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SMART CITIES, HAPPY CITIZENS: INTERACTION BETWEEN TECHNOLOGY, MOBILITY, AND HAPPINESS

Patrícia Fraga

Abstract

The development of smart cities, focused on the interaction between technology, mobility, accessibility, and citizens' well-being, highlights the crucial influence of emotions on the urban experience. An innovative approach, exemplified by the Abayomi Methodology, is proposed to create dynamic urban environments, and promote happiness among residents. The aim is to transcend the traditional conception of technological centers, emphasizing the importance of mobility and universal accessibility. By underscoring the relevance of inspiring global practices, the research encourages strategies to enhance inclusion in urban daily life, particularly for individuals with reduced mobility and various disabilities. The approach seeks a holistic understanding of smart cities, emphasizing technological efficiency and the positive impact on citizens' quality of life. The adoption of the Abayomi Methodology aims to positively influence urban development, creating more inclusive environments tailored to the diverse needs of residents.

Introduction

The concept of smart cities has transformed urban development, integrating technology, mobility, and accessibility to redefine the urban experience. As cities embrace technological advances, prioritizing the emotional well-being of citizens is crucial, moving beyond infrastructure and efficiency. The increasing focus on the

emotional influence of urbanization underscores the complex connection between positive experiences and the overall quality of life in cities.

> ***"[...] A smart city is the one that puts technology at the service of the citizens and the happiness of individuals and communities." (Fraga, P., 2021, p.11)***

In this paper, the aim is to elucidate the diverse dimensions of smart cities and their emotional implications. The complex interaction among technology, mobility, and accessibility forms the core of this analysis, connecting the objectives of smart cities to the transformative potential outlined by the Abayomi Methodology. This forward-looking and integrative approach goes beyond established norms, considering emotional well-being and happiness as fundamental pillars in urban development.

The relevance of happiness in urban environments is crucial, influencing citizens' interaction, perception, and care for their surroundings. In this analysis, real-world case studies are examined to extract lessons and inspiration for the desired urban development.

The Abayomi Methodology is presented as an innovative approach to enhancing positive emotions in smart cities, grounded in principles of well-being, inclusion, and happiness. It transcends conventional urban development strategies, connecting various fields of knowledge through 6 dimensions of analysis. Its main objective is to integrate these dimensions into the analysis of smart city structures, recognizing the fundamental role of intelligent resource use and emotions in the daily lives of urban residents.

In summary, this paper proposes an innovative analysis of smart cities, emphasizing the interaction between technology, mobility, and accessibility, and highlighting the importance of citizens' happiness. The aim is to understand positive and balanced urban experiences for the entire community, fostering dialogue on approaches that enhance accessibility and promote universal design. The effort seeks to facilitate the integration of people with reduced mobility, the elderly, and those with physical, sensory, or intellectual disabilities into urban dynamics, inspiring constructive debates to improve cities, making them more inclusive continually and adapted to a wide range of needs.

1. Smart Cities and Happiness

The urban landscape and contemporary life undergo profound transformations with smart cities, driven by technological innovations to increase efficiency, sustainability, and overall quality of life. These cities utilize interconnected devices, data analysis, and digital infrastructure to optimize various aspects of urban life.

Urban life profoundly impacts emotional well-being, influenced by factors such as city design, mobility, accessibility, and communication. The design of public spaces, green areas, and the quality of urban infrastructure are crucial for residents' emotional experiences (Gehl, 2010). Mouratidis (2021) highlights the role of urban design in creating environments conducive to positive emotions and social interactions. Caragliu, Del Bo, and Nijkamp (2011) underline that smart cities incorporate elements such as governance, population, mobility, economy, environment, and intelligent living, representing a new urban paradigm that adapts

old structures, creates new cities, and redefines human interactions with the environment.

As cities incorporate technologies like the Internet of Things (IoT), artificial intelligence (AI), and advanced data analysis to address urban challenges, intelligent mobility solutions such as innovative transportation systems simplify traffic and reduce environmental impact (Ahvenniemi et al., 2017). This technological integration in urban spaces also shapes citizens' interaction with the environment and access to essential services, which are crucial for positive emotional experiences. However, inadequate transportation infrastructures can generate frustration, negatively impacting residents' emotional well-being (Stanley et al, 2011).

Integrating emotional well-being into smart city initiatives poses challenges and opportunities. The need for approaches considering the diverse needs of inhabitants, including emotional ones, is a challenge highlighted by De Lange et al. (2020). Emotionally responsive urban environments require a nuanced understanding of cultural, social, and individual differences. The potential lies in adapting technology to meet citizens' emotional needs. AI-based applications, as mentioned by De Nadai et al. (2016), can analyze data to identify patterns of emotional well-being and inform urban planning decisions. The challenge is balancing technological advancements with a people-centric approach, prioritizing emotional satisfaction.

The current landscape of smart cities, driven by technological advances, provides opportunities to enhance emotional well-being. However, the emotional aspects of urban life require careful consideration in city planning, mobility, and accessibility to

create inclusive and satisfying environments for all residents. The upcoming sections will delve into the details of the Abayomi Methodology and its implications for promoting positive emotions in smart cities.

2. What is the Abayomi Methodology

After presenting the fundamental concepts of Smart Cities and their objectives, the Abayomi Methodology is introduced as a framework for subsequent urban analyses. Initiated in 2018, this dynamic methodology mirrors the complexity of urban life in continuous transformation. Its purpose is to model the emotional dimension in smart cities, surpassing conventional paradigms of urban planning. The Abayomi Methodology constitutes a holistic framework, emphasizing the essential interconnection between technology, community well-being, and urban emotional experiences.

Placing citizens at the core of urban development, the Abayomi Methodology emphasizes human-centered design principles to promote inclusion and a sense of belonging. Prioritizing not only technological advancements but also well-being, the methodology focuses on six areas: Conscious Citizenship, Physical and Digital Space, Innovative Management, Communication, Human Relations, and Health and Well-being.

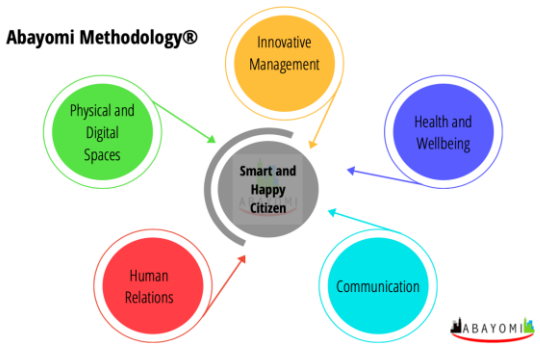

Image 1: The Abayomi Methodology
Source: Abayomi (2020)

The conscious citizen understands their space and needs and collaborates in seeking solutions for urban challenges. Physical and digital spaces should be adapted to local realities, establishing a connection between the real and the virtual. Efficient and Innovative management triggers solutions tailored to users' needs. Clear and inclusive communication guides movements. Strengthening human relations in environments contributes to compassionate cities. Urban environments should promote the health and well-being of inhabitants, encouraging practices that make cities more inclusive and dynamic.

The Abayomi Methodology aims to connect intelligent urban planning with community engagement, starting with Conscious Citizenship. A city's intelligence goes beyond technological achievements, including the ability to influence positive emotional experiences. Through active citizen participation, they become active contributors to the conception of the urban environment (Tobias et al, 2023). This collaborative approach fosters a sense of belonging, ownership, and connection, emotionally enriching the community (De Lange et al., 2020). Whether in creating green spaces, accessible infrastructures, or cultural centers, the Abayomi Methodology seeks to present an approach that not only promotes positive emotions but also empowers citizens to become co-authors of their urban narrative. The principles of the Abayomi Methodology aim to guide our journey toward truly smart cities and genuinely happy citizens.

3. Mobility and Accessibility: A Key Component for Smart Cities

The vitality of modern cities is intrinsically linked to mobility and accessibility. For a city to be considered "smart", it must develop fair and effective solutions in these aspects. A comprehensive

approach to mobility, considering its complexity, enhances the quality of life by promoting inclusive options that meet the needs of residents and consider their perception of happiness. Efficiency and universal accessibility, as complements, are significant factors for well-being, directly influencing cultural and social issues and fostering positive thinking (Tobias and Ramos, 2021, p. 35).

The interconnection between mobility, accessibility, and emotional experiences in urban environments is crucial in smart cities. As cities become more connected, citizens' movement significantly influences their integration and emotional well-being in urban life. Stanley et al. (2011) emphasizes understanding the emotional dimensions of transportation, highlighting that these experiences are not only functional but are intrinsically linked to individual feelings and perceptions.

Image 2: Urban Accessible Experience
Source: Mark Thomas (2023) from Pixabay

In developing smart cities, it is crucial to address mobility challenges and enhance universal accessibility. Mobility influences accessibility, shaping citizens' ability to connect with urban life. The Abayomi Methodology recognizes the crucial role of

technology in promoting inclusive environments, seeking to reshape the paradigms of urban mobility and accessibility, emphasizing the need for accessible transportation systems to enhance citizens' emotional experience.

The Abayomi Methodology prioritizes intelligent urban planning for mobility, requiring equitable access to various modes of transportation. This goes beyond traditional methods, including innovative solutions like smart public transportation systems and pedestrian-friendly spaces. These measures converge to create an urban environment where mobility is integrated into the emotional fabric of the city, surpassing its basic function.

Intelligent public transportation systems, leveraging advanced technologies such as real-time tracking and data analysis, play a crucial role in redefining urban mobility. They optimize routes, minimize wait times, and enhance overall efficiency, creating an experience that caters to diverse citizen needs, including those with reduced mobility and physical, sensory, and intellectual disabilities. Beyond public transportation, the adoption of shared mobility solutions, like ridesharing and bike-sharing, prioritizes accessibility, promoting efficiency, reducing traffic congestion, and providing inclusive options for residents.

Urban design is another dimension where a commitment to inclusive mobility should be evident. Prioritizing pedestrian-friendly spaces promotes not only efficient movement but also enhances citizens' emotional well-being. Well-designed walkways, green spaces, and universally accessible infrastructure contribute to an urban landscape that encourages active engagement with the surroundings, fostering a sense of community and connection.

Image 3: Urban Accessibility for All
Source: Antonio Faundes (2016) from Pixabay

The Abayomi Methodology, through its dimensions of analysis, understands that mobility and accessibility go beyond the conventional, ushering in a new era where technology and urban planning harmonize to create emotionally enriching and inclusive smart cities, where citizens actively participate in urban discussions.

4. Emotional Impact of Accessible and Efficient Mobility Solutions

Efficient and accessible mobility solutions deeply impact citizens, influencing urban experiences. Studies, such as Gehl's (2010), emphasize the relevance of accessible transport for a positive emotional connection between citizens and the city. Mouratidis (2021) highlights that accessible transportation promotes independence and inclusion, positively impacting emotional well-being. Facilitating city movement, regardless of physical abilities or socio-economic conditions, fosters inclusion and shared community. Implementing universal design principles in transportation infrastructure ensures full participation in urban life, including individuals with disabilities.

Integrating emotional dimensions, as proposed by Duarte and Cohen's "Emotional Accessibility" (2018), is crucial in the context of smart cities, ensuring inclusive and harmonious urban experiences. The concept underscores that accessibility extends beyond the physical, conveying a sense of welcome and respecting emotional, affective, and intellectual aspects. This approach challenges the notion that accessibility is limited to removing physical barriers, encompassing the ambiance that treats the user as a whole being. This perspective is inherently connected to the emotional impact of accessible and efficient mobility solutions.

Emotional benefits include stress reduction and increased well-being. Ahvenniemi et al. (2017) highlight that accessible transportation options contribute to a more relaxing urban experience. When citizens can navigate the city seamlessly, it positively impacts their mental and emotional states. Incorporating these emotional dimensions into the principles of smart city development is crucial.

The emotional impact of accessible and efficient mobility solutions, from the perspective of the Abayomi Methodology, goes beyond functional convenience. It encompasses a profound perspective that enhances citizens' emotional well-being, fosters a sense of community, and contributes to a positive urban experience. This begins with the awareness and active participation of citizens in discussions about mobility and accessibility in their own communities.

5. Promoting Inclusive Spaces and Happiness in Smart Cities

The dialogue on smart cities emphasizes the centrality of inclusive spaces, recognizing the need for urban environments to address

diverse needs. The idea goes beyond physical accessibility, encompassing dimensions such as age, gender, physical and intellectual ability, and socioeconomic conditions. Caragliu, Del Bo, and Nijkamp (2011) stress that a comprehensive vision of smart cities necessitates a commitment to inclusion.

The Abayomi Methodology highlights inclusive spaces as a fundamental principle, recognizing the interconnection between emotional well-being, belonging, and accessibility. The methodology advocates for the integration of universal design principles, ensuring that urban spaces are not only physically accessible but also welcoming to everyone, regardless of their background or abilities. Promoting emotional well-being through inclusive design is crucial in public spaces, a perspective addressed in the dimensions of the Abayomi Methodology.

Per Gehl (2010), in people-centered urban environments, collaboration in shaping these spaces aims to transform public areas into inclusive arenas capable of accommodating various activities and fostering a sense of community and shared ownership. This approach not only reduces environmental impact but also ensures the accessibility of urban spaces for individuals of all abilities. Inclusion in this context goes beyond physical infrastructure, encompassing the ease with which individuals interact with the surrounding environment.

The examples below illustrate strategies to enhance mobility and universal accessibility in various cities, linked to the analytical dimensions of the Abayomi Methodology. Understanding these dimensions can catalyze smart cities, focusing not only on creating spaces where each citizen feels valued and connected but also indicating how incorporating this methodology into

discussions about smart cities, mobility, and universal accessibility can significantly contribute to the design of truly effective, intelligent environments oriented towards people's well-being and happiness.

In Tokyo, Japan, citizen awareness is promoted through interactive educational campaigns on accessibility in public spaces. The city uses digital technologies to provide real-time information on accessibility conditions in public locations, promoting more conscious citizenship. This initiative contributes to enhancing both physical and digital space inclusively, thus connecting with the dimensions of the Abayomi Methodology, specifically Conscious Citizenship and Intelligent Physical and Digital Space.

Image 4: Barrier-Free in Public Spaces

Source: Japan National Tourism Organization (2024)

Stockholm, Sweden, adopts an innovative approach to public transportation management, ensuring universal accessibility. The city's bus system uses advanced algorithms to optimize routes in real time, catering to the specific needs of passengers with reduced mobility. Moreover, intelligent communication is facilitated by apps that provide information in an accessible manner, promoting innovative management and effective communication. This practice aligns with the dimensions of the

Abayomi Methodology, notably Innovative Management and Intelligent Communication.

Image 5: Stockholm App for People with Disabilities
Source: Startup Network (2021).

Copenhagen, Denmark, stands out in promoting human relations and well-being through its shared bicycle system adapted for people with disabilities. Investing in public spaces designed to encourage social interactions, the city contributes to the emotional health of the community and an inclusive environment. The dimensions of the Abayomi Methodology connected with this proposal are Human Relations, Health, and Well-being.

Image 6: Accessible Shared Bike System
Source: Coulon (2019). "Cycling Without Age".

Singapore integrates citizen awareness and intelligent technology to ensure accessibility. Its public transportation network uses IoT sensors to monitor real-time crowding and accessibility. Additionally, the city invests in smart sidewalks and digital

signage to create an inclusive physical and digital space, promoting awareness and facilitating mobility for all. This practice relates to the dimensions of the Abayomi Methodology, especially Conscious Citizenship and Intelligent Physical and Digital Space.

Image 7: IoT for People with Disabilities
Source: Lai (2017). Better Life by Design: Designing for People with Disabilities. A co-creation workshop with Design Singapore and Very Day

Barcelona, Spain, stands out as a comprehensive example of how the Abayomi Methodology is connected to urban decisions. The city embraces inclusive practices, from innovative public transportation to spaces adapted to foster human relationships and well-being. Active community participation in superblocks reflects a collaborative commitment. This model aligns with the Abayomi Methodology's emphasis on citizen involvement, ensuring that spaces meet diverse community needs. Barcelona is recognized for creating an inclusive and joyful urban environment, embracing diversity.

Image 8: Superblocos for All
Source: Robert (2019). "Superblocks: Barcelona's Plan to Free Itself from Cars".

The practices illustrate the transformative impact that the Abayomi Methodology can offer in smart cities, prioritizing spaces that promote belonging and universal connection. With its six dimensions, the methodology can guide the creation of inclusive environments and strengthen smart cities. By integrating universal design, people-centered approaches, and community engagement, it is possible to redefine urban spaces to nurture emotional well-being through inclusion and efficient use of available resources.

Conclusion

As we explore smart cities, it becomes clear that the interaction between technology, mobility, accessibility, and citizen well-being is vital in defining the urban future. This paper presents the Abayomi Methodology as an innovative contribution to urban discussions and a catalyst for harmonious and emotionally enriching environments, promoting well-being, community, and citizen participation.

The concept of smart cities goes beyond technology, aiming for citizens' happiness. A smart city puts technology at the service of well-being. The Abayomi Methodology, with its six dimensions, guides innovations by integrating universal design, digital environment, technologies, people-centered approaches, and strengthening community involvement.

The Abayomi Methodology, when examining mobility and accessibility, embraces a holistic perspective, considering both functional efficiency and emotional impact on citizens' lives. This interconnection between smart mobility, innovative management, and the promotion of universal accessibility emerges as a crucial strategy to build truly intelligent and emotionally enriching cities,

addressing diverse community needs. In this analysis, the importance of promoting inclusive spaces is highlighted as a fundamental pillar for emotional well-being. Drawing inspiration from exemplary practices in cities worldwide, such as Tokyo, Stockholm, Copenhagen, Singapore, and Barcelona, it becomes apparent that inclusion extends beyond physical accessibility, encompassing cultural, social, and individual aspects.

The analytical dimensions of the Abayomi Methodology - Conscious Citizenship, Physical and Digital Space, Innovative Management, Communication, Human Relations, and Health and Well-being - provide a robust framework for analyzing and improving urban practices. Citizen awareness, intelligent use of technology, innovation in urban management, and the active promotion of human relations are key elements in creating cities where every citizen feels valued and connected.

The Abayomi Methodology goes beyond an approach to smart cities; it's a vision of recognizing emotions in constructing enriching urban spaces. By integrating it into discussions about smart cities, mobility, and universal accessibility, urban spaces can be redefined and become happy, inclusive communities tailored to diverse needs. The challenge is to adopt these principles in different urban contexts, empowering citizens to co-write the narrative of their cities, and ensuring a more sustainable, joyful, and equitable urban future.

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