowing data and the interaction of people and computers to be transmitted in real time. And in 1973, he coined the powerful concept 'post-industrial society' that sketched where we are today. Indeed, Ernest Mandel also predicted how computing would create a third wave of industrialization in 1972.[30]

[30] Ernest Mandel (1999)

[31] Forum Virium Helsinki (2015)

The collaborative imperative The twin conditions to foster new solutions to problems and to harness opportunities are openness and collaboration. This is summarized well by Forum Virium (FV), which notes there are three options. First, each city buys its own dedicated and customized systems – this is expensive and inefficient but still the dominant model today. Second, large corporates produce service platforms and sell them to cities one by one with the city acting merely as a customer. 'This is okay. When a large company sells a product to a hundred different places, as the 101st buyer, the city will get a fairly good product. The downside is that these are closed source solutions.' Being tied to and locked into one company as provider risks the city becoming an addict, even if that company may be the best. The solution is for a group of cities, companies and citizens to collaborate in building an open source service platform, on top of which different stakeholders can develop their own services. FV notes: 'The great thing about using open source code is that it enables changing service providers, it lowers costs and allows small and medium sized companies to get involved in public IT service development.'[31]

Open source service platform

The aim is for cities to have interfaces that are open so they can communicate and learn. This leads to a next step – ur-

› Silo thinking, planning and acting will never help us achieve a great city.

ban platforms between cities operating on common standards, as detailed in the Forum Virium-led Six City Strategy[32] and Digiconnect, the European Union's memorandum on urban platforms. This collaborative model, based on openness, in turn requires a new governance model whose co-creation effect could be just as disruptive as Uber was to taxi companies. If achieved, it would imply cities getting involved in the innovation dynamic at an exponential rate. With cities as part of the innovation eco-system, they would be able to hire experts on short, task-driven projects (like Digital Helsinki) and to be actors in the evolution of open data and its experiments. Such an integrated approach is not confined to big cities, as Ghent, Tallinn or Riga prove, with populations of around 200,000.

[32] for more information visit: http://www.forumvirium.fi/en/sixpackstrategy and https://ec.europa.eu/dgs/connect/en/content/dg-connect

Section conclusion:

- The digitally enabled cityscape has provided global brands present in all larger cities with the ability to dominate our sensescape and visual experience as they seek to embed their distinctive identities on places. This has emotional and psychological effects on urban dwellers that are only beginning to be charted given the dangers of sense overload, clutter and over-stimulation.
- The 'smart' word is slippery, in danger of over-use and exhaustion, with cities twisting definitions away from its corporate origins in order to redefine how the 'smart city' debate is conducted.
- There are no one-size-fits-all solutions: becoming smarter will mean different things to different cities. Most of all, it is crucial to involve people in the process: there can be no smart city without smart citizens.
- The overall aim is to search for grand patterns of social change and being able to distinguish between fads and fashion or noise and deeper-rooted shifts and the occasional change that uproots the tectonic plates.

delights and discontents

The promise, paradoxes and predicaments

The digerati, that elite of the Internet, draw pictures and promote a vision of what could be, and it can be seductive. Technology in this vision can be deified, so to be cautious about the digital is not to be a technophobe or luddite but fosters a healthy rather than headless attitude that encourages public discussion and reflection. It focuses on ensuring that the public interest remains in view. 'Any process of major technological change generates its own mythology: "Technologies of Freedom", "The Network Society", and "The Culture of Autonomy". At its origins, the Internet is a technology of freedom, coming from a libertarian culture, paradoxically financed by the Pentagon for the benefit of scientists, engineers, and their students, with no direct military application in mind.'[33]

Technology and innovation are like a double-edged sword with digital technology ushering in a classic Schumpeterian creative destruction[34] period, bringing into reach untold potential and the capacity to do old things better. Think of Wikpedia or Skype. Yet this can also threaten, be sinister and even destroy the valuable. And even the new mega-corporations, so seemingly hip, might in effect control every move we make in the digital world. Think here of Google, Amazon, Facebook, or Apple. These powerful forces have increasingly been active in mobilizing their customers to fight government regulations by launching crusades to shape the world in their image, with Uber and Facebook as high profile examples. This reminds us that 'whoever controls the technology to mobilize our attention will essentially set the terms of the political debate.' [35]

Our society is a 'technopoly' where we idolize its feats. The cultural critic Neil Postman sums up the dilemmas beautifully: 'Because of its lengthy, intimate and inevitable relationship with culture, technology does not invite a close examination of its own consequences. It is the kind of friend that asks for trust and obedience, which most people are inclined to give because its gifts are truly bountiful. But, of course, there is a dark side to this friend... it creates a culture without a moral foundation. It undermines certain mental processes and social relations that make human life worth living. Technology, in sum, is both friend and enemy.'[36]

Openness and the innovation accelerator

The delights of the digital are enhanced by curiosity and openness. This is an attitude of mind, and these are primary pre-conditions to foster innovation in any sphere. This has led to the 'open source' movement, which has been powered by the possibilities of the digital world. The logic is simple: many minds crowdsourcing ideas from differing backgrounds can help solve problems or create opportunities by sharing research and resources. This has turbocharged potential.

[33] *Manuel Castells (2001)*

[34] *Ricardo J. Caballero (n.d.)*

[35] *Evgeny Morozov (03.01.2016)*

[36] *John Naughton (23.12.2012)*

Open source

There had been free sharing of software between academics during the origins of computing and the Internet, and is well etched into its ethos, but the movement took off in the early 1980s when the Free Software Foundation was launched. It gathered pace when Linux, invented by Linus Torvalds from Helsinki, was launched, a freely modifiable source code and it hit critical mass after the Open Source Summit in 1998.

> A tension exists between an ethos of openness required to drive creativity and its flipside, a desire to protect.

The idea spread to companies who had vast under-exploited patent libraries locked in their vaults and realized these assets could be unleashed, but also wanted to solve tough new problems by crowdsourcing. General Electric, one of the first in the field, has an 'open innovation manifesto' which states: 'We believe openness leads to inventiveness and usefulness. We also believe that it's impossible for any organization to have all the best ideas, and we strive to collaborate with experts and entrepreneurs everywhere who share our passion to solve some of the world's most pressing issues. We're initiating a fundamental shift in the way we do business.'[37] Henry Chesbrough, who coined the term 'open innovation', says it is a paradigm that assumes firms can and should use external ideas as well as internal ideas to advance their technology, or, put differently, it is 'innovating with partners by sharing risk and sharing reward.'

With open source, the world is helping you. It relies on collaborative activities between disciplines as well as breaking the silos. Indeed, genetic technology advances could not have happened without medicine, engineering and digital enablers coming together, robotics only work with GPS, and many successful ageing projects link health, social services and culture together. The same applies to sectorial partnerships, such as when the public, private and community realms connect to address complex urban problems like entrenched deprivation, developing new mobility or energy saving schemes. These only work by bringing differing skills and approaches together.

[37] for more information visit: http://www.ge.com/about-us/openinnovation

Sci-art and the digital

An example of openness is how at the end of the 20th century, a rapprochement began between the two great ways of exploring, understanding and knowing: science and art, often called sci-art. This has been given a boost by digitization. This process of 'boundary blurring' has now generated considerable momentum in bringing their joint insights and those of technology much closer together.

A special focus for art, technology and science collaboration developed once city centres became a union of everyday consumption and spectacle, in effect turning retailing into a part of the entertainment industry. This involved creating settings where customers and visitors participate in all-embracing sensory events, whether for shopping, visiting a museum, going to a restaurant, conducting business-to-business activities or providing any personalized service from haircutting to arranging travel.

Crucially, the merging of creative economy sectors, such as music, design and the audio-visual, with the world of ICT and apps is happening at a pace and migrating into the larger digital landscape. Together, they are becoming one of the largest sectors of the economy with multiple effects on areas as diverse as logistics, bio-medicine or film – in short, any field where tracking, interactivity, immersion, virtual reality and experience is required.

Experiment zones

Few cities have become a laboratory for new ideas or test bed experimentation zones, and in order to exemplify the real possibilities and pitfalls of a digitizing world, more need to be set up. A typical pharmaceutical or car company, by contrast, has an R&D department that tests its products both internally and with external user groups. Cities usually have no R&D department – and they should have.

There is a long history of special spatial development zones focused on physical regeneration, like the London and Melbourne Docklands Development Authorities, which have preferential planning laws and tax breaks. Pilot projects have proliferated, such as the EU's Urban Pilot Programme or more latterly the European URBACT programme, but it is questionable whether they are enough, even though they have provided an enormous pool of lessons learnt in the last 15 years, covering themes ranging from abandoned spaces, to circular economies, financial engineering, social innovation to urban mobility to city branding and disadvantaged neighbourhoods. Launched in 2002 and now in its third programme (2014-2020), it is the European Union's response to increasing demands for an EU Urban Agenda. Yet a criticism has been that they are too policy-oriented, that they remain pilots, and that they have had too little practical or systemic impact on the ground.

The European Union is responding and good examples of a new generation of EU-funded projects are the three lighthouse projects of 2015. TRIANGULUM[38], REMOURBAN[39] and GROWSMARTER[40]. It is the first time the EU is trying fund-integrated approaches within the smart city agenda.

Living Labs

Cities need safe places to try things out given the escalating speed of digitally driven innovations. A city or a neighbourhood rather than a nation is the ideal place to experiment, such as Kalasatama in Helsinki. They have more legitimacy with citizens and users and are closer to them since many inventions require behaviour change. Here, two movements have hastened the experimental approach.[41] Living Labs have a user-centric and citizen driven innovation philosophy fitting the co-creative ethos of the times in seeking to turn ideas into practice in real life contexts. These have either been a physical facility where people leading normal lives test how effective a new technology is, such as in PlaceLab at MIT[42] or ExperienceLab at Philips[43]. Alternatively, they can be Living Labs which are more like organizational arrangements for engaging multiple stakeholders in research and real life experiments. These emerged in Europe in the early 2000s. One of the most interesting examples is the City of Things project in Antwerp which embraces the whole city; there are now 170 active members worldwide.[44]

[38] for more information visit: http://www.triangulumproject.eu/

[39] for more information visit: http://www.remourban.eu/

[40] for more information visit: http://www.grow-smarter.eu/home/

[41] *The first is the rise of the Living Lab notion, a term William Mitchell from MIT coined as 'living laboratory' in the 1990s, and the second the smart city idea.*

[42] for more information visit: http://web.mit.edu/cron/group/house_n/placelab.html

[43] *Evgeny Morozov (03.01.2016)*

[44] for more information visit: *http://www.openlivinglabs.eu/aboutus*

> Crucially, the Internet enables us to shift from communicating to masses to mass self-expression. No more a message sent from one to many, but messages sent from many to many with interactivity attached. Here, senders are receivers and receivers are senders.

The social and the shared The steam revolution brought us railways to connect places faster. The electrical revolution gave us the telegraph and telephone to connect across distance as well as radio and television allowing us to reach mass audiences and of course the car, with each invention surpassing its predecessor with novel features. The electronic revolution enabled the Internet. The crucial difference between electrical and electronic circuits[45] is that electrical circuits have no decision making (processing) capability whilst electronic circuits do. An electrical circuit simply powers machines with electricity, but an electronic circuit can interpret signals, instructions or perform a task. Most modern appliances combine both.

[45] for more information visit: http://www.brightknowledge.org/knowledge-bank/engineering/careers-in-engineering/electrical-and-electronicengineering-whats-the-difference

> Social behaviour and life have changed, and so has the city. Every medium of communication changes the way we interact, and each one has foreshortened and bridged physical or mental distance.

Each transformation has increased social possibilities – sociability grew with the ability to catch a train, to drive a car, to make a phone call. It has not declined with the Internet, in fact, it has escalated and been accelerated by the possibilities of social media. The central question is whether and in which ways it has changed the qualities of our interactions. Does online social life, catalyzed by permanent connectivity, complement our offline world by enriching our overall life experience or replace it, leading to some loss? New software advances are increasingly seeking to mirror these senses, yet can the chemistry imagined be as good as the real? Perhaps shutting out emotional elements that can distort conversations is positive given the relative anonymity of the Internet.

The desire for and necessity of community has not changed, but how it is expressed and is socially constructed has. It is less bound in the fixed physical spaces of traditional community limited to family and a few outsiders. The astonishing technical advances that have enabled us to move and be mobile also allow a more nomadic life within which we affiliate and identify ourselves in multiple ways, defined more by and embedded in our networks than classic bonds. Networks define community in a nomadic world. This sits well with deep long-term trends towards individualism and a 'culture of autonomy'. Such a culture has been given extra power through the Internet and is still cradled within tribal instincts of the in-group and out-group based on interests, prejudices and culture. People look for and choose the like-minded or useful, forming networks of connection with relative freedom, or search for new connections such as through dating sites. Yet there are two flipsides as this can encourage a more 'me centred' society as well as the rapidly increasing negative networks.

Autonomous, more assertive actors or groups can be active in their own right, notes Manuel Castells, less bound by the rigidities and power of social, political and media institutions. Creating and getting news that is not swayed by mass media can be liberating. This allows people to 'mobilize and introduce new cultures in every domain of social life: in work (entrepreneurship), in the media (the active audience), in the Internet (the creative user), in the market (the informed and proactive consumer), in education (students as informed critical thinkers, making possible the new frontier of e-learning and m-learning pedagogy)... and the more autonomous...' It is palpably clear that 'the large-scale development of networking as the fundamental mechanism of social structuring and social change in every domain of social life is not possible without the Internet'.[46]

Anytime, anyplace, anywhere

The significant deeper question about the Internet is why is it so compelling, so much so that it changes our social life rather than focusing only on its tools and technical capabilities or those of Facebook, Instagram or WhatsApp. Its power lies in its freedom, flexibility and fluidity. It gives users space to be, to interact and to work anytime, anyplace, anywhere and with seamless connectivity, immediacy and instant involvement.

Psychologically, this free flow can be taxing since everything that was solid, stable and secure is in motion. People need a physical place to anchor themselves in and place matters as never before in spite of our increased virtual interactions. The loud cry for authenticity harbours a sense of lacking. Facilities, such as a café, which the mobile worker or nomad needs, represent the 'authentic', 'real' atmosphere and are mostly provided by people who love their neighbourhood or street. When people feel they belong, as of right, and this could simply be a known gathering place, they feel like citizens. This is different from being loyal and attached to the branded experience of entertainment chains.

Place matters in this shifting landscape as it provides anchorage, belonging, opportunity, connection and, ideally, inspiration. Here, online and offline, cyberspace and local space combine to make identity, shape interests and generate a meaningful life where people are more at ease in the multiple dimensions of the web and its multi-tasking possibilities.

The power of place

This has manifestations in the way cities work, are designed and navigated. The public realm, from sidewalks to benches, pocket parks and well-designed covered areas rise dramatically in importance, as do third places, such as informal cafes.[47] These are essential for community building where you can be communal yet homely, yet always with free wifi. You are neither at home nor in an office where you talk, transact or work on projects or can be alone together in a small crowd as well as watching others. It is a neutral territory, a leveller of difference and an outdoor community or living room. Space distinctions between home, work and relaxing are increasingly blurring – a new space typology is emerging. The traditional office is in rapid decline, down by 33% in 2015 since its peak in 2009 when each worker had 35 square metres (now only 25 square metres). Greater connectivity and faster Internet have liberated people to work from home as telecommuters or on the move, and property prices have pushed corporates into reducing space. Third places are work environments both for stranded corporates liberated from the confines of a cubicle and the office tower and more significantly for the breathtaking increase in micro-businesses connected to the start-up culture, itself enabled by the Internet. Such spaces can be either commercial or co-operatively run co-working places or shared offices that both reduce costs and increase the potential for interaction across disciplines. For many, the rent-free café, the book-

[46] *BBVA Annual Series (2014)*

[47] *Ray Oldenburg (1999)*

store, the library, theatre foyer or publicly accessible lobby are vital since costs are minimal (bar the drinks bill).

Third places

A typical image of life in an Internet café is someone sitting at a laptop, heads down, fidgeting and not looking up – physically present and absorbed in remote connections but not making social contact. Yet is this any different from being in a library in times past absorbed in a pile of books? There is simply a power in being alone together, so the social effects of the Internet on peoples' psychological well-being largely look fine.

The main quality of third places is being welcoming, comfortable, easy, accessible spaces, with a combination of regulars and newcomers, and where you do not have to spend money. As a bonus, many animate their venues and organize diversions to encourage engagement, commitment and belonging, be that music, talks or poetry readings, exhibitions, fairs and food events. A whole street even gets involved on special occasions. Indeed, the collective urban experience will take on added importance in future. With fragmented communication channels as the norm, there are very few common events to be discussed over the clichéd water cooler. Perhaps watching the football world cup or, more locally, the sports team where tribal loyalties can be expressed. This is why festivals culture and spectacular events, often artistically driven, frame an increasingly significant part of urban culture. See here the vast expansion of lumière events across the world.

> In an anywhere, anytime world, public gathering places become increasingly important.

Third places, of course, exist in the virtual realm with online communities, whose qualities mirror those of physical communities and where relative freedom from social status is a boon. You can extend your tentacles into cyberspace and be personal, approachable, or professional and communicate from the comfort of your home, university, or workplace. Special interest virtual communities have been with us longest in academia, but the popularity of online multiplayer video games is revealing. They form global communities with social norms and rules of engagement similar to those of third places, such as giving regulars the role of moderator or special credit, even though they may be acting through an avatar.

The city reinvented

The look, feel and structure of the cities we have built reflect their time and purpose especially their economic organization and mode of production. Our built environment has been designed for how we lived and worked at least 50 years ago. The factory world of industrialism with a 9-to-5 day or shift-work and with clear demarcations between home and work has gone. This fostered functional zoning with living, offices and dirty industry in tidy separation and ordered infrastructure, based on hubs and spokes piecing the city parts together with roads and metros systems. Typically, there was a city centre with key functions, government offices, the main retail and dominant cultural institutions.

> What happens in a world of anyplace, anywhere, anytime? What happens with portfolio working, where life and work are meshed and the mobile is the main communication device so you can work while walking?

Indeed, time spent online while on the move has increased five-fold in the decade since 2005, and time spent online overall for the average adult has more than doubled to 20.5 hours per week.[48]

The city needs to be both reverse engineered for the digital age as well as to create new infrastructures that live within its hard-engineered fabric. The key ingredient then is free wifi, and it needs to be everywhere in trams and trains, on buses and in cars and while walking down the street, in parks. Getting to work can be just as productive as being at work. Expectations of what the city provides increases, too. People want sensing technologies embedded into infrastructures, which tell them what is happening in real time so they can make better decisions (for instance to use a train or bus or a specific road). They want the infrastructure to respond to their needs and behaviour and in general help in creating a low-carbon city. The city centre is not the only hub. Anywhere can be one, provided a cluster of basic facilities are nearby, such as a multi-purpose venue, a few restaurants, an incubation centre, individually owned shops, places for the community to gather, or a market. A walkable environment, easy to reach and with good connections to other urban hubs is key.

Encroachment and engagement The capacity of the Internet to engage us in untold worlds and in force-feeding potential as well as opportunity is widely acknowledged as beneficial. The Internet invites but also invades us and thus, a vast literature is proliferating on the social changes brought about by the Internet and whether it or the social media is good or bad for you.

Many highlight the negative, citing how it is breaking concentration, fragmenting attention, disconnecting from life and invading the mindscape and leaving people defenceless. One under-explored dimension is the genetic basis of the addictive qualities of the social media and our attraction to the flashing light landscape of the urban environment. Drawing on this, the advertising industry adroitly lures us into its web and inserts itself ever more cleverly into our consciousness.

> Ironically, as the digitized world becomes more immersive, there will need to be places where we pay to avoid wifi.

A bias to be social

There is a deep neurological and thus psychological and emotional basis and bias to our need to be social and to communicate, including the 'social brain'[49,50] hypothesis. Humans, like all primates, rely on each other and need a nurturing environment to survive and grow given the length of infancy and ability to be independent. To say 'humans are social animals' is not a cliché but a profound need. It helps us understand the allure of the sharing economy. Social bonds ensure survival, and what is now different between humans and non-humans is that our links criss-cross the globe through the Internet, and they are explosive in reach and scale with a different quality. That complexity has grown exponentially and how individuals, the social network and the group interact involves embedded chemical imperatives in the brain that help us understand the addictive power of social media. Everyone has experienced how it is impossible to ignore emails, to be compelled to Twitter or texting or to look up Facebook notifications or to have googled information, only to find you have ended up on a completely different topic.

[48] *OFCOM (2015)*

[49] *Robin I.M. Dunbar (1998)*

[50] *Courtney Seiter (10.08.2015)*

Chemistry and curiosity

Dopamine plays a decisive role as neuroscientists now understand how it effects mood, attention, and motivation. It is like a curiosity drug. It causes 'seeking behaviour'[51], making us want, desire, search. This is critical from an evolutionary perspective, as we need to scan surroundings and learn in order to survive, affecting not only basic needs like food, but also curiosity about things, thoughts and ideas – thus information.

Linked to dopamine, the driver of 'wanting' is the complementary 'pleasure feeling' opioid system.[52] One propels us into action and the other satisfies us and, crucially, dopamine does not have a saturation mechanism built in. This creates the dopamine loop as texting, Facebook, Twitter and the Internet can give you instant access to what is going on and instant response, rather like a conversation, or instant gratification. You seek, you get rewarded, and this is where the addiction begins. You want more and more.

This is heightened by the Facebook 'like' symbol, which creates a process of emotional contagion, since we like to be liked. This creates 'intentional attunement' where, by observing someone else's emotions, the brain regions involved experience similar emotions in a mirroring process. This activates us to continue to respond, in a loop of 'unmediated resonance'.

The reason people get overwhelmed by the power of the digitized world and social media are its very numbers. Dunbar's Number[53] suggests various limits. We can only have up to 150 people as casual friends or people whose name we know and might invite to a very big party. This cascades down to 50 people seen on occasion and then 15 people with whom you can be quite intimate, and finally, many surveys suggest that 5 is the number of our close support group.[54,55] So how can we handle 1,000-plus Facebook friends and 100s of LinkedIn connections and Instagram followers? The answer is: with great difficulty and with psychological costs.

Most people use devices for socializing and keeping in touch with friends and family. Clearly an incredible advantage, but the headline grabbing findings are that 50% of regular users saw their behaviour change for the worse given factors such as negatively comparing themselves to others or being online 24/7 – a major hazard especially amongst the young. 60% felt the need to switch their devices off or using blockage software like Cold Turkey, as they were not capable of simply ignoring them[56]. It seems that if you are predisposed to anxiety pressures, technology acts as a tipping point, making people feel more insecure and overwhelmed and out of control.

The marketing armoury

Given this context, consider the communications armoury of the marketing world on a continual drive to grab attention. They know our weaknesses and how we move from one platform to another, always trying to stay updated and in the know and how, in a matter of seconds, we refresh Facebook feeds or pull down the screen to update Twitter. But how do they circumvent the avoidance strategies, especially of Millennials[57] who long for the 'authentic', of whom 60% think they see too much sponsored content and ads from brands?
To blast through the information saturation, stories are key.

[51] *Susan Weinschenk (07.11.2009)*

[52] *Kent C. Berridge and Terry E. Robinson (1998)*

[53] *Aleks Krotoski (14.03.2010)*

[54] for more information visit: http://kreativproces.dk/

[55] *Maria Konnikova (07.10.2014)*

[56] for more information visit: http://getcoldturkey.com/

[57] *Larry Alton (17.09.2015)*

This is how we, as humans, think and seek order, certainty and narrative structures that are familiar, predictable, and comforting. These are ordering devices like settled mindsets, mental maps, scripts, metaphors, or narratives. Stories trigger parts of the brain concerned with imagination. Then we become participants in the narrative.

Users are now so focused on image-based social media platforms such as Tumblr, Pinterest, Instagram or videos that are growing exponentially, outpacing traditionally text-based media, so the next move is 'visual storytelling'. This needs to be monetized, so videos get interrupted with pre-roll ads that you cannot avoid. We will see more incursions as marketers leap directly into social media streams.

Storytelling

When these techniques are propelled into stories, invasiveness levels increase. This helps humans be able to extract meaning from seemingly incongruous and unrelated facts and data. Cognitive scientists believe human minds innately process and store incoming information as stories. Our sensory cortex lights up when urban screens, metro ads or online videos extol delicious foods or smells. Meaning and emotion then merge.

> Storytelling is the most powerful tool as it puts the whole brain to work, stimulating a desire to connect threads and to narrate a causal sequence of events.

Gamification, which builds game principles into non-game contexts such as competition, mastery and rewards, takes this a step further in order to improve the flow of the user experience and learning. It aims to create the infinite experience by allowing people to immerse themselves in a step-by-step process, thus luring them into their web. Ian Bogost has called this marketing technique 'exploitationware'. [58]

There is a yearning for people to simplify the complex. There is a desire to find meaning in a world that seems to rush by. People long for tranquillity amidst the frenzy and fragmentary nature of everyday life. Reflective calm is something many search for, and staying centred in this tech saturated world is not easy. No wonder 'mindfulness' is all the rage.

[58] *Ian Bogost (03.05.2011)*

Civility and etiquette

The digital with its connective power is an unfolding civilizational force that inevitably shapes social life and behaviour and whose norms have not yet been firmly set. At the beginning of the mobile phone era, people used to show off by letting their phones ring loudly in public places like restaurants, and this rarely happens now. Yet, in Russia, one can still hear phones interrupt a concert, but mostly putting phones on silent is the norm. In meetings or public lectures mobiles are ever present and we are not sure whether if someone is in, their private world e-mailing their friends or keeping up to date or tweeting or writing up notes. Are they paying attention or being distracted?

It is probably impossible to create strict regulations as behaviours evolve and are negotiated through practice so ultimately becoming norms or common sense values. So we have reached a stage where it is clear that the onus with mobiles is on the user to take the right steps, such as not to speak too loudly in public or not to put the phone on speaker, to know where not to use the phone, such as at a funeral or in a museum. The main point is to be alert since what is right in any given situation will be based on judgement.

Section conclusion:

- The delights of the digital are enhanced by curiosity and openness. This attitude of mind is the primary pre-condition to foster innovation in any sphere.
- A few cities have become a laboratory for new ideas or test bed experimentation zones. To exemplify the real possibilities and pitfalls of a digitizing world, more need to be set up.
- The desire for and necessity of community has not changed, but how it is expressed and is socially constructed has. It is less bound in the fixed physical spaces of traditional community limited to family and a few outsiders. Networks define community in a nomadic world.
- The significant deeper question about the internet is: why is it so compelling, so much so that it changes our social life rather than focusing only on its tools and technical capabilities or those of Facebook, Instagram or WhatsApp?
- Our built environment has been designed for how we lived and worked 50 or more years ago. A reverse engineering process is necessary to adapt to the digital age as well as to create new infrastructures that live within its hard-engineered fabric. Place matters as never before in spite of our increased virtual interactions as people need physical places to anchor themselves in.

governance and democracy

The threads of the digital come together in considering the regulatory, governance and incentives framework that harmonizes fairness, transparency, public access and the right to privacy well.

This balancing act must navigate between sanctioning, enabling, supporting and containing, curtailing and controlling. The two perspectives are: dealing with the core of the digital technology itself, such as standards and technology and then addressing the implications and consequences brought about by digitization, such as changes in social life or increased scope to be mobile.

> Does the idea of citizenship change when we are mobile and have multiple identities?

The end of open-ended openness At the heart of the Internet and the World Wide Web and at its origins lie openness and sharing, and this has powered an intensity of interactions and opened up possibilities. This embedded trust was an accelerator of opportunity, as it enhanced research capabilities, shortened transaction times, saved resources, and it even helped competitiveness. The 'sharing economy' largely relies on trust, as do operations like eBay.

The integrity of the person or organization, who lives what they say and the clarity and transparency of intent has created a trust zone. This is an operating environment, which has had astonishing results, but it is under threat, and the centralizing tendencies of the large tech corporates threaten the web's wide-open spaces.[59] There is a need for a new social contract of the Internet to regulate levels of openness and closedness and safety and security as well as to determine who is in control at one end and how to safeguard people from bullying at the other. It includes addressing the ethics of digital databases.

We have lived through a struggle to open out data and more as of right, and much more needs to be done in the majority of countries. Yet with continuous tracking and the use of cookies, which remember your every move and then target you for advertising, a new level of invasiveness has occurred where privacy is more significant. In addition, personal data has an increasingly significant economic value for companies, and social and practical value for individuals.

> The World Economic Forum states: 'Personal data is becoming a new economic asset class, a valuable resource for the 21st century that will touch all aspects of society'.

[59] *Tim Berners-Lee (2014)*

MyData – the Nordic model

The 'MyData' movement switches principles and is a paradigm shift in personal data management and in processing personal information, by seeking to shift the current organization-centric system to one where humans are in control. It is based on the right of individuals to access the data collected about them. The MyData approach aims to strengthen digital human rights, such as the right to be forgotten, while opening new opportunities for businesses to develop innovative personal data based services built on mutual trust.

[60] for more information visit: http://www.ddhn.org

In similar vein, Forum d'Avignon created a 'Preliminary Declaration of Digital Rights' in 2014 and is exploring setting up a Data-Ethical Culture Observatory.[60]

[61] *Graham Smith (2005)*

[62] for more information visit: http://www.ddhn.org

[63] *Mike Lydon and Anthony Garcia (2015)*

[64] for more information visit: http://www.hri.fi/en/

Reinventing democracy Everything has been reinvented: business models, organizational forms, technologies and social life, but less so democracy. There is no shortage of ideas from deliberative democracy, which holds that there is more to democracy than simply voting or citizens budgeting. 'Beyond the Ballot: 57 Democratic Innovations from Around the World'[61] summarizes these well under electoral, consultation, deliberative, co-governance, direct democracy and e-democracy innovations.

Yet the full power of the digital unleashes untold abilities to mobilize opinion and movements, of which the Arab Spring, the Occupy movement, the Five Star Movement in Italy and Podemos in Spain are current examples. The latter castigate the economic, political and media establishment and contrast themselves as speaking for the people. Tactical urbanism[62] projects, such as 'parking day', 'restaurant day', 'better block' or 'guerrilla gardening' stem from the same ethos. They are all social media savvy so enabling citizens to unite whilst not requiring them to meet physically. Their aim is to change the way the city and citizens communicate with each other and make decisions - these are the radical civics in action[63], and they present some of the newer challenges to traditional notions of democracy from all quarters.

Harnessing community intelligence

Once you redefine the city as a community of brains where the aim is to harness the collective community intelligence, there is a different paradigm. Historically, community responsibility and its problems were outsourced to the public administration, which was a service production engine – 'why does the city not clean the streets.'

Consider how democratic participation is usually discussed when we ask 'have the people been consulted'. It is more important to know how to harness people's capacities for the common good. Helsinki Region Infoshare[64] is an example of an enabling mechanism that lets people play with data in a way that fosters entrepreneurship. This becomes a touchy topic when someone other than the city proposes to handle welfare services in a new way and so returns the responsibility to take care of themselves back to the individual. Politicians find this difficult, as they would be instantly labelled as wanting to dismantle the welfare society. However, the young, whilst sharing the welfare philosophy, are not wedded to preserving the model in its existing form.

Transparency and governance
All paperwork connected to Helsinki's decision-making procedures was moved into a digital environment in 2011. This Electronic Case Management System (AHJO) was initially used by several thousand users, from Councillors to City Board members and officials in city departments.
A game-changer occurred when an open API was inserted into the AHJO system in 2013. This made it possible for developers to innovate applications, so enabling citizens to easily enter a formerly closed system and browse decisions, find related documents or track the course of a particular issue in the local political system. This works because each issue being prepared for decision-making receives a AHJO case number with the relevant metadata recorded for every step in the process. One prominent solution is the freely downloadable mobile app 'AHJO Explorer' used regularly by top decision-makers in the city as well as others.
Digital case management not only saves the public administration substantial resources, but, more importantly, it creates huge potential to govern more democratically and openly. Helsinki's open data policy was the backbone without which the AHJO system or the data portal Helsinki Region Infoshare, in which hundreds of open datasets are available for free use, could not have happened. 'My vision is that all the data on decision-making will be available to all', noted the Mayor Jussi Pajunen, and this stance was strongly endorsed by the City Council in 2013.

The break-up of established models of operating includes procurement, traditionally geared to reach the lowest price rather than based on other principles. In encouraging new entrants, innovative procurement to encourage start-ups or SMEs is valuable.[65] In addition, Citymart[66] has explored how to transform the way some cities solve problems and procure by connecting them with new ideas through open challenges to entrepreneurs and citizens. This avoids those classic tender processes, which are often focused on prescribed methods or technologies.

This raises the question of misalignment between the digital natives' view of the world (new ways of doing things) and that of the digital settlers.

The context overlaying everything is that tax revenues can no longer pay for the service levels we are used to, and this crisis is driving an atmosphere that things must change. On top of this, there are a series of 'revolutions' taking place.

First, the communications revolution has broken the monopoly of the public sector as everyone has access to knowledge on their devices and is able to be an editor of their own media. The combination of principle and technology has made transparency possible, and there is no principled excuse for hiding.

Previously 'City' also meant City Hall and you would ask: 'why has the city/city hall not done this or that'. Now, when people say 'City' they mean the whole community of people living in it. This major upheaval of local governance means

> Add to this that for the first time in history, the young are teaching the old rather than the reverse. This is a dramatic shift with substantial cultural implications.

[65] *European Commission (2014)*

[66] *Ana Lopez (24.09.2014)*

City Hall has to support citizens' activities, with the community partially overtaking city government.

Feedback loops

The way the cities can operate is now much more transparent with instant, perhaps Twitter-led feedback loops. 'The Twitter mayor', deputy mayor of Helsinki Pekka Sauri, exemplifies this. He started replying to citizens' queries by e-mail and found it increasingly inefficient, as it was one to one communication. After a dramatic snow crisis and a mass of complaints in the city, he realized that the social media, one-to-many, and many-to-many communications increased his capacities exponentially. Five years ago regarded as a maverick, he now has 37,000 followers and regards the job of responding as 'his job' rather than as an extra function to be outsourced to a department or external agency. However, some still ask 'when do you do your job?'. This implies a culture shift with transparency permeating the culture rather than in a flagship or figurehead project.

[67] *Joel Weickgenant (06.01.2015)*

The open default position allows even the caretaker to use social media. If they grumble on internal matters (a constant fear), it means it has not been addressed in the department.

> Can a city serve different people differently with custom-made services?

The mobile citizen A mobile world where people move from place to place beggars the question 'where am I based and where am I a citizen?'. Nations and cities need to ask afresh 'what is identity' and 'what is citizenship'. Estonia that is 'so close to Russia, so far from Silicon Valley'[67] is an inspiration of where things could go. An innovation hub, it has fully considered the consequences of the digital revolution. It is one of the world's most digitally advanced places based on government strategies and support; broadband speed; cost and availability; wireless Internet access; technology adoption; with its records in the cloud; tech-education, technology culture and future potential. It used a massive cyber-attack in 2007 as an opportunity to become the West's leading think tank on cyber security. It is positioning its digital strategy to push itself past its geopolitical constraints. Its e-residency programme does not extend to physical residency, but allows anyone, worldwide, to establish a business in the country and to transact every aspect of their legal affairs online. Taxes can be paid, documents administered, notaries and intermediaries avoided, through using an electronic signature. In its first week, it attracted 13,000 subscribers. The aim is to give entrepreneurs abroad a stake in Estonia's future and indirectly increase the 'population' from 1.3 million to several million in the next decade.

> Estonia: this is where Skype was invented, free wifi initiated in 2005, and e-governance has been launched.

Section conclusion:

- Navigating between sanctioning, enabling, supporting and containing, curtailing and controlling is a balancing act. The two perspectives of regulation are: dealing with the core of the digital technology itself, and then addressing the implications and consequences brought about by digitization.
- The MyData movement switches principles and is a paradigm shift in personal data management by seeking to shift the current organization-centric system to one where humans are in control.
- The way the cities can operate is now much more transparent with instant social media-led feedback loops.
- A mobile world where people move from place to place beggars the question 'where am I based and where am I a citizen?'. Nations and cities need to ask afresh 'what is identity?' and 'what is citizenship?'.

measuring the digital eco-system

The methods to measure digitality or the digital capabilities of a city do not need to be conceptually different from good management sense, and various approaches exist. Three are highlighted, with the first two generic and the last city focused.

The first method involves readiness, human capacities and performance. It starts by looking at a city's digital readiness, such as whether it has a strategy, including a wish to be co-creative in moving to the digital world linked to an open-minded governance framework; then the presence of relevant digital infrastructures and a means of evaluating the city's progress. Second, it would look at its human capacities. These include: buy-in from leading players across sectors and their willingness to partner; solid competences downstream throughout the public organizations and other private and community entities; an open culture that fosters a test-and-learn culture. Lastly, it would assess how a city is performing against desired and stated aims. These overarching criteria would be matched by many questions, such as 'is wifi ubiquitous' or 'is digital literacy part of the curriculum' combined with qualitative assessments such as 'to what extent is the city sensorized'.

A second approach has been proposed by McKinsey[68], called the Digital Quotient DQ™ and is primarily addressed to the private sector, but its thinking can be adapted for cities. DQ™ assesses four major clusters that drive digital performance: strategy, culture, organization, and capabilities.

- Strategy – Is there an ambitious vision reflecting citizen needs and driven by them in place to meet short, medium and longer term digital aspirations?
- Culture – Have minds shifted and grasped the power of the digital? Is there a mind-set and behaviours able to capture digital opportunities by being willing to take risks, to foster an agile experimentation culture and to encourage internal and external collaboration?
- Organization – Is there a structure and process with roles and responsibilities and appropriate skills and expertise able to implement a digital strategy?
- Capabilities – Are there technical systems, such as ubiquitous wifi and tools, such as data driven decision making processes or digital skills in place to achieve strategic digital goals?
- Attached to these is a questionnaire-based qualitative diagnostic in order to dig deeper into the four domains.

The measures noted are strong in that they are simple, but weak in that they do not specifically focus on the sectors that make up an urban eco-system.[69]

The third method is the digital scorecard, and by contrast, it can be applied to any sector such as health, environment or mobility and, most importantly, to a city as a whole. Dublin's Digital Masterplan[70], launched in 2014, was the first comprehensive and pioneering initiative within which there was a Digital Maturity Scorecard (DMS)[71] focused on the whole urban eco-system. Unfortunately, the city has put this holistic evaluation system on hold even though it would put Dublin at the forefront of digital thinking. It has scaled its plans back to focus more on tactical issues like delivering sensors for lighting, mobility, pollution and so on.
Yet the DMS provides the necessary broad-based conception that cities require to assess where they stand digitally and what they need to do. It defines six layers of digital activity that the city must build up to international and best practice standards in order to become a truly Digital City with a roadmap to match as follows:

- 'Digital city governance' includes: vision, strategy and management processes as well as an open innovation culture and novel procurement policies.
- The 'building ubiquitous city networks' element includes interconnected, intelligent digital capacities.
- The 'leveraging urban data' component measures platforms, storage and analytics as well as progress on security and privacy issues.
- 'Fostering digital services' capabilities looks at interoperability or levels of participatory design.
- 'Digital access and skills proficiency' evaluates research capacity and digital inclusion.
- Finally 'city impact realization' assesses behaviour change, performance management or financial and non-financial returns.

Actions pursued as part of the Digital Masterplan relate to one or more of six digital city service domains which impact on quality of life in the city region: economy and innovation; community and citizenship; culture and entertainment; movement and transport; urban places and spaces; environmental practices. Within each domain there are also sub-elements containing good practices that cities can aim for. Digital readiness can move from 'ad hoc', to 'basic', 'to 'intermediate' to 'advanced' to 'optimizing'.

> The progress of the digital age can only be assessed by working across boundaries.

Section conclusion:

- Measuring, benchmarking and evidence building is part of any solid management ethos. It rises in importance in transformational moments like the shift to the digital.
- The methods to measure digitality or the digital capabilities of a city do not need to be conceptually different from good management sense, and various approaches exist.

[68] *Karel Dörner and Jürgen Meffert (2015)*

[69] for more information visit: http://www.mckinsey.com/client_service/mckinsey_digital/digital_quotient

[70] for more information visit: http://digitaldublin.ie/masterplan/ and http://digitaldublin.ie/two-innovative-toolsets/

[71] *The scorecard looks at maturity on a scale of one to five.*

digital literacy

Literacy is the ability to understand, decode, work and create or communicate with the dominant symbol systems of a culture. Literacy, originally defined merely as the capacity to read and write with our alphabet system, has vastly broadened, encompassing even cultural and emotional intelligence.

Various forms of intelligence or literacies are required to become competent, capable citizens of a city. They include grasping the media landscape or the shifts of a knowledge intensive society or the digital age itself. Literacy is a higher order form of thinking than acquiring knowledge and requires more than fact and discipline based learning.
There is a digital deficit in Europe with approximate 90% of jobs requiring some ICT skills, yet digital literacy cannot be discussed in isolation. It is part of a bigger context, namely the process and purpose of learning and knowledge acquisition in the 21st century. This is a political question. It concerns the purposes society chooses, which are negotiated in the public sphere. The traditional view of education's role was concerned with building responsible, capable, democratically-inclined citizens. The dominant discourse now is that learning should be primarily a servant of the economy[72], with knowledge as the asset, replacing location or physical resources. This is effectively the neo-liberal agenda with knowledge seen as use value feeding an engine to instrumentalize its worth. Currently, it is cities that are pushing back on this narrow perspective. They are shifting the smart cities agenda with a focus on 'people first' given the complaint that corporates are using cities simply as a new market to sell the technologies for smart city solutions.

A central challenge for our age, given its extensive diversities, is to define the comprehensive cultural, social and personal purpose and ethos for learning in the 21st century. This requires a different story and a collective agreement about what a good citizen is.

The concept of today's knowledge society is a complex shorthand for the fundamental qualitative changes we are experiencing in the digital age, and they are of the magnitude as industrialization was 200 years ago[73]. Yet, the learning system is conceived and still largely organized for a past industrial age and related needs. It could be called a production line approach to mass produce standardized pupils ready for work guided within a canon of accepted universal truths. We now realize there are many truths, many forms of knowledge, and so experts are less trusted. In addition, people have many identities and play multiple roles. Learning then changes, and so should schools or universities. People will still be encouraged to understand the rules and knowledge of traditional disciplines, professions and trades, yet with an aim to see how they might be improved, applied to new situations, mixed in with different disciplines and replaced in an innovation process[74]. This shift explains the innovation frenzy that can be detrimental to achieving other forms of value and values.[75]

> Digital literacy is more than functional IT skills, but rather a richer set of digital behaviours, practices and identity management processes.

The culture changes, too. It shifts the focus from simply remembering, understanding and applying facts and knowledge to being able to learn to learn, to critically analyze and, vitally, to create and co-create. In short, to live, manage oneself and operate in a digital society.

The obvious digital disciplines and practices we need to learn include using the diversity of social media, instant messaging and participating online, blogging, video or podcasting, searching, processing and evaluating online information, maintaining a website, photoshopping, and so on.

The Digital Europe Agenda[76] notes that, in order to be competitive and inclusive, Europe's education systems – from primary schools to university level – need to transform systematically to fully integrate digital literacy into the curriculum. Europe's Internet penetration is 80%, but this masks a North/South divide, and anyway having an Internet connection does not mean you are able to use its potential. See here the recent World Bank research quoted in 'The Internet is not the equalizer'. [77]

This is crucial given the strong correlation between e-skills and competitiveness. Notwithstanding the vital economic spin-offs from digital competence, much of the policy debate tends to overlook the deeper cultural learning required to adapt to the digital world as well as its pitfalls. Knowledge is a resource and, to drive innovation, fields of knowledge can be mixed just as within the digital realm which allows you to remix images, words and music. This means going beyond the mastery of a subject and requires the ability for navigational thinking, which enables you to scan horizons and detect the essence, the assumptions, and how experts generate their knowledge rather than its details. 'Knowledge is no longer a "thing" or matter produced by humans and then codified in disciplines or by experts... it is more like energy, defined by its effectiveness in action'. [78]

Section conclusion:

- Literacy is the ability to understand, decode, work and create or communicate with the dominant symbol systems of a culture.
- Culture changes, too. It shifts the focus from simply remembering, understanding and applying facts and knowledge to being able to learn, to critically analyze and, vitally, to create and co-create.
- Knowledge is a resource and, to drive innovation, fields of knowledge can be mixed just as within the digital realm which allows you to remix images, words and music. This means going beyond the mastery of a subject and requires the ability for navigational thinking, which enables you to scan horizons and detect the essence, the assumptions, and how experts generate their knowledge rather than its details.

[72] *Jane Gilbert (2005)*

[73] for more information visit: http://www.ddhn.org

[74] *Jean-François Lyotard (1979)*

[75] for more information visit: https://www.jisc.ac.uk/full-guide/developing-digital-literacies

[76] *DIGITALEUROPE (2009)*

[77] *Rory Cellan-Jones (15.01.2016)*

[78] *Manuel Castells (1996) quoted in Jane Gilbert (2005)*

next steps

Digital technology is a revolutionary force, and we need a guiding picture of what we want from its power as citizens and cities. This needs an ethical anchor to guide politics, policies and investment, which should be about solving the global and local problems that really matter. It needs to be driven down into new procurement methods, new collaborative technology sharing platforms, new regulatory and financial frameworks. These can push markets into the right direction and create the conditions to unleash a mass of small scale citizen, community or business-led innovations that lead to massive change[79]. Without machinery and an engine that pushes the digital into public interest investment, all we will get are the conveniences consumers want to buy rather than well-planned, fair, more equal, safe, healthy cities that combat climate issues and provide opportunities to make the most of people's potential to enhance overall prosperity. And, speaking on inequality, it should be remembered against the prevailing rhetoric that the technology driven economy is exacerbating our inequalities.[80]

Think cities, think digital technology, and the smart cities moniker rises with force. Yet where are these smart cities so much talked about and which ones provide 'the city we need'? Places that are already possible to create technologically. There are pilots, short-term initiatives, corporate R&D projects or grant funded experiments. There is little collective courage, will and determination from cities to ensure that every procurement from private sector providers has smart city criteria built into them, nor have planning, energy or building codes been adapted for the digitally enabled age.

Let us remember that technology left on its own can do more harm than good unless it is cradled within more lofty aims. As Rick Robinson notes in his insightful essay: a smart city or community is one which successfully harnesses the most powerful tool of our age — digital technology — to create opportunities for its citizens; to address the most severe acute challenges the human race has ever faced, arising from global urbanization and population growth and man-made climate change; and to address the persistent challenge of social and economic inequality.[81]

Periods of history involving mass transformation, like the Industrial Revolution or technological one of the past fifty years, can produce confusion; a sense of liberation combined with a feeling of being swept along by events. It takes a while for new ethical stances to take root or to establish a new and coherent world-view. The digital revolution is well underway and we now stand at the cusp of a rare and perhaps once in a lifetime opportunity to make cities better places with technology an able servant and enabler to allow citizens and cities to be and become the best they can be.

[79] for more information visit: http://www.massivesmall.com/

[80] *Erik Brynjolfsson, Andy McAfee and Michael Spence (2014)*

[81] *Rick Robinson (01.02.2016)*

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