

Supplemental Material 1.

Correspondence of Smart City Governance objectives with Disruptive Technology outcomes (literature Review Based)

SCG Objectives Category	Smart City Governance Objectives	Big Data	Open Data	AI	IoT	Blockchain	
Citizens centered transformation	To implementing a citizen-centric approach	x	x	x	x	x	(Hashem et al. 2016a), (Janssen, Charalabidis, and Zuiderwijk 2012a), (Kankanhalli, Charalabidis, and Mellouli 2019a), (Cisco 2016), (Marda 2018), (Chatterjee et al. 2018), (Hakak et al. 2020)
	To transform of processes and structures	x	x	x	x		(Heeks 2001), (Ju, Liu, and Feng 2018, (Agnihotri 2015), (Janssen, Charalabidis, and Zuiderwijk 2012a), (Cisco 2016), (Kankanhalli, Charalabidis, and Mellouli 2019a)
	To support impact on society		x	x	x		(Janssen, Charalabidis, and Zuiderwijk 2012a), (Leitner and Stiefmueller 2019)
	To realize urban sustainability and resilience in terms of resource availability and disaster response	x	x	x			(Bertot et al. 2014), (Janssen, Charalabidis, and Zuiderwijk 2012a), (Kankanhalli, Charalabidis, and Mellouli 2019a)
Decision making processes	To build fair and efficient models of public service design, delivery and transactions	x	x	x	x		(Singh, Srivastava, and Johri 2014), (Bertot et al. 2014), (Agnihotri 2015), (Janssen, Charalabidis, and Zuiderwijk 2012a), (Bradley et al. 2013), (Kankanhalli, Charalabidis, and Mellouli 2019a)
	To provide evidence-based decision making	x	x	x	x		(Ju, Liu, and Feng 2018), (Camarinha-Matos and Afsarmanesh 2005), (Pereira et al. 2017), (Peters, Janssen, and Van Engers 2004), (Janssen et al. 2019), (Kankanhalli, Charalabidis, and Mellouli 2019a), (Plotkin 2013)
	To support understanding of data (on events, conditions, problems and processes)	x	x	x			(Mahmoud, Omar, and Ouksel 2019), (Janssen et al. 2020), (Hakak et al. 2020)
	To sustain innovation and creativity	x	x	x	x		(Agnihotri 2015), (Janssen, Charalabidis, and Zuiderwijk 2012a), (Leitner and Stiefmueller 2019), (Sharma, Yadav, and Chopra 2020)
	To use simulations and modelling as a decision support techniques	x		x	x		(Hashem et al. 2016b), (Agnihotri 2015), (Mahmoud, Omar, and Ouksel 2019), (Leitner and Stiefmueller 2019), (A. Dwivedi et al. 2019)
	To collect data or observations through search agents				x		(Ali et al. 2016), (Plageras et al. 2017)
Smart urban collaboration		x	x	x		x	(Janssen, Charalabidis, and Zuiderwijk 2012a), (Bartenberger and Grubmüller-Régent 2014), (Viale Pereira et al. 2017a), (Peixoto 2008), (Viale Pereira et al. 2017b), (Cunha, Coelho, and Pozzebon 2014), (Kankanhalli, Charalabidis, and Mellouli 2019b), (Nam et al. 2019), (Scekic, Nastic, and Dustdar 2019), (Ju, Liu, and Feng 2018)
	To increase e-Participation			x			(Makhdoom et al. 2020), (Ubaldi, Ooijen, and Welby 2019)
	To ensure privacy and security						
	Provide e-democracy and advance democratic expression, and e-Voting	x	x			x	(Yigitcanlar et al. 2020), (Desouza and Jacob 2017), (Janssen, Charalabidis, and Zuiderwijk 2012a), (Y. K. Dwivedi et al. 2019), (Ubaldi, Ooijen, and Welby 2019)
	To increase governance accountability, transparency, effectiveness, and trust					x	(Bertot et al. 2014), (Plotkin, 2013), (Janssen, Charalabidis, and Zuiderwijk 2012), (Janssen, Charalabidis, and Zuiderwijk 2012b), (Peled 2011), (Zuiderwijk and Al. 2014), (Kankanhalli, Charalabidis, and Mellouli 2019b), (Oliveira, Oliver, and Ramalhinho 2020), (Ubaldi, Ooijen, and Welby 2019)
Smart administration	To establish and manage public-private collaboration	x	x	x		x	(Pereira et al. 2017), (Magalhaes, Roseira, and Manley 2014)
	To ensure social equality	x	x		x	x	(Janssen, Charalabidis, and Zuiderwijk 2012), (Johnson 2019), (Tilmes 2018)
	To provide integration and storage of data	x	x				(Mahmoud, Omar, and Ouksel 2019), (Janssen et al. 2020), (Hakak et al. 2020)
	To build new style of leadership		x				(Benfeldt, Persson, and Madsen 2020), (Johnson 2019)

References

- Agnihotri, Nishant. 2015. "Big Data Analysis and Its Need for Effective." *International Journal of Innovation and Advancement in Computer Science* 4(March): 219–24.
- Ali, Muhammad Intizar et al. 2016. "Real-Time Data Analytics and Event Detection for IoT-Enabled Communication Systems : Web Semantics : Science , Services and Agents on the World Wide Web Real-Time Data Analytics and Event Detection for IoT-Enabled Communication Systems." *Web Semantics: Science, Services and Agents on the World Wide Web* (October 2017): 0–19. <http://dx.doi.org/10.1016/j.websem.2016.07.001>.
- Bartenberger, Martin, and Verena Grubmüller-Régent. 2014. "The Enabling Effects of Open Government Data on

- Collaborative Governance in Smart City Contexts.” *JeDEM* 6(1): 36–48.
- Benfeldt, Olivia, John Stouby Persson, and Sabine Madsen. 2020. “Data Governance as a Collective Action Problem.” *Information Systems Frontiers* 22(2): 299–313.
- Bertot, J. C. et al. 2014. “Big Data, Open Government, and e-Government: Issues, Policies, and Recommendations.” *Inf. Polity* 19(1–2): 5–16.
- Bradley, J., C. Reberger, A. Dixit, and V. Gupta. 2013. *Internet of Everything: A \$4.6 Trillion Public-Sector Opportunity*. San Jose, CA: Cisco.
- Camarinha-Matos, Luis M., and Hamideh Afsarmanesh. 2005. “Collaborative Networks: A New Scientific Discipline.” *Virtual Organizations: Systems and Practices* (June 2014): 73–80.
- Chatterjee, Kiron et al. 2018. *Young People’s Travel-What’s Changed and Why? Review and Analysis Preferred Form of Citation: Chatterjee, K.* www.gov.uk/government/publications/young-peoples-travel-whats-changed-and-.
- Cisco, ITU. 2016. *Harnessing the Internet of Things for Global Development*. Geneva: International Telecommunications Union (ITU); Cisco.
- Cunha, M. A., T. R. Coelho, and M. Pozzebon. 2014. “Internet e Participação: O Caso Do Orçamento Participativo Digital de Belo Horizonte.” *Revista de Administração de Empresas (RAE)* 54(3): 296–308.
- Desouza, Kevin C., and Benoy Jacob. 2017. “Big Data in the Public Sector: Lessons for Practitioners and Scholars.” *Administration and Society* 49(7): 1043–64.
- Dwivedi, Akhilesh et al. 2019. *E-Governance and Big Data Framework for e-Governance and Use of Sentiment Analysis*. <http://ssrn.com/link/ICAESMT-2019.html=xyz>.
- Dwivedi, Yogesh K. et al. 2019. “Artificial Intelligence (AI): Multidisciplinary Perspectives on Emerging Challenges, Opportunities, and Agenda for Research, Practice and Policy.” *International Journal of Information Management*.
- Hakak, Saqib et al. 2020. “Securing Smart Cities through Blockchain Technology: Architecture, Requirements, and Challenges.” *IEEE Network* 34(1): 8–14.
- Hashem, Ibrahim Abaker Targio et al. 2016a. “The Role of Big Data in Smart City.” *International Journal of Information Management* 36(5): 748–58.
- . 2016b. “The Role of Big Data in Smart City.” *International Journal of Information Management* 36(5): 748–58.
- Heeks, R. 2001. “Understanding E-Governance for Development.” *i- Government Work. Pap. Ser.* 20(2): 1–27.
- Janssen, Marijn et al. 2019. “Challenges for Adopting and Implementing IoT in Smart Cities: An Integrated MICMAC-ISM Approach.” *Internet Research* 29(6): 1589–1616.
- . 2020. “Data Governance: Organizing Data for Trustworthy Artificial Intelligence.” *Government Information Quarterly* 37(3).
- Janssen, Marijn, Yannis Charalabidis, and Anneke Zuiderwijk. 2012a. “Benefits, Adoption Barriers and Myths of Open Data and Open Government.” *Information Systems Management* 29(4): 258–68.
- . 2012b. “Benefits, Adoption Barriers and Myths of Open Data and Open Government.” *Information Systems Management* 29(4): 258–68.
- Johnson, C. 2019. “Technological Disruption and Equality: Future Challenges for Social Democracy.” In: *Social Democracy and the Crisis of Equality*. Springer, Singapore. https://doi.org/10.1007/978-981-13-6299-6_8.
- Ju, Jingrui, Luning Liu, and Yuqiang Feng. 2018. “Citizen-Centered Big Data Analysis-Driven Governance Intelligence Framework for Smart Cities.” *Telecommunications Policy* 42(10): 881–96.
- Kankanhalli, Atreyi, Yannis Charalabidis, and Sehl Mellouli. 2019a. “IoT and AI for Smart Government: A Research Agenda.” *Government Information Quarterly* 36(2): 304–9.
- . 2019b. “IoT and AI for Smart Government: A Research Agenda.” *Government Information Quarterly* 36(2): 304–9.
- Leitner, Christine, and Christian M. Stiefmueller. 2019. *Public Service Excellence in the 21st Century Disruptive Technologies and the Public Sector: The Changing Dynamics of Governance*.
- Magalhaes, G., C. Roseira, and L. Manley. 2014. “Business Models for Open Government Data.” In *Proceedings of the 8th International Conference on Theory and Practice of Electronic Governance (ICEGOV)*, ACM.
- Mahmoud, El Benany Med, El Beqqali Omar, and Aris M. Ouksel. 2019. “Big Data Interoperability for E-Governance.” *Journal of Computer Science* 15(10): 1430–38.
- Makhdoom, Imran et al. 2020. “PrivySharing: A Blockchain-Based Framework for Privacy-Preserving and Secure Data Sharing in Smart Cities.” *Computers and Security* 88: 101653. <https://doi.org/10.1016/j.cose.2019.101653>.
- Marda, V. 2018. “Artificial Intelligence Policy in India: A Framework for Engaging the Limits of Data-Driven Decision-Making.” *Philos. Trans. R. Soc. A Math. Phys. Eng. Sci* 376(2133): 1–19.
- Nam, Kichan, Christopher S. Dutt, Prakash Chathoth, and M. Sajid Khan. 2019. “Blockchain Technology for Smart City and Smart Tourism: Latest Trends and Challenges.” *Asia Pacific Journal of Tourism Research*. <https://www.tandfonline.com/doi/abs/10.1080/10941665.2019.1585376> (September 21, 2020).
- Oliveira, Thays A., Miquel Oliver, and Helena Ramalhinho. 2020. “Challenges for Connecting Citizens and Smart Cities: ICT, e-Governance and Blockchain.” *Sustainability (Switzerland)* 12(7).
- Peixoto, T. 2008. “E-Participatory Budgeting: E-Democracy from Theory to Success?” In *E-Working Papers*, European University Institute Department of Political and Social Sciences, Badia Fiesolana, San Domenico di Fiesole, Italy.

- Peled, A. 2011. "When Transparency and Collaboration Collide: The USA Open Data Program." *Journal of the American Society for Information Science and Technology* 62(11): 2085–2094.
- Pereira, Gabriela Viale, Marie Anne Macadar, Edimara M. Luciano, and Maurício Gregianin Testa. 2017. "Delivering Public Value through Open Government Data Initiatives in a Smart City Context." *Information Systems Frontiers* 19(2): 213–29.
- Peters, Rob M., Marijn Janssen, and Tom M. Van Engers. 2004. "Measuring E-Government Impact: Existing Practices and Shortcomings." *ACM International Conference Proceeding Series* 60(May 2014): 480–89.
- Plageras, Andreas P et al. 2017. "Efficient IoT-Based Sensor BIG Data Collection-Processing and Analysis in Smart Buildings." *Future Generation Computer Systems* (October). <https://doi.org/10.1016/j.future.2017.09.082>.
- Plotkin, D. 2013. "Data Stewardship: An Actionable Guide to Effective Data Management and Data Governance." *Newnes*.
- Scekic, Ognjen, Stefan Nastic, and Schahram Dustdar. 2019. "Blockchain-Supported Smart City Platform for Social Value Co-Creation and Exchange." *IEEE Internet Computing* 23(1): 19–28.
- Sharma, Gagan Deep, Anshita Yadav, and Ritika Chopra. 2020. "Artificial Intelligence and Effective Governance: A Review, Critique and Research Agenda." *Sustainable Futures* 2: 100004.
- Singh, V., I. Srivastava, and V. Johri. 2014. "Big Data and the Opportunities and Challenges for Government Agencies." *Int. J. Comput. Sci. Inf. Technol.* 5(4): 5821–5824.
- Tilmes, Klaus. 2018. *Perspectives on Disruptive Technologies and Forces*.
- Ubaldi, Barbara, Charlotte Van Ooijen, and Benjamin Welby. 2019. "A Data-Driven Public Sector: Enabling the Strategic Use of Data for Productive, Inclusive and Trustworthy Governance." *OECD Working Papers on Public Governance* (33): OECD, Paris. <https://doi.org/10.1787/19934351>.
- Viale Pereira, Gabriela et al. 2017a. "Increasing Collaboration and Participation in Smart City Governance: A Cross-Case Analysis of Smart City Initiatives." *Information Technology for Development* 23(3): 526–53.
- . 2017b. "Increasing Collaboration and Participation in Smart City Governance: A Cross-Case Analysis of Smart City Initiatives." *Information Technology for Development* 23(3): 526–53.
- Yigitcanlar, Tan, Kevin C. Desouza, Luke Butler, and Farnoosh Roozkhosh. 2020. "Contributions and Risks of Artificial Intelligence (AI) in Building Smarter Cities: Insights from a Systematic Review of the Literature." *Energies* 13(6).
- Zuiderwijk, A., and Et Al. 2014. "Special Issue on Innovation through Open Data: Guest Editors' Introduction." *Journal of theoretical and applied electronic commerce research*, 9(2): i–xiii.