
A Tale of Two (Smart) Cities: Atlanta (USA) and Cox's Bazar (Bangladesh)

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Abstract

As urban developments are swiftly transformed into “smart cities” across the world, our proposed research unpacks these efforts that focus on the geographically, culturally, and infrastructurally disparate cities of Atlanta (Georgia, USA) and Cox's Bazar (Bangladesh). In this proposal, we lay out existing literature on “smart cities” and what the impending transformation will entail for residents of these cities across the board. Studying the demands that are placed on these residents, we propose a set of research questions that aim to unpack the marriage between the social and the technical dimensions in the discourse around smart cities.

Author Keywords

Smart Cities; Sociotechnical Systems; Participation

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Introduction

According to the United Nations, more than 3.5 billion of the world's population lives in cities and this number is slated to rise by 2.5 to 3 billion by the year 2050 [26]. There has been a growing focus to turn these urban developments into “smart cities” in recent years. The metrics for assessing

a city's smartness are not universal, however, aside from an uncontested enthusiasm towards improving infrastructures that support "Internets of Things" in order to more effectively manage the city's existing resources. While the technological drive has been unanimous across academia and industry, little attention has been paid thus far on the role played by existing human infrastructures that already exist in these cities, functioning perhaps without "always-online" access. In this paper, we propose research that will contribute to the growing body of "smart city" literature. We approach this research using the lens of "organic integration" between the technologies and citizens of a city [4].

What is a "Smart City"?

There is no single operational definition of "smart cities" [16, 13]. It depends on who is defining it, what context is considered for the definition, and what metrics will be used for the evaluation of its "smartness". Definitions offered as part of the "smart city" discourse mostly come from a top-down (institution, technology oriented) perspective. Very little work focuses on the human dimension of a "smart" city. We first aim to deconstruct what "smart" means in the context of a "smart city". Then we present how different stakeholders define and perceive "smart cities". Next, we identify the dimensions that have been explored in the "smart city" discourse. Finally, we present prior literature which focuses on the human dimension of "smart city".

Interpretation of "Smart"

Nam et al. investigate the meaning of the word "smart" in the context of "smart cities" [13]. In marketing terms, "smartness" is a more user-friendly term than the elitist term "intelligent", which is generally limited to having a quick mind and being responsive to feedback [1]. Other interpretations infer that the idea of "smart" encapsulates "intelligent", as the smartness of a system can only be real-

ized when it adapts itself to users' needs [13, 10]. A study conducted in London, Manchester, and Glasgow revealed that the participants didn't know exactly what "smart" meant in "smart city" [25]. These participants were using their familiarity with the term 'smart' to guess what a "smart city" might be.

In the urban planning field, "strategic directions" are considered as a requirement to become "smarter" [13]. Governments and public agencies at all levels are embracing the notion of "smartness" (or "strategic directions") to distinguish their new policies, strategies, and programs for targeting sustainable development, sound economic growth, and better quality of life for their citizens [19]. Achievement of policy success is labeled as smart in their (government and public agency) jurisdiction [13].

The "smartness" in technologies draws attention. The technologies had permeated into the commercial application of intelligent-acting products and services, artificial intelligence, and thinking machines [12]. "Smartness" in the technology context includes automated computing ideas including "*self-configuration, self-healing, self-protection, and self-optimization*" [20].

Smart homes, smart buildings, and larger smart ensembles like airports, hospitals, or university campuses are equipped with a multitude of mobile terminals and embedded devices as well as connected sensors and actuators [8]. The technology centered perspective for making things "smart" is evident here.

A "smart" ecosystem is a conceptual extension of "smart" space from the personal context to the larger community and the entire city [29].

The word has been explored in the context of tourism as

well. Tourism can be called “smart” if it is “supported by integrated efforts at a destination to collect and aggregate/harness data derived from physical infrastructure, social connections, government/organizational sources and human bodies/minds in combination with the use of advanced technologies to transform that data into on-site experiences and business value propositions with a clear focus on efficiency, sustainability and experience enrichment” [5].

Definition and Components of a Smart City

In one of IBM's documents, “smart city” was described as an “instrumented, interconnected and intelligent city.” “Instrumented” refers to the capability of capturing and integrating live real-world data through the use of sensors, meters, appliances, personal devices, and other similar sensors [6]. “Interconnected” means the integration of these data into a computing platform that allows the communication of such information between various city services [6]. “Intelligent” refers to the inclusion of complex analytics, modeling, optimization, and visualization services to make better operational decisions. The combination of “instrumented” and “interconnected” systems effectively connect the physical world to the virtual world [6]. Combining software and telecommunication networks, sensors, and identifiers creates intelligent cities [11].

Deakin et al. laid out four factors that serve as markers for a city's “smartness” [3]:

1. The application of a wide range of electronic and digital technologies to communities and cities
2. The use of ICTs to transform life and working environments within the region
3. The embedding of such ICTs in government systems

4. The territorialization of practices that brings ICTs and people together to enhance the innovation and knowledge that they offer

Deakin et al. define a “smart city” as a city that utilizes ICTs to meet the demands of the citizens of the city, and state that community involvement in the process is necessary for a smart city [2]. A “smart city” would thus be a city that not only possesses ICTs in particular areas but also implements these technologies in a manner that positively impacts local communities.

Nam et al. discuss the notion of smart cities based on previous literature and “identify and clarify” components of a smart city—“technology, people, and institution” [13]. “Technology” captures the hardware and software infrastructure, “people” broadly covers creativity, diversity, and education, and “institution” covers the concern related to governance and policy.

Washburn et al. define a “smart city” as a collection of smart computing technologies which are applied to seven critical infrastructure components - “city administration, education, healthcare, public safety, real estate, transportation, and utilities” [28]. They place explicit emphasis on smart computing. Smart computing refers to “a new generation of integrated hardware, software, and network technologies that provide IT systems with real-time awareness of the real world and advanced analytics to help people make more intelligent decisions about alternatives and actions that will optimize business processes and business balance sheet results” [28].

While most of these definitions focus on the technology-driven perspective, some portion of the discourse identifies the citizens' engagement in the vision of “smart cities”.

We aim to add to these body of literature by placing re-search questions for our research proposal to unpack what a “smart city” entails for its citizens. Based on our finding, we will be able to understand that how citizens can become more engaged with these technology driven “smart city” notion.

Human Dimensions of “Smart Cities”

Information generated from the citizens of a “smart city” can have a two-fold impact - (1) it changes the social behavior of citizens for utilizing the resources of the city sustainably and efficiently (ground-up), and (2) it allows service providers and city governments to provide more efficient and sustainable services (top-down) [7]. The difference between these two approaches lies in terms of how the data is used. In this section we focus on the human dimensions of the “smart city” discourse.

Partridge was one of the first to focus on the human dimensions of “smart cities”. Her observation of Brisbane in Australia sheds light on social inclusion and equal participation as enhanced opportunities created by smart city initiatives. The Brisbane City Council (BCC) expressed a vision for Brisbane as a *“smart city [that] actively embraces new technologies ... Brisbane should seek to be a more open society where technology makes it easier for people to have their say, gain access to services and to stay in touch with what is happening around them, simply and cheaply. All residents will have access to the Internet, and the ability to use it”* [17].

In an attempt to place the citizen’s voice in the smart city discourse, Thomas et al. conducted a research study in three cities of the United Kingdom - London, Manchester, and Glasgow [25]. They asked citizens from these three cities what their idea of a “smart city” was and what they envisioned in a “smart city”. The study found that most

participants were mostly unfamiliar with the term “smart”. They shared their vision for smart cities with three distinct themes: *“role of digital technologies in future smart cities”*, *“the importance of privacy”*, and *“the value of community”*.

The term “smart city” might not be universal because it has been applied to two different domains - “hard domains” and “soft domains”. Neirotti et al. identify the “hard domain” as buildings, energy grids, natural resources, water management, waste management, mobility, and logistics [14]. On the other hand “soft domain” refers to education, culture, policy innovations, social inclusion, and government. Very little literature focus on the integration of the “hard” and “soft” domains. Our proposed research seeks to identify the missing pieces in these two domains.

Two Smart Cities: Atlanta and Cox’s Bazar

Our proposed research will take place in two cities across borders—Atlanta (GA, USA) and Cox’s Bazar (Bangladesh)—that are marked by infrastructural, technological, and cultural differences. For example, while almost 80 percent of Atlanta’s households are connected to the internet [9], in Bangladesh only 13 percent of the population is currently connected [23]. Our goal is to explore how these differences might contribute to different (or not) definitions of smart cities. Thus far, the literature (as we saw above) only uncovers the definition of smart cities as seen in the west. We are keen to contrast this definition with findings across borders. We believe that the results of our exploratory study could potentially inform researchers, practitioners, industries, and stakeholders to be reflexive about their planning and execution of long-term ideas, especially when their vision derives from definitions that might not apply to their context but have been borrowed from elsewhere.

Atlanta, GA, USA

AT&T declared their initiative of making Atlanta smart by deploying "Internets of Things"(IoT) that will be able to "talk" to each other [15]. They came up with a framework for defining "Atlanta" as "Smart". The categories under this framework are as follows.

1. *"Infrastructure"* - The motivation for including infrastructures is to inform maintenance crews to locate and engage in the maintenance of *roads, bridges, buildings, parks and other venues*.
2. *"Citizen Engagement"* - The citizens will be able to look ahead based on the condition of the city with the use of mobile applications. The examples that have been discussed in this regard are viewing parking meters in advance to reserve spaces ahead of time, getting information about non-functional traffic lights.
3. *"Transportation"* - This category will let the commuters know in real time about the arrival of the next bus or train. Digital signage is envisioned as a tool that will allow commuters to rent electric bikes across the city and reduce the amount of traffic.
4. *"Public Safety"* - Law enforcing agencies can take advantage of "gun fire technology" to know where a shooting occurred, how many people were involved in it, and the numbers of rounds fired in that incident. In addition, the cities are envisioned to *"better manage traffic patterns of pedestrians at stadiums, parks, and busy intersections."*

Cox's Bazar, Bangladesh

Cox's Bazar, a southern coastal city, is one of the tourist attractions of Bangladesh [21]. In the past few years, surfing

has surfaced as a popular sport for the international audience [27]. In mid-2015, the Bangladesh Computer Council (BCC) and Airtel declared a joint initiative to make Cox's Bazar the "Digital Surfing City" [22]. Local Wi-Fi hot-spots are being envisioned for providing internet access. Connectivity is seen as something to *"improve the lifestyle of the city dwellers"*. Setting up ICT clubs is also considered a part of the five-year plan [24]. Bangladesh is keen to make the entire country "digital" by 2021, which is also labeled as the "vision 2021" [18]. The transformation of Cox's Bazar is seen as one of the milestones - *"To build a digital Bangladesh, it is very important to turn every city into digital city. And our journey starts from tourism city Cox's Bazar"*, according to State Minister for ICT, Junaid Ahmed Palak.

Proposed Research

To more deeply investigate the smart city discourse and identify dimensions that may have been overlooked, we propose to proceed "across borders" with the research questions below.

- What are the social and technological components of smart as defined in the discourse around smart cities? What are the digital literacies that might be assumed regarding this participation and who gets eliminated from participating as a result of this assumption?
- As for those who are unable to participate in the transition to "smartness", what are the consequences that they must suffer on account of this discourse? Do they miss out on specific opportunities? If yes, what are they? Also, are there ways and workarounds that they might take advantage of to close the gap to smartness?

- Even for individuals who might be included as far as availing the benefits of smart cities is concerned, are there ways in which their participation is or isn't permitted or encouraged? Do the plans for these cities require any kind of human infrastructure? Are there particular ways in which they do and others in which they don't?
- Moving beyond the politics of participation and the digital skills required, what considerations do smart cities make for privacy, security, and other individualist concerns? This is along the lines of the finding conducted by Thomas et al. [25].
- How might we integrate pre-existing infrastructures into the plan for smart cities? For example, do current offerings of public internet access need to be replaced or might they be iterated upon? How do the "new" and "old" come together? And looking to the future, what role do issues of sustainability play in shaping this discourse?

We hope that the HCI Across Borders symposium will allow us to connect with researchers who have similar interests and are working on one or more of the questions above. As the drive towards smart cities becomes increasingly prevalent across countries, developed or developing, it is important for us to consider how it might address pre-existing concerns and introduces new ones.

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