Advertising for the people: Digital media and citizen engagement in the smart urban environment

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Abstract
The aim of this paper is to explore how advertising can enhance citizen engagement within smart urban environments, aligning with the principles of human-centered digital transformation. Building on previous research into artificial intelligence (AI) and its role in increasing the effectiveness of digital advertising campaigns, the study expands this focus to examine the social and communicative dimensions of advertising in the context of smart cities. The object of analysis is the transformation of advertising through AI and data-driven media, which enable the creation of adaptive and context-aware content. These technologies make it possible for advertising to evolve from a purely commercial activity into a participatory form of communication that connects institutions, spaces, and citizens. The method combines content analysis with theoretical reflection on recent studies concerning digital media, advertising, and smart city communication. The results suggest that intelligently designed advertising can enhance awareness, inclusion, and interaction among urban communities. The implications highlight that advertising, when strategically aligned with civic values and digital innovation, can contribute to citizen participation and community resilience—supporting the broader vision of leading for the people while accelerating with the digital.

Keywords: smart cities; digital advertising; citizen engagement; artificial intelligence; urban communication; digital transformation

1. Introduction
The concept of the Smart City—an urban environment leveraging integrated technology and data-driven solutions to enhance efficiency and quality of life—has become a dominant paradigm in urban planning and governance worldwide. However, the initial phase of smart city development was often criticized for prioritizing infrastructure-driven and techno-centric solutions over the actual needs and voices of the people they were meant to serve, creating a risk of a digital divide and a lack of public oversight [1]. This foundational critique has spurred a critical shift in global discourse toward a human-centered or People-Centered Smart City model, which grounds technological development in a commitment to human rights, inclusivity, and maximizing community participation.

Against this backdrop of a necessary paradigm shift, this paper explores a novel avenue for enhancing citizen involvement: the strategic transformation of digital advertising. Building on previous research into Artificial Intelligence (AI) and its role in increasing the effectiveness of digital advertising campaigns [2], the study expands this focus to examine the social and communicative dimensions of

advertising within the smart urban environment. While commercial advertising is traditionally viewed as a unidirectional, persuasive monologue, the object of analysis here is the transformation of this medium through AI and data-driven media. These technologies enable the creation of adaptive, context-aware content that connects institutions, public spaces, and citizens in new, potentially participatory ways [3], [4].

The aim of this paper is therefore to explore how intelligent, ethically designed advertising can move beyond purely commercial activity to enhance awareness, inclusion, and interaction among urban communities. Utilizing content analysis combined with theoretical reflection on contemporary studies concerning digital media, advertising, and smart city communication, the results suggest that digital advertising, when strategically aligned with civic values and digital innovation, can significantly contribute to citizen participation and community resilience. The core thesis holds that by accelerating with the digital transformation while deliberately leading for the people, advertising can be successfully repurposed as a robust tool for civic engagement, helping to realize the broader vision of a truly democratic and inclusive smart city [5], [6].

2. The human-centric turn in urban communication

The evolution of urban governance toward the Smart City model requires a parallel evolution in urban communication. While technology platforms like dedicated e-participation portals, participatory budgeting systems, and fix-it apps are increasingly used to encourage citizen input these platforms often struggle with issues of access and awareness, requiring a stable internet connection and digital literacy that can exclude marginalized or lower-income groups.

This challenge underscores the necessity of the human-centered digital transformation. Major international bodies, such as UN-Habitat, advocate for this approach, emphasizing that smart city activities must be centered on people's needs, maximizing community participation, and ensuring digital equity through universal access to affordable internet and digital skills. For technology to be effective, it must meet the citizen where they already are, embedding participatory mechanisms into the ubiquitous flows of daily life.

The current study leverages the established principles of digital transformation—specifically the shift from infrastructure-driven to citizen-centric models—to argue that the pervasive, hyper-targeted nature of digital advertising represents an underutilized channel for meeting this challenge. By reframing the mechanism that currently drives commercial outcomes (AI-driven targeting, personalization, and real-time content optimization [7] toward civic outcomes, communication can be made instantly relevant and context-aware. This approach bypasses reliance on

citizens actively seeking out engagement platforms and instead integrates crucial public information and opportunities for feedback into the digital media spaces they already consume, aligning the goal of civic participation with the reality of ubiquitous digital media.

3. From commercial monologue to context-aware dialogue

Traditional advertising operates as a monologue: a one-way transmission intended to persuade consumers to purchase or adopt a behavior. At first, it was social networks that thrusted advertising onto the road of creating a dialogue [8], especially when it came to meeting consumers' needs [9]. However, the integration of Artificial Intelligence (AI), specifically machine learning (ML) and natural language processing (NLP), has fundamentally transformed this dynamic, shifting it toward a more complex, context-aware dialogue.

In the commercial sphere, AI processes vast amounts of real-time data on user behavior, location, demographics, and preferences to deliver hyper-personalized content that significantly boosts engagement and brand affinity. This personalization, often called hyper-customization, allows for messaging to be modified for each user in accordance with their location or current activity, strengthening the user's affinity with the content because it speaks directly to their needs and interests.

This study posits that the very mechanisms of AI-driven personalization and content adaptation can be ethically repurposed for public service and civic engagement. In the smart city context, this evolution means:

- Contextual Relevance: Instead of advertising a sale, a digital street display in a specific neighborhood could deliver real-time information about a local participatory budgeting vote, an upcoming community clean-up, or a sudden change in public transit based on real-time mobility data.
- Adaptive Content: The AI can tailor the style and language of the message to resonate with the specific demographic profile (language, interests, digital literacy) of the citizens currently viewing the advertisement, thereby actively countering the digital divide and promoting inclusion.
- Two-Way Communication: Adaptive digital media, particularly on interactive screens or through mobile ad formats, can evolve from a simple display into a feedback loop. Citizens can be prompted to provide immediate input (e.g., a quick one-tap survey on a proposed bike lane) or be directed to a relevant local service or platform, effectively turning an advertising slot into a public service communication portal that fosters transparency and direct interaction with government.

By embracing the sophistication of modern AI-driven advertising, cities can transform passive media spaces into dynamic, inclusive channels for urban communication.

4. Interactivity and digital out-of-home (DOOH) advertising

It is only fair to ask the question: "What has interactivity, especially in advertising, has to do with the quality of life of cities' residents?" The answer lies in the fundamental goal of the Smart City concept: to transform the work, life, and play of its residents, thereby enhancing their quality of life. As an example, the city of Singapore, designated the smartest city in 2012 [10], demonstrated that a key component was its IT2000 plan, designed to create an "intelligent island" where Information Technology (IT) permeated and transformed these daily activities. It is safe to assume that the concept of play has a lot to do with interactivity, which, in its basic etymology, consists of "inter" and "action," or engaging through action.

The definition of "interactive" [11] is fundamentally dual: 1: "mutually or reciprocally active"; and 2: "involving the actions or input of a user." The noun action is vital, as people engage, participate, and learn through action. In the context of Smart Cities, technology is a pervasive component, and Digital Out-of-Home (DOOH) advertising represents a crucial crossing point of people, technology, urban space, and interactivity. Therefore, it is necessary to dive further into the notion of interactivity and its role in enhancing advertising efficiency—and, by extension, civic communication.

Karimova [12] argues that interactivity is inherent in both traditional forms of advertising and so-called new media, denoting mainly the Internet. Her arguments, while foundational, may be approached from a philosophical perspective rather than a purely practical one. She proposes a model of inherent components of interactivity in advertising consisting of seven dimensions: active engagement and reaction; physical action; flow; involvement; control of consumers; two-way communication; and feedback. A detailed analysis reveals areas for refinement, particularly in the context of DOOH advertising and its role in Smart Cities:

- Active Engagement and Reaction: The argument that consumers engage by interpreting, constructing, and co-creating meaning may be viewed as a passive role, applicable to any communication form. A true civic application requires a more active, demonstrable action towards the marketing communication, leading into the next dimension.
- Physical Action: Karimova's examples, such as rubbing a scented magazine page or building a model, aptly demonstrate that traditional advertising can suggest an action. DOOH, however, enables a much higher degree of integrated, real-time physical action (e.g., scanning a QR code, tapping a screen).

- Flow: Hoffman and Novak [13] state that the flow state requires a balance between skills and challenges. When skills exceed the challenge, the result is boredom; when the challenge exceeds the skills, the result is anxiety. In either case, the interaction is interrupted. This balance is critical for civic DOOH, ensuring public service messages are neither too simplistic nor too complex.
- Involvement: Researchers find a correlation between interaction and experiential involvement, assuming that the more immersive the experience, the more interactive it is [14]. For civic engagement, experiential involvement is key to generating lasting community interest.
- Control of Consumers: The argument that traditional media offers audiences no control over content [15] is becoming less defensible, though digital media undeniably offers a higher degree of user control, driving the shift towards participatory models.
- Two-Way Communication: Karimova strongly defends this as a tautology, arguing that communication inherently implies at least two sides. While true, effective two-way communication in the Smart City context necessitates clear, functional feedback mechanisms.
- Feedback: Some researchers characterize an ad as interactive when it provides feedback [16], [17]. While any consumer reaction, including purchase, may be argued as feedback, true interactivity in public dialogue requires an explicit, structured response mechanism, such as surveys, comments, or direct digital input.

All of the analyzed components play a vital role in defining the interactivity of advertising. However, in the context of digital and intelligent media, an additional component is suggested to enhance the process: personalization of advertising communication with regard to behavioural data analyzed by AI. When a message is personalized, it speaks directly to a particular customer or set of customers. In the DOOH environment, personalization is played through contextual advertising. Though interactivity is present in traditional media, the digital environment, especially in smart cities, presents a significantly higher degree of integrated and dynamic interactivity.

5. The cultural dimensions of context-aware communication

The effectiveness of both commercial and civic digital communication is fundamentally reliant on understanding the target audience. In the smart urban environment, this audience is intrinsically intercultural, requiring adaptive communication strategies that respect and account for societal differences. This necessity brings into focus established frameworks of cultural analysis.

Throughout the scientific field, culture has been given various definitions, and there has been an ongoing debate as to whether or not it needs to be defined through a

framework of dimensions. Hofstede, however, provides a measurable model, defining dimensions as an "aspect of culture which can be measured relative to other cultures" [18]. His theory is by far the most used and cited model in marketing research for understanding differences among cultures [19].

In his most renowned work, Culture's Consequences, Hofstede outlines six dimensions of national culture that hold vital implications for how civic messages are formulated and received in a smart city context:

- Power Distance: This refers to the extent to which the less powerful members of institutions and organizations expect and accept that power is distributed unequally.
- Individualism versus Collectivism:
- Individualism is characteristic of a society where ties between individuals are loose.
- Collectivism describes a society where individuals are part of strong, cohesive in-groups, identifying with "we."
- Masculinity versus Femininity:
- Masculinity describes a society where emotional gender roles are distinct.
- Femininity describes a society where this separation is weakened, with a focus on quality of life for all.
- Uncertainty Avoidance: This is the extent to which members of a culture feel threatened by ambiguous and uncertain situations.
- Long-Term Orientation versus Short-Term Orientation:
- Long-Term Orientation fosters pragmatic virtues focused on future rewards.
  - Short-Term Orientation focuses on the past and present, valuing tradition and fulfilling social obligations.
- Indulgence versus Restraint:
- Indulgent societies allow relatively free gratification of basic human desires.
- Restraint societies suppress the gratification of needs, regulated by strict social norms.

These six factors play a vital part in determining where, when, and how a DOOH advertisement is deployed. AI-driven machine learning is capable of using these predefined cultural traits, often cross-referenced with demographic and behavioral data, to ensure a relevant civic or public service message is introduced to the appropriate audience, simultaneously taking into consideration its intercultural characteristics. This analytical capacity allows the smart city to execute truly inclusive and empathetic urban communication.

6. Social advertising as the focal point of smart city communication

The core mechanism analyzed—the use of AI and data-driven personalization within the DOOH environment to promote awareness, inclusion, and interaction—aligns perfectly with the principles of Social Advertising [20]. Unlike commercial advertising, which is primarily focused on achieving marketing outcomes like sales or brand recall, the fundamental objective of social advertising is to influence public attitudes and behavior towards non-commercial, civic, or societal issues. This includes promoting public health, discouraging anti-social behavior, encouraging sustainable practices, or, as is crucial here, driving citizen engagement and participation in governance [21], [22].

The integration of intelligent digital media in the urban environment allows for the evolution of this category of communication into a highly effective tool for smart governance:

Purpose-Driven Personalization

When repurposed for social goals, the AI-driven targeting discussed in Section 2 is no longer used to sell a product but to optimize the delivery of public value. In a smart city, this means the adaptive communication system uses data (behavioral, geographic, demographic) to overcome historical barriers to civic participation, such as lack of awareness or relevance. By using DOOH and mobile channels to deliver context-aware Social Advertising—such as real-time alerts about local construction plans, participatory budget deadlines, or community voting initiatives—the communication transforms into a dynamic bridge that enhances the urban experience through targeted, meaningful, and immediate information delivery.

Credibility and the Challenge of Trust

Shifting communication from commercial to social objectives is vital, but its success hinges on public trust and credibility. In an era of pervasive digital advertising, consumers (and citizens) often express cynicism and fatigue, which erodes the credibility of all advertised messages [23]. For AI-driven Social Advertising to be effective in a civic context, it must adhere to strict principles of transparency and authenticity:

- Authenticity: The message must align with the genuine social mission and values of the city.
- Transparency in Data Use: City-led social advertising must be transparent about why a message is being shown to whom, building confidence that the technology serves the common good, not covert surveillance.

By embracing these guardrails, social advertising platforms can leverage their unique ability to facilitate two-way, interactive dialogue. Unlike traditional one-way Public Service Announcements (PSAs), smart city social advertising must

integrate clear feedback mechanisms (as noted in Section 3), transforming passive awareness into active involvement and making citizens feel like co-creators of the urban environment. This places the responsibility on the municipality to ensure that the content is perceived as reliable and that the feedback collected is demonstrably used to shape policy, fulfilling the human-centric mandate of the smart city.

7.Conclusion

This study set out to explore the transformative potential of reframing digital advertising as a core mechanism for citizen engagement within the rapidly evolving smart urban environment. By leveraging the capabilities of Artificial Intelligence (AI) and data-driven personalization, the historically unidirectional flow of commercial communication can be repurposed into a context-aware, interactive tool for public service.

The findings demonstrate a path toward aligning digital acceleration with a human-centric mandate. The transition from commercial persuasion to Social Advertising allows municipalities to utilize the dynamic and pervasive nature of DOOH media to overcome chronic issues of low awareness and access that plague traditional civic platforms. Furthermore, the capacity of AI to adapt messages based on complex cultural and behavioral data ensures that engagement is not only efficient but also inclusive and culturally relevant, thereby bridging the digital divide and enhancing community resilience.

Future research should focus on developing measurable frameworks for assessing the efficacy of AI-driven social advertising outcomes—specifically, quantifying the increase in citizen participation and policy feedback directly attributable to these platforms, thereby solidifying their role in the next generation of urban governance. The power of digital media in the smart city is not inherent to the technology itself, but to the ethical intention and design of its application. That is why the ethical principles behind even social advertising in a smart public spaces should also be studied. It would be only when these priciples are met that we could establish a genuinely participatory form of communication that fosters continuous dialogue between institutions and citizens, and truly fulfills the vision of a democratic and inclusive smart city.

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