What Does the 'Smart City' Construct Not Yet Contain?

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Abstract

Adriana-Carolina Bulz discusses contemporary humanistic limitations, paradoxes, false challenges and perspectives within a 'Smart City', while focusing on Don DeLillo's novel Cosmopolis (2003). Eliza Bulz expands on financial drift to learn from previous mistakes (by way of the 2008-2013 global financial crisis, and more versus the estate boom trick), while Nicolae Bulz starts from the concept of "Knowledge Society" and works toward "Consciousness Society" alongside the 'Smart City' construct.

Keywords: cyber-capital, financial drift, leveraging, knowledge, consciousness, challenge.

> **Motto: "**We depend on disaster to consolidate our vision."
> *(Don DeLillo – The Power of History)*

I. A satiric approach to the smart city concept

Within our wider topic, I would like to address the smart city construct as it is reflected in the work of contemporary American author Don DeLillo, mainly as it appears illustrated in the novel *Cosmopolis* (2003).

The (postmodern) city of *Cosmopolis*, like many other versions of the city appearing in literature, inflicts upon the main character a feeling of frustration that the reader can easily partake in. For the City is the antithesis of the Garden of Eden, of a place where desire is appeased. On the contrary, in the city, desire is perpetually frustrated and occasional gratification only gives rise to more intense desire. As an introduction to the present paper, I will briefly look into Richard Lehan's book entitled *Dreamscapes: The City in Literature*, which is a history of the evolution of the city concept as it appears in literary works. As Italo Calvino wrote in *Invisible Cities* (1972), "the cities, like dreams, are made of desires and fears." In accordance to the postmodern approach to the city, the urban environment is perceived as a maze, where the character becomes lost in a

hermeneutic circle, where the physical space and the state of mind are superimposed, so that looking for the truth outside the self inevitably leads back to one's self. Moreover, "urban activity becomes more abstract and unreal as power operates from hidden sources" (Lehan 287). In the absence of transcendence, chance predominates, while the uncanny abounds in all encounters. The self is a discontinuous entity, fraught with electronic stimuli, while surrounded by simulacra of value (such as money itself). The central idea of Lehan's study is that cities, like novels, can be read as texts and that they are mutually dependable.

The city as an enlightenment ideal has been questioned repeatedly by the romantic, naturalistic, modern and postmodern trains of thought, but the city nevertheless remains a source of intellectual excitement through its establishment of political order. The challenge, on the other hand, is provided by the perpetual threat of social chaos that the diversity inherent in city life presents. The main character in DeLillo's novel, Eric Packer, connects the critique of city life with the case against materialism and the cyber-capital issue. He is a 28-year old billionaire and genius of finance, with a taste for poetry, abstract art and of course women, embodying two contradictory tendencies: that of dissipation and that of concentration in one personality (the Apollonian and the Dionysian). Although he has accumulated a great deal in real estate and cyber capital, he is an equally ardent expender, especially towards the end of his life, which is the time frame that the story focuses upon. Throughout the novel, the main character's energy is on the wane – we are told about his sleepless nights – and he attempts to seek power and inspiration in the material objects surrounding him (his gorgeous apartment, his limousine, the skyscrapers etc.). From this viewpoint, the first chapter abounds in descriptions of the images and objects that the gaze or touch of Eric Packer reaches and by which the character takes possession of the world around him, feeding himself, ever more greedily, on its aura:

He went back up to the living quarters, walking slowly now, and paused in every room, absorbing what was there, *deeply seeing*, retaining every fleck of energy in rays and waves. The art that hung was mainly color-field and geometric, large canvases that dominated rooms and placed a prayerful hush on the atrium, skylighted, with its high white paintings and trickle fountain. The atrium had the tension and suspense of a towering space that requires pious silence in order to be seen and experienced properly, the mosque of soft footfall and rock doves murmurous in the vaulting. (DeDillo *Cosmopolis:* 2, emphasis mine)

DeLillo's *Cosmopolis* has many passages that focus on the movement of people, with fleeting but impressive portrayals of the working class – "a generic identity, the identity of no-identity, the identity which is beyond all identities". As Alain Badiou argues, "for Marx, 'proletariat' was the name of something like that. It's not an identity. It's … humanity as such, because the working class is something generic and not a pure identity", but today "probably that function of the working class is saturated." (qtd. in McNamara 99) However, the issue of the masses is still topical for authors such as DeLillo who "seek to construct that *generic identity* and make the problem of the socioeconomic outsider the key to reform of the modern world." (Keunen and Droogh in

McNamara 99) A quote from the novel will easily prove that the scope of the novel includes the aforementioned point:

Buses rumbled up the avenue in pairs, hacking and panting, buses abreast or single file, sending people to the sidewalk in sprints, *live prey, nothing new*, and that's where construction workers were eating lunch, seated against bank walls, legs stretched, rusty boots, appraising eyes, all trained on the streaming people, the march-past, checking looks and pace and style, women in brisk skirts, half running, sandaled women wearing headsets, women in floppy shorts, tourists, others high and slick with fingernails from vampire movies, long, fanged and frescoed, and the workers were alert for freakishness of any kind, people whose hair or clothing or manner of stride mock what the workers do, forty stories up, or schmucks with cell phones, who rankled them in general. These were scenes that normally roused him*, the great rapacious flow, where the physical will of the city, the ego fevers, the assertions of industry, commerce and crowds shape every anecdotal moment.* (*Cosmopolis* 18, emphasis mine)

While, from the above description, it is obvious that the working class is marginalized by society, the former is nonetheless a part of the latter and – more importantly – the workers are "appraising" society, while somehow aloof from it, their stance being similar for that matter with that of the observing hero. *Cosmopolis* may be remote in time from Edward Bellamy's urban utopia *Looking Backwards* (1888). It nevertheless enters a prolific dialogue with it as yet another dystopian response to the illusion of post-industrial bliss. Besides the portrayal of the working class and somehow included in it, DeLillo's cityscape equally highlights the minorities and the immigrants, bordering on the sense of multicultural crisis that the 9/11 events were rooted in:

Hasidim walked along the street, younger men in dark suits and important fedoras, faces pale and blank, men who only saw each other, he thought, as they disappeared into storefronts or down the subway steps. He knew the traders and gem cutters were in the back rooms and wondered whether deals were still made in doorways with a handshake and a Yiddish blessing. *In the grain of the street he sensed the Lower East Side of the 1920s and the diamond centers of Europe before the second war, Amsterdam and Antwerp. He knew some history.* He saw a woman seated on the sidewalk begging, a baby in her arms. She spoke a language he didn't recognize. He knew some languages but not this one. She seemed rooted to that plot of concrete. Maybe her baby had been born there, under the No Parking sign. FedEx trucks and UPS. *Black men wore signboards and spoke in African murmurs.* Cash for gold and diamonds. Rings, coins, pearls, wholesale jewelry, antique jewelry. *This was the souk, the shtetl.* Here were the hagglers and talebearers, the scrapmongers, the dealers in stray talk. *The street was an offense to the truth of the future. But he responded to it. He felt it enter every receptor and vault electrically to his brain.* The car stopped dead and he got out and stretched. Traffic ahead was a long liquid shimmer of idling metal. (*Cosmopolis:* 26, emphasis mine)

Amidst the urban flurry, the image of the beggar woman holding a baby in her arms is both touching and destabilizing for the hero and reader as well. The emotional appeal is

thwarted by the fact that her speech is unrecognizable, that her presence there is untraceable to any original location, by the fact that she seems a statue in motion – an impersonal presence, a generic non-identity, and therefore yet another specter of capitalism, her extreme, unquenchable poverty blankly juxtaposed with "cash for gold and diamonds". The way urban modernity has sought to solve the urban issues and has attempted to cope with such dazzling heterogeneity as the New York cityscape presents is indicative of the deepening crisis that will eventually end in the conflict and disaster that *Cosmopolis* anticipates:

Eye contact was a delicate matter. A quarter second of a shared glance was a violation of agreements that made the city operational. Who steps aside for whom, who looks or does not look at whom, what level of umbrage does a brush or a touch constitute? No one wanted to be touched. There was a pact of untouchability. Even here, in the huddle of old cultures, tactile and close-woven, with passersby mixed in, and security guards, and shoppers pressed to windows, and wandering fools, people did not touch each other. (*Cosmopolis*: 28, emphasis mine)

The Arcadia element present in the idealized image of the city may imply a powerful element of satire. It is therefore possible that DeLillo intended to incorporate in the novel an element of melodrama, thereby distancing himself (and the reader) from the toils of the (mock)hero. The concept of the urban pastoral elaborated on by McNamara and Gray in the last chapter of *The Cambridge Companion to the City in Literature* includes the urban presence of both music and poetry, which are two powerful artistic forces in DeLillo's text as well. However paradoxical or oxymoronic it may seem, life in the city does not preemptively exclude the possibility of finding (or at least seeking for) appeasement and enlightenment and we do get characters who are entranced by a passion for music and verse (the two elevators that Eric uses in his luxurious suite play music by Satie and Brutha Fez; also, Eric tries to soothe his mind by reading sparse verse at night while, on the other hand, he strongly dislikes the poetry of his wife Elise, calling it "bullshit" (probably because it is more descriptive and less mathematically precise). One way or another, postmodern urban fictional characters frequently find solace in various art forms; besides music and poetry, Eric also cherishes abstract art. The disturbing "white" paintings that hang in his living room are significant for their role in confusing his guests, thus adding to Eric's aura of unreachability. As a cultural connoisseur, Eric entertains an artistic relation to the space surrounding him, including the skyscraper building which he inhabits and about which he muses, reflecting that the name ("skyscraper") is outdated, since reality surpasses the meaning that such a name once reflected. Last but not least, Eric's limousine is indicative of the phenomenon of *conspicuous consumption* that Thorstein Veblen theorized in 1899, which is a sine-qua-non characteristic of the urban environment:

He liked the fact that the cars were indistinguishable from each other. He wanted such a car because he thought it was a platonic replica, weightless for all its size, less an object than an idea. But he knew this wasn't true. This was something he said for effect and he didn't believe it for an instant. He believed it for an instant but only just. He wanted the car because it was not only oversized but aggressively and contemptuously so,

metastasizingly so, a tremendous mutant thing that stood astride every argument against it. His chief of security liked the car for its anonymity. Long white limousines had become the most unnoticed vehicles in the city. (*Cosmopolis:* 3)

In a multicultural urban environment like New York, consumerism, participation and competition between members of all social classes are intensified and never held in check (as opposed to past societies where religion and the separation of classes limited the outspread of consumer desire). Thus, when frustration of the masses reaches a peak (which in *Cosmopolis* is exemplified by the crowds protesting against the economic monopoly of the cyber-capital, embodied in a rat symbol), there is a strong demand for sacrificial violence – which is where the unraveling of the action leads Eric, to the scapegoating moment meant to quench the descending spiral of societal desire. In fact, at a certain point the frenzied masses vandalize Eric's limousine, while he wonderingly waits inside for their fury to be quenched. In the last half of the novel, a true Bachanalia seems to be ongoing, with rampant violence choosing its victims randomly, it would seem. The moral of all this violent display is that humanity has been de-humanized by vanity and the acquisitive instinct that life in the city exacerbates.

In order to mirror the inhuman factor alienating citizens in the urban environment, DeLillo allows us to contemplate the city skyline dominated by the lurid glow of cybercapital. For the main character, Eric Paker, sensitivity is dulled by the game of figures:

He sat in the club chair at the rear of the cabin looking into the array of visual display units. There were medleys of data on every screen, all the flowing symbols and alpine charts, the polychrome numbers pulsing. He absorbed this material in a couple of long still seconds, ignoring the speech sounds that issued from lacquered heads." (*Cosmopolis:* 4) Such is the extent of his overexposure to data that he can't perceive the individuality of people that he comes into contact with anymore: "People hurried past, the others of the street, endless anonymous, twenty-one lives per second, race walking in their faces and pigments, sprays of fleetest being. *They were here to make the point that you did not have to look at them*. (*Cosmopolis*: 8, emphasis mine)

For an external observer, the environment in which the characters strive to feel at home is dazzling, especially their propensity to work with cyber-capital:

He looked past Chin toward streams of numbers running in opposite directions. He understood how much it meant to him, the roll and flip of data on a screen. He studied the figural diagrams that brought organic patterns into play, birdwing and chambered shell. It was shallow thinking to maintain that numbers and charts were the cold compression of unruly human energies, every sort of yearning and midnight sweat reduced to lucid units in the financial markets. In fact data itself was soulful and glowing, a dynamic aspect of the life process. This was the eloquence of alphabets and numeric systems, now fully realized in electronic form, in the zero-oneness of the world, the digital imperative that defined every breath of the planet's living billions. Here was the heave of the biosphere. Our bodies and oceans were here, knowable and whole. (Cosmopolis: 10)

The south side of the street was nearly empty of pedestrians. He led her out of the car and onto the sidewalk, where they were able to get a partial view of the electronic display of market information, the moving message units that streaked across the face of an office tower on the other side of Broadway. Kinski was transfixed. This was very different from the relaxed news reports that wrapped around the old Times Tower a few blocks south of here. These were three tiers of data running concurrently and swiftly about a hundred feet above the street. Financial news, stock prices, currency markets. The action was unflagging. The hellbent sprint of numbers and symbols, the fractions, decimals, stylized dollar signs, the streaming release of words, of multinational news, all too fleet to be absorbed. But he knew that Kinski was absorbing it. (*Cosmopolis*: 35)

Since money has become the blood of Cosmopolis, the rites of sacrifice demand as their victims the richest of men. Moments after Eric witnesses on TV the bloody assassination of a Russian billionaire, he gets hit by the pie-assassin in a mock tragic scene. However, as his councilor Vija Kinski predicts, somebody someday will truly have to answer for the loss of old certainties and their effective replacement with time-speeding devices:

Because time is a corporate asset now. It belongs to the free market system. The present is harder to find. It is being sucked out of the world to make way for the future of uncontrolled markets and huge investment potential. The future becomes insistent. This is why something will happen soon, maybe today," she said, looking slyly into her hands. "To correct the acceleration of time. Bring nature back to normal, more or less." (*Cosmopolis* 34)
This sentence leaves our discussion open to the expert on economics and to the interdisciplinary thinker on issues of knowledge and society, in the hope that the notion of Cosmopolis may show its brighter side.

II. Financial and economic aspects of smart cities development
What Don DeLillo envisions through the notion of Cosmopolis is the enslavement to money markets, scrolling screens and virtual realities which alienate people from reality. (Morrison, 2003)

Eric Packer, the anti-hero wants to live a surreal life "in a chip, on a disk, as data, a consciousness saved from void". Like the bankers behind the financial crisis of 2008-2013, he is trading billions as a game of profit and loss rather than something that has real life effects on labour, consumers, and environment. (Bonca, 2012)

Since the financial crisis Western consumers and companies have been "deleveraging" - getting rid of debt. This debt however simply takes on new forms. When American consumers slowed down on spending, China had to take up the slack through a large government stimulus program, which meant a major run up in debt for China. Other governments around the world have similar issues, holding more debts than ever. (Foroohar, 2015)

The reality is that US stocks, European markets, global commodities and emerging market bonds are all interconnected. Even the most minor shocks or perturbations can generate significant effects. If one asset class goes down, they all are impacted. The concern after the 2008 crash is that recovery is built on shaky foundations and that the financial sector has not changed that much. Monetary policy pumped up asset prices but didn't do much for raising the real economy. Cash or liquidity just went into the balance sheet and wasn't lent out, while some of it went to increasing asset prices. (Doward, Elliott and Ardehali, 2016)

The solution is not a quick fix. In order to create real growth expert analysts recommend big infrastructure projects and more support for innovative new businesses. This is also where the smart city structures come in to boost the economy.

From an economic and financial perspective, aiming to turn a city into a cosmopolis should create new business opportunities and encourage business research and innovations in order to solve 21st century challenges like greenhouse gases, crime and high energy costs.

 In the near future communities will grow at a very fast pace. The United Nations predicts by 2030, 60% of the world will live in cities. Demand for clean air, water, energy and convenience will skyrocket. (CNN, 2014)

Responsibility areas are: the built environment, economic development, energy, health and human services, payments, public safety and security, telecommunications, transportation, waste management and water.

Technology is a key enabler when aligned with a strategic vision for citizens and the right governance systems. By leveraging technology, local government authorities can start to manage disparate city services through smart unified control systems.

What makes a city really smart goes beyond optimising the performance of individual systems and requires a new model of urban collaboration.

In Figure 1, as illustrated below, the complexity of new applied technologies for city modernization is shown. The city is being developed towards efficiency and sustainability, being perceived in its wholeness, where the municipality and the citizens have an active role. The benefits are many: transparency, by providing and reacting to information related to energy and the environment.
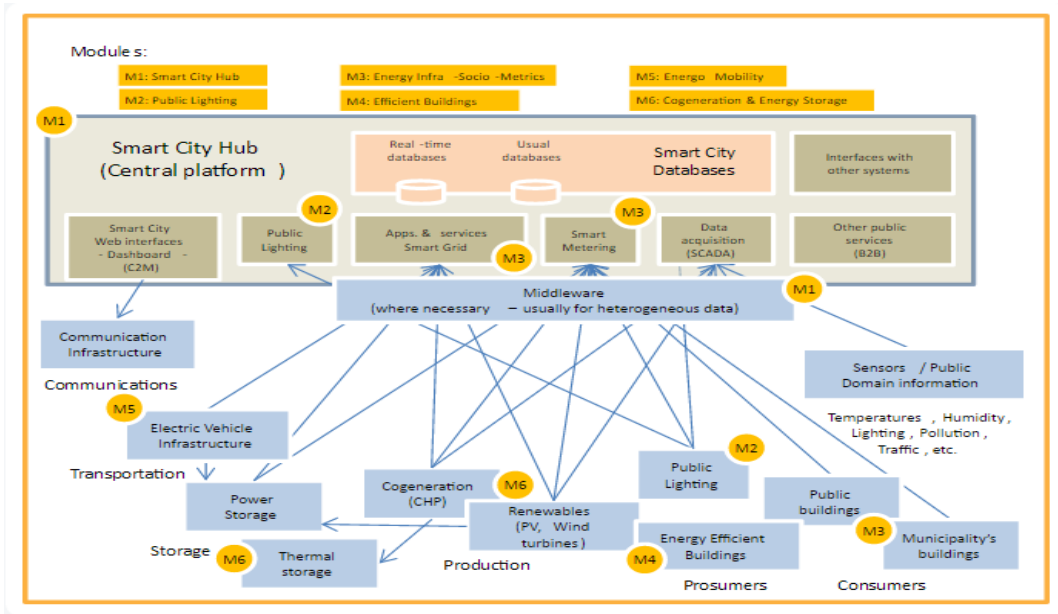
Fig. 1. Smart city hub.
Source: http://ecro.ro/en/applied-research/smart-comunities/smart-city-sibiu/

To enable the smart city structure, there are: data analytics, citizen engagement, computing resources, connectivity, instrumentation and control, interoperability, policy and leadership, security and privacy, finance and procurement. (Smart Cities Council, 2016)

Depending on who is in charge of what, a smart city can fall into one of four business models: (Sing, 2013)

- Build Own Operate (BOO) where the city planner independently builds the city infrastructure and delivers smart city services. The operation and maintenance of these services are fully under the planner's control. Chinese smart cities are an example for this model.
- Build Operate Transfer (BOT) where the planner appoints a trusted partner to build city infrastructure and provide services for a particular area within a time period. After completion the operation is handover to the planner. Some instances of this model are in Thailand and Myanmar.
- Build Operate Manage (BOM) where the planner appoints a partner to develop city infrastructure and services. The planner has no further role. Most of the public private partnerships are built on this model, like the Amsterdam City Project.
- Open Business Model (OBM) where the planner allows any qualified company or business organization to build city infrastructure and provide city services. The planner will impose some regulatory obligations on the companies involved.

Businesses can have various roles in the smart city construction: (Konkana, 2013)

- Integrators, companies like IBM, Oracle and Accenture – bringing together various sectors of the city through pre-packaged platforms providing a unified, holistic, end-to-end integration
- Network Service Providers, companies like Cisco, Verizon, Ericsson, AT&T – offering collaborative networks, data analytics and enterprise working solutions that connect people, assets, systems and products by leveraging on their network and M2M capabilities.
- Pure play product vendors, companies like Eaton, Honeywell, ABB, Siemens-providing hard assets like smart meters and distribution devices that operate as the main nodes of connectivity
- Managed Service Providers, companies like IBM, Serco, SAIC, Infosys – offering round the clock monitoring, complete management, compliance monitoring and on-site consulting.

The revenue opportunities identified through the smart city value proposition are estimated by 2025 at a global level to be as shown in Figure 2 below.
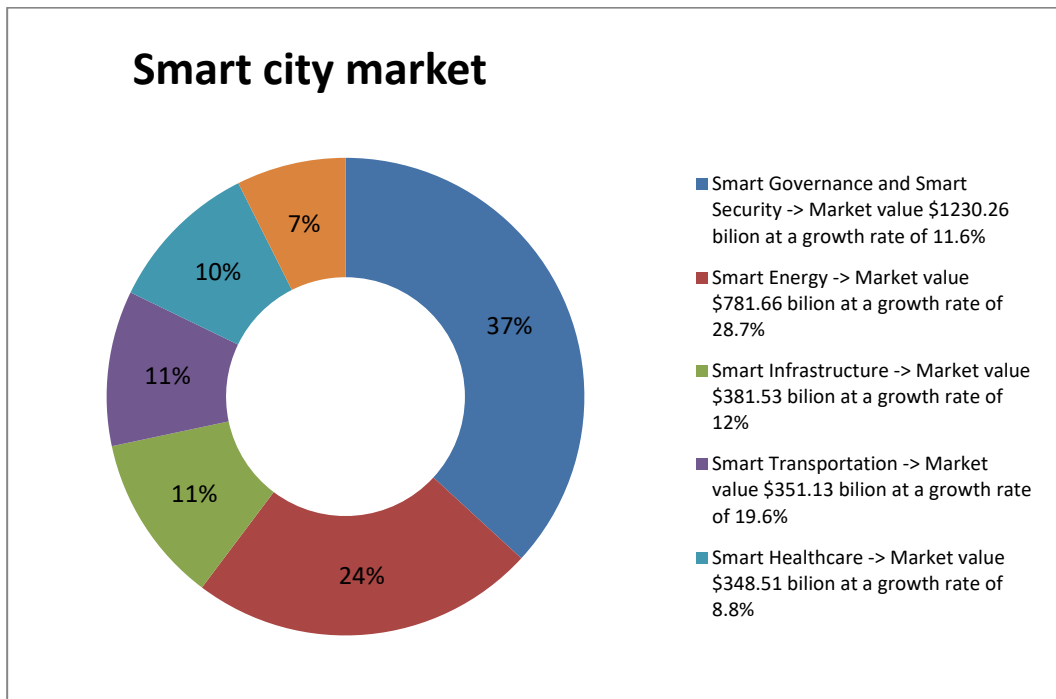

Fig. 2. Smart City Market by Segments
Source: ww2.frost.com/

Smart Cities market is projected to grow from $386.55 billion in 2014 to $1,386.56 billion in 2020, at a Compound Annual Growth Rate of 20.48% over the forecast period. (Mordor Intelligence, 2016)

The question is where the opportunities are, as in fact there is no one smart city market, but threads, segments, ecosystems and subsystems. Tailored cost effective and smart solutions for different subsystems, regions and stakeholders are required. (Vellosa and McLellan , 2011)

Also, there are two types of smart cities to cater services to the Greenfield and the Brownfield. Greenfield or brand new cities are seen especially in emerging markets like China and India.

200 smart city pilot projects are planned in China. The government plans to move 250 million citizens by 2050 and determine to make urban areas efficient and equipped for the influx of population. The idea here is that a blank canvas town can adopt new technologies faster that established cities that are already too big, like Beijing and Shanghai. They aim to create a repeatable pattern as to how to build and create and roll out a smart city. Western experts are weary of this approach, saying that only in five or ten year's time they will get to see how citizens' behaviour and technology should be connected. (Carrington, 2016)

Brownfield (retrofit cities) are represented by a large number of cities with aging infrastructure. Examples of these are the grid work for Amsterdam, Holland and the water system for Washington DC, which has elements that date to the US civil war.

The response of the Dutch government is to encourage private-public partnerships. They have a special website for Amsterdam (https://amsterdamsmartcity.com/) where interested citizens, local or international businesses can get involved and follow the progress of different projects. Regarding the energy sector, there are currently 31 projects ongoing, each for a different segment of energy issues.

Meanwhile, in the US, lead poisoning has been a problem in Washington D.C.'s tap water supply for decades. There are many other cities in the US where this is a problem, most notably Flint, Michigan. The risks are heightened as a result of changing the water disinfectant chemical and only partially fixing lead pipes. Engineers estimate over $1 trillion will need to be spent over the next 25 years to address the most urgent pipe replacement. The only solution seems to be more political activity from civil engineers as the water and drainage system seems to have been overlooked by decision makers. (Thompson, 2016)

Other cities that would like to develop as smart cities, like Rio de Janiero are investing in 'one-stop-shop' solutions in the form of centralised operations centres. The reality is that such projects are failing to really solve complex issues or add long-term value because there is little coordination between city functions and/or there is no overarching strategy. (Ballentine, 2013)

There must be a more holistic understanding of what citizens and businesses value fundamentally. Top research group Accenture states that: "As an industry we can work together to define how technology, along with business, governance and finance model innovation, will help realise these outcomes." Accenture worked with the New York Metropolitan Transportation Authority on procurement processes, helping them save $80 million. Rather than an upfront payment, they earned an outcome-based commission – a percentage of the savings realised through the project.

Indeed, given uncertain current economic conditions, the use of innovative financing models is integral in implementing a smart city strategy. Services providers are developing new business models with greater flexibility and no upfront capital investment. This facilitates accessibility of smart city projects worldwide.

III.   Smart knowledge society, smart consciousness society

Knowledge and consciousness are two fundamentally linked concepts. Knowledge is information shared between members of society, including assessments about the world that have been verified over time by reliable third parties. The more validated knowledge is, the more robust and useful it becomes. However, new discoveries that are based on existing knowledge continue to be made, some revealing what was considered knowledge yesterday is ignorance today.

Consciousness, on the other hand, is the ability to distinguish between ego and inner self. Consciousness allows people to evolve when current knowledge becomes obsolete.

Knowledge is still critical to the expansion of the intellect, the improvement of the quality of life, and the evolution of civilization. In fact, if used properly, knowledge can also be used to spark the awakening of consciousness. However, past a certain point, all knowledge becomes insufficient before the greatness and mystery of the human soul. Carl Jung once said "Who looks outside dreams. Who looks inside awakens." Only by developing the consciousness can humans conquer their nature and solve, once and for all, the issues that threaten the survival of the planet. (Lemero, 2014)

In the pursuit of lasting development, a smart city should focus mainly on social and human capital, as simply a technology/knowledge- filled city is nothing without its residents and visitors. Citizens must be considered as an active part of the community not only as consumers of services, but also as contributors of information, ideas, solutions and innovation. This will be the future: the city as a community.

The societal trends that are pushing forward in smart cities worldwide are: the move from municipality to community, from ownership to sharing and personal/citizen level adjustments and interactions.

The city of Almere, in the Netherlands, even calls itself a 'smart society' instead of a 'smart city' to avoid the impression that its only driver is technology. They have a City

Protocol Society, comprised of city leaders, businesses and academics that believe the smart society will only be realised if it is developed for and by the city's residents, businesses and institutions. Together they air to address urban challenges such as sustainability, self-sufficiency, quality of life, competitiveness and citizen participation. The mayor expresses this idea: "The cooperation we are developing in the city together with consortium parties will result in the creation of an 'urban network' that is focused on economic growth, sustainable urban development, efficient urban management and social innovation and cohesion." (Almere Smart Society)

All relevant stakeholders within the city must be invited to participate in urban decision-making to gain access to greater intelligence. Smarter data sharing is essential for optimising city functions and service delivery.

Boston, in the US, has developed a Citizens Connect app that enables ordinary citizens to become more connected to government issues, by alerting the city authorities to neighbourhood issues such as potholes and graffiti. This leverages the power of collaboration and technology to transform citizens' interaction with government. (O'Brien, 2013)
Barcelona's Smart City vision merges urban planning, ecology, and information technology to improve the lives of citizens, and has already harnessed collaborative cloud technologies to enhance administrative operations. Using a Microsoft programme, the CityNext initiative, residents can use the app to monitor real- time fluctuations in population density, unemployment rates, and other local data, to help make decisions about where to start a business or where to live. Their statement says: "Smart urban planning is first and foremost about improving citizens' welfare and for supporting economic progress and technology is simply a means to that end." (Barcelona Digital Strategy)

In conclusion, a smart city/cosmopolis is created through a process that takes place on a physical level, an economic level and a personal level. On a physical level you can add sustainability and smartness to all objects. This is the external approach. On an economic level you can use different business models. But the personal level (consciousness) is both the most important and most difficult to change. Technology can only help people progress and evolve if it gives them more freedom instead of less. The idea of cosmopolis as it is being considered today has more to do with human growth and flourishing through various means: interdisciplinary insight, cultural literacy, collaboration with each other and the ecosystem in a creative, participatory way. This is needed to lead to the creation of a world that is both functional and aesthetic.

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