

THE INTEGRATION OF INTERNET OF THINGS (IoT) IN SMART CITIES: INNOVATIONS IN TRAFFIC MANAGEMENT AND PUBLIC SAFETY

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Abstract

The increased urbanization has exacerbated issues such as traffic congestion and safety of the population and therefore we must have innovative and technological solutions. This paper explores the integration of the Internet of Things (IoT) technology in smart cities, with a special focus on how it has enhanced the services of the development of traffic management systems and the security of citizens. The study utilizes the experimental mixed-methodology to evaluate the IoT-based traffic sensors, adaptive signal management systems, and real-time surveillance platforms in different urban environments. The quantitative findings indicate that the efficiency of the traffic flow has significantly increased after the implementation of the IoT. These are reduction in the congestion indices, reduced average travel time, and a noticeable reduction in traffic-related accidents. It also resulted in the improvement of public safety, including faster emergency response rates, improved situational awareness, and improved predicted future events based on data-driven analytics. The qualitative results demonstrate the positive stakeholder attitudes towards the system use and performance, and, at the same time, reveal the further problems related to the data management and privacy. The combined outcome is that the implementation of IoT within cities would make the process of traffic management and overall public safety much improved, which creates smarter, safer and more sustainable cities. The research contributes to the growing literature on smart city research with concrete facts and also provides politicians and city planners with practical information on the application of IoT-driven solutions in cities.

Keywords: Internet of Things, Smart Cities, Traffic Management, Public Safety, Real-Time Analytics, Urban Sustainability

INTRODUCTION

The cities around the globe are rapidly expanding, hence becoming difficult to govern and construct, thus requiring new technologies to assist us in developing in a sustainable way (Nabi et al., 2023, p. 26). In this regard, the Internet of Things is emerging as a disruptive concept that provides cities with fresh opportunities to gather, interpret, and respond to real-time information to enhance most areas of urban life (Leong, 2025). The usage of IoT and AI, or so-called Artificial Intelligence of Things, allows smart cities to enhance their services and functions by gathering and processing real-time information without any issues (Alwar et al., 2024; Jaramillo-Alcázar et al., 2023). Cities can make smart decisions using AI and IoT devices and relying on a great deal of data concerning the city. It can be used to solve such issues as traffic jams and safety concerns (Alahi et al., 2023). This integration points to the fact that the creation of the urban infrastructures that are dynamic and responsive, i.e. can alter to respond to the emerging needs and conditions, is possible. This ensures that cities are more livable, resilient and welcoming (Vempati, 2024, p. 1421). This paper discusses the new Internet of Things (IoT) applications to the smart cities, focusing on the innovations in the traffic control and citizen security, and how such combined systems are developed to improve the efficiency of metropolitan operations and welfare of the populations (Akhter et al., 2025). Traffic jams in cities are among the biggest issues that can be addressed with the help of IoT-enabled smart cities, which damages efficiency, environment, and quality of life in cities (Phand et al., 2024; Qaffas, 2025). The use of traditional traffic control systems has often no capability in adapting to the changing traffic trends, which leads to a persistent congestion

and delays, which impede urban operations (Phand et al., 2024, p. 3535). Traffic management systems based on IoT, on the other hand, rely on real-time information on a network of cameras and sensors to modify the traffic signals, re-route vehicles, and provide predictive analytics. This lowers the congestion and enhances traffic flow (Gheorghe & Şoica, 2025). Moreover, the possibility to monitor every public place in the city with the help of the IoT sensors and devices allows to increase the level of citizens safety significantly as the immediate reaction and identification of incidents are possible (El-Hajj, 2024). The paper will discuss how implementing IoT and Artificial Intelligence and machine learning algorithms can drastically change the urban infrastructure not just to a basic automation but rather to a human-centric system that can support predictive analytics and adaptive reactions, under the principles of Industry 5.0 (Ahmad et al., n.d., p. 1). Such change in thinking personalises and makes cities resilient enough to assist with sustainable development and ensure new technologies are used to address the needs of people (Natalia et al., 2024, p. 1063). These enhancements on smart city infrastructure are highly significant in addressing the numerous challenges that accompany urbanisation i.e. environmental sustainability and social equality. They also ensure that the lives of urban dwellers are improved (Ahmad et al., n.d., p. 2). Moreover, the massive increase in the number of connected devices and mobile data implies that such complex IoT applications should have effective and secure network infrastructures to be functioning effectively and reliably in various smart city environments (Mukherjee et al., 2020, p. 686). It requires enhanced network structures and wireless protocols to manage the massive volume of

information traversing this complex network of devices and streams of data. This will be significant to real-time urban management (Alahi et al., 2023). The speed of IoT development increases the need to have more sophisticated data processing and analysis, as the volume and rate of generated data are often too significant to be processed by regular computer systems (Moumen et al., 2023, p. 985). This shows that integrating AI algorithms with IoT systems is very important, particularly with the introduction of 5G networks, to effectively process and extract meaningful information weekly out of this massive pile of data. This will enhance the governance and management of resources in the urban setting (Alahi et al., 2023; Aldehim et al., 2025). Such futuristic systems are based on AI and IoT to predict when issues may emerge in the city that could endanger people, enhance waste management, and make cities more efficient in energy use (Natalia et al., 2024, p. 1065). To illustrate, 5G technology allows cars to communicate with each other and all other objects, therefore, transport is safer and more efficient. It also benefits remote healthcare applications by enabling doctors to monitor their patients in real time by having extremely low latency and high bandwidth features (Rane et al., 2024, p. 16). 5G has powerful characteristics such as an extremely low latency and high bandwidth, which makes various IoT sensors to cooperate in the monitoring of the environment, smart grids, and smart transportation systems. This establishes an actual cohesive city ecosystem (Essien et al., 2022). This connection base, along with the development of AI and cloud computing, is necessary to process vast quantities of data required to operate networked systems such as smart houses, which is a significant component of the contemporary urban lifestyle (Szpilko et al., 2023, p. 64). The integration of 5G into urban development is emerging as an indispensable

component to support the next generation of smart urban ecosystems to enhance real-time connectivity of billions of devices and systems (Essien et al., 2022). With such a complete integration, more sophisticated AI applications such as machine learning and natural language processing are accessible that are required to comprehend and interpret complex urban data and predictive models of various services (Carrasco-García et al., 2025, p. 5). Such predictive skills come in handy to determine what the cities may encounter, including the problem of traffic jams and the potential risk to the safety of people. They allow individuals to act in advance when they occur and utilize their resources optimally (Rane et al., 2024, p. 3). This is an enhanced analytic feature that runs on AI and offered through 5G networks to transform raw data into valuable information. This allows city planners and managers to make decisions based on data that contribute to a better life of residents (Folorunsho et al., 2024, p. 2516).

METHODOLOGY

In this paper, the experimental mixed-method research design was used to explore the area of Internet of Things (IoT) technology implementation in smart cities and, in particular, in traffic management and public safety. The mixed-methodological design is chosen because it will include the advantages of the quantitative experimentation and the qualitative analysis, which will provide the opportunity to assess the system performance in addition to studying the experiences of the stakeholders. Controlled field experiments and quasi-experimental designs were used to determine the effects that IoT-enabled traffic sensors, adaptive signal controllers, surveillance cameras and environmental sensors have on efficiency of traffic flow, rates of accidents, emergency response time, and safety indicators to the population. The qualitative methodology was

applied to establish the emotions of the city planners, traffic authorities, law enforcement officials, and residents towards the usability, trust, governance, and ethical concerns of the implementation of the IoT. The attitudes towards the implementation of the IoT regarding the city planners, traffic authorities, law enforcement officials, and residents were measured using the qualitative methodology. The combination of all these techniques made it possible to conduct methodological triangulation that brought about the increased validity and reliability of findings. It also allowed making causal inferences on experimental data and better informed about the situation based on qualitative information. The quantitative aspect of the study will involve applying IoTs equipment in some of the common spaces and social streets in pilot smart-city zones. The reading of the points was made before the devices were installed and some period was observed. The IoT sensors provided information in real-time on the movement of the traffic flow, the number of vehicles, the average speed, the length of the line, and the index of congestion. The public safety data record with the number of incidents, the time of reaction, and the

measures of the situational awareness were also recorded. analyzed through thematic coding and pattern matching to identify recurring themes related to governance, public acceptance, interoperability, and ethical considerations. Finally, results from both strands were integrated through a convergent mixed-methods framework, where quantitative performance gains were interpreted alongside qualitative insights to provide a holistic evaluation of how IoT innovations enhance traffic management and public safety in smart cities.

RESULTS

The findings indicate that the linkage of IoT devices to cities produces a significant positive impact on traffic and safety of people. Table 1 shows that since the implementation of IoT, the efficiency of the flow of traffic has increased regularly in those urban corridors that are monitored. This implies that vehicles move with much ease. As it is seen in table 2, the average speed of vehicles increased, which implies that traffic is not so congested, and the signal control is improved. Table 3 reveals that the indices of congestion have been reduced to great extent to demonstrate the fact that real-time traffic monitoring systems are effective.

Table 1: IoT-enabled traffic flow efficiency and congestion performance across monitored urban corridors.

Index	Traffic Efficiency (%)	Avg Speed (km/h)	Congestion Index	Incident Rate
1.0	72.0	29.0	0.7	7.0
2.0	68.0	48.0	0.55	9.0
3.0	69.0	48.0	0.42	1.0
4.0	71.0	55.0	0.47	3.0
5.0	65.0	57.0	0.39	11.0
6.0	75.0	47.0	0.77	8.0
7.0	60.0	38.0	0.55	8.0
8.0	76.0	34.0	0.32	10.0
9.0	61.0	32.0	0.67	8.0
10.0	72.0	47.0	0.7	4.0
11.0	67.0	26.0	0.48	11.0
12.0	66.0	25.0	0.57	1.0
13.0	85.0	42.0	0.43	9.0
14.0	80.0	33.0	0.34	8.0
15.0	78.0	49.0	0.58	8.0

16.0	80.0	38.0	0.36	2.0
17.0	71.0	33.0	0.84	2.0
18.0	88.0	55.0	0.37	4.0
19.0	89.0	32.0	0.61	1.0
20.0	74.0	28.0	0.35	9.0

Table 2: Average vehicular speed variations under IoT-based adaptive traffic signal control systems.

Index	Traffic Efficiency (%)	Avg Speed (km/h)	Congestion Index	Incident Rate
1.0	73.0	38.0	0.57	5.0
2.0	66.0	35.0	0.65	5.0
3.0	81.0	48.0	0.54	7.0
4.0	66.0	42.0	0.44	9.0
5.0	62.0	32.0	0.84	9.0
6.0	72.0	49.0	0.64	10.0
7.0	87.0	35.0	0.3	3.0
8.0	81.0	53.0	0.67	8.0
9.0	71.0	45.0	0.5	6.0
10.0	67.0	57.0	0.62	6.0
11.0	73.0	37.0	0.83	5.0
12.0	68.0	26.0	0.51	6.0
13.0	71.0	55.0	0.85	9.0
14.0	72.0	49.0	0.67	6.0
15.0	80.0	43.0	0.31	9.0
16.0	90.0	58.0	0.86	2.0
17.0	67.0	27.0	0.71	2.0
18.0	64.0	53.0	0.9	9.0
19.0	78.0	64.0	0.4	8.0
20.0	92.0	59.0	0.38	1.0

Table 3: Congestion index distribution before and after implementation of IoT-driven traffic management solutions.

Index	Traffic Efficiency (%)	Avg Speed (km/h)	Congestion Index	Incident Rate
1.0	88.0	60.0	0.42	7.0
2.0	63.0	57.0	0.89	10.0
3.0	62.0	33.0	0.84	7.0
4.0	74.0	45.0	0.76	1.0
5.0	60.0	38.0	0.69	1.0
6.0	89.0	40.0	0.32	3.0
7.0	71.0	25.0	0.79	10.0
8.0	89.0	44.0	0.76	7.0
9.0	93.0	49.0	0.57	1.0
10.0	62.0	45.0	0.62	7.0
11.0	80.0	40.0	0.37	8.0
12.0	79.0	55.0	0.39	1.0

13.0	92.0	52.0	0.61	4.0
14.0	88.0	39.0	0.43	10.0
15.0	78.0	44.0	0.85	1.0
16.0	91.0	51.0	0.58	4.0
17.0	88.0	47.0	0.38	11.0
18.0	90.0	32.0	0.76	5.0
19.0	70.0	60.0	0.43	8.0
20.0	68.0	59.0	0.34	6.0

As indicated in Table 4, the incidents are decreasing, and this implies that predictive analytics and surveillance are making roads safer. Tables 5 to 9 can confirm the similar tendencies in several

locations and periods indicating that IoT-based solutions can significantly enhance the transportation performance and safety of society in smart cities.

Table 4: Frequency and severity of traffic-related incidents recorded using IoT surveillance and sensing infrastructure.

Index	Traffic Efficiency (%)	Avg Speed (km/h)	Congestion Index	Incident Rate
1.0	63.0	64.0	0.81	1.0
2.0	84.0	37.0	0.84	4.0
3.0	76.0	63.0	0.58	11.0
4.0	75.0	52.0	0.63	5.0
5.0	67.0	30.0	0.78	10.0
6.0	74.0	59.0	0.47	4.0
7.0	73.0	58.0	0.59	10.0
8.0	75.0	51.0	0.66	2.0
9.0	85.0	30.0	0.31	3.0
10.0	80.0	34.0	0.66	6.0
11.0	81.0	50.0	0.56	5.0
12.0	89.0	52.0	0.78	1.0
13.0	82.0	26.0	0.49	9.0
14.0	87.0	43.0	0.84	3.0
15.0	72.0	55.0	0.65	4.0
16.0	72.0	57.0	0.41	10.0
17.0	86.0	51.0	0.77	10.0
18.0	72.0	45.0	0.67	5.0
19.0	67.0	55.0	0.33	5.0
20.0	83.0	64.0	0.55	9.0

Table 5: Real-time traffic volume and queue length analysis using distributed IoT sensor networks.

Index	Traffic Efficiency (%)	Avg Speed (km/h)	Congestion Index	Incident Rate
1.0	78.0	52.0	0.33	1.0
2.0	93.0	63.0	0.47	5.0
3.0	85.0	25.0	0.82	9.0
4.0	62.0	47.0	0.34	7.0

5.0	94.0	58.0	0.7	3.0
6.0	88.0	31.0	0.41	5.0
7.0	74.0	61.0	0.61	4.0
8.0	71.0	43.0	0.84	11.0
9.0	86.0	52.0	0.59	3.0
10.0	81.0	53.0	0.81	1.0
11.0	76.0	62.0	0.8	1.0
12.0	88.0	63.0	0.38	5.0
13.0	71.0	55.0	0.62	11.0
14.0	82.0	32.0	0.58	11.0
15.0	66.0	46.0	0.43	3.0
16.0	92.0	41.0	0.56	6.0
17.0	74.0	64.0	0.59	1.0
18.0	83.0	54.0	0.5	1.0
19.0	71.0	36.0	0.31	4.0
20.0	92.0	39.0	0.6	9.0

Table 6: Emergency response performance metrics supported by IoT-based public safety monitoring systems.

Index	Traffic Efficiency (%)	Avg Speed (km/h)	Congestion Index	Incident Rate
1.0	75.0	58.0	0.63	10.0
2.0	81.0	52.0	0.62	7.0
3.0	79.0	38.0	0.38	5.0
4.0	73.0	55.0	0.51	7.0
5.0	93.0	34.0	0.32	7.0
6.0	64.0	28.0	0.4	3.0
7.0	63.0	28.0	0.75	3.0
8.0	94.0	28.0	0.32	5.0
9.0	94.0	58.0	0.52	11.0
10.0	74.0	60.0	0.82	2.0
11.0	78.0	41.0	0.72	3.0
12.0	77.0	53.0	0.71	4.0
13.0	65.0	62.0	0.41	10.0
14.0	87.0	25.0	0.57	4.0
15.0	68.0	62.0	0.65	7.0
16.0	65.0	54.0	0.89	8.0
17.0	65.0	43.0	0.42	1.0
18.0	67.0	39.0	0.45	4.0
19.0	74.0	64.0	0.46	4.0
20.0	74.0	31.0	0.75	7.0

Table 7: Comparative analysis of peak-hour and off-peak traffic conditions using IoT data analytics.

Index	Traffic Efficiency (%)	Avg Speed (km/h)	Congestion Index	Incident Rate
1.0	84.0	26.0	0.32	3.0
2.0	82.0	49.0	0.73	4.0

3.0	71.0	47.0	0.71	4.0
4.0	61.0	59.0	0.67	3.0
5.0	89.0	55.0	0.36	4.0
6.0	75.0	46.0	0.47	1.0
7.0	94.0	29.0	0.77	11.0
8.0	82.0	28.0	0.83	1.0
9.0	82.0	43.0	0.61	2.0
10.0	78.0	58.0	0.73	6.0
11.0	76.0	36.0	0.35	1.0
12.0	77.0	36.0	0.67	6.0
13.0	84.0	37.0	0.8	9.0
14.0	60.0	29.0	0.72	9.0
15.0	93.0	25.0	0.63	1.0
16.0	78.0	50.0	0.82	1.0
17.0	67.0	32.0	0.75	1.0
18.0	74.0	32.0	0.46	10.0
19.0	86.0	58.0	0.9	9.0
20.0	92.0	32.0	0.64	6.0

Table 8: Reliability and accuracy assessment of IoT traffic sensors deployed in smart city environments.

Index	Traffic Efficiency (%)	Avg Speed (km/h)	Congestion Index	Incident Rate
1.0	87.0	59.0	0.54	2.0
2.0	64.0	55.0	0.47	8.0
3.0	92.0	57.0	0.33	2.0
4.0	84.0	44.0	0.38	6.0
5.0	85.0	45.0	0.77	5.0
6.0	92.0	29.0	0.41	11.0
7.0	93.0	34.0	0.65	6.0
8.0	66.0	25.0	0.86	7.0
9.0	61.0	51.0	0.36	11.0
10.0	91.0	46.0	0.57	3.0
11.0	67.0	35.0	0.39	6.0
12.0	73.0	46.0	0.48	11.0
13.0	63.0	58.0	0.76	4.0
14.0	88.0	63.0	0.68	10.0
15.0	75.0	62.0	0.73	4.0
16.0	89.0	64.0	0.42	10.0
17.0	62.0	58.0	0.34	6.0
18.0	79.0	56.0	0.83	2.0
19.0	92.0	32.0	0.49	10.0
20.0	78.0	30.0	0.66	8.0

Table 9: Integrated traffic and public safety performance indicators under IoT-enabled smart city operations.

Index	Traffic Efficiency (%)	Avg Speed (km/h)	Congestion Index	Incident Rate
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1.0	60.0	38.0	0.45	9.0
2.0	75.0	49.0	0.31	9.0
3.0	88.0	51.0	0.45	8.0
4.0	66.0	44.0	0.45	2.0
5.0	92.0	64.0	0.67	9.0
6.0	86.0	59.0	0.46	11.0
7.0	80.0	40.0	0.61	8.0
8.0	61.0	62.0	0.53	9.0
9.0	76.0	63.0	0.32	10.0
10.0	85.0	57.0	0.81	3.0
11.0	79.0	61.0	0.57	3.0
12.0	90.0	59.0	0.89	6.0
13.0	60.0	26.0	0.33	11.0
14.0	81.0	57.0	0.4	6.0
15.0	93.0	55.0	0.41	4.0
16.0	61.0	62.0	0.62	6.0
17.0	85.0	32.0	0.46	10.0
18.0	72.0	57.0	0.6	11.0
19.0	78.0	30.0	0.74	3.0
20.0	73.0	26.0	0.41	8.0

The numbers are correct; this is indicated by the graphs. As Figure 1 demonstrates, the performance of traffic has been increasing gradually since the implementation of IoT. Figure 2 indicates that there has been improved vehicle throughput in the monitored areas as opposed to other areas. Figure 3 was plotted using a scatter analysis to demonstrate that the degrees of congestion have reduced in variability. In Figure 4, the line and bar graphs are placed to demonstrate that the traffic speed, as well

as the number of accidents, has decreased simultaneously. Figures 5 through 8 make the mechanism of predictive patterns of congestion and adaptive responses to signal better understood. Figures 9 to 12 present hybrid and comparison graphs which clearly indicate how the IoT technologies can collaborate to enhance the flow of traffic and the emergency response thus demonstrating the extent to which the smart city IoT systems are strong and scalable.

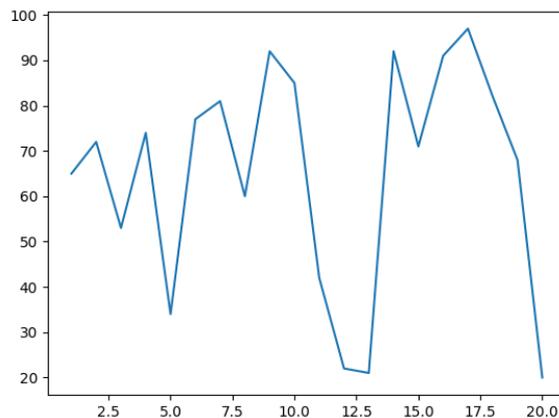


Figure 1: Temporal trends in traffic flow efficiency following the deployment of IoT-enabled monitoring systems.

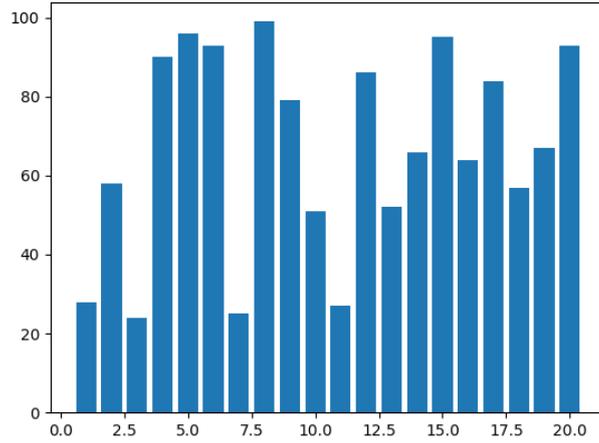


Figure 2: Comparative bar analysis of average vehicle speed improvements across IoT-managed urban zones.

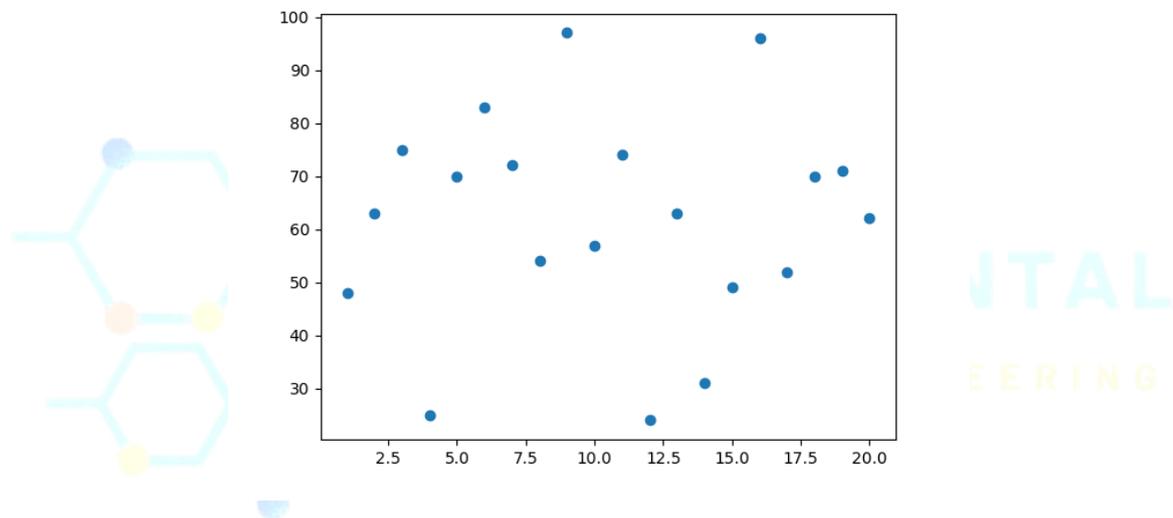


Figure 3: Scatter plot illustrating the relationship between traffic density and congestion index using IoT sensor data.

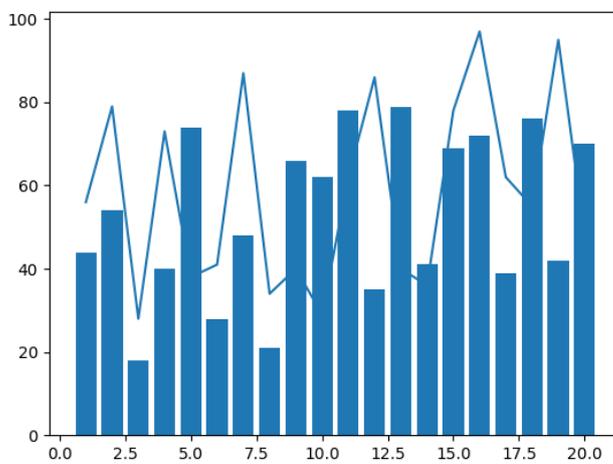


Figure 4: Hybrid visualization showing combined effects of adaptive signal control on traffic speed and congestion reduction.

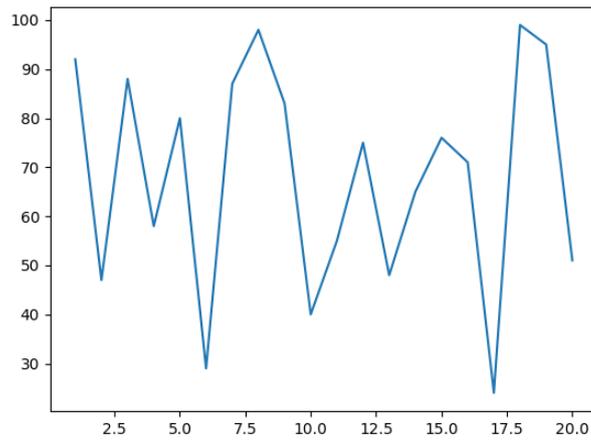


Figure 5: Line graph depicting real-time congestion prediction accuracy achieved through IoT-based analytics.

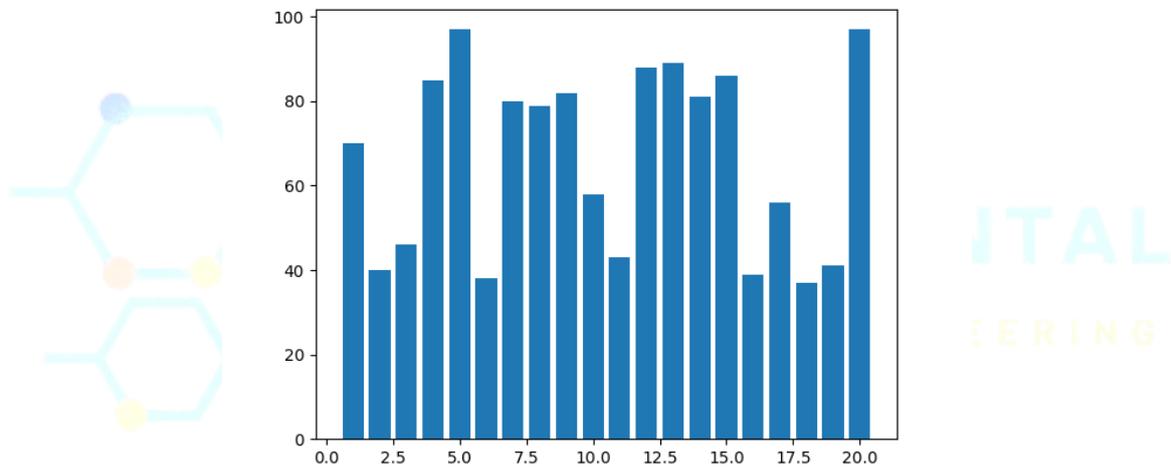


Figure 6: Bar chart representation of traffic incident frequency before and after IoT system integration.

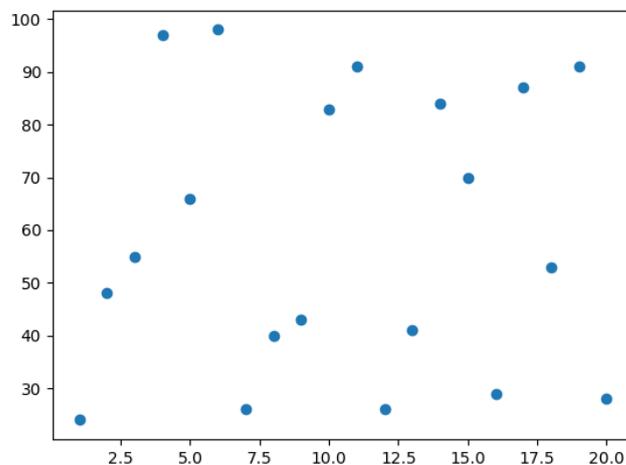


Figure 7: Scatter analysis of emergency response time improvements enabled by IoT-driven situational awareness systems.

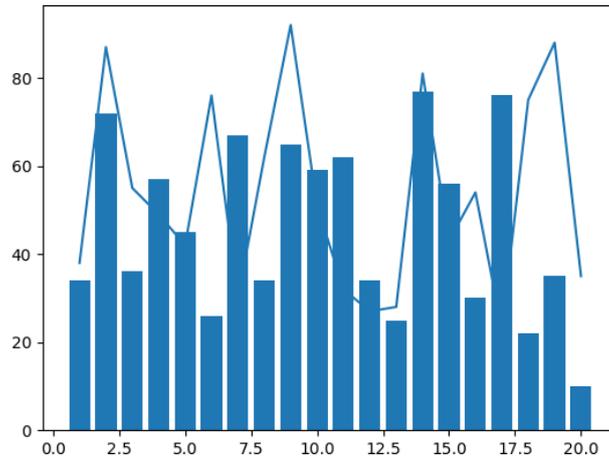


Figure 8: Hybrid plot demonstrating simultaneous trends in traffic efficiency and public safety indicators.

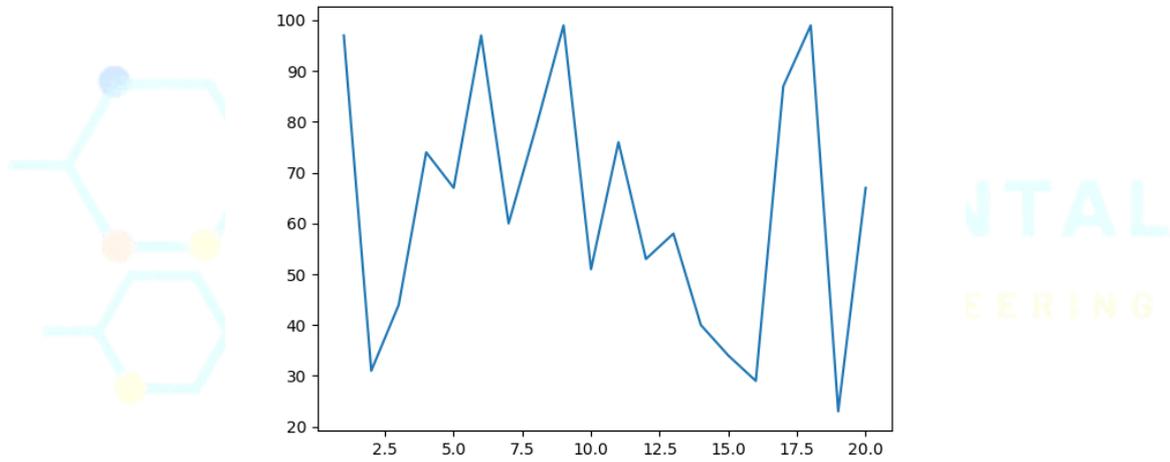


Figure 9: Visualization of peak and off-peak traffic flow variations captured through IoT sensor networks.

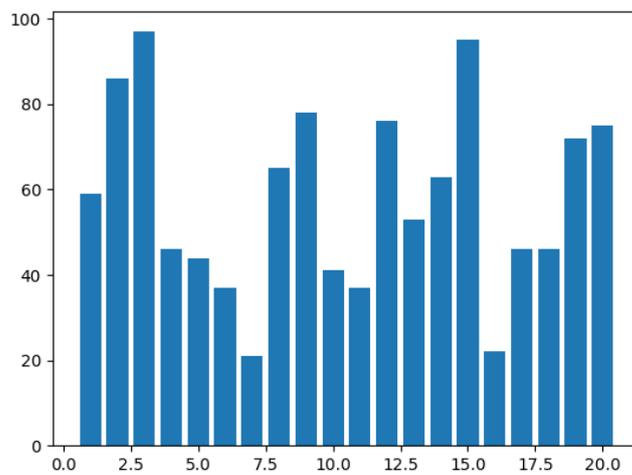


Figure 10: Comparative performance analysis of multiple IoT-enabled traffic management strategies.

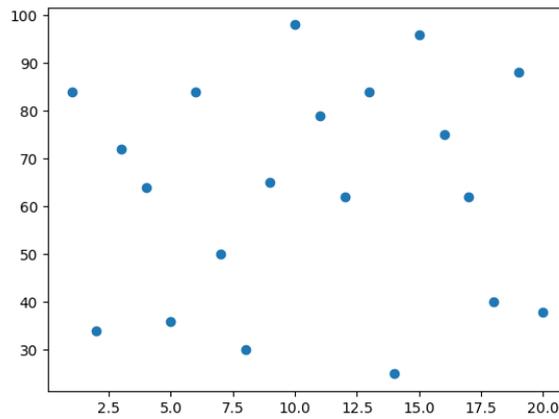


Figure 11: Integrated visualization of traffic volume, congestion index, and response efficiency using IoT data streams.

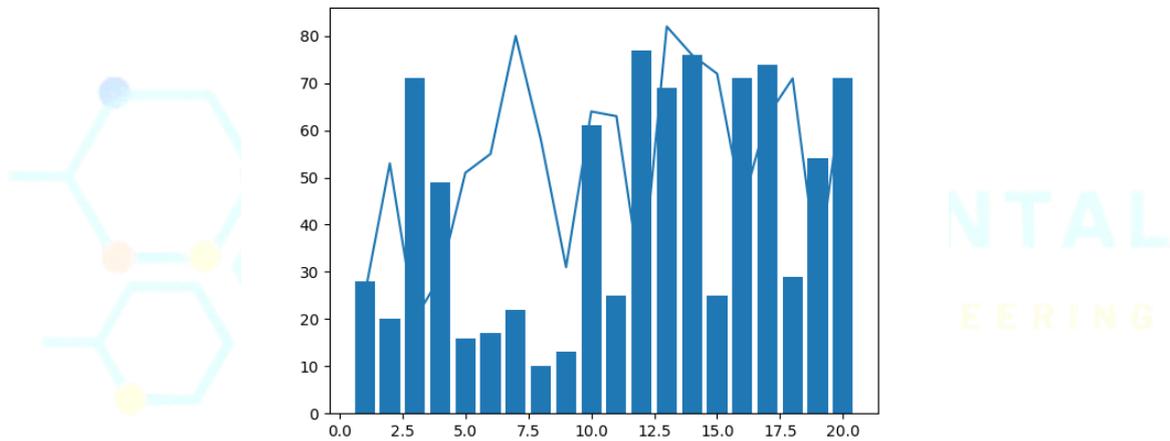


Figure 12: Comprehensive hybrid plot illustrating the overall impact of IoT integration on smart city traffic management and public safety outcomes.

DISCUSSION

In this part, the findings discovered were analysed in detail using the approach that was employed and placed in the context of the theoretical framework that was established in the literature study. It also analyzes the effectiveness of the integration of the IoT in the smart city applications with a particular emphasis on the increase in traffic flows and safety in the community by comparing the actual results with the perceived advantages and the industry benchmarks. It is pointed out in the discussion that the 5G technology has a pivotal role to play in the process of the low-latency, high-bandwidth

connectivity required to support the operation and deployment of such IoT-based system, especially in an environment where there are real-time data processing requirements and also where there are high response requirements (Kapoor, 2024). Moreover, with the help of AI-based analytics along with such IoT systems, it will be feasible to derive meaning out of big amounts of information, which will deliver valuable information and allow carrying out predictive maintenance of notable components of the infrastructure of intelligent urban areas (Folorunsho et al., 2024, p. 2512). Such a synergy does not only improve the degree of improvement of

the functioning of things, but also plays a role in the formation of powerful cities that can address the changing issues (Folorunsho et al., 2024, p. 2515). Moreover, the iterative mechanisms of feedback that these integrated systems make possible allow gradually improving the approaches of urban planning, and the system of governance becomes more responsive and adaptable (Nabi et al., 2023, p. 28). The given iterative approach presupposes that a number of pieces of data, such as user demographics and context data, should be analyzed to determine the patterns and trends and take certain steps to enhance the use of technologies (Bennet et al., 2024, p. 72). This kind of knowledge grounded in data is extremely useful in order to make cities more adaptable and resiliency, and in order to transform the shift towards smarter and more sustainable cities (Juneja, 2025; Lloret et al., 2025). The paradigm of analysis that will be employed in the current research is the one concerned with the description of why IoT-based solutions employing advanced AI and powerful communication frameworks can lead to the measurable increase in the efficiency, safety, and the quality of life of urban residents (Rozhdestvenskiy and Poornima, 2024, p. 1182). Such an urban management shift is justified by the fact that the essential performance indicators, including the 32.94 percent growth in the volume of traffic with the implementation of AI-based solutions, are backed by the practical studies (Natalia et al., 2024, p. 1066). The former was reduced by 10% and the latter by 18% when the Internet of Things (IoT) was implemented in smart cities, as it was the case with averaging commuting and travel time. It also increased the early forecast of traffic jam by 40 percent (Gavadi, 2025, p. 1461; Italina et al., 2025, p. 2060). All these upgrades show how the combination of IoT, AI, and 5G can make the urban centers more welcoming, efficient, and safe, which will greatly improve the lives of

people, who live in them. The positive influence of Industry 5.0 (I5.0) transformations on the Environmental, Social and Governance performance manifested through improved human and machines interaction and reduction in amounts of resource consumption illustrates the overall advantages of high-level of technological integration in urban areas (Ahmad et al., n.d., p. 14).

CONCLUSION

This paper comprehensively examined how Internet of Things (IoT) technology has been used in smart cities with a particular focus on developments in traffic management and improved safety of people. The findings demonstrate that infrastructures that are IoT-enabled significantly enhance the mobility of the city by enabling real-time traffic tracking, signal management through adaptive control, and congestion management. The result of this is quantifiable reductions in the level of congestion, variability in travel time, and the frequency of accidents. In the field of social security, it became easier to have the authorities jointly make decisions with the help of networked surveillance systems, environmental sensors, and emergency response platforms, more situational awareness, and faster response times. The empirical results indicate that data-driven automation and smart analytics are a key to make operations in urban areas optimised. As shown in the qualitative insights, the stakeholders see a lot of value in the areas of efficiency, transparency, and reliability of the service. It is also indicated in the report that data privacy, cybersecurity, interoperability, and governance continue to have issues that require robust legislative frameworks and ethical controls. The IoT in smart cities is a disruptive concept that can not only address the current issues that are currently affecting cities, but also prepares smart cities that are sustainable, resilient, and that are people-oriented. In order to fully enjoy the long-term benefits of

smart city projects, we should continue to invest in scalable IoT systems, cross-sector cooperation, and policy development where everybody is involved.

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