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The Influence of Digital Technology on Decision-Making in the South African Police Service: Balancing Emerging Technologies with Ethical Imperatives

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Abstract

Digital technology is increasingly reshaping decision-making in policing, altering how law enforcement agencies gather information, allocate resources, and respond to threats. This paper critically examines the influence of digital technology on decision-making within the South African Police Service (SAPS), with particular emphasis on the transition into Fourth and Fifth Industrial Revolution (4IR/5IR) environments. SAPS operates under a constitutionally defined mandate to prevent, combat, and investigate crime; maintain public order; protect inhabitants and property; and uphold the law. As crime becomes more complex—including cybercrime and technology-enabled criminality—SAPS is compelled to modernise its systems and practices to maintain operational relevance and legitimacy. The study explores SAPS's current digital initiatives, including crime intelligence systems, e-dockets, automated fingerprint identification systems, CCTV surveillance, mobile applications (including the newly launched MySAPS App), digital forensics, drones, and limited body-worn camera pilots. While these initiatives offer significant promise for improving efficiency, transparency, accountability, and community engagement, they also introduce new ethical and governance risks. These include algorithmic bias, unequal access to technological resources across operational levels, data privacy vulnerabilities, and the potential erosion of human rights through surveillance and media exposure. The paper argues that emerging technologies can enhance policing outcomes only when supported by robust legal frameworks, clear practice guidelines, and decision-makers who understand both the capabilities and limitations of the tools they deploy. Using Rogers' Diffusion of Innovation Theory as a guiding framework, the study analyses how SAPS leaders interpret, adopt, implement, and evaluate digital technologies. A qualitative

methodology is employed, drawing on interviews with 25 senior SAPS officials, document analysis, and observational insights. Findings highlight both strong institutional intent toward digital transformation and persistent barriers, including resource constraints, outdated infrastructure, uneven skills development, and resistance to change. The paper concludes that SAPS's digital future depends on balancing innovation with ethical imperatives, strengthening training and governance, and ensuring technology adoption advances democratic policing principles.

Keywords

South African Police Service (SAPS), Digital Policing, Crime Intelligence, Technology and Ethical Decision-Making, Fourth Industrial Revolution (4IR), Ethics and Accountability in Policing

1. Introduction

The contemporary landscape of law enforcement is rapidly evolving, with digital technology emerging as a pivotal factor shaping decision-making within policing agencies worldwide. This paper critically analyses the influence of digital technology on decision-making within the South African Police Service (SAPS). It also reflects on the ethical imperatives of introducing and applying emerging technologies in decision-making processes, and on the critical need for decision-makers to be properly informed about and to understand the technologies being used. It is crucial to note that SAPS, the primary law enforcement agency in the Republic of South Africa, is tasked with a broad mandate, outlined in Section 205(3) of the Constitution of the Republic of South Africa (1996). This mandate includes preventing, combating, and investigating crime; maintaining public order; protecting and securing the inhabitants and their property; and upholding and enforcing the law (South African Police Services, 2022: p. 5). To effectively discharge these responsibilities, SAPS relies heavily on its personnel on the ground. These officers play a crucial role in crime prevention and in protecting South Africa's citizens (Pheiffer, 2014).

In today's rapidly evolving technological landscape, SAPS's efficiency and effectiveness in fulfilling its constitutional mandate hinge on its ability to embrace advancements from the Fourth—and even Fifth—Industrial Revolutions. Characterised by a fusion of technologies that blurs the boundaries between the physical, digital, and biological spheres, the Fourth Industrial Revolution (4IR) involves integrating artificial intelligence, blockchain, the Internet of Things (IoT), and advanced data analytics into everyday policing operations. At the same time, 5IR is more characterised by stacked innovation, as AI begins to innovate on itself and increases synergy between human and machine intelligence. As Nosta (2023: p. 1) succinctly points out:

The 5IR promises a future where AI is not just an auxiliary function but a core

component of our cognitive processes, enhancing our decision making, creativity and interaction with the world around us.

As we navigate this cognitive revolution, the importance of an ethical lens and ethical use considerations becomes increasingly vital. There is no gainsaying that the shift towards 4IR presents significant challenges for policing and law enforcement. Implementing these technologies requires a comprehensive understanding and an adaptation process that can be complex and demanding for SAPS. SAPS must overcome these challenges to enhance its operational effectiveness and service delivery to the community. This study aims to provide a detailed understanding of SAPS's current technological infrastructure, the skill levels of its personnel, and the leadership's commitment to this transition, in a manner that enhances efficacy and efficiency and ensures ethical accountability.

While functional, SAPS's current technological infrastructure may not be fully equipped to handle the demands of 4IR technologies. Integrating new technologies requires hardware and software upgrades, as well as significant changes to processes and workflows. Additionally, personnel using these technologies must be adequately trained and equipped with the necessary skills to maximise their potential.

Reviewing existing literature on 4IR and law enforcement provides a foundational understanding of the potential benefits and challenges of integrating advanced technologies into police work. Studies on similar transitions in other countries' law enforcement agencies will offer valuable insights and best practices. This study employs a qualitative approach to ensure a comprehensive analysis of both statistical trends and personal insights. The research adheres to strict ethical standards, ensuring participants' confidentiality and anonymity. Informed consent was obtained from all participants, and the study will be conducted with transparency and integrity. Multiple data sources will be used to ensure the study's reliability and validity, and findings will be triangulated. Peer reviews and expert consultations will enhance the credibility of the research.

This study was guided by three explicit research questions:

1) How do digital technologies influence strategic, tactical and operational decision-making within the South African Police Service (SAPS)?

2) How do SAPS leadership interpret and evaluate emerging digital technologies within contemporary policing environments?

3) What organisational, ethical and resource-related challenges shaped the use of digital technologies in policing decision-making?

For the purposes of this study, decision-making referred to the processes through which police leadership assessed information, considered available alternatives and determined appropriate courses of action in response to organisational and operational demands. Within the SAPS context, three levels of decision-making were identified:

Strategic decision-making, which engages with long-term organisational direction, policy development and institutional planning, including decisions regard-

ing the adoption of technological systems.

Tactical decision-making, which relates to the planning and coordination of policing activities, such as the deployment of resources, crime-prevention strategies and operational planning.

Operational decision-making, which involves day-to-day decisions taken in response to incidents, investigations and routine policing activities.

2. Background of the Study

The 4IR has brought remarkable technological advances, reshaping global industries, economies, and societies. This technological revolution presents challenges and opportunities for law enforcement agencies, such as the SAPS, to adapt and innovate to ensure public safety and security (Campbell, 2018). Underpinning this transformation are legal considerations surrounding the adoption of such technologies, as well as the social and ethical implications of specific emerging technologies in policing practice (Connon et al., 2023). Understanding how SAPS adapts to this transformative era is crucial for effective policing and public safety.

SAPS has historically faced significant challenges in fulfilling its mandate, including high crime rates, limited resources, and a deficit in public trust (Faull, 2023; Hoeyi & Makgari, 2021: p. 1). However, the emergence of 4IR technologies presents a unique opportunity for SAPS to overcome these challenges and transform its policing practices. By implementing technologies such as artificial intelligence, data analytics, and surveillance systems, SAPS can potentially reform crime prevention, detection, and response strategies (Vuma, Mofokeng, Adewale, & Motseki, 2022: p. 448). Nevertheless, SAPS's transition to 4IR technologies is not without obstacles (Vuma et al., 2022: p. 449). These obstacles include limited capacity and resources, inadequate training, and underdeveloped network infrastructure to address 4IR crimes, such as cybercrime (Vuma et al., 2022: p. 449). Given ongoing budget cuts by the National Treasury, it is reasonable to assume that SAPS will not soon be able to address these challenges and acquire the necessary new technology to fight crime effectively (Singh, Smit, & Kempen, 2022: p. 56). However, SAPS has undertaken digital initiatives to enhance capabilities and improve service delivery. Singh et al. (2022: p. 54) agree that SAPS has, albeit to a limited extent, embraced the 4IR through technological advancements and digital initiatives to enhance its crime-prevention, investigation, and public-engagement capabilities. These digital initiatives aim to harness technology to improve operational efficiency, enhance data-driven decision-making, and strengthen collaboration with the community and other stakeholders.

Digital Initiatives by SAPS

Implementing digital initiatives has improved crime prevention, investigation, and overall service delivery. Below are some of the key digital initiatives implemented by SAPS to date:

Crime Intelligence System: SAPS has invested in crime intelligence systems to

analyse and predict criminal activity. These systems often use advanced analytics and data-driven approaches to identify trends and hotspots.

E-Docket System: The implementation of an electronic docket system is intended to streamline case management and reduce paperwork. It enables more efficient case file management, information sharing across departments, and improved collaboration.

Automated Fingerprint Identification System (AFIS): AFIS technology is used for the rapid and accurate identification of individuals from their fingerprints. This technology supports law enforcement agencies in criminal investigations and in identifying suspects.

1) SAPS Website and Online Reporting: SAPS provides an online platform for citizens to report certain types of crimes or incidents. This not only makes it more convenient for the public but also facilitates the efficient processing of reports.

2) Mobile Applications: SAPS has developed mobile applications that citizens can use to access information, report incidents, or request assistance. These apps provide a quick, direct communication channel between the public and law enforcement.

3) CCTV Surveillance Systems: The deployment of Closed-Circuit Television (CCTV) cameras in public areas enhances monitoring and surveillance. These systems can be integrated into a broader network for real-time monitoring and crime prevention.

4) Digital Forensics: SAPS has invested in digital forensics capabilities to investigate cybercrime and analyse electronic evidence. This includes examining digital devices, data recovery, and identifying digital trails.

5) Training and Capacity Building: Initiatives to train law enforcement officers to use digital tools and technologies are crucial. Keeping the workforce up to date with the latest advancements ensures effective use of digital resources.

6) My SAPS App: Established in 2022, My SAPS is a free app available on all smartphones, allowing citizens to submit anonymous crime tip-offs, access information about SAPS Stations, and connect with SAPS Social Media platforms. The app also enables users to upload images, videos, or audio related to incidents (Singh et al., 2022: p. 94).

7) Body-worn Cameras: The use of body-worn cameras for SAPS was piloted but had limited implementation due to budget constraints. These cameras advance policing and align SAPS with 4IR standards. Although responses to their effectiveness are mixed, partnerships with private entities could enhance their deployment (Singh et al., 2022: p. 95; Perkins, 2018: pp. 1-2).

8) Drones: Drones are a relatively new addition to SAPS's toolkit and are used for mapping, monitoring hostage situations, crowd management, and crime scene investigation. The acquisition of over 160 drones in three phases aims to bolster police operational command centres and Safer City Projects (Labuschagne, 2022).

Through these digital initiatives, the SAPS aims to improve operational efficiency, enhance data-driven decision-making, and strengthen collaboration with

the community and other stakeholders, ultimately ensuring more effective crime prevention, investigation, and service delivery. However, Connon et al.'s (2023: p. 137) caution about adopting and using new technology bears repeating:

> …the more sensitive the information being processed by a piece of technology, the greater protection needed…[T] he more sensitive the information, the greater the need for specific legal structures to authorise the processing and to ensure the necessary reliability, transparency, and accountability.

Specifically, regarding algorithmic use, Singh (2024: p. 275) cautions that algorithms can increase bias and discrimination, as they are known to scaffold, mask, and exacerbate human bias (Connon et al., 2023: p. 141). These are key considerations for any decision-maker, as appropriate protection for people and society cannot be left to chance.

3. Theoretical Framework

Drawing on Rogers' (2003) Diffusion of Innovation Theory, this research examines how digital technologies interact with the decision-making dynamics of SAPS leaders. The organisational behaviour perspective examines how internal structures and cultures affect technology adoption. The technology adoption framework outlines the stages and factors that influence the integration of new technologies. Decision science provides insights into how information and tools influence the cognitive processes underlying decision-making. Integrating these frameworks offers a comprehensive analysis of how SAPS adopts and utilises digital technologies and their impact on leadership decision-making. However, responsible decision-making underpins the regulatory regime for law enforcement and specific practice guidelines.

Rogers's Diffusion of Innovation Theory

This study examines the factors influencing the South African Police Service's (SAPS) transition to the Fourth Industrial Revolution (4IR). Rogers' Diffusion of Innovation theory, introduced by Everett Rogers in 1962, will be used to address this knowledge gap. The theory offers a valuable framework for understanding the integration of 4IR technologies in policing contexts. According to Rogers, the adoption or rejection of innovations hinges on whether they are perceived as optimal or suboptimal courses of action. The theory outlines a diffusion process encompassing stages such as knowledge, persuasion, decision, implementation, and confirmation, during which the spread of innovations within a community occurs at varying rates and patterns.

During the knowledge stage, SAPS management and personnel become familiar with emerging 4IR technologies, including artificial intelligence, data analytics, and smart surveillance systems. Factors influencing knowledge acquisition may include internal and external training initiatives, expert consultations, and exposure to successful case studies from other law enforcement agencies. Understand-

ing the concepts of 4IR and its technological implications for addressing modern crimes becomes pivotal for SAPS members.

Subsequently, in the persuasion stage, SAPS management evaluates the potential benefits and drawbacks of 4IR technologies. This assessment may be influenced by factors such as the perceived relevance of these technologies to organisational challenges, the credibility of sources advocating for them, and the existence of pilot projects demonstrating effectiveness. Consideration must be given to the impact on human rights at every stage of the process, from proposal to implementation, and final decisions must be thoroughly and thoughtfully informed (Connon et al., 2023: p. 135). Commanding officers play a crucial role in persuading members to adopt technological tools by highlighting benefits such as increased efficiency, safety, and accuracy, ensuring that new technologies are evaluated for ethical soundness and potential human rights implications, and providing comprehensive training and support.

The decision stage follows, in which SAPS management decides to adopt and implement 4IR technologies. Budgetary constraints, political pressures, stakeholder support or resistance, strategic alignment, and perceived compatibility with existing organisational structures and goals influence these decisions. Implementation then ensues, with SAPS integrating 4IR technologies into its operations. Successful implementation hinges on several factors, including the availability of technical expertise, the adequacy of infrastructure, change management strategies, collaboration with external partners, and alignment with strategic priorities.

Lastly, in the confirmation stage, SAPS evaluates the outcomes of its 4IR initiatives to assess their success and impact on policing outcomes. Factors influencing this assessment include improvements in crime detection and prevention, enhanced member safety and efficiency, bolstered public trust, and the addressing of community privacy and human rights concerns.

4. Methodology

This study uses a qualitative research methodology to examine the complexities of digital technology adoption within SAPS. Key methods include:

Interviews: Conducting in-depth interviews with SAPS leaders to gain insights into their experiences and perceptions of digital technology in decision-making.

Document Analysis: Reviewing internal reports, policies, and strategic documents to understand SAPS's formal stance and implementation strategies for digital technologies.

Observation: Observing the use of digital tools in real-time decision-making to capture practical challenges and benefits.

Digital Technology in SAPS Decision-Making: Digital platforms, data analytics tools, and communication technologies significantly inform SAPS decision-making. These tools are used at various levels:

Strategic Decision-Making: Digital platforms provide comprehensive data ana-

lytics to support long-term planning and policy formulation.

Tactical Decision-Making: Real-time data and communication technologies enhance the ability to respond to emerging threats and incidents.

Operational Decision-Making: Day-to-day activities and resource management are streamlined with digital tools, improving efficiency and effectiveness.

The study drew on interviews with 25 senior officials within the South African Police Service. Participants were purposefully selected, based on their involvement in organisational decision-making and their experience with the use of digital technologies in policing environments. Most participants had extensive policing experience, with service histories generally ranging between 20 and 30 years. Their professional roles placed them in positions where decisions relating to strategy, operations or organisational management were routinely made. Efforts were made to include participants from different operational environments and functional areas within the organisation in order to capture a range of perspectives. While many participants recognised the potential benefits of technological innovation in policing, the interviews also revealed reservations and concerns relating to infrastructure, training and ethical considerations. This approach helped ensure that the data reflected a range of views rather than only strongly technology-supportive perspectives. All participation was voluntary and conducted in accordance with the ethical principles governing academic research.

Data Analysis

The interview material, observational insights and documentary sources were examined using a thematic qualitative approach. Interview responses were carefully reviewed to identify recurring ideas, patterns, and areas of concern related to technology and decision-making within SAPS. Initial coding focused on identifying key concepts emerging from the interviews, including organisational readiness for digital technologies, resource constraints, ethical considerations, and operational benefits. These initial codes were subsequently grouped into broader themes that reflected common experiences and institutional dynamics. Rogers' (2003) Diffusion of Innovation theory provided an interpretive lens during this stage of the analysis. Participants' reflections were considered in relation to the stages of innovation adoption described by Rogers, particularly the processes of knowledge acquisition, persuasion, decision, implementation and confirmation. This framework helped situate the interview findings within a broader understanding of organisational responses to technological change.

5. Literature Review

5.1. Introduction

This literature review examines how digital technologies affect decision-making within the SAPS, with a specific focus on integrating 4IR technologies for crime prevention, detection, and investigation. Understanding the historical context of the Industrial Revolution is essential to grasping the trajectory of technological

advances and their implications for sectors such as law enforcement. From the mechanisation of the first Industrial Revolution to the digital transformation of the fourth, the progressive integration of technology underscores its pervasive influence across society.

Key to operationalising this understanding is defining the components of 4IR, such as artificial intelligence, data analytics, the Internet of Things (IoT), and blockchain technology. These concepts underpin technological advancement within SAPS and are instrumental in enhancing operational efficiency and effectiveness in combating crime. Examining the legislative framework provides insight into the specific policies and regulations governing the use of 4IR technologies within SAPS. Policies such as the Mobile Communication Services Policy No. 2 of 2020, National Instruction No. 2 of 2023, and others provide a structured approach to implementing digital initiatives within the organisation.

The primary focus of this study is to explore the challenges and opportunities SAPS encountered during its transition to the 4IR. These include issues related to technological infrastructure, resource constraints, training and skills development, leadership, data management and privacy, collaboration, budgeting, and regulatory compliance. By delving into these areas, the study aims to provide a comprehensive understanding of current research on the 4IR in law enforcement, particularly within SAPS. This literature review will inform the study's analysis and recommendations, ensuring they are grounded in existing knowledge and best practices in the field.

5.2. Industrial Revolutions, Constitutional Governance, and the Transformation of Policing in South Africa

Industrial revolutions are not merely technological milestones; they are structural transformations that reshape economic systems, social relations, and the architecture of governance. Each industrial revolution has altered the relationship between the state and society, redefining state capacity, regulatory responsibility, and institutional legitimacy (Brada & Park, 2024; Moll, 2022: p. 4-24). In the South African context, these transformations must be examined through the lens of constitutional supremacy, human dignity, equality, and freedom as foundational values of the Constitution of the Republic of South Africa, 1996.

Section 205(3) of the Constitution mandates the South African Police Service (SAPS) to prevent, combat and investigate crime; maintain public order; protect and secure the inhabitants of the Republic and their property; and uphold and enforce the law. The evolution of industrial revolutions, therefore, has direct implications for how this mandate is operationalised. Technological change not only transforms the nature of crime but also reshapes the tools, risks, and accountability frameworks within which policing occurs.

Understanding the trajectory from mechanisation to technological convergence is thus essential for assessing the constitutional and governance implications of the Fourth Industrial Revolution (4IR).

5.2.1. The First and Second Industrial Revolutions: Urbanisation, Bureaucratisation, and the Foundations of Modern Policing

The First Industrial Revolution (1760-1850) introduced mechanised production and steam power, catalysing rapid urbanisation and social restructuring (Africa, 2019; Moll, 2022: p. 6). Industrial urban centres generated new forms of social dislocation, labour unrest, and concentrated criminal activity. Historically, modern policing institutions emerged in response to these conditions, reflecting the state's growing role in managing urban order and regulating industrial society. The First Industrial Revolution was fundamentally a technological revolution that focused on the sources of invention (Allen, 2009).

The Second Industrial Revolution extended these transformations through electrification, mass production, and scientific management (Africa, 2019; Moll, 2022: p. 17). Unlike the First Industrial Revolution, the technologies of the Second Industrial Revolution were more widely adopted. They became a way of life in the world's industrialised countries (Moll, 2022: p. 17). This period coincided with the consolidation of bureaucratic governance structures characterised by hierarchy, proceduralisation, and standardisation. Policing models similarly evolved toward centralised command structures and formalised operating procedures.

For South Africa, these developments laid the structural foundations of modern state policing, although historically embedded within colonial and apartheid governance systems. The transition to constitutional democracy in 1994 reoriented policing from a tool of state control to a service grounded in legality, accountability, and respect for human rights. The Constitution, therefore, reframes the historical legacy of industrial-era policing within a transformative constitutional order.

5.2.2. The Third Industrial Revolution: Digitalisation, Information Governance, and Constitutional Safeguards

The Third Industrial Revolution (3IR), beginning in the mid-twentieth century (around the 1940s), introduced automation, computing, and digital communication networks (Africa, 2019; Moll, 2022: p. 24). Digital technologies reshaped governance by enabling data-driven decision-making, electronic records management, and intelligence-led policing.

In South Africa, the 3IR intersected with democratic transition and institutional reform. Digitalisation offered opportunities to modernise public administration and enhance transparency. However, it also introduced new constitutional tensions. The expansion of digital surveillance capabilities implicates rights entrenched in the Bill of Rights, particularly the right to privacy (Section 14), the right to equality (Section 9), the right to dignity (Section 10), and the right to just administrative action (Section 33).

Information governance in the digital era has been shaped by legislative instruments such as the Protection of Personal Information Act (POPIA) and the Regulation of Interception of Communications and Provision of Communication-Related Information Act (RICA), which attempt to balance state security interests

with constitutional protections.

The digital divide and unequal access to technological resources also raise substantive equality concerns. Persistent disparities in digital literacy and ICT participation reflect broader socio-economic inequalities, which policing institutions must be careful not to reproduce through technologically mediated practices.

5.2.3. The Fourth Industrial Revolution: Technological Convergence and Constitutional Policing

The Fourth Industrial Revolution represents a qualitative shift beyond digitalisation. Characterised by the convergence of Artificial Intelligence (AI), big data analytics, robotics, biometric systems, and cyber-physical integration (Africa, 2019), the 4IR fundamentally transforms both the nature of crime and the modalities of policing. For SAPS, 4IR technologies offer significant operational benefits, including predictive analytics for crime prevention, real-time surveillance and facial recognition systems, enhanced forensic capabilities, and the potential for data integration across criminal justice systems.

However, these capabilities introduce profound constitutional and governance risks. Algorithmic decision-making may entrench bias, undermining Section 9's equality guarantee. Mass surveillance technologies risk disproportionate intrusions into privacy under Section 14. Automated decision systems may compromise procedural fairness and transparency, challenging the requirements of lawful, reasonable, and procedurally fair administrative action under Section 33.

Furthermore, the constitutional principle of accountability (Sections 1 and 195) demands that technological adoption in policing remain subject to oversight, transparency, and democratic control. Section 195 of the Constitution requires public administration to be governed by democratic values and principles, including transparency, responsiveness, and ethical conduct. The integration of AI and advanced surveillance systems must therefore be accompanied by clear regulatory frameworks, oversight mechanisms, and ethical guidelines.

The 4IR also transforms criminality itself. Cybercrime, digital fraud, identity theft, and technologically facilitated organised crime transcend traditional territorial boundaries, challenging SAPS's capacity within conventional jurisdictional models. Effective policing in the 4IR era thus requires inter-agency coordination, international cooperation, and specialised digital competencies.

The challenges the SAPS faces in transitioning to the 4IR have been documented in various studies. The study by Vuma et al. (2022) found that local SAPS Gauteng police stations often turn away victims of cybercrime due to officials' limited understanding of these crimes and the applicable charges. Additionally, the study found that government policy priorities often overlook crimes arising from the 4IR, resulting in inadequate prevention and investigation efforts. Recommendations included developing IT capacity and resources within SAPS to effectively combat sophisticated cybercrime.

A separate study proposed a framework to assess South Africa's readiness for the 4IR (Olaitan et al., 2021). The study emphasised the need to develop physical

infrastructure, particularly digital infrastructure, as well as supporting infrastructure, such as an uninterrupted electricity supply. Additionally, the study highlighted the importance of government facilitation of ICT access and affordable data prices, especially for marginalised communities.

Moreover, studies evaluating SAPS's challenges regarding the 4IR underscored the need for sufficient funds to purchase IT equipment and software, and to recruit individuals with the requisite skills to combat 4IR crimes (Vuma et al., 2022: p. 451). Legal frameworks to police the digital space were also emphasised (Singh et al., 2022: p. 57). Effective laws are crucial for ensuring data security and privacy, as well as for regulating unethical behaviour in the digital realm. This was reiterated by Connon et al. (2023), who cited the Council of Europe guidelines. They emphasize the need for legal frameworks that address each type of use and that provide clear and detailed explanations of the specific use and the purpose, the minimum reliability and accuracy standards, the retention periods for personal data, the possibility of auditing the set criteria, the traceability of the processes, and any other safeguards deemed relevant and appropriate for legal, social and ethical efficacy Connon et al. (2023: p. 135).

The SAPS's transition to the 4IR has been hampered by significant challenges, including deficiencies in IT capacity and resources, insufficient infrastructure, and a legal framework ill-equipped to address digital policing needs. However, with robust IT capacity, adequate resources, improved infrastructure, and effective legislation, SAPS can effectively navigate the complexities of the digital landscape and combat sophisticated crimes perpetrated by criminals using advanced technologies. Central to the success of this transition is buy-in from SAPS decision-makers. Decision-makers must recognise the imperative to embrace 4IR technologies and their transformative potential to enhance law enforcement capabilities. By securing support from key stakeholders, including policymakers, senior leadership, and operational personnel, SAPS can mobilise the necessary resources and expertise to implement comprehensive strategies to leverage 4IR technologies for crime prevention, detection, and investigation.

Furthermore, addressing the challenges of transitioning to the 4IR requires a multifaceted approach encompassing technological upgrades, capacity building and training programs to understand the technologies and establish partnerships with relevant stakeholders, including technology providers, academic institutions, and international law enforcement agencies. By fostering collaboration and knowledge sharing, SAPS can leverage the collective expertise and resources to effectively address the evolving nature of digital crime threats.

Ultimately, SAPS's successful transition to the 4IR hinges on proactive leadership, strategic planning, and a commitment to innovation and adaptability in the face of emerging challenges. By addressing existing gaps in IT capacity, infrastructure, and legal frameworks, SAPS can position itself as a formidable force in combating sophisticated crimes in the digital age, safeguarding the security and well-being of South African citizens.

5.2.4. Toward Constitutional-Intelligent Policing

The evolution of industrial revolutions demonstrates that technological change consistently reconfigures governance institutions. In South Africa's constitutional democracy, such transformation must occur within a normative framework anchored in human dignity, equality, accountability, and the rule of law. The 4IR demands more than technological modernisation; it requires a reconceptualisation of policing as constitutionally intelligent governance. This entails, amongst other:

1) Normative alignment and ensuring that technological adoption complies with constitutional rights and democratic values.

2) Institutional adaptation, which involves developing digital capacity, specialised skills, and adaptive organisational models within SAPS.

3) Regulatory innovation and updating legal frameworks to address AI governance, cybercrime, data protection, and algorithmic accountability.

4) Ethical oversight and strengthening civilian oversight bodies and internal accountability mechanisms to prevent technological abuse.

A failure to integrate technological advancement with constitutional safeguards risks undermining public trust and eroding democratic legitimacy. Conversely, principled and strategically governed technological integration can enhance efficiency, transparency, and service delivery, strengthening SAPS's ability to fulfil its Section 205 mandate.

Industrial Revolutions have been pivotal historical moments that have transformed societies, economies, and people's lives and work (Brada & Park, 2024), and at the same time have reshaped both crime and the institutions designed to control it. In South Africa, these transformations must be interpreted within a transformative constitutional framework that prioritises rights, accountability, and social justice. The Fourth Industrial Revolution represents a governance inflection point offering unprecedented tools for crime prevention and institutional reform yet simultaneously testing the resilience of constitutional safeguards. While the 4IR is poised to transform society as never before, it builds on the foundations laid by the first three industrial revolutions discussed below and sets the stage for advances in the 5IR (McGinnis, 2023). Understanding the progression and impact of these industrial revolutions is crucial for grasping the full potential and challenges of the 4IR. For SAPS, the central challenge is not technological adoption per se, but the development of a policing model that is digitally capable, constitutionally compliant, ethically grounded, and socially responsive. The future of policing in South Africa will depend on the state's ability to reconcile innovation with the Constitution's foundational commitments.

6. Discussion and Insights from the Study

6.1. Interviews with Key Stakeholders within the SAPS

Twenty-five (25) participants, comprising senior police officers with service tenures ranging from 20 to 30 years, were interviewed as part of the research meth-

odology. Interviews with key SAPS stakeholders provided invaluable insights into the organisation's internal dynamics, challenges, and strategies. Direct engagement with key police officials enabled a firsthand understanding of their perspectives and experiences, involving a diverse group of high-ranking officers responsible for strategic decision-making within SAPS. Researchers applied a thematic framework during focus group discussions to guide probing questions directed at the identified participants.

6.1.1. Theme 1: Alignment of SAPS's Digital Initiatives with Democracy Principles

Participants' findings highlighted the evolution of communication and liaison within SAPS. Before 1994, manual processes impeded clear communication between the police and the community. The shift to digital initiatives, guided by policies such as the Batho Pele Principles, has ushered in transparency through the publication of online information. Technological improvements, including the introduction of the 10111 Command Centre Call number, have enhanced crime-reporting channels and response times and addressed historical limitations, such as station walk-ins for reporting crimes.

SAPS's digital initiatives align with transparency principles, as evidenced by successes in firearms licensing and competency follow-ups. The transformation from manual to digital platforms, such as reporting crimes via WhatsApp, demonstrates improved community engagement. These findings concur with the results of Hattingh's (2015: p. 2) study and those of Mabasa et al. (2022), emphasising that social media platforms, online reporting tools, and digital forums enable SAPS to interact with the public more effectively. Moreover, the transition from physical to digital case dockets ensures data backup and allows crime victims to track case statuses, highlighting technological advancements within SAPS.

The perspectives collectively illustrate a shift from manual practices to a more streamlined and responsive system. Furthermore, participants discussed other digital initiatives, such as the Biometric system, CCTV, and AVL systems, that enhance accountability in SAPS access control. This finding aligns with Masuku's (2005) view that SAPS accountability systems are particularly relevant in democratic South Africa, given the historical legacy of unaccountable and brutal policing.

6.1.2. Theme 2: The Influence of Digital Transformation on Policing Strategies

Digital transformation has influenced policing strategies as they adapt to changing societal dynamics. Findings from the focus groups showed that using drones in public areas assists in virtual patrolling and monitoring crowds during strikes and other civic unrest. Another listed example is the Geographical Information System (GIS), which is used for crime mapping and demarcation areas for station operations.

Members of the focus groups highlighted positive efforts to embrace digital transformation within SAPS, but also identified challenges, such as resistance to

change, outdated systems, and legal constraints that hinder the realisation of the full potential of technology for crime prevention and efficiency gains. In short, digital systems aim to enhance policing strategies through the utilisation of technology, but challenges persist. Issues with SMS quality control, community trust in the SAPS App, and the importance of maintaining a human touch underscore complexities in balancing technology and traditional methods in community engagement. One senior officer noted that while digital systems had improved information sharing, "some stations still struggled with outdated infrastructure, which made it difficult to fully benefit from the technology".

6.1.3. Theme 3: The Role of Technology in Empowering Communities

Technology has empowered multicultural communities to report crimes that were underreported previously, such as domestic violence or gender-based violence, sexual offences, and cybercrimes. With the My SAPS App, WhatsApp messages and calls via sector cell phones, and the 10111 Command Centre Call number, public participation in policing activities has increased. Community members can now report crimes anonymously and give tip-offs to the SAPS. Technology has facilitated improved collaboration with the private sector and the CPF to reduce crime levels and improve investigations. Participants' findings showed that CCTVs and neighbourhood watch strategies were mentioned as successful collaborations built by community members. Social media platforms have empowered community members' voices. Furthermore, smartphone devices have enabled community members to record crime scenes for evidence keeping and send tip-offs on MySAPS App. These successes were also highlighted by Singh et al. (2022: p. 95). One participant remarked that digital platforms had enabled communities to report crimes more easily, noting that "people are now more willing to send information anonymously through mobile platforms than they were in the past".

6.1.4. Theme 4: Contribution to Inclusive Governance

Participants collectively expressed concerns about the uneven distribution of technological resources within SAPS, particularly between top management and frontline officers. This resource disparity affects visible policing and community perception. Geographical considerations in technology implementation were highlighted, emphasising the strategic deployment of resources in areas with internet access. Some participants criticised the organisation's reliance on physical demonstrations of force, urging a shift towards leveraging technology such as drones and cameras. The need for equitable resource allocation and collaboration with underprivileged communities, especially in farming areas, was emphasised. Historical context was provided, noting a shift in SAPS's structure and raising questions about the current state of resources.

Participants continued to emphasise the uneven distribution of resources within SAPS, which affects community perceptions and operational effectiveness. The need for geographical considerations in technology implementation was reiterated to support effective reporting and crime mapping. Criticism of the organisa-

tion's emphasis on physical demonstrations of force persisted, with a call for a more strategic distribution of resources to reach marginalised groups. Suggestions included leveraging Community Policing Forums (CPFs), affirmative action policies, and community collaboration to improve transparency and communication. The importance of digital initiatives in informing the community about crimes and enhancing collaboration between law enforcement and the public was highlighted. Participants emphasised the need for SAPS to urgently address resource disparities, strategically deploy technology, and foster collaboration with diverse communities to enhance overall policing effectiveness and community safety.

6.1.5. Theme 5: Navigating Challenges in Technology Implementation

Participants emphasised SAPS's measures to protect client information and ensure data security. The adoption of the Protection of Personal Information (POPI) Act, the development of mobile applications, the implementation of password systems, and the development of guidelines for technology use demonstrate the organisation's commitment to privacy regulations. However, the challenge of governing human behaviour, particularly the potential sharing of sensitive information without proper authorisation, remains a concern. The dynamic nature of technology and its continuous development necessitate ongoing efforts to maintain information integrity. Nevertheless, participants highlighted SAPS's adherence to data protection legislation, particularly the POPIA, indicating data security within the organisation. The transition to online processes has improved transparency and accountability, addressing issues such as missing dockets. Electronic information gathering has reduced data loss by enabling tracking of data access. Despite these advancements, concerns about unauthorised information sharing, particularly through images of crime scenes, persist, underscoring the need for ongoing vigilance.

Ethical considerations in the digital age were a focal point, with participants expressing concerns about the potential erosion of ethical standards amid digital transformations and media coverage. Questions were raised about televising arrests during raids and the need to protect suspects' privacy until investigations are complete. The importance of honesty, integrity, and prioritising human rights, including privacy, was emphasised as an area requiring ongoing attention, training, and development amongst the SAPS members. Challenges in implementing ethics, particularly with the use of drones and apprehensions in front of the media, were acknowledged. Participants emphasised the importance of maintaining ethical conduct in law enforcement, highlighting the need to balance objectives with respect for individual rights. One of the participants specifically emphasised the ethical dimension of technology use, stating that "technology could strengthen accountability, but it also required careful management to ensure that people's rights and privacy were respected".

6.1.6. Theme 6: Policies Related to Digital Transformation

Participants collectively highlighted the need for policy alignment with SAPS's

technological transformation. Concerns were raised about outdated processes that hinder effective work, and the importance of policies aligned with democratic principles was emphasised. Suggestions included tailoring policies to the organisation's needs and ensuring that democratic ideals are embedded in digital initiatives, emphasising openness, accountability, and citizens' rights.

Participants emphasised the accessibility of SAPS's National Instruction, the well-defined procedures governing resource access, and the positive impact of digital transformation on governance and efficiency. Digital transformation policies were seen as contributing to efficient governance by optimising processes, enhancing data accuracy, and preventing unauthorised access. The importance of staying ahead of emerging dangers through technological adaptability was emphasised.

Challenges within SAPS were identified, including non-operational systems, concerns about the effectiveness of digital tools, slow adaptation to change, and gaps in skill development. The transparency provided by digital records and cameras was acknowledged, but scepticism about the universal benefits of digital tools and the importance of information security was equally highlighted.

Participants emphasised the importance of equipping SAPS detectives with in-house resources, enabling rapid adaptation to change, and learning from other industries to enhance the use of digital technologies. Recommendations included aligning recruitment processes with technological advancements, fostering collaboration among law enforcement agencies, and exploring technological solutions, such as CCTV systems, to address these issues. One of the respondents indicated that policy frameworks needed to evolve alongside technological change, explaining that "technology is moving faster than policy, and organisations like SAPS must constantly review their procedures to remain effective".

6.1.7. Theme 7: Understanding the Impact of Technology on Policing Strategies

Participants highlighted the positive impacts of technology on SAPS, including increased accountability, reduced police brutality, improved professionalism, and transformative changes in policing procedures. Technological advancements, such as digital case recording, forensic laboratories, fingerprinting systems, and e-filing, were identified as contributors to positive change. While acknowledging these benefits, participants recognised potential vulnerabilities in specific systems. Overall, technology has played a crucial role in enhancing communication, surveillance, crime prevention, and investigation within SAPS.

Participants discussed the transformation of SAPS post-1994, emphasising the organisation's changing perception and improved image. Technology adoption was identified as a significant factor in this transformation, driving changes in work processes and resulting in cost savings. Digital initiatives were highlighted as effective tools for apprehending criminals operating across regions, displaying the positive impact of technology in combating crime and maintaining order.

6.2. Emerging Themes from the Participant Feedback

Key themes arising from the discussions are tabulated below:

1)	Technological Transformation in SAPS	Participants emphasised the transformative impact of technology in SAPS. The adoption of digital systems, online platforms, and mobile applications has revolutionised communication, transparency, and accountability.
2)	Communication Evolution	• The shift from manual to digital communication methods, including the 10111 hotline and crime reporting via WhatsApp. • The use of online information publications and transparency initiatives, such as the Batho Pele Principles, for enhanced SAPS-community communication.
3)	Transparency Challenges	• Despite advancements, challenges with transparency, execution, and accountability persist. • Acknowledgement of the need for continuous improvement and proper execution of digital initiatives for transparency goals.
4)	Accountability in the Digital Age	• Discussion of accountability challenges, particularly in managing expenses during significant events. • Role of digital platforms in promoting organisational accountability, managing risk, and fostering community trust.
5)	Community Engagement and Public Interaction	• Impact of digital initiatives on public interaction, with a focus on reducing workload by limiting public engagement on specific platforms. • Efforts to encourage public participation, including legislative acts, social media use, and community policing forums.
6)	Data Security and Ethical Considerations	Concerns about data security and ethical considerations in the digital age, particularly in information sharing, media coverage, and the use of technology in law enforcement.
7)	Resource Distribution Disparities	Collective concerns about the inequitable distribution of technological resources in SAPS emphasise the need for fair access, particularly at the operational level and in underprivileged communities.
8)	Human Behaviour and Training Challenges	• Challenges in governing human behaviour, including unauthorised capture and sharing of crime scene information, indicate the need for comprehensive guidelines and training. • Highlighted challenges in skill development and the need for continuous training in advanced technology courses.

6.2.1. Digital Transformation and Institutional Modernisation

The findings indicate that SAPS is undergoing a substantive digital transition characterised by the adoption of online platforms, mobile applications, and digitised communication systems. Participants consistently described technology as transformative, particularly in relation to operational efficiency, communication speed, and record management. Tools such as the 10111 hotline, WhatsApp-based reporting mechanisms, and online information platforms have altered traditional policing workflows and introduced new modes of engagement.

This transition reflects a broader shift from paper-based administration toward networked, platform-enabled governance. However, the data suggest that digital transformation within SAPS remains uneven. While technological tools have been introduced, institutional integration, execution discipline, and interoperability across units appear inconsistent. Digital modernisation is therefore occurring at the level of systems adoption, but not yet fully at the level of organisational redesign.

The distinction is significant: technological procurement does not automatically translate into institutional transformation. Effective digital policing requires governance frameworks, performance measurement systems, and clearly articulated digital strategies aligned with organisational mandates.

6.2.2. Communication Evolution and Public Service Responsiveness

Participants emphasised the shift from manual to digital communication methods as a critical development in SAPS operations. The introduction of digital reporting channels and online publication of information aligns with broader public administration principles of transparency and accessibility. References to the *Batho Pele* principles suggest that digital initiatives are framed within a normative commitment to service delivery and responsiveness.

From a governance perspective, digital communication enhances procedural accessibility by lowering barriers to reporting and facilitating real-time interaction. However, the findings indicate variability in responsiveness and execution. Digital platforms, while expanding communication channels, risk undermining institutional legitimacy if not consistently managed. Delayed responses, system inefficiencies, or selective engagement may erode public trust rather than strengthen it.

The evolution of communication thus represents both an opportunity and a performance test. Digital engagement must be systematically integrated into operational workflows to avoid creating parallel systems that are symbolically progressive but operationally fragile.

6.2.3. Transparency, Accountability, and the Governance Paradox

Despite technological advancements, participants reported ongoing challenges related to transparency, financial oversight, and execution integrity. Concerns regarding expense management during significant events and broader accountability gaps highlight a governance paradox: digital tools designed to enhance trans-

parency do not automatically produce accountable outcomes.

This suggests that SAPS's digital transformation has outpaced the development of robust oversight mechanisms. Technology can generate traceability and data visibility, but without institutionalised audit systems, enforcement protocols, and leadership accountability, transparency remains aspirational.

The findings, therefore, reveal a critical governance tension: digital capability has expanded, yet accountability systems need strengthening to ensure that technological tools meaningfully enhance institutional integrity.

6.2.4. Digital Risk, Organisational Exposure, and Reputational Vulnerability

The research underscores the emergence of new forms of risk in the digital environment. Participants identified both operational and reputational vulnerabilities associated with technology adoption. These include cybersecurity threats, unauthorised information sharing, and increased public scrutiny facilitated by digital platforms.

The unauthorised capture and dissemination of crime-scene information illustrates a behavioural governance challenge in a technologically saturated environment. The issue is not solely technical but cultural. Digital technologies amplify the consequences of individual misconduct, making ethical lapses more visible and institutionally damaging.

This finding highlights the need for digital risk governance frameworks that extend beyond cybersecurity to encompass ethical compliance, internal monitoring, and reputational management. The digital era transforms accountability into a real-time phenomenon, requiring proactive oversight rather than reactive correction.

6.2.5. Community Engagement and Hybrid Policing Models

Participants described efforts to use digital platforms to enhance public participation and streamline engagement. Legislative mechanisms, social media use, and community policing forums form part of this engagement ecosystem. However, references to limited engagement on certain platforms suggest capacity constraints or strategic selectivity in public interaction.

These findings point to the emergence of a hybrid policing model combining traditional community engagement structures with digital interfaces. While digital tools expand reach and accessibility, they must not displace face-to-face engagement in communities where digital access remains uneven.

The sustainability of digital community policing depends on ensuring inclusivity, accessibility, and reciprocity. Technology should deepen participatory governance rather than centralise communication in ways that marginalise digitally excluded populations.

6.2.6. Resource Inequality and Institutional Fragmentation

A recurrent concern across participants was the inequitable distribution of technological resources within SAPS. Operational-level units and under-resourced

communities reportedly experience limited access to advanced digital tools.

This internal digital divide raises significant governance implications. Uneven resource allocation can produce operational fragmentation, reduced service equity, and institutional stratification. If digital capabilities are concentrated at higher organisational levels, frontline effectiveness may remain constrained.

The findings suggest that technological transformation must be accompanied by equitable infrastructure investment and coordinated national implementation strategies. Without this, digital modernisation risks reinforcing structural inequalities within the organisation.

6.2.7. Skills Deficits and the Human Dimension of Digital Policing

The research reveals persistent skill gaps and training challenges associated with advanced technological systems. Participants emphasised the need for continuous professional development, advanced technical training, and clearer behavioural guidelines.

This finding reinforces a central insight: digital transformation is fundamentally a human transformation. Institutional effectiveness depends not only on hardware and software but on digital literacy, ethical awareness, and adaptive learning cultures. The absence of structured, ongoing digital capacity-building undermines the sustainability of technological reforms.

Moreover, behavioural governance challenges—such as unauthorised information sharing—indicate the need for stronger ethical socialisation within a digital environment.

The findings suggest that SAPS is in a transitional phase of digital transformation. Technological adoption is visible and progressive, yet institutional consolidation remains incomplete. In this milieu, the central challenge currently facing SAPS is not technological adoption per se, but governance maturity in a digitally mediated policing environment. The transition to digitally enabled policing, therefore, requires a multidimensional strategy encompassing, amongst others, formalised digital governance and oversight, ethical compliance, and conduct regulation in technology use, continuous digital skills development, equitable infrastructure investment, and structured, inclusive digital community engagement. Without such (or similar) reforms, the opportunities for and improvements in the SAPS regarding digital transformation risk becoming fragmented and symbolic rather than substantively transformative.

7. Limitations

This study draws primarily on the perspectives of senior leadership, which may not fully capture the lived experiences and operational realities of frontline officers who interact directly with digital technologies in routine policing activities. While senior leaders provide valuable strategic and institutional insights, their exposure to day-to-day frontline practices may be uneven, potentially shaping how challenges and successes are interpreted. As a result, certain operational dynamics

or contextual nuances experienced at the implementation level may not be fully reflected in the data. In addition, the findings emerge from specific stations and institutional contexts; therefore, caution should be exercised in generalising the results across all stations or broader organisational settings. That said, the study highlights patterns in leadership perceptions, institutional priorities, and governance-related dynamics within the sampled contexts. However, it does not claim to represent the full range of frontline experiences, nor can it assert that the findings are universally applicable across all stations or SAPS environments. The results should, therefore, be understood as contextually grounded insights that contribute to ongoing discussion and further research examining how digital technologies are shaping decision-making in the SAPS—and globally—as policing shifts into 4IR/5IR environments.

8. Conclusion

The study enhances the discourse on digital transformation in policing by critically examining the impact of digital technologies on decision-making within the SAPS. It explores the experiences, perceptions, and practices of SAPS leaders, providing valuable insights into the evolving role of technology in law enforcement governance and accountability. Policymakers, practitioners, and researchers can leverage these insights to bolster decision-making and organisational performance in the digital era.

The research demonstrates that SAPS is actively engaging in digital innovation, yet the success of this transformation depends on institutional coherence, ethical discipline, and equitable capacity-building. There is no gainsaying the capacity of digital innovation, technology, and Artificial Intelligence (AI), specifically, to significantly transform policing by improving crime detection, forensic analysis, and predictive policing. Internationally, AI technologies are already used to analyse crime patterns, identify suspects through facial recognition, automate forensic processes such as fingerprint and DNA matching, and mine large datasets to disrupt organised crime networks. These tools can enhance investigative efficiency, support evidence analysis, and enable more effective allocation of police resources. In South Africa, early technological developments—including upgrades to SAPS digital forensic laboratories, data extraction tools, and municipal CCTV analytics—suggest a gradual movement toward AI-supported policing. A further major advantage of AI integration is its potential to improve operational efficiency and investigative accuracy.

The use of AI in policing in South Africa must be viewed through the lens of the Constitution with a focus on legality, proportionality, accountability, and respect for and protection of fundamental rights, including equality, dignity, and privacy. Before AI is adopted in policing, the ethical, legal, and operational risks—especially those related to algorithmic bias and predictive policing—must be thoroughly examined in light of prevailing research highlighting AI systems trained on historically biased crime data that can reproduce or amplify patterns of racial

profiling and over-policing, especially in marginalised communities (Singh, 2022). Given South Africa's legacy of apartheid-era surveillance and discriminatory policing, such risks will deepen public mistrust in law enforcement. Privacy and human rights concerns with available facial recognition technologies and large-scale surveillance systems that may infringe on constitutional protections of dignity, privacy, equality, and freedom from discrimination if not properly regulated are apposite (Singh, 2022). At the operational level, institutional limitations within SAPS, including limited digital infrastructure, shortages of digital expertise, and the absence of a formal governance framework, further exacerbate concerns about SAPS' readiness for AI adoption. (Grootboom, 2024; Vuma et al., 2022; Stone, 2022)

The digital age advances opportunities but, concomitantly, raises the bar for increased scrutiny as innovation is balanced with human rights, transparency, and accountability. The current study illustrates SAPS's resilience and flexibility amid complex socio-political changes and economic constraints, demonstrating its sustained efforts to fulfil the nation's diverse requirements. A retrospective analysis of the past three decades, particularly with respect to policing methodologies, reveals a nuanced yet strategic transformation that equips SAPS to meet contemporary needs and constitutional obligations. Moving forward, the knowledge gained from this historical review, particularly in the technological era, offers essential lessons for harnessing technology effectively and ethically, enhancing leadership, and implementing strategic reforms aligned with the values of democratic South Africa. These lessons are vital to ensure that SAPS remains a responsive and accountable law enforcement institution, adapting to the changing demands of the technological age in South Africa and fulfilling its national mandate while remaining cognisant of history and its influence on current social dynamics.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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