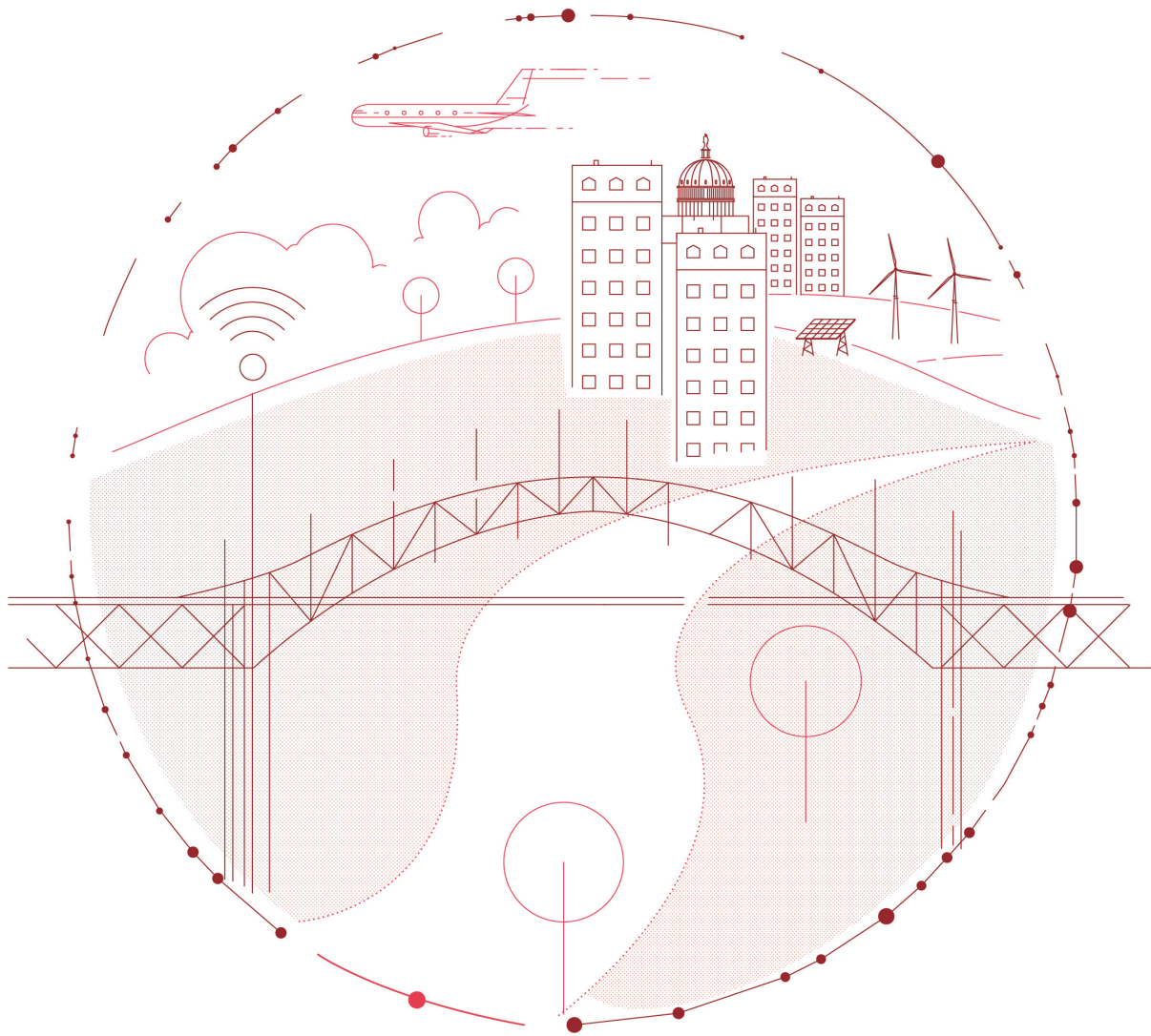
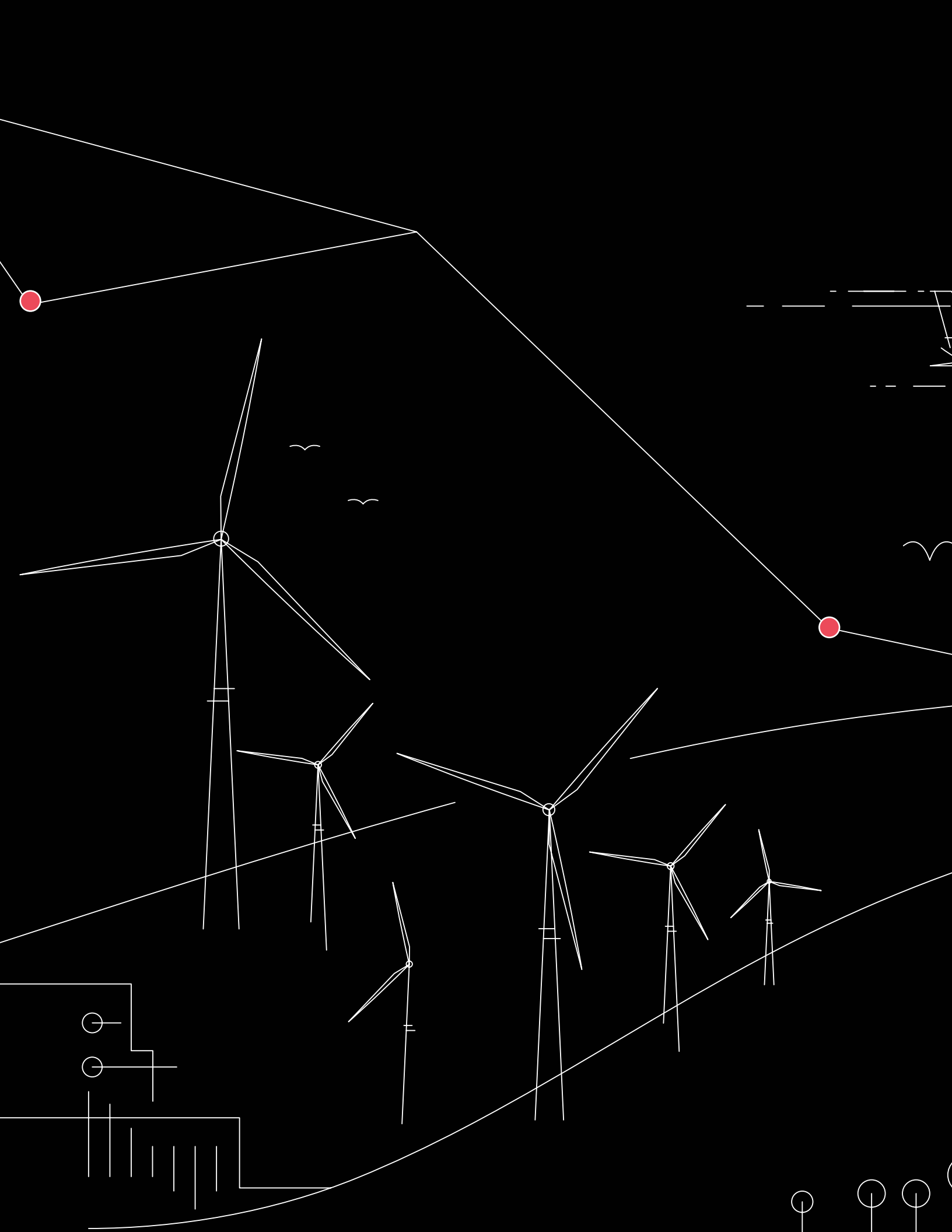




The challenge of paying for smart cities projects



About



John Skowron

John has more than 25 years of experience in industry and management consulting. Within Deloitte Consulting LLP, he serves as the Global Government & Public Services leader for Consulting. John is responsible for accelerating Consulting's Public Sector global network by building the key foundations required to effectively deliver impactful work for our Public Sector clients. Working across Consulting's global network, John leads the establishment of strong, coordinated global leadership teams, and drives the development and execution of global Public Sector strategies. Previously, John held a number of Public Sector leadership roles including the Deloitte Consulting National Industry leader for US Public Sector and well as the US State Sector leader role. John is also currently the advisory partner for multiple government accounts in the US.



Michael Flynn

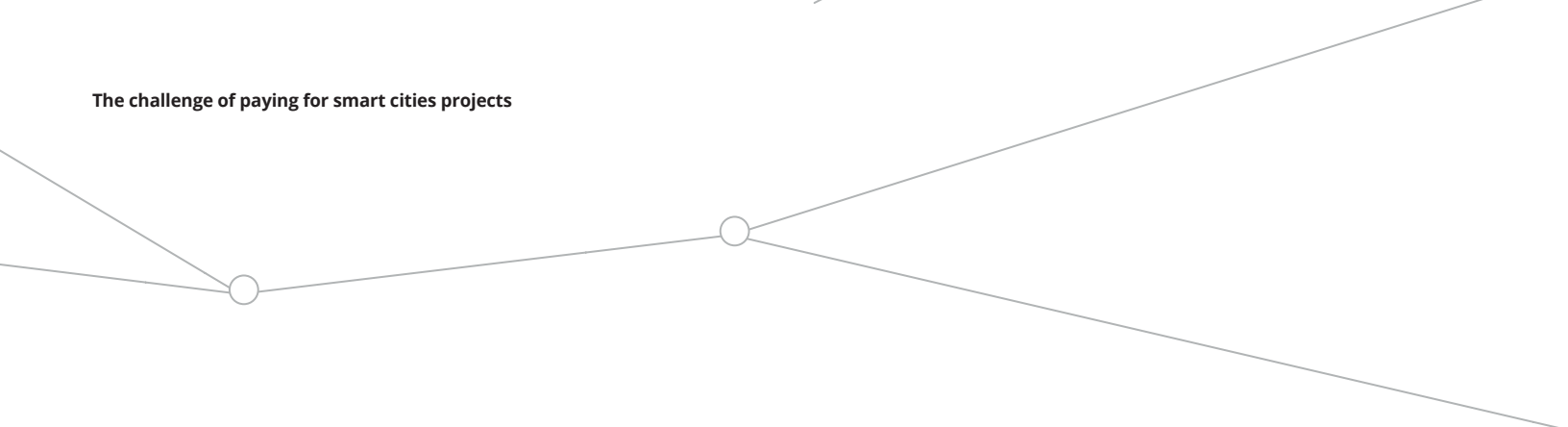
Michael Flynn is the Global Financial Advisory Public Sector Leader for Deloitte. He also leads the Deloitte EMEA Infrastructure & Capital Projects practice and focuses on advising public, private and banking team clients on finance raising, restructuring and refinancing of both project finance and corporate debt transactions including the development of government and infrastructure assets, real estate, energy, and renewable energy assets. This advice has included the incorporation of 'smart' into traditional infrastructure and considering value capture opportunities including asset recycling for government clients.

Michael is a member of the United Nations Economic Commission for Europe (UNECE) PPP Business Advisory Board and the International Project Finance Association Council in Ireland. Michael is a member of the Deloitte Insights board.



Introduction

As cities look to upgrade their infrastructure with smart technologies, paying for those projects presents a significant challenge of introducing smart technologies on a wide-scale basis. Constrained by tight budgets, cities need to identify business models that can help to attract private financing in order to make the introduction viable and financeable.



Several factors make it difficult to finance smart cities projects. One common obstacle involves technology risk: the project may be the first to deploy a particular technology, reducing investor confidence in the integration and usability of the technology in the absence of demonstrable proof of concept. It may also be hard to secure financing for a smart city project where it is difficult to monetize the benefits of the project.

For example, a project might offer a clear positive socioeconomic impact, but there may be no way to assign a dollar figure to that benefit, including the potential to generate revenues. Other impediments to financing include: projects that do not have a clear path to steady revenue; where the return on investment (ROI) is uncertain; and/or the unconventional nature of smart cities projects based on interconnectivity (of the internet, Wi-Fi, fiber optic cable, etc.) with physical devices and infrastructure, which often lack the traditional, single-sector focus that conventional financing favors. Lastly, the types of financiers that will generally understand smart cities often have an infrastructure background; however, their preference is for long-term projects. The shorter term nature of technology-related projects can be outside their remit or bring additional risk and challenges to smart cities projects that need to be considered.

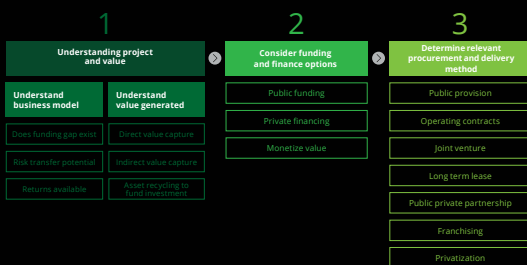
A key step in any smart city financing effort is developing a comprehensive strategic plan to capitalize on the project's strong points. This can help to improve the initiative's "investment readiness" and its access to finance. The plan should include a robust business model; a creative approach to funding and financing sources (finding new sources of revenue for projects and new business models for recovery and value capture); and innovative financing structures for investors.

While there are numerous options available to source finance for smart cities investments, a challenge in taking advantage of many of these options is matching the project to the most appropriate financing tool. This requires that you fully understand the project, its potential cashflows, the range of financing options available (locally and internationally), and available procurement methods to government in order to deliver.

Our key value propositions

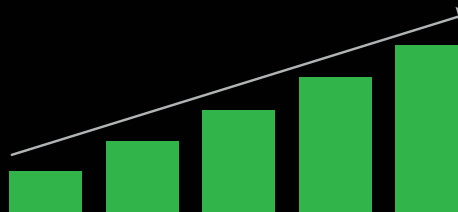
Model for delivery of a successful project

Our approach



Revenue model

A clear funding stream is needed and critical if private financing is being sought

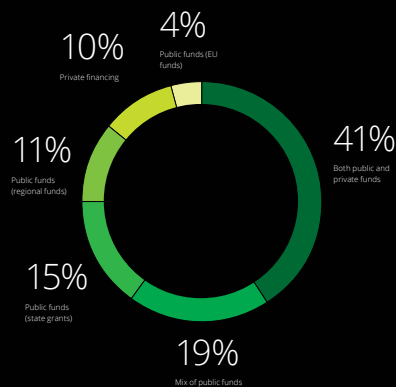


Value capture and asset recycling

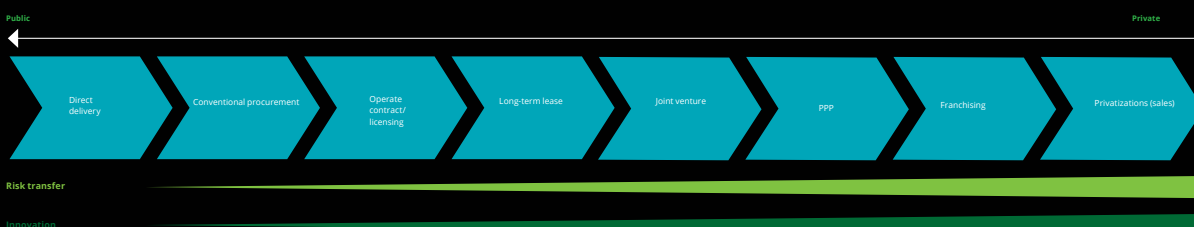


Financing and funding options

Matching the smart city project to the financial tool



Procurement structures



Model for delivering an effective smart city project

An effective smart city project starts with several key steps. The first is to define the objectives and the desired outcomes, so participants can tailor their efforts toward those goals. Next, develop an inventory of existing assets that may be available for use by the smart city project.

With those preliminaries complete, it's time to define the business model. How will the project generate economic value? What new value chains will arise from advanced technologies and related services?

Next, determine if, and how, the project will generate revenue and free cash flow. Will the project require more funding than it can recover from its project revenue? What sort of value will the project create (directly or indirectly), and how might you capture (monetize) that value?

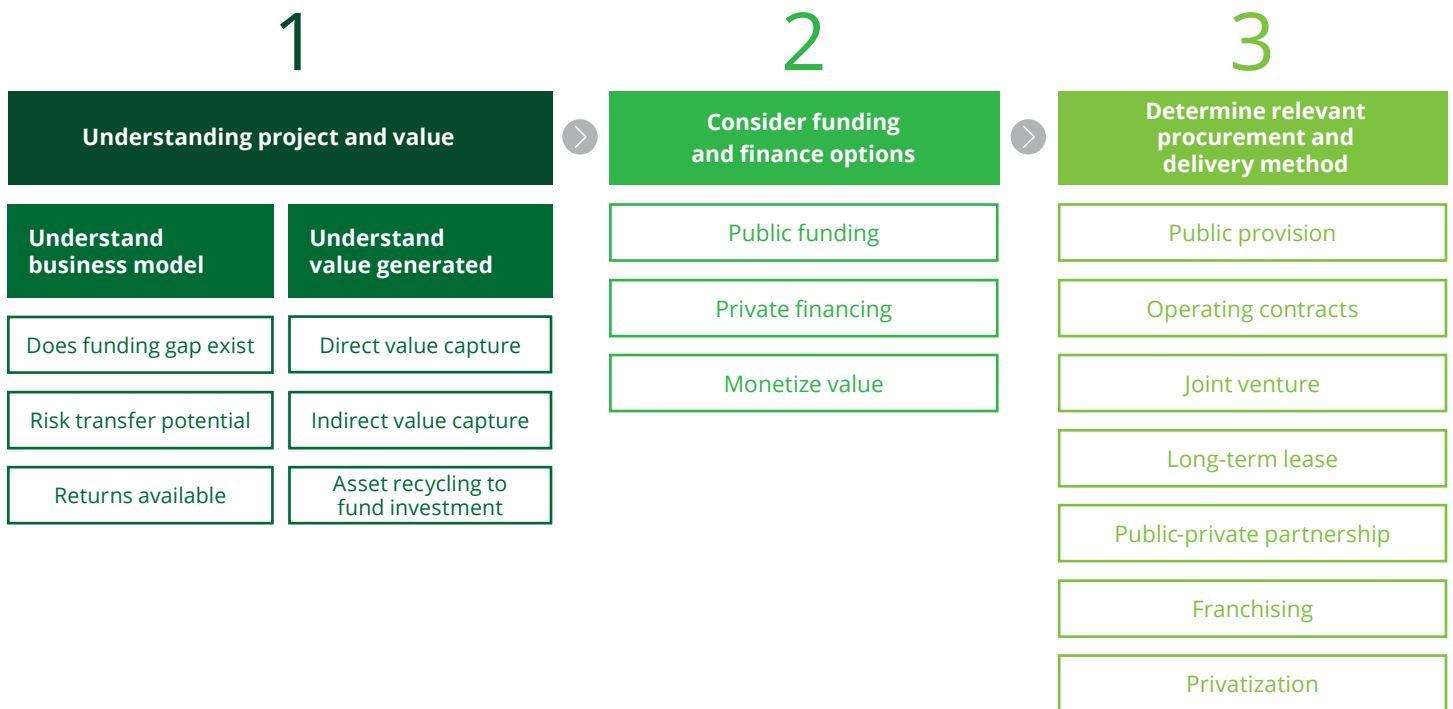
Finally, a plan for funding and financing the smart city project must be developed.

The difference between "funding" and "financing"

When planning a smart city project, it is important to remember the difference between funding and financing. In funding, the government provides a specific amount of money for a specific purpose (e.g., to a project, usually free of charge or interest-free) with no expectation of repayment. In financing, someone (usually one or more financial institutions) provides an amount of capital (debt or equity) to a project with the expectation that it will be repaid with interest.



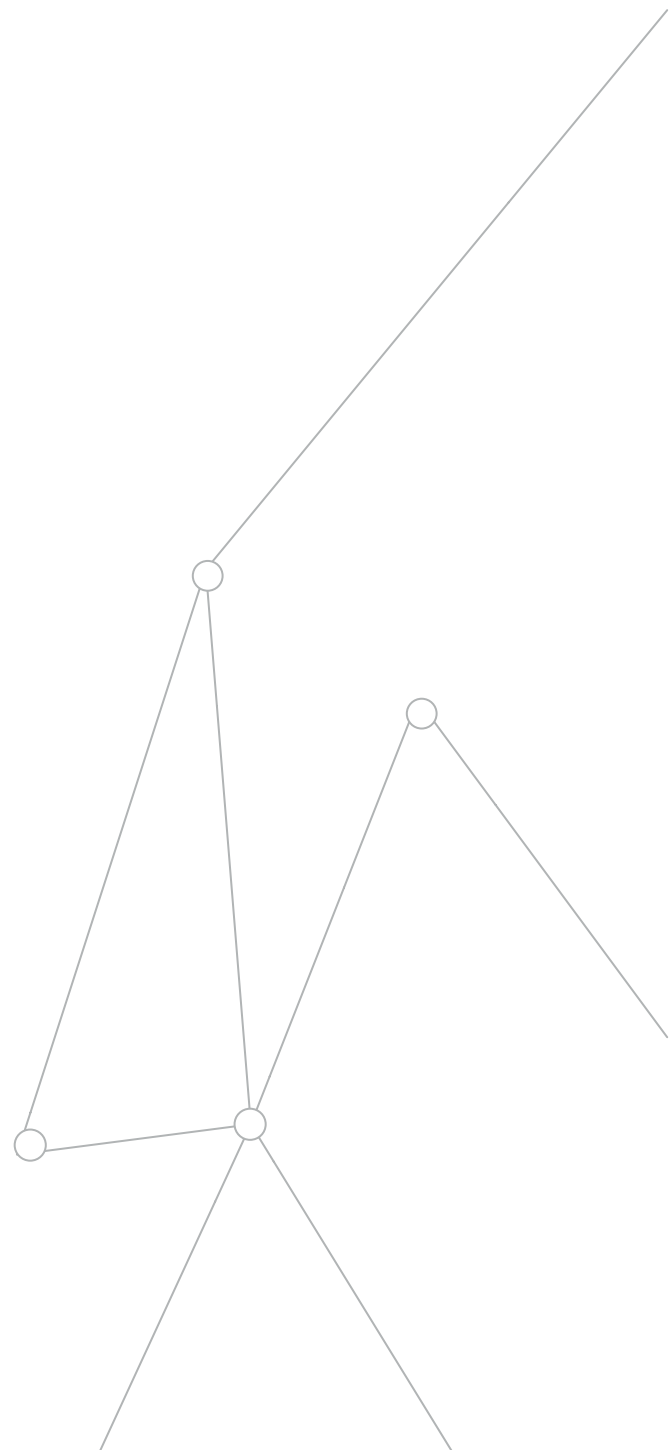
Model for delivery of a successful project



Smart cities initiatives require innovative business models



A smart city initiative can put a digital overlay on any physical asset, opening the way for unprecedented opportunities, increased productivity, and new revenue streams. One important factor that can make a smart city project successful is determining a clear path to steady revenue (its revenue model). A clear funding stream is especially critical if the project is seeking private financing.



Business model canvas:

	Focus on value creation through efficiency		Focus on "value generation"	
Delivery impact	Key activities	Value proposition	Customer segments	Customer relationships
	What is the smart city project delivering?	What problem does the smart city project solve and for whom?	Who are the smart city's customers?	How will the smart city project maintain its relationship with the customer
	The activities that must be performed to offer and deliver a product or service	- Must be compelling (solving a real problem) - What to offer and how to differentiate? - Who are the customers? - Does the "value proposition" match their needs? - Being connected or IoT-enabled is a base expectation	- Group of customers with homogeneous needs with a common approach toward the focal product or service - The end-user is not always the smart cities customer	How the customer contact begins, and in which way are customers retained?
	Key resources	Key partnerships	Channels	
	What resources will be required to effect delivery?	How will internal resource gaps be filled?	What channels will be utilized to deliver a value proposition, product or service to a customer?	
	The resources required to offer and deliver a product or service at the basis of the value proposition	Some activities are outsourced and some resources are acquired externally	E.g. communication, distribution, and sales channels	
Cashflow impact	Cost structure		Revenue structure	
	What cost structure will be utilized for the resources and the partnerships to perform key activities?		What are the new or increased revenue streams and how are the revenues generated?	
	- What cost savings can be made? - Strategies for staying cost competitive?		- Who receives the revenues? - Who pays? Government, public, end-users, third parties? - How are they shared across the value chain? - For what "value" and how does the customer pay (e.g., "freemium," subscription fees, usage fees, "pay-as-you-go" pricing)?	

To determine the most effective way to finance a smart city project, it must be decided who will pay for the service and assume the associated risks. Historically, the public sector has been the first choice. Often, the government pays to build and operate the service, receiving a return in the form of savings or greater efficiency. But the government could also recoup its investment by getting the public to pay fees (directly or indirectly) to use the service.

In an alternative scenario, revenues to support a smart city project could come from selling value generated to other third parties. The project sponsor might, for example, sell advertising space on an asset, monetize data that the service collects or form affiliate or strategic partnerships, and use these revenues to pay for the asset or the service for the city/public.

The sponsor should continuously look for opportunities to leverage the technology platform and network to generate additional smart cities revenue streams. Vendors and partners can find creative ways to generate revenue from the solutions and services they provide in each layer of the business architecture. These opportunities may mirror the revenue models used in the wider digital economy. The four most effective digital revenue models to date are using advertising to support a service; selling an “all-you-can-eat” subscription; data monetization (e.g., selling data captured by a service to companies for marketing purposes); and pay-as-you-go user fees.

As the project sponsor evaluates potential revenue models for a smart city project, here are some questions to consider:

- Does the project capture economic benefit through direct revenue streams? Will it generate any free cash flow (money left over after all costs have been paid) that can be used to cover various expenses, such as up-front capital and finance costs and ongoing operation and maintenance?
- What kinds of risk connected with free cash flow, quantum, certainty, and source does the project face, and how do those risks affect the kind of finance the sponsor may source?
- Can public and private sources of finance be combined? This is sometimes done if the cash flows are insufficient to repay finance from the private sector, which will include a premium for the level of risk transferred.
- Is the present value of the total investment costs greater than the present value of net revenues? If such a funding gap exists, the sponsor will need to identify alternative funding mechanisms.

Revenue models utilized

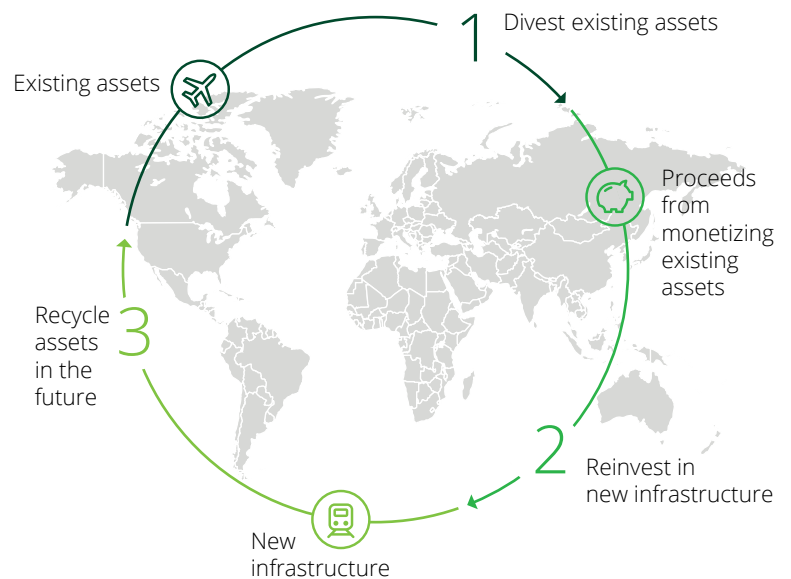
Type	Source	Description
Financing model payments	Public sector	Payments received that match agreed cost (including finance) amounts, allowing full coverage of expenditure and agreed returns.
Availability payments	Public sector	Payments received that are linked with the performance of the private sector operator and availability of the service/asset in line with agreed performance standards.
Savings sharing	Public sector	Certain services will generate savings for the public sector. If quantifiable and accountable, those savings can generate a budget to help fund the associated assets/service.
Shadow tolls	Public sector	Public sector makes payments to private sector based on usage of the service/asset. In some cases, recurring payments may apply so as to reduce risk.
User fees/charges	Third parties	Users pay directly for services (e.g., road tolls). This tends to be riskier than public sector payments as it is more difficult to quantify in advance with any certainty.
Rate type payments	Third parties	The public sector collects revenues from the public and utilizes these to pay the private sector for specific services/assets (e.g., power generation/water utilities).
"Pay-as-you-go"	Third parties/ public sector	User is charged for each use of the service. Can be collected using billing system of mobile operator.
Subscription ("all-you-can-eat")	Third parties/ public sector	User pays fixed amount for service irrespective of level of usage.
Advertising-based	Third-party advertising	Revenue streams are generated by selling advertising on asset space, rather than collecting from individual users. This allows service providers to provide service free (or inexpensively) to users. An example is Wi-Fi kiosks in New York that provide a free service underwritten by advertising income.

Value capture and asset recycling

Along with more traditional funding strategies, a city can use value capture to provide a contribution to funding for a smart city project.

Direct value capture generates value directly within a project, using strategies such as revenue sharing, profit sharing, refinancing gain share, user fees, and impact fees. Indirect value capture creates value as a result of government decisions (e.g., a zoning change) or investments (e.g., developing a new transit system) that benefit developers. A government might also capture more value from a project, for example, by leasing air rights above the property, or swapping a piece of public land that a developer wants for a piece of privately owned property.

Another option is asset recycling. In this strategy, the government sells (or leases) a public asset to a private entity for value and then uses the proceeds to fund future investment. The government might sell an asset it no longer needs; sell an asset to take advantage of its current capital value and then lease it back for public use; or conduct an asset swap or share arrangement to help with a private sector development plan. In each case, the goal is to use existing assets to enhance the overall government portfolio while achieving value for money.



Financing options

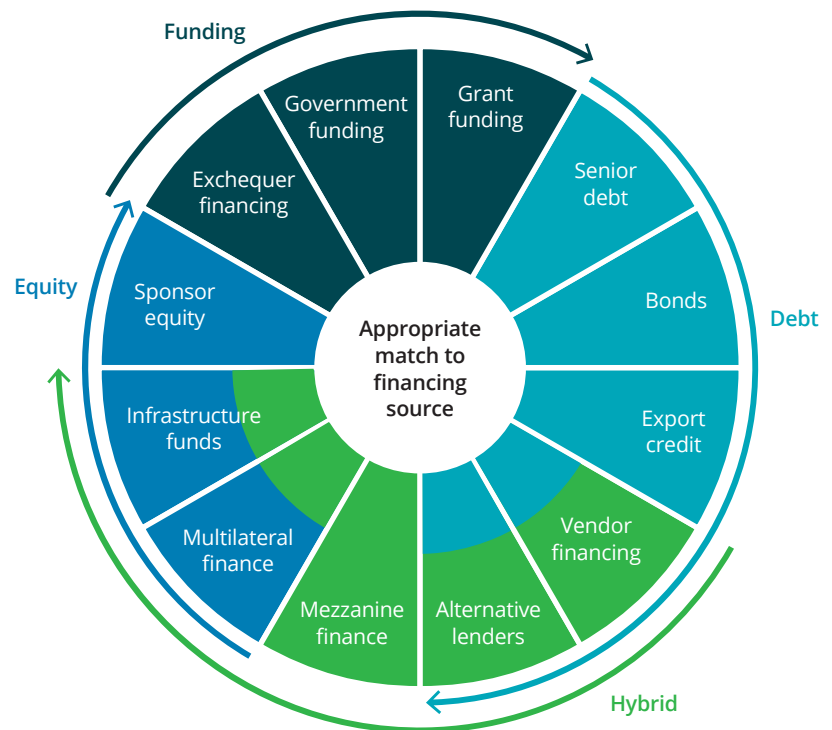
Smart cities projects often require multiple investors. Attracting appropriate sources of capital (debt or equity) for a given project requires effort, innovation, and a sophisticated understanding of the project's fundamental components.

Smart cities projects may include traditional physical infrastructure assets, new technologies and connectivity, transportation systems, and safety and security features. They may also include aspects of a project associated with economic development, tourism hot spots, citizen sociality, and sustainability. Investors/financiers generally have investment criteria to evaluate projects.

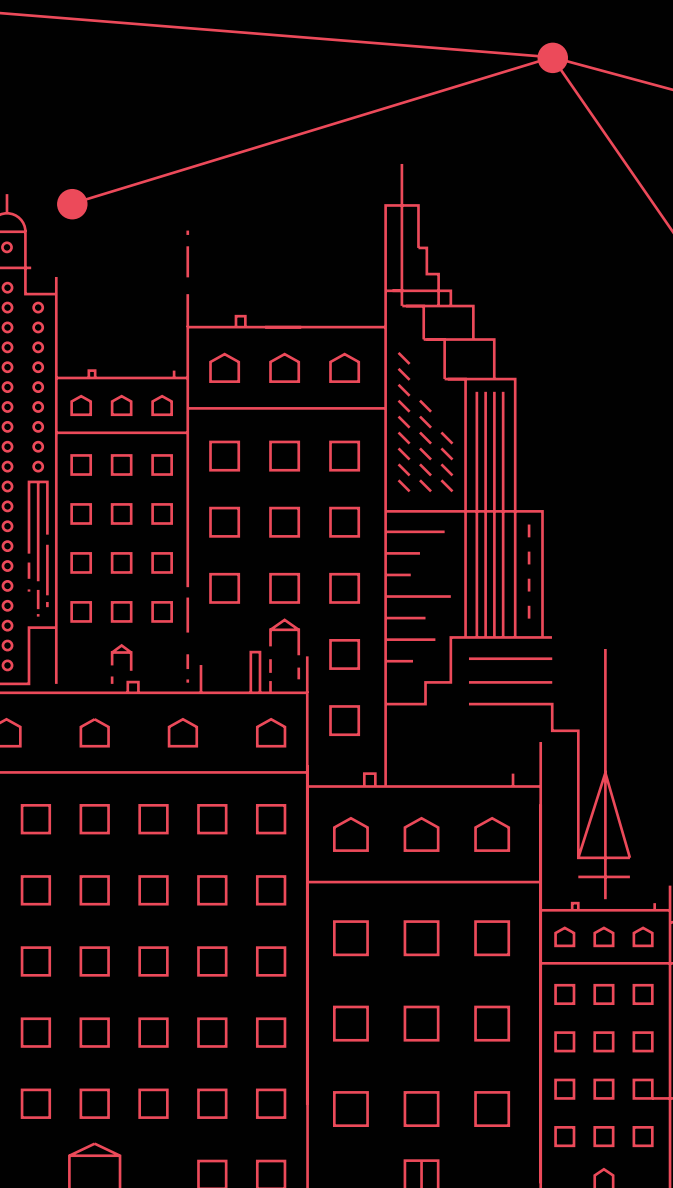
Some investors will invest only in traditional infrastructure such as roads and transportation systems, while others will invest only in projects that match investment strategies focused on particular assets, sectors, countries, or themes.

Therefore it is important to develop a strategic plan to secure financing from different sources for different aspects of the project as required. Grouping various elements of a project matching specific financial investor criteria can make a smart city proposal.

Financing options



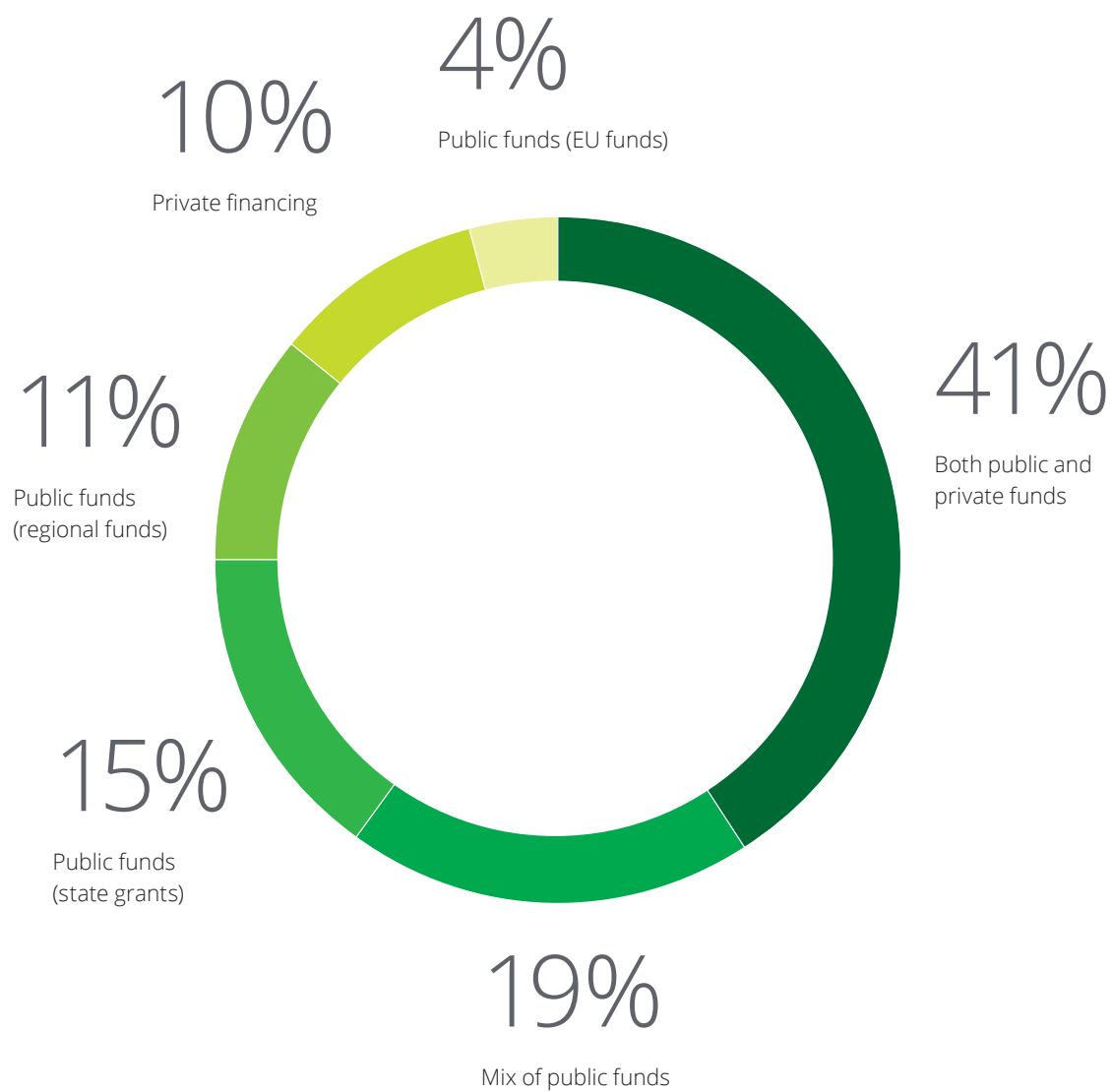
Financing mechanisms utilized



Typical financing mechanisms

Project financing	Focuses on the financial assessment of a given project, rather than on the business/enterprise as a whole. The remuneration is set according to the estimated cash flows and profits generated by the project.
Traditional loans and leases	Focuses on paying for infrastructure investment over time. Repayment can come from public sector or third-party/user payments. Financing is at the project level and involves a private equity partner.
Vendor finance	An equipment vendor; an engineering, procurement, and construction (EPC) contractor; or another supplier will offer financing for the project. Because an equipment vendor, for example, may have a better understanding of a project's technical risks, or of the industry concerned, it might be more willing than a commercial lender to assume those risks.
Consumption-based financing	Project sponsor pays for technology based on usage and adjusts capacity up and down as needed. Financing is at the supplier level rather than project level.
"As-a-service" financing	Rather than purchasing technology, project consumes it as a service. Financing is at the supplier level.
Concession financing	Project gains the benefits of technology at little to no cost, while enjoying incremental revenues and cost savings.
Revenue share financing	Project obtains funding for technology investments in exchange for a share of the revenues from customer contracts. Revenues may be committed or uncommitted.
Equity financing	Scales business across multiple cities with capital and expertise from a strategic private equity partner.

Funding/financing options typically chosen by smart cities projects



Source: European Commission; Analysing the potential for wide scale roll out of integrated smart city and communities solutions, European Commission, June 2016.

Procurement structures utilized

Just as different funding and financing strategies work best for different smart cities projects, so do different procurement structures, and specific procurement mechanisms are required in order to accommodate different funding/financing strategies. The options include:

Direct Delivery: The public sector provides goods or services directly to the customer utilizing the public sector staff/assets.

Conventional Procurement: The public sector defines its requirement for goods and/or services, procures them via traditional procurement and contracting methods, and pays for them.

Operating Contracts: The public sector contracts with a vendor to provide goods and services. These contracts may cover a range of activities, from technical assistance to full responsibility for the operation and management of a public infrastructure asset. They are generally shorter term in nature.

Licensing: Typically used for procuring technologies, these agreements generally come in two varieties. The first is a perpetual license, which is a one-time, up-front purchase funded by the CAPEX budget. The other is a subscription license, supported with periodic payments from the OPEX budget.

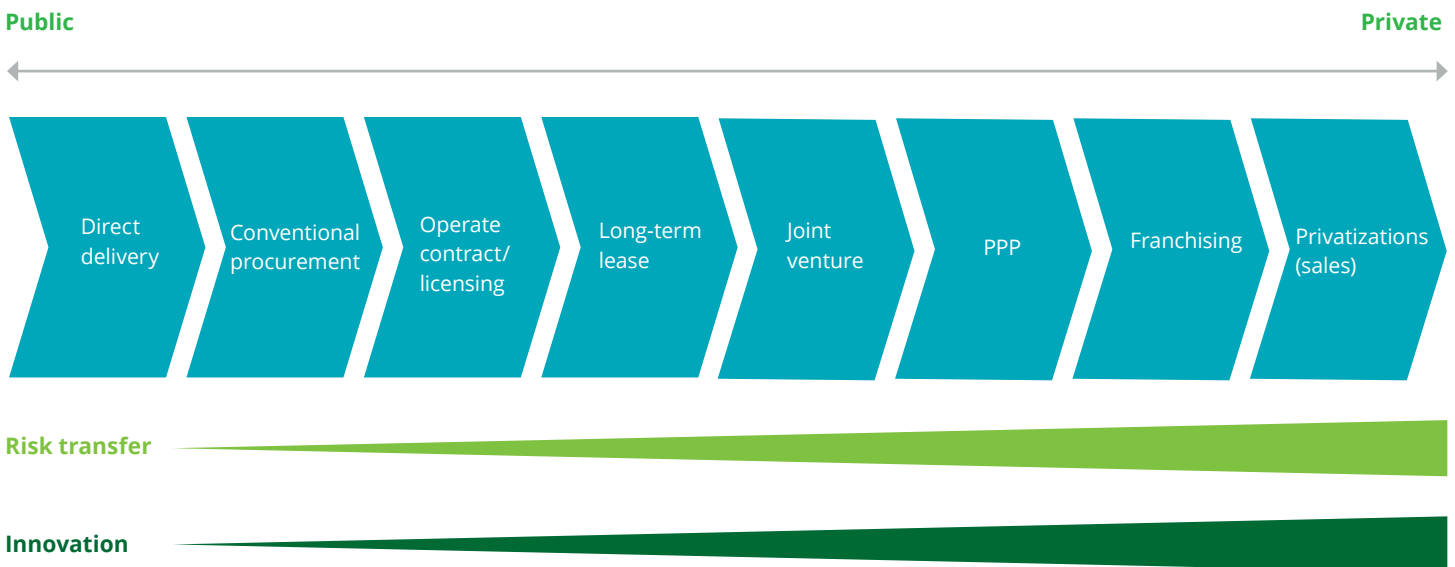
Long-Term Lease: Leasing property or equipment, rather than buying, provides flexibility and reduces up-front costs.

Joint Venture (JV): In this Private Sector Participation (PSP) model, the public sector joins with the private sector to jointly deliver a service/asset in an effort to utilize the best of each party. In many cases, this structure is utilized by the public sector to involve itself in a project (often) without providing funding; however, it can make an asset available for use to the JV.

Public-Private Partnership (PPP): Under this structure, the government contracts with the private sector (usually long term) for the provision of a service. The delivery of the service may involve the construction of a related and underlying asset; however, payment is made based on performance and availability of the service. By the use of risk transfer, the public sector pushes manageable risks to the private sector to deliver value for money.

Privatization: This is where the private sector is fully responsible for the design, delivery, and operation of projects that provide (or previously provided) a public service. The public sector has no direct control over these entities except for legislation and regulation. In certain cases, these project services may have been provided by government, and the private sector may acquire the project/asset for consideration.

Franchising: An agreement to operate government-owned assets on a commercial basis to generate returns (e.g., rail operator contracts where government supplies the rail infrastructure).



While the smart cities movement offers exciting new opportunities for governments, their citizens, and businesses, finding the money to support such products or services can be a complex undertaking. When government officials understand the full range of options for funding, financing, and procurement; analyze the advantages of each; and choose strategies that best fit their situation, they can vastly increase the odds that their smart city initiative will succeed.

Conclusion



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