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Why government supported smart city initiatives fail: Examining community risk and benefit agreements as a missing link to accountability for equity-seeking groups

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This paper utilizes concepts from a critical social justice discourse on smart cities to identify factors behind resistance to new smart city initiatives from equity-seeking groups. The broader critical discourse is examined based on relevance to the eventual failure of the initiatives selected as case studies. It highlights institutional failure within government-supported initiatives due to the lack of consideration given to equitable distribution of risks and formal accountability mechanisms. It describes outcomes surrounding smart cities in which the benefits accrue to some groups within the city while risks increase for other groups. Finally, we examine the integration of "risk" as an adaptation to the existing practical mechanism of Community Benefit Agreements, for use of this framework to support value sensitive design approaches in future smart city initiatives.

KEYWORDS

smart cities, social justice, institutional failure, value sensitive design, community benefits agreement

Introduction

The dominant public discourse on smart cities typically focuses on the economic benefits of smart city projects, including jobs, revenues and cost reductions. Simultaneously, there is a growing critical literature on smart cities from a social justice perspective (Kitchin, 2014; Pali and Schuilenburg, 2019; Safransky, 2020; Curran and Smart, 2021). This paper draws out specific concepts from this critical discourse on smart cities by analyzing related case studies of failed smart city initiatives to highlight institutional failures and alternative processes of development. The case studies are used to demonstrate the need for a value sensitive approach to facilitate inclusion of identifiable risks and benefits and the need to incorporate accountability through formal processes of governance to address social justice through equitable distribution of identified risks and benefits. Smart city initiatives in this paper refer to city

government-supported projects involving substantial investments in Information and Communications Technology (ICT) infrastructure and ubiquitous computing projects for real-time monitoring, management and regulation (Kitchin, 2015). Social justice in this context refers to equitable social and economic outcomes for equity-seeking groups, such as women, racialized communities, older individuals, people with disabilities, and individuals with lower socio-economic status.

The findings and arguments in this paper contribute to a critical smart city initiative governance discourse through identification of critical concepts and related exploration of a practical governance framework. One area of governance discourse is institutional failure, where smart city initiatives fail even though they employ citizen participation processes. We utilize the concept of institutional failure where governments initially support smart city projects that are subsequently rejected by the majority of citizens. For the purposes of this paper we define "institutional failure" as a failure of smart city project governance, a failure in government policy by the city as an institution in defining and achieving smart city project goals (Derwort et al., 2019). We also refer to "value sensitive design" as a framework for advancing a process of broad stakeholder participation, where different needs of stakeholders are explicitly incorporated into the project (Friedman et al., 2021). We acknowledge value sensitive design as a useful approach to the identification and incorporation of different values of stakeholders; while it is necessary, it is not sufficient to address the additional need for an alternative governance framework to address institutional failure and accountability related to inadequate distribution of risks and benefits with equity-seeking groups. An alternative governance framework needs to incorporate transparency and accountability as key elements in addressing the risks of smart city projects for equity-seeking communities. We focus on an undertheorized area: governance of distribution of risks and benefits. We bring together two disparate bodies of literature, a critical literature on smart cities, and a solution-oriented literature on community benefit agreements, to create intersecting framework we describe as Community Risks and Benefits Agreements (CRBAs). CRBAs provide a framework for addressing the governance of distribution of risks and benefits of smart city projects.

Smart city discourse

The term "Smart City" is a nebulous term, but in general it has come to represent a city which intensively utilizes Information and Communications Technology (ICT) to achieve its goals (Ingwersen and Serrano-López, 2018). The risks and benefits of smart cities are contested, and therefore smart city literature includes a number of different threads of discourse. In the dominant economic development discourse on smart cities, there is research on economic benefit multipliers of smart city projects (Wiesmeth et al., 2018), or distribution of economic benefits. Although a body of critique exists in smart city literature identifying some of the social and environmental risks (Mouton and Burns, 2021), there is a lack of related literature on how these identified risks are multiplied or distributed across different communities across the city. For some urban communities already at risk, smart city projects multiply these risks through technology-mediated outcomes.

Moreover, there is a failure of governance where these risks are exacerbated rather than mitigated through formal mechanisms as part of smart city projects. In a meta-synthesis of smart city literature, Esashika et al. (2021) identify "high-tech governance and citizen participation" as a key theme indicating the connected nature of participation by citizens to governance of smart city projects. In a systematic review of smart city literature, Wahab et al. (2020) identify a prevalent concept of "smart governance", which focuses on collaboration between governments and citizens, including transparency of governance. In another systematic review, Ruhlandt (2018) identifies "stakeholders," "processes," and "technology and data" as the most frequently occurring clusters of discussion in smart city literature. This set of meta-synthesis and systematic reviews highlights the importance of stakeholder communities in a city, involvement of stakeholders in governance of smart projects and their processes, as well as accountability of governance processes to citizens and different stakeholder communities. Therefore there is a considerable discussion of governance in smart city projects, but the questions of which stakeholders are involved in governance and how they are involved becomes a question of power dynamics (Kitchin, 2014; Scholl and Al Awadhi, 2016). The gap in governance mechanisms that leads to inequities in mitigation of the risks of smart cities is the lack of accountability in commitments to different communities.

Critical analysis of smart cities

There is a significant and growing body of literature that is critical of smart cities and their impacts on equity-seeking communities. Curran and Smart (2021) use the example of smart cities in China to indicate that the benefits and risks of smart city projects are differentiated by socio-economic status. In terms of the intersection of race and socioeconomic class for example, Safransky (2020) analyzes the use of data in allocation of values in smart city contexts and concludes that in cities like Detroit where spatial data is predicated by historical practices such as redlining, decontextualized data analysis risks continued underinvestment in low income, racialized neighborhoods. The majority of datafication-oriented smart city benefits often accrue to those with high socio-economic status, and the majority of risks accrue to those with low socio-economic status. Curran and Smart (2021) usefully identify the issue of risks as necessarily accompanying the benefits of smart city projects. This area of

smart city project governance resulting in differential benefits and differential risks of smart city projects for different groups of citizens is a reoccurring phenomenon. For example, O'Malley and Smith (2022) describe the implementation of CCTV and related security technology in the city of Darwin, Australia that targets Aboriginal community members in a continuation of colonial structures.

The issue of surveillance and its differential outcomes is a substantial critique of smart cities; for example, Pali and Schuilenburg (2019) argue that smart cities are positioned as safe cities, but the implementation of surveillance technology increases risks for equity-seeking communities. Kitchin (2014) similarly describes the politics involved in instrumenting a city, as well as the panoptic surveillance aspects of smart cities negatively impacting specific communities. Smart city projects are necessarily political, from the decisions on what data will be collected to the geophysical placement of sensors to collect data (Sadowski, 2021). On equity issues with data collection in smart cities, Jelks et al. (2018) describes a process of citizen engagement utilizing local knowledge in combination with instrumented data collection. Asteria et al. (2020) utilizes a case study of the city of Jakarta to indicate a gendered divide in the implementation of smart city initiatives. In identifying the risks and benefits of smart city projects, differences by geography are incomplete without analyzing intersectional issues by gender. Similarly, the risks and benefits of smart city projects are not distributed equitably across different age groups. Loos et al. (2020) highlight the issues of accessibility for older people in public transit and mobility planning for smart cities. Describing the lack of data on which smart city decisions are made, Deitz et al. (2021) conclude there is a lack of data on infrastructure required by people with disabilities. Wang et al. (2021) analyze smart city proposals for the U.S. department of transportation smart city challenge and identify a lack of inclusion of accessibility considerations for people with disabilities.

In summary, the social issues of class, race, gender, age, and disability provide useful context for analyzing groups who accrue risks and benefits of smart city projects. Using these frameworks raises the question of governance and accountability for smart city projects. For city governments, accountability is to citizens, but citizens cannot be treated as a monolithic group; true accountability involves addressing the different needs of equity-seeking groups disaggregated by class, race, gender, age, and disability. The themes of risks from datafication and surveillance also feature prominently in the critical and equity-related literature on smart cities. The relationship between city governments and citizens who experience over-policing and surveillance is a relationship of mistrust. The governance mechanisms of smart city projects need to address mitigation of these risks for equity-seeking communities. This area of governance of smart city projects is a contested yet increasingly important space, as Meijer and Rodríguez Bolívar (2016) and subsequently Pereira et al. (2018) describe the diverse perspectives on governance, while Joss et al. (2019) describes the increasing importance of governance in smart city projects. Returning to the theme of accountability, governments need to rebuild the deficit of trust (Edelman, 2022) to be able to implement smart city projects and in general ICT projects that will have an appropriate distribution of risks and benefits for equity-seeking groups. In a subsequent section we point to Community Risk and Benefit Agreements (CRBAs) as one method for building accountability and trust with affected communities.

This paper frames a discussion on failed smart city initiatives using three acknowledged areas of critique on smart cities from a social justice perspective. First, ICTs are deployed in an existing web of power relationships rather than in a neutral space. There are power relationships between city governments and citizens, between law enforcement agencies and equity-seeking communities, and between different neighborhoods within the same city. Second, there is greater datafication of individuals from equity-seeking communities than other communities in a city, and the implementation of surveillance-related ICT projects typically results in compounding or exacerbation of existing inequities rather than leveling the playing field. Therefore, smart city projects which involve ICT-based additional collection of data from citizens are viewed with suspicion by equity-seeking communities as projects that will collect data inequitably, often leading to increased risks of surveillance and harmful consequences. The third aspect is distribution of benefits and risks where benefits accrue to some groups within the city while increasing risks for other groups. In addition to providing additional tools for law enforcement, citizens who are concerned about property crime benefit from increased surveillance through ICT (Wood and Steeves, 2021). The risks and benefits of surveillance-related ICT are therefore inequitably distributed across cities. For over-policed and over-surveilled communities, institutions of government, particularly law enforcement agencies, have failed these communities for decades. For these equity-seeking communities the implementation of smart city projects is often a technology-based extension of existing practices which exacerbates existing inequalities rather than mitigating them (Joh, 2019; Minocher and Randall, 2020; O'Malley and Smith, 2022; Qarri and Gill, 2022).

Methodological approach

This paper draws on selected critical literature from a social justice discourse on smart cities. The broader literature is conceptually mapped against three government-supported and failed smart city initiatives in the USA and Canada. Two of the highly visible initiatives failed to be implemented and the third, a participatory approach, was so contested that parallel processes

were undertaken by different stakeholders. The conscious hybrid approach allows us to make connections across literature-based concepts and documented outcomes from the case studies. As a result, identification of factors contributing to contestation among city governments, equity-seeking communities, and technology companies can be understood from a theoretical perspective with direct relevance to tools of practice and governance mechanisms. For the purposes of this paper, we utilize institutional failure to refer to a failure in government policy by the city as an institution involved in the initiation and attempted implementation of the failed projects. We refer to value sensitive design as an approach aimed at incorporating values identified through participatory processes. Finally, we propose the potential of conceptually adapted community benefit agreements to address some of the factors leading to the institutional failures highlighted.

Institutional failure

Institutional failure is a useful perspective to frame some of the causes of failure of smart city projects, including the two cities that are highlighted through case studies. Following Derwort et al. (2019), we define institutional failure as a failure of government policy to achieve its goals for smart city projects; at the macro level the contestation of private sector and community values lead to many of these failures. In particular, we examine institutional failures involved in city governments engaging in ICT projects which can be characterized as a techno-political process (Sadowski, 2021). This paper continues in the direction of identifying institutional failures at the level of the city or municipal government, through case studies of projects in New York City and the City of Toronto. In these examples where city governments were initially supportive and approved these projects, we highlight the question of institutional accountability as the majority of citizens disapproved of the proposed project. In addition to failure of the smart city project itself, it is a failure of the city as an institution in understanding the values of the majority of its citizens. We note that it is not simply a failure of consultation as all the case studies included substantial consultation but a failure of governance where mitigations to the risks identified by the citizens from these consultations were not adequately or formally incorporated in the smart city projects. Mitigations to the risks identified by citizens were proposed, but they were not formally accepted by citizens, and therefore there is a lack of accountability to citizens. Although the majority of solution-oriented institutional failure literature points to addressing the process of failure within the institution itself, such as a city government, we point to partnerships with community-based institutions though formal community benefit agreements (Baxamusa, 2008) as a promising development toward mitigating institutional failures on smart city projects. Communities within the city are often represented by community groups and civil society organizations that reflect the interests of, and are deeply accountable to, the local community. Community benefit agreements (CBAs) are formal, written agreements among project proponents, governments and communities and therefore provide a mechanism for accountability to communities (Baxamusa, 2008).

Value sensitive design and accountability

Value sensitive design is another useful and solution-oriented framework for understanding the failures shown in the case studies. Value sensitive design has been utilized most often for information technology projects (Primiero et al., 2020). Winkler and Spiekermann (2018) provide an overview of the different flavors of value sensitive design for different types of projects. Friedman et al. (2021) provide direction for the future development of value sensitive design, describing grand challenges including: accounting for power and framing and prioritizing values. Mulligan and Bamberger (2018) specifically point to value sensitive design for large scale technology projects and argue for a governance approach that privileges human and public rights. Stone (2021) refines the concept of value sensitive design and applies it to urban contexts and urban technologies. This paper confirms the importance of utilizing value sensitive design at the level of the city, through analysis of case studies of projects in New York City and the City of Toronto. Value sensitive design essentially argues for identifying the different values across different stakeholder groups and designing projects to address these diverse and sometimes conflicting values (Mulligan and Bamberger, 2018). In the majority of smart city projects there is some form of public engagement and varying methods of public consultation to understand requirements. Value sensitive design principles encourage projects to invest additional resources in identifying deeper values underlying surface level stakeholder opinions.

Value sensitive design centralizes the importance of engagement and public participation, but as demonstrated in the case studies later, current processes remain inadequate. This is due to a lack of accountability, particularly accountability to addressing the needs of equity-seeking populations. Value sensitive design, when applied at the level of a city requires incorporation of differing values across different communities. Some communities may value security afforded by ICT solutions; whereas, other communities may place a higher value on privacy. Current processes of engagement tend to identify common values rather than a difference in values between different stakeholders, and value sensitive design alerts projects to the importance of identifying differing and often conflicting values among stakeholders. We point again to CBAs which are formal written agreements among project proponents, governments and communities and therefore provide a mechanism of negotiation for different values. Long

term accountability for achieving the values-based metrics in these negotiated CBAs have been demonstrated for physical infrastructure projects (Saito and Truong, 2015).

Smart city case studies

In a systematic review, Lim et al. (2019) describe the hypothetical nature of the positive and negative results of smart city projects, where much of the literature claims a positive or negative result, but there are insufficient case studies to confirm these results. This section addresses this gap in connecting theory to practice by utilizing illustrative case studies to highlight a number of institutional failures related to the risks identified in previous sections. In these case studies where city governments were initially supportive and approved these projects, we identify the question of institutional failure as the majority of citizens subsequently disapproved the project. The first example is of the failure of Amazons HQ2 project in New York City. The second case study utilizes the experience of Sidewalk Labs Quayside project in the city of Toronto. The Amazon HQ2 project highlights the issues of distribution of economic benefits and social risks across different groups in the city of New York. The Sidewalk Labs Quayside project highlights the issue of mistrust of data collection and surveillance and brings together the combined roles of anchor tenants and inequitable risks. A third example highlights issues of participatory decision processes through the experience of New York City Automated Decision Systems Task Force despite attempts at public participation in ICT decision-making by cities.

Case study 1: Amazon headquarters HQ2—Failure

The case of Amazon HQ2 highlights a number of issues related to anchor tenants (Baglieri et al., 2012) and inequitable distribution of costs and benefits. In agreement with (Gupta, 2019), due to the nature of the organization and its technology implementation practices, the Amazon HQ2 narrative should be viewed through a multifaceted smart city framework, and not simply as corporation securing a physical location in a city. Amazon held a worldwide competition for a city to host its second headquarters, HQ2 (Nager et al., 2019). Hundreds of cities participated in the request for proposal, and twenty cities were short listed including New York and Toronto (Bisnow., 2018). Different cities offered Amazon significant incentives including land, tax discounts and tax holidays, highlighting the long-term economic benefits cities anticipate from large technology firm anchor tenants as outlined in the previous section. Amazon selected New York and Northern Virginia as finalists for two HQ2 locations, in part based on the various incentives offered by city and state governments (Yurieff, 2018).

In the case of New York, there emerged significant resistance to Amazon's proposed HQ2; the resistance was led by unions and garnered broader support from citizens and eventually politicians, leading ultimately to the cancellation of the project (Gupta, 2019). This case study provides an example of when a city government may be initially substantially supportive of a large technology anchor tenant, but the majority of citizens can be weary of the risks of increasing income inequality, housing prices, as well as datafication and surveillance. Amazon has a long history of anti-unionism, particularly in delivery centers and warehouses (Fuchs et al., 2022). The range of issues identified by Amazon workers include low wages and work practices that include negative health and safety risks as well as intense workplace surveillance (Retail, 2018). Therefore, from the labor movement's point of view, locating Amazon's HQ2 in New York would increase income inequality since a technology firm headquarters attracts high wage employees, and at the same time would have risks of displacement for existing low-income communities by increasing costs of real estate and rents. Additionally, the resistance to Amazon's HQ2 was a tactic to increase pressure on Amazon to pay more equitable wages to its existing mostly low wage blue collar workforce, as well as improve health and safety conditions and reduce technology-based employee surveillance. Taking stock holistically, the rejection of Amazons HQ2 project in New York City, first by unionized labor, and then by the majority of citizens, was at its essence about equitable distribution of risks and benefits of a smart city project. As originally planned, the majority of benefits would accrue to white collar Amazon workers and to the city in the form of jobs and revenues. Simultaneously the risks would increase for existing low-income residents, continue to be experienced by blue collar Amazon workers, and potentially impact communities negatively through additional ICT implementation by Amazon in conjunction with the city. Given Amazon's reputation with ICT products that exacerbate community surveillance issues (Guariglia and Gullo, 2021; Guo, 2021; Lyons, 2021), the rejection of Amazon's HQ2 was not only about the real estate risks of a new head office but also about the influence a technology company has over local government policies regarding data collection and datafication.

Institutional failure, governance, and accountability for amazons HQ2 project in New York

Analyzing the rejection of Amazons HQ2 through a lens of smart city project equity, distribution of risks and benefits provides new insight to why a broad section of citizens rejected the project, including the company. Moreover, the failure of the Amazon HQ2 project is an instance of institutional failure of government where New York City government was

TABLE 1 Perceived risks and vulnerable parties in the Amazon Headquarters HQ2 failure.

Perceived risks	Vulnerable
Increasing income inequality	Existing low-income residents
Rising housing prices/increasing costs of real estate and rents.	Existing low-income residents
Increasing data collection/surveillance	Equity-seeking groups, specifically low income and racialized communities
Low wages, and work practices that include negative health and safety impacts	Blue-collar Amazon workers, majority of whom are part of low income and racialized communities
Extreme workplace surveillance	All Amazon workers

initially strongly supportive of the project offering tax incentives to Amazon, a view that did not reflect the position of the majority of citizens. In terms of governance, there were no broadly accepted multiparty agreements between Amazon, New York City government, and community organizations that mitigated the risks identified by equity-seeking communities. The potential risk of increased costs of housing were not addressed through mechanisms such as subsidized housing for affected communities. Ongoing health and safety risks to Amazon workers were not mitigated through formal contracts. Risks related to surveillance were not mitigated through formal written agreements with community groups. In terms of accountability, formal agreements addressing distribution of risks and benefits among different affected communities were not utilized to increase support and reduce opposition. As demonstrated in the next example, guaranteeing quantifiable social and environmental benefits for local communities is necessary but yet still not sufficient for many smart city projects since it is not just the aggregate benefits but consideration of the distribution of risks and benefits that is essential. See summary in Table 1.

Case study 2: Sidewalk labs quayside project—Failure

Sidewalk Labs, which is a subsidiary of Alphabet and the parent company for Google, proposed project for the Quayside neighborhood in Toronto. This was a smart city project where a technology giant proposed a bricks and mortar development which would incorporate a number of ICT elements. There were a number of potential economic benefits for the proposed project, including direct jobs involved in construction and maintenance as well as economic multipliers of a large infrastructure project. There were prospective environmental benefits it would be the first development in the city of Toronto with net zero emissions. There were potential social benefits, specifically an increase in subsidized housing which would alleviate a significant issue of a lack of affordable housing in the city of Toronto (Joy and Vogel, 2015).

The most significant issue with this smart city project was that the main proponent of the project, Sidewalk Labs, a subsidiary of Alphabet (the umbrella organization including Google), which has developed a long-term negative reputation for collection of data without regard for individual privacy (Zuboff, 2019). Another issue with the project was that it did not follow a standard government process of putting a tender out for bids; it was Alphabet and Sidewalk Labs that approached the City of Toronto with a proposed project. A second issue was that when Sidewalk Labs submitted their complete written proposal, it expanded the proposed scope of the project to multiple city blocks, ostensibly to gain the efficiencies from economies of scale that would enable the project to meet ambitious environmental and social targets. The expansion of scope included the financing of additional public transit infrastructure, something the City of Toronto has struggled with for decades (Amar and Teelucksingh, 2015). There was a significant civil society-led resistance to the Sidewalk Labs Quayside project led by a coalition named Block Sidewalk. Block Sidewalk, a volunteer group of citizens and community groups, spearheaded a backlash against the project leading to Sidewalk Labs eventually canceling the project, despite the city government having initially supported the project.

There was a significant level of investment in public consultation by Sidewalk Labs and government agencies. To its credit, Sidewalk Labs, with its deep pockets, engaged in a significant level of public engagement through large open meetings as well as smaller topical advisory groups. Sidewalk Labs reports that they engaged 21,000 individuals including 11,000 visitors to its education center (Sidewalk Labs, 2020). Therefore, in this case, it was not a lack of public engagement that is often the Achilles heel of unsuccessful smart city projects but rather the inequitable distribution of risks and benefits that sparked citizen rejection of the project. Sidewalk Labs' Quayside project included a number of social and environmental benefits as previously mentioned; that is, affordable housing (Joy and Vogel, 2015), additional public transit infrastructure (Amar and Teelucksingh, 2015), and environmental benefits including a substantial reduction in greenhouse gas emissions (Syed, 2019). Again, in this case, it was not a lack of explicitly identified, measurable, and achievable social and environmental benefits that were issues for this particular smart city project, it was the distribution of risks and benefits.

In terms of the distribution of risks and benefits, the residents of the proposed development would bear the majority of datafication and surveillance risks. For example, a family or individual may benefit from subsidized housing but is required to provide much more data on their lives due to the instrumented and intensive data collection nature of the project. There are similar developments where a deeply

subsidized cost of living is a sufficient incentive to provide substantial and continuous amounts of personal data to a private sector technology company (Belcher, 2022), but the citizens of Toronto rejected this risk benefit trade-off. In terms of environmental benefits, savings in energy and water use are not only achieved by physical design but through monitoring and altering usage and consumption habits of individuals and families. In a large technology firm-led, purpose-built, highly-instrumented and data-intensive smart city development project, individual use of water and energy at each unit can be monitored and residents of the units can be nudged to conserve more water or energy. Simultaneously the data collected by the large technology firm on water and energy use at a detailed level can be sold to companies who want to market targeted products and services to individuals. Therefore even if the environmental benefits proposed by Sidewalk Labs would be achievable, it is accompanied by the risk of increased datafication and surveillance of energy and water use. The citizens of Toronto again recognizing this trade-off between social and environmental benefits and surveillance risks rejected the project as a whole. It is the reputation of the parent company of Sidewalk Labs' (Alphabet's) practices as a technology company in datafication and monetization of data that concerned most citizens, where collection of similar water and energy usage data by a government utility is typically not monetized and therefore a lower risk. Analyzing the rejection of Sidewalk Labs' Quayside project through a smart city equity lens, that includes both risks and benefits, provides new insight into why a broad section of citizens rejected the project and the company.

Institutional failure, governance, and accountability for sidewalk labs quayside project

The Sidewalk Labs' Quayside project is an example of both institutional failure and value sensitive design. In terms of institutional failure we point again to the role of government, including the City of Toronto and Waterfront Toronto, the government body tasked with revitalizing Toronto's waterfront. Both the City of Toronto and Waterfront Toronto were initially supportive of the project; whereas, the majority of citizens rejected the project. A failure of government to mitigate the risks of concern for the majority of citizens is a failure of the government as an institution. The lack of formal agreements among Sidewalk Labs, government agencies and equity-seeking communities, regarding the risks and mitigations of these risks as a failure of governance, contributed to the failure of this initiative. Some risks were identified and mitigated; the socio-economic risk of increased costs of housing in this case was addressed by guaranteeing a certain level of subsidized housing for low-income families. However, risks related to datafication and surveillance were not mitigated through formal written agreements on maintaining data privacy for residents of the development, as well as broadly for the citizens of Toronto. In this case, many technical solutions were iteratively proposed, but there was no balanced solution found between the business model based on monetization of personal data and the privacy needs of citizens. The technical solutions proposed by Sidewalk Labs for the identified risks were not substantially agreed to by citizens and by organizations representing citizens (Wylie, 2020).

TABLE 2 Perceived risks and vulnerable parties in the Sidewalk Labs Quayside Project failure.

Perceived risks	Vulnerable
Surveillance of residents	Residents of the Quayside development
Surveillance of visitors	Citizens visiting the Quayside development
Surveillance of low-income individuals	Individuals living in subsidized housing in the Quayside development

In terms of value sensitive design, the project did conduct broad consultations. A significant component in value sensitive design is to explicitly identify values from different stakeholders that need to be incorporated into the design of the project. In this case, the devil was in the details. Although public consultations for the project were voluminous and varied, there was a diversion of citizens concerns toward issues the project could solve easily, rather than the issues that were of higher importance for citizens. For instance, many citizens expressed strong value for privacy of their personal data, and the project advanced a number of technology solutions which would protect privacy, to some extent, but not to the level required by most citizens. In the end the business model for Alphabet is based on monetization of personal data, and therefore an appropriate balance between the privacy needs of citizens and the financial needs of the organization could not be found (Artyushina, 2020). The substantial effort invested in consultations both by Sidewalk Labs and by communities did not result in incorporation of sufficient distribution of benefits into the project to outweigh the risks for affected communities. As demonstrated in the next example, consultation is necessary but not sufficient if the consultation process does not consider the unequal distribution of risks and benefits of city government-led ICT projects. See summary in Table 2.

Case study 3: New York City Automated Decision Systems Task Force

An example demonstrating how institutional failure is not simply from a lack of intention but also from the disjunction

between values and procedural expectations among stakeholders is provided in the New York City Automated Decision Systems Task Force. Here we return to the previous location of New York City, but describe a failure of engagement between the city and its citizens, highlighting the shortcomings of an implemented participatory process. Smart cities use ICT in automation, including collection of data and automating decision-making processes for governments, typically to reduce costs of government including staff required to make and implement these decisions. The risks of datafication and algorithmic governance for equity-seeking communities are coupled in the implementation of data intensive automation (Levy et al., 2021). One method of reducing risks of smart city projects for equity-seeking communities is to implement a participatory consultation process, where citizen input is incorporated in the ICT decisions made by cities (Gooch et al., 2018). The challenge with the citizen consultation process is that the consultations have to be substantial rather than superficial, and genuine rather than performative. Citizens and community groups need to see that the investment of their time and effort in participating in consultations yield results in terms of changes in ICT decisions by cities that take their substantive input into account. An example that involved transparency of automation is New York City's Automated Decision Systems (ADS) Task Force (Shadowen et al., 2020). This particular example highlights the difference in values between the government and citizens represented by civil society organizations on how automated decision systems should be implemented in cities (Richardson, 2019). The city of New York initiated an ADS task force in 2017 based on pressure from citizens and civil society organizations. The majority of community-based groups that were engaged with the government-constituted task force became disillusioned with the process, since it involved limited public consultation and limited information on technology used by government. The government-led ADS Task Force construed algorithms as narrowly defined automated decision systems (NYC Automated Decision Systems Task Force, 2019), while civil society organizations wanted to utilize a broader definition, and the two groups could not even agree on a definition of an ADS (Lecher, 2019). The government-led ADS Task Force eventually published a report in 2019 that was of limited value (Cahn, 2019), and the civil society organizations that dissociated themselves from the process published an alternative shadow report (Richardson, 2019).

First, this is an example where civil society organizations held the government to account based on different values between the government and citizens. Therefore this is an example highlighting the importance of Value Sensitive Design. The civil society organizations valued a broader inclusion of systems, greater public participation, and greater transparency from the government. The government of the city of New York, on the other hand, valued efficiency and constrained the scope of the ADS, public participation and level of information provided to civil society organizations and the public. Second, this is an example of how smart city initiatives are often implemented in a top down non-participatory and non-transparent process (Shadowen et al., 2020). Participation is limited and constrained by governments that do not want to reverse decisions or change their trajectory of implementation of ICT. Citizens on the other hand, particularly those who are part of equity-seeking communities, facing higher risks from ICT projects, require a higher level of participation and transparency from governments. Often in the implementation of surveillance technology the implementation of ICT often tends to further disadvantage equity-seeking communities rather than leveling the playing field (Pali and Schuilenburg, 2019).

TABLE 3 Perceived risks and vulnerable parties in the New York City Automated Decision Systems Task Force critique.

Perceived risks	Vulnerable
Unfair algorithms implemented by the city	Equity-seeking groups, specifically low income and racialized communities
Increased surveillance of low-income individuals	Equity-seeking groups, specifically low-income communities
Increased surveillance of racialized individuals	Equity-seeking groups, specifically racialized communities

Institutional failure, governance, and accountability in New York City's Automated Decision Systems Task Force

This example again points to an institutional failure of government, where the city of New York convenes a task force including community groups, but the vast majority of these community groups reject both the process and the final product, publishing their own final product in the form of a shadow report. The lack of formal agreement between the New York City government and community groups on process, product, and the fundamental question of what is an algorithm indicates a broken governance process, and an institutional failure. The lack of agreement on the number and scope of consultations, level of transparency, and level of participant involvement contributed to a perceived lack of accountability of government to citizens, and the failure to agree on joint, rather than a disparate and opposing, outcomes. More fundamentally this experience increased the pre-existing deficit of trust between equity-seeking groups and the government of the city of New York. Equity-seeking communities do not have a high level of trust in the ability of government to recognize and mitigate the risks of ICT

projects for their communities, particularly when there is no agreement on fundamental processes. See summary in Table 3.

Discussion

A combined analysis of critical smart city literature and the failed smart city initiatives presented in the case studies identifies the inequitable distribution of risks and benefits of smart city projects and the lack of accountability in governance process to communities impacted by these risks as significant factors within a social justice framing. Social justice framing in this paper utilizes the social issues of class, race, gender, age, and disability to provide useful context for analyzing groups who accrue risks and benefits of smart city projects. The impact of surveillance and economic impacts on communities that are already socio-economically disadvantaged requires a significant shift in governance processes for smart city projects. Joh (2019) describes the relationship between smart city-related surveillance technology and policing, and how policing is embedded into smart city infrastructure. Joh (2019) also argues that increasing government surveillance is related to quell dissent and inhibit free expression. Goodman et al. (2020) describe research on government-funded smart city projects in Canada and conclude that public participation in smart city projects remain top-down processes. Lee et al. (2020) advocate for a more bottom-up approach in identifying and engaging equity-seeking communities in smart city projects. As highlighted previously, a bottom-up approach is not simply about consultation between different stakeholders for a smart city project, it is about changing power relationships that exist in smart city projects. A community-based bottom-up approach is about affected communities independently defining the risks and benefits of smart city projects, and then negotiating the specific benefits and risk mitigations with other stakeholders such as project proponents and governments in order to arrive at concrete agreements. Multi-party written agreements that specify the concrete benefits of the project for all stakeholders have been used on non-smart city projects and are described as CBAs. Since CBAs are negotiated, agreed, documented and signed agreements, they form an accountability mechanism for communities to hold project proponents and governments to account if the benefits are not delivered as agreed.

We suggest that the model of community benefits agreements which has been implemented across many non-ICT municipal projects (Saito and Truong, 2015) provides an opportunity for reconfiguring governance of smart city initiatives to increase accountability and the equitable distribution of benefits. We additionally argue that existing community benefit agreement approaches need to be conceptually expanded to explicitly address governance of new types of risks introduced by the implementation of ICT as highlighted in the selected case studies.

Community benefit agreements: An underutilized tool for smart city projects

Community benefits agreements are written agreements between infrastructure project proponents and local communities affected by the project (Belongie and Silverman, 2018). Community benefits agreements are not a theory but a framework for practice operating on the theory that the local community should be explicitly allocated some of the benefits of a project such as jobs and training through formal written agreements (Baxamusa, 2008). CBAs originated in California through a project involving development of a hotel and retail complex in Hollywood (Harris, 2015). Successful CBAs have historically had strong participation from community groups representing racialized minorities and labor unions (Saito and Truong, 2015), indicating a social equity aspect for these agreements. Saito and Truong (2015) highlight the involvement of the Latino community along with community organizations and unions in accomplishing a CBA in Los Angeles that has been successful over a longer time frame. Laing (2009) describes an initially contentious relationship between African-American community groups and labor unions that was later resolved, culminating in a large scale CBA in the Figueroa Corridor in California, again pointing to the active involvement of racialized communities and labor unions in CBAs. Laing (2009) also highlights the fact that not all CBAs proceed smoothly.

Potential benefits of CBAs in the context of value sensitive design are (1) they can explicitly incorporate what decision-making involvement community members and groups have in the project; (2) they explicitly state quantifiable benefits and targets such as hiring of employees from affected communities; and (3) they provide a concrete pathway for achieving the quantified targets. CBAs not only state that a certain number of carpenters will be hired from the local community for a physical infrastructure project but also establish partnerships with trade unions and training colleges to ensure the required number of local community members are trained for those roles in advance of their need for the project. Therefore CBAs are long-term commitments among private sector project proponents, governments, trade unions, educational institutions, and most importantly community groups. The commitments for employment benefits in CBAs often extend beyond the construction phase of the project to include employment for local community members during the subsequent operational phase. For example, in the City of Toronto a CBA was developed for the expansion of the Woodbine racetrack and casino complex, included employment for local community members during construction as well as in the longer-term operation of the facility after construction (City of Toronto, 2020). CBAs were recommended for the Toronto Quayside project (Baker, 2019), but were not realized before the project was canceled by sidewalk Labs.

There are a number of identified critiques with existing implementations of CBAs. Cain (2014) argues that CBAs do not sufficiently oppose growth but rather work with developers and governments to enable large development projects. CBAs are definitely not useful as an oppositional tactic to smart city projects but more of a framework for distribution of project benefits and mitigation of risks. Cain (2014) usefully acknowledges that CBAs increase accountability of developers to local communities. Harris (2015) on the other hand argues that all CBAs do not equally provide strong mechanisms for communities, as demonstrated through examples of weak CBAs. Harris (2015) argues for strengthening CBAs by increasing more broadly the group of community stakeholders involved and increasing transparency. Janssen-Jansen and van der Veen (2017) again point to the differences between weaker and stronger CBAs, advocating for broader coalitions of community stakeholders and for increasing enforceability, transparency, and accountability to achieve stronger CBAs. Harris (2015) additionally recognizes the issue of risk, and advocates for guarantees of benefits through incentives and penalties (which is a type of risk mitigation), as well as explicit mitigation of risks such as displacement of households. Berglund and Butler (2021) again highlight the importance of broadening the group of community stakeholders involved beyond members of the immediate geographical neighborhood of affected communities. Nugent (2017) describes the gaps in specificity of benefits in a CBA in Toronto, leading to sub-optimal achievement of desired community outcomes. MacDonald (2011), describes the power relations between different partners in community labor coalitions in a CBA in New York, resulting in stronger partners having more influence on the agreements. Finally, Patterson et al. (2017) find that CBAs in cities with growing populations tend to deliver greater benefits to communities; whereas, CBAs in cities with declining populations deliver fewer benefits to communities, speaking to the power dynamics among communities, governments, and project proponents in growing and declining city contexts.

Harris (2015) reviews CBAs across multiple cities and discusses the need for including the risks to particular communities, including community displacement, and lack of transparency. Since CBAs have not been widely adopted for smart city projects, the issues of risks of increased ICT-based surveillance prevalent in critical smart city literature has not been addressed in CBA literature. Conversely, although many of the ICT-based surveillance risks have been outlined in smart city literature as described earlier, there is little intersection with community benefits literature. As an example, Berglund and Butler (2021) describe a city level "Community Benefit Ordinance" for Detroit, which impacts all large projects rather than project-level community benefit agreements. However, none of the 11 projects included by Berglund and Butler (2021) as being governed by the "Community Benefit Ordinance" were ICT-based smart city projects. Therefore extending CBAs to smart city projects requires further conceptual development.

Community risk and benefit agreements: Hypothesis for an updated framework

Looking ahead it is essential to examine alternative and complementary frameworks for engagement that address some of the shortcomings of current participatory approaches in the context of value sensitive design and in the associated institutional failures of ICT-based smart city projects. As per the preceding discussion the critical discussion of CBAs has explicitly identified the element of risk as being an important element for explicit consideration in CBAs (Harris, 2015). Once the risks to particular communities are explicitly identified, they can be mitigated and accountability mechanisms for monitoring and evaluation of the mitigation of the risks can be built into CBAs.

As expanded forms of CBAs, Community Risk and Benefit Agreements (CRBAs) can specify the benefits often found in CBAs, such as the number of people to be employed during and after the project, the limitations on the pool of candidates, such as local community residents, and training provided as part of the employment process. CRBAs, like CBAs, are therefore a negotiation of different values. A project proponent may value cost efficiency in the form of obtaining the cheapest construction labor they can for a project from a globally-sourced pool of labor, which is contested by the value of hiring local labor, including the cost of training programs to ensure local community members can fill the required roles. A negotiated agreement in the form of a CRBA then involves a specific number of individuals to be hired from a specific geographical area, with identified, specific training programs. CBAs, when designed appropriately, are intended to shift decision-making power to local communities (Baxamusa, 2008). CRBAs extend this power-based analysis by explicitly considering the distribution of both risks and benefits of ICT-based smart city projects. In the case of smart city projects, there can be a number of different competing values based on risks and benefits accruing to different stakeholders. For example, the City of San Diego installed thousands of smart streetlights (Perry, 2018), on the premise of financial benefits through cost savings to city government and therefore indirectly to municipal taxpayers, as well as environmental benefits of reduced energy consumption. There were additional benefits for a short period of time through enhanced data collection of temperature, humidity etc. at each smart streetlight (Perry, 2018). At the same time, there were risks accrued to already over-policed communities through the addition of surveillance cameras to these streetlights (Marx, 2020). The City of San Diego

did not achieve the proposed savings, the planned data was not completely collected, and yet the primary ongoing use of smart street lights remains surveillance for law enforcement purposes (Marx, 2020). This short example illustrates the intertwined nature of smart city projects and surveillance of equity-seeking communities, as well as the inequitable distribution of risks and benefits. This is another example of a government-supported but failed smart city project.

By contextualizing critical literature on smart cities through the presented case studies of failed initiatives, it has been possible to identify a number of risks for equity-seeking communities, particularly low income and racialized communities. Therefore where CBAs are applied to smart city projects, they must address the mitigation of these risks in addition to benefits. Many of the mitigations will be similar in structure to previous examples of benefits. For example, a mitigation of the risk of increasing income inequality can include hiring requirements from particular communities, including the benefit of a training program. Similar benefit commitments can be made through CRBAs, where the ICT-related jobs created by the project are key benefits that can be distributed to address community needs. In this example again we raise the importance of considering risks in addition to benefits. ICT careers, even for certified individuals, have higher risks than for example a carpenter trained and certified through a local trades union. In most ICT careers, there is no representative union, and the certifications are less universally recognized; therefore there are many more long-term employment risks for community members who opt for the benefit of ICT-based job training and initial employment in a smart city project. Yet there are examples of private sector companies training individuals with limited skills from extremely disadvantaged communities to obtain long-term full-time employment (Peters, 2022). Therefore CRBAs can include ICT employment benefits accompanied by early career training focused on long term career risk reduction.

CRBAs can be developed for smart city projects to include the types of benefits and risk mitigations that have been included for other infrastructure projects. In the Sidewalk Labs' Quayside project CBAs were discussed, but the project was abandoned before substantial agreements were concluded with community groups. The inability to come to an agreement on a CBA with local community groups is an indicator of the difference in values and highlights the importance of value sensitive design. One of the significant differences in values was the types of jobs offered by the project vs. the types of jobs desired by equity-seeking communities. As a bricks and mortar smart city project, Sidewalk Labs' Quayside project included traditional construction jobs and, more importantly, included an equivalent number of technology development, installation and maintenance jobs. During consultations, the project offered some traditional construction jobs as community benefits, but did not substantially offer any technology jobs. Therefore there was again a gap in distribution of benefits, with a recognition and willingness for distribution of construction jobs, and yet a lack of recognition of ICT jobs as a benefit that can be distributed to equity-seeking communities. Technology jobs, whether in development, installation, or even maintenance, are highly desirable jobs in most communities, and a mismatch in values resulted in a lack of support and failure for this project in a city that already has other multiple ongoing CBAs in place.

To understand the potential mitigations of more complex datafication and surveillance risks, we continue to look at the use of CBAs, but for natural resource development projects. The risks related to datafication in smart city projects are similar to the extractive process of natural resource development, where authors have described the analogy for data as the "new oil" (D'Ignazio and Klein, 2020, p. 24). Datafied surveillance which is one of the more harmful uses of data collected through ICT can be mitigated though similar analogies to mitigations for environmental risks. In agreement with O'Faircheallaigh (2013), examining the trajectory of CBAs in natural resource development is instructive for other types of CBAs. CBAs used in natural resource development are often referred to as Community Development Agreements or Impact and Benefit Agreements, respectively, highlighting the development aspects and the impact aspects related to the concept of risk in this paper. CBAs used in natural resource development are similar in many ways to CBAs in urban infrastructure development projects. Strong CBAs used in natural resource development require political organizing at the community level that maintains accountability of local organizations to local communities, and in turn the ability of these community-based organizations to conduct independent monitoring and evaluation that maintain accountability of resource development companies to representative organizations (Gunton et al., 2021). Glasson (2017) indicates that CBAs have been utilized in large scale wind, solar and gas energy-related projects and highlights the issue of distribution of benefits. Hira and Busumtwi-Sam (2021) describe the use of CBAs in the mining sector and advocate for a stronger community-based monitoring and evaluation system to ensure accountability.

Natural resource-related CBAs explicitly recognize environmental risks and mitigate identified risks through preventive processes, engineered solutions, and remediation processes. A similar set of processes can be used to manage risks of datafication and surveillance, including prevention of use of data for surveillance, engineered solutions including anonymizing personal data, and methods of remediation when there is harm. Additionally, the generic factors related to community-based agreements apply. For example, to resist datafication and surveillance risks, communities need strong political organizing at the local level, as well as the ability to conduct monitoring and evaluation. As an example of local political organizing, Minocher and Randall (2020) describe the importance of local community groups in achieving bans on facial recognition technology used in U.S. cities. As an

example of the ability to perform independent monitoring and evaluation, Amnesty International (2021) completed a crowdsourced project identifying 15,000 surveillance cameras in New York City, but these surveillance cameras are not equitably distributed across the city; the surveillance cameras are concentrated in Black and Brown neighborhoods. The concentration of surveillance cameras in racialized neighborhoods results in an increase in policing of communities that are have been historically over-policed in interactions with law enforcement agencies, resulting in additional ICT-based surveillance of specific communities.

Hypothesizing CRBAs for the case studies

Returning to the case studies, we hypothesize that implementation of a Community Risks and Benefits Agreement framework could have addressed issues raised by different communities, using the Sidewalk Labs Quayside project in Toronto as an example. The risk of increased costs of housing was addressed by guaranteeing a certain level of subsidized housing for low income families. Some of the risks related to surveillance could similarly be mitigated through formal written agreements on maintaining data privacy for residents of the development, as well as broadly for the citizens of Toronto. For example, citizens of Toronto wanted the data collected through the project to be stored on servers physically located in Canada, to minimize the risks of surveillance by U.S. government agencies if the data was stored on servers in the U.S. Although Sidewalk Labs proposed a technical solution that included storage of data in Canada, they could not guarantee the same data would be not shared and therefore potentially stored on servers in the U.S. This example of physical location of data storage highlights the importance of negotiated agreements which reflect the values of relevant stakeholders. In this case, there was no balanced solution found between the values of a business model based on monetization of personal data and the privacy values of citizens.

Sidewalk Labs' project could have included a substantial number of technology jobs with concrete targets through a CRBA. With the vast pool of technology expertise available through the parent company Alphabet, Sidewalk Labs could have developed training and mentoring programs for equity-seeking community-based individuals to ensure they have the skills required when the project requires them. In addition to implementing data collection technology on the site, Sidewalk Labs could simultaneously install internet connectivity devices in underserved communities in the city to mitigate the existing digital divide in the city of Toronto. Sidewalk Labs could create the long-term employment and education pathways targeted to equity-seeking groups in the city to eventually become high paid employees as part of the Alphabet constellation of companies. These potential initiatives can all be formalized and documented through a CRBA, which would enable joint governance by communities and project proponents.

Conclusion

This paper has highlighted the importance of equitable distribution of risks and benefits in the governance of smart city initiatives by extricating concepts from critical literature on smart cities against case studies of highly-documented, failed smart city projects. The paper has also illustrated the roles of institutional failure and values-sensitive design within the case studies presented. The primary risks of ICT-based smart city projects highlighted here are the inequitable distribution and impact of surveillance and economic impacts on communities that are already socio-economically disadvantaged. We point to the CBAs as frameworks of governance of benefits as well as mechanisms for formally identifying and mitigating surveillance risks for equity-seeking communities. The paper also argues that it is worth considering the explicit inclusion of risk in the development of CRBAs, in the context of smart city developments. This expanded framework has the potential to integrate an additional dimension of social justice and therefore lower the probability of institutional failure. This paper extends the concept of distribution of benefits that already exists in CBAs to application in smart city projects where there is a greater range of benefits including infrastructure and ICT-based employment as well as a greater range of risks for equity-seeking communities.

Author contributions

Both authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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