ICED Evidence Library

Frontier Technology solutions for improved urban and infrastructure governance

Tags: Employment, Jobs, Youth, Digital, Infrastructure, Urban

ICED
Infrastructure & Cities
for Economic Development

Using industry research along with professional experiences, ICED designed this toolkit to explore the application, benefits, use cases and foundational dependencies for the eight frontier technologies by sector . Creating a powerful snapshot of these technologies in a contextualized fashion so that DFID programme managers can understand and see the versatility of these frontier technologies. The tool should be used in conjunction with the ICED Digital Benchmarking tool, which containis indicators and qualitative questions exploring country's readiness for digital and frontier technology adoption. For more information on improving the use of digital solutions in programming please consult the ICED website or contact ICED programming.

Technology	Internet of Things	Blockchain	Big Data Analytics	Artificial Intelligence	3D Printing	Digital Financial Services	Online Marketplaces	UAVs
	Internet of Things (IoT): Loosely defined as the ""infrastructure of the connected society"", IoT represents the networking of physical devices, vehicles, buildings, and other items embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data	*A digital ledger in which transactions made in bitcoin or another cryptocurrency are recorded chronologically and publicly.*	*The process of examining large and varied (structured or unstructured) data sets -- i.e., big data -- to uncover hidden patterns, unknown correlations, market trends, customer preferences and other useful information that can help organizations make more-informed business decisions*	*The theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.*	*The action or process of making a physical object from a three-dimensional digital model, typically by laying down many thin layers of a material in succession.*	*Using digital technology to improve access to payments, savings, credit products and other financial services.*	*Establishing a virtual platform where users can transact goods and services digitally.*	*An aircraft piloted by remote control or onboard computers.*
Application & Benefits	· Use sensors, improve waste management infrastructure to streamline public garbage collection and water management · Use location based services for civic participation – report damage to roads, etc. and give city planners insights into usage of public roads · Improve disaster reponse to flood, earthquake, fire etc through sensor networks e.g. smart fire alarms, or river monitoring systems · Smart heating and cooling in public buildings based on preset preferences · Smart ID cards for electoral	· Through blockchain encryption, establish or improve land title registry and intellectual property · Asset registry (vehicles, bicycles, etc.) · Improve integrity of elections through voter registry via blockchain	· Use data generated by citizens on the state of municipality services, improve quality of governement policies and services · Use data from aerial sensing, IoT etc to inform urban risk analysis and spatial planning · Formulate, improve and manage tax policy and administration	· Through artificial intelligence with chatbots, improve government capacity to address and serve citizens 24x7x365 · Apply artificial intelligence to update records and maintain databases in real time · Use artificial intelligence to manage budgets and disperse funds; will help identify and reduce fraud and graft		· Integrate digital financial services with government aid to disperse government to person payments · Use digital financial services to improve revenue collection, and reduce corruption	· Provide online marketplace for comparison of fees and quality of urban services e.g. waste collection, energy provision etc · Support online localised jobs marketplaces to reduce unemployment / improve skills matching	· Use unmanned aerial vehicles to improve the quality and integrity of maps across hard to reach geographies and dense urban areas · Evaluate the quality of transportation infrastructure through UAV surveillance · From maps developed, formalize addresses to construct tax systems
Rest of World Project Examples	Songdo, South Korea, the first of its kind fully equipped and wired smart city	Bitland Real Estate Land Title Registration	Tax policy and administration in Brazil and China: ERP systems rolled-out across national and local govt (accounting, planning/reporting)	Singapore Government Chatbot	N/A	Electronic G2P Payments in Brazil, Mexico, Colombia, and South Africa: GIS-based cashless local gov't revenue collection and information system piloted in 8	UK .GOV digitalmarketplace	24 hr Drone police units piloted in the UK; Ramia Huria - using drones to map Stone Town in Zanzibar and Dar es Salaam

Foundational Considerations

Reliable Broadband Networks								
Affordable Devices and Data								
IT Capacity and Skills								
Digital Literacy and Use								
Digital Payments Infrastructure								
Availability of Capital								
Labour Market								
Ecosystem Policy & Regulation								
Reliable Energy Infrastructure								
Reliable Transportation and Logistics Infrastructure								