Governance and Economics of Smart Cities: opportunities and challenges

PB Anand[1] and Julio Navío-Marco[2]

Summary

This editorial introduction to this special issue provides an overview and a conceptual framework of governance and economics of smart cities. We begin with a discussion of the background to smart cities and then it focuses on the key challenges for consideration in smart city economics. Here it is argued that there are four dimensions to smart city economics: the first is regarding the scale of global market for smart cities; the second issue concerns data to be used for smart city projects; the third concerns market competition and structure and the fourth concerns the impact on local economy. Likewise, smart city governance framework has to be considered a layered and multi-level concept focusing on issues of transparency and accountability to the citizens.

Key words: Smart cities, governance, economics, smart governance, financing

Introduction

[1] Reader in Environmental Economics and Public Policy, University of Bradford. Email: p.b.anand@bradford.ac.uk

[2] Professor of Business Management, UNED, Spain email: jnavio@cee.uned.es

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A search on Google Trends suggests that worldwide interest in smart cities significantly increased since 2013 making 'smart' the most popular adjective of cities in comparison with others such as sustainable, healthy, livable, green and resilient. The idea of smart cities changed significantly since the original (and narrow) usage in the first half of the first decade of the twenty first century combining ICT, digital usages and citizen participation and navigating a complex system of governance involving local administrations, public agencies, firms, citizens and communities. Popularity comes with a price and in this case, it is about expectations from citizens and the tendency to over use the rhetoric of smartness at times without appropriate strategic planning insights and at others missing the opportunities for using smart technologies to solve the real problems that matter to the citizens and instead solving some trivial non-problems. Inadequately conceived approaches of the past also contributed to over-investment in projects that are taking long time with limited results to show for in the medium term. Optimism bias so common in public projects may also have contributed to the over-sell of smart cities. Thus, the present generation of smart cities are facing several challenges such us legitimacy, confidence of citizens, financing, regulation, governance and there is an urgent need to develop new solutions based on successful and effective collaboration between citizens, agents, and institutions using innovative, sustainable and inclusive business models and policies. Some challenges of smart cities are common irrespective of the context: what can smartness bring to the management of infrastructure and public services; how to generate, collect meaningful data and how to analyse such data; how to ensure data security; how to ensure privacy of citizens; how to develop a system architecture that can communicate with a wide range of other systems and stakeholders and so on. Many other challenges faced by smart cities in different contexts will be different (such as how to deal with digital divide and inequality; who will pay for the smart city system and how; how does a smart city project other existing priority policies and investments) so it is important that innovations address both general as well as context-specific challenges.

The smart city concept is evolving and still subjected to a strong debate (Caragliu, Del Bo, & Nijkamp, 2011) and the issues raised by Hollands (2008) appear even more relevant today. As Soderstrom (2014) highlighted until recently the paradigm of smart cities has been used as

brand, a vehicle for corporate positioning and market capture and technocratic reductionism (of reducing complex social and technical problems into data to be analysed). As Picon (2018) notes, smart cities appear to give importance to occurrences, events and scenarios thus giving more importance to image and imagery rather than the reality of the place and people. Events can gain and lose prominence based on what is trending while underlying infrastructures and relationships between social and technical worlds can often take much longer. This fixation on image and trending can lead to significant bias in superficial 'fixing' of problems rather than solving the underlying issues and challenges. While many critics of smart cities focus on the specific construct of the concept or specific ways in which technology is being applied for solving social problems, others focus on ways to measure smartness through the development of indicators. In our view, the more relevant need is to critically examine the evolution of "intelligence in cities" and the ways in which policies and models are being blended and crafted to suit new contexts and the potential role they can play in enhancing citizen participation and enhance well-being.

Smart cities are at the interface between social and technological dimensions. However, much of the discussion has been dominated from the technological dimension mainly due to the initial lead role by corporate organisations such as IBM, CISCO, Intel and more recently by GE, Microsoft, Oracle, and Amazon. These initiatives tend to focus on the development of cloud based platforms and solutions for smart city projects. The role of technology has been key for the enablement of new production, distribution and governance processes; the transformation of organizational and institutional arrangements; and the information of individual choices and behaviors. (Ferro et al., 2013). Technically, a wide array of previous research on IT initiatives and projects has highlighted these issues as important success factors or major challenges (Vasseur, 2010; Gil-García & Pardo, 2005) leaving open a big area of debate and research as a major challenge is to fit the role of the technology, its importance, benefit and disadvantages in an environment that should been human-centric.

Technologically, the combination of several socio-technical innovations such as Internet of Things (IoT), mobile Internet access, smartphones, data analytics, open data initiatives, and

sharing economy models among other, gives room to interesting models where citizens collaborate in the provision of the services regardless of governments and local authorities and open relevant avenues of research.

While technology is an important ingredient of smart cities, there is an evolutionary change and almost all successful smart cities owe their success to clever blend of policy innovation, leadership and building collaborations. While technology remains a necessary but underlying common ground it is the creation of space for innovation and citizen participation in solving urban problems that real successes in cities such as Amsterdam, Barcelona and New York appear to lie. Therefore, defining appropriate policies and engaging citizens are key to the success of smart city initiatives and and to promote the construction of the new digital citizenship that is inclusive, transparent and open.

Smart city economics

At the global level, it is possible to see smart cities as indicators of neoclassical globalization and the next step in the evolution of 'new public management' philosophy where urban problems are converted into opportunities for corporate investment and profiteering. Thus, the spaces previously occupied mainly by local government institutions are opened up for involvement of new corporate actors. Estimates such as those by Grand View Research (2018) that the global market size of smart cities is about US dollars 550 billion in 2016 and projected to increase to US dollars 2.57 trillion by 2025 are indicative of this trend to see smart cities mainly as investment opportunities for digital technologies. Who benefits from these market opportunities, how the benefits are harvested and distributed are hugely important questions. In general, public trust in multi-national corporations has been declining especially in the light of the use of personal information by social media companies to target political campaigns and potentially affect the functioning of liberal democracies themselves.

The second aspect of economics of smart cities is about what kind of data and approaches should cities use in selecting between different smart city projects and interventions. In ideal circumstances, smart city projects are no different to other public infrastructure projects and thus should be subject to cost benefit analysis. Presently there is limited guidance or literature

on this (though there is some literature on economic appraisal of smart grid systems). However, valuing benefits from smart city interventions such as cloud platforms or building knowledge hubs can be a little bit challenging due to the lack of clarity on how to value something which is presently hidden from ultimate users. There is scope for developing and adapting valuation methods including those such as the survey-based contingent valuation method in some cases and perhaps qualitative and deliberative methods in other cases.

A third aspect is how cities can use an understanding of markets and competition to achieve good value for money in smart city project. This is the aspect that is most problematic due to the dominance of few large players in the smart city market and conceiving and presenting smart city project as a composite basket of various products. Such an approach favours monopolistic competition and cities especially in the Global South may find it difficult to unpack the different elements and negotiate a good deal for the city that delivers overall value for money for the city. Regulatory institutions needed to manage such a market also have not yet fully evolved. At present telecommunications regulators whose jurisdiction includes digital, mobile and broadband services are acting as de facto regulators for smart cities if at all.

A fourth aspect is in terms of how a smart city project can enhance or boost the strengths of the local economy and help the city to overcome the challenges such as youth unemployment or lack of skills among a section of the adult population or hurdles to innovation and business enterprise growth and sustainability. Many of these are deep social and economic issues and a smart city project can hardly be a quick fix but the real smart cities are those that are able to leverage technological and informational advantages to kickstart inclusive economic growth. This requires an innovation ecosystem approach with the involvement of a wide number of institutions and agents.

Financing and Business models as key issues

Besides the promising forecasts for Smart City market, many projects haven't taken off due to financial restrictions or unsustainable business models. There is an urgent need to build a

holistic framework to analyze all business models included in the Smart City (Agudo-Peregrina & Navio-Marco, 2016). As a matter of fact, the studies that analyze the business models in the context of Smart City refer mainly to e-government services (e,g. Anthopoulos & Fitsilis, 2015; Kuk & Janssen, 2011; Molinari, 2012; Walravens, 2015), while there is a large amount of dispersed studies that just focus on business models for specific applications within Smart City: e.g. smart mobility (Abdelkafi, Makhotin, & Posselt, 2013) or smart energy (Vincenzo & Fulli, 2012).

There is a need to expand this framework beyond traditional expensive and unsustainable public infrastructures to provide e-services, towards an open and wide paradigm that includes multiple applications, agents, and technological and social innovations (Saunders & Baeck, 2015) that can set the ground for sustainable financial models.

Smart Governance challenges

Chairobi et al (2012) established different factors included in the governance; each constitute real challenge in the successful deployment of the smart city´s governance. Almost all approaches to developing indicators for smart cities include smart governance as an important dimension. For example, the European Smart City index (Giffinger et al, 2008) includes smart governance as one of the six dimensions (others being: smart environment, smart mobility, smart living, smart people, smart economy). This dimension of smart cities includes: participation in public life, public and social services and transparent governance. The CITYkeys (2017) indicators include governance as one of the five dimensions (others being: people, planet, prosperity, and propagation). The governance dimension here includes: organisation, community involvement and multi-level governance. The key performance indicators for smart cities developed by United For Smart Sustainable Cities (U4SSC, 2017) do not specifically include governance dimension but governance aspects are included in some indicators within the three main dimensions (economy, environment, society and culture dimensions). For example, traffic monitoring, e-government, open data, urban development and spatial planning are included in economy dimension; Gini coefficient, voter participation and emergency service response time

are included in the society and culture dimension. The governance challenges of smart cities are many and at one level these include issues of digital inclusion, inclusive delivery of public services, new forms of participation in the decision-making or transparent governance, among others. In the context of cities in the Global South, in addition the governance challenges can include how to situate or locate smart city projects within a legitimate city-wide economic and spatial planning process that is open, transparent and accountable. Size matters both in terms of the nature of challenges being different depending on the size of the city but also in terms of the scale of smartness being envisaged. There is no way a mega-city of more than ten million people can aspire to transform itself into a smart city overnight. The challenge is whether to do some for all (meaning deliver an aspect of smart city for the whole metropolitan area) or all for some (meaning deliver all dimensions of smart city for a small area within the metropolis. Both models have their own shortcomings. The first approach means resources are spread too thinly and also that it can take a long time to cover the four or five dimensions and thus it can become a very long time horizon project. This can also lead to disenchantment even disillusion with smart city due to the seemingly slow progress. The second approach can be good as a demonstration project but the inherent assumption that the demonstration effect will attract similar investment to the rest of the city areas is problematic. Also focusing on one small area then exacerbates inequality and the benefit of smart city investment will be mainly captured by real estate price appreciation for the smart city location and adjoining areas only.

Beyond the conceptualization of the smart governance and the elements that are involved, and the implementation strategies, it is especially relevant to highlight the aspired outcomes of the smart governance that involves (Bolivar & Meijer, 2016) changes to the e-government organization, changes in the position of government vis-à-vis other urban actors and improvements to the city. These authors identify nine aspired outcomes from the smart governance that can represent real challenges: economic performance, citizen-centric services, social exclusion, ecological performance, e-government interaction, city branding, efficient government, integral vision and collaborative governance.

The most specific aspect is probably the interaction with the citizenship and the centrality of the citizen in the definition and implementation of any action in the smart city context. A city "smartness" is meaningless unless it is rooted on citizens´ participation.

Beyond Smart Governance

Going beyond the smart governance concept, it could be relevant to understand the role of the smart cities networks governance in the smart cities success, as the organization in networks is an emergent phenomenon in the smart cities environment, with clear managerial and economic implications, and the particularities of the interactions between different levels of governments (Landsbergen & Wolken, 2001). There are also challenges related to a more general institutional framework and the policy environment, in which government organizations operate and how public accountability especially for public financial resources is embedded in smart city frameworks.

There are also concerns of whether a focus on smart cities will contribute to widening the already existing spatial inequalities (Sujarwoto and Tampubolon, 2016). From a political economy perspective, it is possible to argue that in a context where access to control of governance institutions is unequally distributed there will be conflicts and smart city agendas will be captured by those in power for their own advantage. It is beyond the scope of this editorial to propose a new framework but we can envisage a smart governance framework with four layers and inter-connected domain areas. The layers include governance of the network of cities (perhaps best pioneered through international organisations such as the ITU or IEEE); connecting national and provincial governance with smart city governance; the third being the city-wide governance and the fourth being smart city market governance (in terms of competition, market structure, pricing and regulation). A single organisation or entity cannot deliver all aspects of smart city governance and therefore collaborative governance is crucial. However, anyone who has worked on metropolitan institutional space is well aware that achieving collaboration in a context of institutional ownership and turfwars is not at all easy. A

related dimension is how smart city governance is made accountable to the citizens that such a smart city is supposed to deliver its services to in the first place.

These topics are the motivation in conceiving this special issue to focus several issues on governance and economic of smart cities. It includes different experiences and countries (China, Japan, Ghana, India, Spain, Vietnam or Korea) showing different challenges, approachesand degrees of progress. We can find meaningful comparisons for the debates about China-Western countries and urban/rural: "A Comparison of Selected Western and Chinese Smart Governance: The Application of ICT in Governmental Management, Participation and Collaboration" or "Examining linkages between Smart Villages and Smart Cities: Learning from rural youth accessing the internet in India", a relevant case from Japan in the agri sector "Induced Effects of Smart Food/Agri-Systems in Japan: Towards a Structural Analysis of Information Technology", or different views of how to develop smart cities in countries in development in   "The nexus between transport and telecommunication in Ghana " and "Promoting smart cities in developing countries: Policy insights from Vietnam". These papers explore important and to some extent under-researched areas of smart cities and the need to interpret the expression smart cities more widely as a development strategy issue and one that is relevant to public management and e-governance. It is easy to forget that e-government is the underlying infrastructure layer of sorts on which smart cities are built and thus in contexts where mobile and digital technologies have outpaced the evolution and reforms in governance systems there is a need for a catch up. Future issues related governance are also discussed: the future e-government (based on Korea's e-government practices) and the collaborative approach for smart city networks' governance, studying the pioneering Spanish smart city network. The special issue is completed with a citizen-centred big data analysis-driven governance intelligence framework for smart cities.

Issues for further research

Together these papers provide insights into a number of smart city governance and economic issues. However, this topic is emerging rapidly and there are a number of issues for further research. Here we identify as few of them by way of suggestion to fellow researchers to pursue.

While the work of ITU focus group and ITU-T Smart sustainable cities forums are creating a lot of awareness, there is a need to embed issues of digital inequalities as also inclusive agendas into these discussions at all levels. While at present many cities are beginning to recognise the multiple dimensions of Sustainable Development Goals and in particular hoe SDG11 on sustainable cities and communities is connected with a number of other SDGs, there is a need to identify the governance implications of and for smart cities in this regard. Third, the term cities can create a bias that attention is paid mainly to large human settlements whereas much of the future urban growth is being absorbed by cities and towns of all shapes and sizes. Thus, the expression 'smart city' should really encompass smart boroughs, smart towns, smart villages and smart hamlets. Fourth, there is a need to reconsider whether smartness can be perceived to be overemphasised and over-cooked in relation to cities and thus soon the term may be seen as being past sell by date. There is a need to move beyond smartness to intelligent, wise and inclusive cities and this takes a lot of institutional development and embedding human rights and freedoms in all dimensions.

In addition to the still open discussion on the definition and concept, we have to delve into how can smartness improve the management of the city, the generation and analysis of the data, security, to examine the evolution of "intelligence in cities" and the ways in which policies and models are being blended and crafted to suit new contexts, citizen participation, the role of the technology, economic implications and value creation, market and competition, impacts in local economies and local citizenship, disruptiveness and sustainability of the business models, smart governance challenges such us digital inclusion, inclusive delivery of public services, new forms of participation in the decision-making, transparent governance and the interaction with the citizenship and the centrality of the citizen. Finally, the dynamics of the nascent smart city network can also open new avenues of research.

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