Machina Research

Research Note

Three routes to the Smart City: Anchor, Beta, Platform

Jeremy Green, Principal Analyst

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The issue	This Research Note describes three different road maps that cities have adopted in their journeys to becoming 'smart cities'. It examines the reasons why cities might pick a particular route and points out the advantages and disadvantages of each approach.
Our view	In the absence of mature standards cities must of necessity pursue a provisional road-map to becoming smart. There several different ways of doing this; we have identified 'Anchor', 'Platform' and 'Beta' strategies. Which one suits any particular city will depend on context, resources and priorities. In the longer term the platform route will probably emerge as the dominant approach, but cities may take some time to get there, with many opportunities to explore solutions, business models and technologies along the way.
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Companies	None

1 Smart cities are not here yet

Reading the blogs, news articles and conference reports, it would be easy to conclude that the smart city was already here. There seem to be so many systems being rolled out, and so many ways in which city governments are making clever uses of IoT and other technologies to improve the lives of their citizens and the efficiency of their own municipal operations.

The reality is a little different. Not many smart city applications are fully deployed, operational, costed and budgeted solutions. Machina Research has just carried out a major study[1].of smart city

[1] The full report, which was sponsored by Nokia, was published as 'The Smart City Playbook'. See https://pages.nokia.com/2170.What.Are.Cities.Doing.to.Be.Smart.html

deployments around the world. We looked at 22 cities and evaluated the maturity of their applications and their plans across a number of different domains.

Some cities have deployed one or more smart applications, often in isolation from each other, but this falls far short of the vision of a fully integrated city described by the supply side. Others have announced application platforms capable of supporting and integrating multiple applications, but then have not deployed many working applications on them.

Many of the reports about smart city deployments turn out to be about pilots, though this is not always clear. We were somewhat surprised to find that San Francisco's much heralded smart parking scheme, SFPark is a pilot[2], and one that has not been taken to full deployment for want of a business model to justify the investment. This is despite evaluations which show that the technology works and has achieved its declared objectives.

In addition, the term 'pilot' actually covers a wide range of different kinds of implementation, from small-scale proof of concept demonstrations, through 'Living Lab'[3] action research and development in a live environment, to full-scale tests of business viability. In some cases the pilot has been completed and the evaluation carried out, but the implementation continues to be cited elsewhere as if it were an operational deployment.

2 Moving from pilot to full deployment is a key challenge for smart cities

The difficulty of moving from pilot to full deployment has been discussed at some length in the smart city literature. There is a particularly good account in "Financing models for smart cities" by an EU Smart Cities Stakeholder Platform Finance Working Group, which sets out the reasons why it is so hard for projects to cross what it calls 'the valley of death'[4].

These include:

- Perception of high risk when investing in innovative solutions and energy efficiency measures;
- Uncertain energy price policies and uncertainty about fossil fuel prices;
- Large volumes of investment required;
- Long-term delays before reaching maturity/profitability;
- Limited capacity for public funding: high public deficits in municipalities and incapacity to raise funding from capital markets.

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[2] https://people.ucsc.edu/~adammb/publications/Millard-Ball_Weinberger_Hampshire_2014_Assessing_the_impacts_SFPark.pdf

[3] See http://www.openlivinglabs.eu/ and http://cities.media.mit.edu/ for a discussion of Living Labs.

[4] https://eu-smartcities.eu/sites/all/files/Guideline-%20Financing%20Models%20for%20smart%20cities-january.pdf

The plethora of pilots is not really that surprising. It is to be expected that some solutions will be trialled and then found wanting; that is, after all, the point of doing pilots.

In cities, though, there are specific difficulties with moving from pilot to full deployment, even where the technology works and delivers the expected benefit. In some cases, this is because that benefit does not translate into an ROI that can justify rollout; a smart parking scheme, for example, might reduce the amount of traffic congestion in the city centre but lead to a decline in revenues from fees and fines. This is exactly what seems to have happened in the case of San Francisco, where the smart parking implementation was successful in reducing 'cruising time' spent looking for parking but did not pay for itself. The UK city of Birmingham similarly found that its smart parking trial did not provide a business justification for deployment. In other words, for some smart city applications, the benefit can be quantified but only makes sense if they form part of an overall vision for the city.

In other cases, there is an ROI that would justify roll-out, but no long-term budget that can support the investment. Here vendor financing, public private partnerships and central government financing may all have important roles to play. It bears saying, however, that the nature of funding to date has encouraged a landscape dominated by sub-scale pilots. Funding organisations are happy to enable such pilots and report them in their portfolios[5]; funding for full rollouts is rarely available.

3 Three different routes to becoming smarter for cities

The prevalence of pilots has led us to identify at least three routes towards a mature smart city:

- An 'anchor' route, in which the city adds working applications in series. Here a city has a clear and pressing need for its 'anchor' application, to which others are then added as priorities dictate.
- A 'platform' route, in which the city focuses on deploying infrastructure first so that a number of applications can be delivered later
- A 'beta city' route, in which the city continues to experiment with multiple applications without a finalised plan for how to bring these pilots to full operational deployment. Beta cities accept that the currently available technologies and business models can only be provisional and prioritise hands-on experience over short-term or medium-term tangible benefits.

These advantages and disadvantages of each of these routes are illustrated below in Figure 1.

[5] It has been suggested to us, informally and 'off the record' that this is a particular issue in the EU, where multiple smart city and IoT programs are oriented towards ensuring a 'fair' distribution of research funding across European institutions and universities rather than avoiding duplication of effort and promoting specific centres of excellence.

Figure 1: Advantages and Disadvantages of Smart City Routes

	Anchor	Platform	Beta
+	• Short path to deployment • Concrete gains and easy to evaluate ROI • Use case driven	• Synergies between applications are possible • Smooth path to integration • Future flexibility • Can engage third parties via APIs and open data • Capabilities and performance "by design"	• Engagement with citizens and politicians • Access to funding for trials and research • Easy involvement of start-ups and small innovative companies • Opportunity to use many tools including consumer-grade internet applications (e.g. Twitter, WeChat)
-	• Future integration can be hard • Absence of synergies between applications	• Absence of mature standards can make specification and choice hard • Risk of lock-in • Upfront investment without initial RoI from applications	• Hard to go beyond pilot and achieve operational deployment • Diffusion of focus

Few cities are pursuing an absolutely pure form of one of these routes. Most have something of more than one route; either they are hedging their bets, or are in the process of shifting from one route to another. Several are at such an early stage that they have not yet settled down into one route or another.

- Examples of 'Anchor Cities' include Mexico City and São Paulo (though the latter shows some characteristics of a 'Beta City', and Barcelona and Shanghai (both of which show some signs of swapping to the 'Platform City' route).
- Bristol, Paris and Vienna are all good examples of 'Beta Cities'.
- Singapore is the best example of a 'Platform City'; Auckland, which is in a very early stage of its smart city journey, shows signs of becoming one.

4 Conclusions and recommendations

Machina Research makes the following conclusions and recommendations:

- **We do not believe that one of these three routes is the 'right' answer, at least for the moment.** Each has something to recommend it, and which one fits best will depend on the city's resources, issues, and priorities. A 'beta' approach may deliver more visible 'easy wins' quickly. An 'anchor' approach might be absolutely determined by a single issue, such as preparations for earthquakes, which dwarfs all others. A 'platform' approach may prove more 'future-proof' for a city with a clear vision and the expectation of a budget to support future application roll-outs.

- **Vendors, service providers and other potential partners will serve their city customers better if they understand which route they are pursuing.** Some suppliers are backing off from smart cities in the belief that the market is immature and the customers are not ready; others believe they can achieve first mover advantages by getting in to the market early and winning early adopter customers. Both misread the situation. The smart cities market is an evolving space. In the absence of mature standards or agreed business models there are few advantages to committing to a fully elaborated road map. Despite some speculation to the contrary, cities do not compete with each other very much, and there are many risks and few benefits from being an early mover. Smart vendors will enable their city customers to engage despite this, offering them ways to experiment and learn through pilots and platforms with a strong 'open' flavour.
- **In the long term the 'platform' route will probably predominate.** There is some evidence of this in the way that those cities who have pursed one of the other approaches are edging towards adopting a platform. But this does not mean it is wrong to pursue the other approaches for the present. Nor does it mean that cities will necessarily end up with a single application platform. It may make sense for architectural reasons, or to preserve vendor-independence, to maintain more than one application platform.

5 Further Reading

Machina Research recommends the following further reading:

'Bristol: a smart city based on its own network infrastructure and many parallel pilots' (December, 2016)

'Auckland: a city preparing for its journey towards smartness' (December, 2016)

'Bangkok: a global city with acute and chronic problems, and a modest smart city program' (December, 2016)

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