

# Enhancing Safety Perception for Disabled Users of BRT System through Closed-Circuit Television Cameras in Johannesburg

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## 1 ABSTRACT

In 2025, the city of Johannesburg has been classified among the ten world most dangerous metropolitan cities. This notion is supported by the city's crime index of 80.8% in mid-year 2025. The modern epoch of transportation planning directs more focus and resources towards implementing smart, effective and efficient bus rapid transit systems to commute urban communities. However, there has been evidence of low ridership of bus rapid transits especially by people with disabilities and the root cause is traced to poor safety perceptions catalysed by criminal and violent activities in and around the bus rapid transit systems. The analysis of this effect is not perceived a massive threat in undermining efforts of smart city initiatives particularly where mass surveillances are implemented in the urban built environment. It is common cause that every development in the city attracts opportunists who poses direct threat towards elimination of innovative strategies. This study adopts a descriptive case study approach to investigate the effect of closed-circuit television cameras in improving the safety perception of disabled users of Rea Vaya BRT system in Johannesburg. Furthermore, the study intends to advocate for the popularization of closed-circuit television (CCTV) networks to combat crime activities in and around bus rapid transit network.

Keywords: Closed-circuit television, bus rapid transit, safety, disabled-users, smart city

## 2 INTRODUCTION

The implementation of closed-circuit television (CCTV) surveillance cameras in public spaces is common in South African metropolitan cities. In Johannesburg, the installation of CCTV surveillance cameras is pivotal in highways, public transport systems, city centre, malls, common places, and private residence (Gorpi, 2018). The high prevalence of CCTV surveillance is influenced by growing concerns over public safety and security, the protection of essential asserts and property. The current legislation of South Africa does not regulate CCTV cameras in public spaces, and such has been identified for rectification because of abuse by individuals, corporates or the state. It is common knowledge that in Johannesburg, the CCTV surveillance cameras rolled out by private security providers are without clear guidelines on how to bridge balance between public safety and security essentials with interest to rights to privacy. To date, efforts have been made for disclaimers arguing compliance with privacy regulations including Protection of Personal Information (POPI) Act of 2013, which has not yet fully realised operational imperatives. People with disability form segment of the vulnerable society that relies heavily on public transport due to affordable fares and convenience, however, they tussle with increasing criminal and violent activities that are prevailing in and around public transport zones. In terms of Rea Vaya BRT system particularly in Ellis Park, efforts have been made to install CCTV cameras to serve as security features and limit criminal activities in and around the BRT station. The implementation of CCTV cameras has been greatly improved and of assistance to disabled persons as they are able to manoeuvre with ease and without fear of crime (PSIRA, 2019).

## 3 HISTORICAL CONTEXT OF CCTV AND BRT IN JOHANNESBURG

The implementation of CCTV surveillance cameras in Johannesburg is not a relative new concept however, it is still growing trend in comparison to metropolitan cities in Western countries such as the United States, United Kingdom and Canada (Lukacs, 2016). However, there is popularization of CCTV systems driven by the state, private sector and private security companies in South Africa. This initiative is sometimes drawn back by the fear notion led by civil society and researchers that the growing demand for surveillance will impede on the right to privacy. According to Minnaar (2015), the implementation of CCTV in South African cities can be tracked back to the early 1970s when the mining industry dealing with diamond and gold refineries invented them to prevent the smuggling and stealing of minerals. However, in the early 1990s and early 2000s, the utilization of CCTV surveillance gained popularity in the central business districts (CBDs)

of many cities where retailers initiated the installation of CCTV surveillance to detect, prevent, deviate and manage criminal activities. This notion is supported by the growing evidence of high volumes of CCTV camera systems in the private sector such as banks, warehouses, retailers and residential estates. During the 2010 World cup soccer tournament in South African, concerns around safety and security of tourists enhanced the fresh push that influenced the public-funded extension of CCTV surveillance on sports facilities, highways, city centres and shopping complexes (Meyersfield &Nyembe, 2016). Moreover, this period has seen public transport systems investing trunk of funds towards installing CCTV cameras in their transport facilities especially the public transport system. The bus rapid transit system in Johannesburg extended more facilities around their stations and inside the fleets to combat, control and deter criminal activities. In 2011, Rea Vaya bus rapid transit system at least installed CCTV cameras in more than 50% of their fleets and stations fully fitted with cameras.

#### **4 CONCEPTUAL AND THEORETICAL FRAMEWORK**

The concept of CCTV system relates to surveillance abilities that serves primarily as a security force multiplier, enabling surveillance for greater range of an area, more often than it would be possible for security personnel alone (Minnaar, 2012). CCTV system is sued to provide support the comprehensive security cluster by integrating video coverage and security alarm detectors for detection, barriers and control access. This concept is not a new concept around the world; it may be traced back to the early 1950s. CCTV systems are complex and encompasses various components with multi-faceted functions, specifications and features. The most prominent components include but not limited to lenses, cameras, power, lighting, and data distribution centres. CCTV systems regularly undergo feature upgrades to enhance performance in extents such as data storage, digital equipment options, wireless communications, component reduction and automated picture analysis (Moatshe, 2018). This study is grounded on the rational choice theory which perceive views that people intend to achieve results aligned with their goals to amplify their self-interest. Also, when alternative options are made available, individuals resort to the route that maximizes benefit and satisfaction. In this case, this theory is relevant to the study to provided basis for argument that people with disabilities are more likely to use BRT systems when presented with various options for public mode of transportation because security measures are enforced and prioritised for passengers as compared to other modes of public transit. Thus, the proliferation of CCTV cameras in BRT system enhances the amount of ridership of persons with disabilities as they project the feeling of safe mobility options.

#### **5 METHODOLOGY**

This study adopts a qualitative research approach to derive an in-depth understanding of how CCTV surveillance enhances safety perception for disabled persons who commute through BRT system in Johannesburg. The research integrates (interviews with municipal transport officials and residents in the city) and secondary data (municipal reports, academic literature and municipal integrated development plans) that are directly related with sustainable public transit and development goals. In a broader context, this research relies extensively on previous arguments and data results which are synced to a dialogue amongst themselves to derive common conclusions on broadened perspectives. Purposive sampling techniques were adopted to guide the study with the target population limited to a total of 30 respondents who responded to structured interviews. Data collection procedures were observed through key informant and stakeholder interviews such as municipal departments (Spatial planning and economic development department; Environmental affairs and Transport department). Secondary data sources consisted of public transport sector plans, annual reports, policies, scholarly publications and spatial development frameworks. Furthermore, thematic approach was adopted to analyse data collected which aimed on outlining key thematic areas, trends and patterns linked to bus rapid transit and CCTV surveillance cameras.

#### **6 THE LEGAL IMPERATIVES OF CCTV SURVELLIANCES IN SOUTH AFRICA**

To derive in-depth understanding of techniques which CCTV surveillance dialects to the right to privacy, there is a broader need to envision the notion of privacy and its imperatives. The right to privacy is a basic human right recognised around the world as one of the concepts of modernity which is set to have a universal common underpinning of definition. The call for the right to privacy remains a global phenomenon, but its foundation is rooted in differential interpretation depending to the prevailing community traits, culture and economic power of the time. South Africa builds its legislative mandate on reference to global legal trends;

in which there have been multifaceted trials at deriving a uniform definition of what the concept ‘privacy’ constitute. Under international law, the right to privacy is recognised by Article 12 of the Universal Declaration of Human Rights (UDHR) together with Article 17 of the International Covenant on Civil and Political Rights (ICCPR) (Meyersfield & Nyembe, 2016). On the other hand, the South African constitution and common law protect the right to privacy which is listed in Section 14 of the 1996 Constitution outlined as: Everyone has the right to privacy.

The overarching law in South Africa discourage interference with the private communication channels of the people. A detailed comprehensive protection of the right to privacy (digitally) is listed in the POPI Act which is not yet fully adopted and implemented (Van Jaarsveld & Minnaar, 2012). The POPI Act outlines that ‘Personal information should only be obtained under specific, explicitly confined and lawful circumstances in relation to a function or works of the responsible party’. In the scenario involving the case of CCTV surveillance, such surveillance should not be carried out in a discriminatory system. It should be regulated, legitimate, lawful and should pass limitation test like any other justification for restriction of fundamental human rights in a democratic society. Furthermore, the deployment of CCTV surveillance cameras should be portioned equally to the legal purpose of pursuit. Along with should be a proportionality test which creates a necessary logical intersection between the extent (CCTV surveillance) and the desired outcome (crime detection, prevention and safety) (PSIRA, 2019).

## 7 PROFILING CCTV SURVEILLANCE IMPACT IN VARIOUS STATIONS OF REA VAYA BRT SYSTEM

Across the city of Johannesburg many serious violent crime categories have been profiled between 2020 and 2025. These violent crimes have targeted the vulnerable societal members in the city centre and spiralling out to the outskirts. These criminal activities include armed robberies, phone snatching, murder, attempted murder, serious assaults and kidnappings. While there were significant decreases in sexual offenses and common assaults; evidence records that violent crime rate for the city is recorded as 1 424 crimes per 100 000 population which is 25% higher than the national crime average. This incline is characterized by 15.5% increase in the number of aggravated robberies in 2024/25 around economic activities of the city. Table 1 depicts the highest number of violent crime incidents in Johannesburg per station identified.

Station Name	2020/2023	2023/2025	Annual change	Rate
Johannesburg Central	4665	5001	4.5%	8654
Hillbrow	4599	4577	-1%	2786
Soweto	2260	2100	-2.1%	1311
Alexandra	3001	2900	8%	1656
Roodepoort	2535	1800	9%	1604
Auckland Park	800	650	10%	1606
Parktown	401	390	15%	998
Sandton	80	65	20%	600
Midrand	100	101	½%	1789
Honeydew	2804	2888	4%	8654

Table 1.

## 8 REA VAYA BRT USER PERCEPTIONS OF SAFETY IN JOHANNESBURG

The Rea Vaya BRT user safety perceptions of safety or the lack thereof has incrementally shaped user travelling behaviour while contributing to further decline in ridership of Rea Vaya BRT system in Johannesburg- while also contributing further to a decrease in safety (given changes, for example in the way in which people utilize public transit system). Figure 1 below presents the safety perceptions held by Rea Vaya BRT users across the City of Johannesburg.

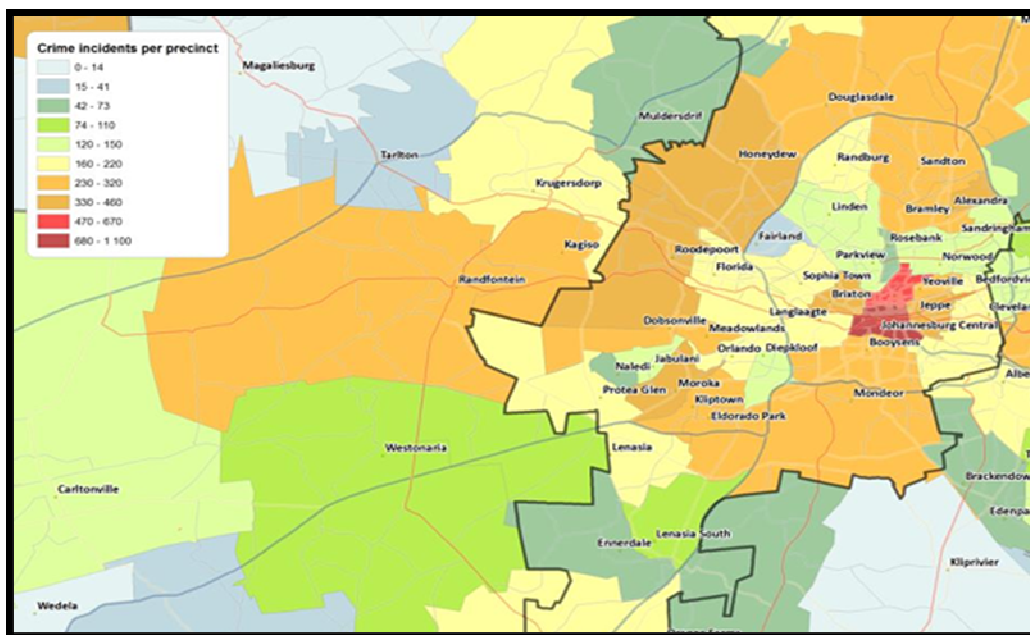


Figure 1: BRT user safety perceptions across the city of Johannesburg

## 9 AREAS FOR FUTURE RESEARCH

The current legislative frameworks on CCTV surveillance were formulated and adopted in a pre-digital time in which the systems and technologies to detect, monitor and record or appreciate surveillance data was not vigorous. In the current times, societies have made progress with appreciating the role of digital and information technology; not downplaying the huge investments made by those who practise crime activities in digital information and systems. In order to combat crime activities and enhance safety perceptions for the vulnerable communities in city centres it is crucial to invest and encourage extensive research on surveillance data which is intercepted from sensors such as cameras, smartphones and social media. Furthermore, to combat crime in Johannesburg, it is important to adopt legal system that put strong emphasis on public surveillance in every street and public infrastructure.

## 10 CONCLUSION

The systematic review emphasizes the importance of balancing the legal system imperatives with human safety methods in the city of Johannesburg. In-depth review in this paper, detected that there is a certain degree of overall constitutional framework and urban planning by-laws in Johannesburg that protects human rights while compromising the acknowledgment of public realities in the city. The findings outline that the Rea Vaya BRT user safety perceptions of safety or the lack thereof has incrementally shaped user travelling behaviour while contributing to further decline in ridership of Rea Vaya BRT system in Johannesburg- while also contributing further to a decrease in safety. In order to derive in-depth understanding of techniques which CCTV surveillance dialects to the right to privacy, there is a broader need to envision the notion of privacy and its imperatives. The right to privacy is a basic human right recognised around the world as one of the concepts of modernity which is set to have a universal common underpinning of definition. The call for the right to privacy remains a global phenomenon, but its foundation is rooted in differential interpretation depending to the prevailing community traits, culture and economic power of the time. South Africa builds its legislative mandate on reference to global legal trends; in which there have been multifaceted trials at deriving a uniform definition of what the concept ‘privacy’ constitute

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