THE APPROACHING CURVE

INFRASTRUCTURES OF THE FUTURE

By Jordan AMAN

strate
ECOLE DE DESIGN

Diplômes 2019

Index

We must ask what the implications are for a citizen's quality of life when civil welfare could be a secondary consideration.

In modern urban development, infrastructure projects are managed more and more by the private sector. Usually it is a team of engineers, planners, designers, investors, and local government actors that come to take decisions on large scale urban projects. Digital infrastructures, along with most other physical infrastructure and municipal projects, are observing a gradual privatization that could disrupt the balance often sought after between social equity and economic efficiency in public-private-partnerships (P3s). If ever private actors take on a disproportionate amount of control or risk through a municipal proposal, they could easily begin making decisions about the nature of the intervention that would be less inclusive, and instead in direct commercial interest of the organization. In observing this gradual privatization of digital infrastructures, we must ask what the implications are for a citizen's quality of life when civil welfare could be a secondary consideration. This paper breaks down the development of digital frameworks, referring both to hardware and software development at the city/country-scale, and begins to examine ethical solutions for better social action, while honoring the citizen experience, into the long-term. These reflections came to form the initial question of this study:

How does the privatization of digital infrastructural development affect citizen living and quality of life?

This question holds an inherent opinion, that indeed the privatization of digital infrastructure can and does have an impact on an inhabitant's quality of life. However, not knowing exactly what changes are effectuated on the human scale in this kind of development, we broke this paper into three main sections. These sections cover the current atmosphere of urban development, digital infrastructure, and partnerships, then dive into existing projects and how might the local actors be able to improve their offer.

We began this investigation attempting to discern the various

stakes and aspects of modern city planning. Additionally it was important to begin to understand the process and trajectory of urban projects across varying cultures to better qualify initial suspicions and propose sound solutions.

As stated, this paper is broken into three main sections. First an explanation of the problem at hand, with a detailed explanation of digital infrastructure and its role in the modern world. Virtual frameworks are the kind of project with national and international level actors in both the private and public sector. To interpret the possible faults of existing P3 systems we continue with an in depth look at partnership through urban evolution and the ethical considerations that come with them.

Section II, The Livability Factor, approaches quality of life in the digital age, asking what makes a city or service livable. As part of this section, case studies provide detailed insight into the variable degrees of livability and how this standard changes in different cultures. Equally, we examine the difference in urbanization efforts between a smart cities initiative in Chicago, USA, an organically smart service and supply chain effort in Mumbai, India, and a ground-up mega-city project, Neom, in Saudi Arabia. Then we take a look at the trend of privatization with actions from Google, Facebook and Amazon, and the history of privatization in emerging markets. Here we are able to identify where public and private actors may be able to improve upon their management and deployment of different project initiatives, as well as what aspects of deployment were successful, so as to better serve the communities for which they are building. Furthermore, we analyze what parts of these proposals are ethically sound and would have the greatest positive impact on the local citizens.

Finally we investigate problem solving for ethical practices and considerations for urban actors. Beginning with a brief introduction to modern ethics in building and planning, we confront currently accepted proposals for positively ethical considerations in the urban building process. Following cues from urban development researchers, we propose a loose ethical framework within which to operate when launching an infrastructural project, while exploring socio-political impacts of digital infrastructural development.

Of the many resources used for this study, two main publications were used in the initial formation of the investigative question and in the subsequent problem solving. Urban and Landscape Perspectives Vol 12[1] by Claudia Basta and Stefan Moroni breaks down the building and planning process and offer a conversation about ethical considerations and guidelines at the citizen-user scale. Their central assertion is that communication and constant dialogue with local citizens can illuminate previously unforeseen problems and stakes in an urban intervention.

Secondly, "The New Urban Crisis"[2] by Richard Florida

1 Basta & Moroni, 2013

2 Florida, Richard 2017

looks at the social disparities in modern cities, how they arose, and how they could be solved. Florida discusses a form of what he calls "winner-take-all urbanism"[3] alluding to the seeming monopoly over advanced development and ownership by the economic upper class. He goes on to discuss economic and industrial clustering within and around urban centers and proposes seven specific considerations for planners, engineers, policy-makers, or developers to curb this kind of socio-spatial developing.

A handful of other main resources were used in the writing of this paper, having to do with privatization, common P3 models, digital infrastructure, the current state of digital in different cities and countries, and a number of resources published by actors involved in the projects included in our case studies.

3 Ibidem

Section I – Background

The Problem at Hand

It is 2018 and the term "smart city" has become one of the hottest buzz words in design, urban planning, government and beyond. Metropoles all around the world like Tokyo, São Paulo, Lagos and Mexico City are in need of very real urban innovations as their respective populations will expand to well over 20 million inhabitants by just 2025.[4] Enter the Smart City. The term alludes to intelligent innovations for urban living. With data driven decision making and more resourceful, careful management, smart city initiatives could be the answer to many problematics that exist today in the urban sphere.

When discussing municipal development, there are many factors that come into play. Arguably first and foremost the issue of funding and special interests is the first hurdle an organization (private or public) must overcome for a project with such grand implications as expanding telecommunications networks, or a new development in city mobilities. Whether private or public, the project should be handled with care to ensure the quality of living for the eventual citizen users. In light of the recent rise in privatization of municipal developments to satisfy increasing urbanism, there arises a need for more careful monitoring of the dynamic between civil-social interest and economic efficiency.

In modern urban evolution, with projects like Sidewalk Toronto, Songdo Smart City in South Korea, Saudi Arabia's "Neom", or even more global efforts like "The Cloud," the development of digital infrastructure holds the same importance as that of the physical.

Digital infrastructure consists of everything from electricity, internet and telecommunications to data collection devices and networks. It is the management and deployment of these infrastructures that will serve as the backbone of the world's future cities. In the spirit of the 'smart city' and future technology and/or data based urban projects, developments should and will be user-centric. Thus mindful, ethical practices for developers in both the private and public sectors remains an important aspect of future evolution and partnerships.

4 Hoornweg, Daniel & Pope, Kevin 2014

The 5 W's of Digital Infrastructure

"Digital infrastructure" is the support system powering the virtual world. This virtual support can be considered in two parts: hardware and software. Hardware of the digital infrastructure includes the 366 systems of submarine communications cables bringing the internet around the world,[5] the sensors and cameras collecting real-time data and information about your city, and the over 6100 data centers processing the digital world non-stop.[6] The software side of infrastructure, on the other hand, is what comes out of these systems; cloud computing, Wi-Fi, LTE[7] networks, satellite signal transmission channels, radio, 4G, and any other communication protocol used every day for data collection and transmission.

This infrastructure is managed much like other more classic infrastructures like roads and bridges: through careful planning, consideration of stakeholders and a myriad of partnerships between local and outside actors. Governments hold a big hand in the policy making, regulation and deployment of the development of these projects. Accordingly, there is an equal player in this game of digital development, the private sector. That said, there are many private actors for which to account. Communication service providers, hardware and software fabricators, and digital service and content providers (among many others) push the private sector into the development of what we know to be the complete framework for the digital world.[8]

The public and private sectors in the case of digital infrastructures form a strong and necessary, mutually beneficial relationship. CSPs[9] are required to get permission from local, state and even national authorities (depending on the size of the intervention) before installing their network hardware.[10] Additionally expanding networks comes at a cost that few local (or even state) governments would be able to absorb.[11] Partnership in this situation is ideal, allowing the company to expand their market while the local government expands its offering of digital services, while maintaining a regulatory eye on the ISP[12]. This relationship can also work in

5 TeleGeography 2018

6 https://map.datacente.rs/2018

7 «Long Term Evolution» - the standard for 4G Networks

8 Marcus, Alan 2014

9 CSP: «Communication Service Providers»
10 Markus, Alan 2014

11 Tommaso, Stella 2016

12 ISP: «Internet Service Providers»

reverse, when governments put out a call for bids to install or update telecommunication networks in their locale.

After considering the relationship between private and state entities, there is the network between private actors to consider. What good is a cross continental communications cable without users and data flow? And what would a telecommunications company or internet service provider be without a physical structure on which to connect their network of customers?

Actors in the telecom sector are woven into a web of mutual dependence, as are the users/consumers in this case. That said, only four companies control over 96% of the telecommunications networks in the United States. As mentioned, it is through negotiations with local governments that they are able to place their cables above and below ground for network expansion, but the management of the market is totally in the hands of these central actors.[13]

For countries like the United States, and many in the EU, internet market competition is [legally] encouraged for the benefit of the consumer population.[14] However the internet, and the economy it supports, is growing at such a rate that state regulation is becoming harder to maintain, but ever-so necessary, to ensure a thriving atmosphere for emerging technologies and new commercial opportunity.[15] This could have major implications for the end-users of these services. Today all across the world, there is better connectivity in urban centers which have more economic interest, whereas rural regions are not given the same attention.

The internet economy is growing at breakneck speeds, building and expanding industries and improving lives and regulatory systems the world over. The ramifications of expanding networks are seemingly endless, and it is important to note that in many cases, access to internet also means access to innovation. Since the advent of the internet, developed markets across the globe have seen unparalleled job growth in the IT sector.[16] The job "App Developer" didn't exist before the revolutionary innovation of the smartphone. Since then, there are connected offices, and IOT[17] devices in our homes and our cities as well as a heavy dependence on social and professional networks all powered by digital infrastructure.[18] For instance, IOT startups are receiving private funding at record levels around the globe, at over $3.3 billion over the last 14 months (Q1 2017 - Q2 2018).[19] Developed cultures and markets have come to rely on connectivity as they move into the future.

In 2017, Richard Florida wrote in his book, "The New Urban Crisis" that there is no greater driver for urban and economic growth than a local airport. Airports provide fast physical connection from one place to another, allowing people, goods, and services a wider dispersion, essentially broadening opportunity with new territories. Here, he asserts that access to displacement is access to growth. He

13 Tommaso, Stella 2016

14 Ibidem

15 Eggers et al. 2018

16 Wigginton, Craig 2018

17 IOT: «Internet of Things»

18 Wigginton, Craig 2018

19 Lueth, Knud Lasse 2018

cites this development while discussing limiting factors to urbanization, explaining that when the primary approval committee for a proposal to extend the runways of Billy Bishop airport in Toronto, Canada[20], vetoed the project (for reasons of noise pollution and feelings of NIMBY[21]), they were denying the citizens of the surrounding urban areas the positive economic implications that would come with the development.[22] As we continue further into the new information age, connectivity has become the new driving force behind expanding markets and urban regions. Again, when access to internet means access to innovation, growth, and so much more for consumers, there is a responsibility that falls on ISPs to consider where, but also why they are expanding networks in a certain area over others.

How significant is connectivity, really, when moving beyond the single user scale? When a whole city becomes a connected organism, beyond having sound access to modern networks, how may its inhabitants benefit from widespread connectivity frameworks? Of course citizens and business owners benefit directly from reliable network connection, but we must look beyond basic telecommunications. With city services like open data platforms, does someone in a city like Paris with a well-integrated culture of open data[23] actually have a higher quality of life than those in cities without? Developers and designers at Alphabet, the technology conglomerate responsible for Toronto's new "Sidewalk Toronto" connected city project, would argue that this is the case. An open data platform, made available through the city's sensors and digital framework to the general public, provides a free opportunity for digital and organizational innovation. Mobilities applications like "Citymapper" or Paris' RATP[24] application thrive on access to the city's open databases, helping them offer a more impactful and seamless experience of urban mobilities. Arguably, this can improve a citizen's quality of daily living. Other organizations like Creative Cooperative[25] in the Netherlands will say innovation and higher quality of life can happen anywhere regardless of infrastructure - innovation depends only on the problem solving abilities of the population, and their decision-makers. Nonetheless, the fact is that digital infrastructures are quickly changing the world in which we live.

20 The purpose of extending the runways was to allow small jets, in addition to the existing prop planes that frequent the regional airport, access to the airport, thereby extending reach to cities like Los Angeles, Miami, New York, and possibly even western Europe. (Florida, Richard 2017)

21 NIMBY: «Not-in-my-backyard»

22 Florida, Richard 2017

23 «Well integrated» is subjective. Reference to Paris' central open data platform: opendata.paris.fr

24 RATP is the public transportation company in charge of Paris' metro and bus systems.

25 http://streetchallenge.eu/?page_id=31

A Case for P3s

Public-private partnerships (or P3s) are as previously stated, a partnership between public (state governmental organizations) and private (privately owned companies, corporations, etc.) entities. In the new era of smart cities, private investment and involvement will be the key to innovative technological and organizational developments that will carry cities and their citizens into the future. With this great task of taking over what is normally state controlled development and leading the drive for future urban innovations comes an equal responsibility to the municipalities and local citizens.

For almost two decades, the United States has observed a gradual and significant rise in privatization of the public sector. In 2012 alone, the US federal government spent over $500 billion in privately contracted products and services.[26] Public-private partnerships (P3s) are serving an important role in public affairs, primarily as they provide extra funding and oversight to public projects while bringing private market competition to the public sector. In some cases it is thanks to private investment that public projects are realized and able to continue, however as P3s are a tool used in many different municipalities/governments with many different motivations and levels of involvement, painting a clear picture of the effectiveness of P3s is difficult.

Partnership between the public and private sector to begin with, is more easily achieved on paper than in reality, because of competing considerations of each entity - social welfare versus economic efficiency. Additionally, the dynamics that come into play in a changing urban ecosystem could leave some very real social and economic problems for aministrations, private actors, and citizens alike. This is why monitoring of the private to public relationship is necessary for more socially and economically balanced cities.[27] When addressing a P3 project, especially those at the city scale (or any involving a large population), the citizen impact should be held in high regard.

A "for-profit" private partner will generally seek to execute a

26 Douglas W. Elmendorf, Director Congressional Budget Office, 11 March 2015

27 Florida, Richard 2017

project for the lowest amount of money, and with the highest margin, providing profit for its shareholders. In the instance of government involvement, the project should stay on an equitable trajectory, but sometimes this is not the case - where a project would become more of an interest in profit for the private contractor, letting social considerations fall to the wayside, or just the opposite essentially leaving the private contractor no choice but to forfeit the project at a loss. Additionally with an unbalanced form of partnership one entity becomes responsible for the concerns of the other. These concessions made by urban developers ripple out into products like a highway toll with prices so prohibitive, commuters end up moving their homes, or scaling back their lifestyle to afford the daily drive to work.[28]

In this particular example, a highway expansion project in the Washington D.C suburbs, private partnership was embraced by the department of transportation when their bid for four new high occupancy toll lanes promised to reduce tax cost and accelerate the development process.[29] Additionally with this plan, instead of the original proposal which required the destruction of over 350 homes and businesses in surrounding communities, was much more conservative with an impact of only eight homes. At the end of the multi-billion dollar project, the Virginia Department of Transportation maintained ownership of the new roads, while all long-term financial risk remained with the private sector. As financial risk remains in the hands of the private investors, and equally due to the high cost of intervention, the toll prices remain much higher than the national average[30] (dynamic pricing puts peak hour toll prices at $1.00 per mile while the national average for interstate toll roads is around $0.06). This project was realized to reduce the already insurmountable traffic and congestion issues of the D.C. metropolitan area. The new lanes provide opportunity for new kinds of transportation systems and by creating exclusivity, actually has provided commuters who can afford the cost of regular tolls a respite from daily congestion. Given the chance to analyze the project and its effects, it is hard to say whether it could have been completed with a more comfortable consumer outcome. If the roads were toll-free, private and state investors would struggle to begin paying themselves back for the investment, a prospect which would have halted the planning directly. If the new roads were completed as was originally planned by the department of transportation with less reliance on the private sector, 350 families would have been displaced in the process. It seems the concessions made in this circumstance are reasonable if we take a logistical outlook. However, at a possible cost of over $100 per week[31] in commuter fees, for travelers living within a 15 mile radius of the capital, the lanes could seem like too much of a luxury, thereby making them largely ineffective for middle and lower class suburban commuter populations.

28 Example: «Hotlanes» and the «Dulles Toll Road» in Washington D.C. suburbs.

29 www.expresslanes.com 2018, accessed October 2, 2018

30 Kara, Jake, 2017

31 Based on a drive of 15 miles, 5 of which are on HOT lanes at peak travel hours, twice per day, for five days. Of course this figure can increase greatly for more southern commuters who could spend over 60 miles per day on these HOT lanes.

Perhaps one of the best situations for a P3 would be a union of a government agency and a non-profit partner, effectively merging the incentives of civil welfare and equity, with economic efficiency.[33] The inclusion of a non-profit organization dilutes the management and governing responsibilities, while the financial exposure rests with the state actor. In this way, the project receives double oversight from both a private partner and the public actor, assuring social equity, while the public entity maintains the financial risk, in a more conservative way than a private company otherwise would. From a consumer perspective, this non-profit P3 ecosystem seems to hold the most social integrity, however because of a predictably less aggressive financial plan, the project trajectory could suffer.

Considering all possible outcomes, all possible interests, and all possible partnerships, what is the ideal situation for a public infrastructure proposal? What are the ideal outcomes, ideal levels of involvement, ideal financial risk and reward, and ideal degrees of civic consideration for each involved party? Most of the time "ideal" just means the "best possible scenario." When examining what would be the most ethical approach to a public project, we must take this into account.

In the United States, most modern urban developments happen in the areas of the most affluence.[33] Here, these areas are large metropoles of over 1 million inhabitants. Metropolitan cities develop affluence through a kind of mass assemblage of industry and economy. For example, today only six percent of the land in the United States accounts for over half of the national total real-estate value, a trend projected to continue.[34] This kind of grouping of value creates huge disparities between populations within and outside metropolitan zones. In the case of digital infrastructure (and other modern municipal developments), city-dwellers have better, more reliable access to connectivity because of the inherent economic benefit for CSPs and ISPs to expand networks in urban regions over rural areas. Now, what would be the most ideal scenario for digital connectivity and telecom networks? Let's explore a citizen-based idealism to understand what could happen. Ideal in this scenario refers to a balanced system which provides equal opportunity to consumers in the market. Ideally, all people should have access to affordable, reliable telecom and/or internet network connection regardless of locale, because access to internet is the modern day access to innovation and opportunity.[35] It is understandable that this is not the case.

CSPs weigh the cost of implementation over the opportunity, and subsequent profitability, that would be provided to a population when devising expansion plans. It does not make sense for the CSP to provide its strongest coverage to a population with a low demand for network strength. Just as it would not make sense for a city with an integrated virtual framework of sensors and monitors to have a low

32 Kuang, Chris, «The unlikely couple: the rise of public-private partnerships in the united states»

33 Florida, Richard 2017

34 Ibidem

35 ...a subject to be elaborated upon in the next section.

36 Ibidem

debit broadband network. After all, over 80% of all people in the USA live in urban areas, which also accounts for just 3% of total national landmass, leaving vast areas of land with little market interest.[36] This is simple supply and demand, and is far from ideal if we approach the scenario from purely a consumer perspective, yet makes perfect sense when talking about the consumer market. The ethical version of this scenario, however, is a bit different. More even distribution of value could come from partnership with the local government who would provide subsidies to contractors involved with CSPs, one of the many ways P3s can be symbiotic and mutually beneficial.

We will cross the case of INTELSAT where the government mandated full coverage of high-cost, but low-volume telecom satellite systems, as a way to maintain social integrity through privatization of a previously international public initiative, where we will gain more insight into the risks and concerns of privatization. There are of course other ways to consider ethical problem solving that are less aggressive. An ethical approach to urban planning would be an approach that provides its citizens access to goods, services, and programs that will uphold a high quality of life. An article by Robin Schmücker[37] presents an argument for the inclusion of partnerships in government in the joint interest of social and economic benefit.

37 Schmücker, Robin 2017

Similar to the US, Germany has observed a gradual privatization of previously state-owned enterprises and missions, since the 1960's in sectors such as energy, transportation, health, education and most recently the development of physical infrastructure.[38] However, this was not done through typical avenues, such as calls for tender by government institutions, or other calls for partnership with the private sector. After the passing of the European Maastricht Treaty of 1992, European state debt ceilings were universally limited to no more than 60% of the national GDP. This move was made for more sustainable public sector development, but (perhaps reasonably so) limited their investment potential. In Germany, this treaty, in tandem with constitutional prohibitions on partial privatization (P3s), invited the public sector to take over where the state left off. This created a large disparity between levels of investment, taking proportions of multiple billions of euros of difference.[39]

38 Ibidem

39 Ibidem

As a result of late constitutional reform passed in June 2017, more private investment is being welcomed into the public sector, and specifically into infrastructure development. A central part of this reform includes the creation of an infrastructure management company, the *Bundesfernstrassengesellschaft*, involved in the management of investments and the maintenance of German highways.[40] The main focus of this company is to cultivate private capital for further investments in infrastructural development, investments which the government is not easily able to afford. The company acts as a loophole to the newest constitutional reforms that actually discourage

40 Ibidem

direct private investment in the public sector, as it remains 100% within public ownership, but is legally registered as a private LLC. This allows for partial privatization through partnerships, and also prevents the state from directly influencing fiscal and developmental decisions. The creation of this new entity has upset several political groups like the SPD, the German Social Democratic Party. SPD speaker Thomas Oppermann maintained, "We neither want the highways nor the infrastructure company to be privatized in any way," because of a perceived loss of control from the state and a subsequent loss of social equity in eventual developments.[41]

41 Ibidem

Schmücker offers an explanation of infrastructure within the public to private ecosystem. He states that infrastructure first off is "critical" for growth and development of the economy by providing basic services that support the GDP, as well as providing the physical foundation of the society. Schmücker argues that basic infrastructure development provides access to basic needs and markets to marginalized groups of people who otherwise would not have an evident point of entry, therefore not only holding infrastructural development to an economic relevance, but also as a factor in ensuring social equity. As Germany currently has one of the highest regarded infrastructure grids in the world, there still remains significant hurdles to cross in meeting the infrastructural needs of new technologies and digitalization - an expense of time and resources that the government alone would not be able to absorb. The partnership between the public and private sectors allows new developments to continue as the markets change, similarly allowing inhabitants to progress in parallel, improving overall livability and quality of life.

In our analysis of livability and digital culture in the coming section, Zheming Zhong offers the notion that perhaps in rural regions, consumers are used to a different quality of life standard, and are not equipped to even take advantage of a well-connected network. Regardless, when discussing the formation of a P3, ethically one has to seek out the best possible scenario that satisfies as many stakeholders as possible; consumers and producers alike. We will cross this kind of "ethical cross-check" in the third section, Problem Solving.

A person's sense of well-being in their locale largely comes from their satisfaction with open, public spaces like parks and markets, pedestrian zones, and general feelings of safety in and around their neighborhood.

Survey of Quality of Life in Cities

How livable is your city? Are you happy with your surroundings? What about your job? Or your lifestyle? What would you change?
In 2013, the European Commission conducted the study "Quality of life in cities, Perception survey in 79 cities"[42] to understand which factors affect a person's positive or negative perceptions of the city in which they live. The survey also stood to motivate policy-makers to tackle urban problems and developments with a more "integrated approach."[43] Over the course of the study, 41,000 participants were questioned, in every European capital city and many other urban centers, about their thoughts on public transportation, local policy making, safety, green spaces, and numerous other topics that makeup city living.

The results were promising, showing 91% of participants (in all but 8 cities) were "satisfied" with life in their city, while offering important qualitative data for making improvements. The study shows that a person's sense of well-being in their locale largely comes from their satisfaction with open, public spaces like parks and markets, pedestrian zones, and general feelings of safety in and around their neighborhood.[44]

Citing this study as a successful means to assess different populations on their quality of life, we adapted the questions to perform our own small scale replica of this survey from the perspective of connectivity and digital infrastructure.[45] We also wanted to know the value of the strength, or lack of, telecom networks to a citizen, over other previously mentioned municipal features and services.
After reaching a rather decentralized group of almost 300 participants in over 120 cities across Western Europe and the United States, the adapted survey's results were at first questionable. Attempting to quantify citizens' perceptions of their own quality of life and their feelings about digital services, it became clear that unless otherwise prompted, participants from metropolitan areas were not aware of the role connectivity and digital infrastructure plays in their lives (see Figure 2.1). Those with more opinionated and varied answers

42 European Commission 2013

43 Ibidem

44 Ibidem

45 Survey questions in Annex, page 64

were largely from rural regions, like one participant from Skagway, Alaska[46] whose responses were quite unsatisfied across all municipal measures but generally satisfied with their life. Skagway lost marks on job opportunities, education, and community engagement, likely because of the small population. Furthermore for the case of the Alaskan participant, poor satisfaction ratings on connectivity and digital services compared to their high habitual use of mobile telecom networks did not yield a shift in importance throughout the survey. In the end, this participant chose safety, community involvement, and public transportation as the most important issues for their city.[47]

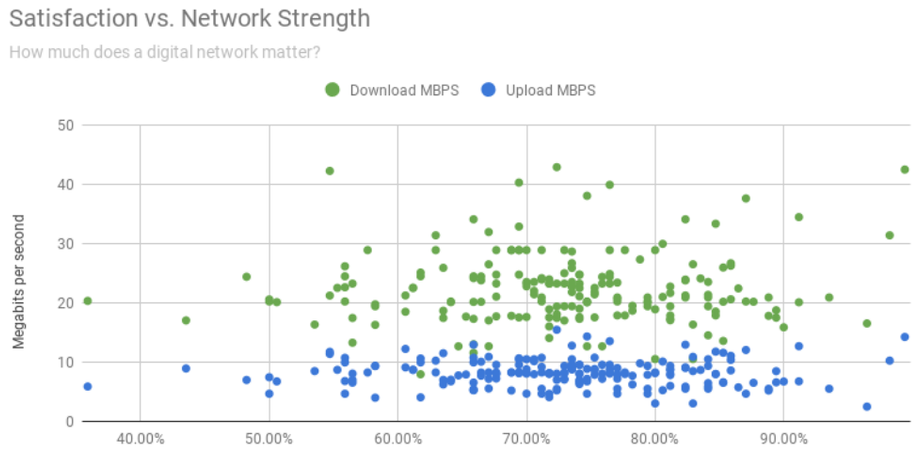

Figure 2.1

46 Population estimates 1, July 2017 - 1,157. United States Census Bureau

47 Description of data analysis: Each participant's answers were quantified on a numeric scale to determine their overall satisfaction with life in the city in which they live. Evaluations of 70-85% denote general satisfaction, and 85-100% signify high satisfaction, while anything from 65% and below showed a participants general lack of satisfaction with their quality of life.

One of the other main goals of this survey was to find exactly how someone's life could be better or worse because of their access to digital infrastructure. We know that access to infrastructure depends on a complicated relationship between different public and private actors and that rural areas are often overlooked because expanding a network would not provide enough revenue to the CSPs and ISPs. However, the diversity of the participants was not great enough to draw any irrefutable conclusions. That said, perhaps we were asking the wrong questions for this kind of expectation. No less, we were satisfied with the initial conclusion that conceivably, network connectivity holds a great importance, yet in comparison to other basic city services, falls to the wayside.

Interview with Zheming Zhong, and the Emerging Market

For the Alaskan participant, they raised concerns that are important to any modern city, but how could we get a closer look at how someone's quality of life is affected by the presence or strength of local connectivity and telecom networks? We spoke with Zheming Zhong, a designer from a Chinese digital and urban, interaction design firm MEXDIA Xiamen Creativity & Technology Co., to understand more about attitudes surrounding connectivity. Zhong began by explaining the current techno centric culture in China. He said, "China has 800+ million netizens[48] until now, and 700+ million netizens who use mobile internet. Technology [primarily in eastern China] is integrated in almost every part of Chinese people's' lives (online food/transportation/movie ordering, sharing bicycle/cars, digital payment, unmanned store/gyms, etc.). You can do almost everything on a phone, and people are becoming so used to it."

We wanted to know how attitudes differed for citizens living outside of these heavily urbanized regions. Since much of the infrastructural development, digital or otherwise, is government contracted and regulated, telecommunications lines and electricity are pretty well distributed. Still there is a problem with implementation and adoption of telecom channels in more rural zones. Zhong added, "There is only a small amount of people who are willing or able to make use of the technology," alluding to the novelty of digital or tech based lifestyles that are not congruent with rural living.

That said, Zhong believes that the work telecom companies and local/regional governments are doing in expanding networks for more diverse populations is quite important. "… It brings convenience for life, creates more opportunities for work and education, facilitates the personal and social communication and connects the [people with the world]," said Zhong at the end of our discussion.

Between the survey and our chat with Zheming Zhong, we came to understand that perception[49] plays a big role in someone's personal quality of life, but objectively so does actual access. We spoke briefly with villagers in a rural mountain village in the Quinliangshan

48 «Netizen» - Someone/citizen who habitually uses the internet. Seese, Michael 2009.

49 We state perception as the perception of a person's own quality of life, citing the EU study which discusses peoples' "sense of well-being." How do they feel about the way they live? This is a much more emotional analysis than a factual model of quality of life (ex. Only people with access to x have a high quality of life).

national park in Zixi county, China around the same time as this interview.[50] The farmers and families living in this removed region were generally quite satisfied with their way of life. It was, however, the young people in these areas, around 20-35 years old, who became restless when asked about this, and quickly asserted that if given the opportunity, they would follow those who had already left and go to the cities nearby in search of education, a more vibrant lifestyle, and more profitable work. If digital infrastructure can, as Zhong said, create economic, social, and educational opportunity for any population, shouldn't we stress this kind of access?

In his study, "Delivering Digital Infrastructure,"[51] Alan Marcus discusses the paradox of emerging markets. Over 4.5 billion people live without connection to internet communication services, while most live in areas covered by 2G and 3G mobile networks. The reason for this, Marcus posits, is the unaffordable costs of access; the need of a connected device like a smartphone or computer, as well as the cost of a communications plan. The basic infrastructures are more or less in place, but it is the uncertain lag time between installation and adoption that has international carriers and investors hesitating on further development and risk. Additionally, to yield a more substantial impact in fields like healthcare, education, and commerce, users generally have to be more well-educated to warrant such an investment in the eyes of outside private and public actors. Coupled with the difficulties of offering services in the local language, the digital and economic divide between connected urban netizens and unconnected citizens in more rural locales is growing.

That said, a study by Boston Consulting Group[52] presents a compelling argument that citizens in emerging markets are actually more frequent users of digital government services, as well as those in education and healthcare fields than users in more established or developed countries. The study goes on to state that users in these emerging markets are more willing to adopt a digital lifestyle because of the perceived benefits to their well-being, intellect and economic stability. This is a departure from western mottos of digital adoption, citing convenience as the central motivator. Furthermore, in economic terms, Marcus asserts that for each 10 percentage points of digital penetration at the country scale, the GDP grows 1.2 percent, with an even superior growth of 1.38 percent for an equal expansion of broadband penetration.

It is clear at this junction that the decision to expand networks and network access may not lie in the hands of its eventual users. It is up to local governments and international internet and communications actors to take the initiative, assume the risk, and begin developing these emerging markets for the benefit of their citizens. There are a handful of initiatives that are trying to answer some of these problems of language, cost, ecosystem engagement, and lacking

50 May 2018. Interview with Zheming Zhong conducted August 2018.

51 Marcus, Alan et al. 2014

52 Boston Consulting Group 2012

infrastructures. The Brazilian government adopted a radio spectrum value pricing model in 2007 that ties the service pricing to radio frequency spectrum requirements of rural areas, allowing citizens in underserved municipalities affordable connectivity services.[53] This model has been adopted all over Latin America, through public initiative, to help drive digital penetration and adoption, while remaining economically efficient.[54] In China, over 60% of time spent on mobile internet is done so on domestically created applications, solving many of the cultural and linguistic concerns from the private sector.[55] Finally from another purely private entity, Internet.org, a Facebook company initiative launched in 2013, tried to tackle issues of access, by providing underserved populations with internet basics like news, weather, job postings, social networks, and helping enable local businesses to connect to Wi-Fi networks for free.[56] We will revisit this topic after the next section. Let's now take a look at what partnerships in telecommunications initiatives look like on a city-wide scale.

53 Balbino e Silva, Abraão

54 Marsden, Richard et al. 2018

55 Marcus, Alan et al. 2014

56 info.internet.org/en ©Facebook 2018

Case studies

City of Chicago Technology Plan - the Classic Western Smart City Initiative

In 2013, Mayor Rahm Emanuel of Chicago, Illinois, USA unveiled the "City of Chicago Technology Plan."[57] This plan encompasses private, public, and non-profit sectors in a multi-step, 28 initiative policy set to strongly affect city living in seven detailed subjects: Savings and optimization in government and taxpayer finances, improvement of municipal services, pushing community engagement, improving access to digital telecom networks and technology, digital skills and computer/IT literacy, creation of new jobs, and finally an emphasis on STEM[58] training and employee retention in and around the city. The plan involves a lot of technological intervention, but also contains a good deal of open policy making. Three of the 28 initiatives are focused on expanding digital infrastructures in a strategy titled "Next Generation Infrastructure." These three initiatives cover the topics of creation and management of an open data platform, improvement of network strengths throughout the city and surrounding areas, and application of policies that would allow for more digital and technology based experimentation/innovation with the city's physical and virtual infrastructures. The major object of these initiatives are to place Chicago on the map of modern cities that innovate based on carefully collected user data, and as a city that has a close relationship with its citizens, thanks to implementation and exploitation of technological frameworks and policy making.

The centerpiece of these three infrastructural initiatives lies in partnerships with private actors and educational institutions to develop a bigger and more powerful broadband network that touches all parts of the city. The partnerships are being formed in direct demand from the municipality through proposal calls and negotiations with existing private partners. This expansion includes lower-income areas that are historically forgotten and underserved, with an advent of free Wi-Fi zones in public spaces like parks. Similarly, a framework of sensors and cameras would be placed around the city to support the creation of an interface where citizens or visitors can interact with detailed

57 Chicago Technology Plan, 2013

58 STEM: Science, technology, engineering, math professionals.

data, offering an opportunity to freely innovate on daily city living.

In June 2015, Mayor Emanuel and Chicago CIO Brenna Berman announced an 18 month update to the initial Chicago Technology Plan.[59] In the year and a half since the plan rollout, the city observed many positive changes. Over 15,000 new tech and IT jobs were created, the IOT based project "Array of Things" was launched through University of Chicago, and as of mid-June 2015, there were four suitable contenders for the rollout of a consumer friendly broadband network expansion as well as a partnership with Google to provide free public Wi-Fi in one of the city's parks. This aforementioned partnership builds upon another five, previously organized through P3s in public spaces around the city. Additionally, the city of Chicago is still working on expanding and maintaining public access to the internet through free-use computers in public libraries, community centers, and the like, including free Wi-Fi in over 300 locations all over the city, totaling over 4,500 public computers with internet access.

Today, the broadband network in Chicago has an average mobile download speed of over 29 mbps,[60] across all four major local CSPs,[61] which is just over the national average of 27.3.[62] Concerning IOT initiatives, by April 2015 there were over 400 connected bus stops displaying arrival times in real-time, which subsequently has improved the general number of daily passengers and also increased the number of transfers from train to bus lines, altogether relieving some pressure from highway traffic. Divvy, the city's bike sharing system, published their rider data in early 2015 as well, and found they were able to increase ridership by showing comparisons between the different types of available public transport systems. "Array of Things" as of May 2018, installed their 100th node in the city of Chicago and has been contracted for partnerships by local governments in Seattle, Palo Alto, Denver, Portland, Detroit, Syracuse, and Chapel Hill to launch similar initiatives for the collection and support of local municipal data. Chicago's subsequent open data portal now holds 1,276 different data sets, helping drive data based innovation projects.[63]

All these initiatives today give citizens, researchers and policy-makers data with which to make informed decisions. The Array of Things nodes monitor air and environmental quality, road and traffic conditions, pedestrian flows, and local water levels and quality all supported on updated, more reliable networks. These ensure decision making can be more accurate and efficient. For instance, citizens can decide for themselves whether or not to go to the beach because of water levels or water quality, asthmatic city-dwellers can check detailed environmental reports before leaving home for the day, urban, environmental, or engineering researchers have much more detailed and complete data sets with which to advance their work, and local government policymakers can leverage data into information with

59 Chicago Technology Plan: 18 month update, 2015

60 OpenSignal 2018, accessed October 2018

61 Verizon, T-Mobile, AT&T, Sprint

62 SPEEDTEST July 18, 2018

63 https://data.cityofchicago.org accessed October 2018

which they can answer real needs of the municipality.

It seems Chicago's technology plan is an ongoing success. Five years after the launch of the project, it has not lost momentum, and through public policy, is remaining focused on improving citizens' quality of life through global implementation and access to technology. Despite the dizzying number of partnerships with the private sector, projects remain fixed on a socially equitable trajectory, surely because of the strong involvement/piloting of the local government. Likely to do, in part, with this digitization initiative, Chicago is now listed at number 47 of 231 on the Mercer quality of life survey,[64] considering quality of life for an employee moving to a mission abroad, and number 22 of 50 according to Deutsche Bank,[65] taking into account health care, consumer economy, and housing affordability.

The Chicago technology plan is a good example of a classic western smart city initiative; that is, driven by implementation of technology. All the services, digital and physical infrastructural improvements, and community engagements outlined by the plan were done so around technology. However this is not a negative critique. The strategy with which the local government has ensured public well-being as the central focus of the whole proposal, and their ability/vigilance to maintain even five years after the initial project launch, is surprising and refreshing. This aspect of public management is essential throughout infrastructural projects, and Chicago stands as a strong example. There is, however, another way to tackle urban projects. Organically smart developments, services and interventions coming from within the community and culture, are perhaps the best illustration of a truly "smart" initiative, and has nothing to do with digital infrastructures.

64 Reuland, Vera 2018

65 Michaels, Mathew 2018

Dabbawalas: Organically Smart Services for a Sustainable Smart City

For over 120 years, dabbawalas have been delivering home-made, packed lunches daily to working men all over the Mumbai region. Through the last 50 years of India's rapid urbanization, the dabbawalas' service has remained consistent; consistently on-time, consistently safe and reliable, and all without the use of technology. Around 2010, the delivery men and their high-precision system garnered international interest, helping dissect the complex pick-up and delivery methods pioneered by what is now over 5,000 semi-literate men. What is now recognized as the "spoke and hub" distribution method is a large part of the dabbawalas' success.[66]

This system is so impressive because it takes into account tradition, customer wants and preferences, geography, and has

66 History: In 1885, a wealthy banker in Mumbai hired a man to deliver a homemade meal, packaged in a metal tin called a dabbas prepared by his wife at home, to his workplace for lunch. The delivery man was then told to retrieve the empty tin after lunch and return it to the banker's home so another delivery could be made the next day. In 1890, one of the original deliverymen created a team of 35 other messengers and began expanding the network of customers and coverage into what has become known as the dabbawalas, delivering around 130,000 meals per day, six days per week with a machine-like precision.

optimized a system of distribution unseen anywhere else in the world, and an error incidence of less than one missed delivery per million. In a traditional Indian household, the women stay at home to keep house, watch and raise children, and prepare meals. Because of many different cultural concerns like caste, religion, personal preferences, lack of satisfying options within the office working environment, and the exorbitant cost of eating out on a daily basis, home cooked meals are a must for many working men. The system of delivery is also tailored well to the physical geography of the city and surrounding areas. Made up of a collection of islands connected by trains, Mumbai and it's longitudinal layout provides a unique challenge for circulation. The dabbawalas created their distribution network around the train line, as it covers more area from north to south much quicker, while eastern and western portions of the delivery routes are done so on foot, bike or handcart.

A typical dabbawalas is responsible for 30-35 deliveries per day. He is part of a group of other messengers with other individual sets of customers, that reports to the locally identified regional train station. Multiple groups then complete their pick-up by delivering and sorting meals at the station, to be taken farther down the line where they will be received, resorted, and finally delivered to the end destination. After the lunch hour, the whole system works again in reverse as the tins are delivered back to their original homes. The dabbawalas focus their service around the trains in a chain of hand-offs, using the train line and stations as central dispatch hubs. On average, a packed meal will change hands four times throughout the day as it goes to and from the intended destination. All these logistics happen without so much as a list of names, not to mention a cell phone or other kind of electronic aid. Tins are marked on the top with all necessary information: departing train station, region and then building of intended delivery, return train line, and the specific group of primary pick-up so the tin can be returned to the home of origin; marked through a system of symbols, colors, numbers, and letters. In some cases with multiple tins going to the same place, the customer's name is also marked on the top. The dabbawalas, in many cases where the messenger has been working in the same group and route for some time, often know the pick-up and return routes and locations by heart. The standardized system of markings on the tins serve specifically to help sorting and dispatching after the tins have arrived on the train platform. Customers are added to the network by word of mouth, and payment is handled monthly, face to face by the dabbawalas with their customers before being evenly split between other men in their dispatch group.

This method of distribution is called "hub and spoke" distribution. The dabbawalas form the spokes by relaying between hubs, the train stations, which creates an efficient chain of handling

and dissemination. In the 1970's FedEx in the US adopted and adapted this method to better serve its network of deliveries, however the next time anyone receives a FedEx delivery, even today, within a minute of originally expected delivery date and time, may be the first.

Elsewhere in India, groups of men and some entrepreneurs have tried to replicate this service, with little success. Delhi, for example, has a central train line, but the communities are too spread apart for this system to work with the same rigor. In the case of Mumbai, the dabbawalas' service is perfectly customized to that specific city and its inhabitants. The success of the service also relies greatly on the incredible work ethic of the dabbawalas. They see the delivery of food as a godly duty, and are happy to be able to provide this service. Furthermore, the understanding that precision is a must, and knowing that as soon as a customer is dissatisfied with any part of the service they will no longer be a paying customer, motivates and incentivizes the men.[67]

67 Thomke, Stefan 2010

The dabbawalas are perhaps a paramount example of an organically smart service. They serve the community and their city in a way that suits the population to the best of its ability, in an exhaustive way. They have withstood stress tests caused by trial innovation, showing that since the conception of the service in 1890, it has been serving Mumbai as it was meant to with complete efficiency. The service was conceived in an era without any developed infrastructures, and it is the lack of reliable infrastructure and utilities like electricity and telecommunications that continue to make the dabbawalas' existence not just relevant, but absolutely necessary. Additionally, this is a service woven into the framework of the city, touching a large portion of the population without any involvement from local or national government actors (completely privatized, and created from/ of the needs of the society itself). It does not rely on partnerships or investments, but rather demands only of its employees and customers directly. In today's modern era, India holds a strong example of how to create intelligent urban solutions that come from the people themselves, supported by culture and local tradition.

Extreme Cases in Urbanization

Chicago's aforementioned "smart" initiative is, as stated, a classic example of a western technological implementation plan. The plan holds the citizen experience in high regard and the fact that the directive comes from the local government ensures a high potential for retention of social equity through the development of the various separate initiatives. Private partners are included as a definite necessity, but the degree of care and oversight from the municipality holds this

development in check. India's dabbawalas are a completely different example of considerate problem solving. They developed one of the most innovative supply chain models in the world, fit perfectly to the terrain and culture, all without any electronics or technological aid. The dabbawalas are an example of human scale engineering and ingenuity that is both organic and sustainable.

It is logical then that these two very different social and economic models could be combined into the ideal urban directive. The global response to this notion has been the idea of a "truly smart" city. There are a few cases in modern urban development that stick out for their level of pure development, and also for their verbal commitment to creating a sustainably high quality of life for their inhabitants through the extensive use of technology, leveraged through the digital infrastructure: Songdo International Business District, South Korea, Sidewalk Toronto Waterfront Project, and Neom, a new sovereign land development backed by Saudi Arabia and the Saudi Arabian Public Investment Fund. These projects, rather than aiming to improve an existing urban landscape through addition of services and infrastructural change, begin from the ground up; total development of physical and digital infrastructures set to create a new way of urban life. From the surface these appear to be incredible projects, even examples of the future of humanity, but they are wildly disconcerting because of the intense involvement of private actors. Neom was even referred to as the "city with a CEO", as the mega-city will be purportedly self-governing. These are cities built with the potential to truly change the way the world views urban planning, as well as subvert conventional systems of government in the interest of individual to collective quality of life. At the same time, they hold the same potential to fall apart without the right balance of social equity and economic efficiency.

Neom, Saudi Arabia

Neom is the mega-city project announced by Saudi Arabian Crown Prince Mohammad bin Salman as part of Saudi Arabia's Vision 2030 development initiative.[68] The project outlines the total construction of a mega-city with the concept of "an entire new land, purpose-built for a new way of living." Neom will be realized at the top of the Arabian Peninsula between Egypt, Jordan, and Saudi Arabia. The Saudi Arabian Public Investment Fund (PIF) was created to focus on leveraging public and private funding for the project after the initial seed of over $500 billion from the Saudi government. Currently the PIF is working on finding the remaining private partners for this ambitious project. As the project funding and conception comes from the Saudi government, it will remain under their authority through the development phases, but is meant to be a sovereign land with its own,

68 Neom.com 2018

automated and self-governing system.

The main interest of the project is total mechanization through automation of hard labor tasks like waste management and maintenance, with a connected infrastructure allowing citizens an ease of living. This allows the new society to focus on economic development through highly skilled work from a population entirely comprised of those with a superior education. Neom hopes to revolutionize ten specific sectors; biotech, media, energy and water, food, mobilities, advanced manufacturing, entertainment, sports, technological and digital sciences, and tourism through its innovative use of technology on the urban scale. The infrastructure will benefit from its geographic location, on the coast of the Red Sea home to over 10% of the world's shipping trade, and major transcontinental telecommunication lines.

In many ways, this project has a large capacity for success, as the city will be built around the citizen experience. Even in light of the unfathomable financial toll, it seems that Neom could truly be the first glimpse of the not-so-distant future of urban living. Be that as it may, the method of development is quite aggressive. Typically municipal projects are realized either from the citizen level upward, or from the city level down; Micro to macro, or macro to micro. In most ideal cases, there should be simultaneous considerations and efforts in both directions to form a sustainable urban development. Neom is beginning literally from the ground up, and people will have an option of moving into this new city to become a citizen.

The considerations of the citizen experience is impressive, but without even a portion of the city with which to conduct tests, studies, or other measures of the various degrees of the project, initial integration and transition of the concept to an infrastructure, to a city, to a living, breathing metropole could be quite difficult. That paired with the heavy involvement of the private sector and the reported "fully automated governing system" could leave inhabitants without much of a real voice. In any case, the economic implications of Neom's success would be enormous, and it is for this reason that the city must actively aspire to become more than just a business and development magnate, but also a homeland to its future citizens. One must also keep in mind that women just received the right to drive in June 2018.[69] The kingdom's historically patriarchal society is perhaps changing (large in part to Salman's Vision 2030 program to open up Saudi society, driving laws included) but is far from a more western definition of progressive. The Neom project is slated to be one of the most advanced urban development projects in the world, if fully realized, in spite of its central sponsorship from the Saudi Arabian government. With a slurry of international actors involved in Neom's realization, perhaps more international oversight should be required to ensure proper deployment from a social level.

69 https://www.bbc.com/news/world-middle-east-44367981 accessed October 2018

The Three Horsemen of the Modern Net: GOOG, FB, AMZN

As we've established thus far, infrastructural projects often begin at the state level and extend through the private sector by way of calls for tender, and intervention proposals.[70] Concerning digital infrastructures, state proposals are answered primarily by CSPs who have their own network of investors and contractors behind them. However, we are beginning to see what happens when the private sector takes control of formerly public efforts with recent actions from Google, Facebook, and Amazon. These three internet giants have recently taken production and maintenance of hardware networks into their own hands for the equal benefit of profit and user satisfaction, and while the threat of a more controlled internet looms in the distance, there are actually economic and user-centric benefits to these seeming monopolies.

Towards the end of 2017 Google announced their plans for investment in three new undersea fiber optic cables that will improve their cloud capabilities, one of which will be entirely owned and maintained by Google itself. The cables will connect from Chile to Los Angeles (privately owned by Google and its parent company, Alphabet), the US east coast with Denmark and Ireland (in collaboration with Facebook), and Guam with Hong Kong (in partnership with a US telecommunications company). The project is slated for completion by early 2019 making them the first non-telecommunications company to entirely own and operate an inter-continental cable.[71] Their propriety over the Chile-L.A. cable gives the company a unique opportunity to control all technical specifications, routing decisions, and deliver the deployment to its end-users much faster.[72]

Ben Treynor Sloss, vice president of Google Cloud Platform, is heading up the project, as the effort is directly tied to the cloud. He states in an interview with Popular Mechanics[73] that he initially did not want to concern Google, an internet company, with cable building, an activity for CSPs, but that there were not many viable options for cloud expansion otherwise. These cables will expand Google's cloud based offers in North Atlantic, Australian and South Pacific, and South American regions. To this date, Google has their hands in 13 undersea cable investments.[74] Accounting for over 90% of search engine traffic[75] and 25% of global internet traffic,[76] these investments are powering not only the company's market share and profits, but also placing them into the hardware side of the digital

70 - with many exceptions, including our earlier example of Germany's latest initiative to open the federal government to private investment.

71 Grossman, David January 2018

72 Ibidem

73 Ibidem

74 Dziri, Mehdi et al. 2018

75 Ibidem

76 Grossman, David, January 2018

infrastructure ecosystem. In turn, this also provides more people around the world with more reliable access to their cloud computing services and capabilities, that we all know quite well such as Gmail, Google Drive, Maps, and their Chrome browser, as well as a myriad of cloud platform tools and services for developers and consumers.

Amazon has also been working on expanding their networks both in the virtual and physical world. What began as an ecommerce platform (now accounting for 49.1% of US Ecommerce market share), is now a top down logistics specialist. Amazon in the last few years has invested in over 300 warehouses and sorting centers with their own dedicated semi-trucks, an air cargo hub with 35 cargo planes, over 400 brick-and-mortar stores supporting their "Amazon Fresh" initiative, last mile delivery infrastructures like "Amazon Key" and "Amazon Locker," and today accounts for 34% of the global cloud market share with "Amazon Web Services (AWS)" a service which also handles data storage and processing.[77] This self-built and maintained ecosystem handles every part of the Amazon offer from the web-based interface, to the physical routing and delivery logistics. Taking the next step into their investment in global networks, Amazon is currently invested in a consortium with Facebook, Softbank, and a handful of private CSPs on the "Jupiter" Pacific submarine cable stretching over 9,000 miles between the US, Japan and the Philippines.[78] The inclusion of non-telecom companies, Facebook, Amazon and Softbank, indicates a changing tide in the hardware market of digital infrastructures. Much the same as in the case of Google, Amazon is investing in submarine cables to improve its AWS offer as well as the reliability of its communication lines with a great deal of personal oversight.

Lastly, Facebook has been making similar strides in its investments into global digital infrastructure. Now invested in 3 submarine cables of their own with partners like Google, Amazon, GlobeNet, SoftBank, and other CSPs, they are able to deliver their messaging, video, call, advertising, connecting, and sharing services with higher speed and quality, on their own terms.[79]

Already invested in several data centers around the western world, these last two years mark the first efforts of many that Facebook is taking in the direction of becoming not just a social network, but a full service internet company. As previously mentioned, Internet.org is a strong initiative Facebook launched to help connect people around the world, through a partnership with six other international communications entities.[80] What was seemingly a purely humanitarian effort from the company's CEO, Mark Zuckerberg, almost ended a few years after its conception when local communities and countries decided that connecting their citizens was an effort better suited to the local government. Facebook tried to take control of a global effort to connect people to the internet without consulting on a

77 Dziri, Mehdi et al. 2018

78 Submarine Networks.com 2018

79 Sawers, Paul 2018

80 Internet.org 2018

meaningful level with local municipalities. Eventually Zuckerberg came to even give presentations to the UN saying internet and data are human rights like food and water. He pressed onward with the effort. Additionally, critics of the project stated bluntly that it seemed too good to be true, that Facebook had too much to gain through a centralized form of internet on their own platform, a notion that may be true.[81] Nonetheless, now five years past the launch of this initiative, it seems as though the research arm of Facebook's Internet.org is separating from the central project into more unexplored connectivity territory, and in the 5 years since project launch, over 600 million people have gained access to internet services.[82]

The heavy involvement of Google, Facebook, and Amazon in the development of the physical infrastructures of the digital world allows them to better deliver their services, improving not only their customers' experiences, but also the economic interests of the companies. In this case, "profit" is not a dirty word – Privatization often indicates a higher degree of competition which is better for consumers. Fundamental worries surrounding these kinds of efforts reside in the fear of total privatization in which there is no connection in any meaningful way to a governing body responsible for social welfare. Furthermore, as critics to Facebook's efforts stated, each new investment to the infrastructure brings the world closer and closer to the possibility of a centralized internet, harping against the core interests of net neutrality.[83]

Net neutrality is one of the central fears and pillars of the argument against the privatization of digital infrastructures. Following the reasoning that access to internet means access to innovation, open access to the internet is also open access to innovation. We've observed through mutually beneficial efforts like the investment in physical infrastructures, major internet companies like Google are able to improve their offers and services from both internal and consumer perspectives without needing to limit or censor data streams. However this is an idealist's argument. The issue of net neutrality and ISPs in the US is far from over, as even now (November 2018) the FCC has petitioned the US Supreme court to review its earlier ruling on open internet policies. It is through lobbying and purely economic decision making that brings these topics to the floor of the supreme court, and it is (as proven) the role of the country's judicial system to uphold the social interest in cases such as this.

In light of the possible censorship of access from ISPs, perhaps it is a good thing that internet actors the likes of GAFA[84] are getting involved in the development game. However their involvement, which could potentially remain one sided, may be better realized with a certain degree of public oversight. The moment any one entity has all the decision making power, is the moment consumers and actors in the ecosystem will lose the ability to make direct change, or make

81 Hemple, Jessi 2018

82 Ibidem

83 Net Neutrality: the principle that everyone should have unregulated access to websites and apps, uncensored by ISPs and CSPs. The term was made famous when Comcast was found to be slowing down access speed to certain websites. The general fear is that major ISPs can charge premiums for access to certain websites, restricting one's access to the full internet. - https://www.battleforthenet.com/ accessed November 6, 2018

84 GAFA: Google, Apple, Facebook, Amazon

choices about their consumption/production.

Emerging Markets: Deregulation of the Nigerian Telecommunications Sector

Deregulation and privatization are commonly used interchangeably, however deregulation often is more comprehensive as an economic descriptor, speaking as a policy within which privatization is included. Deregulation as a policy is centered around reducing the role of the government in economic affairs, and pushing private investment, yielding a benefit to market expansion. In developing countries/emerging markets, due to a number of severely limiting factors like internal corruption, deregulation invites foreign actors to the table who in turn are able to ensure proper service delivery. In the case of Nigerian telecommunications, the process of deregulation was decades in the making, but it is thanks to privatization that their most recent government was able to observe impactful socio-economic growth, specifically within the telecom sector.[85]

The early stages of governmental reform in the 1980's, when Nigeria began its second Republic,[86] marked the beginning of the country's newest development efforts spearheaded by state owned enterprises. These efforts, meant to be the catalyst for socio-economic growth, became wrought with mismanagement, insurmountable debts, and general corruption, preventing them from making significant impacts, and slating the new government for some already much needed reform. In the telecommunications sector, services were similarly suffering from the same lack of attention and misappropriation of resources. It wasn't until the country's Fourth Republic in 1999,[87] that the Nigerian Communication Commission gained traction, and began advocating for a more deregulated system surrounding the control and operation of the telecom market.

This final push towards deregulation involved heavy privatization, removing previously government owned property from state ownership and management, and calling local and international private investors to the table. This effort was seen as an elimination of many barriers preventing entry into the industry, as well as the effective removal of limitations on the development of telecommunications in the country. Additionally, to promote competition within the sector, the deregulation efforts actually forced the government to install basic regulatory measures, which had not existed previously in any meaningful capacity.

The government took the stance that privatization would cut down on the financial burden and ensure efficient delivery of service, allowing the market to thrive in a way that it hadn't been able to under state control. This policy advanced the communications

85 Adeyemi, Raji Abdulwasiu et al. 2017

86 Thurston, Alexander 2018

87 Ibidem

network penetration by well over 33,000% (450k connected lines to 151 million connected lines) between 2000 and 2015. This similarly increased the market contribution to almost 8% of the total GDP between 2001-2013. The overall privatization of the telecom sector in this case largely improved access to communication services, which allowed for both such a rapid development of economic benefits and the improvement of people's ability to use communication services.[88]

In western developed markets, privatization is a necessary and normal part of the economy, providing competition that drives development for both stakeholders and consumers. However, total deregulation carries with it many concerns previously stated about the potential loss of focus on social equity. Here, we observe how the deregulation of an emerging market was necessary to develop the economy, and in turn improve the living experience of the local population, exactly because of the kind of competition and creation of market it brought to the region.

88 Adeyemi, Raji Abdulwasiu et al. 2017

One has to consider "Who's in, and who's out?" when beginning the process of planning a new urban intervention.

Ethics in Digital Infrastructure

History of ethics in building and planning

Ethical codes refer to the moral frameworks within which we live our lives. They govern general conduct, drawing a line between what is good and bad, right and wrong behavior, definitions which also vary between cultures.[89] The field of ethics is often broken down to three main parts: Metaethics, dealing with issues like the will of god, the origin of ethical principles, and universal truths; Normative ethics, detailing moral standards that will regulate what is accepted as right and wrong, and articulating habits and duties we should acquire because of their good virtue; Applied ethics, examining controversial issues like war, and social taboos.[90] Normative ethics, then, is possibly the next big topic of the modern era.

Normative ethics stretches between any professional and developmental domain and speaks to how humans interact with one another and the world in which they live. General ethical considerations in urban planning are no different. From Ancient Greek times, ethics in building and planning was made synonymous with aesthetics. A building's form was much more important than its function, and this was made clear by philosophers of the day. This trend lasted well through antiquity and just in the last couple hundred years ethical designing and planning has been based on the intended function of the space,[91] meaning an ethically sound space or architectural intervention is one that optimizes its layout and physical features based on the intended use. For instance, a loading dock that is taller than a semi-truck trailer is in this case unethical because the physical platform is not built to best suit its intended use – unloading semi-truck trailers – and impedes upon the operator's ability to use the space. This same notion carries over into the design and manufacture of products and services: one must consider how best the intended (or even unintended) use matches the form.

Within the last fifteen years or so normative ethics in design and planning have come to encompass much more than just the function of a service or space. Ethics today accounts for the total experience

89 The Internet Encyclopedia of Philosophy - "Ethics" https://www.iep.utm.edu/ethics/

90 Ibidem

91 Basta & Moroni 2013

of one person versus that of the greater population. In digital development, user experience and user interface design (UX and UI, respectively) speak to the interactions, participations and contacts as well as context of an intended user with a service or product. Ethics in designing for digital platforms additionally involves considerations of access to information, ease of use, and inclusion; making sure anyone could reasonably access the central functions of the service while also having a positive experience. In urban planning and development, we can adopt these considerations for what some call Urban UX Design and Planning. The ethical considerations observed in digital platforms take shape in the urban context, speaking to how best a space, service, or intervention on the city level can accommodate the population within that locale. In contemporary urban evolution, cities are becoming much more citizen centric. It is for this reason that as ethical considerations are changing, we must identify how best to treat future developments, specifically those of digital infrastructures, that will power the cities of the future.

Proposals for change by Claudia Basta and Stefan Moroni

In previous sections we approached the need for ethical considerations in the instance of privatization of formerly state owned and operated metropolitan expansion, specifically in the case of digital infrastructures. As rapid urbanization is taking hold all over the world, the need for expansion of digital and physical infrastructures is growing. Typically one has to consider the question of "Who's in, and who's out?"[92] when beginning the process of planning a new urban intervention. Claudia Basta and Stefano Moroni write in their book "Urban and Landscape Perspectives" (2013) about ethical dilemmas that arise throughout the planning and execution stages of development for a downtown space. The authors describe the recent shift towards dehumanization of societies and populations by planners and designers by way of the cultural shift to the acceptance of the scientific method as the only source of knowledge. They stress that designers ought not lose sight of the feelings and meanings involved in the execution and realization of an urban project meant for large multicultural populations in fear that once overlooked, a certain even marginalized population could be experiencing or interacting with spaces and services at a completely different standard and quality of life than the rest of the local population.

Additionally, the authors approach the argument that a project designer (over an architect, private representatives or public figures, etc.) is perhaps the most well-equipped to find/search for compromises between various types of marginalized users of public

92 Ibidem

spaces because of the nature of basic urban design methodology. Marginalized users include homeless, teenagers, street vendors, street performers, hustlers, and more citizens like this who are often forgotten through the execution of municipal projects.[93] Even focusing on the experience of marginalized users from the start of the planning stages could be a way to avoid unnecessary or unintentional segregation within the public sphere. They go on to propose a new lens with which to examine a project. The heart of this discussion asserts that the planners and policy makers should be constantly asking questions referring to the intended user of a space, the motivations for intervention, the transition of a space in regards to the population demographics, and then stress transparency about who is at the table when conceiving the plans for intervention and who is not.

93 Basta & Moroni, 2013

Socio-Political Concerns

Richard Florida in his book "The New Urban Crisis" refers to a similar consideration through his analysis of what he calls "winner-take-all urbanism."[94] This notion of winner-take-all refers to the phenomenon of those with the most resource and power making the majority of the decisions, or at least having the most effect, on cities and their inhabitants. One of the dangers here is that if a city's industries, or perhaps even just one industry, are the driving force of the local and regional economy, the actors responsible for the success of the industry are more likely to be the ones actually making many of the decisions about development within the city. Of course in a system of checks and balances, the local government can limit the influence of private actors, but at a risk of suppressing economic gain. This is a common reflection on the creation of P3s. If ever the private actor takes on a disproportionate amount of control (or risk as well) through a municipal proposal, they could easily begin making decisions about the nature of the intervention that would be less beneficial to all members of the local population, and in the direct economic or otherwise interests of the company.

94 Florida, Richard 2017

Robin Schmücker concludes his analysis of P3s in German infrastructure by saying that if private sector participation becomes necessary because of financial need, it is crucial that the details of all contracts and proposals remain accessible and transparent to other stakeholders.[95] A high degree of accountability has to remain with the private actors if they are to enter into the public sector in this way. Schmücker goes on to say that the aversion to public spending perpetuated by newer liberal parties is based on simple ideologies and not fact, and asserts that the "public good" should and will be provided by the public sector - not private investment entities - as it is

95 Schmücker, Robin 2017

their first and foremost responsibility.

We looked previously at the unprecedented efforts of Google, Facebook, and Amazon, but how might the risks of privatization apply in the existing digital ecosystem with classic actions by CSPs? In 2005, INTELSAT (International Telecommunications Satellite Organization) went private because of significant competition from the private sector, raising many of the same concerns of access and decision making at the national and international level.[96] Here, we provide a look at the transition out of the public sector, and how these concerns of accountability and "public-good" were answered.

96 Katkin, Kevin D. 2005

INTELSAT was formed in 1971 between 85 countries as the world's first intergovernmental and global telecommunications satellite system. The aim was to guarantee interconnectivity of the world's communications systems, and ensure an effective international telecom service to every nation on the planet, with a uniform pricing policy. In the late 1980's, private sector competition became substantial and by the early 2000's the large scale propagation of privately-owned submarine fiber-optic cables and telecommunications satellites pushed U.S. Congress to order the privatization of INTELSAT. In 2005, the process was completed and for $5 billion INTELSAT was sold to private investors.[97]

97 Ibidem

Politically, and otherwise, there was significant trepidation surrounding the move of this internationally conceived and operated organization to the private sector. The central goal of the endeavor was a humanitarian one - providing telecom services, or rather the opportunity thereof, to every country in the world - and private concerns historically fall under the best interests of stakeholders over social consideration. Mainly, critics of this shift worried that INTELSAT would discontinue or raise the cost of service in developing countries, where affordable and reliable telecommunications are shown to be significantly beneficial to socio-economic growth. The questions of "Are the legal safeguards instituted during the privatization sufficient to dispel such economic and political threats?" and, "Will this new for-profit entity continue to be willing and financially able to serve high cost, low-volume users around the world?" came to the forefront of the discussion.[98]

98 Ibidem

In economic terms, Intelsat Ltd. is required by law to serve developing countries at similar or lower rates than those detailed before privatization, falling within the uniform pricing stipulated at the project's beginning. As this endeavor is now privately-owned, there is however a risk of bankruptcy should the company lose its ability to support itself. The risk in this case would be that populations relying on service could lose access should the company lose their ability to provide it. In spite of this hazard, it is purportedly unlikely that even in the event of bankruptcy, the service to underserved nations will continue.[99]

99 Ibidem

Through privatization, INTELSAT fell subject to U.S. law and U.S. international trade policies. By the nature of INTELSAT's conception, its operation is fairly political, and concerns over its ability to operate in lower-middle income countries is not just an economic matter. It is possible that in operating under U.S. regulations, that congress could place sanctions on international trade that would hinder Intelsat Ltd.'s ability to deliver service. As is still the case, U.S. law protects the system's ability to serve the global market without political restriction, a policy that can change if U.S. Congress decides to do so. However, threat of legal impediment is low because of the nature of the service.[100]

100 Ibidem

The risks in a move of an organization so deeply involved in infrastructure and basic telecom provision into the private sector were assured by lawmakers who detailed how social concerns were to be resolved. The populations relying on INTELSAT's service were (and are) protected by numerous, even redundant, laws that prohibited Intelsat Ltd. from complicating their access. Were the transition to take place with less legal protection on the side of social equity, the situation could be much different. Similarly, should lawmakers decide that Intelsat Ltd.'s actions are no longer in the best political interests of U.S. foreign policy, privatization has removed the internationally political bounds that kept stakeholders accountable for delivery. We may consider that national level infrastructural concerns are indeed a matter of political importance. Nonetheless, problem solving methods remain the same at any level of development – physical or digital, town/city or national/international.

Florida states that amid the many problems that exist in cities, just as the crisis is urban, so is the solution; more responsible urbanism. He states that the socio-economic gap could be bridged by some mix of local government, non-profit organizations, and philanthropic organizations to keep the focus on the best interests of the citizens in each respective city. This is in line with the ideal P3 development mentioned earlier, in which a public organization partners with a non-profit private actor to ensure proper civil and commercial balance.

Florida identifies another main pillar of urban development issues called the urban land nexus.[101] This position is centered around the land in super-developed neighborhoods, think San Francisco, Detroit, Los Angeles, New York, which is limited to what is already there. Winner-take-all urbanism is mainly to blame for the divide between lower, middle, and upper class citizens, and the opportunities provided to them in their cities. Taking this into account, land use and management in cities is more important than ever to maintain an inclusive vision of city planning. It is precisely because of land regulation faults that some major social and economic problems exist in cities today. Florida posits that a revised land use framework including modifications of the state tax system, more investment in

101 Urban Land Nexus (theory developed by Richard Florida, 2017): Extreme clustering of economic activity in limited parts of a limited number of cities, and the resulting competition over these parts.

public collective transportation, and a shift towards rental-housing based real-estate could constitute the kinds of mixing of professional profiles, density and urban clustering that a progressive metropolitan economy requires. More specifically, Florida cites 7 steps in his own solution to a revised urbanism:

"- Reform zoning and building codes, as well as tax policies, to ensure that the clustering force works to the benefit of all
- Invest in the infrastructure needed to spur density and clustering and limit costly inefficient sprawl.
- Build more affordable rental housing in central locations
- Expand the middle class by turning low-wage service jobs into family-supporting work
- Tackle concentrated poverty head-on by investing in people and places
- Engage in a global effort to build stronger, more prosperous cities in rapidly urbanizing parts of the emerging world.
- Empower communities and enable local leaders to strengthen their own economies and cope with the challenges of the new urban crisis."[102] [103]

102 Florida, Richard 2017, page 11

103 The new urban crisis (developed by Richard Florida): Cities are experiencing increased inequality, segregation between income levels and class, and disappearance of the middle class.

These detailed efforts generally boil down to paying attention to cities at the citizen level. By investing time, attention, and energy into the specific needs and experiences of a city's inhabitants, policy-makers and even private urban actors can work to create a more level playing field. This kind of shift in public and economic policy carries a good deal of risk, however, by encouraging investors to endow underserved and yet less-productive communities under the belief that they will rise to the given standard in light of the right opportunities, a sentiment which received legal reinforcement in the case of INTELSAT mentioned earlier.

Focusing on the citizen is also the main design and development target of Sidewalk Labs, an urban innovation company, helping to evolve the way in which people and their leaders interact with each other and their city. Currently, Sidewalk Labs has partnered with Waterfront Toronto to redevelop the Quayside neighborhood along the Toronto waterfront. This effort sets to use technology to facilitate a citizen's interaction with their city and with their policy makers. Streets, buildings and public spaces will be filled with sensors and monitors to allow for real-time innovation on the urban experience, fulfilling specific needs of the local inhabitants. Throughout the development of the planning and eventual rollout of the project, Sidewalk Labs has initiated a strong dialogue with local citizens to better understand their wants and needs, as well as their concerns, so as to effectively create change in the way we think about urbanization. A noticeable initiative of this effort can be seen in the "Sidewalk

Toronto Residents Reference Panel."

The Residents Reference Panel is part of thirteen different citizen based reference points that ensure the success of the project. This panel is comprised of 36 participants ranging in age from 18 - 65+, half men and half women, from a variety of backgrounds and origins, and different lifestyles from all over the city of Toronto. They will meet for 40 hours over nine months to analyze and respond to the progress of the Quayside project. The participants are all volunteers, chosen at random from over 600 submitted inquiries, to actively participate in the planning of the project in their city. First the panelists were educated about the city and the project from presenters, company representatives, designers, and urban experts to better understand the scope. Their main task through these meetings is to discuss, problem solve, and agree upon shared priorities within the ongoing development.[104] So far, as representatives of their city the panelists have begun tackling issues of personal data management and privacy, as well as accessible public space planning. They have all recognized that this is indeed an arduous process, and have each individually come to appreciate the effort and care with which Sidewalk Labs and the City of Toronto have come together to offer them the chance to participate in what promises to be a truly sustainable and user-centric development.

104 Sidewalk Labs 2018

105 Basta & Moroni 2013

Restitution

The implementation or evolution of digital infrastructures is generally not as dynamic as a project the likes of Sidewalk Toronto. Still, there are many actors involved in the decision making process, taking into consideration a range of eventual influences of their proposal. These influences include the private partners, public actors and their personal agendas, the city and its socio-economic health, the citizen perspective of the collective city, and that of the individual citizen. It is imperative to consider the human scale perspective of projects as large as an infrastructural intervention, in addition to the service being provided. Who is gaining what from such a development? What is the worst possible scenario socially, financially, in the short term and long term? What is the best? Who could also benefit from this development that hasn't yet been considered? And in the case of Alphabet, how might we provide the most efficient and reliable service that serves ourselves and our users in an equal capacity? Their answer was perhaps more disruptive than should be expected.

As Basta and Moroni assert, planners and policy makers should be always asking questions of the intended user of intended services, the motivation for intervention, as well as the transition period and who could possibly be affected.[105] As Zheming Zhong alluded, there is also the consideration of the fitness of the community to accept change at an infrastructural level. Undoubtedly digital network expansion is a valuable revelation for underserved and rural communities, but in these cases the transition must be handled with care so that the local inhabitants are equipped to take advantage of this change. Equally, private actors have to be ready to work with their intended consumers. A discussion can sometimes remain just a discussion, whereas a continued dialogue can offer deeper insight into the citizen-user experience that may not be evident to a CSP, or even to the local government, no matter how thorough of a planning process.

Keeping these solutions in mind, one must also consider the bottom-up approach to urbanism. As the Neom project is neither a macro to micro nor a micro to macro project, by nature of the total development of a new infrastructure, the other efforts listed in this paper, with the exception of the dabbawalas, are handled mainly from a top-down approach. The initiatives for the most part begin with the government and stay with the government until final rollout. One notion that is equally important to sustainability of citizen based projects is citizen engagement. Sidewalk Labs is pioneering this aspect by initiating a kind of collective responsibility between the developers and citizens. In this way, even though the financial and political risk remains at the upper level, citizens become responsible for their own experience and voice within the project and resulting product with which they have to live. This responsibility, in turn, will motivate local citizens to give meaningful input, and knowing or not, help with the introduction and integration of the project onto the terrain.

If users were able to have a dialogue with the central actors in the rollout of a network expansion plan, perhaps give details about their data usage and needs, expectations or even demands of their municipality, project satisfaction and adoption could be much higher. This is why, in addition to a top-down approach where public and private actors must look at the citizen level for guidance and inspiration, citizens must equally look to their leaders and local private actors for assurance, and to educate themselves in a way that makes them capable of making change or making themselves heard. The developers of these city-scale projects hold the important role of opening these kinds of discussions, after which city-dwellers/citizen-users can become not just a consideration but also an integral part of the development and planning process.

In observing privatization of the development of digital infrastructures, the shift in developing power and decision making signals an equal shift in responsibility.

Conclusion

We began this study investigating the question, "How does the privatization of digital infrastructural development affect citizen living and quality of life?" This question holds an inherent opinion, that indeed the privatization of digital infrastructure can and does have an impact on an inhabitant's quality of life. Not knowing specifically what changes are effectuated on the human scale in this kind of development, we broke this paper into three main sections. These sections cover the current atmosphere of urban development, digital infrastructure, and partnerships, then dive into existing projects and how might the local actors be able to improve their efforts.

In observing the gradual privatization of digital infrastructures, we explored what the implications are for a citizen's quality of live when civil welfare could be a secondary consideration. Based on the premise that access to internet and digital services means, in this modern world, access to innovation and progress, the expansion of virtual frameworks – hardware or software based – must be handled with ethics in mind.

We began this investigation attempting to discern the various stakes and aspects of modern city planning. Additionally it was important to begin to understand the process and trajectory of urban projects across varying cultures to better qualify initial suspicions and propose further sound solutions.

Over the course of this study, we found that the overall responsibility for maintenance of social welfare rests with the public sector. We agree that this is the case and should remain so, however in observing privatization of the development of digital infrastructures, the shift in developing power and decision making signals an equal shift in responsibility. The effect of this privatization additionally takes on different proportions in different environments, depending largely on the local consumer population as well as the local government.

As seen in Nigeria, privatization through deregulation of

telecommunications development gave the country a chance to grow by inviting private market competition into their economy. This kind of growth was otherwise unlikely to happen given the political turmoil at that moment in time. Deregulation in Nigerian telecom was a blessing that allowed the country to move forward. Conversely, the concerns that arise in already developed markets include lack of transparency, as discussed by Schmücker in German infrastructural privatization, as well as losing sight of social welfare, discussed at length by Richard Florida. As seen, privatization is actually quite positive for communities and economies so long as proper oversight is maintained by local state actors, and/or social concerns are held in high regard.

We arrive briefly on the topic of citizen engagement in the case of Chicago's technology plan, as well as comments from Zheming Zhong and a deductive conclusion from Sidewalk Toronto's community action portion of their urban development plan. Citizen engagement, creating a dialogue between consumers/users/citizens and actors installing infrastructure in the locale, is a powerful way to maintain social equity if the involved parties are all open to the whole ecosystem. Furthermore, it is much easier for a private entity to remain transparent through this kind of consumer involvement in planning and deployment, as public actors are required to do. As Basta and Moroni assert, planners and policy makers should always ask questions of the intended user of a project, question their own motivations for intervention, and discuss the transition period and who could possibly be affected.[106] This sentiment is corroborated by Richard Florida and developers with Sidewalk Toronto, stating that citizen-centricity as a policy is the best way to make change in the urban environment from an ethical perspective.

106 Basta & Moroni 2013

Designer Questions

Over 4.5 billion people live without connection to internet communication services, while most live in areas covered by 2G and 3G mobile networks. This results mainly from the high cost of access, either by physical access points like connected devices and computers, or to subscription services from CSPs. It is important to consider that citizen users in emerging markets are more frequent users of digital government, education, and healthcare services, than users in more established or developed countries. Similarly, citizen users in emerging markets are more willing to adopt a digital lifestyle because of the perceived benefits to their well-being, intellect and economic stability. Because of many socio-economic disadvantages of living in developing countries, as well as limiting factors like dialectic language and access to the most basic infrastructures like electricity, international investment is generally withheld and allocated to more well-educated, and economically stable populations. This is done so in hopes to yield a more substantial impact in fields like healthcare, education, and commerce in regions that are prepared to reap such benefits. As discussed in this paper, the economic implications of connectivity in an emerging market are overwhelmingly positive. These reflections allow me to ask: How can I as a designer facilitate digital integration and adoption in emerging markets for the social and economic benefit of local populations?

For almost two decades, the United States has observed a gradual and significant rise in privatization of the public sector. Similar to the US, Germany has also undergone a gradual privatization of previously state-owned enterprises and missions, since the 1960's in sectors like energy, transportation, health, education, and most recently the development of physical infrastructure. After the passing of the European Maastricht Treaty of 1992, which protects but also limits public sector investments, along with German constitutional

prohibitions on partial privatization (P3s), the public sector began to completely take over where the state was forced to stop on infrastructural projects. As a result of new reform, aimed at closing the investment gap between private and public institutions, passed in June 2017, more private investment is being welcomed into the public sector with close monitoring through, a government owned but legally private LLC. Political parties and citizens protest this kind of privatization because of a perceived loss of control from the state and a subsequent loss of social equity in eventual developments. Citizens and policy-makers dislike P3s because private entities are often much less transparent about their spending, interests, and contracts. This attitude acts equally as a severely limiting factor to further development and economic progress. How can I as a designer improve communication and transparency between public and private entities and the general public to improve perception, adoption, and deployment of sound partnership proposals?

Zheming Zhong discussed the consideration of the fitness of a community to accept and exploit change at an infrastructural level. Without a doubt, digital network expansion is a valuable revelation for under served and rural communities, but in these cases the transition must be handled with care so that the local inhabitants are equipped to take advantage of this change. Equally, private actors have to be ready to work with their intended consumers. Opening this dialogue remains a challenge for private and public actors alike, but is essential for maintaining social concern. How can I as a designer open dialogue with communities in emerging markets to help equip the population for socio-economic development?

Annex

Bibliography

Print:

BASTA, Claudia; MORONI (Eds.), Stefano
Urban and Landscape Perspectives Vol 12
"Ethics, design and planning of the built environment"
(c) Springer Science Business Media, Dordrecht 2013. 218 pgs.

Dziri, Mehdi et al.
The Augmented Infrastructure
October 2018
Published by Ardian & Fabernovel in print and online
Paris, October, 2018

FLORIDA, Richard
The New Urban Crisis: How our cities are increasing inequality, deepening segregation, and failing the middle class - and what we can do about it.
[2017] Basic Books, New York. 310 pgs.

Marcus, Alan et. al.
"Delivering Digital Infrastructure, Advancing the Internet Economy."
World Economic Forum; Geneva, Switzerland April 2014

Quality of life in Cities
© European Union, 2013 Luxembourg: Publications Office of the European Union,
Printed in Belgium. 145 pages

Thomke, Stefan H., and Mona Sinha.
"The Dabbawalas System: On-Time Delivery, Every Time."
Harvard Business School Case 610-059, February 2010. (Revised January 2013.)

Web:

Balbino e Silva, Abraão.
The Brazilian Experience on spectrum pricing modeling: the 3G and 4G license
2013
Presentation PDF, ITU/BDT Regional Seminar on the Economic and Financial Aspects of Telecommunications/ICT
https://www.itu.int/ITU-D/finance/work-cost-tariffs/events/tariff-seminars/Mexico-13/pdf/Sess5_Silva_spectrum-en.pdf
Accessed November 6, 2018

The Boston Consulting Group
"Adapt and Adopt: Governments' Role in Internet Policy"
2012
https://www.bcgperspectives.com/ content/articles/digital_economy_public_sector_adapt_adopt_ government_role_internet_policy/

Chappell, Bill.
Supreme court won't review decision that OK'd Obama-era Net Neutrality Rules
November 5, 2018
©2018 National Public Radio, Inc.
Published online, accessed November 6, 2018
https://www.npr.org/2018/11/05/664451451/supreme-court-wont-review-decision-that-ok-d-obama-era-net-neutrality-rules?t=1541537496380

City of Chicago Technology Plan
Published and written by the City of Chicago, 2013
Online http://techplan.cityofchicago.org/
Accessed October 4, 2018

City of Chicago Technology Plan: 18 Month Update
Published and written by the City of Chicago 2015
Online http://techplan.cityofchicago.org/
Accessed October 4, 2018

Eggers, William D; Turley, Mike; Kishnani, Pankaj
The Future of Regulation
June 19, 2018
© Deloitte 2018
https://www2.deloitte.com/insights/us/en/industry/public-sector/future-of-regulation/regulating-emerging-technology.html
Accessed November 21, 2018

Elmendorf, Douglas W.
Re: Federal Contracts and the Contracted Workforce
Letter to Honorable Chris Van Hollen
Director Congressional Budget Office 11 March, 2015,
Accessed www.cbo.gov 20 July, 2018

Encyclopedia Britannica Online
Search: Protocol (computer science)
https://www.britannica.com/technology/protocol-computer-science
Last updated 31 August, 2018. Accessed 4 September, 2018

Kuang, Chris.
"The Unlikely Couple: The rise of Public-Private Partnerships in the United States,"
14 June, 2017, Harvard Political Review - Online
Accessed 12 August, 2018.
http://harvardpolitics.com/united-states/the-unlikely-couple-the-rise-of-public-private-partnerships-in-the-united-states/

Grossman, David
Google is about to build its own undersea internet cables
January 16, 2018
Published on PopularMechanics.com
© 2018 Hearst Communications, Inc.

Hemple, Jessi.
What happened to Facebooks grand plan to wire the world
May 17, 2018
Published online. Wired. Accessed November 6, 2018
© 2018 Condé Nast
https://www.wired.com/story/what-happened-to-facebooks-grand-plan-to-wire-the-world/

Kara, Jake.
Data, How much do drivers pay at tolls across the country?
June 7, 2017; TrendCT.org accessed September 30, 2018
https://trendct.org/2017/06/07/how-much-do-drivers-pay-at-tolls-across-the-country/

Katkin, Kenneth D.
"Communication Breakdown: The Future of Global Connectivity After the Privatization of INTELSAT"
(March 12, 2005). bepress Legal Series. bepress Legal Series. Working Paper 508.
http://law.bepress.com/expresso/eps/508

Accessed 18 November, 2018

Lueth, Knud Lasse.
IOT Investments 2018
Published October 3, 2018 IOT Analytics 2018
https://iot-analytics.com/iot-investments-m-and-a-market-update-2018/
Accessed October 5, 2018

Marsden, Richard; Ihle, Hans-Martin; Traber, Peter.
Effective Spectrum Pricing in Latin America : Policies to support better quality and more affordable mobile services
© GSMA, February 2018
Published online. Accessed November 6, 2018.

Michaels, Mathew
33 cities around the world where healthcare is good, housing is affordable, and people have the best quality of life
26 May, 2018 Online; Business Insider online publication
http://www.businessinsider.fr/us/best-cities-quality-of-life-affordability-healthcare-ranked-2018-5
Accessed October 8, 2018

OpenSignal search: "[city]"
OpenSignal Ltd. London, UK. © 2018 Mobile IOS application,
Accessed September 15-17, 2018, October 8, 2018

Raji Abdulwasiu Adeyemi, Mohd. Haniff bin Jedin & Muhammed Subhan
International Journal of Research in Business Economics, and Management Vol.1 Issue 1 July-August 2017 – "The Privatization of Telecommunications Sector in Nigeria: Prospects and Challenges"
www.ijrbem.com, Published October 14, 2017,
Accessed October 29, 2018

Reuland, Vera; Rygalski, Corinna.
Zürich mit der Zweithöchsten Lebensqualität Weltweit
Published online, 20 march, 2018, Zurich, Switzerland
Accessed October 8, 2018
https://www.mercer.ch/newsroom/quality-of-living-2018.html

Sawers, Paul
Facebook is building a 1,553 mile subsea cable to boost internet speeds in Argentina
September 6, 2018
Published online by Venture Beat "Cloud"

Accessed November 6, 2018
https://venturebeat.com/2018/09/06/facebook-is-building-a-1553-mile-subsea-cable-to-boost-internet-speeds-in-argentina/

Schmücker, Robin
Privatizing the German Autobahn? - Another Neoliberal Assault on Public Provision
Published Online 11 August, 2017
© 2018 Heinrich Böell Foundation
https://us.boell.org/2017/08/11/privatizing-german-autobahn-another-neoliberal-assault-public-provision
Accessed 17 November 2018

Seese, Michael.
Scrappy Information Security.
May 2009, Scrappy About Publishing, Silicon valley, California, USA
P. 130. Retrieved 27 sept 2018 in eBook format.

Sidewalk Labs
Interim report and recommendations of the Sidewalk Toronto Residents Reference Panel
September 2018
Accessed online October 10, 2018
https://sidewalktoronto.ca/wp-content/uploads/2018/09/Sidewalk-Toronto-Residents-Reference-Panel-Interim-Report.pdf

SpeedTest Reports: United States
Published online July 18, 2018; Speedtest.net © Ookla LLC. 2018
Accessed October 8, 2018
http://www.speedtest.net/reports/united-states/

SubmarineNetworks.com "Jupiter"
Published January 7, 2018
© 2018 SubmarineNetworks.com
Online, accessed November 6, 2018
https://www.submarinenetworks.com/en/systems/trans-pacific/jupiter

TeleGeography Submarine Cable Map
www.submarinecablemap.com
© 2018 PriMetrica, Inc Washington D.C. / San Diego / Exeter / Singapore
Accessed October 12, 2018

Thurston, Alexander
African Studies Review, Volume 61, Issue 1

April 2018 , pp. 215-238
©2018 African Studies Association
https://doi.org/10.1017/asr.2017.99
Published online: 05 March, 2018
Accessed: 16 November, 2018

Tommaso, Stella.
Regulation of market power in the US Internet sector
1 November, 2016 The Market Mogul
https://themarketmogul.com/regulation-market-power-us-internet-sector/
Accessed 7 September, 2018

Population Search, "Skagway Municipality, Alaska"
United States Census Bureau; Estimates 1 July, 2017. Accessed online 20 September, 2018
https://www.census.gov/quickfacts/fact/map/skagwaymunicipalityalaska,US/PST045217

Wigginton, Craig
2018 Telecommunications Industry Outlook
2018 Deloitte & Touche LLP
Published online, accessed 9 September, 2018

Questionnaire

Pre-Q:

1. How old are you?
2. Where do you live? City, state, country
3. On a scale of not at all to very often, how often do you use mobile or online platforms to give or receive information?
3. On a scale of not at all to very often, how often do you use mobile or online platforms to give or receive information about your city?

Q1 Generally speaking, please tell me if you are very satisfied, rather satisfied, neutral, rather unsatisfied or not at all satisfied with each of the following issues in your city?

ANSWERS: Very satisfied Fairly satisfied Not very satisfied Not at all satisfied No answer

1. Public transportation, for example the bus, tram or metro
2. Health care services, doctors and hospitals
3. Sports facilities such as sport fields and indoor sport halls
4. Cultural facilities such as concert halls, theatres, museums and libraries
5. The state of the streets and buildings in your neighborhood
6. Public spaces such as markets, squares, pedestrian areas
7. Green spaces such as parks and gardens
8. Availability of retail shops
9. Schools and other educational facilities
10. The quality of the air
11. The noise level
12. Cleanliness
13. Availability of real-time information concerning security, transport, events, etc. (measurements like occupancy, which we can see on Google search results)
14. Open data platforms or applications

15. Availability of internet connection (Wi-Fi, 3G, 4G)

Q2 I will read you a few statements. Please tell me whether you strongly agree, somewhat agree, somewhat disagree or strongly disagree with each of these statements?

ANSWERS: Strongly agree, Somewhat agree, Somewhat disagree, Strongly disagree, No opinion

1. I am satisfied to live in my city
2. It is easy to find a job in my city
3. I use the internet and mobile applications to improve my life in my city
4. I have access to information I believe to be important about my city
5. It is easy to find good housing at a reasonable price in my city
6. The administrative services of my city help people efficiently
7. I feel safe in my city
8. I feel safe in my neighborhood
9. My city is committed to fight against climate change (e.g.: energy efficiency, green transport)
10. Generally speaking, most people in my city can be trusted
11. Generally speaking, most people in my neighborhood can be trusted
12. Generally speaking, the public administration of my city can be trusted
13. As a citizen, I feel heard in my city

Q3 On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with...?

ANSWERS: Very satisfied Fairly satisfied Not very satisfied Not at all satisfied No opinion

1. Your personal job situation
2. The financial situation of your household
3. The life you lead
4. The place where you live

Q4 In your opinion, among the following issues, which are the three most important for your city? (MAX. 3 ANSWERS)

Safety / Air pollution / Noise / Public transport / Health services / Social services / Education and training / Unemployment / Housing / Road infrastructure / Digital services / DK or NA

To view full data set results, consult this link:
https://docs.google.com/forms/d/1krPnFZKrFI6qH4AKi-e3y-HT7HaOo0eTgLlaxckndvI/edit?usp=sharing

Interview Transcript

Interview objective: understand the government role in physical and digital urban projects, judge whether digital culture affects general quality of life.

Zheming ZHONG
DESIGNER
Xiamen Mexdia Creativity & Technology Co., Ltd.
Xiamen, China

Transcript:

Jordan: What is your role at Mexdia? How long have you been working in this domain?

Zheming: I am working as a designer in Mexdia, my main focus is on the design that often bases on a new concept which tries to integrate technology for the innovation, we work on the basis of a cross-disciplinary team, in which I would normally be responsible for the concept. After my study as a master student in the Multimedia Design department of KASK (Royal Academy for fine arts in Ghent, Belgium), I have worked for Mexdia for 3 years.

J: When taking on an urban project what are your first considerations before beginning?

Z: 'Sustainability' in an economical, but also ecological and societal contexts is something we would consider before we start an urban project, it is often overlooked when we work with some clients in an environment of 'China's rapid development', in which the pursuing of short-term values is often targeted.

J: How closely do you work with the municipality throughout the project ? What does this process look like?

Z: It depends on the specific projects, our clients include enterprises, organizations and government institutions, but generally projects in China are often involved with working with the government either directly or indirectly. It's probably unlike the situation in the West, Chinese governments would have a deeper engagement in the activities of various sectors (economy, culture, social, etc.), generally, in our experience, the government plays different roles, they might be the partner in PPP projects (Public-private partnership), they might be the supervisor of a wide range of citizen's activity, they might also be the competitor (in the case of state or local government owned companies).

J: How do you include the citizens' opinions and/or experiences throughout the development of your project?

Z: In projects dealing with the public, for us, it's important to have a lot of communication with the residents at the beginning phase, which would help a lot to understand the general situation but also some particular aspects we would like to know in order to define the problems. In the development of the project, it is also common to test some ideas with the residents either through just interviewing or sometimes through a specially designed workshop.

J: How important is the digital culture in your region? How is it integrated? How many people use the internet in their day to day life?

Z: The Chinese people's daily life has been largely relied on the technology in recent decades, it is more so in the more developed east part of China in where we are based, the technology is integrated in almost every part of Chinese people's life (online food/transportation/movie ordering, sharing bicycle/cars, digital payment, unmanned store/gyms, etc.), you can do almost everything on a phone and people are becoming so used to it. According to some relevant government reports, China has 800+ million netizen until now, and 700+ million netizen who use mobile internet.

J: How do these sentiments change between urban and rural areas?

Z: There is still big distance between Chinese urban and rural areas in terms of development, some technologies (e.g. digital payment, various online services) have been widely promoted and accepted by some younger people in the rural areas, which has proved to be beneficial to the rural residents (e.g. farmers join the online platform selling their agricultural produce to the city, some areas have started developing the agriculture based on new technology,

etc.). Although comparing with the situation in urban areas, there are only small amount of people who are willing or able to make use of the technology, but the government, and more and more enterprises have been putting efforts and resources on the construction of the technology related infrastructure, the introduction of new business model (e.g. Alibaba's O2O supermarket), and the promotion of new technology based services.

J: Would you say that access to internet and internet services affects people's quality of life? Why?

Z: I would agree with this, it has already been a reality that the internet and its related products and services have brought both positive and negative impact on people's life, this is quite obvious in China, the technology has been deeply integrated in people's everyday life (eat, sleep, transportation, recreation, education, work, etc.) which has totally changed the way we live maybe 2 decades ago, it brings convenience for life, creates more opportunities for work and education, facilitates the personal and social communication and connects the local to the globe.