Editorial

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1 Background to the call for papers

Across the globe, cities are being signposted as emergent platforms of open innovation. Under the pressures of a growing demand and economic restrains, a new breed of 'smart cities' is being heralded as looking towards such open innovation along with new technologies to provide better services and infrastructure which improve quality of life and incentivise local innovation. By embracing open data, new internet technologies, and sensors in transit, building and utilities infrastructures, cities are accessing real-time data

on everything from congestion and energy efficiency to crime and pollution. Opportunities for connecting people and places with things are proliferating and new open innovation systems are emerging as a result. A large number of high-profile EU programs in Europe have already recognised the importance of the 'smart city' and open innovation but their standing has risen immensely in the landscape created by the Future Internet and Internet of Things (ECa, n.d.a, n.d.b). For these are expected to form dense socio-physical interactions, connecting people, communities, and institutions, with technologies and infrastructure so enabling them to co-produce novel applications and services people and cities need.

Since 2010, through experimentally-driven research, more than 20 large-scale European programs have deployed smart city real-life piloting projects in over 60 cities across the continent. Through user-driven open innovation ecosystems, such as Living Labs, in urban areas and cross-border networks of cities, innovative open shared platforms have been created for smart cities services making use of information generated by users or captured from sensors, stimulating demand based on next generation access (NGA) networks (Stavdas, 2014). Industry and citizens have been encouraged to become more creative to develop: more sustainable socially-aware and intelligent sensing services, to support independent living and social interaction of elderly people; smart neighbourhoods where media-based social interaction occurs; smart streets and urban districts where new transportation and energy consumption behaviours develop; smart squares where civic decisions are taken; and smart museums and parks where natural and cultural heritage feed learning. As a result, city-led innovation ecosystems are occurring and emerging collaborative economy concepts such as crowdsourcing, big data, open data, open networks, and open government, are merging with the smart cities movement to create an interesting mashup, leading to new forms of open innovation ecosystems in urban environments (Cohen et al., 2017). A number of cities with multiple projects are already champions here – Milano, Manchester, Barcelona, Amsterdam, Berlin, Helsinki, Issy-les-Moulineaux, Malta, Athens, Bologna, Gent and Rome. Many others, large and small, have joined the club too – Tirgu Mures and Baia Mare in Romania, Aalborg and Arhus in Denmark, Joensuu and Oulu in Finland, Thermi, Lamia, Agkistri, Drama, Santorini and Zadar in Greece, Vitry sur Seine in France, Bremen, Tubingen, and Cologne in Germany, Malmö in Sweden, Palmela, Mouraria, and Lisbon in Portugal, Lazio, Rovereto, Trento, Genova, Velletri, Torino, and La Spezia in Italy, Wien in Austria, Dublin in Ireland, Majadahonda, Santander, Majorca, Sevilla, Zaragoza, Valladolid and Bilbao in Spain, London, Bristol, Birmingham, and Newcastle in the UK, and Istanbul and Gaziantep in Turkey. Many of these cities have claimed to have adopted co-production processes and structures to develop new public services. In the USA alone, more than 40 cities use open data portals to involve citizens and private firms use hackathons and open app competitions to encouraging civic entrepreneurs to develop services that improve quality of life (GovLab, 2013). Yet, we need to know more about the success of these initiatives. Now seems an apposite time to ask just how robust the evidence base is, emerging from all of this research endeavour, for what has and has not worked, particularly, for instance, in attempts to move 'co-production' in 'smart cities' from theory into established practice.

Smart city services research has witnessed the strategic and innovative use of information and communication technologies (ICTs) with the intention of providing citizens-centred public services that improve quality of life and the urban environment through collaborative processes. By now, governance-related challenges have been

identified as key to service co-production. But questions remain open about how to establish well-grounded approaches to governance that can be exploited to develop efficient citizens-centred smart city services (Draetta and Labarthe, 2010; Cleland et al, 2012; Pallot et al., 2010). A number of factors have already been identified as being critical, such as citizen participation and effective collaborative processes between the stakeholder (Odendaal, 2003; Paskaleva, 2011), leadership (Mooij, 2003; Lam, 2005), private-public partnerships (Giffinger et al., 2007) and governance infrastructure (Johnston and Hanssen, 2003) – the latter allowing for collaboration, data exchange, service integration and communication. In smart city open innovation eco-systems, such as the European Living Labs, 'governance' deals with the organisation of the innovation eco-system as a whole as well as the interactions between its constituent members, examples being the commitments and responsibilities of members, financial arrangements for joint infrastructures, as well as mutual arrangement in respect to using each other's technologies and services [Mulder et al., (2008), p.4]. Yet, there is something more happening in smart city governance. In a recent study on the challenges faced by co-production of smart city services, Paskaleva et al. (2015) found that engaging stakeholders effectively, and on a sustainable basis, is a critical factor that determines success or failure of such projects. Management skills are crucial here but the ability to cooperate amongst stakeholders, and the structure of alliances, leadership, and working under different jurisdictions, are key factors as well (Scholl et al., 2009). For city services are smart when the ICTs and Future Internet developments are successfully embedded in the networks urban society needs for them to not only generate the intelligence necessary for wealth creation but the principles and standards by which citizens and communities are engaged in the governance of such developments (Deakin, 2014). So the eco-systems which are capable of nurturing collaborative governance to create new value and construct the services that people need have to be subjected to critical examination and evaluated.

2 The search for evidence of what has worked

With this in mind, this special issue of *IJSTM* sought to encourage authors to consider co-production of services in the smart city in the context of governance. Aside from recognising the significant opportunities for many urban actors to enter this arena, with this special issue we aimed to uncover unique perspectives on the role of governance in smart cities as platforms for open innovation. We aimed to further the debate about smart city governance by focusing on stakeholder relations in the co-production of smart city services. To this end, we sought for empirical verification of successful governance for smart city services, especially where governance resulted not just from stakeholders' participation, as 'participatory governance' implies, but from their engagement as a long-term aspect of sustainability, and one that served as the main vehicle driving the process of service co-production in the smart city (Paskaleva et al., 2015). By offering critical insights about the evidence base currently available, we intended that the special issue would help to explain smart city services in terms of the actor networks, partnerships and collaborative environments and their relationships to the vital ecologies of the open innovation eco-systems, value creation and standards of collaborative governance regulating their development.

In short, reflecting on the state of the art of service governance and its implementation in co-production, the special issue would provide evidence to show what has worked or not in smart cities. Authors were asked to open up to critical scrutiny the Quadruple Helix Innovation model – and its underpinning assumption that in the smart city seamless interaction and mash-up of ideas are created through open innovation between government, industry, academia and citizens in innovation ecosystems (EC, 2014). We asked authors to provide evidence that the move – from the existing Triple Helix model of smart cities where networks are formed to use the intellectual capital of universities, wealth of industry and participatory governance of the democratic system to generate spaces where the informational basis of communication systems are exploited (Deakin, 2014) – is worth the additional effort and resources involved.

Accordingly, the overall objective of the special issue was to bring together state-of-the-art research on experience of governance in the production of smart city services and provide evidence of its practical application and the results arising from co-production. Authors were requested to provide evidence of both theoretical advances and effective implementation of smart city governance. We were looking for evidence that the governance approaches authors reported had delivered effective implementation of services and that this had been shown through robust evaluation. Contributions were sought to offer critical evaluations of what has already been achieved and what changes need to be made in future. So authors were invited to identify the success criteria needed for establishing the proven case for the governance approach adopted. This would be gauged through: co-production and delivery of services that meet the needs and desires of the citizens and the city; co-creation of sustainable value that improves quality of life and city environments through continuous iterative smart service development; and that builds effective and sustainable governance structures that supports trusts amongst partners and empowers them so they can jointly deliver the desired services. In short, the special issue was to be dedicated to providing evidence required to validate the paradigm shift to new models of governance seen as necessary to underpin collaborative, value-driven, and data-intensive co-production.

3   Subject coverage sought

Contributions from leading experts in the field of smart city governance, ICT services, and public service innovation were invited in the call for this special issue. The call welcomed empirical papers – both qualitative and quantitative – which were theoretically developmental and which signalled significantly progress that would help to add to the stock of lessons learnt about what does and what does not work in smart city service governance thereby contributing to smart city service research and practice. Hence, capturing the experience of reflective practitioners was considered as valuable as that of scholars. In short, as editors, we were especially interested in high-quality submissions that: were practice-based, reflective, critical and empirical; were not just theoretical but grounded in a robust evidence base; but that were also inspirational and predictive about future directions. The goal here was to collate a set of papers that, jointly, would advance our knowledge about the empirical or methodological means that could be used for studying and implementing governance for smart city services.

Contributions were invited to address the following research questions about smart cities as platforms for stakeholder engagement in service co-production: What can be learned from the growing number of actors involved in service co-production? How do smart cities scale their service innovations from one city to the next? What are the emerging smart city ecosystems that sustain governance? How do citizens and businesses engage with public entities for the co-production and delivery of collaborative services? How are multi-level governance models transforming from that of service providers to ecosystem managers and what are the associated implications for smart city strategy? How can established firms engage with urban innovation ecosystems to capitalise on the collaborative governance? What collaborative governance models exist for capitalising on open innovation eco-systems in smart cities? And what are the barriers and challenges for stakeholder engagement in the co-production of public services in smart cities?

A long list of possible contents for the special issue was identified.

- Using service co-production and innovation to foster collaborative governance in the smart city.

- Innovating and designing service systems, value networks, and ecosystems that enable sustainable co-production of smart city services.

- Using a bottom-up approach to understanding what people want, need and wish for aimed at identifying key service value drivers.

- New processes, lifecycles, and methods for service co-design and innovation and their governance foundations.

- Involving stakeholders through user-driven innovation and collaborative design and leveraging these processes with the desired outcomes.

- Leveraging technology with social innovation to design and innovate smart city services.

- Leveraging social media in government to enhance citizen engagement and citizen co-production of smart city services.

- The production and distribution of new governance processes, actors.

- The transformation of organisational and institutional arrangements.

- The influence on individual choices and behaviours.

- Effective management of large and heterogeneous smart city communities.

- Assessment of the impact in term of marginal value creation of smart city services governance models.

- How to increase the intelligence of urban communities to enable them engage in the co-production of smart city services.

- Measurement of good governance for smart city service innovation.

- Emerging Governance models of smart city service co-production and their impacts on future trends and processes in the smart city.

- Policy innovation perspectives on:
  1 connected co-productive intelligence
  2 the design of assessment frameworks aimed at evaluating cities' smartness both in terms of governance readiness and outcomes generated.

Accordingly, the call suggested that successful submissions should contain:

- Evidence of what has and has not worked.

- Articulation of the assessment regimes and success criteria needed to evaluate the efficacy of the governance approach.

- The theoretical underpinning and conceptual frameworks necessary for robust research designs for undertaking such evaluations.

- Specification of the stakeholders who need to be involved in such evaluation, the roles they will need to play, and the skill sets they need to operate effectively.

Given the wide ranging topic areas suggested regarding smart city service innovation and governance, we were hopeful that special issue would itself be highly cross disciplinary, transgressing both academic and practice boundaries.

4   The response to the call

Abstracts for potential papers were received from around the globe, from North America to South East Asia, from the Mediterranean to Scandinavia, and from Western across to Eastern Europe. Glimpses into the operation of smart city initiatives were offered in Austria, Belgium, Bulgaria, Canada, Finland, Greece, Italy, Norway, Spain, South Korea, Sweden, Thailand, the UK and the USA. Most prospective authors offered papers based on individual urban locations but a substantial fraction involved multiple case studies comparing what has happened in cities both within and between different countries – and this was echoed in the multi-national nature of the research teams often concerned. However, as the list of countries above testifies, most of the smart city initiatives on offer were those that have occurred in Europe, the majority of these with some form of funding from the European Union.

5   The selection process

Abstracts were selected on the basis of the fit of their topics with the call, the quality of their argumentation, research design and evidence base (to the extent that these were elaborated) and to maintain as wide a geographical spread as possible – in an attempt to reveal a rich picture of what is happening globally in the name of smart cities. In practice, once full draft papers were received, the most difficult of these selection criteria proved to be the strength of the evidence base offered, especially since the call had requested a clear focus on the evaluation of what had been achieved. The special issue does illustrate the wide range of policy domains being addressed and has maintained a geographical variety of cities covered in the papers presented. Authors in Europe, North America and Asia do consider the nature and evolution of smart cities service research and do shed

light on the evolving implementation frameworks for governance emerging in these continents. The case studies provided do further understanding about how the concepts of smart city governance and co-production are being enacted around the world. The selected papers share what is being learned in major cities such as Bangkok (Thailand), Halifax (Canada), Helsinki (Finland), Vienna (Austria) and Bologna (Italy) together with insights from smaller cities as Vitoria-Gasteiz (Spain), Ruse (Bulgaria), and Trikala and Heraklion (Greece). Taken together, the collated set of papers provides new understanding of how both large and mid-sized cities are pursuing smarter governance objectives.

6 The selected papers

This special issue is devoted to the study of implementation of governance in co-production in the smart city services. It contains analytical, empirical and normative studies that provide new knowledge about how to study governance and open innovation in smart city initiatives. They identify different drivers and barriers that are at play in empirical co-production processes, and uncover the impact of the efforts to enhance governance in innovation in the public sectors through varying levels of monitoring and evaluation.

The selected papers illustrate two types of approaches. The first contains three papers focused on governance frameworks for smart cities that promote and enable co-production. These papers rely on theory and literature reviews to develop the concept of smart city governance and show how cities are using it to develop the collaborative processes and environments to engage stakeholders in developing policies and services in the smart city. The second also contains three papers focused on the co-development of governance tools and services and evaluation frameworks in smart cities. Taken together, these six papers provide a valuable indication of the range of ideas, concepts and efforts currently being employed for studying and trying to understand governance and co-production in smart cities.

The first set of papers analyse the problems and potentials of promoting smart city governance through co-production between actors from different organisations and sectors. The paper on 'Smart cities in Canada: an examination of progress and impediments in Halifax, Canada' looks at how the production and distribution of governance processes by city governments can give rise to better local governance and improve collective outcomes via the development of a complex set of inter-related technological and human capacities for learning, innovation and adaptation. How 'co-smartisation' processes – which require citizens to participate in all phases of smart city projects (Coccossis et al., 2017) – can help local authorities to more easily overcome potential barriers which may arise during the whole lifetime of such projects is the focus of the second paper – 'The challenge of incorporating smart city activities in medium-size cities: the case of Greece'. The third paper in this category – 'Identifying preferred smart city services for a major city in a developing country: the case of Bangkok' – illustrates how through co-production of demand-driven smart city services residents in the Bangkok metropolitan area can gain the services they wish and how related exploration of stakeholders' needs can be used to facilitate this process.

The second set of papers enhances the field of study by analysing the existing literature and current practices focused on methods and tools for enhancing governance in smart cities. 'Participatory governance in smart cities: the urban API case study' contains analysis of the potential benefits of participatory governance as a fundamental enabler of ICT-enabled decision-making processes and tools for supporting policy co-design and implementation around the future spatial evolution of cities through strategic planning. The second paper – 'Developing online illustrative and participatory tools for urban planning: towards open innovation and co-production through citizen engagement' – is focused on how emerging open innovation approaches and smart technologies can be used in order to provide better services that improve citizens' quality of life and incentivise local innovation in urban planning. Finally, the last paper in the special issue – 'From top-down land use planning intelligence to bottom-up stakeholder engagement for smart cities – a case study: DECUMANUS service products' – illustrates how ICT can enable urban governance and the development of decision-making tools for delivering more integrated urban planning.

7   The contribution made by the papers

This edited issue makes a significant contribution to what is known about the co-production in the smart city and about how collaborative governance can enhance public service development. It does this by creating a more comprehensive collection of worked examples for understanding how 21st century smart cities are pursuing innovation of public services. The papers collated in the issue go beyond what is currently available in the field of by addressing 'open innovation' as an approach to co-production through analysing and evaluating smart city service initiatives in a geographically dispersed case studies in a diverse set of application domains. By telling different cities' stories and the lessons they have learnt, the set of papers present complex views on how co-production and governance inter-relate. Between them, the authors show how collaborative governance and citizen participation can help smart cities innovate public services and generate new value. Attention is given to the risks involved and to the concerns of the stakeholders collaborating in co-production, as well as to the opportunities and benefits available. This contributes a more comprehensive, systematic and nuanced view of co-production. As a result, the argument that Osborne et al. (2014) made that co-production can be an effective means of public service innovation can be restated in terms of a smart city. If smart cities can be regarded as an innovation eco-system, a critical question is whether urban actors can use this system as a laboratory for experimenting with novel forms of governance. And, if so, in what way can they maintain the engagement required to co-produce the services they want? The special issue illustrates what may be possible. However, besides smart governance, a smart city is also revealed to need smart actors. How government, citizens, businesses and academia become smarter is revealed as being part of the innovation process employed.

The collated papers give attention to issues of smart city governance, co-smartisation process, citizen-driven public service, tools for decision-making and innovation in urban planning, strategic urban development and learning capacity. Focusing on these diverse topics – specifically in the context of governance for co-production – provides insights that can guide cities not only in framework development but in the execution of their related co-production policies and projects. All of the papers make a contribution both to

the development of approaches and methods to the smart city, by linking co-production to specific governance practices in a variety of urban contexts. Hopefully, this will provide readers with multiple lenses for viewing the integrated nature of the efforts required for city-level smart city initiatives. All papers take conceptualisations employed in the field of smart cities and expand and enhance existing approaches and models with new understanding of the role played by citizens and urban actors in co-producing the desired public services and programs. One particular contribution that can be claimed for the issue is that it offers examination of how emerging open innovation and smart technologies can be employed to provide better services for the citizens in the field of strategic urban planning.

8 The papers response to the challenges thrown down in the call

Our position as editors of the special issue is that collaborative governance is necessary to effectively apply co-production in the phenomenon called the 'smart city', and specifically in the innovation of public services. Our ambition of this special issue of the *IJSTM* journal was to map out the important features of research and practice in this field. We aimed to stimulate critical examination of different perspectives on co-production as well as related governance approaches and of how they interact to produce specific types of solutions to smart city service innovation. We were particularly interested in investigating real life examples – illustrating what was taken to have worked – in order to broaden and deepen knowledge about smart city evaluation both for the scientific community and about the scope of service innovation solutions available for service developers and decision makers. The papers included in the issue show that there is first a need to understand how best to engage citizens and public service users in co-production of public services in order to improve their effectiveness and to enhance citizens' quality of life. Three key drivers of co-production are identified: citizens' engagement, ICTs, and multi-actor governance. The special issue contains analyses of the extent to which these drivers are essential for organising and integrating effectively the knowledge, skills, assets, and actor networks in smart cities. Their integrated organisation appears to be a prerequisite for successfully developing the services cities and citizens need.

In aggregate, the papers contribute to the theoretical understanding of the processes of co-production in smart city services from a number of domain perspectives – innovation, politics, sociology, technology, and evaluation. The impacts of this body of research have several dimensions:

a the identification of innovative forms and processes of public service provision that are based in a systematic understanding of the potentials and challenges of co-production at the theoretical and practical levels

b the implications of this understanding for delivering effective and efficient public services

c the employment of the knowledge and expertise of the urban actors to co-produce these services and to add value both to their own lives and to their city

d the potential of ICTs, particularly digital and virtual, to support and enhance such co-production

e the evaluation of the process, outcomes and impacts of co-production.

The literature on smart cities already contains an evolved body of theory and research about service co-production that speaks directly to the challenges of public service innovation. This special issue reveals that there is a strong need to strengthen governance for addressing co-production challenges and for moving towards more effective collaborative actor processes and relationships. Through this issue, we have sought to encourage the dissemination and spread of innovative and impactful solutions for transforming public services through co-production. It is our hope that this special issue will spark further debate about how and when co-production can help reinvigorate public service innovation in the smart city by bringing together a set of empirically-based papers that focus on 'actually existing' cases. We hope that these examples of smart service co-production will appeal to both applied scholars and practitioners. They will be of interest to smart city service researchers and practitioners for three reasons:

1   The field of smart cities is an increasingly important policy and academic approach for framing urban development around the world.

2   The special issue brings to the fore core concerns about the governance of public service innovation in the field of smart cities.

3   In providing an in-depth treatment of co-production as a topic, in its own right, the special issue brings to the attention of a mix of scholars and practitioners current work on, and the priorities raised by, smart city governance.

9   Conclusions

Our major disappointment is the limited response in the collated papers to the scope we advocated for coverage of co-production – to the roles and contributions of the citizens and other actors in the whole life cycle of co-production (definition, design, development, delivery, management and evaluation of public services) in smart cities. The precise nature of innovation systems that government, citizens, users and other organisations will have to develop in order to innovate and deliver improved public service outcomes are insufficiently addressed. Further elaboration of these could offer creative policy responses to enable cities to provide better public services in times of growing urban challenges. Further research will be needed to look deeper into this matter. And, despite the claims made, some papers do not actually adopt a triple, let alone a quadruple helix approach to who should be involved in smart city decision making. Instead technocratic mind-set can still often be glimpsed as operating behind the research cases presented in this issue. This too is a matter for concern. In practice, the types of stakeholders reported as being involved in the production and evaluation of ICTs are primarily what are called 'domain experts' (professionals). Investigation of the reception of the new services and ICT tools, as well as the benefits derived from their use, by lay people (citizens) is often implied. But it is not well demonstrated. Nor are all the claimed advantages of the co-production approach – as listed in the call – discussed and demonstrated in the collated papers. Often there are claims made about the importance of the governance of urban decision making. But the way in which 'the stakeholders' who need to be included in such decision making are framed means that most of the governance issues raised by such decision making lie within a technocratic frame of reference. Such technological framing for research is also signalled by the continued use of the term 'user requirement'. As has

been long understood (Arnstein, 1969), so-called 'participation' in urban decision making can be offered across a very wide spectrum, ranging from one-way consultation, through two-way exchanges, up to citizen-led initiatives that reflect notions of entitlement and rights. Where smart cities – and those engaged in research with them – choose to settle on this spectrum is illustrated not just through their choice of vocabulary but in their resultant research and engagement techniques. These, in turn, speak about how willing they are to address the underlying power differentials experienced by different types of stakeholders when trying to engage in urban decision making. This special issue suggests that, in the case studies recorded here, the journey towards the active inclusion of lay people, as opposed to professionals, in the co-production of public services is still in its infancy.

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