

SMART CITY DEVELOPMENT

Why does it matter for Southeast Asia?

Strategies such as right-sizing, adopting integrated data infrastructures, and recognising that there is no one-size-fits-all model can better enable smart city development.

Increasingly populous Southeast Asian cities are investing in smart city solutions that often fail to deliver the desired impact due to a lack of co-ordination, fragmented governance, and a failure to consider local needs.

City authorities must pay attention to diverse urban contexts and prioritise liveability to deliver effective smart city solutions.

In 2050, nearly 70 percent of the world's population will live in urban areas.¹ In Southeast Asia, this urban transition is already in full swing, with over half the population residing in cities.² As urban centres grow, so does the demand on city infrastructure, fuelling the growth of a massive market for smart city solutions. These solutions can enhance city governance and make urban processes more transparent and calculable, leading to operational efficiencies across various areas of urban life – from offering smooth mobility and seamless public services to providing an overall increased sense of safety and security. With each technological advancement, there is renewed potential to address longstanding urban challenges such as urban sprawl, overcrowding, environmental degradation, inadequate infrastructure and uneven access to services, thus making cities more liveable, equitable, and sustainable.

However, the success of smart city initiatives has been piecemeal at best, and the potential of most of these initiatives remains unrealised despite strong interest and investment from both the public and private sectors. Many initiatives also fail to move beyond the pilot stage or achieve their intended impact.

This article identifies five key lessons for developing enduring smart city initiatives by examining what smart city development looks like across Southeast Asia – from primate cities all the way to secondary or tertiary cities.

ONE DIGITAL VISION, MANY SMART CITY REALITIES

A key reason for smart city initiatives failing to take off is misalignment, of which we identify two forms: horizontal and vertical. Horizontal misalignment refers to a lack of coordination between public and private sectors or between departments at the same level of governance. Vertical misalignment occurs when strategies planned at the national level are not implemented adequately on the ground, often due to competing ambitions or inequitable funding allocations. These forms of misalignment are exacerbated by a mismatch between smart solutions and citizen needs – a disconnect stemming from technological optimism and profit-chasing that prioritises innovation for its own sake.

When driven by such motivations, smart city initiatives can create systems that are unsuitable for local contexts and can complicate, rather than improve everyday life.

These challenges of misalignment are pronounced in many Southeast Asian cities, where stakeholders wishing to implement smart city solutions must navigate the exceptional speed of urban growth, excessive bureaucracy, limited financing opportunities, and infrastructural failure. At the same time, they must avoid the pursuit of ‘smartness’ for its own sake and re-centre the fundamental goal of making their cities more liveable.

Despite these challenges, interest in smart city projects as a way to tackle urban problems in Southeast Asia is high. The ASEAN Smart Cities Network (ASCN) was established in 2018 with the aim of facilitating cooperation on smart cities development, championing people-centred solutions, and contributing to the enhancement of mutual understanding across cultures.³ Many cities within ASEAN face similar problems, and can benefit from dialogue with one another, especially in the case of major urban centres like Bangkok or Jakarta that might have more in common with each other than the smaller cities within their own country.

However, regional commonalities coexist with profound differences, which makes Southeast Asia cities unsuited for easy classification. The varying forms of government, economic systems, base infrastructures, and levels of technology readiness result in a wide range of contexts for smart city implementation. To enable people to better appreciate these differences, the McKinsey Global Institute has identified four archetypes of smart city development in Southeast Asia.⁴ The first is Smart City Sandboxes like Singapore, where initiatives

can be implemented relatively easily due to a smaller population and streamlined governance. The second is Prime Movers which includes Bangkok, Jakarta, and Ho Chi Minh City – cities with relatively high GDP (gross domestic product) and a large population that are likely to attract private sector interest and investment. The third is Emerging Champions, which refers to midsize cities that benefit from being relatively smaller but may struggle to attract the investments required. And the last is Agile Seedbeds – small but nimble cities where smart solutions can be adopted as guiding principles from the start, rather than something achieved via retrofitting projects.

SUCCESSFUL SMART CITY DEVELOPMENT: FIVE LESSONS FROM SOUTHEAST ASIA

The lessons outlined below emerged from a three-year project led by Singapore Management University’s (SMU) Professor Orlando Woods and Professor Lily Kong titled *Technocratic Regionalism in Southeast Asia: The Translational Politics of Smart City Knowledge Transfer*. The project explored how smart city policies and digitalisation initiatives are developed, transferred, and adapted to different urban contexts across Southeast Asia. The research team conducted fieldwork in Ho Chi Minh City in Vietnam; Jakarta and Banyuwangi in Indonesia; Bangkok, Chiang Mai, and Phuket in Thailand; and Singapore. A total of 290 interviews were conducted with stakeholders from the public and private sectors, as well as members of the public. Interviews from the public sector included

government agencies and research institutes. Private sector representatives included multinational and local companies with an interest in smart city development, such as real estate developers, consultancies, and architectural firms.

The five key takeaways that emerged from these interviews speak to the reasons behind the various successes and struggles of smart city development in the region. These insights surfaced from recurring patterns and tensions that were observed between smart city ambition and implementation, as well as between technological solutionism⁵ and infrastructural realities. These lessons are overarching but not prescriptive, and should be locally interpreted and adapted to different contexts.

The following discussion explores each lesson with real-world examples of both successful and unsuccessful initiatives, paying attention to how strategies like right-sizing, citizen engagement, and centralised data platforms can lead to more successful smart city development.

Lesson 1: Smart city projects fail to scale up because they are not accurately scoped and adapted

Early-stage failures can happen due to a range of common challenges – many of which are often outside of the control of smart city executives – such as funding constraints, changes in government, and bureaucratic hurdles. However, one critical challenge that is within the executives’ control is the lack of alignment between local contexts and the scope of proposed interventions. To avoid that, smart city solutions need to be ‘right-sized’ in order to be effective in their implementation.

Right-sizing is an important strategy in smart city development for identifying concrete goals, attracting investment, and optimising limited resources. It first emerged in Western planning practice as a tactic for dealing with shrinking cities/population loss, and involved land-banking to stabilise declining neighbourhoods. When rethinking right-sizing through the lens of Southeast Asia and the context of building smart cities, the concept captures how effectively cities can be scaled to balance technological innovations with socio-economic and administrative demands.⁶ It is intended to optimise smart city development by strategically shaping resource distribution.

Certain forms of misalignment that cause smart city initiatives failing to take off are exacerbated by a mismatch between smart solutions and citizen needs – a disconnect stemming from technological optimism and profit-chasing that prioritises innovation for its own sake.



A well-executed right-sizing strategy is behind the success of MuvMi, an on-demand, electric *tuk-tuk*⁷ ridesharing service in Bangkok, which operates in carefully delineated service zones. Users can request a ride, and multiple passengers may be picked up along the calculated 'best route'. One of MuvMi's co-founders came up with the idea after experiencing frustrations during his commute. Even with Bangkok's expanding skytrain and underground metro networks, getting from the closest station to his home was inconvenient, with limited options that were typically unreliable and/or overpriced. He thought that the *tuk-tuk*, which is agile enough to navigate narrow streets and congested roads, could bridge this first- and last-mile mobility gap without further growing Bangkok's car population.

The service was piloted at Chulalongkorn University, and expansion followed only in places that showed a clear need for it – mostly areas

where public transit was already good, but last-mile connectivity was lacking. Today, the company operates in 11 distinct zones. They range from compact areas of about three square kilometres – such as Chitlom, a linkage point between larger neighbouring zones – to districts of up to 20 square kilometres, each centred around skytrain stations. This calculated zoning is the reason MuvMi has succeeded in maintaining operational efficiency and solving the problem it originally aimed to address, proving that targeted growth outmatches indefinite expansion.

Lesson 2: Without meaningful citizen participation, smart initiatives fail to meet actual needs

Consulting the end user is a necessary step for implementing any smart solution. Failing to do so early and deeply enough leads to misidentified problems and ineffective solutions. This is because smart technologies

themselves are not inherently transformative and can only deliver value when the need for them is clear and recognised. In many initiatives, citizen engagement plays only a minor role within the overall smart city rhetoric. Many initiatives brand themselves as 'citizen-centric' without actively seeking meaningful solutions for their target communities. Members of the public might be engaged for testing or consumer surveys, but too often, this engagement remains surface-level, and communities are not given the opportunity to challenge the political and commercial rationalities behind the development of the smart solution.⁸

An example of poor citizen engagement is the rollout of RetailerLink – an app that ultimately failed to provide meaningful utility for its users – in Singapore. It was created to help consumers in heartland malls 'go digital' by broadcasting promotions, showing stock updates, and facilitating communication between customers and retailers. It was developed by the Housing & Development Board (HDB), which is Singapore's public housing authority and the country's largest landlord. The goal behind this initiative was to incentivise users to choose physical malls over prevailing e-commerce platforms. However, multiple malls hailed as 'flagship' RetailerLink locations experienced low usage and scant levels of awareness amongst shoppers. Those who were aware of the existence of the app found it unhelpful: retailers did not see any clear benefits, and customers saw

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little need for yet another app to navigate malls they were already familiar with.

In a similarly unsuccessful example at Thailand's Chiang Mai University, smart buses were introduced as part of the university's smart campus initiative. Despite providing convenience in theory, the buses saw low ridership because students were used to relying on their motorcycles for transport, and no community feedback loop had been implemented to understand their preferences. The takeaway here is clear: smart city development should begin with identification of the problem, not with implementation of the technology. This can be achieved by engaging communities from the outset through fieldwork or extensive social impact assessments, and empowering them to co-create solutions in order to design interventions that are truly citizen-centric.

Lesson 3: Smart cities need coordinated data infrastructures to avoid expensive inefficiencies

Fragmented data ecosystems can lead to smart solutions backfiring, resulting in overloading operational capacities instead of streamlining workflows. Without integration, information remains locked in silos and is thus unable to deliver beneficial insights.

Singapore provides a strong case for how centrally coordinated data infrastructure can enable more effective decision-making. The Urban Redevelopment Authority's (URA) central data repository integrates demographic trends, mobility patterns, amenity usage, market dynamics, and ground concerns to inform policy and resource allocation. For example, authorities use housing and amenity service area data to allocate land for healthcare facilities for the elderly, prioritising



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neighbourhoods with high populations of older adults and limited access to other healthcare services. Data integration is also a key requirement for Singapore's (or any other city's) digital twin initiatives. A digital twin is a dynamic, virtual model of the city that draws on multiple data streams, including building footprints, vegetation cover, traffic flows, heat emissions, and weather patterns such as wind direction and rainfall.⁹ The consolidation of these datasets into one model allows for the digital twin to simulate various situations and disruptions, helping planners make better-informed decisions.

In other contexts, building effective data infrastructures requires new arrangements that overcome institutional silos. In Bandung, Indonesia, the establishment of the Bandung Command Centre (BCC) brought together multiple government agencies, researchers, and start-ups on a shared platform for problem-solving. BCC is a tool to help Bandung city leaders make decisions based on real-time data – including weather and other sensor data, CCTVs (closed-circuit televisions), traffic monitoring, and public service performance data. The existence of the BCC facilitated the development of open-data policies, encouraged data sharing across departments, and improved the digital literacy of municipal staff. By creating a space for collaboration, the Command Centre transformed the city's approach to information management, making it more responsive and integrated.

The weakness of uncoordinated digital development is evident in Indonesia's broader experience. In 2022, Minister of Finance Sri Mulyani criticised the proliferation of government apps as a drain on state finances. More than 24,000 overlapping apps – each with its own independent database – were being used by ministries and institutions to run administrative processes. This fragmented application ecosystem led to duplication of efforts, inconsistent records, and costly systems that could not “talk” to one another, thus limiting the ways data could be used. In response, the Ministry of Communication and Information Technology merged many of the fragmented services into one “superapp” in an attempt to improve public service delivery, cut costs, and enable better data usage.¹⁰

Across these cases, the lesson is consistent: smart city initiatives must align implementation across stakeholders, promote information sharing, and invest in coherent, harmonised data infrastructure.

Lesson 4: Smart solutions do not always have to be large-scale, cutting-edge technological innovations

An overemphasis on technology risks neglecting on-the-ground citizen needs and may lead to more harm than good – increased surveillance, the privatisation of digitally-mediated public infrastructure, and new forms of marginalisation being (re)produced through algorithmic decision-making.¹¹ In many cases, the ‘smartest’ solution involves focusing on liveability rather than technology.

Even private companies embrace low-tech solutions when they are most viable. Tech giant Grab employs riders to produce hyperlocal maps that conventional GPS (Global Positioning System) could not by manually mapping narrow alleyways and shortcuts in various Southeast Asian cities. Similarly, Thailand's ViaBus app uses GPS trackers on buses to give commuters location updates and predicted arrival times. While not a breakthrough technology, it is a simple adaptation that significantly improves the commuting experience. In Indonesia, the Smart Kampung model relies on local operators to act as a mediating interface with residents, addressing gaps in digital literacy and working within the constraints of the available infrastructure.

The same cannot always be said for the implementation of smart gates and dormitory access systems in Chiang Mai University, where power outages have repeatedly caused malfunctions, revealing the fragility of high-tech systems built on unreliable base infrastructure. In such cases, solutions must correspond to on-the-ground realities, focusing on making incremental improvements instead of attempting to leapfrog existing development, even if the smartest solution turns out to be an analogue one. The idea of smart *enough* cities is useful here, where social goals stand in the heart of development, and technology is deployed selectively and intentionally, with equal attention given to strengthening the infrastructure that sustains it.¹²

Lesson 5: There is no universal, one-size-fits-all model for smart city development that can be applied across different contexts

Attempts to export best practices without adapting them to local governance structures, community needs, or infrastructure capacities inevitably lead to poor outcomes.

One example of a successful adaptation is Indonesia’s Smart Kampung initiative in Banyuwangi Regency. Spanning 5,782 square kilometres, Banyuwangi’s vast territory makes the delivery of public services a challenge. Recognising this, the regency government reimagedined the smart city concept for a predominantly rural and dispersed setting. The initiative flips the usual top-down model – instead of imposing uniform solutions from higher government levels, the Smart Kampung starts at the village level and scales upward. Each *kampung*¹³ designs and implements its own digital services according to local priorities, preventing the vertical misalignment that occurs when there is a lack of communication between high-level government agents and on-the-ground realities.

The Smart Kampung initiative in Banyuwangi succeeds because it adopts a people-first approach (as opposed to a solution-first approach) by designing services without overcomplicating them. The technology is deployed selectively, with innovations categorised by their intensity of use and applied only where the local *kampung* context allows for it.¹⁴ The specific services typically digitise tasks that residents already

carry out, such as applying for ID cards, registering births and deaths, and obtaining permits or licences. These can be accessed via the Smart Kampung app or through kiosks in village offices, ensuring inclusion for residents with limited digital literacy. Banyuwangi’s model remains socially grounded by giving agency to local governments to selectively implement solutions, and not forcing the digitalisation of all activities that can possibly be digitised.

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A contrasting, but equally effective approach can be seen from Singapore’s Smart Nation success. Crucially, this success cannot be dissociated from the country’s unique context of having a centralised, highly coordinated governance structure with citizens’ strong trust in the government – conditions that enable the seamless rollout of ambitious initiatives, integrated into almost every aspect of daily life. This includes instant payments, a digital identity system, real-time traffic and vehicle parking data, telehealth services, and many more. Singapore can easily and quickly deploy new, needs-based digital platforms like TraceTogether, which was used during the COVID-19 pandemic to facilitate contact tracing efforts. It is important to be cognisant that the Singapore Smart Nation initiative is not easily replicable elsewhere, and it does not have to be. There are many different pathways to success, and just as many paths to failure. But there are also principles to be learned from past examples and successful cases – principles of ethics, trust, integrity, and intentionality.

RETHINKING SMART CITY GOVERNANCE

The lessons discussed in this article are supported by recent scholarship on smart city governance. Researchers Luca Mora et al. argue that while many smart city projects begin with good intentions, they frequently fall short due to

fragmented governance, lack of coordination, and limited adaptation to local conditions. To address this, they propose a four-stage framework for rethinking smart city governance:¹⁵

Stage 1. Consensus-building

There is a need to establish consensus on the local, national, and international levels for common requirements, and terminology for interpreting and managing smart city governance. There must be a holistic understanding of smart cities, and their governance across disciplines and sectors. Currently, a lack of agreement creates barriers to long-term success as different stakeholders might not be approaching projects with the same understanding of smart cities.

Stage 2. Geographically-informed design and experimentation

Case studies are usually derived from large cities in the Global North. This creates a mismatch with local contexts, overlooking the needs of small urban areas or developing countries. Greater testing and iterative feedback are needed for developing solutions, rather than imposing a successful solution from elsewhere.

Stage 3. Scalability and integration

Success stories are often isolated and cannot be scaled up for regional or international integration. There is a need for a systematic approach to integration, including standardised procedures, and policies at national and international levels.

Stage 4. Assessment and continuous improvement

It is necessary to go beyond simplistic rankings of smart city projects, and meaningfully assess the effectiveness of projects and governance strategies. New instruments need to be created to accurately measure factors such as citizen engagement, data privacy, and context sensitivity, as well as assess where projects may be falling short of their goals. Lessons learnt should also be incorporated into future projects and developments, creating a culture of learning and adaptation rather than making one-off attempts.

CONCLUSION

Smart city development is a crucial dimension of modern urban life and has the potential to make meaningful improvements for citizens across a variety of domains, but it must be carefully handled. The cases above demonstrate that to avoid failures, *smart* solutions must first be *sensitive* solutions: responsive to local contexts, grounded in available resources, and attuned to community needs. Despite many challenges on the ground, realising the utopic ideal of smart cities is possible, but only through a collective commitment to identify and address the right problems with right-sized solutions. [AMU](https://smu.sg/SMUAMINov2025)



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