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ETHICS OF SMART CITIES: PERCEPTIONS
OF TECHNICAL STAKEHOLDERS IN PAKISTAN

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Ethics of Smart Cities: Perceptions of Technical Stakeholders in Pakistan

Akıllı Şehir Etiği: Pakistan'daki Teknik Paydaşların Anlayışları

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ABSTRACT

As the world has raced ahead and developed into a collection of wired cities and connected on the grid communities, we have also become effaced with challenges of urban sprawl, gentrification, pollution and climate change (Halegoua, 2020). Big tech companies as well as multiple governments around the globe are putting forth smart city technologies as a possible solution to our emerging problems, citing the power of modern technologies when data-driven systems as a solution to complex urban issues (Cocchia, 2014). At the same time science and technology research is destabilizing the assumption that technology is value neutral instead scholars posit the technological artifacts are imbued with consequences norms as well as values which can encourage certain behaviors while discouraging others (Costanza-Chock, 2020; Winner, 1980). Furthermore, the black box nature of AI systems further motivates the need to study the “less-tangible” aspects of algorithms and algorithmic thinking (Young & Kitchin, 2020, p. 3).

This research undertakes the study of these ‘less-tangible’ aspects of technological artifacts and their creation and investigates how they manifest in the context of Smart City projects in Pakistan. In order to achieve this goal this research focuses on technical stakeholders which may be critically positioned to shed light upon what ethical considerations, deliberations, and concerns surface in the act of technological creation in the country. In so doing this research hopes to add to a conversation that has so far been restricted to western economies and allow the deconstruction of how data harms manifest and low-to-middle income countries. By conducting 12 semi structured participant interviews this research was able to show that while technical stakeholders are unsure of the local implementations of smart city projects the same cannot be said for datafication processes, perceptions of which, were largely positive. It also shows that trust in government-led initiatives is low in comparison to corporate initiatives, due to historical political instabilities. Although participants displayed some

understanding of common ethical concerns their knowledge of how these issues can affect local communities was sparse at best, and inclination towards security at the cost of privacy also reared its head in the data. These insights show that local contexts severely impact how ethical choices are made and highlight the importance of including local stakeholders in applications of smart technology. In conclusion this research underscores the importance of mapping data ethics in previously understudied parts of the world so that a fuller picture of what ethics of smart cities means on a global scale can be constructed.

Keywords: Smart City, Ethics, Datafication, Technical Stakeholders, Pakistan

ÖZET

Dünya hızla ilerleyip kablolu şehirlerden ve şebekeye bağlı topluluklardan oluşan bir koleksiyona dönüşürken, kentsel yayılma, soylulaştırma, kirlilik ve iklim değişikliği gibi sorunlarla da boğuşur hale gelindi (Halegoua, 2020). Büyük teknoloji şirketleri ve dünyanın dört bir yanındaki çok sayıda hükümet, karmaşık kentsel sorunlara çözüm olarak veriye dayalı sistemleri devre sokarken, modern teknolojilerin gücüne atıfta bulunarak, ortaya çıkan sorunlarımıza olası bir çözüm olarak akıllı şehir teknolojilerini öne sürüyor (Cocchia, 2014). Aynı zamanda bilim ve teknoloji araştırmaları, teknolojinin değer açısından tarafsız olduğu varsayımını sorgularken, birçok araştırmacı, teknolojik eserlerin bazı normların yanı sıra belirli davranışları teşvik ederken diğerlerini de caydırabilecek değerlerle dolu olduğunu öne sürmektedir (Costanza-Chock, 2020; Winner, 1980). Ayrıca, yapay zeka sistemlerinin kara kutu niteliği, algoritmaların ve algoritmik düşüncenin "daha az somut" yönlerini inceleme ihtiyacını daha da motive etmektedir (Young & Kitchin, 2020, s. 3).

Bu araştırma, teknolojik eserlerin ve bunların yaratımının bu 'daha az somut' yönlerini incelemeyi üstlenmekte ve Pakistan'daki Akıllı Şehir projeleri bağlamında bunların nasıl ortaya çıktığını araştırmaktadır. Bu amaca ulaşmak için bu araştırma, ülkedeki teknolojik yaratım eyleminde hangi etik düşüncelerin, müzakerelerin ve kaygıların ortaya çıktığına ışık tutacak şekilde eleştirel bir konuma sahip olabilecek teknik paydaşlara odaklanmaktadır. Böylece bu araştırma, şimdiye kadar Batı ekonomileriyle sınırlı kalan bir tartışmaya katkıda bulunmayı ve verilerin açık ve düşük-orta gelirli ülkelere nasıl zarar verebileceğinin yapı sökümüne öncü olmayı ummaktadır. Bu araştırma bağlamında, 12 yarı yapılandırılmış katılımcı görüşmesi gerçekleştirilmiştir. Teknik paydaşların, akıllı şehir projelerinin yerel uygulamalarına şüpheyle baktıkları, ancak aynı şeyin, paydaşlar tarafından genel olarak olumlu değerlendirme süreçleri için söylenemeyeceği gösterilmiştir. Ayrıca, tarihsel siyasi istikrarsızlıklar nedeniyle hükümet öncülüğündeki girişimlere duyulan güvenin kurumsal girişimlere kıyasla

düşük olduğu da ortaya konmuştur. Katılımcılar yaygın etik kaygılar konusunda bir miktar anlayış sergilemiş olsalar da, bu konuların yerel toplulukları nasıl etkileyebileceği konusundaki bilgileri en iyi ihtimalle seyrek olarak ifade edilebilirken, mahremiyet pahasına güvenlik değerinin öncelenmesi de verilerde kendini göstermektedir. Bu içgörüler, yerel bağlamların, etik seçimlerin nasıl yapıldığını ciddi şekilde etkilediğini göstermekte ve akıllı teknoloji uygulamalarına yerel paydaşların dahil edilmesinin önemini vurgulamaktadır. Sonuç olarak bu araştırma, akıllı şehir etiğinin küresel ölçekte ne anlama geldiğine dair daha kapsamlı bir resmin oluşturulabilmesi için dünyanın daha önce yeterince görece çalışılmamış bölgelerinde veri etiğinin haritalandırılmasının önemini vurgulamaktadır.

Anahtar Kelimeler: Akıllı Şehir, Etik, Verileştirme, Teknik Paydaşlar, Pakistan

INTRODUCTION

The wet eye, the stormy spirit, are not enough
The accusation of secret love is not enough
Today come in fetters to the marketplace,
Come waving hands, come exulting dancing
Come with dust on the head, come with blood on the dress,
All the city of the beloved is gazing, come;
There too is the governor of the city, the public gathering too,
The arrow of calumny too, the stone of abuse too,
The unhappy day break too, the wretched day too.

- Faiz Ahmed Faiz

translated by Victor G. Kiernan

As realities of climate change and unhindered capitalist consumption set in, government bodies as well as enterprising citizens are looking towards the promise of a future saved by ICT interventions under the moniker of Smart Cities. In the corporate vision statements as in the case of Siemens, smart cities are posited to offer high standards of living due to their digitalization capabilities and this promise has led to construction of multiple projects across the globe (Siemens, n.d.).

However, claims of sustainability and betterment of citizens' lives are often eclipsed by corporate interests, neoliberal economics, and an ethos of commodification through datafication (Yüksekdağ, 2021). Perhaps the most emblematic example of how ICT-led urban transformations can unhinge urban dynamics is the creation of Amazon's HQ in Seattle, which led to a rent hike across the city and overexerted transit systems

(Figueredo et al., 2019, p. 174). More symbolic still is the gentrification surrounding Silicon Valley which is borne from its propensity to attract foreign investors without care for the rest of the city (Callander, 2019, p. 2). It is also important to note, that new media technologies such as social media platforms, ICT technologies that are part and parcel of Smart City technology, not only enable communications and interactions but are also able to steer it in realms of socio-political concern. (Nieborg & Poell, 2018, p. 03) Moreover scholars like Baykurt and Raetzsch (2020) assert that New Media technologies have a “material dimension” in that they can refer to political and economic tools that create media technologies themselves and second, that it can use such technologies to transform urban spaces themselves. (p. 11)

Similarly, under critique, is the idea that purely-ICT led redevelopment projects can solve long-standing socioeconomic issues of urban decay and poverty. Instead, critics like Townsend (2013) point out that in contrast to the virility of urban environments, Smart cities yield “sterile social utopias” (Schürer, 2019, p. 45). Others like Haleboua (2020) go further and trouble the underlying assumption that Smart Cities are better for the environment. Still more, like Kitchin (2018) and Couldry (2019) call in to question the processes of datafication which are the modus operandi of such ICT-led reinventions of urban space pointing out how such data-driven platforms categorize and sort citizens and may make their behavior susceptible to being “nudged” or influenced for neoliberal ends.

Despite mounting critique, many governments and communities are being set up for a Smart City reinvigoration- a trend that began in Europe but has taken places like East and Southeast Asia by storm. Recently, India’s Prime Minister announced a 100 Smart Cities Mission (Figueiredo et al., 2019, p. 169). An aim closely echoed by Pakistan and Bangladesh which followed with projects of their own. Perhaps the most peculiar aspect of these goals is how asynchronous the perceptions around smart city technologies between these two geographic areas.

Although critiques of the emerging idea of Smart City mount in places like Europe and Canada, middle to low-income countries like Pakistan are planning to leapfrog their way into a sustainable future. Lofty as they may be these goals are not backed by the guardrails and protections like the General Data Protection Regulation (GDPR). Instead, short-term economic and political gain of a few holds the power to dominate and damage public interest. As symbolized by the Cambridge Analytica debacle, this can be a hard thing to counter for developed democracies like the United States of America (Calvo, 2020, p. 144). Since technological innovation is racing ahead, comparative policies and discussions about how Data Governance laws and ethical concerns such as privacy, accountability impact local realities and experiences are extremely necessary.

Complicating this setting further is the growing segment of ICT and STEM professionals in countries like Pakistan and India, who ideally should have been able to begin a local discourse on potential safeguards and guardrails. So far, however, work in this direction is sorely missing (Taylor & Broeders, 2015, p. 2). Even though the country is currently undergoing at least three mega self-styled Smart City projects, in and around two of its most important cities, the historical city of Lahore and the capital of the country Islamabad.

All three projects are the result of public-private partnerships but are being used as vehicles of communication for the governments and political parties that signed the projects into being. Despite performing as a selling point, detailed information about how the Smart City project is being planned as well as a clear definition of goals is absent. The place of this vital communication has been taken over by 3D digital renders of the vision of Smart Cities, and lofty promises of luxury and wellbeing. Hence this research will undertake an analysis of how those belonging from a technical standpoint perceive Smart City projects in Pakistan and attempt to begin a critical discourse around these projects in Southeast Asian contexts.

To undertake a full overview, this thesis will first undertake an analysis of the catch-all term smart city, inspecting various dimensions like the environments and economics which have shaped its ethos. Building on this discussion the thesis will undertake a review of ethical issues that arise from Smart City implementations supporting this discussion with a brief overview of Inclusion, Exclusion, Predictive Policing. This review will be supported by a discussion of relevant ethical frameworks like Value Sensitive Design (VSD) and Design Justice as well as an overview of Smart City projects in Pakistan. In so doing the thesis will review prominent ethical concerns, value judgements, and moral values that play a role in Smart City implementations, as well as provide an overview of how scholars have interpreted technological developments and processes such as datafication, commodification, Internet of Things, digital access and usability.

The research question at the heart of this work pertains to how technical stakeholders in Pakistan perceive Smart City projects and rationalize competing ethical concerns.¹ This is a tri-partite question which first engages with how aware those with proximity to Big Data are of local projects, second, it investigates their awareness of common values and ethical concerns and lastly it asks how they balance competing concerns like privacy and security.

This is followed by a discussion on methodology, here I elaborate why I chose discursive participant interviews with technical stakeholders as the research method. The inclusion criteria for these participants depended upon their proximity to Big Data and Smart Cities projects in Pakistan. This research focused primarily on technical stakeholders, rather than citizen-based or local community-focused research because of the researcher's own proximity to technical stakeholders as well as the uneven

¹ I borrow the concern over such a bottom-up approach from Yusuf Yüksekdağ, see (Yüksekdağ, Ahsan and Kula, 2022).

socioeconomic landscape of Pakistan. This aspect of the research is discussed Chapter 3.2.

Values, ethical considerations, and concerns that emerged through the literature review were then used to conduct 12, one hour long semi-structured interviews with participants chosen through purposive sampling.

Analysis of interview audio and transcripts reveals that technical stakeholders recognize common ethical concerns with applications of Big Data but lack deep knowledge about how these changes may impact fringe communities. Moreover, while participants seem to show a lack of confidence in the discussed Smart City projects, their confidence in the promise of datafication is strong. This research also observed divergences in how technical stakeholders rationalized values that may be in friction with one another like privacy and security-the results of this analysis are summarized in Chapter 5. The final and sixth chapter offers concluding comments about gathered data and insights as well as offers recommendations for future work in the area.

1. SMART CITY: CONCEPTS AND DEFINITIONS

The popularity of Smart City projects will have most convinced that these mega urban reimaginings are grounded in a stable and relatively thick definition. The reality, however, is far from this assumption. The origins of the term Smart City are uncertain and equally uncertain is the breadth of what it promises. Some like Picon and Hill (2019) point to term having its origins in IBM's "Smarter Cities" campaign, others point to narrative of "digitally optimized cities" having emerged in terms like "wired cities" before (Cocchia, 2014). This section will undertake an analysis of the term Smart City and breakdown how the term inhabits disparate paradigms of economics, innovation, and sustainability at the same time.

Often ICTs are termed as “the meta-factor” rooted in all features of different kinds of smart city projects (Mark & Anya, 2019, p. 5). With the increasing networking of certain urban infrastructures such as traffic management systems, specific and more technically charged concepts like ‘wired cities’ have started being culminated around the late 1990s (Cocchia, 2014, pp. 13–14; Kitchin et al., 2018, p. 2; Mark & Anya, 2019). Given the conceptual ambiguity regarding what exactly constitutes smart cities, they have been often referred to using terms such as ‘knowledge city’ and ‘intelligent city’, while ‘digital city’ seems as one of the most common usages (Cocchia, 2014, pp. 13–14).

According to the working definition of the European Commission, Smart City posits a platform that solves community issues through ICT-led interventions (Calvo, 2020, p. 2). When we consider the review works on the ways in which smart city has been discussed in the scholarly discussions, it is highlighted that 97% of the concerned publications and projects focus on the ICTs and AI solutions (Rjab and Mellouli, 2018, p. 4). Notably, ICT is better considered a very thin concept, broad enough to refer to many different communication and digitalized technologies ranging from visual tools and wireless censoring infrastructures to systems based on blockchain technologies.

To be more particular, ICT-based urban solutions then can be referred to on the basis of the following separate issues or domains: urban economy, individual and individual choices, public governance, mobility of individuals and goods, environment and social relations at large. To digitize and digitalize various aspects of the urban environment and living, technologies are utilized like Smart Information Systems (SIS) that collect, use and analyze big data sets of urban actions that relates to abovementioned issues or domains (Kontokosta, 2018, p. 382). The employment of such SIS technologies in different cities such as Helsinki, Amsterdam, Copenhagen and Hamburg imply that

such technologies may lead to urban spaces to be considered as “homogenously interchangeable” places (Mark & Anya, 2019, p. 7).²

1.1. ICT Governmentality

The international push towards hyperdigitization of urban space has caused government bodies to push for ICT-led transformations without any system-wide coordination. When unifiable design solutions are not prevalent, then such local government bodies then try to build their own rules and regulations for the interface design of such applications. This resulted in almost 30,000 Federal web platforms in the United States that does not posit any consistent application (Sultan, n.d.). Considering how these interface design types provide a front entrance for the citizens to use government services, the challenges exacerbated by inconsistent interface solutions might also lead to an “erosion of trust” in these services (Government Services Administration et al., 2016, p. 16). Regardless, as life became digitized and networked in the 2000s, public or private deployment of “e-government” became a possibility and quite a profitable endeavor, inevitably enmeshing governance with digital technologies (Kitchin et al., 2018, p. 3).

While we have a wide range of stakeholders for the issue at hand that includes the city-dwellers and local governments, the institutions utilizing data extracted via smart cities are confined mostly into companies such as General Electric, IBM, Cisco Systems, Siemens AG, Microsoft, Oracle, SAP, Intel, Arup, Alcatel, Hitachi, Fujitsu, and NEC (Mark & Anya, 2019, p. 6). The embedded rationale of novelty and the very prospect of smart technologies arguably enabled such companies to use the city as a “testbed” for their technologies and to monetize their products (Halegoua, 2020, p. 45). It is

² This paragraph is readapted from the parts of an unpublished project report that I have written (Yüksekdağ, Ahsan, and Kula 2022).

argued that this is because of a ‘top-down’ approach that failed to responsibly innovate and ensure inclusion of all parties affected (Mark & Anya, 2019, p. 6).

It should be noted here that many governments across Europe were also trying to meet their promises for the Kyoto Protocol during the late 2000s. Signed in 1997 by 191 parties, the protocol’s chief purpose was to decrease CO2 emissions and safeguard the environment all over the world (Cocchia, 2014). During the second commitment period of the protocol between 2013 and 2020, the number of projects and publications discussing Smart Cities have increased from two-digit figures to three-digit figures per year. (Cocchia, 2014, p. 25). This exponential increase does also imply an effect of European governments trying to find ‘smart’ solutions to prevent (What Is the Kyoto Protocol? | UNFCCC, n.d.).

While digital cities are often understood in literature to be enabled by “ICT-dependent” technologies, the term Smart City, researchers suggest goes further. This concept encapsulates deploying ICT technologies in urban environments for the betterment and protection of the environment (Cocchia, 2014). In the following section I will critically analyze smart cities as environmentally conscious projects.

1.2. Smart City ‘for’ the Environment

Digital City Solutions initiative of Siemens suggests that they “unlock the potential of cities” via utilization of cloud-based software that screen emissions in real time (Smart Infrastructure | Siemens Global, n.d.). Their answer to “why build Smart Cities?” is as follows:

Because our energy reserves are limited. Because the importance of renewable energy is continuing to grow. Because we are being forced to budget our use of resources. Because we have to realize that

buildings and cities can play a far more significant role in this regard than we assume (Halegoua, 2020).

Such big scale ICT companies are not the sole representative of recommending Smart City solutions to the changing climate. In 2008, ‘Covenant of Mayors’ was signed by the coalition of countries that participate under the European Commission. Its aim was to encourage promote Smart City projects while being especially invested in reducing CO2 emissions (Cocchia, 2014, p. 26). The objectives of this initiative have been revised since then and 40% reduction is aimed now by 2030 (Covenant of Mayors | EU, n.d.). These initiatives claim to have the efficient prospect of offering green and clean urban spaces.

Using current urban woes of architectural decay, pollution, and lack of greenspaces, to foreground the innate efficiency and “nature-friendliness” of their solutions (Halegoua, 2020, p. 41). Smart cities are argued to combat population growth, climate change and many other implications of increasing urbanization (Halegoua, 2020).

The claims put forward by Siemens are that such technologies will make the world “greener, eco-friendlier, resource-efficient, and potentially carbon neutral” (Halegoua, 2020). On the other hand, claims of an “eco-city” with the prospect of zero-carbon footprint happen to be rarely accomplished in real life applications (Halegoua, 2020, p. 37; Saiu, 2017). These implementations notably tend to be “over stylized” and cater to privileged users or audiences in general that might increase the inequalities found in current cities (Halegoua, 2020). Malmö, Sweden is a seminal example of this where large glass windows were mounted so that the resource-rich city dwellers could enjoy the scenery even though such windows were neither cost nor energy effective (Halegoua, 2020).

It should be noted here that ascertaining the success of smart city technologies as sustainability projects is challenging because most of the data that is necessary to make such judgements is retained by ICT companies. Therefore, such organizations are often

ranking their own implementations and solutions, introducing potential instances of bias (Mark & Anya, 2019, pp. 6–8). This coupled with many initiatives being unable to evenly include city dwellers, shows how the rhetoric of sustainability might be considered as ‘greenwash’ on deeper financial motivations (Halegoua, 2020). The next section discusses the economic dimension of smart cities in more detail.³

1.3. Smart City as an Economic Project

Smart City initiatives are not only signaled as tech-based novelties that can combat climate change, but they also imply economic gains for cities if smart strategies are employed. Halegoua (2020) identifies three main economic justifications for the adoption of smart city initiatives: “increased savings for city governments, new revenue streams from the sale of smart city products and the incubation of businesses and talent and attracting global businesses or new businesses” (Halegoua, 2020).

One exemplary case is that of IBM’s Smarter Cities campaign. Which ran from 2007 and 2011 and ended with the company owning legal and commercial rights to the term “smarter cities”. Critics like Oliver Schürer, argue that it added little to the discourse of social urbanism but serves instead as marketing communication, that is spread widely so that “it looks like common sense” (Schürer, 2019, p. 49). IBM defines a Smarter City as:

A smarter city is one that uses technology to transform its core systems and optimize the return from largely finite resources. By using resources in a smarter way, it will also boost innovation, a key factor underpinning competitiveness and economic growth.

³ This paragraph is readapted from the parts of an unpublished project report that I have written (Yüksekdağ, Ahsan, and Kula 2022).

Investment in smarter systems is also a source of sustainable employment (Dirks & Keeling, 2009, p. 10).

Dissecting IBM's definition, we are met first with the aforementioned regimes of ICT and greenwashing, wherein technocratic interventions are supposed to resolve civic issues like urban decay, gentrification, and poverty. After this layer of green pain, we are left projects that detract from real issues ailing city dwellers and instead find their legitimacy by foregrounding 'economic justifications' like that of 'growth', 'competition' and 'employment'.

After more than a decade and a half, this strategy by IBM has had time to take root. In 2018, the smart city market was predicted to hit US \$1.565 trillion by 2020. Although data shows that we haven't achieved those numbers yet, we are not far off either (Glasmeier & Christopherson, 2015, p. 4). With the market size for Smart Cities hitting 1.0259 billion in 2021⁴, and a projected growth rate of 24.1%, those numbers are closer than ever. The largest stakeholders in the market include the likes of ICT-providers like Siemens, Cisco and IBM.

Herein, as Townsend states the motivation behind promoting smart products is not entrenched in the search for resolution of social issues. Instead, Townsend argues that Siemens and Cisco wish to become the 'electrician and plumbers' of the new digitized realm while IBM vies to be their 'choreographer, superintendent, and oracle rolled into one' (Townsend, 2013, p. 63).

Moreover, research on the previously mentioned Smarter Cities campaign by IBM found that a market creation strategy is at the heart of their communication strategy on the issue (Söderström et al., 2014, p. 12).

⁴ <https://www.precedenceresearch.com/smart-cities-market>

1.4. The Floating Signifier

Post-dissection, the term smart city presents itself not as a discrete or static process but a porous container for multiple different organizing regimes, such as economics, technology, and civic issues like climate change. According to Schürer (2019), the term struggles to inhabit a stable meaning because it is a floating signifier. He states that these are “expressions that have no certain meaning”. Schürer argues that since these words have no embedded meaning, they can be modified to take on whatever definition desired, in Schürer’s words these words are signifier “that absorbs rather than emits meaning” (Schürer, 2019, p. 48).

While the field of urban studies is still working towards a definition for the term, Schürer’s (2019) seemingly contrarian solution is to argue that the term smart city was never meant to be described, only used. As such the term serves less as an identifier of a new era of urban living and more a marketing catch-all term for new urban-facing ICT products, other scholars such as Kitchen (2016) have similarly asserted the centrality of ICTs in smart city project. In addition, Schürer (2019) asserts regardless of how Smart City projects are structured the ‘propaganda’ of these projects always links them to a realm of “digital control” (p. 49). The use of the word “propaganda” underscores how the messaging around Smart Cities is manipulated to further digitization led by corporate interests.

Since ICTs seize urban resources and infrastructures, they have the capacity of transforming the city into a market in and of itself. This allows cities to become a cog in the wheel of a “larger neoliberal economic project” which survives by attracting capital from the international market (Kitchin et al., 2018, p. 7). To maximize profit, smart cities must capture urban spaces and the embedded data points to run efficiently through insights on the basis of the data collected from smart devices (Kitchin et al., 2018).

This constant stream of wrangled information is known as Big Data, which refers to datasets that are too large in Volume, Variety and Velocity to be processed without latency. The scale of this data often prompts Big Tech companies like IBM, Google, etc. to present it as a naturally occurring end result of modern technology.

This abstraction is deeply enmeshed into how modern technology is conceptualized and its influence extends from newspapers to the World Economic Forum, which states that personal data has the potential to become similar to a natural valuable resource like oil and once it does, it can classify as a new form of “raw material” (World Economic Forum, 2011, p. 5).

Critical technology theorists like Couldry and Meijas (2019) argue that abstracting data into a natural resource allows it to be rendered into an unintentional all-comprehension of everyone’s livelihoods and environments. According to them naturalization of data and data practices makes it impervious to critique or analysis, because:

As such, nature is distinctively immune from critique; only by a process of de-naturalization that unmask how particular things or processes were first constructed as natural, can they be opened once more to critique (Couldry & Meijas, 2019, p. 3).

By rendering data into a byproduct, we shift the gaze away from the producers of data to those who make use of data. As digitalization increases around the globe, simply opting out of virtual ecosystems becomes more and more difficult. Due to the sheer volume of Big Data, organizations have been able to shift the conceptualization of data away from those who produce it to those who utilize it:

[...] in contrast to the concept of ownership of physical goods, where the owner typically has exclusive rights and control over the good ... this is not the case for intangibles such as data ... The digital divide isn’t about who owns data – it’s about who can put that data to work.

(The Organization of Economic Co-operation and Development
(OECD), 2015, p. 195–197)

Herein, data as capital necessitates a constant cycle of generation and consumption which becomes vulnerable to the ‘extractive’ practices that work to reorder everyday life so that it can be digitized into data (Couldry & Mejias, 2019, p. 39).

In the same vein, Jathan Sadowski (2020) claims that digital capitalism mostly relies on big data since it is both “valuable” and “value creating” (p. 30). Due to the advances in ICT technologies such as mining data, algorithms and Big Data analytics, data that companies unceremoniously deleted before is now central to a “data economy” and contemporary capitalism (Sadowski, 2020). Hence, companies no longer care about hitherto sampling methods or customer feedback as they are slow and they don’t deliver highly granular material (Kitchin, 2016, p. 2).

Since it functions as a form of capital and source of profit, ICT providers are more driven towards generating more data regardless of the ethical implications of the data collection and production. These data extraction practices can distort how “cities” are framed in the context of smart urban solutions and can put an emphasis on treating them as systems and computers rather than as sites of social interaction (Halegoua, 2020, p. 26).⁵

⁵ This paragraph is readapted from the parts of an unpublished project report that I have written (Yüksekdağ, Ahsan, and Kula 2022).

2. ETHICAL PERSPECTIVES: DATAFICATION AND SMART CITY

The aforementioned discussion on smart city's role as a floating signifier has highlighted in multiple places that applications of this technology often mean construction of thinly veiled infrastructure development projects which treat cities as "homogenously interchangeable" (Mark & Anya, 2019, p. 7). However, Big Tech companies as well as their proponents continue to argue that technologies like AI and ICTs are neutral, and it is their mode of use that results in specific consequences.

In this section, I will provide a literature review that touches upon how critical technology theorists have conceptualized ethics for a system, whose makers insist it is neutral or opaque. Second, I will investigate the ethical concerns that emerged from the reviewed work such as objectification, privacy, and exclusion as well as the frameworks established so far to carry ethical investigations on technological artefacts. This review shows that technological artefacts not only have embedded values but consequences and norms as well. These values impact how artefacts are used and to whom they are available as well opens up the inquiry about who embeds values, what values should be embedded in technologies etc.

2.1. Literature Review

As urban environments that espouse Smart City technologies grow, so do cases of reported harm incur due to algorithmic biases, misdirected spending of public funds and gentrification. For example, in Malmo Sweden, buildings were "outfitted" with large windows so that "affluent" residents could enjoy the scenery. Even though this expenditure was not environment friendly, nor cost-effective (Halegoua, 2020, p. 38).

Others have highlighted how Smart City technologies can be used to subject citizens to increase in surveillance, predictive policing as well as discrimination based on ethnicity, gender, and race (Benjamin, 2016, 2020).

These issues have prompted an in-depth study of the ethics of Smart Cities, by scholars on a broad area of concern ranging from Kitchin (2016) study of machinations of data, Couldry (2019) overview of ethical concerns in current implementations, to Ryan(2019)'s particular study of SIS dashboards and their ethical implications.

These investigations have led scholars like Kitchin (2016) to conclude that for Smart city technologies to deliver on their promises of sustainability, welfare and progress, stakeholders must stop constructing cities as “knowable” and “manageable” systems which can be directed through “mechanical and linear ways” (p. 11). Building on this definition he argues against essentializing statements that allow ICT technologies to assert that they can provide a “god’s eye-view” of the whole city, when in reality cities, are messy, “fluid, open and complex” (Kitchin, 2016, p. 11).

This ethos wrenches control away from technological determinism and reinstates it within the local context of the city and its citizens. Often what allows technocratic assumptions to take hold is the assertion that technological artifacts function merely as a neutral tool, whose consequences are determined by the context it is applied in. Multiple streams of research within Disclosive Computer Ethics, Value Sensitive Design as well as Universalist Design, have deconstructed this assumption starting perhaps from the famous work by Langdon Winner “Do Artifacts have politics?” (1980).

In this seminal work, Winner asserts that technological objects or artifacts can have values and consequences embedded into their design and function. At the forefront of this critique are low bridges over parkways that the architect Robert Moses, specifically instructed his engineers to design with the aim that it would keep school buses from poorer neighborhoods out (Kessler, 2021). Hence, technological artifacts are not only

capable of being partial, but their design can also embody specific values which are realized in the design of the artefact, through this the designer makes certain consequences easier, while other more difficult or impossible. One good example of this is the dominance of default male-presenting characters in endless runner games, as opposed to female ones. Scholar Constanza-chock notes that while the impact of this choice is relatively small, the same cannot be said for all design choices. For example, she gives points to Robert Moses, a designer who built overhead passes that may have kept public buses carrying underserved communities from reaching more affluent parts of town (Costanza-Chock, 2020, p. 40).

2.1.1. Values, Norms and Consequences

As is colloquially understood, value refers to the act of measurement of the worth of an object. Often when used as a refrain in the market, value refers to monetary compensation one can receive in change for a product. However, “value” also refers to “what ought to be promoted in the world”- ideals or maxims that are important to individuals or communities (Gabriel & Ghazavi, 11 C.E., p. 2).

As such values can be both moral and amoral. For example, fairness, justice and equality are moral values and aesthetics as amoral values (Friedman et al., 2006, p. 60). It is important to note that values are different from norms which are prescribed rules built on corresponding values (Brey, 2010). Similar to values, norms can be both moral and amoral, examples of moral norms can be “do not steal”, “do not lie”, “do not litter” etc. Very highlights that artifacts can have embedded values and norms that effectuate specific consequences. For example, users can disable the “accept all cookies” option and thereby enact a norm that no information about them may be collected online. Through so doing the user would have maximized the value of privacy (Brey, 2010, p. 6).

By deconstructing technological advancements into constituent values and norms, researchers can build away from the persistent myth that technological artefacts are value neutral. In fact, multiple lines of research are investigating Smart City applications through the lens of specific values like citizen participation (Kitchin et al., 2018; Lange & Waal, 2017) and fairness (Benjamin, 2020; Costanza-Chock, 2020). For example, research by Breuer et al. (2019) investigates what role open data technology can play in increasing citizen participation, by studying the Smart Flanders Program started by the Flemish Government in Belgium in 2017. In their thesis the writers conclude that although their interesting are noteworthy, they also show that:

[...] making data available does not necessarily mean engagement, impact, or change when it comes to tackling complex urban challenge. (Breuer et al., 2019, p. 132).

As previously stated, multiple technologies are being scrutinized for values that Batya Friedman states are “universally held” like, privacy, freedom from bias, fairness, autonomy, and trust etc. It is argued that while the discussed values are held universally, they manifest in each context differently (Friedman et al., 2006, p. 86). Regardless of whether one subscribes to this view or not, the question of values alone, unleashes a whole new line of inquiry: who embeds values in technologies? who can and should do so and how?

Methodologies like Disclosive Computer Ethics, VSD and Universalist Design take up this line of inquiry and have built separate but sometimes overlapping mechanisms to combat the assumption that technological artefacts are neutral. Table 2.1 below summarizes how values impact each other and can come in conflict:

Table 2.1 Balancing Conflicting Ethical Concerns

BALANCING CONFLICTING ETHICAL CONCERNS		
Values	Implications of Maximizing the Value	Implications of Minimizing the Value
Datafication	Objectification	Exclusion from Digitized Realms
	Commodification	
Privacy	No group awareness of collective actions	Commodification
	Lack of scrutiny	Surveillance
	Weakened Governance	Predictive policing
Security	Lack of privacy	Governance
	Lack of citizen participation or control	No monetary, physiological, psychological safety
Responsibility and Accountability	Rehauling all blackbox models	Fairness and consumer protection

One primary ethical concern in this discourse pertains to datafication, and digital control. It is argued that hyper-digitization relies on constant datafication of everyday practices and people (Couldry & Mejias, 2019, p. 39). By treating data generated by common individuals as a natural, abundant resource, ICT companies and cohorts can construct deeply granular profiles of citizens exacerbating chances of predictive policing, surveillance, commodification (Benjamin, 2020).

On the other hand, certain cities like Milledin and Amaravati in Andhra Pradesh India, have taken on ICT transformation but focused on citizen led participation and citizen welfare (Figueiredo et al., 2019, p. 168). While Milledin was able to pull out of poverty and combat its decaying slums, Amaravati has abandoned measuring progress in terms of economic achievement and instead measures itself by a “happiness index” (Figueiredo et al., 2019, p. 168). Hence, the results of Smart City implementations are heavily dependent upon how the local context, design and values are constructed and imagined.

While research analyzing particular projects for their efficacy and delivery on moral values is growing, some questions still need investigation. For example, not as much is said about how stakeholders with authority construct and rationalize values while designing technological artifacts. What constraints to their agency are experienced and how their perceptions about potential ethical concerns guide their design work and life choices.

Although research in this area is scarce, some case studies are already showing the merits of investigating these questions. For example, one case study covers how a queer identified YouTube engineer navigated the choice between the platform’s stability and providing more streaming space for an ongoing and effectual queer movement called the It Gets Better Project (Honda, 2016). The other studies the Ethical Engineer project which is a website that allows undergraduate engineering students to share the ethical dilemmas they encounter in the field (Anonymous, n.d.).

However, this line of inquiry is even more limited for those parts of the globe that are struggling to develop after years of imperialism or colonialism as noted by Taylor and Broeders (2015, p. 2). Regardless, the scarcity of critique is not reflective of the propensity these regions have to adopt ICT technologies that have perceived global use cases. Often, due to lax regulations and/or governments countries like Pakistan, India

or Bangladesh, can be the most convenient “testbeds” for nascent technologies (Halegoua, 2020, p. 45).

In the absence of guardrails and accountability the effects of hyperdigitization and commodification can be even more severe and damaging. Moreover, in countries like Pakistan, citizen-led participation or citizen involvement is often sacrificed in the favor of autocratic control and efficiency. In the absence of mechanisms that can support citizen involvement, stakeholders like designers and engineers take on an even more central role. For once the responsibility to design ethically is underscored, since accountability mechanisms like public involvement or transparency mechanisms are absent.

2.1.2. Technology under scrutiny: Smart Cities

As Kitchin (2016) highlights, various cities have integrated sensor technologies and networks on their urban infrastructure like “lampposts and bins” (p. 7). An example of such an application in London is given by Kitchin (2016) where sensors on 200 bins were able to collect information from around 4 million devices in a single week (7). These interventions require urban activity to be observed, sorted, and quantified into ‘data’ so that artificial intelligence can run analysis and provide institutional stakeholders with actionable insight.

Halegoua (2020) argues that ‘smart’ initiatives can be conceptualized especially in regard to how the ICTs are utilized to “aggressively implement” the collection of data that aims to optimize the very places from where the data is collected (p. 148). While data driven insights have been used in urban planning before, Kitchin (2016) points out that, earlier uses relied on sampled data which was typically generated for a single use case that was helpful to generate a “snapshot” of cities at a given time only (p. 2). Now however, the mobilities and actions extracted as data via technologies such as cameras

or sensors are “reliable, advanced, and all-comprehensive” (Kitchin, 2016, p. 2). An all-comprehensive datafication of urban environment promises to create an urban big data enterprise that will be able to “produce a highly granular, longitudinal, whole system understanding of a city system” enabling a “God’s eye-view” of urban spaces (Kitchin, 2016, pp. 2-4).

This process of turning non-tangible phenomena like urban activity, citizen actions and behaviors into highly granular and tangible datapoints is known as datafication. At the heart of this understanding lies the idea that it is possible to have an “external reality” of the city, which can be objectively constructed and represented (Kitchin, 2016, p. 4). It is important to note here that the process of datafication is not limited to the context of cities, geographies, or urbanities. In fact, any social realm in which technological intervention is used to record and collate human behavior on a highly granular scale, can be said to be datafied.

Datafication of the courtship process between individuals has been datafied and optimized to a minute degree by the dating app Tinder. Perhaps the biggest concern arising from hyper datafication is that of privacy. Recording and quantification of human behaviors and feelings can expose people to breaches of privacy as well as security. A recent example of this can be found in the recent case of a Twitter employee who was found to be sharing location as well as personal data of certain Twitter users with the Saudi government (Joe Walsh, 2022).

Furthermore, unlike one-off sampled data, Big Data can give the illusion of providing a “God’s eye view” of social cultural phenomena (Kitchin, 2016, pp. 2-4). This assumption is dangerous because Big Data is the result of a process that is laden with value-judgements, logistical and resource constraints, hence while it may be granular, it isn’t necessarily complete. Big Data collection methods are often unable to surpass issues of digital access and understanding, making collected data blind to fringe

communities and people. Moreover, as Constanza-Chock points out, designers often imagine the default user to be someone from the most dominant group. These types of biases filter through data collection and design stages and result in end-products that are not made for or are harmful to non- dominant groups. Hence, datafication can actively to security harms experienced by vulnerable communities like whistleblowers or targeted ethnic or social groups.

2.2. Datafication and Some Ethical Issues

As the discussion on definitions pertaining to Smart City has briefly highlighted, multiple implementations lead to exacerbated issues of inequality and commodification. This section will undertake a close inspection of cases as well as scholarly literature to compile a comprehensive list of ethical issues that emerge from Smart City implementations. While doing so, Patrici Calvo's (2020) typology will be mostly utilized to highlight issues such as use of data, obsolescence, and exclusion, while additional issues such as commodification will be emphasized.

2.2.1. Use of Data and Transparency

The ethical concern about the ways in which data is used and if so transparently, relates to how companies utilize data to extract insights or monetize and distribute to other parties as a form of commodity. The popular case of Cambridge Analytica's use of Facebook user data to allegedly influence the American Presidential elections in 2016 is an example of how data can be used for purposes that might impede fair democratic processes (Calvo, 2020, p. 144). Raising further concerns are issues of access. For instance, a recent report shows that a male Facebook employee abused his access to Facebook's gigantic database to track his ex-partner's location data and invade her privacy (Facebook Fires Employee Who Allegedly Used Data Access to Stalk Women, n.d.). These cases highlight the ways in which data collection can lead to vulnerabilities

in regard to illegitimate access and poor organizational oversight (Sadowski, 2020, p. 83).⁶

In places where data protection laws are lax or still developing, negative consequences of data collection, sharing and use can be a lot worse and harder to detect. For example, in March 2022, The Caravan was able to prove after a long investigation that the True Caller app, exploits the gaps in India's data privacy regulations to continue building its success in the region. Similar critiques highlight that after a user signs up for the app and agrees to share their contacts through the indiscriminate "I Agree" button, their entire contact list becomes part of the True Caller database. Inevitably this process shares information with the company about people who have not consented to this process or have any knowledge that it has occurred (Khaira, 2022).

2.2.2. Objectification

Online activity such as clicks made by the users as well as networked meta-data allow companies like Meta to collect, network and use human interactions. Additionally, geo-location data and the use of one-to-many media platforms like Twitter, Tiktok, and Instagram can allow companies to create effective online profiles of people. In Calvo's (2020) words this is "objectification of human beings at the most sophisticated level" (Calvo, 2020, p. 145).

2.2.3. Privacy

Hyper connected environments produce perpetual streams of data that are relayed back to collection of organizations ranging from ICT companies to governments. This can result in the erosion of privacy on different levels such as individual movement privacy and group privacy (Kitchin et al., 2018, p. 9; Taylor, 2017).

⁶ This paragraph is readapted from the parts of an unpublished project report that I have written (Yüksekdağ, Ahsan, and Kula 2022).

Centralizing the issue of privacy is important to a discussion on digital ethics because many ubiquitous practices in the modern world have very different situations of privacy than processes of times past. As Schürer (2019) points out, no email today can enjoy the same level of privacy that was part and parcel to the analog letter-writing system. These comments allude to how privacy concerns can be about granular information about movement and particular data, as well as more abstract processes like the tradeoffs in digital communications.

2.2.4. Predictive Policing

A prominently criticized use of machine-learning algorithms does relate to predictive policing, by which law enforcement agencies use location and mobility data along with demographic data and social media data to figure out which areas or people(s) might be “hotspots” (Kitchin, 2016, p. 10). Police forces might depend on predictive policing to designate patrol routes, create profiles of certain areas and the concerned dwellers (Kitchin, 2016, p. 10).⁷

Research into the politics of policing in the modern age is already troubling the rising field of smart surveillance. Offenhuber and Auinger (2019) point to technologies like CASSANDRA which can detect aggressive behaviors through audio visual data (p. 191).

It is shown that these types of technologies allow security agencies to identify and detect “violence and aggression”(Offenhuber & Auinger, 2019, p. 191). As stated by the research concerning CASSANDRA, the technology is aimed at and optimized for public settings (Zajdel et al., 2007). Figure 2.1 below was used by the authors to give examples of an “aggression buildup scenario” (Zajdel et al., 2007, p. 204).

⁷ This paragraph is readapted from the parts of an unpublished project report that I have written (Yüksekdağ, Ahsan, and Kula 2022).

Figure 2.1: Image of people fighting captured by CCTV camera © 2007 IEEE⁸



In the conclusion of their work on Cassandra, the contributing authors write that in the future they plan to improve their research to include more physical attributes such as auditory responses (laugh vs scream), visual information about body-contact and partial pose estimation as well as more contextual data (Zajdel et al., 2007, p. 205).

The promise of security through smart surveillance systems like CASSANDRA, fails to appropriately communicate the increase of monitoring and surveillance that these systems will necessarily mandate. Even more absent is any indication or proper acknowledgement of possible biases in these systems that may result in racial profiling and hate crimes.

Organizations like Data for Black Lives are investigating how datafication can enable racial profiling and hate crimes. Their website on Data Capitalism, speaks against the kind of ethos promulgated by the authors of CASSANDRA, i.e simply datafying more human behaviors like laugh and scream cannot be addressed without engaging with how these processes may have embedded biases in their data sets and design.

⁸ In reference to IEEE copyrighted material, which is used with permission in this thesis, the IEEE does not endorse any of Istanbul Bilgi University's products or services.

2.2.5. Exclusion

Smart technologies create a “cyberphysical” space which boots “hyperdigitization” and penalizes the lack of it (Calvo, 2020, p. 144). Even though definitions of Smart City are difficult to ascertain, certain districts and groups of individuals that have no access or considered not worthy of efficiency considerations can be left behind by the reliance on ICT structures (Calvo, 2020, p. 144).

When areas or communities are omitted from digital transformations, the communities living within can experience multiple layers of social and political harm. As Calvo surmises these harms include but are not limited to increased poverty, increase in the urban/rural divide as well as job insecurity.

2.2.6. Obsolescentization

Due to the increasing digitization of the urban markets and economic urban activities, workforces have been revised often in harmful ways. (Calvo, 2020, p. 144). For instance, Microsoft and Google have increased the role of computational decision making in their Human Resource departments. Such initiatives may arguably inhibit the viability of existing city services. Popular examples of are Uber and Airbnb, which challenged hitherto and rather traditional transportation and lodging services (Kitchin et al., 2018, p. 7).⁹

⁹ This paragraph is readapted from the parts of an unpublished project report that I have written (Yüksekdağ, Ahsan, and Kula 2022).

2.2.7. Blurring Responsibility

Companies are more and more depend on algorithms and AI driven decision-making processes. Considering that most of these algorithms are constructed and utilized by agents such as computer scientists, marketing, and legal advisors, it is a challenge to delineate who is responsible for a mathematical model. As makers of the Boeing aircraft discovered, when their 737max crashed due to a “confused AI” receiving signals from a faulty, artificial intelligence can perform unexpectedly in unforeseen circumstances sea (Calvo, 2020, pp. 144–145; Helmore, 2019). Unfortunately, 346 people died as pilots struggled to take back control from an autopilot system that was meant to override them. Black box data shows that this struggle occurred 21 times before the aircraft plunged into the sea (Calvo, 2020, pp. 144–145; Helmore, 2019).¹⁰

2.2.8. Imposition and Universalization

Cities implementing Industry 4.0 techniques are regarded as more technologically advanced than those who aren't, compelling local public officials to instrumentalize strategies without fully accounting for the viability or feasibility of such efforts. Calvo (2020) argues that this is representative of a ‘trans-humanist’ nexus that technology should be developed to whatever it will allow even if it might be harmful (Calvo, 2020).

Already in 2019, research from European countries was highlighting concerns of losing employment, mistrust of technology and the need to limit hyper-automation in the European urban environment. As Calvo points out this technocratic maxim of innovation comes at the cost of loss of local traditions and even suppression of local needs and requirements. In order to build against this tradition of blind innovation,

¹⁰ This paragraph is readapted from the parts of an unpublished project report that I have written (Yüksekdağ, Ahsan, and Kula 2022).

movements like #TechWontBuildIt are building away from needless digital reinvigorations of public and private space.

Perhaps the most successful example of collective organization against technocratic imposition is the collective protest by Google employees in 2018, after highly sensitive internal plans about building a censored version of Google for China called Project Dragonfly were leaked. After this mobilization as authors like Constanza-Chock point out, Google announced it won't be attempting to enter the Chinese market in the near future (Costanza-Chock, 2020, p. 214).

2.2.9. Commodification

By utilizing economic frameworks provided by Marx and Bourdieu, critical technology theorists like Sadowski (2020) argue that capital (data) occurs not as a 'natural resource' but instead because of the work (digital labor) done by people. Apart from just being constructed as end-users, city dwellers are also sources of data. Data here serves as commodity to turn into to monetize and make profit from (Yüksekdağ, 2021).

These recontextualizations provide a stronger argument for increased inclusion of citizens into Smart City initiatives as they aren't mere 'users' of technologies, but instead digital laborers whose work is commodified to run and optimize smart cities (Canellopoulou-Bottis & Bouchagiar, 2018; Sadowski, 2020, p. 34; van Dijck, 2014, p. 103).¹¹

¹¹ This paragraph is readapted from the parts of an unpublished project report that I have written (Yüksekdağ, Ahsan, and Kula 2022).

2.2.10. Inclusion/Exclusion

Rather than empowering citizens to become co-creators and overseers of culturally active, receptive and sustainable cities, Smart Cities tend to yield datafied “end-users” (Lange & Waal, 2017, p. 27).

In many ways this can lock citizens into a cycle in which they face harm by virtue of their role as users in the system and at the same time do not possess the power to enact any changes into the design of the system. Hence despite being included in the use of smart city systems, citizens can still be largely excluded from its overall design and machinations. Since citizens are primarily constructed as a source of feedback rather than a source of creation or brainstorming, final designs can often be far from what is needed by individuals and communities. Moreover, this construction of the citizens as an end-user inherently introduces power imbalances between the citizen and designer, making it much harder to create equitable and fair solutions.

2.2.11. Algorithmic Imaginations

No doubt, as in the case of any datafying rationale, tech-based changes and data-driven design patterns, while providing ubiquitous solutions to urban issues, they also enable reimagination of our own issues and problems via their intervention. However, when such interventions lead citizens to juxtapose themselves into the relevant privately deployed neoliberal logic of doing things, the issue of responsibility also seems to always fall on to the city-dweller. It is not just the intervention and new data-driven imaginations of our social and urban interactions, but that we have to be also smart people being able to navigate in our increasingly digitalized urban landscapes (Liu et al., 2018). First and foremost, this might create vulnerabilities in regard to previously discussed issue of responsibility in the context of smart city projects and initiatives. Secondly, this phenomenon might reposition city-dwellers towards neoliberal market principles and the very principle of free economic choice. The idea is that inside the

conditions of a free market, individuals then are considered to be preferring to monitor their own footsteps, do their recreational activities and monitor their health via mobile applications, while being affected by them in consideration of the meaning of these activities and while also being fully responsible for potential end results of these choices.

Notably, there is a tendency to please rather than to punish when we consider the neoliberal extension of the markets and this might be considered to be infiltrated into the construction and implementation of today's technological artefacts. There are many tech-based interventions today that rather use 'seduction' in the form of providing rewards that might end in a means of control (Kitchin et al., 2018, p. 14). When we digitize all the potential urban experiences, the degree of smartness available make it possible to gamify the experience itself where city-dwellers can be ranked or put into a reward-based order and be regarded for their 'good' or 'bad' deeds in the context of a digital city. For big-tech companies, solutions are structured and implemented in the concerned labs when the main issue becomes the implementation. Herein, city is not necessarily regarded as a space where relations and ideas do come into being, cultivated and reproduced but they are treated as "deployment sites", whose citizens are "end-users" (Halegoua, 2020, p. 108; Kitchin, 2016).

2.3. Applying Ethics to Design: Relevance of Perceptions

Having identified the ethical concerns at stake there is a need to assess how ICT stakeholders like Siemens and IBM respond to these issues. Often, when faced with questions about ethical issues at stake, ICT companies and their civic-enablers resort to blaming the implementation and exonerate the underlying technologies themselves. This line of argument is born from the "neutrality thesis" wherein ICT technologies are painted as valueless 'artifacts' that can be molded to achieve a variety of ends (Brey,

2012, p. 43). For some time now, critical technology theorists have been working hard to destabilize this assumption.

As Brey states this approach delineates “the ethics of computer systems” from the “ethics of using computer systems” (Brey, 2012, p. 41). Herein, rather than assuming technological artefacts are neutral, scholars argue that it is a potentiality to realize certain normative tendencies so that we can determine which ones to highlight or diminish (Brey, 2012, p. 42).

One approach that allows for an examination of embedded values, is VSD (Value-Sensitive Design). This practice is a tripartite, theoretical methodology which uses iterative processes to “account for human values in a principled and comprehensive manner” (Friedman et al., 2006, p. 1). While VSD does posit that technological artefacts “embody” values, biases, and norms, it does not state that computer systems in and of themselves are blameworthy (Brey, 2012, p. 42). Instead, it claims that the design and functions of computer systems incur moral consequences and is thereby subject to ethical inquiry (Brey, 2012, p. 42).

2.3.1. Value-Sensitive Design and Embedded Values Approach

As our earlier discussion in Section 2.1.1 eluded, values, norms and consequences can be embedded into technologies. VSD relies on iteratively building a theoretical analysis about these embedded values, which results in an analysis that is greater than the sum of its parts. This methodology is broken down into three types of investigations namely, conceptual, empirical and technical. In the first part, researchers must come up with clear definitions for values under investigations as well as identify who the direct and indirect stakeholders of the system are.

Empirical investigations can utilize any quantitative or qualitative methodology and try to establish clear answers to questions about how particular stakeholders perceive

certain values, how they balance conflicting values etc. The third part of VSD which deals with technical investigations can focus on how a particular technology espouses values under consideration (Friedman et al., 2006).

As explicated by Friedman (2006) the main difference between empirical and technical investigations is that discusses, empirical processes build upon questions about the “socio-technical” systems surrounding a technology, and technical investigations concern and focus upon the artefact itself (p. 4).

As is suggested by the name, this methodology is not only about investigations of a system, but also about “proactive design” (Friedman & Kahn, 2002, p. 4). The third and last part of VSD can actively be adapted to a methodology that seeks to design new systems that promote or a certain value. This is precisely what Friedman et al. do in their study of cookies and informed consent in Web Browsers, wherein the findings of the first two stages are then enacted in the technical stage by redesigning the Mozilla browser (Friedman et al., 2006, p. 5; Friedman & Kahn, 2002).

As Friedman (2006) points out one seminal feature of VSD is that it does not perceive values to be embedded into technology(p. 13). Instead, it posits that although the design of technologies may promote certain ethical consequences while discouraging others, the final and real use of the technology depends upon the intentions and motivations of its users (Friedman et al., 2006, p. 13). Similarly, VSD also believes that certain values are held universally.

Within this methodology, certain values appear universally but can manifest differently depending on socioeconomic, political and geographic contexts. Appendix lists values that Friedman (2006) posits maybe of “ethical import in system design” (2002, p. 17). Moreover, as is implicated by the discussion by Friedman on conceptual investigations, values can also conflict with each other. For example, while a group of businessmen may prioritize the value of buying land and investing in assets, this goal may conflict

with that of those people who may face eviction from their land for real estate development.

Some scholars like Sasha Constanza-Chock, argue that work related to VSD has focused primarily on identifying bias which is defined as a computer system “that systematically and unfairly discriminates” against particular individuals or group who may or may not be direct stakeholders in the system (Brey, 2012, p. 7; Costanza-Chock, 2020, p. 48).

For example, Nisenbaum(1998) puts forth the case of an educational system that was designed mostly with boys in mind, in so doing this system inherently excludes feminine users. With more than two decades to build on these ideas, scholars have been able to go beyond Nisenbaum’s initial categorization of bias into the buckets of preexisting, technical, emergent biases to more specific critiques about user and information biases (Brey, 2012, p. 48). Investigations of particular values such as privacy, community, trust and informed consent have also added displaying the wide set of values that today’s computer systems are capable of embodying (Brey, 2012, p. 49).

To put it more simply, in her book “Design Justice”, Sasha Constanza-Chock reuses, Langdon Winner’s words “artifacts have politics” (Costanza-Chock, 2020, p. 4; Winner, 1980). Although VSD was a breakthrough in identifying the politics embedded in technological artefacts, it does not recommend any particular value over another. For example, approaches like Universalist Design (UD) which were developed later, borrow heavily from VSD but go one step further to prescribe that the design of systems should prioritize usability by all as much as is possible without needing to introduce special changes or ramifications for certain groups of users (Costanza-Chock, 2020, p. 53).

2.3.2. Universalist and Inclusive Design Methodologies

UD or Universalist Design largely aims to open design from accessible for many to accessible for all. In so doing, UD embodies the value of inclusion, equality of design and access and undertakes analyses of computer systems with accessibility as a central indicator. It develops Nisenbaum's analyses of embodied values to recommend embodiment of certain values. Although UD was the first analytical framework to prioritize a certain set of values from the get-go, it is also inherently reliant on universalization. It assumes that computer systems or other architectures can be designed to be equally accessible to all (Costanza-Chock, 2020, pp. 53–55).

The disability justice methodology takes issue with this assumption and posits that due to how people are distributed across intersections of race, class and gender, some groups are always prioritized and other deprioritized by a given design (Costanza-Chock, 2020, p. 53). In a similar vein, Inclusive Design also recommends embodiment of values, primarily inclusion. Hence, ID builds towards inclusion and away from universalization by stating that it is a methodology that caters to human differences in their entirety as they manifest in different forms of socio-economic and physical identities around the globe (Costanza-Chock, 2020, p. 53).

By prioritizing the inclusion of all human differences, ID reframes disability not as something inherent to an individual but a “mismatch” between the needs of the individual and the environment (Costanza-Chock, 2020, p. 53). By challenging what disability is and reframing it as an inability of the design to meet the user's needs, ID can reverse how power is traditionally conceptualized in these analyses. It also reverses the role experts and users have traditionally played in design (Costanza-Chock, 2020, p. 53). Wherein an expert brainstorms a solution from their domain knowledge, that is tested by users, who learn to adapt and use it. In Inclusive Design frameworks, the expertise of people with accessibility needs is rightfully accredited and designers take on a more facilitative role (Costanza-Chock, 2020, p. 196).

2.3.3. Design Justice Framework

Building upon UD and ID and arguing for an intersectional consideration of all marginalized groups, author Sasha Constanza Chock puts forth the Design Justice framework. Grounded in feminist standpoint theory this framework regards knowledge systems that emerge from any particular standpoint as “partial” and not complete (Costanza-Chock, 2020, p. 22). Herein standpoint refers to one’s location in the socio-political and economic hierarchies of society. The author further explains that the framework is in friction with imposed narratives of universalization and instead draws from standpoint theory which “recognizes, respects and specifies difference” as opposed to asserting that it doesn’t exist. (Costanza-Chock, 2020, p. 230).

Building on developments in Inclusive Design, Constanza-Chock offers the following definition for design justice as a framework which can help deconstruct how a system dispenses advantages and disadvantages to different compositions of demographic groups (Costanza-Chock, 2020, p. 23).

Since this framework is built for design of systems, it applies very well to an analysis of standpoints within Smart Cities, which are often described as a “system of systems” (Cavalcante et al., 2016) . As highlighted before, it would be a mistake before to essentialize a city as only a “technical system”. Longstanding opponent of Smart Cities, Adam Greenfield, disagrees and states “cities are not like technical systems, where an operator can cleanly and without undue ethical complication choose to optimize one regime of performance over another” (Schürer, 2019, p. 52).

Therefore, the impact of optimizations done from a “god’s eye view” of the city have a deeply penetrating impact on the life worlds of citizens (Kitchin, 2016, pp. 2–4). Hence, optimizations within systems and innovations at the scale of the city, cannot be divorced from the local citizen, their lifeworld, and their right to the city.

2.4. Right to the City

Originated by Henri Lefebvre in 1968, “Right to the City” has seen some resurgence as multiple groups such as activists and critical technology theorists argue for a more “inclusive” process of “city-making” (Breuer et al., 2020, p. 126). According to Breuer, Right to City represents refers to the civic right of every individual to utilize urban space and affect changes in their lives by “(re)producing” space without being constrained by public or private forces (Breuer et al., 2019, p. 128). Moreover citizens “earn their belonging” to urban space by the simple action of living in and within it (Breuer et al., 2020, p. 128).

These ideas introduce friction in the traditional roles occupied by stakeholders like designers and managers, which often assume the role of the expert and creator, while citizens are relegated to the realm of user-testing. Traditionally within discourses surrounding development and design, technical standpoints are prioritized, inevitably resulting in technocratic solutions that are far from what citizens need. Both Design Justice and Right to the City argue that present discourses should be restructured to focus on the standpoint and life worlds of citizens, especially those who are marginalized.

It is suggested that designers do not commonly perceive themselves as particularly discriminatory towards any socio-political group (Costanza-Chock, 2020, p. 40). However, frameworks like Design Justice or Value Sensitive Design, are not about “intentionality” but instead what the author calls “process and outcomes” (Costanza-Chock, 2020, p. 41). Herein, the processes with which designers and engineers come to design decisions about how the system will distribute benefits or harms among users, is more important than any designer’s personal intention.

Regardless of intentionality of the designer or whether one thinks values emerge from technology or from interactions with them, most critics agree that all technologies inhibit certain actions, and favor others. Due to this some like Gabriel and Ghadavi

have argued that no “technology of scale can be value neutral” and that all result in certain scenarios being realized while making others impossible (p. 2).

This ability to enable certain consequences while disabling others allows designers to engage in a “world-making activity” that bounds them to moral responsibility and public accountability (Gabriel & Ghazavi, 11 C.E., p. 3). Moreover, given the black box nature of AI, the need to investigate those who designed the algorithms, their perceptions and value systems is further underscored.

There is no doubt that the ways in which values of moral import can be discussed and balanced can be subjected to analytical ethical analysis. This analysis in turn can provide a basis for frameworks seeking to judge or scrutinize good or ethically wrong practices after they are established and put into use.

Notably, however, the idea of Smart City is an emerging technology, and it is a challenge to do more than defining some relevant ethically charges processes and values given the lack of examples or the black box problem. It might be therefore a good starting point to survey how different stakeholders perceive such issues.

This is not merely to explore the issue at hand but also because many ethical/theoretical design implementation frameworks rely on the ways in which the relevant stakeholders and agents can implement good or bad design choices or outcomes. It might be an ontological flaw to disregard the active and dynamic agency of technical experts or designers in designing ethically good platforms. After all, it matters to some extent they internalize values of ethical import and make value judgments, hence when faced with balancing decisions they can act on it.

Therefore, in this thesis I survey the ways in which values with moral valence are either recognized or balanced by the technical experts as a case in point. This study serves as a starting point for more experimental surveys and studies that focus on users and citizen stakeholders of smart cities directly.

3. CONTEXTUALIZING ETHICS: PAKISTAN AS A CASE IN POINT

Investigating those who build algorithms and AIs is a value laden activity. On the surface the practice moves from citizen focused narratives and instead focuses on the much criticized “designer” behind the system. However, in cases when information and practices around smart city projects are scarce or withheld, these stakeholders can become the only window into otherwise remote decisions and processes. Moreover, there is also tension between applying the Western ethos of Kitchin and similar scholars, to post-colonial countries in the subcontinent. Again, on the surface, this practice runs the risk of engaging in the same gaze that the likes of Said have already criticized- a gaze that orientalizes this region.

However, it must be noted here that this research also aims to identify gaps in the current discourse around ethical implications of Smart City systems. In so far that aim is concerned, this research identifies the absence of relevant investigations about stakeholder’s perceptions as well as implications of Smart City design in the region. It also identifies that despite the absence of work in this area, this region continues to climb the ranks of ICT importers globally. Moreover, works by the likes of Ruha Benjamin, and Sasha Constanza Chock may have originated in the West, but are inherently critiques of practices like colonialism, racism, and imperialism. The last vestiges of which left the subcontinent with the British in 1947. Hence, these critiques are aligned with the socio-political discourse emerging from the subcontinent and borrow heavily from it, for example, Said’s work on “orientalism” (Said, 2016). Lastly many of these projects are being built by borrowing terminologies and marketing ethos from Western projects- which alludes to the global nature of the Smart City projects.

Keeping these arguments in sight, this chapter will undertake a review of the Smart City projects in Pakistan, how they have been presented to public and what their implications have been so far.

Design Justice promotes radical shifts in how ICT technologies and their overarching urban governance systems are designed. It demands citizen led co-creation and multiple stakeholders from the start of the development process rather than turning cities into living labs or testbeds (Costanza-Chock, 2020, p. 175). This shift necessitates that technical stakeholders such as computer scientists, designers and engineers acknowledge the value of community knowledge(s). The readiness with which community members are accepted as co-creators and incorporated in overall Smart City design can be a good representation of how true any implementation holds to its promise of sustainability and prosperity.

To illustrate this further, we can compare the ICT led reinventions of two places, Medellin in Colombia, and Lagos in Nigeria. For Medellin, an incursion of ICT-led innovation meant an investment into the city's slums, which allowed it to eventually bounce back from high crime rates and become Wall Street Journal's most innovative city in 2013 (Corburn et al., 2020, p. 1).

This resounding success was underpinned by a decentralization of autonomy mandated by the government and a heavy emphasis on citizen participation in new projects. An illustrative example of this is a statement by former Director of Planning for Medellín, Jorge Perez, which highlights that the planning of the city was made possible by dedicated investment into local community building efforts, such as investing in local higher education, which allowed new generations of architects and urban planners to emerge from within the streets of Medellín. He adds:

When you have local knowledge and local research you have better chances of finding real solutions (Corburn et al., 2020, p. 6)

On the other end of the spectrum is Lagos, a city that has become Africa's fifth largest economy. Out of sync with the city's growth, the housing in Lagos was not prepared for the influx of citizens that were attracted by the city's economic rise. Which resulted in rapid expansion of slums around the city.

Now that Lagos has established itself as a metropolitan hub, previously undesirable properties are becoming enticing opportunities for real-estate developers. To establish the new face of Lagos, more than 30,000 people have already been evicted, people who had previously lived in those areas for over a century (Kazeem Yomi, 2022).

These two cases underscore the importance of citizen participation and its impact on the success of Smart City projects. Essential for a Medellín-esque transformation is the inclusion of citizens as co-creators of public space. However, it can't stop here.

As important as co-creation is investing in local citizen's wellbeing and growth. Medellín focused on building local talent allowing it to have a generation of experts, which emerged from within the context of the city rather than without. This requires much more than the installation of sensors around a community garden or building, and instead necessitates the existence of a citizen-centric and citizen-led long-term plan. Often, Smart City projects are skewed towards Lagos. Herein, an ethos of dislocation runs behind the scenes of glorious reimaginations of decaying urban spaces - which inevitably does very little to deliver promises of sustainable development.

Another example of skewed priorities can be found in Dhaka, Bangladesh. The city celebrated Smart City Week in 2017 hoping to not only invest in technology but also in engaging "smart people who cared" (Callander, 2019, p. 3). Yet as Callendar points out, Dhaka lacks proper analog maps of its transit systems. Between 1962 and 1971, Dhaka was the second capital of Pakistan. After which, Bangladesh (formerly known as East Pakistan) split due to years of oppression and an onslaught of genocidal attacks from the west Pakistan army.

With a complicated, deeply intertwined history, the Southeast Asian region is host to many diverse languages, political thoughts, cultures, and religions. Yet due to its shared experiences of imperial and colonial authority, many civic and social issues between the distinct countries of India, Bangladesh and Pakistan are hauntingly reminiscent of one another.

3.1. Pakistan and Smart Cities

Despite of having quite poor cyber and data protection laws, Pakistan produces more than 20,000 IT graduates every year. For freelance IT development, the count ranked number 4 on a global list, with IT exports increasing by 70% in the years 2015-2019 (Pakistan Produces 20,000 IT Graduates, Engineers Annually, Says Minister, 2019). As these numbers illustrate Pakistan's affinity for ITC-dependent projects is quite high in comparison to its work on potential guardrails such as consumer protection agencies and legislation around data use, privacy, and cybercrime.

At the moment the country is home to at least two self-styled Smart City Projects, dubbed Capital Smart City in Islamabad and Smart City Lahore in Lahore, which are under construction. Another similar architectural development scheme being built with smart city narratives and promises embedded in the communication strategy is the Ravi River Front Project.

3.1.1. The Ravi River Front Project

Inaugurated by the former Prime Minister Imran Khan in 2020, the project is meant to have two-fold effect where it can serve as a booming economic opportunity as well as help restore the drying river, Ravi. Recently the former Prime Minister Imran Khan, shared updates on the project along with some pictures:

Work is progressing on Ravi city. With \$40 bn investment portfolio it will accommodate 15 mn ppl & will be Pak's first green & smart city. Vertical riverfront development provides a range of opportunities for int & national investors. Ravi City will have world's largest waterfront (Khan, 2022).

Tweeting further:

including three barrages conserving 270 bn litres of water for much needed aquifer of Lahore. Rakh Jhok, initiated last yr, is part of 5000 acres of reforestation environment plan. Embankments will be built with innovative method of using natural soil to prevent flooding (Khan, 2022).

Noteworthy here is the reality that the pictures are merely computer-generated images of the future of this project. Elements such as the incorporation of green spaces, manicured lawns, hedges, as well as sprawling layouts, are meant to convey a city that is sustainable and a land of promise.

In the background of this promise, is the desperate attempt by the government to draw attention away from the neighboring metropolitan city of Lahore. Which has over the years become burdened by population growth, pollution, and urban sprawl. According to the government sources, the Ravi River Front Project is meant to shift some of this population growth away from the historic city of Lahore.

While the promises would have anyone believe that the Ravi River front project is being built on land that was previously of no use. This is far from the truth. What the messaging about the project fails to include is that the area was already owned by farmers. These families have been working the fields for generations to produce vegetables to be sold in the nearby city of Lahore. For the megaproject to unfold, the government authority overseeing the project “RUDA” (Ravi Urban Development Authority) decided to evict these farmers and in compensation make payments to the affected in exchange for their land.

However, several years of generationally passed knowledge about farming on a specific soil, within the passing of specific weather conditions cannot be easily quantified for reparative payments. In September 2022, farmers from the area broke

out in protest warning the provincial government that there will be “severe reaction if they are evicted from lands they have lived in for generations” (Singh, 2022).

As the PM stated despite these issues, work on the project continues. As part of the former PM’s Clean Green Pakistan, the Ravi River Front Project serves an important purpose. The initiative includes lofty plans to plant many trees, improving waste management and building Japanese style Miyawaki gardens.¹²

It should be noted here that details on how and why these particular interventions were chosen by the government are unclear. In fact, reporting on the issue is so scarce that it is hard to discern if other plans were even on the table. For example, the question of why the solution to Lahore’s problem is building another city next to it, is largely unaddressed.

The difficulty faced in accessing clear answers to these fundamental questions is emblematic of how little these interventions care about including the public and engaging in co-creation.

The fact that no plan for the project includes any hints of preserving the farmlands that exist in the area right now, is another sign of how far these Smart City projects are from the ethos enabling Medellín’s progress. No part of the Ravi River Front project is for

¹² This is a horticulture technique developed by the Japanese researcher Akira Miyawaki, gaining traction for its effectiveness in urban environments where space is limited. Similar projects have been undertaken by the government of India, environment minister inaugurated Anand Van, a Miyawaki garden in 2020.

Although the idea seems promising, biodiversity experts argue that blanket tree forestation plans like the Miyawaki gardens don’t solve environmental issues instead may exacerbate them. Critics like Dr. Abi Vanak argue that these schemes can often be out of sync with the demands of local soil and landscape, stating there is a “craze” for Miyawaki-style hyper dense plantations even in areas which are facing groundwater depletion issues. He also points out that the plantation style does not match the local ecosystem.

the people who lived on and near the riverbed. The Ravi River Front Project will not just temporarily displace the people and history of Ravi, it seeks to bulldoze and build an entirely new one. No part of the new city will hold any memory of what was there before, not even as a tourist spot—at least no signs of this conservation appear in any plans for the city.

Unlike Medellin, this project is not coming after a long-term investment in local talent. Hence, the primary Smart City technology provider for the project is Meinhardt¹³, a company that started out of Singapore but now has global presence. On its website, Meinhardt also lists the Kabataş Square Transfer Hub in Turkey. As description of what the project entailed the company only adds: “Kabataş Transfer Center and Square project generated great public concerns among Istanbul residents” (Meinhardt, n.d.). No further updates about where the project is right now and what these concerns were are mentioned.

Similarly succinct but still more communicative than Pakistan’s government on the subject, the company describes the Ravi River Front project on their website in the following manner:

The environmental and social impact assessment highlighted the positive impacts of the project such as economic uplifting of the region and country, improved quality of life, socioeconomic and lifestyle enhancement, ecological uplifting of River Ravi, sustainable lifestyle, tourism, and flood protection. There will also be some negative impacts (such as loss of agricultural lands of about 76,684 acres and impact on almost 65 settlements that include 20,723 households with the population of 80,000 along with their assets during project implementation and operational stages. However,

¹³ See <https://meinhardtgroup.com/>

these are expected to be temporary in nature and can be mitigated as suggested in EIA and SIA reports (MeinHardt, n.d.).

The details about the reports mentioned above are not accessible. Nor is it clear how the government plans to rehabilitate the farmers past paying them for their land. Moreover, the description above doesn't address whose quality of life will get better and exactly what it means by "economic uplifting" and "ecological uplifting" either (MeinHardt, n.d.).

3.1.2. Capital Smart City and Lahore Smart City

Both Capital and Lahore Smart City are being made by a partnership between another Singapore-based ICT services provider Surbana Jurong¹⁴, and a local partner Habib Rafiq Limited¹⁵. Although both projects include a host of other business partners including real estate developers, the exact details about who is responsible for what has not been made clear.

Even though the exact labels and language of ICT-mediated features of the Smart City projects are different their functions bear similarity. The Lahore Smart City aims to build the following structures and systems within its plans¹⁶: Executive Block, Sports District, Education District, Theme Park, Silicon Valley, Mosques, and a Healthcare District.

The Capital Smart City in Islamabad expands on these ideas and has added districts like the China District and the overseas district to its plans¹⁷ (Capital Smart City | The

¹⁴ See <https://surbanajurong.com/>

¹⁵ See <https://www.habibrafiq.com/>

¹⁶ See <https://www.lahoresmartcitypk.com/#master-plan>

¹⁷ See <https://www.smartcitypk.com/#master-plan>

First Smart City in Pakistan, n.d.; Lahore Smart City | The First Smart City in Lahore, n.d.).

Both projects promise ICT technologies in areas like street lighting, air conditioning systems, traffic control, utility supply, solar parks, and surveillance. They also feature a central hub where the various systems of the city will be controlled. Detailed descriptions of how each of these features will be implemented are not available. However, media generated to attract consumer interest was obtained from a real estate agent selected to participate in the study.

The Capital Smart City, which is named so for being the capital of the country, has additional global goals. Which it embodies in features like the China District and the Overseas District. The reason why China has been given this precedence is deeply intertwined with the recent increase of influence of the country through deals like CPEC, which are out of the scope of this study¹⁸.

Other than this, it is also unclear how each of these megaprojects will achieve goals such as cutting down carbon emissions for climate change and how sustainable these buildings will be.

3.1.3. Megaprojects Disguised as Smart Cities

By boiling down the idea of Smart Cities to a few automated urban utilities and luxurious architecture, these projects fail to engage even the most greenwashed

¹⁸ An analysis of this project and Pak-China relations ships can be found at <https://www.cfr.org/article/how-china-and-pakistan-forged-close-ties> Similarly, the political sentiments the Pak-China collaborative project CPEC is hurting can be found at <https://www.aninews.in/news/world/asia/pakistan-baloch-movement-alleges-cpec-benefitting-only-punjab-province-not-balochistan20221014012655/> This article also points to a discussion about how the province of Punjab (the locus of all Smart City projects) is reaping the biggest advantages of Pak-China collaboration in comparison to the rest of the country.

definitions of the term smart city. The earlier discussed definition of the term by Siemens bears repetition: “greener, eco-friendlier, resource-efficient, and potentially carbon neutral” (Halegoua, 2020).

Far from being carbon neutral, the projects set no clear goals towards sustainability at all. Instead, they claim abstract efficiencies achieved by the incorporation of urban infrastructures and utilities like waste management and collection, solar parks, and green spaces. Lack of proper communication about the impact of each of these interventions is a sign of a paper-thin commitment to the goals of sustainability. Absence of pre-defined and publicly disclosed goals and numbers keep stakeholders like communities and citizen rights groups in the dark. Essentially cutting off anything with which they can argue that urban redevelopments have not achieved what they had promised.

3.1.4. The State of Squalor

What these promises of progress hide are the realities of historic cities like Lahore. In the heart of Lahore, is one of its most culturally rich but desiccating parts Bhatti Gate. Here, residents are packed densely together in buildings that haven’t been fit for occupation for a long time. With narrow streets and barely any view of the sky, the area still bustles with life but has long since lost the ability to conserve its cultural heritage. In 2022, another resident of Bhatti Gate lost his life as a 9-story dilapidated building fell over. In the same month reports of fires and robberies in the area also made headlines (Man Injured as a Portion of Three-Story Building Collapses, 2022).

In 2022, the issue of poor architecture and urban planning became a dinner table discussion for every household in Pakistan, owing to a country -wide flooding event. Once over, the floods submerged one-third of the country (Suleman Anees, 2022).

Along with devastated farmlands and suburban populations, major cities like Lahore and Karachi (the hometown of the author) also fell apart. The country-wide devastation occurred during an unstable government which hastily changes hands as PM Imran Khan faced a “vote of no confidence” (Latif & Sajid, 2022).

Citizen-led charity drives for flood victims now dominate national conversation, as cities try to return to normal without functioning roads and urban infrastructure. Meanwhile, those who lost land have nothing left to turn back to with more than 500000 destroyed or damaged (BBC, 2022a).

3.1.5. Promising a better tomorrow

In the context of the discussion above, projects like Capital Smart City, Lahore Smart City and the Ravi River Front project seem like gold dust on a bleeding wound. At a time where many have already lost their homes and lands¹⁹, the Ravi River Front Project is dislocating more farmers and adding to the problem of rehabilitation.

Furthermore, rather than employing strategies like those in Medellin to improve areas like Bhatti Gate, elected governments continue to promise megaprojects and urban expansion to legitimize a second term. Here, partnerships with foreign technology providers help lend legitimacy to claims, without the trouble of taking the long route to sustainability: engaging local talent and building context specific solutions. Without any input of citizens at all, nearly all these projects will be able to surveil the movements of individuals as well as commodify their actions and information. Far from citizen-led workshops, these projects have failed the first rung of public engagement: transparent and publicly accessible information.

¹⁹ 2 million Acres of crops have been destroyed due to the flooding, BBC reports. (BBC, 2022b)

As such, by laying the foundations of these projects in forcibly obtained land, these projects echo previously stated concerns of Inclusion/Exclusion. None of the Smart Cities plan to honor the culture and history of the people of Punjab, in fact, at best they refer to the people of China, and their recent contributions to the country's governments. In the background deeper queries about why the province of Punjab is a locus for these projects in the first place lurk unaddressed (ANI, 2022).

Nearly all communicated descriptions about the projects are similar without any real engagement with how each locality differs from another. The pictures shared by the former PM convey a rather "sterile social utopia" far from the messy and rich culture of the historic province of Punjab (Schürer, 2019, p. 45).

Despite this sterile disposition, the promise of these projects looms large in front of citizens that are growing ever more frustrated with the urban planning of their own metropolitans. When this promise is combined with lofty goals of achieving new economic growth through the IT sector, the argument becomes even more potent. It is also easy to sell this dream to the people of Pakistan because their neighbor India, has achieved something similar over the past two decades.

Even though it has quite poor cyber and data protection laws, Pakistan produces more than 20,000 IT graduates every year. For freelance IT development Pakistan ranked number 4 on a global list, with IT exports increasing by 70% in the last 4 years (Pakistan Produces 20,000 IT Graduates, Engineers Annually, Says Minister, 2019). As these numbers illustrate Pakistan's affinity for ITC-dependent projects is quite high in comparison to its work on potential guardrails such as consumer protection agencies and legislation around data use and privacy (One Trust Data Guidance, 2021).

This not only explains why Pakistan is home to quite a few Smart City endeavors, but also why many among the middle-class think it might be a good idea. As more IT students join the workforce and rise through corporate ranks, the promise of a green and efficient future seems like common sense.

3.2. Analyzing the perceptions of technical ‘experts’ about Smart City Projects

Hence, the need to investigate the perceptions of those people that are grounded within a technical standpoint is paramount. While many other parts of the public are kept in the shadows, those involved within the IT-industry in Pakistan are better positioned to understand the nuts and bolts of the system.

Since the larger public is never invited to participate in the first place, these agents are uniquely poised to affect how Smart Cities in Pakistan will look, either by virtue of their work or by participating in the buying and selling of land in these projects. Understanding how this key group navigates ethical concerns that emerge from hyper-digitized and commodified environments can be critical in the discovery of ethical implications of smart urban environments and second pushing the conversation forward.

As Kitchin (2017) points out, the process “translating” real world use cases into logical codified statement is one that is often presented as value-neutral, highly technical, and “benign” (p. 17). Similarly, he also notes that technocratic ethos focuses primarily on discussing algorithmic efficiency and technical optimality and rarely veers into realm of inspecting its socio-cultural impacts.

Moreover, building on this critique multiple streams of critical technology research as well as Science and Technology Studies are highlighting the need to introduce ethical reflexivity in jobs that were previously considered agnostic to morality and subjectivity, such as engineering, product design and computer science (Morrison, 2020). For example, while a comprehensive body of work already exists on how engineers can be educated about ethical issues, research works by Nathans-Kelly and others (2010) points out the need to understand how these professionals apply ethical training in their work life.

Moreover, Kitchin points out that far from being a “dry technical exercise” programming is a process alive with engagement with thought processes and materials

(Kitchin, 2017, p. 18). More simply, creation of algorithms is not merely a deterministic process but one that depends upon trial and error, and negotiation between competing interests (Kitchin, 2017, p. 18).

This research will work to unmask some of these deliberations and negotiations as well as try to investigate what value judgements underlie the processes of turning real world problems into well formulated smart systems. As technological advancements have raced ahead, and cases like that of Cambridge Analytica and the Chinese Social Credit System have emerged, the call to introduce ethical reflexivity in jobs that were previously allowed to operate in moral ambivalence has started echoing in many streams of research.

As Costanza-Chock (2020) illustrates ‘standpoint approach’ asserts “that all knowledge is situated in the particular embodied experiences of the knower” (p. 9). According to this approach, people’s individual perceptions and opinions are shaped by and emerge from their sociopolitical frame of reference and context.

In keeping with this tradition, I must mention here my own standpoint. I am a 25-year-old, Urdu-speaking, female presenting resident of Karachi, Pakistan with a Bachelor of Science in Computer Science. My hometown is an immensely important economic hub in the country, and struggles with deeply enmeshed issues of gentrification, poverty, urban sprawl and degradation. As Jeff Pooley asks of the researcher, the job of the media scholar is different from that of others, “the task we face is not, like the historian or anthropologist, to make the strange familiar, but the opposite task: to make the familiar strange” (Pooley, 2018).

In an attempt to render my familiarity with living in cities and technological advancements strange as Pooley suggests, this research methodology focuses on urban environment, how technologies can try to make them smart and how people design such technologies. Unfortunately, not a lot of research is available into how ethical concerns and considerations like Privacy, Accountability and Trust materialize in

South Asian contexts. Even less is said about how these concerns impact local design and programming choices, even though multiple Smart City projects are currently underway in the country.

While research into how citizens feel and perceive these projects is pertinent, it will do little in the way of providing insight into what happens in board room meetings and in programming sprints and huddles. The only way to gain insight into this process is by engaging with the agents directly and probing their understanding of values, decisions and their impacts.

4. METHODOLOGY

Having comprehensively reviewed the ethical implications of Smart City projects in Pakistan, relevant frameworks, and the growing need to peer inside the black box of AI, this chapter will cover the methodology undertaken by this research to review technical stakeholder's perceptions.

The three primary objectives of this research are summarized below:

A. Awareness of Smart City Initiatives and Concepts: Understanding how well participants understand the Smart City concept and what level of awareness they have of local projects.

B. Awareness of Particular Values: Deciphering how participants evaluate situations that carry moral valence. Moreover, understanding what moral values like trust, autonomy, equality and freedom from bias mean to the participants.

C. How are competing values and interests balanced? This part of the research concerns identifying situations where moral values come into friction with one another and how participants rationalize these competing interests.

Understanding expert stakeholder perceptions around Smart Cities and their attendant ethical dimensions is the business of uncovering and describing how expert stakeholders perceive such applications. The emphasis on semi-structured interviews has reared its head in the work of many scholars in the critical technology field. For example, in order to assess the perceptions about the use of AI technology in agriculture, Ryan uses data collected from interviews with 3 employees at an agricultural company (Mark & Anya, 2019).

Similarly, Young and Kitchin (2020) use qualitative methods like interviews to create guidelines for city dashboards, stating that qualitative methods were better adept at

reaching the more qualitative aspects or as Kitchen terms it, “less-tangible” aspects of the study of Human-Computer Interactions (HCI) (p. 3).

A possible example is of how the dashboard affects different social groups and demographics (Young & Kitchin, 2020, p. 3). City dashboards as well as AI technology can both be utilized in Smart City implementations and therefore, qualitative interview methodology can serve a similar role in uncovering the “less-tangible” aspects of our inquiry such as (Young & Kitchin, 2020):

1. How participants perceive individual ethical concerns like datafication, commodification etc. in the smart city context?
2. How do participants rationalize seemingly competing values like “privacy” and “security”?
3. What values do they prioritize or deem important?
4. What level of agency do participants think they have in the development of smart city projects?
5. Which communities according to them will most benefit from projects? Who will not? Even more subjective questions around “who should benefit from development projects” can also be explored.

Building on the arguments above, interviews were the chosen methodology for this research after a review of qualitative strategies that best fit professionals in an ethical inquiry. Herein, work by Trinczek (2009) on how to interview managers overviews multiple factors such as, setting of the interview, subject matter as well as the expertise level of the interviewer that can help set a successful strategy in place.

Trinczek (2009) elaborates that methodologies which demand discursive and reflexive interview strategies do not fully match to the standard commonly underscored in

qualitative research, wherein the interviewer play a more facilitative and passive role (p. 8).

He adds that while these standards often suggest that the interviewer takes a supporting neutral role, interviews with managers have different mechanics at play. In light of how communication is conducted in office spaces, interview strategies with managers must match these tonalities and be conducted in an argumentative and discursive manner (Trinczek, 2009, p. 8).

A discursive and argumentative interview methodology is also better suited to investigating the “less-tangible” aspects of this research’s inquiry that were mentioned before. For example, an argumentative structure lends itself to an inquiry into how professionals rationalize and prioritize different ethical values and which communities and groups they deem the most important and why in smart cities contexts.

It is important to elaborate here that such a strategy is not meant to be “confrontational” and in fact seeks to reproduce an environment similar to the participant’s day-to-day professional life (Trinczek, 2009, p. 8) . In fact, it builds on the argumentative and discursive nature of board room meetings and workplaces and allows participants to fall into the same “structures of relevance” that exist in their interactions at work (Trinczek, 2009, p. 8).

Furthermore, as Trinczek points out such an interview strategy has a few pre-requisites:

[...] presupposes an interviewer commanding a high level of competence, both socially and pertaining to the subject matter in question. As a necessary condition for managers to accept and engage in a discursive, argumentative, and for the research project potentially productive interview situation, the interviewer must be able to give the impression of being sufficiently compatible and on a par with the interviewee (Trinczek, 2009, p. 9).

Herein, my background in computer science and professional familiarity with IT-workspaces and businesses proves to be a considerable asset. One that establishes points of commonality between the interviewer and the subject and rather than building animosity helps with building trust and rapport.

Hence, allowing for this discursive structure, a semi-structured interview strategy is selected for this research. It is important to note here that since the research will be studying participants that our bound by professional contracts as well as social expectations within the local context of Pakistan, all data collected that can be used to identify participants or their organizations will be anonymized.

4.1. Outlining the Questions

Since the structure of the interview is discursive, this section broadly outlines the questions that will be posed to each participant. Rather than group questions by a specific ethical concern e.g., privacy or datafication, this section categorizes the interview questions based on the role each set of inquiries will serve in exploring different facets of stakeholders' perceptions about smart cities.

4.1.1. Opening the Conversation

“What role will data play in the smart city project?”

This question is intentionally kept broad to encourage the participant to offer an answer that is built on their experiences of proximity to Big Data in their professional lives. This will also allow us to initiate a conversation about whether participants conceive of data as a natural resource or the result of commodified labor.

4.1.2. Question of Values

The questions that deal with specific values like Inclusion/Exclusion, Local Values, Social Equality, and Informational Privacy will be dispersed throughout the interview and used to bring up competing values and ethical concerns. This will allow an examination of how participants rationalize and prioritize ethical concerns, and which values they deem most important and why. The questions include:

1. Whose data is collected in the smart city and how much?
2. Whose data has had the most impact on the smart city design and implementation?
3. Can the smart city logic(s), design and notions be extended beyond the development project?
4. How do they manifest in the broader context of the local community?
5. What does an equitable smart city project look like to you?
6. What does privacy mean to you as a citizen?
7. What level of informational privacy do you expect the Smart City projects to have?

4.1.3. The Question of Stakeholders

Since a discussion about ethical concerns within smart cities will be incomplete without a serious engagement with the issue of stakeholders in this context, these questions will be posed to aide and build a discursive reflexivity within the interview. By engaging with the questions about who builds, is affected by and benefits from smart cities, participants will have to draw from their own professional expertise and knowledge of

the IT industry. In many ways these questions are about the participants themselves and the people that have used the products that they build. The questions include:

- a. What groups are affected by the development of the smart city project?
- b. Who is the smart city built for?
- c. What kind of access and agency is available to concerned groups?
- d. What role do you think local communities currently play in building smart city projects?

While the last question (d) asks what role local communities play in building these projects, given Pakistan's propensity for top-down approaches to development, the answer is already known, precious little. Instead, the question serves to open a conversation about which parties, if not local communities play a central role in building such IT-centered projects?

Participants in this research were chosen through purposive sampling in line with practices observed in ethics research in the field of nursing ethics. Unlike convenience sampling, this technique is not done arbitrarily but instead refers to the deliberate choosing of a participant due to their relevance to the research (Etikan, 2016, p. 4). Here the researcher first identifies the area of and target of the research, and then searches for participants that will be able to provide the requisite insight. This method is often used to gather the most information rich data without unduly exhausting resources.

Here, unlike random sampling which tries to include the widest possible set of people, this methodology is focused on a certain type of participants that possess characteristics relevant to the research (Etikan, 2016).

In our case the inclusion criteria were based upon nationality in Pakistan as well as participants' proximity to Big Data and Smart City projects in the country. Herein,

professional experience with Big Data was a pre-requisite and purely academic experience was not enough. This is because engineering classrooms are infamous for ignoring engineering ethics and moreover, students are usually not part of the design process at large companies or in the government. Hence, their views would have provided no useful insight into how algorithms and computer programs are actually deployed for commercial deployments around the cities of Pakistan.

Hence 12 semi-structured interviews were scheduled with participants chosen for the proximity to the research question, and each session was recorded, and notes were taken by the researcher during each interview. Interview sessions were preceded by seeking written consent from each participant and each session lasted from 40 to 60 minutes. Interviews were conducted over a 10-day period, where each interview was coded for the values discussed and ethical concerns mentioned after the session.

All sessions began with an introduction to the research and by asking participants to provide a brief overview of their professional and academic experiences. These steps allowed the researcher to later compare professional experiences, expertise and inhabited geographies with given answers and insights. All interviews involved a discursive approach wherein participants were urged to point out which socio-cultural issues they would like to see resolved, how smart cities could enable resolution, and whether this resolution could negatively impact certain communities.

Similarly, anecdotes about professional experiences, personal life and comments on personal beliefs were encouraged. Unlike strategies where interviewers take a passive role, here I tried to introduce a more discursive form of dialogue, wherein I could question why participants made certain choices and if it is the best idea to make them. For example, those participants that highlighted security as a primary concern and showed willingness to optimize it through Big Data were asked “what will this do for privacy?”. This methodology allowed the researcher to observe how participants

rationalized between competing moral values and interests and proved to be very useful for analysis of value judgements.

Finally, all interviews were coded for values and ethical concerns identified as well as for emergent themes such as Trust in institutional stakeholders as well as Perceptions about datafication. Insights gathered from this codification are summarized and reviewed in the Analysis section.

4.2. Research Ethics

The questions for this interview and the semi-structured interview methodology were approved by the Ethics Committee of Istanbul Bilgi University. For all the interviews' informed consent was taken. 11 out of the 12 interviews were done online. 1 took place at the participant's house at the time of their choosing in Turkey as this participant is from Pakistan but works in Istanbul currently.

Research concerning the ethics of online and face-to-face interviews highlights that the ethics remain relatively stable between both situations due to the similarity of audio-visual cues in both situations (Janghorban et al., 2014).

However, issues of digital access, availability of electricity and internet connection, can impede the validity of samples by impacting who participates in the study. However, since our research participants were mostly employed in technical jobs that require high-speed internet connections, this issue did not impact my data collection. Interviewing individuals from technical backgrounds also had the issue of Non-Disclosure Agreements, in these cases special care was taken to anonymize information about participants' involvement.

All participants were more than 25 years of age and had at least 1 year of working experience. All interviews were taken after the full scope of the project was explained to the participants and written consent was sought. All interviews were recorded but

kept within the strict access of the researcher, the recordings were transcribed and anonymized to ensure accuracy and anonymity.

5. ANALYSIS

The table below summarizes the results of this research, by first listing the values identified by the participants and following these with attendant ethical concerns and competing ethical considerations.

Table 5.1 - Summary of research observations

Values Identified	General concerns	Competing Ethical Considerations
Privacy	Autonomy, self-censorship	Privacy's relationship with Security and Human welfare
Security	Autonomy, safety, and wellbeing	Security's relationship with data and surveillance
Accountability	Transparency, Civil responsibility	Lack of Data privacy laws
Inclusivity	Equality, Representation	Digital Divide and Gentrification
Equality	Fairness, Freedom from bias, Representation, Inclusivity	Representation in datasets and in advancement efforts
Trust	belief in institutions	Unevenness of trust in institutional stakeholders
Informed Consent	Autonomy over what is known about oneself	Role of informed consent in data collection
Human welfare	Improvement of living standards and wellbeing	Relationship of Human welfare with privacy and surveillance.

Finding participants for this research was a challenge. While multiple Smart City projects are underway in Pakistan, reaching anyone directly involved with the projects proved to be an impossible task. I tried to access the relevant provincial authority overseeing technological development, The Punjab Information Technology Board, but was unable to receive a response. Similarly, the communications department overseeing the Ravi River Front Project stopped responding abruptly after learning that I was not associated with a media organization and was seeking an interview.

The only available source of information that was in close proximity to the projects was a Real Estate Agent who was currently involved with selling plots of land inside one of the discussed local projects. This participant fit the brief not only because of his proximity to the project but also because he gained an education as an engineer, was currently also employed as a civil servant, and had worked both in Tech and Government sectors previously.

This participant (henceforth Jim) proved to be a treasure trove of information for this research and was able to supply the materials. He also informed me that the Real Estate Group overseeing the development of the discussed projects was called the Habib Rafiq Limited Group and my chances of being able to access them were negligible. Unfortunately, this proved to be true, and my earlier experiences were beginning to show that accessing someone in close proximity to the projects will be nigh impossible.

Fortunately for the research, I was able to interview two participants that had actively invested in the Smart City projects, Ryan and Kevin, who also shared an engineering background and proximity to Big Data in their professional lives. All participants in the research had current or recent proximity with Big Data. Moreover, the interviews revealed two more participants (henceforth Pam and Michael), that had actively worked for a Smart City Project in the country called Lahore Knowledge Park City, a few years prior.

Accessing the right participants for the research was a challenge in terms of relevance to the current Smart City projects and impacts of this constraint will be discussed in the Limitations section later. Yet this research was able to gather technical stakeholders that had intimate knowledge and, in some cases, vested interests, into how these projects were currently being executed and how similar projects were executed in the past.

Due to their technical backgrounds, nearly all participants were aware of smart technologies and examples of their use in urban governance and development. However, awareness of the discussed Smart City projects varied, with only participants directly involved with the discussed projects as investors or as planners displaying any real knowledge of what the projects promise or are promised to be.

Despite their limited knowledge about the concerned projects, all participants displayed awareness of values that are commonly discussed in technological implementations such as privacy, security, informed consent, and human welfare. Although this awareness surfaced many times in the interviews, participants had diverging attitudes towards how they balanced competing interests and values.

Similarly, participants also displayed strong preferences towards certain institutional stakeholders like corporations, elected governments and the military. How these preferences shaped their value judgements will be discussed in this chapter. This will be followed by a review of participants' perceptions about the concept of smart city as well as processes like datafication and technological transformation and will conclude this section.

5.1. Balancing Competing Moral Values

Below I discuss two pairs of values that prominently featured in the interviews and how participants rationalized prioritizing one value over another. This is followed by a discussion of what roles participants assigned to values like inclusivity, accountability, and trust within their narratives.

5.1.1. Data Privacy vs Security/Surveillance

One major problem with trying to maximize privacy and security at the same time within conventional Smart City projects is that these values can often be in friction with another. Which means improving one can adversely affect the other. For example, while maximization of privacy mandates limited sharing of personal information including geolocation, this kind of information can be critical to artificial intelligence software which works on predicting crime. This kind of tradeoff is also in line with research that has stated that unlike technical systems, cities cannot optimize one realm of performance without affecting others (Schürer, 2019, p. 52).

The participants seemed to be intimately aware of this tradeoff and some chose security over privacy, with Pam making a poignant statement about why she chooses security:

I am a person whose family in Karachi,
each one of us, has been on gunpoint, at least twice in our lives

Adding further:

If you can take my data, my photo, what my ear looks like, what my nose looks like, and if you can give me that security that, I can drive out on the street alone at night, and I can rush to a hospital without having two people come with me. I'm ready to give you the data.
Take it.

This desire for better security was echoed by other participants as well. With one participant (henceforth Kelly) putting forth a hypothetical where ecommerce data could be used to find people online and communicate with them if they had driven very fast through a school zone. Alternatively, drivers could be alerted when they are in the school zone and be reminded to drive slowly.

These two statements show that participants are not only concerned with apparent security such as cutting down on street crime or bomb blasts, but their concept of

security stretches beyond these statistics, to more abstracts goals and needs like having roads that are safer for women and children.

However, the kind of case hypothesized by Kelly earlier, would require most citizens to share data about their location and whereabouts freely. Participants displayed relative ease with mass surveillance as long as it guaranteed the provision of something else, for example, safer roads, more autonomy to explore urban space, better transport infrastructure etc.

One dominant issue with wide mass surveillance for the sake of policing has emerged in the field of predictive policing (O’Neil, n.d.). When this concern was brought up to a participant, their response showed how divergent perceptions of mass surveillance really are:

The idea of mass surveillance being used to make social decisions on a very large scale is a lot more commonplace than you think it is. But the fact is that many people notice when it comes to the police, which is a one off of this idea. If the bank shows up to your house and seizes your house and forces you to live on the street, is that not force?

Adding further:

That's the problem with this view of morality, it is okay to go bankrupt, and it is okay to traumatize them (people) to stretch them out. But the second you punch someone that is “force” now, it wasn't force before. I disagree with that philosophy completely. On a large scale, financial markets do exactly the same thing. When the police do it, that’s when we have a problem.

Interestingly this participant did not believe that securitization should be a priority of the government of Pakistan unlike Kelly and Pam. In fact, far from it, the participant

thought our current technological research and efforts would be better directed towards Agricultural Research and farming, he said:

I think that security is an outcome of prosperity not something that causes prosperity. Pakistanis in general, even the private sector, I think, is very security centric.

While this participant does not think data sharing for surveillance could be very problematic, they also don't think it is very important to focus on this use case in the first place. Moreover, their frustration with what is considered "force" and what is understood as "wrong" is perhaps the most interesting dilemma to arise from the research.

Is being identified and tagged by an algorithm that locks you out or denies you a loan worse than being identified and tagged for suspicion of criminality? Is the baton of the policeman any worse than hand of the market?

Hence, all participants displayed relative comfort with mass surveillance as long as it was in the lieu of something, for Kelly and Pam, security was a good enough tradeoff. For our other participants, agricultural research and disaster planning was primary. Even the participants that did not prioritize security were not concerned with security agencies gathering surveillance data on the same scale as corporations.

It is essential to investigate the privacy vs security tradeoff . Before the tradeoff scenario is blindly accepted, it is essential to note that minor infringements of privacy do not necessarily lead to an increase in security. Instead, they may adversely affect it, as in the case of losing one's credit card. In fact, gains in security are only observed when privacy is compromised on a mass scale, through granular surveillance of populations.

As research in this regard notes, the tradeoff between Privacy vs Security lends a certain immediacy to security concerns, since slight privacy losses for the guarantee of

security seems commonsensical (Friedewald et al., 2017, pp. 7–8). Moreover, unlike security harms, privacy harms tend to occur after a delay from the date of data collection or interaction. Similarly, these harms may also occur in indirect manners or on a large scale, making attributing negative experiences to a loss of privacy even more difficult (Friedewald et al., 2017, pp. 7–8).

Additionally, the value of privacy guarantees or safeguards other social rights such as freedom of expression and enables the protection of citizens from possible misuse of authoritative powers by stakeholders like the state, its elected government or military. However, the “commonsense” and misleading disposition of the privacy-security tradeoff, allows governments to push for increased surveillance without having to provide proof of security (Friedewald et al., 2017, p. 7). Hence, research destabilizes the assumption that an increase in surveillance will automatically increase security. In fact, it may cause issues of inefficiency since mass surveillance systems necessarily have to produce a high number of “potential threats”, higher than what security agencies can handle (Friedewald et al., 2017, p. 7).

Not only did our participants buy into the tradeoff due to its commonsensical disposition but no one was able to foresee that it could result in a relentlessly surveilled state which is none the less still inefficient at detecting crime. Under this state citizens will be extremely vulnerable to state-level discrimination or misuse of power.

Moreover, this discussion also casts doubt on the relationship between surveillance and security. While one of our participants assumed this relationship to be directly proportional, investigation of this relation reveals this isn't always the case. Increased surveillance can introduce inefficiencies in the system at the cost of overall security. As mentioned earlier the privacy-security tradeoff is not universally stable. It is easy to point out cases in which privacy guarantees security and vice versa. Similarly unstable is the relationship between surveillance and security wherein one does not always guarantee the other. When applied to our participants, this insight shows that while

participants perceive they are making a tradeoff between privacy and security, it may instead be a tradeoff between privacy and surveillance, with no guarantee of security.

Solving security by means of Big Data risks creating a surveillant environment that prioritizes detection rather than addressing the root cause of security concerns. Here the cycle of data collection and need for more surveillance perpetuates endlessly, laying both privacy as well as security to waste.

5.1.2. Data privacy vs Human welfare

One recurrent sentiment across all interviews was the willingness displayed by the participants to share data if it could help resolve a civic problem. Kelly stated:

If you want to take my data for the progress of Pakistan, sure that's okay. But if it's to sell me things then I have a problem with it

Another participant Angela, who is currently teaching computer science students at a prestigious university in Karachi, shared how this tradeoff has featured in conversations with her colleagues:

I was having a conversation with an old classmate and an old professor; we were sitting in his office. This is exactly the point he was making, he said that there's a lot of potential for using data and analyzing it, using it for our decision-making processes, whether it's in the corporate sector or in the public sector. He was also heavily emphasizing that there is a significant gap in our industry, and our academia, we do not make use of that potential.

She followed this statement by giving an example of her university years and how difficult the process of getting enrolled in courses used to be. While this example wasn't directly related to Smart Cities it pointed to a larger trend in the data wherein nearly every participant was giving examples of civic progress, by highlighting issues

they've experienced personally. For example, earlier when Kelly pointed out that roads in front of schools need to be safer, this was prompted by her experience of picking up her children from school in a city which has no zoning or mechanism to reprimand speeding.

Similarly, other participants brought in civic problems from their own standpoint and lived experience. Since Pakistan is currently facing multiple resource shortages due to supply chain issues globally, one participant pointed out that consumer data combined with inventory data could be used to predict medicine shortages. Interestingly enough, the research had two participants that worked as Data Engineers in pharmaceutical companies or their distributors. This concern was not raised by these two participants but instead raised by another, who lived out of the country and was facing issues arranging insulin for his diabetic father in Pakistan.

Other concerns that featured prominently were traffic management and disaster relief. All participants displayed relative ease and comfort with sharing data for better traffic management and disaster planning. While Covid-19 was a shock for Pakistan, in the summer this year, the country faced heavy rains and major flooding, which displaced millions of people and animals, killed at least 1100 people, and turned urban infrastructure in to rubble (Suleman Anees, 2022).

It is difficult to say how much these recent events skewed the perceptions and demands of participants, but since multiple participants either referred to the term "floods" or "diseases", it seems impact of the recent past was deep and still living.

Among other human welfare initiatives that appeared during the interviews were improvement in farming, reducing carbon emissions, increasing education as well as cutting down poverty. One participant expressed their frustration with the city of Karachi by saying:

There is not a five-kilometer radius in the city I live in which is the largest metro in Pakistan where there is no broken road, or there is no trash on the road, or there is no electricity or gas or water shortage. We're looking at a global food crisis right now ... the Russia Ukraine war, there is no wheat in Pakistan. We can't buy flour.

The resolution according to the participant was both awe-inspiring and could be extremely useful, and in fact has been implemented in Pakistan before:

IoT applied across the farms was fascinating. The floor talking to the sprinklers was fascinating. The temperature control thermostat is directly managed by the intensity of temperature and intensity of light in the environment. Regardless of weather conditions, that is awesome. Preventive intervention can happen through informed data decisions, yields went up 600%.

As these comments displayed, current macroeconomic conditions were weighing heavily on participant's minds and suggestions naturally did come out of those concerns. However, innovation in farming and seed quality was a theme that emerged in one-third of the interviews.

Similarly, reducing gentrification and access to education was also brought up by participants, and better transport management as well as reducing carbon emissions also featured as concerns.

As in the case of deconstructing the privacy-security tradeoff, the privacy-human welfare tradeoff appears to be deceptively simple as well. On the one hand the trade seems obviously simple, sharing of personal information for access to better livability standards and amenities. However as mentioned earlier, privacy harms can be particularly difficult to detect and recognize, which makes determining the gravity of

the tradeoff very difficult for agents in their day-to-day interactions. As research points out, increasing privacy can impact people's welfare both positively and negatively.

For example, people benefit from businesses not knowing how much they can actually afford to pay for a product and in turn can undertake negotiations and bargain for better deals. On the other hand, societies may suffer negatively if particular criminal behaviors remain private like bribery, insider trading, arbitrage etc. Hence, determining how privacy impacts human welfare is a business of deconstructing contexts. Moreover, this exercise needs identification of what realm of human welfare is being optimized, for whom and what kind of privacy is being discussed (information, movement etc.).

Research also points out that privacy is “intertemporal” which means that while some positive tangible effects of sharing data may immediately become visible the cost of doing so may only become obvious at a later point in time (Cecere et al., 2017, p. 6). As nuanced as this discussion is, conversation with the participants rarely appreciated different forms and structure of privacy and at no point did participants discuss how benefits maybe experienced in the present only for possible harms to become apparent later.

5.2. Inclusivity and Accountability

All participants acknowledged the importance of representing people and communities in data accurately and establishing guardrails to avoid harm. In some cases, this acknowledgement had to be nudged by questions like “what is the impact on communities that are underrepresented in data?”, in other cases, participants mentioned concerns like bias or privacy breaches themselves.

One participant was keen to point out:

What is the number one form of data these days? It's based on things like internet connectivity, smartphone access and different things like that. The majority of our population doesn't have that.

While pointing out the key issue of access, the participant goes further and calls upon the phenomenon of the “unmarked user”, saying that if certain communities are not represented accurately then (Costanza-Chock, 2020, p. 27):

[...] they're always overlooked, whenever people are making decisions, whether it's a company like us making decisions for our customers, if a large group of our customers are underrepresented that data, then we're not going to make decisions for them.

As Constanza-Chock argues design teams tend to “default” to imagined users that belong to a socially dominant group (Costanza-Chock, 2020, p. 78). As the participant highlights, when data is not available on underserved communities, their digital invisibility keeps decisions from being made for such groups. that due to limited access to technology such as IoT and smart devices, certain communities are underrepresented in data and eventually left out of considerations of design.

The scholar memorably draws upon the example of the body scanning machinery on airports, which fails to recognize her trans body as safe.

However, it would be a mistake to think that communities become forgotten or unimagined in design simply due to logistical unavailability of data. Instead, as Constanza-Chock explains for the detector and as is true in this case, inclusion in data is rooted in questions of access to social and financial capital.

Similarly, another participant (henceforth Dwight) stressed that having access to Big Data could resolve some common civic and urban issues, he drew from his experience living in Karachi, Pakistan and now London, UK:

Gentrification is a big issue in many cities, some cities are more concerned with it than others. So, you can't really understand this issue unless you have access to a big amount of demographic data.

Adding further that:

The problem with Pakistan is that we definitely have a lot of talent in engineering and technology, that can help with building these solutions, but Pakistan doesn't have data gov infra that would enable safe use of data. Any corporation that gathers this data has no governmental agency overseeing them to ask, "what are you doing about data retention, lineage and so on?"

To explain just how bad the position of Data Governance is the participant went on to describe his experience working on his final year thesis as a Computer Science student. His work focused on dental x-rays and used AI to help dentists better diagnose patients' illnesses. To gather the training data for his model, Dwight needed patient x-rays. He gained access to the data by taking the following steps:

I went to a lab assistant; I was able to give them a simple USB and ask for the medical records of the patient's data and I was given the files over. Compare this with my experience in London where I was working on a project for y former employer, I had to seek many permissions and I was let into the lab from where I was only handed anonymized data. While all the unanonymized raw data was held on an NHS computer nearby that wasn't connected to anything.

This incident helps paint a very accurate picture of how lax data privacy and governance are in Pakistan. It is important to remember that at the time of the incident the participant was no more than an undergraduate student. It also helps ground the

importance of establishing data governance strategies in place. Echoing this sentiment, Dwight said:

While it is pertinent for countries like Pakistan to have Smart City projects, I think one of the first elements to a massive project like this, is to set on a federal and provincial level, policy around data governance and privacy.

Upon being asked why it was important to have data governance in place, he answered:

Because privacy and protection are a fundamental right, and while Pakistanis are not concerned with this, people who are involved in these kind of projects should be. There is no incentive to do this, to be fair. But it is probably the right thing to do, because otherwise you have places like China, where you have the Social Credit System.

Dwight went on to point out that while he thought the Social Credit System in China could be used to make sure everyone is involved with their civic duties, such data could also be misused and that he was aware of reports coming out about such abuses. Like most other interviewees, this participant also felt that Data Governance was not high up in the list of priorities of most residents of Pakistan. Pam who I have mentioned earlier, when asked about the importance of privacy laws and data governance, also memorably said:

What the f*ck are you talking about you know?

This was a common theme. Most participants did not think establishing Data governance laws or accountability mechanisms was a high national priority, however nearly all of them noted the importance of such guardrails and the absence of them in Pakistan. The overwhelming response seemed to be “we do not have the luxury to worry about this, but maybe we should”.

In fact, Dwight was the only participant to state that the establishment of Data Governance and accountability procedures should precede the development of IoT and Smart City projects. Most participants did not seem convinced that policy making at this level would precede implementation. On the topic of Accountability, Angela stated:

Since so many ethical boundaries have been crossed if some are being crossed for data analysis that could eventually be used to give our people some solutions. It might not be such a bad thing.

5.3. Trust in Institutions: Government, Military and Corporations

As the term Data Governance implies, proper mechanisms of accountability need institutions and structures to be set up within public and private domains that can oversee, collaborate and sign into being a policy that governs data sharing practices. While this can be straightforward in countries where governments are empowered and have a reputation for generating reliable public data, this is not true in Pakistan. At the moment the country is trying to conduct its first digital census, and Angela wrapped up the concerns with the government's digital census perfectly:

There's also a political dynamic in Pakistan, where the documentation of certain people or the demographic composition of areas and voter districts matters a lot. If they're smart cities, and they rely on data, which means documentation is necessarily involved, and everyone's registered on some level. It will make it difficult for the government to lie about certain demographics.

What the participant is referring to here is the common belief held in Karachi that the government misrepresents the city's total population in order to avoid allocating it more funds. Karachi is often ascribed to the ethnic group "urdu-speaking" or "mahajirs/

migrants from India” and because of this has been at odds with other dominant groups like Sindhis, Punjabis, and the Pashtuns. As the city’s population has ballooned, it is no longer only occupied by mahajirs like me and Angela but has evolved to be one of the most diverse cities in the country and an industrial hub and port city. However public census data has failed to represent this growth and private corporate estimations have long surpassed public ones.

Hence, this comment is illustrative of two things. First it shows the concerns of citizen’s that the government misrepresents the census data like the total population of the city of Karachi, so that the government does not have to allocate it more funds. Secondly this comment also points out that participants are aware of the classification and sorting capabilities of algorithms. According to Kitchin (2017), algorithms can be used to “nudge” behaviors and identify, classify, and sort people (p. 18). The participant agrees but points out that in Pakistan’s case this categorization could be used to hold the government accountable.

Most participants showed similar mistrust in the government as the governing body. Like Angela, Michael displayed lack of confidence in the government’s ability to regulate such matters, by saying:

Since I run an advertising agency, I sent a lot of money to Google and Facebook for my advertising campaigns. Now the State Bank of Pakistan has sent me a Performa, asking me why I send them this money and if I can prove that there is no local alternative.

He added:

Inherently government involvement means in a country like Pakistan, which is sick at every strata of society with the corruption cancer, that nothing can happen without it.

Pakistan's citizens including myself are deeply familiar with the extent of corruption in our government and private offices. I have yet to acquire a driving license in my own country because to do so I will most likely have to pay one official or another. In fact, the issue of corruption was hailed as one of the primary targets of the last Prime Minister's election campaign (BBC, 2022a). This issue features prominently on news channels and is part of the local zeitgeist.

It is important to note here, that scholars and economists like Atif Mian, point out that corruption however prevalent may not be Pakistan's biggest issue. Instead, it is the unproductivity of its privileged classes, which keep the country from progressing (Mian, 2019). Mian critiques how popular real estate is as a choice of investment. He emphasizes that since the privileged class is focused on the buying and selling of property (which creates no new commodity in the economy), other opportunities like investment in finished goods are always ignored. Keeping the country locked in its current state of inflation and economic instability (Mian, 2019). Mian was also briefly employed by Khan's government before he was forced to resign because he belonged to a targeted and considered non-muslim sect qadyanis (Dawn, 2018).

Hence, while this comment is more emblematic of local experiences, it is also a good representation of just how unsure citizens are of the government's "effectiveness".

While the Smart City projects currently being discussed are government led initiatives, the same cannot be said for all real estate projects in Pakistan, wherein, the military plays a major role. Through its various arms, the military has established multiple commercial mega real estate projects in Pakistan, and has a reputation for building successful, upscale communities like DHA Lahore, Islamabad, and Karachi.

Ryan who reported having invested in the Smart City Lahore project, shared that one motivation to invest was that, since the Smart City Lahore project was not military owned, it was less expensive and a lot more accessible to young investors like himself. According to him, "despite being the top investment opportunity" those projects were

not a viable option for him. In comparison to trust displayed in other governance bodies, trust in the military at least in this regard seemed high.

Pam, who was the Chief Communications Officer for the Lahore Knowledge Park City and also an employee of the Punjab Government, reported that she left the position after the government changed and it became unclear, what the new government's agenda is and who it will put in charge. Similarly, frustration was expressed by Michael, who had worked alongside her and also left the project after the change of government.

When asked “do you trust our government agencies to develop data that is reliable?” one participant simply responded with “no”. This answer does not bode well for the digital census currently being undertaken in the country by the government. In the absence of trust in government bodies, most participants reported that corporate agencies would be best able to collect reliable data and generate technological solutions around them. Only with two exceptions, the first participant Dwight said:

Transport in general is a public service. Many companies in Karachi are collecting traffic data but its all for their own use like ride hailing services. When data and analytics is used in a public entity the benefits of that can be redistributed to all sectors of the public.

He went on to explain that all transportation in London came under one authority. Hence these comments were more illustrative of his trust in the “public-model” of data governance rather than trust in the specific government of Pakistan.

Jim who is a real estate agent, engineer as well as training to be a civil services employee of the government of Pakistan was the only participant to show any confidence in the government of Pakistan specifically. According to him the government had displayed its efficiency during its Covid prevention campaign and

related data collection programs. Hence, he believed that corporations did not possess the depth of data that the government of Pakistan did.

These comments are illustrative of how strongly academic and social standpoints can influence implicit and explicit trust in government bodies. While Angela, a mahajir from Karachi thinks digitization can help with unmasking the government's mistreatment of Karachi, Jim from Punjab does not see this issue at all.

Research investigating the effect of e-government ventures on public trust for the government can help shed light on how the discussed Smart City projects will impact public perception about the government. These investigations show that the quality of e-service strongly impacts public trust however it adds that this effect is more visible in people who already have positive views of e-government ventures (Gracia & Casaló Ariño, 2015).

For the discussed Smart City projects this means that no positive impact in citizen trust will be observed in those individuals which either highly mistrust government ventures or e-government ventures. As distrust in the government's efficiency was a reigning theme, it is likely that only those that have highly positively skewed perceptions of digital transformations will be able to fully trust SC ventures by the government.

5.4. Perceptions of Datafication

Perhaps one implicit goal of this research was to understand how technical stakeholders perceive datafication, a process which features heavily in their professional lives. As stated earlier, participant Dwight expressed that collecting demographic data is central to understanding some civic problems like gentrification. Later on in the interview he also expressed that he thinks "data collection is inevitable".

Similar sentiments were expressed by other participants. Another example of this sentiment can be found in a statement quoted earlier by Angela, which is reproduced here (in part) for readability:

I was having a conversation with an old classmate and an old professor... he said that there's a lot of potential for using data and analyzing it, ... and he was also heavily emphasizing on the fact that there is this significant gap in our industry, and our academia, we do not make use of that potential.

Another statement by the participant is reiterated:

Since so many ethical boundaries have been crossed if some are being crossed for data analysis that could eventually be used to give our people some solutions. It might not be such a bad thing.

As well as:

The data is already there.

When I questioned her about this sentiment further and asked her where data comes from, she easily agreed that data isn't just latently available in the environment like oil or gas but is generated by people. However, when I asked her if people should be compensated for their data, she seemed unsure and said it was dependent on the context of use.

Another participant was enquired about the capabilities of Big Data and AI, and whether it could artificially create demand in the pharmaceutical sector where he worked. In response to this the participant brought up the opiate crisis in America and said that something similar could be achieved with data in Pakistan. Where

consumption patterns can be used to push to alternative medicine brands or other products. However, in his opinion this should not happen.

When I enquired if he had seen anything similar in his career, he responded by saying that he generally believes in the good intentions of people and that often issues arise from gross negligence or being a small part of a larger abusive system.

As such there wasn't much divergence in how the participants perceived usage of data, which was primarily positive and ascribed to outcomes that result in solution of civic issues and human welfare. However, only some showed some discomfort with extremely granular data.

When one participant was asked about what crime prediction models should do in cases where criminal data is heavily skewed towards a certain population because they were discriminated against some way, like in the case of the predictive policing harms in America (O'Neil, n.d.). The participant responded by saying that in such cases it is very unlikely that a data science company or department would decide how the algorithm should treat different demographics. Instead, it is more likely that a government agency, another institution or simply the "client" would be making this call.

These comments about which communities are datafied and "included" and how, also tie into the earlier discussion about Accountability. It shows that the end predictions of an algorithm are rarely the decision of only party such as the data engineers. Instead, it is mediated by multiple groups of stakeholders who are not necessarily as close to the technical and digital structure of algorithms as Data Engineers and Data Scientists are. It is also illustrative of the limits to the agency that technical stakeholders possess to change things if they felt the need to do so. As Kitchin (2017) states, algorithmic systems are not "standalone" boxes but instead large systems with many stakeholders involved (p. 18).

Earlier comments by participants like Pam have pointed out how ready even technical stakeholders are to trade their data for better security. Apart from sharing her gunpoint

story, she also pointed out that she would like corporations like Google to provide her with self-management tools, which can alert her if she has left her door unlocked etc. At the same time, we have other participants who believe that security does not result in prosperity but is a result of it. Hence to reify, while divergences exist about how datafication should take place, and why, not many doubts were cast on the process itself.

5.5. Perceptions about Smart Cities

Due to the nature of the research and its focus on Smart Cities, one part of each interview was how participants perceived Smart City initiatives in general and in Pakistan specifically. This allowed me to pursue multiple lines of questioning such as what participants wanted in an ideal smart city, why they trusted/distrusted current projects, and whether they thought the current projects were achieving what they should.

Surprisingly no participant reported a lot of trust or hope in the “smartness” of the projects, not even those that have invested in or worked for such projects in Pakistan. In fact, Pam who had been deeply involved with the Lahore Knowledge Park City, stated:

We have yet to see any example of a particular community or a city within a city that even touches the boundary, of what really a smart city could be.

It is important to note here that this participant has worked on multiple real estate projects both in and out of Pakistan, including the international Emaar group. She also added that despite there being six or seven such projects that were undertaken in the province of Punjab, not even one has risen to national recognition. Moreover, nearly every project suffers an upheaval each time there is a change of government:

Every time the government changes, everything kind of goes back to square one, and the millions and billions that taxpayers have kind of contributed to the national accounts. They go to waste.

Additionally, her past colleague Michael, corroborated this point of view by saying that the “intention” of each reigning government is different, it depends whether you want to create a “Technopolis” or “smart city”, adding:

One is putting in technology for the heck of putting in technology, the other is to reduce energy consumption, create jobs, improve livability.

He also stated that given Pakistan’s current economic situation even those that mean well and want to change things for the better may not want to prioritize, progression within “smart cities”, instead they may say:

They’d be like let’s first save our self from bankruptcy then solve the food crisis, then deal with the health crisis. Then we’ll think about Smart Cities.

In a similar vein, Kevin self-reported investing in a smart building, and said he did so only due to the investment opportunity and not truly because he was attracted by the smart features. He further added that if the smart features did not exist, he may still have invested in the building due to its high Return on Investment possibilities. In the same vein, the participant expressed frustration with what was being communicated about the discussed Smart City projects, which he thought was not detailed or technical enough and only focused on abstract promises of improvement.

Similarly, Dwight, after engaging with the marketing, said that he doubts that the projects will be anything more than a “suburban utopia”. Nearly all participants showed some level of distrust in the initiatives being undertaken in Pakistan.

However, the same cannot be said for their perceptions about Smart Cities in general. Pam brought up multiple examples of projects and urban planning initiatives that she thought worked or were useful, citing examples from the gulf states as well as multiple East Asian economies such as Singapore and Malaysia.²⁰

Similarly, nearly all participants said that increased innovation in the areas of flood prevention, traffic management, water, and waste management as well as education could benefit large swathes of Pakistan's population.

Pam added that the "cultural code" for development and progress in Pakistan is construction of real estate and physical infrastructure like roads and bridges. Stressing further that when the government was presented the opportunity to choose between the smart city model followed in the gulf states as opposed to the east Asian market, the government chose the gulf state model.

According to her this meant that the city was more focused on building Telecommunication rails and what Michael termed as a "Technopolis". This was in contrast to what they would prefer, which is focusing on more socio-cultural elements and working on issues of gentrification, sustainable and affordable housing etc.

This shows that both participants have a clear image of what a smart city should look like and that this image is far from what was aimed for in Pakistan. Most likely as Michael stated, what we will see outside of the Smart City projects in Pakistan, is a vast population of unstructured and poorly built settlements by low-income workers that cannot afford housing inside the Smart City projects but go to work there during the day. This scene of gentrification is common in every major city in the country and participants did not think this would change for these projects, with Kevin adding that rarely do people who build such cities reap any benefit from it. He also brought up an

²⁰ It is important to note that comparing two different socio-economic urban spaces has its own problems. This comparative argumentation was exhibited by participants themselves (see pg.82) – but needs to be investigated and problematized on its own in future research.

example to illustrate that managing gentrification and ensuring human welfare on this scale can be difficult, but some corporations have been able to set good examples:

Unilever for their tea division, in Kenya. Instead of introducing machinery, they created different housing, hospitals, and schools for people to remain there and work. But now they have an added bonus where their children could get a better education and they have a better living situation.

When I looked into this case after the interview, I found multiple reports highlighting how the workers in these settlements live in horrible conditions, and that recently workers from the Kenya settlement filed a UN complaint against the company saying that the organization failed to adequately assist the workers and stopped their wages for 6 months when they were attacked in 2007. The complaint also states that Unilever knowingly put workers in a position of peril in the settlement (Schipani et al., 2022).

It is highly likely that the participant was not aware of these reports nor of these complaints and maybe found their information from Unilever's corporate communications. It also shows how easily projects and initiatives can be greenwashed for the purposes of corporate marketing.

After stating that the data available in Pakistan was not being utilized, Angela's primary frustrations were how models that can help optimize things in Pakistan already exist outside of the country. According to her all we might have to do is apply them here. This statement again highlighted that participants in general prioritized innovations and optimizations that come from Smart technologies and Big Data and are not reticent to repurpose models that work globally for Pakistan. No participant showed any awareness of issues that may come from doing so and very little was said about developing these solutions locally or from citizen-led initiatives. In fact, nearly all participants seemed to be looking towards the corporate sector for such innovations and betterments.

5.6. Limitations of the Research

Possibly the biggest limitation of the project is that it wasn't able to include anyone currently involved with building a Smart City project in Pakistan. As highlighted earlier, this proved to be a challenge due to the red tape and general unwillingness of governmental agencies to co-operate with students. While this research was not able to access anyone working within the projects discussed, I was able to talk to multiple participants that had experience of working on such projects in the past or are directly invested in the discussed projects right now. However, research into people currently involved in the projects and the details of the projects themselves, warrants study and should be undertaken in future work.

Moreover, the past one year has proven, especially difficult for Pakistan. The country was still dealing with the aftereffects of Covid and supply chain issues, when earlier in the year, Imran Khan's government was toppled before it could finish its tenure. Soon after, during the monsoon season of May to July, the country was wracked with a terrible spell of flooding, which displaced many and ruined urban infrastructures. Due to all of these issues and the alleged mismanagement of Foreign Exchange funds by successive governments, now the country is facing bankruptcy, unless it recoups its Foreign Exchange reserves. The US dollar is unavailable in the local market and has skyrocketed in the past one year.

One participant comment that accurately depicts how heavily these circumstances weigh on their mind is Michael. He stated that before the interview he was in a conversation with his wife, where they were brainstorming to see if they had enough funds and assets to liquidate if they had to leave the country.

As is apparent, these social and economic calamities bore strongly in each participants' mind and also surfaced in their answers. It would be difficult to ascertain if the answers would have been the same one year ago. Would participants have felt differently in

2021 or 2020 when Prime Minister Imran Khan was still going relatively strongly after being elected on the mandate of promoting progress and ending corruption?

Although conditions strongly skewed the data, it must be remembered here that nearly all issues that surfaced during the research such as unstable governments, gentrification, lack of data governance, lack of urban infrastructure or education are issues endemic to the country and have only worsened in the past one year. For someone who has lived in Pakistan their whole life, like me, these issues are part of the local zeitgeist and have affected daily lives there since before I was born.

As discussed earlier in the literature review, citizens play a key role in the development of truly sustainable smart cities. While this research deeply acknowledges that fact, I was not able to access the farmers and people living in and around areas where the projects were being developed. Hence, this research focuses solely on the technical stakeholders' perspective and doesn't include the point of view of citizens that are experts about the realities of their life. Acknowledging this gap, this research calls for a similar exploration to be conducted with citizens so that the point of view of technical stakeholders can be balanced with those of local citizens and knowledge.

CONCLUSION

This research set out to investigate how technical stakeholders perceive Smart City projects in Pakistan, and the attendant processes like datafication and digital transformation. The three main goals of this research pertained to firstly identifying general awareness of Smart City projects, secondly, investigating awareness of particular values. Finally, this research also looked at how participants balanced competing moral ethical considerations.

As discussed in the earlier parts of this research, the process of datafication is not value-neutral but instead one that is actively involved in processes of “world-making” (Gabriel & Ghazavi, 11 C.E., p. 3). As everyday life is recorded, collected, and processed into data, features of daily living which cannot be quantified are lost in the favor of creating optimized, but “homogenous” digital representations of urban life. In so doing, details about daily life are subsumed, categorized, and sorted to optimize extractive agendas and neoliberal ends (Kitchin et al., 2018, p. 11). As the cycle of consumption of data worsens, more and more data are collected at the cost of people’s inalienable rights and their freedom. Yet often technologies like AI are often made in a black box manner, making them impervious to analysis and critique. Hence, a growing number of scholars are pointing towards the need to explore the decisions, individuals, contexts, and companies around algorithms as well as the algorithm itself.

Through an investigation of 12 semi structured interviews, this research was able to focus on a previously scarcely discussed subject, Smart City ethics in Pakistan and how technical stakeholders rationalize its implementation. These interviews were focused on technical stakeholders for their proximity to local work and knowledge of complexities of the environment.

As discussed above, participants in this research exhibited a strong distrust of local Smart City projects and the government. With only participants Dwight and Jim,

deviating from this pattern. Dwight supported the public model of Data Governance in general and only Jim showed any real confidence in the government of Pakistan's capability to generate reliable data.

Oddly, while perceptions of deployed Smart City projects were primarily negative, participant's feelings towards processes of datafication and smart cities in general were positive. Participants trusted corporations to enact innovation and progress a lot more than local governments and exhibited a lack of confidence in government bodies. Unlike Jim, who was training to be a government employee, two other participants Pam and Michael who had experience working in this capacity, were keen to point out how inefficient government planning could be.

While not all participants prioritized security, some said they would gladly compromise on their privacy for the sake of increased security and human welfare. Interestingly participants that were most reticent about their data being used for targeted marketing were the closest to such businesses. One worked with an eCommerce Checkout provider and another with one of the big five Tech companies in the world. This difference in espoused practice could have emerged from the fact that these participants out of all had the most knowledge about exactly how granular advertising and marketing data collection could be. This knowledge played a part in making them reticent towards the practice, participant Michael called it his "occupational hazard".

Moreover, we have also discussed how these tradeoffs are not universally stable and that security has an inherent relationship with surveillance. A relationship that may not be properly understood by the technical stakeholders and which warrants more study in the context of Pakistan.

On the other hand, all participants showed positive inclinations towards attempts of datafication with one participant clearly harboring a very "naturalized" view of data until questioned (Couldry & Mejias, 2019, p. 3) However, nearly all participants were

aware some well-known harms that can arise from misuse of data and stated that Pakistan has very little guardrails in place to avoid such negative impacts.

Taken together these insights mean that those employed in Pakistan's corporate sector highly distrust the government's ability to establish adequate controls and look towards corporate organizations to fill in the gap. Somewhat worryingly, participants are not very concerned with the negative impacts of datafication and seemed to be more appreciative of the inefficiencies of the analog and non-smart system.

To reiterate what one participant said earlier, public models of data governance and collection make it possible for the advantages and benefits of data collection to be redistributed to the public. This is not true in the case of corporate-led initiatives. In places where governments cannot liaison on the behalf of their citizens or can't provide infrastructure themselves, issues like that observed in the tea plantation in Kenya, can easily recur. At the moment, big company names like Lipton keep workers in similarly terrible conditions in Bangladesh and India as well (World Socialist Web Site, 2019). However, due to the influence of the mega corporations and the large funds they allocate to their marketing campaigns, realities about mistreatment often get overshadowed by promises of never-before-seen progress.

While some readers of this research may find Pam's comment about trading data for the sake of increased security a risky bet, it is important to remember that nearly everyone around the globe engaged in the same tradeoff during the Covid 19 pandemic. For contact-tracing apps, people around the world made the bargain between being safe from exposure to Covid-19, in exchange for information about where they are and where they've been. Although the ethics of such contact tracing apps are outside the realm of study of this research, this case provides a relatable global example of the value judgements some of the participants made.

On the same note, one participant also exhibited signs of deprioritizing security, instead arguing for prosperity. Multiple others pointed to alternative goals such as building

research and innovation in the finished goods industry and farming. The kind of descriptions of security offered by participants like Pam and Kelly, are very far from the Orwellian hyper-present state of surveillance and rather a civic freedom to enjoy and experience urban spaces safely and easily. It is also important to note that both of these participants identify as women, whose access to urban spaces in Pakistan is a lot more limited than male-presenting citizens.

Moreover, nearly all participants wanted datafication in lieu of something. For example, participants pointed towards benefits like increased access to education, reduction in poverty, sustainability and economic growth as possible goals that could be achieved with the technological process of datafication restate here the distinction made by the participant Michael, between “Technopolis” and “smart cities”. Hence, the assumption that technical stakeholders may be interested or motivated by innovation for the sake of innovation was not confirmed. Instead, all participants seemed to be actively reaching into their experiences living in cities that are affected by bad urban planning and gave examples of possible areas of improvement from their lives. It became clear that technical stakeholders were actively trying to solve issues experienced from and within their standpoint. While this datafication was viewed positively its impact on security, the relationship between surveillance and security was not very well understood. Moreover, no participants identified the “inter-temporality” of privacy (Friedewald et al., 2017, pp. 7–8).

Although participants seem to always suggest that they would like datafication “in lieu of solutions to civic problems” some participants hinted that this wasn’t always the case for the government of Pakistan.

As is apparent participants didn’t show much trust in the government to undertake the process of datafication and many of them leaned towards corporate players. When this insight is combined with the reports of lax data governance policies in Pakistan, a rather peculiar picture emerges. Even though participants were not confident in the Smart

City initiatives, they trusted smart city technologies and the capability of private corporations to fill the gap that the government, in their opinion, has failed to fill.

This means that private corporations may very easily sway public opinion in favor of datafication initiatives and may be capable of building a reputation that government initiatives have failed to. One possible local partner, whose abilities were not doubted was the military. Hence the public private partnership in Pakistan could very easily look like a military-private partnership.

This is especially worrying because the military has historically been beyond reproach in Pakistan. It holds the power to bring governments into power and topple them when it is necessary. In fact, democratic governments in Pakistan have often failed to complete their tenure due to military interventions. Moreover, the research participants gave a thick description of how lax data governance laws are in Pakistan.

When combined this paints the picture of two powerful entities which have the implicit trust of the intelligentsia, to create an environment where citizens are “classified and sorted” as described by Kitchin (2017) and datafied for neoliberal ends (p. 11). These ends can be pursued without being impeded by any regulating policy or structure that guarantees the safeguarding of citizen interests.

As bleak as this picture is it is perhaps reassuring to know that awareness of common issues and social harms that may come out of hyper digitalization and datafication, is present. However, most participants also prioritized provision of basic amenities like functional roads, electricity, water and food over solving issues of data privacy or governance. Michael repeated the famous local socialist political chant “roti, kapra, makan” or “bread, cloth, house” to emphasize local priorities.

While this sentiment is easy to relate to, it is also important to remember that the de-prioritization of data governance policies locks it in an endless cycle, wherein the next national emergency can easily unseat accountability measures and delay policymaking further. Meanwhile, corporate work in Big Data is racing ahead and the popular view

that technological transformation will resolve civil issues is only stoking that fire and lending corporate ventures legitimacy. Unfortunately, being locked in an inflationary and unstable economy does not prevent people from privacy harms and bias, in fact it may compound the effect of exploitation. For example, the farmers that were dislocated from their lands to build the Ravi River Front Project, are now not only facing skyrocketing prices due to the high inflation in Pakistan's economy, but also have no means to provide for their families, because their lands have been taken from them to build a Smart City.

This example is even more poignant when I look towards the gathered data and see that most of participants pointed towards farming as the most useful outcome and pertinent goal for Smart City Technologies in Pakistan. Far from achieving this ideal, the projects currently underway are actively harming the sector that is identified by most participants as the most beneficial and deserving area of innovation. Moreover, ethical concerns that might emerge in an IoT based application of farming, might not be clear to the participants.

Another popular area of concern was traffic management. As of 29th December 2022, 6 days after the data gathering was ended, local news agencies are reporting how construction of Metro Lines through Karachi's area Malir is destroying local farming lands. The only remaining green spaces left in the city. These Metro lines will be used to connect new mega real estate projects, both owned by the military. Hence, like this research has previously stated it is very difficult to optimize one realm of processes in a city without causing chain reactions in multiple others. While the participants were aware of outcomes of certain datafication processes, their understanding of how each technological intervention they proposed could affect local communities in Pakistan maybe limited. For example, Kelly who suggested using shopping behavior data to find people on the internet and inform them when they've been speeding in a school zone, might not have been aware of issues with the paradigm of zoning itself.

As a growing body of research is pointing out, zoning practices can cause rent hikes, increase racial and ethnic violence as well as increase gentrification. (Been et al., 2019, p. 03) Similarly applying datafication in agricultural practices comes is a quagmire of its own. Surveilling low-income workers and trying to optimize their performance for perfect yield has grave ethical implications for values like freedom from bias, equality and inclusion (Foster et al., 2023).

Participant Dwight alluded to how Big Data can help resolve gentrification. However, his understanding of whether this data is capable of fully describing the issue may be limited. Instead, his intonation and emphasis seemed to be that through data we could gain a “god’s eye-view” of gentrification (Kitchin, 2016, p. 11). Another participant admitted that while he knew very little about how crime statistics work, in the case of crime prediction he would be “very agnostic to data”.

These insights tell us that while technical stakeholders are adept at recognizing common issues and finding scenarios where technological intervention can help, their insights and knowledge of said implementation is limited to and purely driven from their standpoint.

These stakeholders may not be able to reliably identify issues that fringe communities will face, but they may be able to make those inferences if they belong to the community themselves. While this insight is true for ethnic, religious, and sexual identities and communities, since employment in technical jobs pay well in Pakistan, it is difficult to say how well technical stakeholders will be able to foresee the impacts of datafication on low-income communities.

Finally, the limited understanding of how IoT and Smart Technology implementation can harm local communities also motivates for an inclusion of a Medellín-esque initiative in Pakistan. Wherein citizens are able to co-create with technical stakeholders described above. Otherwise, the assumptions made by technical stakeholders may

subsume local goals and benefits due to unavailability of accurate data as well as absence of structures that can lobby on behalf of the citizens.

Hence, future research can investigate how discussed projects are impacting farmer communities, as well as investigate how local communities and citizens perceive Smart Cities and Smart City Ethics. Moreover, future research can also dig deeper into the question of trust in relevant stakeholders and identify more social paradigms that impact this trust. While this research was able to focus on values like privacy, security, autonomy, human welfare, trust, inclusion and accountability, and sustainability other values such as right to own property, usability, and informed consent could not be fully explored. This was experienced due to the limitation of available interview time and research period and the wide breadth of the research question. This research serves as a starting point and an exploration into the ethics of smart cities in Pakistan. Future work in this regard can focus on specific values and investigate perceptions for specific concerns in more detail.

Finally future research could also dig deeper into how datafication processes can be used to subvert exploitation by the government as pointed out by one of the participants. Moreover, similar lines of inquiry can be researched by consulting with local citizens rights groups and NGOs.

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ANNEX

Batya Friedman's List of Values with Ethical Import

Source: (Friedman et al., 2006, pp. 58–59)

Human Value	Definition
Human Welfare	Refers to people's physical, material, and psychological well-being.
Ownership and property	Refers to a right to possess an object (or information), use it, manage it, derive income from it, and bequeath it.
Privacy	Refers to a claim, an entitlement, or a right of an individual to determine what information about himself or herself can be communicated to others.
Freedom from bias	Refers to systematic unfairness perpetrated on individuals or groups, including pre-existing social bias, technical bias, and emergent social bias.
Universal usability	Refers to making all people successful users of information technology.
Trust	Refers to expectations that exist between people who can experience good will, extend good will toward others, feel vulnerable, and experience betrayal.
Autonomy	Refers to people's ability to decide, plan, and act in ways that they believe will help them to achieve their goals.
Informed consent	Refers to garnering people's agreement, encompassing criteria of disclosure and comprehension (for "informed") and voluntariness, competence, and agreement (for "consent").

Accountability	Refers to the properties that ensure that the actions of a person, people, or institution may be traced uniquely to the person, people, or institution.
Courtesy	Refers to treating people with politeness and consideration.
Identity	Refers to people's understanding of who they are over time, embracing both continuity and discontinuity over time.
Calmness	Refers to a peaceful and composed psychological state.
Environmental sustainability	Refers to sustaining ecosystems such that they meet the needs of the present without compromising future generations.