Corporate Social Responsibility and AI and their impact on Smart Cities

Abstract

Due to increasing urbanization, smart cities have developed rapidly, and they focus on technology driven infrastructure and sustainable development. With cities becoming more digital, Corporate Social Responsibility (CSR) and Artificial Intelligence (AI) are key issues in determining the urban habitat of the future. This work investigates the relationship between CSR, AI and smart cities, and their implications for urban development. Aiming from the perspective of the role of AI in smart city making and the responsibility of corporations in enhancing sustainable city environment, this chapter discusses the opportunities and difficulties in combining CSR and AI in building more liveable, efficient, and sustainable cities. More specifically, this study aims to help extend understanding of entanglement between corporate responsibility, technological innovation, and urban sustainability to guide the development of more resilient and just cities of the future.

Introduction

City living has changed dramatically in recent years and is predicted to change even more in the future with the UN predicting that over 2 billion people will be living in urban areas by 2050 (United Nations, 2021). The UN considers development in urban or city environments to directly link to eight of their sustainability goals. These urban centres are increasingly being referred to as smart cities (De Falco, 2019). There are many definitions as to what constitutes a smart city. A definition from Ranchordás (2020, p261) is perhaps one of the most useful to this discussion; “Smart cities are defined as urban centers where local institutions implement smart technologies (IoT, big data, AI or ML, blockchain, virtual reality) to advance the innovative character of the city and improve the inclusion, participation, and well-being of citizens.” This rise in urbanization presents challenges for city planners and citizens (Tan and Taeihagh, 2020), with cities around the world harnessing technological capabilities in the

urban sphere to deal with the trend toward greater 'smartness' in cities, with AI being at the forefront of this endeavour (Okai, Feng and Sant, 2019).

The constituent building blocks of smart cities are defined by Giffinger *et al.* (2007) into six domains, these are smart economy, smart people, smart governance, smart mobility, smart environment and smart living. These domains are widely agreed on by scholars (Bifulco *et al.*, 2016; Nieto, Yelpo and Guzmán, 2021) as the building blocks of smart cities and while they were established almost two decades ago, they are still relevant today. As illustrated in Table 1 the smart city construct details much of what will be discussed in this chapter. Smart cities are built on many of the aspects recognized in CSR, such as responsible use of resources, sustainability and community. While ethics are not explicitly detailed here an ethical approach is implied throughout the domains (Chang, 2021; Ziosi *et al.*, 2024), nor is AI explicitly detailed here, this is perhaps unsurprising given that developments in this area leapfrogged in the last ten years, smart cites are very much built around ICT and its potential. Developments in digital technology have driven smart urbanization (Bunders and Varró, 2019; Han and Kim, 2021). The use of Artificial Intelligence (AI) has very much taken hold (Luusua *et al.*, 2023), providing scope for greater efficiency and additional city services.

Table 1 – Domains of a smart city with detailed aspects for each smart domain. Adapted from Giffinger *et al.* (2007)

Economy	**People**	**Governance**
Innovative spirit Entrepreneurship Economic image &trademarks Productivity Labour Flexibility Ability to transform	Level of qualification Affinity to lifelong learning Social and ethnic plurality Flexibility Creativity Cosmopolitanism Participation	Participation in decision-making Public and social services Transparent governance Political strategies &perspectives
Mobility	**Environment**	**Living**
Local accessibility International accessibility Availability of ICT-infrastructure Sustainable, innovative and safe transport systems	Lack of pollution of natural conditions Pollution Environmental protection Sustainable resourcemanagement	Cultural facilities Health facilities Individual safety Housing quality Education facilities Social cohesion

Cities that are deemed to be 'smart' are those in which actors (both human and AI) or objects (Internet of Things (IoT)) are connected through Information Communication Technology (ICT), enabling the sharing of information across a range of areas to enhance the living experience of citizens (Oke *et al.*, 2020). This use of on and offline channels has been seen to dominate the public sector agenda in recent years (Wang and Teo, 2020), supported by the idea that the two principal activities of governments are policymaking and service delivery (Hansen and Fuglsang, 2020). These two activities are greatly improved by higher levels of citizen participation (de Jong, Neulen and Jansma, 2019), while AI applications are also greatly improved by user engagement (Abdulqadir *et al.*, 2024).

The interconnected nature of this smart city concept is built around the sharing of information, sharing economy and creation through multiple actors (both human and artificial); therefore, co-creation begins to become relevant to the study of smart cities. Actors in a smart city context are seen to be those stakeholders that have some function within the city such as citizens, suppliers, city workforce and private sector. Some authors even recognise the overlap between the sharing economy and smart cities (Šiuškaitė, Pilinkienė and Zvirdauskas, 2019; Ranchordás and Goanta, 2020; Palgan, Mont and Sulkakoski, 2021; Sánchez Vergara, Papaoikonomou and Ginieis, 2021).

The concept of corporate social responsibility (CSR) in its most basic form is to recognize that an organization is part of the community within which it operates (Wan-Jan, 2006). This view proposes that organizations are not solely in existence to make money via transactions of goods or services, but also to behave like other members of society, not just exploiting resources for profit, but also giving back to the community in other ways. This is conceptualized through the triple bottom line concept (Elkington, 1998), where organizations must judge success not only through growing profits, but improvements in the planet (wider environment) and people (giving back to the community). While this concept has been originally focused on for-profit organizations, it can also be applied to not-for-profit organizations, charities are often set up to make money and dispense it in activities designed to develop the community and/or the environment. This can also be said of the public sector, which encompasses cities that many people live in; money is generated normally through some form of taxation and allocated to both environmental and community development. Research from Dahlsrud

(2008), refines the scope of CSR further into five dimensions; environmental, social, economic, stakeholder and voluntariness.

The following chapter explores the concept of AI, smart cities and CSR in more detail, looking at the applications of AI within smart cities and its ability to develop CRS goals and activities further. The chapter goes on to examine these concepts in relation to safety and well-being and the related ethical issues. The chapter goes on to a critique of much of the development within the fields of AI, smart cites and CSR, before concluding and outlining some limitations.

Artificial intelligence.

Artificial intelligence (AI), so long the trope of science fiction, is increasingly becoming science fact. The concept holds that machines using software can replicate or even exceed what humans are able to do with their natural intelligence i.e. to think and reason. Put another way artificial intelligence enables machines to perceive their environment, learn from experience and undertake actions to achieve an objective, without the need to be preprogrammed for the task or request further instruction (Russell and Norvig, 2020). This has given rise to an acceleration in scientific research with AI being able to generate hypotheses, collect, examine and interpret huge datasets with little or no human involvement, in much shorter timescales than before (Wang *et al.*, 2023). AI is also being harnessed to identify and act for greater efficiency and effectiveness in areas such as energy and resource usage (Li *et al.*, 2023), customer service (Buhalis and Moldavska, 2022), customer relationship management (CRM) (Kumar, Sharma and Dutot, 2023) to name but a few, as well of course its application to the smart city phenomenon (Ahmed, Jeon and Piccialli, 2022). In recent years machine learning and deep learning have taken the AI concept much further. Machine learning concerns itself with algorithms that enable machines to learn from big data and make generalization whereas deep learning relies on neural networks to learn from networks of large datasets often with unstructured data (Sharifani and Amini, 2023). The scope of AI usage is perhaps best highlighted by Alahakoon *et al.* (2023) who suggest that AI can be used to manage smart city activities such as traffic, police and other emergency service deployment, the spread of epidemics within a community, infrastructure repair and utilities such as water and electricity.

Brem, Giones and Werle (2023) look at AI from two perspectives firstly as the originator of activity, secondly as the facilitator. Essentially this is saying that an originator invents or creates, whereas the facilitator uses what is already creative to look at efficiencies and improvements. While Papagiannidis *et al.* (2021) discuss the benefits of AI in terms of resources, suggesting that AI can be used to create value, building on the concept of resource orchestrated value (Sirmon, Hitt and Ireland, 2007) which aims to replace resource-based view (RBV). By using AI an organisation can better co-ordinate its resources to create greater value in a more efficient way. Measuring AI output is important organisations need to understand what they need to achieve and set KPI's to measure the performance of AI to ensure that the software is delivering on what the organisation needs (Mikalef and Gupta, 2021).

Artificial Intelligence's role in smart city development and operations

Technology has always been considered to be at the centre of the smart city phenomena (Han and Kim, 2021; Kumari, Gupta and Tanwar, 2021), so it is perhaps unsurprising that many smart cities have embraced AI to help improve current services and support development of new services.

While perhaps, not the most glamorous of smart city applications, smart bins are playing a key role in city waste management. These are refuse bins that have been fitted with sensors to determine not only how full a bin is, but what type of waste is present in it based on factors such as heat, type of gas found in the bin and humidity. These enable the dispatch of collection trucks in a timely and efficient manner but also with the correct equipment to collect and then recycle the type of waste that has been deposited (Fang *et al.*, 2023). All of these activities ensure that not only are the optimum amount of resources used to collect the waste, but also that it is recycled or repurposed in the most effective way. Application of smart bins can be seen in cities such as Najran (KSA) (Ali *et al.*, 2020), Milton Keynes (UK) (Kumar *et al.*, 2024) and Klang Valley (Malaysia) (Josephng *et al.*, 2024). Smart bins are not the only area of waste that AI is used in. It is also applied to sewage management, to improve sanitation and general public health, as well as to protect the environment (Madhavi *et al.*, 2024). Using senor, AI can detect sewage levels, warning of potential overflows and blockages, as well as detecting gas anomalies. AI systems are also linked to water pumps and control valves in order that they can take corrective action where necessary, which enables flood prevention and sewage spillage (Alprol *et al.*, 2024). These

systems are also able to predict potential usage and operate accordingly, often triangulating with weather reporting that could also impact on the volume of water in the sewage system (Ma *et al.*, 2024).

The application of AI in smart cities activities does not stop at smart bins and sewage management, power grids in many cities use AI to anticipate demand, reduce waste, increasing generation of power as needed to avoid unnecessary surplus (Sulaiman *et al.*, 2023). AI uses a range of data sets both historic and real-time to both analyse consumption (Pandiyan *et al.*, 2023) and predict need (Selvaraj, Kuthadi and Baskar, 2023) which enhances sustainable and efficient generation, with consideration toward the most effective use of resources. These approaches are used throughout the world in cities such as Boulder (Colorado US) (Levenda, 2019), which was the first US city to implement a complete smart grid termed 'SmartGridCity', while in Europe the city of Copenhagen has a similar system named 'EnergyLab Nordhavn' (Wang *et al.*, 2017). It should also be noted that AI is not just providing benefits in the generation and management of smart grids, but also in relation to examining faults in the grid, through fault prediction, identification and resolution (De La Cruz *et al.*, 2023). By predicting potential faults through understanding component lifecycles, to identifying where faults have occurred and directing swift maintenance, AI smart grids can reduce outages and aid in more efficient maintenance routines and procedures.

Not only energy grids can be seen to flourish with AI but transportation grids too. Smart cities around the world are increasingly using AI to manage transportation. Whether it is the city of Barcelona who use AI to ease traffic flow and the development of autonomous vehicles, to the cities using AI to operate metro networks such as Seoul (South Korea), Doha (Qatar) and Kobe (Japan). By leveraging AI, train journeys can be scheduled more efficiently to match peak usage times improving service provision for citizens (Lukic Vujadinovic *et al.*, 2024), while also improving journey times (Lin *et al.*, 2024). Equally journey times can be improved when AI is applied to traffic management aiding with greater efficiencies in flow and predicting potential choke points (Hasanujjaman, Chowdhury and Jang, 2023; Mushtaq *et al.*, 2023).

AI is also enabling development of autonomous vehicles on the road, providing greater road safety and public transport opportunities such as autonomous taxis. Autonomous vehicles are not confined to

public transportation as there are increasing opportunities for automated road haulage (Sindi and Woodman, 2021), where automated lorries can transport large quantities via roads without the need for drivers who need regular rest periods, so companies can provide longer service periods more safely. It appears clear that AI can not only provide efficiencies in the use of resources and a better service for users but also a reduction in the use of expensive human resources.

The smart city of Dubai is currently developing a new airport which will be controlled by AI to ensure a smooth and efficient passenger experience while maintaining all the appropriate checks for security, immigration and passenger transit (Kamel, 2024). AI in public service has not only improved efficiency, making the process of public service seamless (Kulal *et al.*, 2024), but it has reduced corruption as it provides greater transparency (Mistry, 2012). Improvement in efficiency and reduction of corruption ensures that resources are used more effectively in keeping with the principles of CSR.

AI application can also be applied in building management, in what is unsurprisingly termed smart buildings. In practice AI is used to regulate things like heating, lighting, ventilation and building access (Javed *et al.*, 2023), even automating the use of windows to control the temperature of a building naturally, limiting the need for using energy to either heat or cool the interior environment. Having AI control some or all of these smart building elements can have benefits such as targeted energy consumption savings and providing greater comfort (Parekh, 2024). Adding solar panel co-ordination into the mix (Okiye, 2024) AI can really start to manage the building and provide efficiencies, with the potential cost benefit of selling excess electricity back to the national grid.

CSR in the AI-enabled smart city: examples of best practice

The development of smart cities and urban development in general is dependent on CSR concept, enabling public policy makers to develop sustainable urban living spaces (Singh *et al.*, 2024) citing technologies such as IoT and AI as key to that development. Adding to this Jain, Gue and Jain (2023) point out that AI can be particularly helpful in UN sustainability goals in areas such as; Housing, Transport Systems, Urbanization, Natural Disaster management, Environmental Impact and Green and Public Spaces. Pérez-del Hoyo *et al.* (2021) relate the smart city paradigm to the UN 2030 Agenda on

sustainability (Goal 13 – Target 11.3) (United Nations, 2015), which also requires smart public participation, while bottom-up governed cities remain a challenge.

Corporate social responsibility is viewed as being at the core of smart cities. Pašalić, Ćukušić and Jadrić (2021) view smart cities as urban centres built around the three pillars of technology, people and community. Building on this Sun and Zhang (2020) state that within smart cities technologies create value for society, community autonomy, service efficiency and social collaboration. Evidence from China (Kong and Liu, 2023) suggests that digital transformation (through mechanisms such as smart cities) has shown positive effects on organisations being more socially response and improving the CSR performance of enterprises.

Any digital transformation implementation and improvement is in part dependent on benchmarking and measurement (Ahmad *et al.*, 2021; Orbik, 2022). To support this there are some standards in place to help guide development in the area of CSR such as International Standard ISO 26000 Guidance on Social Responsibility (Söderberg, 2017) and for smart cities standards by which they are developed and measured exist in the form of International Organization for Standardization (ISO); ISO 37120 (Heaton and Parlikad, 2019; Bencke, Cechinel and Munoz, 2020). Both of these standards have aspects of alignment with the fundamental aspects of CSR outlined by scholars above (Elkington, 1998; Wan-Jan, 2006), around ethical behaviour, governance and community, continual improvement. Organisations need to decide on the metrics that are suitable to measure their activities, however the key areas of CSR need to be the focal point of measurement; community, diversity, employee relations, environment, product, and human rights (Koh, Li and Tong, 2023).

Frameworks for managing quality such as SERVQUAL (Parasuraman, Zeithaml and Berry, 1988) have existed long before AI and the rise of smart cities. The European Quality Framework Model (EQFM) was designed to improve business results, drawing on resources and staff at the organisation's disposal to provide results, which are viewed not only in terms of business results (profit), but also results in terms of staff, customers and society ensuring continual improvement through innovation. This model draws on ideas of the triple bottom line (Elkington, 1998), accordingly this model lends itself well to smart city services operating in line within CSR values and EQFM is being widely used. For example,

the Abu Dhabi (UAE) police have been using the EQFM to transform how they deal with digital information, integrating databases providing greater efficiencies and productivity (EQFM, 2024) providing greater value to the community. Writing extensively on the subject of smart cities Yigitcanlar *et al.* (2021) offer a framework for responsible urban innovation, which includes the three pillars of governance, policy and community and technology (including AI), all of which need to be considered in terms of cost, benefit, risk and impact. This is somewhat akin to the EQFM outlined earlier. Underpinning all of this are CSR considerations of explainable (transparent), ethical, trustworthy and frugal (efficient use of minimal resources). While another framework devised by Bokhari and Myeong (2023) provides guidance to city managers and planners in the application AI and IoT to deliver and enhance a range of city services such as healthcare, transportation and education.

AI for Public Safety and Community Well-being and ethical approaches

Well-being and public safety has always been at the heart of both smart cities (Giffinger and Gudrun, 2010) and CSR (Macassa *et al.*, 2021), with human well-being forming the cornerstone of many economic and green policy-makers around the world (Szpilko *et al.*, 2023). However, the role of AI in these areas has been less clear. In relation to public safety AI chatbots are providing secure platforms to support women's safety, enabling reporting and crowdsourcing data to provide greater safety with the community enabling faster responses to safety issues (Jewani *et al.*, 2023). While Sandoval *et al.* (2023) highlight the benefits of AI controlling street lighting from both a public safety perspective by ensuring that public areas are well lit, but also from an energy consumption point of view with lighting turned off where it is not being used. AI is also being deployed to tackle crime (Ejjami, 2024), with systems such as CCTV being linked to AI to deter crime more swiftly and effectively, deploying resources (such as police) in real-time, while also building up database modelling to plan better responses and predict future incidents (Sung and Park, 2021).

Turning to public safety and in particular pandemics Alrashdi and Alqazzaz (2024), highlight that the integration of smart cities aspects enables potential early detection of outbreak, effective and efficient tracing, and optimised allocation of necessary healthcare and other resources. Leveraging off smart city big data it is possible to be more proactive in terms of preventative interventions.

Critique

Despite the benefits AI offers to both smart cities and corporate social responsibility goals, these three facets are not without criticism, and it would be foolish to treat them as a panacea. To suitably harness the benefits outlined above, it is important to understand the drawbacks.

Bibri *et al.* (2023) acknowledge that AI provides smart cities with opportunities to provide better services and sustainability, particularly in line with SDG 11 (United Nations, 2016), however the concept of smart cities has fragmentated in recent years with different cities taking different approaches some of which undermine the sustainability values within. Cugurullo *et al.* (2024) go further suggesting that urban AI may not be sustainable given the expense of new technology and the energy and raw material it consumes.

The topic of surveillance of citizens has long been an area of controversy in the public sphere, this has been intensified with the introduction of AI within digital surveillance. There have been many reports of facial recognition systems used in surveillance and crime detection that is unfairly biased against non-westerners (Henman, 2020), as well as have a gender bias (O'Connor and Liu, 2024) and exhibiting ageism (Diaz, 2020) and ablism (Van Leeuwen, Smets and Jacobs, 2021).

While for many advances in AI, smart cities technologies and CRS practice are welcome and beneficial, it is important to remember that not all benefit from or have access to these developments (Lipuma and Leon, 2024). Some sections of the community don't have the necessary access to wifi-enabled devices and good internet access, creating a digital divide between those how have and those who do not. These groups can begin to miss out on the opportunities created by new development and risk falling behind the rest of society creating an underclass (Božić, 2023). Others may have access to these technologies but lack the skills, understanding and training to effectively use AI and smart devices and services and benefit from them (Luttrell *et al.*, 2020). Finally, people with physical disabilities are often overlooked within the literature, they should not be left out of AI and other smart developments (Makkonen and Inkinen, 2024). CSR cannot truly be achieved while members of the community are disenfranchised. Further criticism is levelled at AI in terms of its lack of transparency (Barredo Arrieta *et al.*, 2020), not

only in the data it collects on the citizen, but also how it is used to arrive at particular AI generated decisions and action. Transparency is key not only for generating trust, but also for accountability which is vital to both smart city operations and CSR reporting (Larsson and Heintz, 2020). To help combat this lack of transparency regulation needs to be considered; as is often the case with new technologies, regulation of AI is somewhat lagging behind developments (Smuha, 2021; Hinojosa and González-Cacho, 2023), with laws such as GDPR providing some protection around use of personal data, this is focused more towards private sector use of an individual's data. Data collected in the public space by government entities is somewhat murkier and the application of that data by AI and the decisions made by AI systems in relation to the individual murkier still.

With AI, CSR and smart cities dependent on data for efficiency, effectiveness and improvement, it raises a major problem in terms of privacy. Much of the data that is collected by these activities is private and personal to both individuals and organizations (Yaraziz *et al.*, 2023). While there is a recognition that data does aid in the development of AI, CSR and smart cities, there are concerns over how individual privacy is maintained and how security the data is with cyber security and cyber attacked on the rise (Zhu and Yu, 2019). However, elements such as AI are not just a cause of a privacy problem, they can be the solution, identifying weaknesses in the current systems and responding to cyber-attacks and the like (Vegesna, 2023).

There is some criticism related to AI and its use in smart cities, firstly the need in most smart cities to have digital access can be prohibitive to some community groups (Taylor, 2021), running the risk of creating a digital underclass. Many parts of the developing world still have limited access to the internet, let alone AI and smart city services (Okolo, 2021) Given the autonomous nature of AI, Cugurullo (2024) feels that many individuals have lost power over their environment to AI, pointing out that the smart city of Barcelona has successfully used a bottom-up approach to city management, whereas AI, by its very nature, is top-down.

Criticism of smart cites themselves have often come from their top-down approach (Porto and Oliveira, 2020; Zandbergen and Uitermark, 2020), this is often seen as a Western and capitalist approach to smart

cites and not necessarily in keeping with all the foundations of a smart city laid out by Giffinger and Gudrun (2010).

Many smart cities models are global North and Western based (Miller *et al.*, 2021; Hoefsloot *et al.*, 2022) and they favour economic and industry growth over community needs. Png (2022) suggests that the global North approach to smart cities, which appears to be the prevailing one, is also reflected in the use of AI, being top-down in nature, arguing that this its not the only template for AI governance in smart cites and that community led bottom-up approaches need to be explored much more for their potential benefits to the community rather than exclusively industry.

On a human level some research found that individual perceived AI and AI delivered services to be impersonal (Parekh, 2024), from a service perspective this can foster value destruction (Järvi, Kähkönen and Torvinen, 2018).

Conclusion

Having explored AI, CSR and smart cities in some detail, it is we are now possible perhaps to more critically understand what benefits all three of these have to offer and what pitfalls should be avoided to gain the most of these emerging entities.

As we have seen, various different types of AI algorithms can be used in smart cities to improve efficiency, sustainability, and quality of life (Alahi *et al.*, 2023), while meeting CSR requirements and link back to the six pillars defined by Giffinger and Gudrun (2010) upon which smart cities have their foundations. The AI concepts continue to be employed in terms of autonomous cities in experimental urban projects like Neom in Saudi Arabia and Beiyang AI Town in China (Cugurullo *et al.*, 2024). While ethical concerns around the use of data and the application of AI with limited transparency and oversight should not be trivialized, the benefits and processes AI provides to city managers in their work to provide better services in a socially responsible way should not be ignored and all three disciplines (CSR, AI and smart cities) should be explored simultaneously and in conjunction with one another, rather than the consideration of ethics imperatives being relegated to an afterthought. With this in mind, further areas that potentially need to be explored. Clarity around intellectual property in relation to AI;

where does the ownership lie (Chesterman, 2024). The ability of AI to help examine and improve organizational capabilities, as well as performance efficiencies and effectiveness continues to be needed (Mariani *et al.*, 2023). Additionally, while the IoT has been widely explored, the emerging concept of AI controlled IoT or AI-IoT needs much further study (Popescu *et al.*, 2024).

In terms of corporate social responsibility, the concept of stakeholder wealth, where organizations voluntarily develop environmental initiatives and social networks, achieving high corporate reputation, fosters greater CSR engagement (Zhao *et al.*, 2023). Cross-sector social partnerships, where groups from different sectors of the community work together, also need to be examined further in relation, not only to CSR but also to smart cities and how AI can support these activities (Sadabadi, Rahimirad and Nikijoo, 2024).

This chapter is not without its limitations, firstly the chapter has mainly focused on examples from the Western approach and from the Global North, this is largely because much of the work in these domains is from this background. The chapter has also focused on a management perspective and perhaps overlooks the perspective of other stakeholders such as customers and users. The longer-term benefits and drawbacks of AI, CRS and smart cities, have not been looked at fully. Emerging themes such as AI controls devices or AI-IoT is lacking, partly due to the very contemporary nature of these devices.

This chapter has drawn together three important areas, artificial intelligence, smart cities and corporate social responsibility. These areas have not been widely explored in connection to one and other. This chapter has attempted to go some way to redress this imbalance and enable academics, citizens and city smart city managers to consider how best to approach city activities and AI developments in conjunction while maintaining a firm commitment to corporate social responsibility. The chapter also recognizes that these concepts are ever evolving and suggests some, but not all areas where development needs to be examined and applied in an ethical and sustainable way.

References

Abdulqadir, Z., Abdulqader, D., Ahmed, O., Ismael, H.R., Ahmed, S.H. and Haji, L. (2024) 'Responsible AI Development for Sustainable Enterprises A Review of Integrating Ethical AI with IoT and Enterprise Systems', *Journal of Information Technology and Informatics*, 3(2). Available at: https://qabasjournals.com/index.php/jiti/.

Ahmad, A., Alshurideh, M., Al Kurdi, B., Aburayya, A. and Hamadneh, S. (2021) *Digital transformation metrics: a conceptual view*, *Journal of Management Information and Decision Sciences*.

Ahmed, I., Jeon, G. and Piccialli, F. (2022) 'From Artificial Intelligence to Explainable Artificial Intelligence in Industry 4.0: A Survey on What, How, and Where', *IEEE Transactions on Industrial Informatics*, 18(8), pp. 5031–5042. Available at: https://doi.org/10.1109/TII.2022.3146552.

Alahakoon, D., Nawaratne, R., Xu, Y., De Silva, D., Sivarajah, U. and Gupta, B. (2023) 'Self-Building Artificial Intelligence and Machine Learning to Empower Big Data Analytics in Smart Cities', *Information Systems Frontiers*, 25(1), pp. 221–240. Available at: https://doi.org/10.1007/s10796-020-10056-x.

Alahi, M.E.E., Sukkuea, A., Tina, F.W., Nag, A., Kurdthongmee, W., Suwannarat, K. and Mukhopadhyay, S.C. (2023) 'Integration of IoT-Enabled Technologies and Artificial Intelligence (AI) for Smart City Scenario: Recent Advancements and Future Trends', *Sensors*. MDPI. Available at: https://doi.org/10.3390/s23115206.

Ali, T., Irfan, M., Alwadie, A.S. and Glowacz, A. (2020) 'IoT-Based Smart Waste Bin Monitoring and Municipal Solid Waste Management System for Smart Cities', *Arabian Journal for Science and Engineering*, 45(12), pp. 10185–10198. Available at: https://doi.org/10.1007/s13369-020-04637-w.

Alprol, A.E., Mansour, A.T., Ibrahim, M.E.E.D. and Ashour, M. (2024) 'Artificial Intelligence Technologies Revolutionizing Wastewater Treatment: Current Trends and Future Prospective', *Water (Switzerland)*. Multidisciplinary Digital Publishing Institute (MDPI). Available at: https://doi.org/10.3390/w16020314.

Alrashdi, I. and Alqazzaz, A. (2024) ‘Synergizing AI, IoT, and Blockchain for Diagnosing Pandemic Diseases in Smart Cities: Challenges and Opportunities’, *Sustainable Machine Intelligence Journal*, 7. Available at: https://doi.org/10.61356/smij.2024.77106.

Barredo Arrieta, A., Díaz-Rodríguez, N., Del Ser, J., Bennetot, A., Tabik, S., Barbado, A., Garcia, S., Gil-Lopez, S., Molina, D., Benjamins, R., Chatila, R. and Herrera, F. (2020) ‘Explainable Artificial Intelligence (XAI): Concepts, taxonomies, opportunities and challenges toward responsible AI’, *Information Fusion*, 58, pp. 82–115. Available at: https://doi.org/10.1016/j.inffus.2019.12.012.

Bencke, L., Cechinel, C. and Munoz, R. (2020) ‘Automated classification of social network messages into Smart Cities dimensions’, *Future Generation Computer Systems*, 109, pp. 218–237. Available at: https://doi.org/10.1016/j.future.2020.03.057.

Bibri, S.E., Alexandre, A., Sharifi, A. and Krogstie, J. (2023) ‘Environmentally sustainable smart cities and their converging AI, IoT, and big data technologies and solutions: an integrated approach to an extensive literature review’, *Energy Informatics*. Springer Nature. Available at: https://doi.org/10.1186/s42162-023-00259-2.

Bifulco, F., Tregua, M., Amitrano, C.C. and D’Auria, A. (2016) ‘ICT and sustainability in smart cities management’, *International Journal of Public Sector Management*, 29(2), pp. 132–147. Available at: https://doi.org/10.1108/IJPSM-07-2015-0132.

Bokhari, S.A.A. and Myeong, S. (2023) ‘The Impact of AI Applications on Smart Decision-Making in Smart Cities as Mediated by the Internet of Things and Smart Governance’, *IEEE Access*, 11, pp. 120827–120844. Available at: https://doi.org/10.1109/ACCESS.2023.3327174.

Božić, V. (2023) ‘Encouragement and Engagement in Technology-Based Language Learning’, *Language Education & Technology (LET Journal)*, 3(2), pp. 96–109. Available at: http://langedutech.com.

Brem, A., Giones, F. and Werle, M. (2023) ‘The AI Digital Revolution in Innovation: A Conceptual Framework of Artificial Intelligence Technologies for the Management of Innovation’, *IEEE*

Transactions on Engineering Management, 70(2), pp. 770–776. Available at: https://doi.org/10.1109/TEM.2021.3109983.

Buhalis, D. and Moldavska, I. (2022) 'Voice Assistants in Hospitality: Using Artificial Intelligence for customer service', *Journal of Hospitality and Tourism Technology*, pp. 386–403.

Bunders, D.J. and Varró, K. (2019) 'Problematizing data-driven urban practices: Insights from five Dutch "smart cities"', *Cities*, 93, pp. 145–152. Available at: https://doi.org/10.1016/j.cities.2019.05.004.

Chang, V. (2021) 'An ethical framework for big data and smart cities', *Technological Forecasting and Social Change*, 165(January), p. 120559. Available at: https://doi.org/10.1016/j.techfore.2020.120559.

Chesterman, S. (2024) 'Good models borrow, great models steal: intellectual property rights and generative AI', *Policy and Society* [Preprint]. Available at: https://doi.org/10.1093/polsoc/puae006/7606572.

Cugurullo, F. (2024) 'The obscure politics of artificial intelligence: a Marxian socio-technical critique of the AI alignment problem thesis', *AI and Ethics* [Preprint]. Available at: https://doi.org/10.1007/s43681-024-00476-9.

Cugurullo, F., Caprotti, F., Cook, M., Karvonen, A., McGuirk, P. and Marvin, S. (2024) 'The rise of AI urbanism in post-smart cities: A critical commentary on urban artificial intelligence', *Urban Studies*. SAGE Publications Ltd, pp. 1168–1182. Available at: https://doi.org/10.1177/00420980231203386.

Dahlsrud, A. (2008) 'How corporate social responsibility is defined: An analysis of 37 definitions', *Corporate Social Responsibility and Environmental Management*, 15(1), pp. 1–13. Available at: https://doi.org/10.1002/csr.132.

Diaz, M. (2020) *Biases as Values: Evaluating Algorithms in Context*. Northwestern University. Available at: https://dataverse.harvard.edu/dataverse/algorithm-age-bias/.

Ejjami, R. (2024) 'AI-Driven Smart Cities in France', *International Journal For Multidisciplinary Research*, 6(3). Available at: https://doi.org/10.36948/ijfmr.2024.v06i03.21920.

Elkington, J. (1998) ‘Partnerships from cannibals with forks: The triple bottom line of 21st-century business’, *Environmental Quality Management*, 8(1), pp. 37–51. Available at: https://doi.org/10.1002/tqem.3310080106.

EQFM (2024) *Abu Dhabi Police Becoming a Stakeholder-Centric Organisation*. Available at: https://efqm.org/case-studies/abu-dhabi-police/ (Accessed: 26 October 2024).

De Falco, S. (2019) ‘Are smart cities global cities? A European perspective’, *European Planning Studies*, 27(4), pp. 759–783. Available at: https://doi.org/10.1080/09654313.2019.1568396.

Fang, B., Yu, J., Chen, Z., Osman, A.I., Farghali, M., Ihara, I., Hamza, E.H., Rooney, D.W. and Yap, P.S. (2023) ‘Artificial intelligence for waste management in smart cities: a review’, *Environmental Chemistry Letters*. Springer Science and Business Media Deutschland GmbH, pp. 1959–1989. Available at: https://doi.org/10.1007/s10311-023-01604-3.

Giffinger, R., Fertner, C., Kramar, H. and Meijers, E. (2007) ‘City-ranking of European medium-sized cities’, *Centre of Regional Science* [Preprint]. Available at: http://www.smart-cities.eu/download/smart_cities_final_report.pdf.

Giffinger, R. and Gudrun, H. (2010) ‘Smart cities ranking: an effective instrument for the positioning of the cities?’, *ACE: architecture, city and environment*, 4(12), pp. 7–26. Available at: https://doi.org/10.1007/BF02992681.

Han, M.J.N. and Kim, M.J. (2021) ‘A critical review of the smart city in relation to citizen adoption towards sustainable smart living’, *Habitat International*, 108, p. 102312. Available at: https://doi.org/10.1016/j.habitatint.2021.102312.

Hansen, A.V. and Fuglsang, L. (2020) ‘Living Labs as an Innovation Tool for Public Value Creation: Possibilities and Pitfalls’, *Innovation Journal*, 25(3), pp. 1–21.

Hasanujjaman, M., Chowdhury, M.Z. and Jang, Y.M. (2023) ‘Sensor Fusion in Autonomous Vehicle with Traffic Surveillance Camera System: Detection, Localization, and AI Networking’, *Sensors*, 23(6). Available at: https://doi.org/10.3390/s23063335.

Heaton, J. and Parlikad, A.K. (2019) 'A conceptual framework for the alignment of infrastructure assets to citizen requirements within a Smart Cities framework', *Cities*, 90(April 2018), pp. 32–41. Available at: https://doi.org/10.1016/j.cities.2019.01.041.

Henman, P. (2020) 'Improving public services using artificial intelligence: possibilities, pitfalls, governance', *Asia Pacific Journal of Public Administration*, 42(4), pp. 209–221. Available at: https://doi.org/10.1080/23276665.2020.1816188.

Hinojosa, H. and González-Cacho, T. (2023) 'The dark side of smart cities', in M. Cebral-Loureda, E.G. Rincón-Flores, and G. Sanchez-Ante (eds) *What AI Can Do*. New York: Taylor and Francis Group, LLC.

Hoefsloot, F.I., Jimenez, A., Martinez, J., Miranda Sara, L. and Pfeffer, K. (2022) 'Eliciting design principles using a data justice framework for participatory urban water governance observatories', *Information Technology for Development*, 28(3), pp. 617–638. Available at: https://doi.org/10.1080/02681102.2022.2091505.

Jain, A., Gue, I.H. and Jain, P. (2023) 'Research trends, themes, and insights on artificial neural networks for smart cities towards SDG-11', *Journal of Cleaner Production*, 412. Available at: https://doi.org/10.1016/j.jclepro.2023.137300.

Järvi, H., Kähkönen, A.K. and Torvinen, H. (2018) 'When value co-creation fails: Reasons that lead to value co-destruction', *Scandinavian Journal of Management*, 34(1), pp. 63–77. Available at: https://doi.org/10.1016/J.SCAMAN.2018.01.002.

Javed, A.R., Ahmed, W., Pandya, S., Maddikunta, P.K.R., Alazab, M. and Gadekallu, T.R. (2023) 'A Survey of Explainable Artificial Intelligence for Smart Cities', *Electronics (Switzerland)*. MDPI. Available at: https://doi.org/10.3390/electronics12041020.

Jewani, V.K., Ajmire, P.E., Chaurasia, S. and Brijwani, G.N. (2023) 'Artificial Intelligence: A Smart and Empowering Approach to Women's Safety', in S. Ponnusamy, V. Bora, P.M. Daigavane, and S.S.

Wazalwar (eds) *Impact of AI on Advancing Women's Safety*. IGI Global, pp. 121–138. Available at: https://doi.org/10.4018/979-8-3693-2679-4.ch008.

de Jong, M.D.T., Neulen, S. and Jansma, S.R. (2019) 'Citizens' intentions to participate in governmental co-creation initiatives: Comparing three co-creation configurations', *Government Information Quarterly*, 36(3), pp. 490–500. Available at: https://doi.org/10.1016/j.giq.2019.04.003.

Josephng, P.S., Vasu, K.P., Phan, K.Y., Sun, J. and Wei, Z. (2024) 'Managing Sustainable E-Waste Resilient Infrastructure with Smart Bin', *Journal of Advanced Research in Applied Mechanics*, 118(1), pp. 108–130. Available at: https://doi.org/10.37934/aram.118.1.108130.

Kamel, D. (2024) *Dubai's new airport terminal promises easier and faster check-in enabled by AI*, *The National*. Available at: https://www.thenationalnews.com/business/aviation/2024/10/24/dubais-new-airport-terminal-promises-easier-and-faster-check-in-enabled-by-ai/ (Accessed: 26 October 2024).

Koh, K., Li, H. and Tong, Y.H. (2023) 'Corporate social responsibility (CSR) performance and stakeholder engagement: Evidence from the quantity and quality of CSR disclosures', *Corporate Social Responsibility and Environmental Management*, 30(2), pp. 504–517. Available at: https://doi.org/10.1002/csr.2370.

Kong, D. and Liu, B. (2023) 'Digital Technology and Corporate Social Responsibility: Evidence from China', *Emerging Markets Finance and Trade*, 59(9), pp. 2967–2993. Available at: https://doi.org/10.1080/1540496X.2023.2199122.

Kulal, A., Rahiman, H.U., Suvarna, H., Abhishek, N. and Dinesh, S. (2024) 'Enhancing public service delivery efficiency: Exploring the impact of AI', *Journal of Open Innovation: Technology, Market, and Complexity*, 10(3). Available at: https://doi.org/10.1016/j.joitmc.2024.100329.

Kumar, P., Sharma, S.K. and Dutot, V. (2023) 'Artificial intelligence (AI)-enabled CRM capability in healthcare: The impact on service innovation', *International Journal of Information Management*, 69. Available at: https://doi.org/10.1016/j.ijinfomgt.2022.102598.

Kumar, V., Gunner, S., Pregnolato, M., Tully, P., Georgalas, N., Oikonomou, G., Karatzas, S. and Tryfonas, T. (2024) 'Sense (and) the city: From Internet of Things sensors and open data platforms to urban observatories', *IET Smart Cities* [Preprint]. John Wiley and Sons Inc. Available at: https://doi.org/10.1049/smc2.12081.

Kumari, A., Gupta, R. and Tanwar, S. (2021) 'Amalgamation of blockchain and IoT for smart cities underlying 6G communication: A comprehensive review', *Computer Communications*, 172, pp. 102–118. Available at: https://doi.org/10.1016/j.comcom.2021.03.005.

De La Cruz, J., Gómez-Luna, E., Ali, M., Vasquez, J.C. and Guerrero, J.M. (2023) 'Fault Location for Distribution Smart Grids: Literature Overview, Challenges, Solutions, and Future Trends', *Energies*. MDPI. Available at: https://doi.org/10.3390/en16052280.

Larsson, S. and Heintz, F. (2020) 'Transparency in artificial intelligence', *Internet Policy Review*, 9(2), pp. 1–16. Available at: https://doi.org/10.14763/2020.2.1469.

Van Leeuwen, C., Smets, A. and Jacobs, A. (2021) 'Blind Spots in AI: the Role of Serendipity and Equity in Algorithm-Based Decision-Making', *ACM SIGKDD Explorations Newsletter*, 23, pp. 42–49.

Levenda, A.M. (2019) 'Mobilizing smart grid experiments: Policy mobilities and urban energy governance', *Environment and Planning C: Politics and Space*, 37(4), pp. 634–651. Available at: https://doi.org/10.1177/2399654418797127.

Li, J., Ma, S., Qu, Y. and Wang, J. (2023) 'The impact of artificial intelligence on firms' energy and resource efficiency: Empirical evidence from China', *Resources Policy*, 82. Available at: https://doi.org/10.1016/j.resourpol.2023.103507.

Lin, D., Zhou, Z., Weng, M., Broere, W. and Cui, J. (2024) 'Metro systems: Construction, operation and impacts', *Tunnelling and Underground Space Technology*, 143. Available at: https://doi.org/10.1016/j.tust.2023.105373.

Lipuma, J. and Leon, C. (2024) 'Minorities and the AI Revolution: Examining the Literature on Equity and the Digital Divide Equity', *Academia Journals*, 16(6). Available at: https://orcid.org/0000-0002-9778-3843,.

Lukic Vujadinovic, V., Damnjanovic, A., Cakic, A., Petkovic, D.R., Prelevic, M., Pantovic, V., Stojanovic, M., Vidojevic, D., Vranjes, D. and Bodolo, I. (2024) 'AI-Driven Approach for Enhancing Sustainability in Urban Public Transportation', *Sustainability*, 16(17), p. 7763. Available at: https://doi.org/10.3390/su16177763.

Luttrell, R., Wallace, A., McCollough, C. and Lee, J. (2020) 'The Digital Divide: Addressing Artificial Intelligence in Communication Education', *Journalism and Mass Communication Educator*, 75(4), pp. 470–482. Available at: https://doi.org/10.1177/1077695820925286.

Luusua, A., Ylipulli, J., Foth, M. and Aurigi, A. (2023) 'Urban AI: understanding the emerging role of artificial intelligence in smart cities', *AI and Society*. Springer Science and Business Media Deutschland GmbH, pp. 1039–1044. Available at: https://doi.org/10.1007/s00146-022-01537-5.

Ma, S., Zhu, Z., Liu, Y., Zheng, Y., Lu, J. and Xu, J. (2024) 'Artificial intelligence-enabled predictive planning for sewage treatment based on improved DNN and LSTM', *Computers and Industrial Engineering*, 198. Available at: https://doi.org/10.1016/j.cie.2024.110636.

Macassa, G., McGrath, C., Tomaselli, G. and Buttigieg, S.C. (2021) 'Corporate social responsibility and internal stakeholders' health and well-being in Europe: A systematic descriptive review', *Health Promotion International*. Oxford University Press, pp. 866–883. Available at: https://doi.org/10.1093/heapro/daaa071.

Madhavi, S., Ashmita, R.S., Dakshatha, E.S. and Dhinakar, T. (2024) 'Smart Sewage System with Advanced Remote Monitoring for Efficient Urban Infrastructure Management', in *2nd International Conference on Artificial Intelligence and Machine Learning Applications: Healthcare and Internet of Things, AIMLA 2024*. Institute of Electrical and Electronics Engineers Inc. Available at: https://doi.org/10.1109/AIMLA59606.2024.10531479.

Makkonen, T. and Inkinen, T. (2024) ‘Inclusive smart cities? Technology-driven urban development and disabilities’, *Cities*, 154. Available at: https://doi.org/10.1016/j.cities.2024.105334.

Mariani, M.M., Machado, I., Magrelli, V. and Dwivedi, Y.K. (2023) ‘Artificial intelligence in innovation research: A systematic review, conceptual framework, and future research directions’, *Technovation*, 122. Available at: https://doi.org/10.1016/j.technovation.2022.102623.

Mikalef, P. and Gupta, M. (2021) ‘Artificial intelligence capability: Conceptualization, measurement calibration, and empirical study on its impact on organizational creativity and firm performance’, *Information and Management*, 58(3). Available at: https://doi.org/10.1016/j.im.2021.103434.

Miller, B., Ward, K., Burns, R., Fast, V. and Levenda, A. (2021) ‘Worlding and provincialising smart cities: From individual case studies to a global comparative research agenda’, *Urban Studies*, 58(3), pp. 655–673. Available at: https://doi.org/10.1177/0042098020976086.

Mistry, J.J. (2012) ‘The role of egovernance in mitigating corruption’, *Accounting and the Public Interest*, 12(1), pp. 137–159. Available at: https://doi.org/10.2308/apin-10287.

Mushtaq, A., Haq, I.U., Sarwar, M.A., Khan, A., Khalil, W. and Mughal, M.A. (2023) ‘Multi-Agent Reinforcement Learning for Traffic Flow Management of Autonomous Vehicles’, *Sensors*, 23(5). Available at: https://doi.org/10.3390/s23052373.

Nieto, S.G., Yelpo, P.C. and Guzmán, K.P. (2021) ‘Smart City Puebla: measuring smartness’, *Revista Ibero-Americana de Estratégia*, 20(1), p. e15793. Available at: https://doi.org/10.5585/riae.v20i1.15793.

O’Connor, S. and Liu, H. (2024) ‘Gender bias perpetuation and mitigation in AI technologies: challenges and opportunities’, *AI and Society*, 39(4), pp. 2045–2057. Available at: https://doi.org/10.1007/s00146-023-01675-4.

Okai, E., Feng, X. and Sant, P. (2019) ‘Smart Cities Survey’, in *Proceedings - 20th International Conference on High Performance Computing and Communications, 16th International Conference on*

Smart City and 4th International Conference on Data Science and Systems, HPCC/SmartCity/DSS 2018. IEEE, pp. 1726–1730. Available at: https://doi.org/10.1109/HPCC/SmartCity/DSS.2018.00282.

Oke, A.E., Aghimien, D.O., Aigbavboa, C.O. and Akinradewo, O.I. (2020) 'Appraisal of the drivers of smart city development in South Africa', *Construction Economics and Building*, 20(2), pp. 109–126. Available at: https://doi.org/10.5130/AJCEB.v20i2.6632.

Okiye, S.E. (2024) 'Renewable energy construction: Role of AI for smart building infrastructures', *Journal of Inventive Engineering and Technology*, 5(3), pp. 40–48. Available at: www.jiengtech.com.

Okolo, C.T. (2021) 'AI in the Global South: Opportunities and Challenges Towards More Inclusive Governance', *International Journal of Innovative Research in Arts, Education and Technology | IJIRAET*, 2(1). Available at: https://doi.org/10.48028/iiprds/ijiraet.v2.i1.09.

Orbik, Z. (2022) 'CORPORATE SOCIAL RESPONSIBILITY AND THE SMART CITY CONCEPT', *Scientific Papers of Silesian University of Technology. Organization and Management Series*, 2022(165), pp. 245–257. Available at: https://doi.org/10.29119/1641-3466.2022.165.18.

Palgan, Y.V., Mont, O. and Sulkakoski, S. (2021) 'Governing the sharing economy: Towards a comprehensive analytical framework of municipal governance', *Cities*, 108, p. 102994. Available at: https://doi.org/10.1016/j.cities.2020.102994.

Pandiyan, P., Saravanan, S., Usha, K., Kannadasan, R., Alsharif, M.H. and Kim, M.K. (2023) 'Technological advancements toward smart energy management in smart cities', *Energy Reports*, 10, pp. 648–677. Available at: https://doi.org/10.1016/j.egyr.2023.07.021.

Papagiannidis, E., Enholm, I.M., Mikalef, P. and Krogstie, J. (2021) 'Structuring AI resources to build an AI capability: A conceptual framework', in *ECIS.* Available at: https://www.researchgate.net/publication/351069404.

Parasuraman, A., Zeithaml, V.A. and Berry, L.L. (1988) 'SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality', *Electronics Letters*, 64(1), pp. 12–40. Available at: https://doi.org/10.1049/el:19850169.

Parekh, R. (2024) ‘Automating the design process for smart building technologies’, *World Journal of Advanced Research and Reviews*, 23(2), pp. 1213–1234. Available at: https://doi.org/10.30574/wjarr.2024.23.2.2461.

Pašalić, I., Ćukušić, M. and Jadrić, M. (2021) ‘Smart city research advances in Southeast Europe’, *International Journal of Information Management*, 58. Available at: https://doi.org/10.1016/j.ijinfomgt.2020.102127.

Pérez-delHoyo, R., Mora, H., Nolasco-Vidal, J.M., Abad-Ortiz, R. and Mollá-Sirvent, R.A. (2021) ‘Addressing new challenges in smart urban planning using Information and Communication Technologies’, *Systems Research and Behavioral Science*, 38(3), pp. 342–354. Available at: https://doi.org/10.1002/sres.2787.

Png, M.T. (2022) ‘At the Tensions of South and North: Critical Roles of Global South Stakeholders in AI Governance’, in *ACM International Conference Proceeding Series*. Association for Computing Machinery, pp. 1434–1445. Available at: https://doi.org/10.1145/3531146.3533200.

Popescu, S.M., Mansoor, S., Wani, O.A., Kumar, S.S., Sharma, V., Sharma, A., Arya, V.M., Kirkham, M.B., Hou, D., Bolan, N. and Chung, Y.S. (2024) ‘Artificial intelligence and IoT driven technologies for environmental pollution monitoring and management’, *Frontiers in Environmental Science*. Frontiers Media SA. Available at: https://doi.org/10.3389/fenvs.2024.1336088.

Porto, J.B. and Oliveira, M. (2020) ‘The smart cities methodology based on public value: The first evaluation cycle’, *BAR - Brazilian Administration Review*, 17(1). Available at: https://doi.org/10.1590/1807-7692bar2020190048.

Ranchordás, S. (2020) ‘Nudging citizens through technology in smart cities’, *International Review of Law, Computers and Technology*, 34(3), pp. 254–276. Available at: https://doi.org/10.1080/13600869.2019.1590928.

Ranchordás, S. and Goanta, C. (2020) 'The New City Regulators: Platform and Public Values in Smart and Sharing Cities', *Computer Law and Security Review*, 36. Available at: https://doi.org/10.1016/j.clsr.2019.105375.

Russell, S. and Norvig, P. (2020) *Artificial Intelligence: A Modern Approach*. 4th edn. Pearson.

Sadabadi, A.A., Rahimirad, Z. and Nikijoo, I. (2024) 'Enhancing cross-sector partnerships in energy saving through social entrepreneurship: A social network analysis approach', *Energy Research and Social Science*, 109. Available at: https://doi.org/10.1016/j.erss.2024.103412.

Sánchez Vergara, J.I., Papaoikonomou, E. and Ginieis, M. (2021) 'Exploring the strategic communication of the sharing city project through frame analysis: The case of Barcelona sharing city', *Cities*, 110, p. 103082. Available at: https://doi.org/10.1016/j.cities.2020.103082.

Sandoval, J.D.P., Arciniega-Nevárez, J.A., Delgado-Galván, X., Ramos, H.M., Pérez-Sánchez, M., López-Jiménez, P.A. and Mora Rodríguez, J. (2023) 'Street Lighting and Charging Stations with PATs Location Applying Artificial Intelligence', *Water (Switzerland)*, 15(4). Available at: https://doi.org/10.3390/w15040616.

Selvaraj, R., Kuthadi, V.M. and Baskar, S. (2023) 'Smart building energy management and monitoring system based on artificial intelligence in smart city', *Sustainable Energy Technologies and Assessments*, 56. Available at: https://doi.org/10.1016/j.seta.2023.103090.

Sharifani, K. and Amini, M. (2023) 'Machine Learning and Deep Learning: A Review of Methods and Applications', *World Information Technology and Engineering Journal*, 10(7), pp. 3897–3904. Available at: https://www.researchgate.net/publication/371011515.

Sindi, S. and Woodman, R. (2021) 'Implementing commercial autonomous road haulage in freight operations: An industry perspective', *Transportation Research Part A: Policy and Practice*, 152, pp. 235–253. Available at: https://doi.org/10.1016/j.tra.2021.08.003.

Singh, K., Kolar, P., Nanduri, S., Seetha Ram, V. and Kumar, D. (2024) 'CSR and smart city progress: a proposed model for urban development', *Letters in Spatial and Resource Sciences*, 17(1). Available at: https://doi.org/10.1007/s12076-023-00367-3.

Sirmon, D.G., Hitt, M.A. and Ireland, R.D. (2007) 'Managing Firm Resources in Dynamic Environments to Create Value: Looking inside the Black Box', *The Academy of Management Review*, 32(1), pp. 273–292.

Šiuškaitė, D., Pilinkienė, V. and Zvirdauskas, D. (2019) 'The conceptualization of the sharing economy as a business model', *Engineering Economics*, 30(3), pp. 373–381. Available at: https://doi.org/10.5755/J01.EE.30.3.21253.

Smuha, N.A. (2021) *FROM A 'RACE TO AI' TO A 'RACE TO AI REGULATION': REGULATORY COMPETITION FOR ARTIFICIAL INTELLIGENCE*, *Innovation & Technology*. Available at: www.cifar.ca/ai/pan-canadian-.

Söderberg, S. (2017) *ISO 26000 and OECD Guidelines*.

Sulaiman, A., Nagu, B., Kaur, G., Karuppaiah, P., Alshahrani, H., Reshan, M.S. Al, AlYami, S. and Shaikh, A. (2023) 'Artificial Intelligence-Based Secured Power Grid Protocol for Smart City', *Sensors*, 23(19). Available at: https://doi.org/10.3390/s23198016.

Sun, M. and Zhang, J. (2020) 'Research on the application of block chain big data platform in the construction of new smart city for low carbon emission and green environment', *Computer Communications*, 149, pp. 332–342. Available at: https://doi.org/10.1016/j.comcom.2019.10.031.

Sung, C.S. and Park, J.Y. (2021) 'Design of an intelligent video surveillance system for crime prevention: applying deep learning technology', *Multimedia Tools and Applications*, 80(26–27), pp. 34297–34309. Available at: https://doi.org/10.1007/s11042-021-10809-z.

Szpilko, D., Naharro, F.J., Lăzăroiu, G., Nica, E. and de la Torre Gallegos, A. (2023) 'Artificial intelligence in the smart city - a literature review', *Engineering Management in Production and Services*, 15(4), pp. 53–75. Available at: https://doi.org/10.2478/emj-2023-0028.

Tan, S.Y. and Taeihagh, A. (2020) 'Smart city governance in developing countries: A systematic literature review', *Sustainability (Switzerland)*, 12(3), pp. 1–29. Available at: https://doi.org/10.3390/su12030899.

Taylor, L. (2021) 'The taming of chaos: Optimal cities and the state of the art in urban systems research', *Urban Studies*, 58(15), pp. 3196–3202. Available at: https://doi.org/10.1177/00420980211012838.

United Nations (2015) *TRANSFORMING OUR WORLD: THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT*.

United Nations (2016) *United Nations Sustainability Goals*. Available at: https://sdgs.un.org/goals (Accessed: 11 October 2024).

United Nations (2021) *People-Smart Sustainable Cities*, *People-Smart Sustainable Cities*. Available at: https://doi.org/10.18356/9789210052658.

Vegesna, V.V. (2023) 'Privacy-Preserving Techniques in AI-Powered Cyber Security: Challenges and Opportunities', *International Journal of Machine Learning for Sustainable Development*, 5, pp. 1–8.

Wang, C. and Teo, T.S.H. (2020) 'Online service quality and perceived value in mobile government success: An empirical study of mobile police in China', *International Journal of Information Management*, 52, p. 102076. Available at: https://doi.org/10.1016/j.ijinfomgt.2020.102076.

Wang, H., Fu, T., Du, Y., Gao, W., Huang, K., Liu, Z., Chandak, P., Liu, S., Van Katwyk, P., Deac, A., Anandkumar, A., Bergen, K., Gomes, C.P., Ho, S., Kohli, P., Lasenby, J., Leskovec, J., Liu, T.Y., Manrai, A., Marks, D., Ramsundar, B., Song, L., Sun, J., Tang, J., Veličković, P., Welling, M., Zhang, L., Coley, C.W., Bengio, Y. and Zitnik, M. (2023) 'Scientific discovery in the age of artificial intelligence', *Nature*. Nature Research, pp. 47–60. Available at: https://doi.org/10.1038/s41586-023-06221-2.

Wang, J., You, S., Zong, Y. and Træholt, C. (2017) 'EnergyLab Nordhavn: An integrated community energy system towards green heating and e-mobility', in *IEEE Transportation Electrification Conference and Expo, Asia Pacific (ITEC Asia Pacific)*. IEEE.

Wan-Jan, W.S. (2006) ‘Defining corporate social responsibility’, *Journal of Public Affairs*, 6(3–4), pp. 176–184. Available at: https://doi.org/10.1002/pa.227.

Yaraziz, M.S., Jalili, A., Gheisari, M. and Liu, Y. (2023) ‘Recent trends towards privacy-preservation in Internet of Things, its challenges and future directions’, *IET Circuits, Devices and Systems*, 17(2), pp. 53–61. Available at: https://doi.org/10.1049/cds2.12138.

Yigitcanlar, T., Corchado, J.M., Mehmood, R., Li, R.Y.M., Mossberger, K. and Desouza, K. (2021) ‘Responsible urban innovation with local government artificial intelligence (Ai): A conceptual framework and research agenda’, *Journal of Open Innovation: Technology, Market, and Complexity*, 7(1), pp. 1–16. Available at: https://doi.org/10.3390/joitmc7010071.

Zandbergen, D. and Uitermark, J. (2020) ‘In search of the Smart Citizen: Republican and cybernetic citizenship in the smart city’, *Urban Studies*, 57(8), pp. 1733–1748. Available at: https://doi.org/10.1177/0042098019847410.

Zhao, L., Yang, M.M., Wang, Z. and Michelson, G. (2023) ‘Trends in the Dynamic Evolution of Corporate Social Responsibility and Leadership: A Literature Review and Bibliometric Analysis’, *Journal of Business Ethics*, 182(1), pp. 135–157. Available at: https://doi.org/10.1007/s10551-022-05035-y.

Zhu, T. and Yu, P.S. (2019) ‘Applying differential privacy mechanism in artificial intelligence’, in *Proceedings - International Conference on Distributed Computing Systems*. Institute of Electrical and Electronics Engineers Inc., pp. 1601–1609. Available at: https://doi.org/10.1109/ICDCS.2019.00159.

Ziosi, M., Hewitt, B., Juneja, P., Taddeo, M. and Floridi, L. (2024) ‘Smart cities: reviewing the debate about their ethical implications’, *AI and Society*, 39(3), pp. 1185–1200. Available at: https://doi.org/10.1007/s00146-022-01558-0.

 # Glossary of Key Terms

Artificial Intelligence (AI)

A technology that enables machines to perceive their environment, learn from experience, and undertake actions to achieve objectives without being preprogrammed or requiring further instruction. In smart cities, AI is used for various applications including waste management, traffic control, power grid optimization, and public service delivery. The technology encompasses both machine learning (algorithms that learn from big data) and deep learning (neural networks that learn from large unstructured datasets).

Smart Cities

Urban centers where local institutions implement smart technologies (IoT, big data, AI/ML, blockchain, virtual reality) to advance innovation and improve citizen inclusion, participation, and well-being. Smart cities are built on six key domains: smart economy, smart people, smart governance, smart mobility, smart environment, and smart living. These cities use Information Communication Technology (ICT) to connect human actors, AI systems, and Internet of Things (IoT) devices to enhance citizens' living experience.

Corporate Social Responsibility (CSR)

A concept recognizing that organizations are part of the communities in which they operate and have responsibilities beyond profit-making. CSR encompasses five dimensions: environmental, social, economic, stakeholder engagement, and voluntariness. In smart cities, CSR principles guide sustainable urban development and the ethical implementation of technologies. It's often conceptualized through the "triple bottom line" approach, focusing on profits, planet (environment), and people (community).

Internet of Things (IoT)

A network of interconnected physical objects embedded with sensors, software, and other technologies that enable them to collect and exchange data. In smart cities, IoT devices are crucial components that work alongside AI systems to manage various urban services. Examples include smart bins with sensors for waste management, traffic monitoring systems, and environmental monitoring devices. IoT enables real-time data collection and automated responses to urban challenges.

Smart Governance

One of the six fundamental domains of smart cities, referring to the use of technology to enhance public participation in decision-making, improve public services, and ensure transparent governance. It involves digital transformation of public services, citizen engagement platforms, and data-driven policy-making. Smart governance aims to create more efficient, transparent, and responsive city administration through technology integration while maintaining ethical considerations and citizen privacy.

Further readings

Baccarne, B., & De Marez, L. (2021). Co-shaping smart cities: participation inequalities in civic crowdsourcing. International Journal of Urban Planning and Smart Cities (IJUPSC), 2(2), 34-47.

Dawar, I., & Kumar, N. (2024). Making Smart Cities Smarter: Role of AI in Smart Cities Application. In Exploring Ethical Dimensions of Environmental Sustainability and Use of AI (pp. 240-262). IGI Global.

Deakin, M. (2010). The IntelCities community of practice: the eGov services model for socially inclusive and participatory urban regeneration programs. In Web-based learning solutions for communities of practice: developing virtual environments for social and pedagogical advancement (pp. 263-284). IGI Global.

Karthikeyan, C. (2025). Smart Governance With AI for Transformative Urban Development in India: Harnessing Data-Driven Insights to Shape the Future of Indian Cities. In Nexus of AI, Climatology, and Urbanism for Smart Cities (pp. 217-246). IGI Global Scientific Publishing.

Lombardi, P., Giordano, S., Caragliu, A., Del Bo, C., Deakin, M., Nijkamp, P., ... & Farouh, H. (2012). An advanced triple-helix network model for smart cities performance. In Regional development: concepts, methodologies, tools, and applications (pp. 1548-1562). IGI Global.

Manivannan, R., Rajakumaran, M., Ananth, A. D., Markkandeyan, S., Venkatesan, R., & Ghalib, M. R. (2024). The Intelligent Urban Nexus: AI-Driven Decision Making in Smart City Development. In Blockchain-Based Solutions for Accessibility in Smart Cities (pp. 29-42). IGI Global.

McKenna, H. P. (Ed.). (2022). Urban life and the ambient in smart cities, learning cities, and future cities. IGI Global.

Padhiary, M., Roy, P., & Roy, D. (2025). The Future of Urban Connectivity: AI and IoT in Smart Cities. In Sustainable Smart Cities and the Future of Urban Development (pp. 33-66). IGI Global Scientific Publishing.

Sposato, M. (2025). Developing Digital Leadership Skills for AI-Driven Research Environments. In Impacts of Generative AI on the Future of Research and Education (pp. 235-254). IGI Global.

Sposato, M. (2025). Digital Leadership in Organizations for Digital Transformation. In Multidisciplinary Organizational Training of Human Capital in the Digital Age (pp. 77-96). IGI Global Scientific Publishing.