MOBILE TECHNOLOGIES AS CATALYSTS FOR PUBLIC SAFETY: A UTAUT-INTEGRATED COMPARATIVE ANALYSIS OF GLOBAL SYSTEMS AND UZBEKISTAN'S SMART MAHALLA EVOLUTION

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ABSTRACT

Mobile technologies play a crucial role in enhancing public safety by enabling faster communication and fostering civic engagement. This study examines various national safety initiatives, including Japan's J-Alert, China's Beijing 110, Singapore's SGSecure, and England/Wales' Neighbourhood Watch, alongside Uzbekistan's "Smart Mahalla" program. Launched in 2021 under Presidential Decree № PF-6196, "Smart Mahalla" spans 9,251 mahallas and had surpassed 100,000 downloads by June 2023, with over 10,000 requests recorded in Tashkent that year [Google Play, 2023; Ministry of Internal Affairs, 2023].

Applying the Unified Theory of Acceptance and Use of Technology (UTAUT), the analysis highlights unique adoption patterns. J-Alert reaches 90% of Japan's population within 4 to 20 seconds [Japan Meteorological Agency, 2023], Beijing 110 processes over 2 million reports annually [Beijing Municipal Public Security Bureau, 2023], SGSecure facilitates actionable responses [Singapore Police Force, 2023], and Neighbourhood Watch strengthens community trust [Neighbourhood Watch Network, 2023]. In Uzbekistan, challenges such as 55% 4G rural connectivity and a 68% digital literacy rate hinder widespread adoption, further exacerbated by the lack of detailed crime statistics [Ministry of Digital Technologies, 2023; UNDP, 2022; Ministry of Internal Affairs, 2023]. While Decree № PF-6196 mandates secure data handling, it does not include specific provisions for user privacy [President of Uzbekistan, 2021].

These findings underscore the need for infrastructure development and clearer legal frameworks. Uzbekistan's experience highlights broader global challenges, particularly in balancing technological advancements with data accessibility and security.

Keywords: Mobile technologies, public safety, Smart Mahalla, J-Alert, Beijing 110, SGSecure, Neighbourhood Watch, UTAUT, digital transformation, Uzbekistan

INTRODUCTION

Mobile technologies have revolutionized public safety, enabling rapid responses to emergencies and promoting direct interaction between citizens and authorities. Japan's J-Alert, governed by the Disaster Countermeasures Basic Act of 1961, efficiently delivers disaster alerts to 90% of the population–approximately 125 million people–within just 4 to 20 seconds, a performance that is meticulously tracked in its annual operational reports [Japan Meteorological Agency, 2023; Japan Legislation Database, 2023]. In contrast, China's Beijing 110, operating under the Public Security Administration Law of 2012, processes more than 2 million crime reports annually, integrating multimedia evidence into its response framework

[Beijing Municipal Public Security Bureau, 2023; National People's Congress, 2012]. Singapore's SGSecure, enacted through the Cybersecurity Act of 2018, produces actionable reports, benefiting from a high national digital literacy rate of 90% [Singapore Police Force, 2023; Singapore Statutes, 2023; Infocomm Media Development Authority, 2023]. In England and Wales, the Neighbourhood Watch initiative takes a different approach, leveraging community bylaws to foster trust among its 2.3 million members, although it lacks centralized data on reported activities [Neighbourhood Watch Network, 2023].

Uzbekistan's mobile safety initiative, "Smart Mahalla," is rooted in the country's traditional mahalla system—self-governing units of 3,000 to 5,000 residents with a historical foundation in local dispute resolution dating back to the 11th century [Geiss, 2001]. Presidential Decree № PF-6196, issued on March 26, 2021, allocated $5 million annually to implement "Smart Mahalla" across 9,251 units. By June 2023, the initiative had achieved over 100,000 downloads, with Tashkent alone logging more than 10,000 requests in 2023 [President of Uzbekistan, 2021; Google Play, 2023; Ministry of Internal Affairs, 2023]. However, rural areas face significant challenges: 55% 4G coverage and a national digital literacy rate of 68%, with 32% of the population over 55 lacking digital skills, limiting access for 16.3 million of Uzbekistan's 34.86 million residents [Ministry of Digital Technologies, 2023; UNDP, 2022; State Committee on Statistics, 2023]. Furthermore, the absence of crime statistics post-2021 complicates the ability to assess the initiative's effectiveness [Ministry of Internal Affairs, 2023].

This study explores how infrastructure and digital literacy impact the uptake of mobile safety tools, guided by the Unified Theory of Acceptance and Use of Technology (UTAUT). The framework considers key factors such as perceived usefulness, ease of use, social influence, and facilitating conditions [Venkatesh et al., 2003]. The research draws on app store data [Google Play, 2023], government reports [Ministry of Internal Affairs, 2023; Ministry of Digital Technologies, 2023], and survey findings [UNDP, 2022]. Unlike Japan's tightly regulated system, Uzbekistan's Decree № PF-6196 emphasizes secure data management but does not address user privacy, a critical oversight that warrants attention. The following sections integrate theoretical insights, global comparisons, and an evaluation of Uzbekistan's current efforts, highlighting the potential for growth despite data limitations—possibly attributable to cultural factors, rather than purely technical challenges.

Theoretical and Methodological Foundations

The effectiveness of mobile technologies in enhancing public safety is predicated on their ability to deliver tangible benefits. Japan's J-Alert, for instance, drastically reduces disaster response times, reaching 90% of the population in just 4 to 20 seconds, a remarkable achievement documented in its annual operational reports [Japan Meteorological Agency, 2023]. Similarly, Beijing 110, handling over 2 million reports annually, strengthens crime resolution processes, as evidenced by municipal records [Beijing Municipal Public Security Bureau, 2023]. In Uzbekistan, "Smart Mahalla" recorded over 10,000 requests in Tashkent in 2023, reflecting its practical utility. However, the lack of crime reduction data opens the door to debate—users might prioritize convenience over tangible safety improvements [Ministry of Internal Affairs, 2023; Venkatesh et al., 2003].

A critical factor in this dynamic is ease of use. J-Alert's efficient design ensures rapid delivery [Japan Meteorological Agency, 2023], while "Smart Mahalla" struggles with delays, sometimes extending to hours, as noted in internal assessments [Ministry of Internal Affairs, 2023]. In Singapore, SGSecure operates within a context of high digital literacy, emphasizing the importance of intuitive interfaces [Singapore Police Force, 2023]. The contrast between these systems raises a pertinent question: could training programs mitigate the usability challenges faced by initiatives like "Smart Mahalla," a consideration underscored by UTAUT's framework [Venkatesh et al., 2003]?

Community dynamics also play a significant role. England/Wales' Neighbourhood Watch flourishes on a foundation of local trust, even though its reporting remains unquantified [Neighbourhood Watch Network, 2023]. In Uzbekistan, urban mahallas, with 92% 4G coverage, likely benefit from similar social pressures, while rural areas, with only 55% coverage, may experience adoption more through top-down mandates than community-driven initiatives [Ministry of Digital Technologies, 2023]. This contrast highlights UTAUT's focus on social influence, yet the alternative perspective of enforced adoption through policy remains equally relevant [Venkatesh et al., 2003].

Infrastructure and literacy are the defining limits. SGSecure's success in Singapore, supported by a 90% national literacy rate, illustrates the impact of digital skills on adoption [Infocomm Media Development Authority, 2023]. In Uzbekistan, however, the combination of only 55% rural 4G coverage and a national literacy rate of 68%, with 32% of individuals over 55 lacking digital skills, restricts "Smart Mahalla"'s reach, leaving 16.3 million people underserved [Ministry of Digital Technologies, 2023; UNDP, 2022]. This gap is not only a reflection of safety needs but also of economic priorities, a nuance that UTAUT encourages us to consider [Venkatesh et al., 2003].

Legal frameworks serve as a backbone to these initiatives. Japan's 1961 Act outlines J-Alert's operational scope [Japan Legislation Database, 2023], while China's 2012 Law enables Beijing 110 to collect crucial data [National People's Congress, 2012]. Uzbekistan's Decree № PF-6196, with its $5 million annual budget and secure server mandate, omits privacy protections, a notable gap compared to global standards and a potential source of concern for user confidence [President of Uzbekistan, 2021].

The analysis is grounded in data such as app downloads (over 100,000), requests in Tashkent (over 10,000), connectivity levels (55% rural, 92% urban), and literacy rates (68%) [Google Play, 2023; Ministry of Internal Affairs, 2023; Ministry of Digital Technologies, 2023; UNDP, 2022]. Rogers' Diffusion of Innovations theory suggests that urban areas typically lead in adoption, with rural areas following suit–a pattern observable here [Rogers, 2003]. However, without concrete crime data, drawing causal conclusions remains difficult [Ministry of Internal Affairs, 2023].

Analysis of International Experiences

Japan's J-Alert, operational since 2007, notifies 90% of its 125 million citizens within 4–20 seconds under the 1961 Act. However, a 2022 survey reveals that only 10% evacuated during missile alerts, a stark contrast to its speed, with the 2017 false alarm being a significant trust

setback [Japan Meteorological Agency, 2023; Japan Legislation Database, 2023; Cabinet Office Japan, 2023]. Speed is undeniably its strength, but trust remains its vulnerable point.

In China, Beijing 110, revamped in 2017 under the 2012 Law, processes over 2 million reports annually. Its scale is impressive, but it comes at a cost–privacy concerns linked to surveillance, as highlighted in academic studies [Beijing Municipal Public Security Bureau, 2023; National People's Congress, 2012; Li, 2014]. It's a trade-off between coverage and civil liberties.

Singapore's SGSecure, governed by the 2018 Act, provides actionable reports within a highly literate population (90%). The system's success lies more in its technical capacity than in the sheer volume of reports [Singapore Police Force, 2023; Singapore Statutes, 2023; Infocomm Media Development Authority, 2023]. It's an example of quality over quantity.

In England and Wales, the Neighbourhood Watch initiative thrives on the trust of its 2.3 million members, built through community bylaws rather than centralized data collection. This grassroots approach contrasts sharply with the state-led systems seen elsewhere, where data flows directly into government control [Neighbourhood Watch Network, 2023].

Uzbekistan's "Smart Mahalla" records over 10,000 requests in Tashkent, echoing Neighbourhood Watch's community-oriented roots more than the vast reach of Beijing 110. While J-Alert's speed and SGSecure's technological sophistication outpace it, the privacy and trust challenges seen in China and Japan suggest that the path forward for "Smart Mahalla" may need a more cautious approach.

Table: Comparative Analysis of Public Safety Systems (2022-2023)

System	Primary Function	Key Performance Metrics	Advantages	Limitations	Adoption Barriers
J-Alert (Japan)	Emergency alerts	- 90% population coverage in 4-20 sec - 10% evacuation rate (2022)	- Instant notification - Nationwide coverage	- Low public response - False alarms	- Infrastructure dependence
Beijing 110 (China)	Crime reporting	- >2M annual reports (2023) - 85% resolution rate	- High capacity - Multimedia integration	- Privacy concerns (facial recognition)	- Surveillance criticism
SGSecure (Singapore)	Cybersecurity	- 60% actionable reports (2023) - 90% digital literacy	- Advanced technology - Skilled user base	- Low specificity (30% false positives)	- Tech-savvy user requirement
Smart Mahalla (Uzbekistan)	Community safety	- >10K requests (2023) - 100K+ downloads	- Cultural adaptation (mahalla system)	- No published crime data - Rural gaps	- 55% rural 4G coverage, 68% literacy

Current State and Prospects in Uzbekistan

"Smart Mahalla" emerged in 2021, spanning 9,251 mahallas with over 100,000 downloads by June 2023 and over 10,000 Tashkent requests in 2023 [Google Play, 2023; Ministry of Internal Affairs, 2023]. By 2021, 49.3% of mahallas reported no crime, a 6.6% rise from 2017, supported by 6,000 cameras [Ministry of Internal Affairs, 2021]. Decree № PF-6196 provides $5 million

annually and mandates secure data handling, yet its silence on privacy contrasts with global standards [President of Uzbekistan, 2021]. Urban areas, with 92% 4G coverage, adopt readily, while rural zones, at 55%, and a 68% literacy rate–32% of over-55s unskilled–lag, leaving 16.3 million underserved [Ministry of Digital Technologies, 2023; UNDP, 2022]. Processing delays further complicate usage [Ministry of Internal Affairs, 2023].

Looking ahead, rural connectivity, up 10% since 2020, could rise further with targeted investment [Ministry of Digital Technologies, 2023]. Adding privacy provisions to Decree № PF-6196 might bolster trust, as could linking "Smart Mahalla" with "E-Mahalla" for administrative synergy [Ministry of Digital Technologies, 2023]. Rural uptake may still falter without literacy gains, a persistent challenge.

CONCLUSION

Japan's J-Alert delivers unmatched speed, yet its 10% response rate in 2022 raises doubts about reliance. Beijing 110's scale dwarfs "Smart Mahalla"'s efforts, though privacy concerns temper its model. SGSecure's tech edge reflects literacy advantages Uzbekistan lacks.

UTAUT reveals urban 92% 4G coverage as a driver, while rural 55% and 68% literacy stifle progress. Delays undermine ease of use. These findings challenge assumptions that technology alone ensures safety–literacy and access may weigh as heavily.

Infrastructure growth and legal clarity, particularly on privacy, stand out as priorities. Without crime data, the initiative's impact remains speculative. Future work could probe user perceptions to test these gaps.

Public data use here avoids harm, but privacy risks in Decree № PF-6196 and rural exclusion–16.3 million affected–demand attention.

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