



## **International Trends in Smart Cities and the Role of Banks**

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## Abstract

Reviewing international smart city cases and relevant literature on their connotations, characteristics, and definition, this study first analyzes their origins, building blocks, and important strategic dimensions in order to explore trends with respect to international cases. Other countries' policies and experiences can serve as models for Taiwan. Second, it further discusses the business opportunities and challenges arising from smart city development, proposing channels for participation in smart city financing, then exploring strategies for the financial industry to support smart cities.

The role of Taiwan's banking industry is one of the biggest challenges for smart city promotion. In fact, bank loans are one of the main way to finance smart cities – along with fiscal expenditures – but their construction is different from normal infrastructure projects. The core task is to rebuild the city and re-allocate its resources. In view of the complexity of the issues and values involved, although the government plays an important role, Public-Private-Partnerships (PPPs) remain indispensable. The PPP model solves the problem of tight government finances, but not the financing problems of private businesses. Since their construction requires the provision of vast social resources – whether from a capital or technological perspective – asset securitization and PPP funds are used frequently. Project financing is another important alternative.



## Research Findings

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### 1. An Overview of Smart Cities and their Building Blocks

The development of smart cities should be centered on people, providing convenient and comfortable living through innovation and technology. To this end, governments should proceed from the perspective of people, starting from the most specific, tangible and relevant items including education, medicine, electronic public services, smart transport systems, and barrier-free facilities. Integration and promotion of existing and upcoming measures should be strengthened so that people feel the benefit of smart cities in their own lives, thus broadening public support. With reference to international experience, Taiwanese county and municipal governments can work together with businesses to introduce innovative methods and technologies to build smart communities with comprehensive functions, including smart solar buildings and wind power systems, which have not only development potential but also long-term strategic meaning. The purpose of smart cities is to improve quality of life and business environment, which inevitably involves various economic and lifestyle changes and enhancements in response to demand. Therefore, in addition to information technology and governmental willpower, stakeholder enthusiasm is also essential.

### 2. International and Taiwanese Smart City Development Experience

Looking at experiences of smart cities around the world, cities have developed different visions, objectives, plans, and implementation methods corresponding to their own cultures, environments, resources, and problems, showing that smart city development begins with local problems. Smart city development has a profound impact on the future of a city, requiring establishment of good laws and regulations, finances, zoning, and personnel training mechanisms. Hence, Taiwan's smart city promotion should be planned in light of cities' own characteristics and infrastructure, integrating Taiwanese smart city development, then looking overseas so that Taiwan shines in the international community, while providing Taiwanese businesses with growth opportunities.

### 3. The Role of Taiwanese banks in Smart Cities

Urban problems can be solved either through resource supply or the efficiency of existing resources. Smart cities – making use of information and communications technology – involves the second method. Taiwanese investment in smart city markets comes from many industries, including IT systems integration, IT hardware manufacturing,



component manufacturing, telecommunications services, construction, and small-scale system solutions, etc. Because of Taiwan's competitiveness in logistics, construction, security, and governance, it can independently contract solutions for smart city construction. The scope of smart cities ranges from smart transport, medical care, and energy to governance. In a complete system, the more systems are integrated, and the higher the degree of analysis, the greater the capacity for solutions and profitability.

Smart city construction requires financial support, and financing remains one of its largest challenges. Most smart city projects require private financing to fill in the funding gap. In terms of business models, Germany and the Chinese mainland mainly use the PPP model, taking the city as an experimental platform, supported by state-owned banks or directly financed from the public sector. Alternately, they may apply for assistance from the government or EU, but the private sector must still contribute. Overall, the most common financing models for smart city projects around the world include public-private partnerships, green bonds, energy performance guarantee contracts, Tax Increment Financing (TIF), crowdfunding, and public investment. With the PPP model, a diverse and multi-level financing system can be established, and construction can be continuously supported through models like asset securitization.

## Results

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### 1. Conclusions

A city is a complex organism composed of government, industry, and the public. Countries can inject innovative and intelligent applications into smart city promotion, collaboratively innovating from various perspectives to create smart city ecosystems. Barcelona, a smart city pioneer, initially promoted smart infrastructure, putting sensors and networking equipment around the city, and inviting businesses and the public to jointly develop applications and accelerate the dissemination of smart city applications through open data platforms. In the case of smart cities led by the private sector – including Songdo near Seoul, South Korea – sensors were embedded in buildings, streets, pipelines, and electric lines during initial construction. Information is transmitted to the central control system, a nerve center collecting and analyzing all data on buildings, power usage, and traffic and making remote adjustments accordingly. In Japan, Fujisawa City and Panasonic Corporation jointly promoted transformation of the city's



environment and streetscape, integrating smart technologies involving home appliances, housing, and devices, transforming smart homes into smart communities.

With the diversity of industries and values involved in smart city construction, beyond government, the use of civil organizations to compliment each other and the rational use of social resources are the keys to success. Looking internationally, it is not difficult to find that smart cities' visions, objectives, plans, and implementation methods are deeply affected by local culture, environment, resources, and problems: smart cities must start with local problems. Due to the great impact of smart city development on a city's future, sound laws and financial regulations and good personnel training mechanisms are required for Taiwan's smart cities to develop in accordance with their own characteristics. They must orient themselves around their own idiosyncratic problems and infrastructure, integrating Taiwanese development before looking overseas. When Taiwan shines in the international community, Taiwanese businesses will obtain growth opportunities.

## **2. Recommendations**

Smart cities are an international trend. Government incentive models for investors include management flexibility, cross-domain added value, subsidies, and cooperation with the public to assess the value of construction plans. Although it is not a new trend, smart cities using technologies like the Internet of Things (IoT), big data, and artificial intelligence (AI) are springing up around the world. These technologies improve the effectiveness of infrastructure and quality of life as they mature. As a result of the growing number of smart cities worldwide, related applications have moved from the experimental to the application stage, not only solving urban governance and livelihood issues, but also promoting industrial development and specific business opportunities. The main object of smart cities is to cure "urban disease," improving quality of life; their core driver is public and user demand. The higher the degree of public participation, the faster the city can mature, which inevitably also improves the national development level and competitiveness.

(A) Smart city mobile payment apps have great market opportunities, and the E-commerce app market is also heating up. With the development of wireless transmission services in particular, digital payments are being integrated with network technology, and the consumer shopping experience is becoming more intelligent. Apps promoting mobile business and smart mobile wealth management are becoming more popular, banks should actively research smart city micropayment business models in cooperation with large-scale domestic IT service providers and startups.



(B) Banks should cooperate with E-commerce businesses – mainly targeting small ones – to build financing platforms, and develop innovative online financing models using big data to resolve the requirements in normal lending for collateral, pledges, and guarantees. Specifically, after the domestic operator discovers the financing demand, they authorize the platform to enter the back-end account to get operational data. The platform produces a credit risk report based on the data, then coordinates credit reference materials to grant credit. After the banks develop big data credit and risk management technology and accumulate the data for the smart city E-commerce platform, the E-commerce SME can obtain credit with less collateral and fewer guarantees through computation of their operational data and repayment ability.

(C) Aside from the technical level, integration of smart city digital payment technology should also consider the possibility of developing value-added services from the perspective of consumer demand. Currently, time is required when using different E-commerce platforms to enter information like delivery address and user information. These steps are inconvenient on mobile devices. Future smart city businesses can develop mobile payments in cooperation with banks. Alternatively, registration and contact information could be stored in the cloud, and directly accessed for the payment. Personal smart mobile E-commerce platforms can allow users and customer service personnel to communicate through AI software, greatly increasing the efficiency of the process.

(D) Banks should cooperate with tech firms to develop smart health insurance and medical services and integrate medical systems in medium- and large-scale hospitals, clinics, and pharmacies, electronically synchronizing medical systems to save resources. This approach can synthesize resources including health care management, health risk assessment, medical customization, and evaluation systems, integrate mobile health management wearables and cloud health management services, provide complete health care management processes, carry out rigorous security measures, and help companies comply with regulations on workplace health management. Doing so can prevent overwork and reduce work-related accidents. Healthy business and healthy workplace certifications are a way for such businesses to improve their image.