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INVISIBLE DATA, VISIBLE EXPERIENCES: ARTIFICIAL INTELLIGENCE IN THE SERVICE OF DATA-DRIVEN CITY MARKETING

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Abstract

Recent advancements in artificial intelligence have begun to reshape the practices of contemporary city marketing by enabling the development of more targeted, efficient and personalised communication and development strategies. By analysing real-time data gathered from digital interactions and user feedback, AI technologies support the creation of segment-specific content and the improvement of the user experience, while fostering a stronger sense of belonging to a community among various stakeholders, including residents, tourists, businesses and students.

This article provides a comprehensive overview of the role regarding data-driven decision making in city marketing. European best practises – such as Madrid's VisitMadridGPT system and Helsinki's MyHelsinki platform – show that AI contributes not only to communication, but also to strategic and operational dimensions of urban development. These examples emphasise the ability of AI to improve both the competitiveness and long-term sustainability of cities. Ethical considerations, particularly in relation to data privacy, are also addressed as integral components of responsible AI adoption. The study aims to summarise current trends, practical implementations and critical challenges in the application of AI regarding city marketing and ultimately contribute to the development of more conscious, data-driven urban strategies.

Keywords: *AI, city marketing, data-driven, sustainability*

1. Introduction

In recent years, the importance and applicability of artificial intelligence (AI) in the field of city marketing has increased significantly. Using AI and big data, municipalities now have access to an unprecedented amount and granularity of information about residents, commuters, local businesses and tourists. By understanding the nuanced expectations of diverse urban audiences, city marketers can develop communication strategies that are both context-sensitive and better aligned with local dynamics.

In addition to traditional campaigns, city marketers are increasingly using real-time data, smart devices and automated marketing tools in the digital space to personalise both communications and service delivery. This allows cities to respond more quickly and accurately to consumer needs, create content tailored to the interests of specific segments and offer more engaging, customised experiences. These opportunities improve the city's competitiveness while fostering greater engagement with diverse communities.

AI also helps the city's marketers to recognise emerging tourism and consumer trends early and respond proactively to changing public expectations. By enabling the adaptation of local products and services to actual demand, AI supports local businesses in optimising their offers.

Importantly, AI is not limited to communication tasks but can also be integrated into the daily operations of the city. Applications in the areas of transport, waste management and energy consumption show how AI is helping to create a more sustainable urban environment. Nonetheless, these advantages must be balanced with growing concerns over how ethically and equitably such systems are applied.

This article is structured to provide a comprehensive and practical overview of how artificial intelligence is changing the field of city marketing. Following this introduction, the second section identifies and summarises the key trends shaping AI-powered marketing strategies in urban contexts. These trends range from real-time data analysis and predictive personalisation to immersive tourism experiences and the challenge of ensuring data security and public trust. Rather than treating AI as a monolithic tool, the section emphasises the diversity of its applications and its strategic impact on cities.

The third section presents three interlinked areas in which AI plays a central role: target group-specific communication and stakeholder engagement, data-driven decision-making and integration into smart city ecosystems. Each of these areas is analysed using concrete examples and literature-based insights, with particular attention paid to successful European case studies such as VisitMadridGPT and the MyHelsinki platform. The analysis shows how AI contributes not only to the external image of cities, but also to their internal functioning and adaptability to dynamic societal needs.

In addition, the study examines how AI enables finer segmentation, the creation of personalised content and efficient resource allocation. It also discusses how digital footprints and feedback loops can be used to measure the effectiveness of marketing campaigns in real time. Particular attention will be paid to the role of AI in bridging the operational, communicative and strategic levels of city management.

The fourth section offers a critical reflection on the limitations, ethical dilemmas and organisational barriers associated with the widespread adoption of AI in city marketing. Issues such as algorithmic bias, digital exclusion, data privacy and the lack of institutional capacity are discussed in the context of responsible innovation. The section also outlines the prerequisites for trustworthy and inclusive AI systems, including ethical frameworks, stakeholder dialogue and cross-departmental collaboration.

Finally, the article concludes with a forward-looking conclusion that summarises the key findings and makes suggestions for future developments. The conclusion states that cities that are able to combine technological capabilities with ethical foresight and human thinking are best positioned to create not only more efficient, but also more inclusive and emotionally engaging urban experiences. The paper thus aims to contribute to both academic discourse and practical policy making by providing a balanced, critical and application-orientated perspective on the evolving role of AI in city marketing.

2. Trends in the application of artificial intelligence in city marketing

The use of artificial intelligence (AI) in city marketing not only represents a technological advance, but also a paradigm shifts towards data-driven, segmented and experience-orientated communication. The following section outlines current trends through which AI is redefining the relationship between cities and their target groups, with a focus on digital transformation, personalisation and community-based value creation.

The key trends in AI-driven city marketing are as follows:

1. Real-time data analytics: AI enables municipalities to provide timely, relevant and user-specific information in a fast and modern way, improving the accuracy and responsiveness of public communication (Labudová, 2023).
2. Predictive analytics and personalisation: AI-based predictive models support the development of personalised recommendations that enable more targeted marketing strategies and increase engagement with different audience segments (Koufi & Belangour, 2023). The optimisation of target group-specific segmentation strategies has become an important tool in various marketing areas (Ertz & Kordi, 2025).
3. Digital behavioural analysis: The use of digital tools such as social listening, netnography and machine learning contributes to a deeper understanding of behavioural patterns and thus supports the creation and positioning of city brands (You et al., 2024).
4. Smart city development and digitalisation: The integration of AI with big data in smart city projects plays a crucial role in promoting digital transformation and long-term sustainability in the urban environment (Yigitcanlar et al., 2020).
5. Immersive experiences in tourism: The combination of AI with AR and VR enables the realisation of immersive city marketing concepts, which represent one of the most promising directions of digital tourism development (Sivarethinamohan, 2023).
6. Improving the quality of life and attractiveness of cities: AI-driven solutions used in traffic management, waste management and environmental monitoring contribute to improving urban quality of life and overall attractiveness (Alam et al., 2022).
7. Data security and trust: Public trust in AI remains fragile. Ensuring data security requires the establishment of transparent and stable technological systems that support responsible data handling and promote user trust (Ertz & Kordi, 2025; Zejjari & Benhayoun, 2024).

The impact is not only visible in tactical execution, such as message targeting or user segmentation, but also in broader strategic changes, such as data governance and participatory planning models. As a fundamental element of data-driven urban strategies, AI holds significant potential for fostering more innovative, inclusive and sustainable urban governance. At the same time, overcoming the associated challenges – particularly in the areas of ethics and data protection – is essential for long-term success.

Future trends in AI-powered city marketing are likely to focus on greater personalisation, emotional sensitivity and ethical responsibility. As data becomes richer and more granular, cities could move towards micro-segmentation that reflects the specific needs and identities of neighbourhoods. Generative AI could play a role in co-creating urban narratives with residents to build authenticity and trust. Real-time sentiment analysis could help cities to respond not only to behaviour, but also to the mood of the population. Immersive, AI-powered platforms could offer location-based experiences that are tailored to the preferences and intentions of individuals. At the same time, the risk of digital exclusion and algorithmic bias must not be ignored. Inclusivity, transparency and local relevance will be key values in the next phase of digital transformation. City marketers need to balance innovation with empathy and critical thinking. The goal is not just to market cities more effectively, but to create shared value for all urban stakeholders. Ultimately, the most successful cities will be those that utilise AI to become not only smarter, but also more human.

3. Applications of artificial intelligence in city marketing

In this part the following three topics will be detailed:

1. Target group-specific communication and increasing engagement,
2. Data-driven decision making,
3. Smart city integration.

3.1. Target group-specific communication and increasing engagement

AI-supported data processing enables city marketing experts to gain more detailed insights into the behaviour and needs of their target groups. This enables the development of more targeted and efficient communication strategies aimed at strengthening community relations and increasing stakeholder satisfaction (Labudová, 2023). Labudová (2023) identifies four primary stakeholder groups in city marketing: residents, tourists, entrepreneurs and students.

A notable example of target group-specific communication is Madrid's VisitMadridGPT, an AI-based virtual assistant capable of delivering personalised real-time information in 95 languages (Töre, 2024). The programme captures and analyses the keywords used by visitors, allowing the content offer to be refined based on actual demand. In the long term, this contributes to an improved visitor experience and greater loyalty.

Importantly, such solutions are not limited to tourism, but are also applicable to residents, commuters and local businesses. In the case of amsterdam ai, the developers emphasise three main areas of application: business innovation, citizen support and health services (amsterdam ai).

By providing personalised content, improving the user experience and tailoring services to the preferences of specific segments, AI can significantly increase the satisfaction and engagement of various urban stakeholders (Hassan et al., 2024; Luthra et al., 2024).

3.2. Data-driven decision making

AI-based systems – especially those that use machine learning and predictive analytics – enable professionals to analyse large amounts of data to identify patterns and trends. This facilitates are the development of evidence-based marketing strategies and the efficient allocation of resources (Pandey et al., 2025). Planning based on these trends becomes more accurate, which is particularly valuable for forecasting tourist arrivals, ensuring the availability of necessary infrastructure and organising events accordingly (Potwora et al., 2024; Olena et al., 2024).

User activity on online platforms generates digital footprints that enable automatic evaluation of the efficiency and effectiveness of various initiatives. By continuously monitoring relevant performance indicators, city marketers can evaluate the impact of their actions in real time and optimise their strategies accordingly.

On *Figure 1* Figure the Different Data Sources in Marketing can be seen.

By analysing customer data, city marketing experts can gain a detailed understanding of the various target group segments. Demographic characteristics – such as age, gender, marital status and place of residence – make it possible to optimise campaigns on platforms that are tailored to the habits of the target group. The creation of interest profiles provides a solid basis for the design of urban cultural programmes and events. The concept of customer lifetime value can be applied to regular visitors, such as commuters, by offering them exclusive programmes and discounts. Willingness to pay can also be segmented according to participants' willingness to attend paid events and their preferred price ranges.

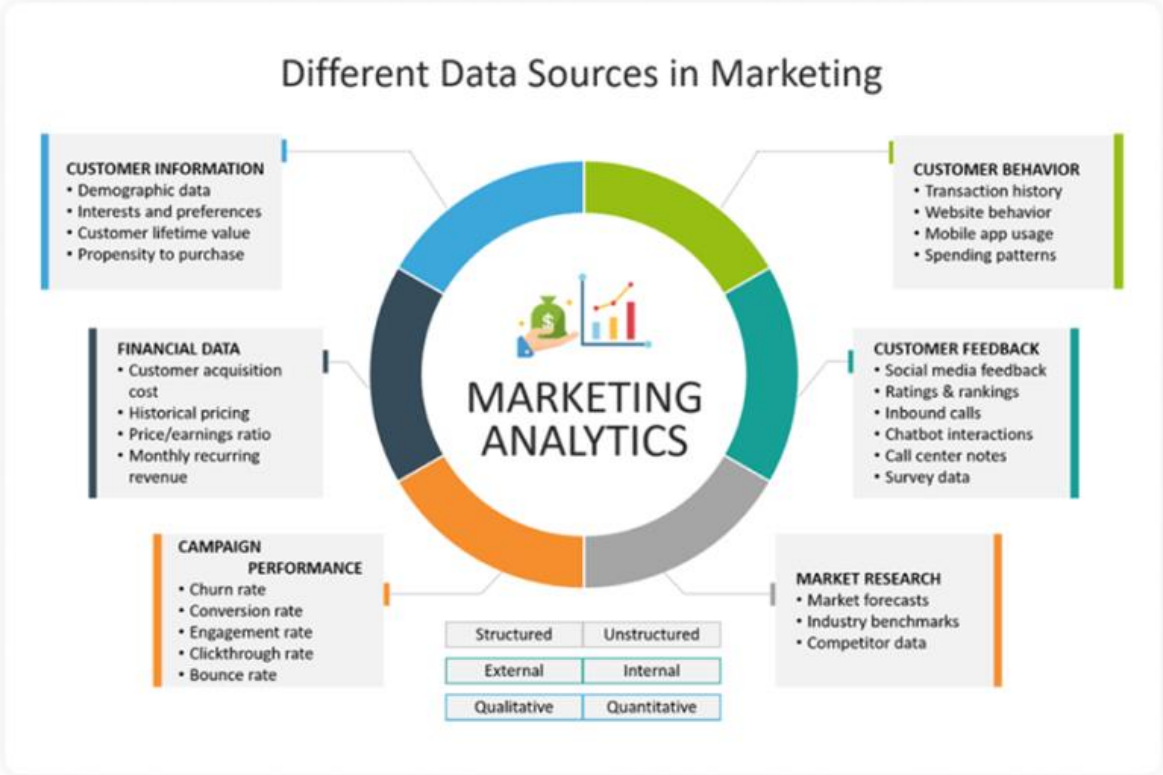

Figure 1. *Different Data Sources in Marketing*
Source: Adkuloo, 2025

Financial data supports the optimisation of marketing budgets and the evaluation of the effectiveness of events. Customer acquisition costs, for example, indicate how much it costs to acquire a new tourist. Historical price data on event tickets, theatre and museum admissions provide information on how prices can be adjusted to maintain competitiveness. An important indicator for the financing of events is the relationship between costs and expected income. Recurring monthly revenue can come from sources such as theatre subscriptions, venue rentals, parking fees or city tourism tickets.

The performance of a campaign can be evaluated using various control indicators. The churn rate shows how many returning visitors are lost year on year. Analysing the root causes and causal relationships enables targeted planning of improvements. The engagement rate, including likes, shares and comments, reflects the activity of a particular community. The click-through rate, i.e. how many newsletter readers click on the city website, shows the interest in the content shared. The bounce rate measures how many users leave the city website immediately.

Customer behaviour includes the analysis of online and offline interactions of residents, employees, entrepreneurs and visitors. The transaction history helps with precise targeting, e.g. through ticket purchases or use of the city map. The analysis of website behaviour shows which content appeals to which segments and thus helps to structure the website and develop content. Similarly, analysing app usage shows which features are popular, providing direction for app development. Spending patterns can guide the development of service packages based on spending in restaurants, accommodation or at events.

Customer feedback includes direct opinions from residents and visitors. Comments and social media posts provide immediate post-event insights. Platforms such as Google Maps or Tripadvisor also provide valuable reviews. User-generated content contributes significantly to a city's image and reputation, and AI can efficiently identify emerging issues. Calls to tourist information centres and help desks often reveal gaps in service due to recurring requests and complaints. Chatbot interactions can automatically record and analyse feedback. Event-related surveys also help to measure satisfaction in a statistically representative way to support future planning.

Market research provides external perspectives by analysing environmental factors. Market forecasting helps to plan and theme campaigns based on predicted tourism trends. Industry benchmarking helps to assess the competitiveness of a city, for example by comparing marketing spend with visitor numbers in other cities. Competitive analyses and best practise reviews can inspire improvements in communication strategies and channel usage.

To summarise, data-driven decision-making is closely linked to data-driven urban management – a transformative approach that uses big data, AI and advanced technologies to create smarter, more sustainable and efficient cities (Lazrak et al., 2018; Bibri & Krogstie, 2020; Bibri, 2021; Grimaldi & Carrasco-Farré, 2021; Radziszewska, 2023).

A practical example of this is Helsinki, where the MyHelsinki app offers residents and tourists alike integrated city information. Local businesses offering services and products are integrated into the platform. Based on the data collected, experts analyse user preferences and optimise both the services for residents and the offers for tourists accordingly.

3.3. Smart city integration

In the context of smart cities, AI is increasingly embedded in the design of urban services, from infrastructure to citizen engagement platforms, not only improving the quality of life of residents, but also strengthening – or even repositioning – the city's brand (Yigitcanlar & Cugurullo, 2020; Alam et al., 2022). The integration of AI with other emerging technologies – such as machine learning, big data analytics and the Internet of Things (IoT) – opens new opportunities to drive city marketing initiatives (Arumugam et al., 2024). These technological synergies enable the application of predictive analytics that provide accurate predictions of user behaviour. This in turn leads to a significant improvement in user experience, increased civic engagement and more efficient utilisation of urban resources.

AI-powered smart city initiatives are a valuable strategic asset in city marketing, particularly when aligned with the overarching goals of sustainability and improving living standards. Such initiatives can provide an opportunity for cities to distinguish themselves not only through innovation, but also by demonstrating that they are responding to the changing needs of their residents – particularly in areas such as mobility, housing and accessibility of services.

4. Summary

While AI contributes to both the strategic planning and operational implementation of city marketing, its integration also brings with it some unresolved ethical dilemmas and systemic challenges. As the capabilities of AI expand, there is a call for AI-based marketing approaches that are not only effective, but also fair, explainable and in line with societal values. Particular attention has been drawn to issues such as privacy, data manipulation and algorithmic bias, as these factors directly influence user trust and consumer responses (Qadri et al., 2025).

The integration of AI into city marketing systems can face obstacles at various levels. Elhajjar (2025) identifies four key challenges: lack of digital skills, ethical uncertainty, resource constraints and organisational resistance to innovation. This is particularly evident in SMEs, where actual implementation remains limited despite great interest in AI-based marketing. This shortfall is attributed to several factors, including a lack of technological expertise, limited access to qualified personnel and an underdeveloped data-driven infrastructure (Weber et al., 2025).

To ensure the responsible use of AI in urban contexts, it is essential to create comprehensive ethical frameworks tailored to the specific characteristics of urban environments (Sáez-Ortuño et al., 2025; Hendawy & Ghoz, 2024). The ethical challenges are diverse and complex. According to the summary by Kumar and Suthar (2025), these may include issues related to discrimination, decreasing social interaction, labour market disruption, cybersecurity risks and the protection of individual privacy.

To ensure responsible and transparent implementation, marketers need to develop and adhere to clear ethical guidelines. This is important not only to maintain consumer trust, but also to promote long-term sustainability.

At the same time, the role of AI in city marketing harbours significant potential for value creation. AI-based tools enable more targeted and efficient communication, the personalisation of user experiences and the strengthening of engagement among both residents and visitors (Labudová, 2023). Data-driven decision making enables the evaluation and optimisation of the effectiveness of marketing campaigns and thus increases the long-term competitiveness of urban tourism.

Looking to the future, the role of AI in city marketing is likely to evolve beyond the current paradigm of efficiency and segmentation. While AI is currently used as a tool to improve communication, predict user behaviour and optimise services, future developments will require a more systemic and comprehensive approach – one that treats AI not just as a marketing tool, but as a co-creator of urban value.

A crucial frontier lies in the integration of AI into participatory governance frameworks. The promise of smart citizenship remains largely unexplored in current AI-enabled city marketing strategies. New technologies could empower citizens to actively co-create the narratives and offerings of their cities by making data collection a two-way process. For example, gamified urban platforms or reward-based feedback mechanisms could provide meaningful incentives for residents to share their preferences, ideas or concerns. Such developments would strengthen the legitimacy and responsiveness of city branding efforts while fostering democratic engagement.

Another potential change concerns the emotional dimension of AI. In future applications, affective computing – the ability of AI to recognise and respond to human emotions – could contribute to more empathetic, context-sensitive communication between cities and their target audiences. This could be particularly valuable when it comes to addressing vulnerable or marginalised populations whose needs are often overlooked by standardised data sets and segmentation models. An ethical, human-centred AI agenda could therefore serve not only commercial or administrative efficiency, but also social inclusion.

Technological convergence also offers new opportunities. The integration of AI with technologies such as digital twins, blockchain or edge computing could transform city marketing into immersive, multi-sensory and hyper-personalised experiences. Instead of just advertising attractions or services, cities could start offering real-time simulations of life in different neighbourhoods, tailored relocation assistance for newcomers or AI-curated learning journeys based on individual interests. These scenarios create a new space for emotional engagement and place attachment – essential components of a resilient city brand.

However, to realise this vision, fundamental work is needed in both the institutional and cultural spheres. Municipalities need to invest in cross-sector collaborations and hybrid knowledge platforms

where urban planners, technologists, marketers and civil society actors work together to develop ethical and impactful solutions. Furthermore, beyond formal frameworks, cities need to foster a data culture that values transparency, critical expertise and collective ownership. Without these foundations, there is a risk that AI will become a technocratic layer that reinforces existing inequalities rather than eliminating them.

In conclusion, the challenge is not only to make city marketing smarter, but also more human. Artificial intelligence can help cities become more visible, efficient and competitive – but its true potential lies in its ability to foster belonging, shared meaning and collective imagination. As urban life is increasingly mediated by algorithms and data, the role of city marketers will also change. The future of city marketing therefore depends not only on technological progress, but also on ethical foresight, institutional courage and civic creativity.

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