

Leveraging Advanced (Information) Technologies in Designing Smart Cities – Algiers Smart City Approach

Algiers Smart City Project

Abstract

Algiers Smart City has embarked into developing and implementing a Smart City strategy, with a clear focus on leveraging technology advancements in designing new solutions that optimize the city operations and services to its residents. The goal is to take into account all the technology evolutions impacting the city, across the board. A specific focus has been laid around Information and Internet technologies, as it is the common denominator that affects every other Smart City aspect, and the condition sine qua non for the success of such projects. This paper addresses three aspects: How Algiers Smart City approaches technology evolution models, the main challenges in integrating such evolution into Algiers Smart City designs and the approach Algiers is taking to address these identified challenges.

Algiers Smart City – Anticipating information technology evolution

Technology innovation, and specifically information technology innovation, will have a major impact on how smart cities are built and designed. Clearly, this applies to all technology sectors within the Smart City environment, such as urbanism, architecture, energy, transportation, security, etc. but apply specifically to information and internet technologies, that are becoming a fundamental component across all aspects of smart cities, and impact all the verticals such as transportation, energy, water, tourism, etc. As such, we would like to emphasize how Algiers Smart City sees the evolution of information technology, the challenges in integrating such evolution into Algiers smart city design and developing a model on how to address these challenges.

Which technologies to focus on and integrate into Smart Cities design is function of what we anticipate in terms of technology evolution over the next 5-10 years, and beyond. So the first question is for Algiers Smart City to grasp such evolution and define an information technology leverage strategy based on that. We see 3 factors affecting technology evolution impacting Smart Cities design

First is the the information technology disruption dimension: Besides the quasi certainty of the speed increases and latency reduction that come with next generation internet and mobile technologies, a number of other technologies are coming to market, and have the potential of significantly changing how data is exchanged over the Internet. A new generation of peer-to-peer communication models, and mobile edge computing using distributed networks has the potential of shifting the economics of content distribution by lowering its costs. A new generation of satellite communications, drone based communications, and shared wireless spectrum models have the potential of making the economics of delivering internet connectivity, to rural regions, in disaster recovery situations and in the developing world way more viable. Technologies such AI will likely push the bar as far as automation and efficiency models and open up the door to new computer human interfaces. Technologies such as blockchain will likely make it viable to deploy applications with very different business models, with probably unforeseen consequences.

Second is the mass-market applications and business models: It is hard to imagine life today without global platforms for e-commerce, social networking, cloud, messaging, shared transport, etc. New platforms will develop over the next couple of decades. VR/AR will certainly evolve, Vehicular technologies and autonomous vehicles will progressively make it to market, starting with niche applications and into mainstream. The existing generation of Internet of Things applications, will benefit from the evolution of embedded computing and chipsets progress, to the point where various instantiations of human as a network interface, will become possible. Applications will spawn very diverse areas from advanced health monitoring and diagnostics to highly efficient self-sustaining smart cities

Third is the regulatory, government and business models angle: The next couple of decades will see an acceleration of what we are already seeing - a direct correlation between the Internet maturity of ecosystems and the society's economic development. This will bring to the spotlight various country specific policies with goals of enhancing their competitiveness. Some would do by pushing public policies to speed up the deployment of Internet based applications, others by favoring their local technology ecosystem, and as such, pushing to market specific technology standards and application development models. It is likely that policy makers will compete at exploiting the emerging leapfrog technologies, such as blockchain and AI, in order to benefit their own ecosystems. Such policies could significantly alter the roadmap one foresees today, as well as drastically shift leadership positions as far as who drives what where and when.

Given all these aspects, Algiers Smart City's strategy has focused on mapping the evolution of information technologies into a clear value proposition for Algiers, and ensuring that investments will be based on a clear understanding of new business and return on investment models enabled by these technologies.

Algiers Smart City – Identifying the fundamental challenges

Anticipating technology evolution is the first step, prior to putting a plan on how to integrate them into Smart City solutions. Doing so brings up its own challenges, and this is what Algiers Smart city has focused on identifying and addressing.

In fact, cities are determined to exploit technology to improve operational efficiency and the life of citizens, yet technology development was at the forefront of challenges facing these cities. Technologies are coming on market at a fast rate that is challenging even for technology ecosystem players themselves to decide on which technology to back. This challenge can only be amplified for cities. The proliferation and fragmentation of technologies each with different go-to-market strategy presents a complex mix of choices for cities to choose from.

The leading Internet and cloud companies, who are driving innovation in information technology, follow a different model of developing and deploying technologies that makes it difficult for the rest of the industry to absorb and adopt. Smart city organizations experience an even more exasperated challenge in doing so as the rapid evolution of Information Technology exceeds their ability to assimilate knowledge, make decisions, plan, design and deploy a particular technology at scale. This results in strong competition between multiple technology camps and little stability.

Leaps in technology are not only moving at a rapid pace, they are also increasing in complexity requiring very sophisticated skills that come at high cost. In fact, commercial entities have been battling to acquire those rare skillsets, making it harder for government organizations of smart cities to achieve the same. The reliance of modern technologies accentuates the need for skills in software that many cities either don't possess, or find hard to attract.

Cities plan over the long term and expectation for mature technologies and validated business case. Modern technologies have a short lifespan relative to what cities seek. Often, the business case is not validated for wide scale deployment. Validating the return on investment is a time-consuming activity. Moreover, the organizational structure of cities, the decision-making cycle, the process of evaluation and deployment is slow to assimilate complex modern technologies that cut across vertical silos around which city functions have developed.

Addressing the challenges: The Algiers Smart City Approach

How can cities address this challenge? The leading 5 strategies that Algiers Smart City is considering include:

- 1- Startups involvement: develop engagement models that allow startups and innovative companies to participate in smart city solutions. This includes defining a startup-friendly deal-flow and procurement process and encouraging compatibility of startup solutions with those from larger solution providers.

2- Global view: Bridge from a local perspective into a global perspective by optimizing the learnings from other cities, primarily those related to technical solutions. There are multiple approaches to achieve this objective, with one of the most relevant being establishing a task force to review and analyze results of select technology deployments in global cities.

3- Link to leading technology players: Bridge into globally leading technology players that have a fair control over technologies central to smart cities. Primary approaches include providing incentives to global players to dedicate resources to smart cities experimentation models and enacting favorable regulations for such players, for example, related to wireless frequencies, data privacy, drones, etc.

4- High-end talent: to bridge the divide between new technologies and their implementation timelines is key ultimately requires building capable technology teams. This could be achieved as a federated exercise across cities where the pool of resources is shared along with returns.

5- Focus on leveraging leapfrog technologies: the rapid pace of technology evolution, has led to the emerging of primarily open source technologies, that are readily accessible. They are mostly designed by lead technology players that have little interest in depending on older legacy technologies. Such leapfrog technologies, in the areas of artificial intelligence, blockchains, alternative wireless Internet access, among others, can be optimally leveraged in Smart City designs, to ensure an optimal return on investment.

Based on these learning and various global smart city initiatives, we crafted a specific Smart City design for the city of Algiers, tailored to the specific local ecosystem, adapted based on a number of factors such as size, location, governance structure, economic conditions and other factors. The strategy builds on the 5 building blocks listed above.

This Smart City deployment strategy for Algiers will continue to evolve, but there's one fundamental goal that we aim to achieve: It is the integration of specialized technology experts within the smart city organization, and optimally address the cascading technology trap.

Conclusion

The evolution towards smart cities has primarily been synonymous with leveraging new information and data management solutions to optimize operations and offer important services to citizens. Such solutions are evolving rapidly with successive technologies coming into the market faster than cities, and even technology companies, can absorb and leverage. This technology adoption dilemma is at the forefront of challenges for cities determined to implement their progressive vision of smart city solutions. In response, leading cities developed different models to address this challenge. Algiers Smart City put together a tailored Smart City design and deployment plan for the city of Algiers and its residents, and described its fundamental building blocks.