

Postprint of: Janowski T., Estevez E., Baguma R., Platform governance for sustainable development: Reshaping citizen-administration relationships in the digital age, *Government Information Quarterly*, Vol. 35, Iss. 4, Supplement (2018), pp. S1-S16, DOI: [10.1016/j.giq.2018.09.002](https://doi.org/10.1016/j.giq.2018.09.002)

© 2018. This manuscript version is made available under the CC-BY-NC-ND 4.0 license

<http://creativecommons.org/licenses/by-nc-nd/4.0/>

Platform Governance for Sustainable Development: Reshaping Citizen-Administration Relationships in the Digital Age

Tomasz Janowski

Gdańsk University of Technology, Poland

Danube University Krems, Austria

tomasz.janowski@pg.edu.pl

Elsa Estevez

ICIC CONICET-UNS, Universidad Nacional del Sur, Bahia Blanca, Argentina

ece@cs.uns.edu.ar

Rehema Baguma

Makerere University, Uganda

rbaguma@cit.ac.ug

Abstract: Changing governance paradigms has been shaping and reshaping the landscape of citizen-administration relationships: the impartial application of rules and regulations by administration to exercise its authority over citizens (bureaucratic paradigm); public service provision by administration to fulfill the needs of citizens (consumerist paradigm); or responsibility sharing between administration and citizens for policy and service delivery processes (participatory paradigm). The recent trend is the administration empowering citizens, through the provision socio-technical system that bring data, services, technologies, and people together to respond to changing societal needs, to create public value by themselves. Such systems are called “platforms” and the trend is called “platform paradigm”. The aim of this article is to offer a conceptual framework for citizen-administration relationships under the platform paradigm. While existing models of citizen-administration relationships mainly focus on specific types of relationships, e.g. citizen trust versus administrative transparency, or citizen satisfaction versus administrative performance, the proposed framework identifies a comprehensive set of relationships that explain how decisions by citizens or administration and the policy environment mutually agreed by them contribute to shaping such relationships and building individual and collective capacity for pursuing sustainable development. The framework comprises 15 types of relationships between three types of actors, distributed through the four governance paradigms, and illustrated through the analysis of 11 case studies published in the current issue. Based on this analysis, the article also formulates some insights that are relevant to researchers and policymakers who intend to utilize platform governance for sustainable development.

Keywords: public governance; platform governance; digital government; sustainable development; citizen-administration relationships

Highlights

- Platform governance for sustainable development was defined and conceptualized.
- The conceptualization is developed incrementally along the series of the bureaucratic, consumerist, participatory and platform governance paradigms.
- The conceptualization identifies 15 types of citizen-administration relationships that underpin different governance paradigms.
- The conceptualization is applied to analyze and compare 11 cases of platform governance for sustainable development.

1. Introduction

In the pursuit of sustainable development, i.e. “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, 1987, pp. 41), modern societies expect their governments to address in a coherent and integrative way a multitude of social, economic, ecological, political and other policy challenges. Such challenges are generally complex, dynamic, uncertain and interdependent. Governments struggle to meet such expectations, having to rely on limited financial, human, physical, and information resources, and on external trust and legitimacy to deal with policy challenges embedded in their indigenous social, economic, ecological, political, and other contexts. However, trust in all types of institutions, especially government, and their legitimacy to act on society’s behalf are in short supplies today.

This pursuit towards sustainable development is refocusing attention away from the institutions of governing, e.g. government, to the processes of governing “whether undertaken by a government, market or network” and “whether through laws, norms, power or language”, i.e. to governance (Bevir, 2012, pp. 1). It also marks progression of governance arrangements from hierarchies to markets to networks, with respective impact on citizen-administration relationships, i.e. on “various ways in which individuals and public sector organizations interact” (Villeneuve, 2017, pp. 1). This impact includes (Villeneuve, 2017): impartial application of rules and regulations by administration to exercise its authority over citizens (bureaucratic paradigm); provision of public services by administration to fulfill the needs of citizens (consumerist paradigm); and responsibility sharing between administration and citizens for policy and service processes (participatory paradigm).

The participatory paradigm, as applied here, integrates related concepts of joint-up government (Bogdanor, 2005), network governance (Goldsmith & Eggers, 2004) and collaborative governance (Emerson, Nabatchi, & Balogh, 2012). Joint-up government involves “the development and implementation of policies across government departments and agencies” and through “private and voluntary bodies, working across organizational boundaries towards a common goal” (Bogdanor, 2005, pp. 1-2). Network governance redefines the role of government organizations from directly delivering public services to delivering such services through networks of public, private and nonprofit organizations, while retaining the responsibility for creating, maintaining and resolving such networks (Goldsmith & Eggers, 2004). Collaborative governance covers “processes and structures of



public policy decision making and management” that engage “people constructively across the boundaries of public agencies, levels of government, and/or the public, private and civic spheres in order to carry out a public purpose that could not otherwise be accomplished” (Emerson, Nabatchi, & Balogh, 2012, pp. 2). While all three concepts introduce structures that facilitate joint decision-making and collaboration between administration and citizens, they do not emphasize the role of administration in providing data, tools, coordination capacity and other structures that aim to empower citizens to create public value by themselves. However, for sustainable development this empowerment is critical.

The empowerment of citizens and other non-state actors to contribute to sustainable development directly is the essence of the platform paradigm. This paradigm, enabled by advances in methods and applications of digital technology, is tapping into assets, resources and competencies that exist within government and across the society, organizing them into common development platforms and using them to orchestrate collective action and pursue collective goals. The assets may include “finance, people's time and expertise, organisational structures and competences, networks, data, things, places, buildings, spaces, vehicles, and infrastructures” (Millard, this issue, p. 10), whereas platform users may include “companies, SMEs, civil society organisations, communities, groups and individuals, as well as hackers, designers and artists” (Millard, this issue, p. 8). From the technological viewpoint, platforms bring together and connect to each other services, applications, technologies and people, who are empowered to amend the platform in the ways not envisioned by their designers, thus allowing them to “evolve over time to adapt to changing needs by the interplay of technology, users, policy-makers and other actors” (Janssen & Estevez, 2013, S5).

Considering the continuum of governance modes that exist between the extremes of state intervention, i.e. “traditional hierarchical government control through authoritative allocation of values to society” and societal autonomy, i.e. “self-organizing networks of co-ordinating societal actors” (Lange, Driessen, Sauer, Bornemann, & Burger, 2013, p. 408), platform-based governance is closer to the latter. However, government is still necessary to facilitate and orchestrate collective action, provide tools, manage assets and ultimately ensure public value (Millard, this issue). In this role, it cannot just act as central authority but respect stakeholder’ autonomy and self-control, recognize that collaboration and progress can be only made with mutual trust and good will, and even accept that the orchestration role is distributed over several actors (Janssen & Estevez, 2013).

Platform-based governance can be related to different models of digital government. For digital government evolution (Janowski, 2015), it coincides with the contextualization stage which aims at improving development conditions for citizens and other development actors. Concerning Lean Government which reduces “the complexity of the public sector by simplifying and streamlining organizational structures and processes, at the same time at stimulating innovation by mobilizing stakeholders” (Janssen & Estevez, 2013, p. S1), Open Government which aims at “linking and integrating the worlds inside government, as well as linking and integrating these with the worlds outside government for the specific purpose of creating public value” (Millard, this issue, p. 4) or Adaptive Governance which enhances “the capacity of an organization to deal with and adapt to changes, while protecting the same



organization from becoming unstable” (Janssen & van der Voort, 2016, pp. 1), all concepts could be leveraged for advancing sustainable development through platform governance.

Platform-based governance could be also used to enable public value coproduction between citizens and administration, through e.g. consultation, ideation, crowdsourcing, co-delivery, reporting, informing, nudging, ecosystem embedding, self-organization, self-service and self-monitoring (Linders, 2012) to pursue a range of collective goals such as fighting crime and corruption, monitoring living conditions, managing social welfare, identifying risks to public health, implementing citizen budgets, planning public spaces, etc. More generally, platform-based governance could be used to govern processes “oriented towards the attainment of sustainable development” (J. Meadowcroft, 2007, p. 1). As sustainable development entails “promotion of societal transformation processes by governments, market actors and civil society” (Lange et al., 2013, p. 405), governance for sustainable development is about “working through formal and informal institutions” to bring about such transformation (Kemp, Parto, & Gibson, 2005, p. 19). Platform-based governance is well suited for this task. Reaching out directly to citizens, it can influence their habits, routines and other informal institutions, and create accumulated effect from individual to societal level.

Depending on the goals, the strategy adopted to pursue these goals and the context where this strategy is implemented, platform-based governance occurs in many variations. In particular, we see large variations in the shape of citizen-administration relationships that are part of the platform-based governance. The problem is to organize knowledge about such relationships as they emerge from cases of platform-based governance, to facilitate learning from such cases, and to apply and reapply learning outcomes between contexts. The aim of this article is to address this problem by offering a conceptual framework for citizen-administration relationships that occur under the platform-based governance paradigm. Fifteen types of relationships were identified based on the literature and conceptual analysis, organized incrementally along the sequence of four governance paradigms: bureaucratic, consumerist, participatory and platform. The framework is then tested through the analysis of 11 case studies published in the current issue to analyze various instantiations of citizen-administration relationships underpinning the platform-based paradigm. Aggregated results are also developed through cross-case analysis and grouping of cases using the Digital Government Evolution stages (Janowski, 2015). At the end, findings are formulated based on this exercise. The findings are relevant to researchers and policymakers interested in utilizing platform governance as an enabler for sustainable development.

The rest of this article is structured as follows. Section 2 outlines the methodology underpinning this research. Section 3 provides analysis of citizen-administration relationships underpinning platform governance for sustainable development, followed by the integrative conceptual framework that is based on this analysis. Section 4 applies the framework to analyze 11 case studies on digitization, governance and development concerning the presence of citizen-administration relationships for platform governance for sustainable development. Section 5 carries out cross-case analysis and presents the findings. The final Section 6 offers discussion and conclusions.



2. Methodology

This article pursues three research questions that focus on sustainable development:

1. What is platform governance?
2. What citizen-administration relationships characterize platform governance?
3. How are citizen-administration relationships characterizing platform governance instantiated in practice?

In order to answer the first research question, we conducted literature analysis focused on theories, models or modes of governance for sustainable development across a range of governance paradigms, followed by the key characteristics of platform governance for sustainable development. The analysis was carried out through literature search on the Scopus database, using the search term: “sustainable development” AND (“governance” OR “governing”) AND (“theory” OR “model” OR “mode”). The outcome is part of Section 1.

In order to answer the second research question, we conducted literature analysis aimed at uncovering citizen-administration relationships between Citizens, Administration and Policy, three main entities taking part in governance for sustainable development. The literature search was carried out on the Scopus database using the family of search terms: “sustainable development” AND (“governance” OR “governing”) AND XXX.

Altogether, 15 citizen-administration relationships were uncovered in the process: administer, steer, regulate, serve, engage, transform, legitimize, disclose, monitor, participate, empower, learn, coordinate, create and collaborate. These relationships were explored using the corresponding search terms XXX:

“administer” OR “administering” OR “administration”
“steer” OR “steering” OR “direct” OR “directing”
“regulate” OR “regulating” OR “regulation”
“serve” OR “serving” OR “service”
“engage” OR “engaging” OR “engagement”
“transform” OR “transforming” OR “transformation”
“legitimize” OR “legitimizing” OR “legitimization”
“disclose” OR “disclosing” OR “disclosure”
“monitor” OR “monitoring”
“participate” OR “participating” OR “participation”
“empower” OR “empowering” OR “empowerment”
“learn” OR “learning”
“coordinate” OR “coordinating” OR “coordination”
“create” OR “creating” OR “creation”
“collaborate” OR “collaborating” OR “collaboration”

The uncovered relationships were mapped into four governance paradigms: bureaucratic, consumerist, participatory or platform, and integrated into conceptual framework of platform governance for sustainable development. The outcome is presented in Section 3.



In order to answer the third research question, we applied the conceptual framework to analyze 11 case studies represented by research articles published in the current issue. The case studies belong to the intersection of digitization, governance and development, and the initial versions of these articles were published in (Janowski, Holm, & Estevez, 2013). The analysis captures the presence of citizen-administration relationships and identifies varieties of platform governance for sustainable development present among the cases. Analysis of citizen-administration relationships has been also performed across the cases. The in-case and cross-case analysis are described in Sections 5 and 6 respectively.

3. Conceptual Framework

The aim of this section is to analyze a variety of citizen-administration relationships that underpin different governance regimes for sustainable development and to build a conceptual framework of platform governance for sustainable development based on this analysis. The purpose of the conceptual framework is to organize knowledge about citizen-administration relationships as they emerge from cases of platform governance, to facilitate learning from such cases, and to apply and reapply learning outcomes between contexts.

The four governance paradigms introduced in Section 1 – bureaucratic, consumerist, participatory and platform – were used to categorize the relationships. The categorization is soft: dominant governance paradigms are identified for different relationships but the relationships could be moved across paradigms. It is also incremental – all relationships that belong to the bureaucratic paradigm also belong to the consumerist paradigm, all that belong to the consumerist paradigm also belong to the participatory paradigm, and all that belong to the participatory paradigm also belong to the platform paradigm. In the end, the platform paradigm accumulates all identified relationships. The categorization is depicted in Table 1.

Individual relationships were analyzed based upon specialized scientific literature on governance and sustainable development. The results are documented in Sections 3.1, 3.2, 3.3 and 3.4 depending on the relationship’s attachment to the latest governance paradigm. For instance, Section 3.4 covers relationships that are associated with the platform but not participatory paradigm. The conceptual framework for platform governance for sustainable development that integrates all 15 relationships is presented in Section 3.5.

Table 1. Citizen-administration relationships across governance paradigms

No	Citizen-Administration Relationships	Dominant Governance Paradigms			
		Bureaucratic	Consumerist	Participatory	Platform
1	administer	x	x	x	x
2	steer	x	x	x	x
3	regulate	x	x	x	x
4	serve		x	x	x
5	engage		x	x	x
6	transform		x	x	x



7	legitimize		x	x	x
8	disclose			x	x
9	monitor			x	x
10	participate			x	x
11	empower				x
12	learn				x
13	coordinate				x
14	create				x
15	collaborate				x

3.1. Relationships for Bureaucratic Governance

Consider the internal performance of administration when governing towards sustainable development, i.e. the *administer* relationship. According to (Heinrichs & Laws, 2014, p. 2623), in line with specific responsibility of the state for coordinating sustainable development, the idea of sustainability should be integrated into “decision-making in politics and administration at all levels”, the process and the outcome also called respectively “institutionalization of sustainability” and “sustainability state”. Part of administration’s role of managing sustainable development is building institutional capacity among state and civil society institutions to manage related processes (Mc Lennan & Ngoma, 2004). Institutional quality, including administration, is also a start point of sustainability on both macro and micro levels, the latter promoting private sector participation (Schomaker, 2014). Administration should also adapt its approaches to sustainability challenges, by developing sustainable development strategies into tools for strategic public management (Steurer, 2007).

Consider the administration’s role to direct sustainable development efforts through various policy instruments, i.e. the *steer* relationship. As a normative objective of steering and governance, sustainability goals are “ambivalent, difficult to agree and hard to specify” (Walker & Shove, 2007, p. 213). Steering for sustainability has to reconcile “the demands of reflexivity (being open, self-critical and creative) with the demands of their existing political world (closed preferences, agenda driven, control)” (Hendriks & Grin, 2007, p. 333). Steering for sustainable development involves three problem dimensions: “ambivalence of sustainability as a goal, uncertainty of knowledge due to complex interactions between society, technology and nature, and distributed power to shape structural change in society” (Voß, Newig, Kastens, Monstadt, & Nölting, 2007, p. 193). In the case of ecological modernization, while central government creates new structures of governance “to keep its initiative over constitutionally independent expert agencies and municipal governments”, such structures could make central governmental steering almost impossible (Lundqvist, 2001, p. 319).

Consider how administration regulates the conduct of citizens, businesses and other non-state actors to advance sustainable development, i.e. the *regulate* relationship. Responsible collective innovation that contributes to sustainable development could be furthered by “voluntary soft-law regulations that complement and extend national and international hard-law regulations” (Voegtlin & Scherer, 2017, p. 227). A voluntary contribution to sustainable development, Corporate Social Responsibility was initially aimed at downscaling government regulation but later progressed towards societal co-regulation (Steurer, 2010). More generally, steering businesses towards sustainable development and Corporate Social Responsibility can use various regulatory instruments, some relying to various extent on government, others on civil society (civil regulation) or businesses (self-regulation), and yet others on both (co-regulation) (Steurer, 2013). However, by promoting compliance with national sustainability standards, national government can restrict “local government’s room to manoeuvre in balancing all relevant interests” but “environmental standards are either not problematically restrictive or, if they are, sectoral policy offers ways to circumvent them” (Van Stigt, Driessen, & Spit, 2013, p. 221).



3.2. Relationships for Consumerist Governance

Consider how administration delivers services to citizens and other non-state actors while meeting sustainability objectives, i.e. the *serve* relationship. According to (Grubnic, Thomson, & Georgakopoulos, 2015), governments and public service organizations should address sustainable development in their decision-making processes for public service provisions. Supporting institutions and building institutional capacity, particularly to deliver services that address poverty and exclusion, are key to supporting quality governance for sustainable development (Mc Lennan & Ngoma, 2004). The delivery of smart public services by city governments responds to sustainability requirements and to changes in service delivery such as “unbundling services from production processes, growth of the information-rich economy and society, the search for creativity in service production and consumption and continuing growth of digital technologies” (Anttiroiko, Valkama, & Bailey, 2014, p. 323). Applied in “knowledge-intensive public services such as education, healthcare and e-government”, digital literacies help integrate marginalized segments of the society (Sharma, Fantin, Prabhu, Guan, & Dattakumar, 2016, p. 628).

Consider how administration engages citizens in co-deciding public policies that advance sustainable development, i.e. the *engage* relationship. In addition to voting, participating in political campaigns or running for public officer, citizens can “engage the policy-making process directly” by attending city council meeting, organizing protests or circulating petitions (Adams, 2007, p. 3-20). In the case of policy-making for sustainable development, without “adequate representation of implicated interests”, such policy-making will “fail to take account of relevant problem dimensions and decisions will lack legitimacy” (Meadowcroft, 2004, p. 166). For example, community engagement with local policymaking is crucial in “providing the building blocks for sustainable neighbourhood regeneration” (Jarvis, Berkeley, & Broughton, 2012, p. 232). Early public engagement is also necessary to reconcile diverging expert and public opinions in sustainable transport policies: experts prefer “techno-economic measures” while the public prefers “behaviour change and public transport improvement” (Xenias & Whitmarsh, 2013, p. 75).

Consider how administration undergoes internal transformation to be more effective towards sustainable development, i.e. the *transform* relationship. Inclusive sustainable development can be implemented through “transforming governance into interactive governance” and adopting appropriate governance instruments to create “conditions for adaptive learning and the empowerment” particularly for marginalized people (J. Gupta, Pouw, & Ros-Tonen, 2015, p. 541). On the local level, a lesson from South Africa points at “local government transformation and restructuring” as a key challenge for pursuing local agenda for sustainable development (Roberts & Diederichs, 2002, p. 189). On the global level, in order to “bring about societal change at the level and speed needed to mitigate and adapt to earth system transformation”, “transformative structural change in global governance is needed” towards a “much stronger institutional framework for sustainable development” (Biermann et al., 2012, p. 51). On the infrastructure level, telecommunication networks advance a more “sustainable urban ecology” by “making buildings more efficient, shifting reliance from roads to fibers and transforming government” (Moss, Kaufman, & Townsend, 2006, p. 234).

Consider how citizens legitimize administration to act on their behalf in pursuing sustainable development, i.e. the *legitimize* relationship. The legitimacy of partnership networks for sustainable development would benefit from “clearer linkage to existing institutions and multilateral agreements” as well as “systematic review, reporting and monitoring mechanisms” (Bäckstrand, 2006, p. 290). The salience, credibility and legitimacy of science institutions among governance actors engaged in Sustainable Development Goals is grounded upon three modes of scientific authority: assessment mode, advice mode and solution mode (Van der Hel & Biermann, 2017). In the case of rural governance for sustainable development, its legitimacy should be analyzed considering “specific contexts” and continuous construction “through discursive processes” (Connelly, Richardson, & Miles, 2006, p. 267). In the case of local urban planning for sustainable development, the legitimation of local actors such as the local community or local government, is justified through “traditional forms of authorisation - namely, in terms of expertise, representation or the common good” (Häikiö, 2007, p. 2147).

3.3. Relationships for Participatory Governance

Consider how administration opens its decisions and operations towards sustainable development to public scrutiny, i.e. the *disclose* relationship. During institutionalization of disclosure systems, technocratic and privatization rationales for governance transparency take a higher priority than democratization and marketization rationales (A. Gupta & Mason, 2016). Factors that promote the disclosure by governments of sustainability information on public policies include socio-economic information such as education and internet access, and e-government factors such as the provision of information and services online (Alcaraz-Quiles, Navarro-Galera, & Ortiz-Rodríguez, 2014). The Malaysian local authority websites feature low disclosure levels of stakeholder engagement information, which does not advance the goals of public sector transparency and accountability (Midin, Joseph, & Mohamed, 2017). An emerging role for government to develop “consumer trust and the expansion of sustainability consumption” is providing “access to information that fosters market transparency and efficiency”, for instance through smart disclosure or open government initiatives (Zhang, Liu, Sayogo, Picazo-Vela, & Luna-Reyes, 2016).

Consider how citizens are monitoring administrative and policy performance towards sustainable development, i.e. the *monitor* relationship. Partnership networks for sustainable development could benefit from “clearer linkage to existing institutions and multilateral agreements, measurable targets and timetables, more effective leadership, improved accountability, systematic review, reporting and monitoring mechanisms” (Bäckstrand, 2006, p. 290). For example, monitoring to detect illegal logging and trade includes “trade data analysis, production/consumption analysis, paper audits, remote sensing analysis, and field investigations” (Smith, 2004, p. 293). However, information available for monitoring global sustainability goals is primarily focused on supply-related aspects of ecosystem services, whereas much less information is available “on social behaviour, use, demand and governance measures” (Geijzendorffer et al., 2017, p. 40). Concerning available tools, mobile technology empowers citizen observatories for environmental monitoring by significantly improving “data coverage by the provision of near-real-time high-resolution data over urban areas” (Castell et al., 2015, p. 370).



Consider how citizens provide inputs to administration concerning its pursuit of sustainable development, i.e. the *participate* relationship. While the value of public participation for addressing sustainability issues is well recognized, a deeper understanding is required about “conditions under which participation is likely to work and what it can achieve in different circumstances” (Hurlbert & Gupta, 2015, p. 100). However political salience of public participation initiatives for sustainable development is affected by cultural factors, key among them deep distrust in government or business initiatives to advance sustainability (Macnaghten & Jacobs, 1997). Public participation initiatives can range from “consensus-oriented processes in the pursuit of a common interest” to “compromise-oriented negotiation processes aiming at the adjustment of particular interests”, the latter is particularly important for participatory initiatives that pursue sustainability (Van den Hove, 2006, p. 10). Meaningful public participation, particularly related to environmental assessment, also requires “critical education and the diversity of individual learning outcomes” (Sinclair et al., 2008, p. 415). However, while participatory governance “improve civic skills and social capital”, its effectiveness on “enforcing sustainable development” is marginal (Geissel, 2009, p. 401).

3.4. Relationships for Platform Governance

Consider how administration creates conditions for citizens to take up decisions and actions towards sustainable development by themselves, i.e. the *empower* relationship. The enabling conditions for inclusive development includes “adaptive learning and the empowerment of marginalized people”, the main instrument to create such conditions is “genuine interactive governance” (J. Gupta et al., 2015, p. 541). On the local level, the role of government in adapting sustainable development to the local context is creating “an environment in which citizens empower themselves by collaboratively making the rules for participation” and identifying “key individuals who connect the various networks and involve them in the development of sustainability strategies” (Kusakabe, 2013, p. 1). On the same level, the integration of municipal government strategies and the development of intellectual capital by educational institutions empowers citizens to contribute to city sustainability (Ortiz-Fournier, Márquez, Flores, Rivera-Vázquez, & Colon, 2010). One tool for community empowerment is freedom of information and open data but both depend on “the quality, completeness and accessibility of government records and data” which suffer from chronic problems (Thurston, 2015, p. 703).



Consider how citizens, empowerment by administration, can engage in learning and self-development towards more sustainable future, i.e. the *learn* relationship. Building resilience in social-ecological systems requires “social context with flexible and open institutions and multi-level governance systems that allow for learning and increase adaptive capacity” (Folke et al., 2002, p. 437). On the organizational level, bottom-up learning processes and co-evolution of self-organized networks of organizations can advance organizational sustainability (Espinosa & Porter, 2011). On the individual level, education for sustainability could be integrated along “transdisciplinary study (head); practical skill sharing and development (hands); and translation of passion and values into behavior (heart)” to enable “community-based, applied learning experiences” (Sipos, Battisti, & Grimm, 2008, p. 68). At the same time, key sustainability competencies such as “problem-solving skills and the ability to collaborate successfully with experts and stakeholders” can be acquired through real-world learning that includes “project- and problem-based learning, service learning, and internships in communities, businesses, and governments” (Brundiers, Wiek, & Redman, 2010, p. 308).

Consider how administration can coordinate societal decisions and actions towards sustainable development, i.e. the *coordinate* relationship. Countries are still at the early stages of how governments should organize processes towards sustainable development, with unresolved challenges of coordination with “the national budget”, with “sub-national level sustainable development strategies” and with “other national-level strategy processes” (Volkery, Swanson, Jacob, Bregha, & Pintér, 2006, p. 2047). Based on the lessons learnt from Swedish housing policy, the central government plays a critical role in implementing such policy through “strategic coordination of policy aims, instruments, stakeholders and interests” (Söderholm & Wihlborg, 2016, p. 1). While sustainable development “strategies should play a key role in better coordinating policies horizontally across sectors and vertically across levels of government”, in Europe the potential of such strategies for vertical coordination across different levels of government is underutilized (Steurer & Hametner, 2013, p. 224). Some authors recommend that given the failure of integrated strategies “on sustainable development, climate change mitigation and adaptation in the EU-15 countries” to better coordinate policies, they should be recalibrated towards fulfilling more realistic communication goals such as “providing direction and raising awareness” (Casado-Asensio & Steurer, 2014, p. 437).



Consider how citizens, empowered by administration, can jointly create public value and more sustainable future for themselves and their communities, i.e. the *create* relationship. Public value creation is often dependent on the process of co-creation between the public sphere and citizens, including deliberation of competing interests and perspectives (Benington, 2009). Based on the urban planning example, co-creation benefits include “bottom-up character of several projects, better responsiveness and greater opportunities for different categories of actors” while the drawbacks include “greater difficulty in ensuring that certain objective are reached (e.g. in terms of fairness and representativeness) and a higher risk of the dispersion of resources” (Trivellato, 2017, p. 337). As an example from Kosovo, engaging the youth in urban planning through “a combination of game based learning, co-creation, simulation modelling and design thinking” using a “modern innovative game-like experience”, is how local government can invest in long-term sustainability (Rexhepi, Filiposka, & Trajkovik, 2018, p. 114). In the Basque Country, entrepreneurial presence, co-creation and co-decision affect the adoption of local sustainability agenda by local government (Barrutia & Echebarria, 2012).

Consider how citizens collaborate with each other and with administration to jointly advance the sustainability agenda, i.e. the *collaborate* relationship. Three distinctive views on partnership for sustainable development, a process through which various societal actors jointly create more sustainable management practices are: a collaborative arrangement, a tool for deliberative social change or a public decision-making structure (Glasbergen, 2011). Based on three game theoretic tools namely the prisoners’ dilemma, the tragedy of the commons and the Nash equilibrium, it is possible to rationalize that “that collaborative behaviours offer better results than individualistic ones” in the transition towards more sustainable society (Lozano, 2007, p. 370). For example, collaborative consumption, i.e. “the peer-to-peer-based activity of obtaining, giving, or sharing the access to goods and services, coordinated through community-based online services” is expected to “alleviate societal problems such as hyper-consumption, pollution, and poverty by lowering the cost of economic coordination within communities” (Hamari, Sjöklint, & Ukkonen, 2016, p. 2047). Finally, collaboration among local government, residents and supporting network of organizations “can bolster the capacity of local governments to plan and implement sustainability initiatives” (Hawkins & Wang, 2012, p. 7).

3.5. Integrative Relationships Framework

Consolidating the analysis carried out, this section proposes an integrative framework that captures three main actors in platform governance for sustainable development and the variety of relationships between such actors at a high level. The framework, called *Platform Governance for Sustainable Development* is depicted in Figure 1 (d) and described as follows.

The framework assumes the presence of three main entities. The first entity, *Administration*, represents all state actors with authority and mandate to steer, coordinate and regulate development processes. The second entity, *Citizens*, comprises citizens, businesses and other non-state actors that delegate powers to *Administration* to act on their behalf, co-design and participate in development processes, and benefit from development outcomes if positive or absorb the impact of development failure otherwise. The third entity, *Policy*, represents



systems of rules, regulations, incentives, networks, communities and other formal instruments through which the *Administration* steers, coordinates and regulates development action, with *Citizens* co-creating, engaging in and monitoring such action.

The internal performance of *Administration* is represented by the *administer* relationship. *Administration* develops and enacts *Policy* through the *steer* relationship. Through *Policy*, *Administration* also regulates *Citizens'* performance as part of the *regulate* relationship. As depicted in Figure 1 (a), the *administer*, *steer* and *regulate* relationships are part of the bureaucratic paradigm.

Administration provides public services to *Citizens* by means of the *serve* relationship. In return, *Citizens* continuously engage in *Policy* processes through the *engage* relationship. Using this mechanism, *Citizens* can indirectly influence the transformation of *Administration* through the *transform* relationship. *Citizens* can also delegate powers to *Administration* to act on their behalf as part of the *legitimize* relationship. As depicted in Figure 1 (b), the *serve*, *engage*, *transform* and *legitimize* relationships are part of the consumerist paradigm, in addition to those under the bureaucratic paradigm.

Administration can apply *Policy* to open its decisions and actions proactively to public scrutiny in order to build trust. This is part of the *disclose* relationship. In turn, *Citizens* can continuously monitor *Policy* performance, e.g. the outcomes of *Administration's* disclosures, through the *monitor* relationship. *Citizens* can also provide direct feedback to *Administration* on its decisions and actions through the *participate* relationship. As depicted in Figure 1 (c), the *disclose*, *monitor* and *participate* relationships are part of the participatory paradigm, in addition to those under the consumerist paradigm.

Administration can empower *Citizens* to engage in development directly. This is part of the *empower* relationship. Thanks to such empowerment, *Citizens* can learn and develop themselves, part of the *learn* relationship. *Administration* can also coordinate *Citizens'* collective action through the *coordinate* relationship. Partly thanks to such coordination, *Citizens* can co-create public value and development futures as part of the *create* relationship. They can do this in collaboration with each other and with *Administration* through the *collaborate* relationship. As depicted in Figure 1 (d), the *empower*, *learn*, *coordinate*, *create* and *collaborate* relationships are part of the platform paradigm, in addition to those under the participatory paradigm. The key difference for platform paradigm, in comparison with earlier paradigms, is the ability of citizens, enabled by administration, to take up development decisions and actions by themselves.

Digital technology is not explicitly mentioned among any of the elements in this framework, as it is assumed ubiquitous. It not only underpins but also transforms the operations and interactions of all actors involved. According to the Digital Government Evolution Model (Janowski, 2015), digital transformation of *Administration* and its interactions with *Citizens* constitutes the Transformation and Engagement stages respectively, while *Policy* transformation through digital technology to respond to the needs and circumstances of different local and sectoral contexts constitutes the Contextualization stage.



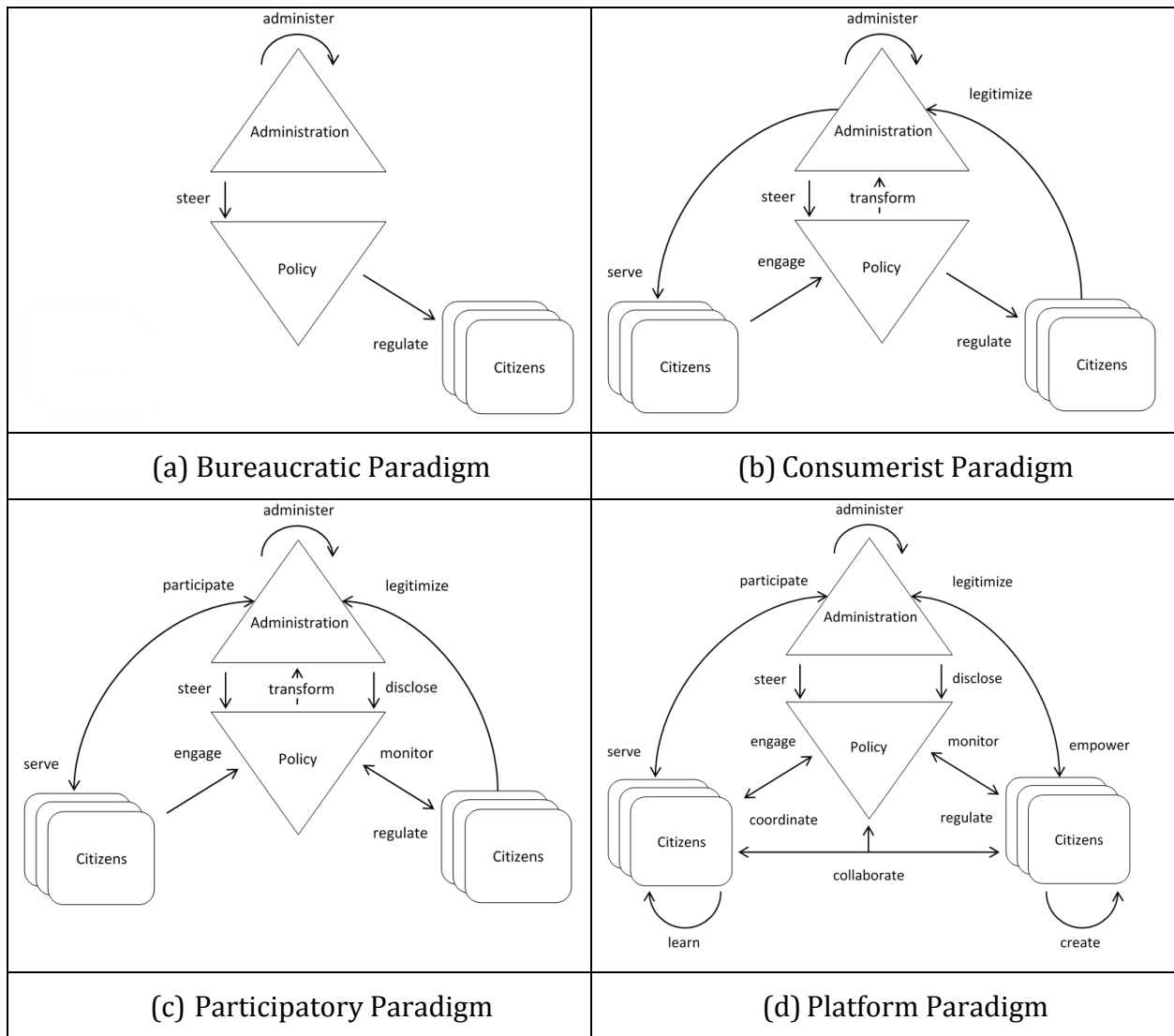


Figure 1. Governance for Sustainable Development across the four paradigms

4. Case Study Analysis

This section carries out the qualitative analysis of 11 case studies that comprise this special issue. The case studies are listed in Table 2 along with references to the corresponding papers. The table also contains classification of the cases into one of four stages of the Digital Government evolution model (Janowski, 2015): *digitalization* – digitalization of government information and services and automation of government operations; *transformation* – transformation of government structures, processes and services as part of institutional and administrative reform; *engagement* – engagement of citizens and other non-state actors in government decisions and processes; and *contextualization* – creating conditions for territories, sectors and communities to pursue development by themselves.

The analysis of individual cases using the *Platform Governance for Sustainable Development* framework is carried out in subsequent sections. Each section formulates a problem tackled by a case including reasons for classification, presents a solution offered to this problem, and outlines possible instantiation of the case study using the framework. It also presents a figure that depicts the application of the framework to this case, with parts of the framework that are used by the case colored in black and the rest colored in grey.

Table 2. Analyzed case studies

NO	CASE STUDY	STAGE	REFERENCE
Case 1	Privacy and Payment in Unseen Internet	Digitization	(Rykowski & Cellary, this issue)
Case 2	Criminal Justice Monitoring System	Digitization	(Dijk, Kalidie, & Choenni, this issue)
Case 3	Standardising e-Waste Management	Digitization	(Kumar & Rawat, this issue)
Case 4	Electronic Government Procurement	Transformation	(Klabi, Mellouli, & Rekik, this issue)
Case 5	Cross-departmental Collaboration	Transformation	(Liu & Zheng, this issue)
Case 6	Adoption of Interoperability Standards	Transformation	(Henning, this issue)
Case 7	Proactive e-Governance	Transformation	(Linders, Liao, & Wang, this issue)
Case 8	Open Governance Systems	Engagement	(Millard, this issue)
Case 9	Software Infrastructure for e-Participation	Engagement	(Porwol, Ojo, & Breslin, this issue)
Case 10	Innovating Policy Cycle	Engagement	(Janssen & Helbig, this issue)
Case 11	Governance Networks for Societal Challenges	Engagement	(Ojo & Mellouli, this issue)

4.1. Case 1 – Privacy and Payment in Unseen Internet

In the case (Rykowski & Cellary, this issue), the authors address two key challenges of the Unseen Internet, i.e. the protection of privacy and the execution of payments. Visible Internet connects servers with human-oriented terminals; its services are paid for directly through e.g. credit cards or indirectly through advertisements; and they are authorized by identification. Unseen Internet connects servers with sensors and actuators embedded in things, it is hidden and not controlled directly or consciously by humans, its services are provided in the background paid directly through micro- or pico-payments, it operates mainly by incidental anonymous access, and it has limited ways of identification. Payments taking place within smart environments are coincidental, numerous and low-value. Additionally, for services enabled by the Unseen Internet to be viable, there is need for continuous tracking of people. The more information is provided about a person, the better the service is able to fulfil this person's needs. However, many people prefer to remain anonymous, particularly for coincidental interactions. This creates a problem of how to combine personalization with privacy protection for occasional interactions.



To address the identified problems, the authors propose a privacy protection scheme and a pico-payment system. Concerning privacy, the authors recommend that policy makers and government regulators set up and enforce rules of privacy protection, e.g. through third-party trust providers. To deal with the trade-offs between personalization and privacy, the use of the fragmentation and the “license-plate” approach is proposed whereby a trusted third-party provides registered users, on request, with secured “license plates” as unique identifiers for coincidental transactions. Such identifiers are then used by the smart environment operators to obtain information, released and authorized by the users, necessary for personalizing the services. Concerning payment, a pico-payment solution is proposed to cover two scenarios: several operators dealing with a smart environment that provides different services to a single client and a single operator offering several services in a smart environment that deals with many clients. Since both operators and clients do not want to see pico-payments directly on their bank accounts, the solution includes a pico-payment aggregator. The aggregator registers all pico-payments in a given smart environment and periodically sends a single aggregated bill to each client, independently of how many operators provided services to this client, and transfers payments to the service operators, independently of how many clients used their services. As the case involves digital technology but no government transformation through this technology, it is associated with the digitalization stage.

Concerning the application of the *Platform-Based Governance for Sustainable Development* framework to this case, users, financial institutions, advertisers, pico-payment aggregators, “license plate” providers, and third party privacy service providers in the Unseen Internet are represented as *Citizens* whereas state agencies in charge of financial and cybersecurity regulations are represented as *Administration*. The *Policy* environment represents the financial regulations and policies, privacy laws and regulations, ICT laws, trade laws and policies as well as e-commerce regulations. *Citizens* share their data and resources with smart services, and produce and pay for such services. These are represented by the *collaborate* relationship. *Administration* is responsible for setting the adequate *Policy* environment, including legal frameworks and solutions to ensure privacy. This is represented by the *steer* relationship. In addition, *Administration* needs to authorise third-party trust providers and deliver innovative services in smart environments. This is represented by the *serve* relationship. The empowerment of enterprises enabled by the Unseen Internet to be paid for their services and the users of such Internet to securely access and pay for services is represented by the *empower* relationship.



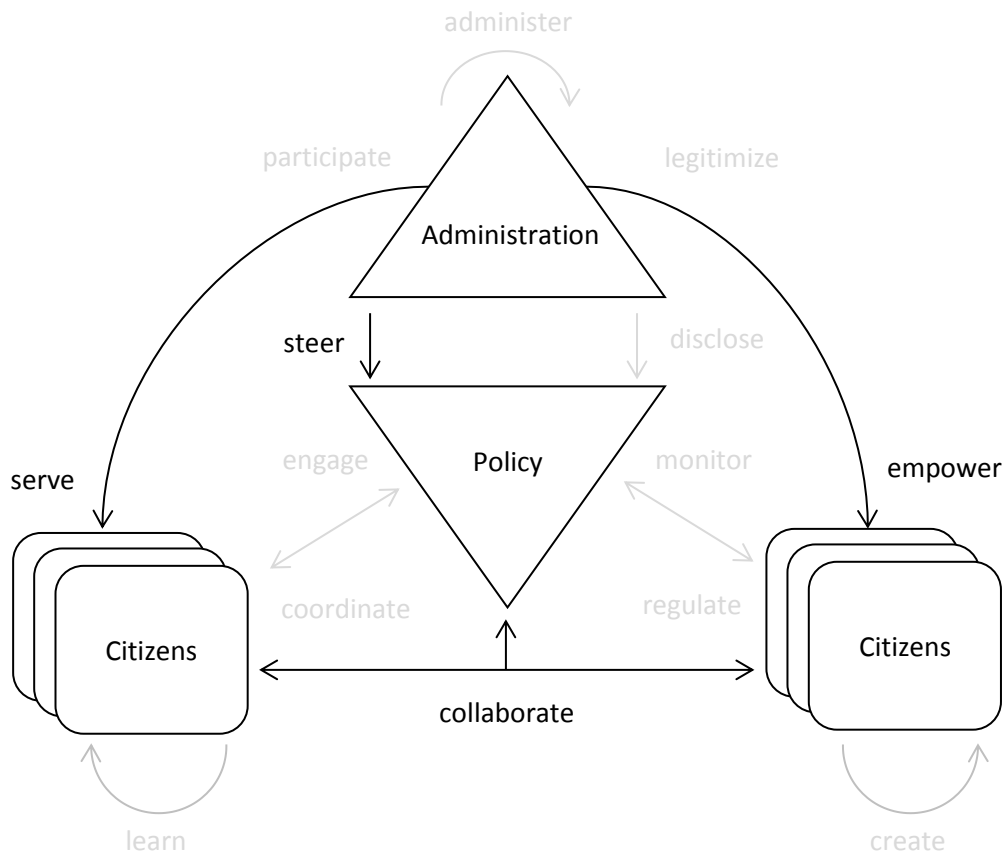


Figure 2. Platform Governance for Sustainable Development instantiated to the “Privacy and Payment in Unseen Internet” case

4.2. Case 2 – Criminal Justice Monitoring System

In the case (Dijk, Kalidie, & Choenni, this issue), the authors address the problem of bottlenecks, deviations and error-prone aggregation of data used in the proceedings of the criminal justice system in the Netherlands. Such proceedings involve events carried out by the police, public prosecution, courts and other organizations comprising the criminal justice system, connected into chains of events through provision of outputs from one organization as inputs to other organizations. However, this connection is impaired by the use of independent data sources by different organizations, and the consequent use of different points of reference to the same real-life entities (e.g. a person or a case), different semantics and interpretations of data, different times and precisions used for recording real-life events, as well as missing data. Such challenges make the automatic aggregation of data difficult, resolving instead to error-prone manual or semi-manual aggregation.

In order to address this problem, the authors propose a so-called data space system. The system is structured into three layers. First, the data space layer contains a set of data sources ranging from individual files to data warehouses. Second, the space management layer contains a database of variables that represent user-defined concepts with attributes stored in the data space layer, the relationship module containing expert-defined rules to



guard the quality of data through handling of missing data and relations between data, and some auxiliary modules to generate variables from the data space layer and to normalize them. Third, the interface layer is responsible for presenting and visualizing data obtained from the space management layer to the end users. The system is currently used by several partners in the Dutch criminal justice system including policymakers at the Ministry of Security and Justice. As the case involves development of a digital system for criminal justice organizations, but not transformation of such organizations, it is associated with the digitalization stage.

Concerning the application of the *Platform-Based Governance for Sustainable Development* framework to this case, ministry of justice, police, public prosecution, courts, and other organizations comprising the criminal justice system are represented by *Administration*, whereas policy makers, experts, citizens, businesses and other users of the justice system are represented as *Citizens*. The *Policy* environment represents privacy laws, information flows implemented within the criminal justice system, principles like “comply or explain” that assign responsibility to organizations for detecting and accounting for bottlenecks or deviations in their information flows, or any other regulations or laws that guide the proceedings of the actors within the criminal justice system. *Policy* also includes expert-defined rules hosted in the space management layer of the system to guard data quality. The purpose of the system is to support and improve the internal operations within and across the criminal justice system and its various actors. This takes place through the *administer* relationship. Another purpose is to make explicit the tacit knowledge obtained from experts in the criminal justice domain; the definition of the expert rules is part of the *create* relationship. The system makes the rules and other expert insights available in *Policy* through the *engage* relationship. Yet another purpose is to help the end users *monitor* system performance. The system also delivers justice to citizens using the *serve* relationship.

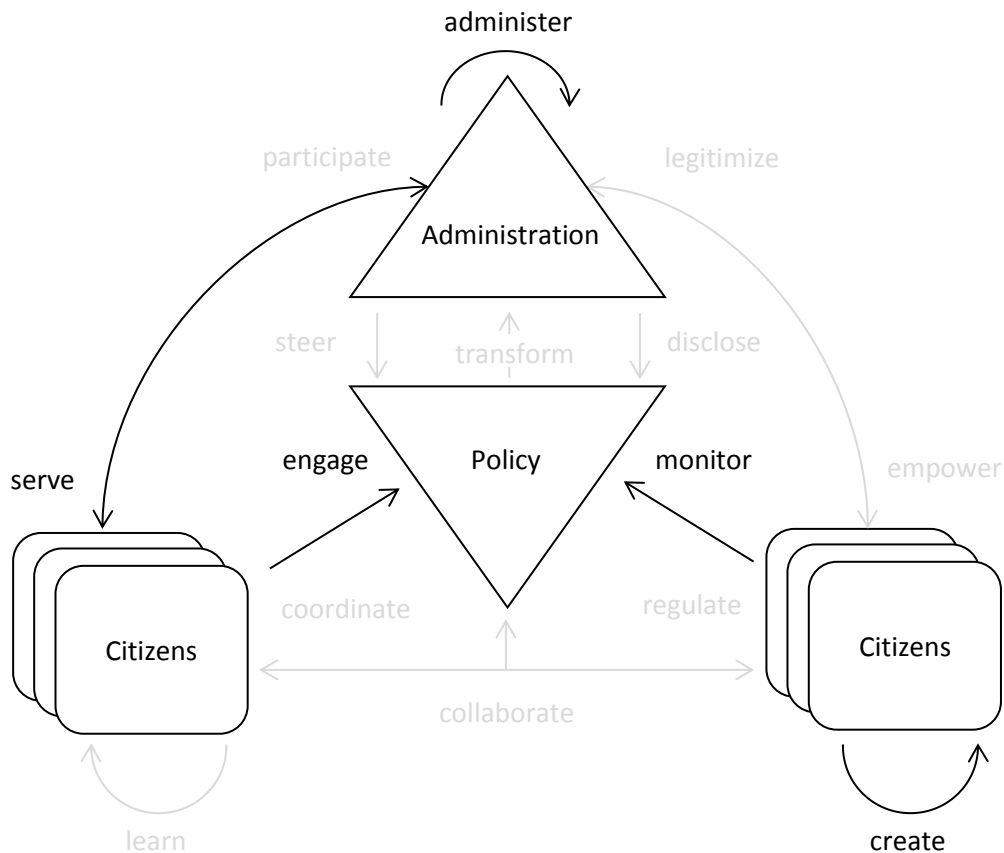


Figure 3. Platform Governance for Sustainable Development framework instantiated to the “Criminal Justice Monitoring System” case

4.3. Case 3 – Standardizing e-Waste Assessment

In the case (Kumar & Rawat, this issue), the authors address the problem of increasing volumes of waste of electrical and electronic equipment (e-waste) due to the fast pace of technological change, fast obsolescence of working products and accelerated consumption, and lack of reliable and complete data concerning the assessment of such e-waste. As many governments around the world adopt policies and regulations concerning the disposal, recycling and generally management of e-waste, lack of reliable and complete data directly influences the implementation of such policies and regulations. The problem is particularly acute in many developing countries that receive e-waste, in violation of international agreements, from more affluent countries and process it by the informal sector outside any control of the health or environmental hazards. Further problem is that existing methods rely heavily on average values concerning the lifespan or weight of consumed or produced electrical and electronic equipment, which makes them imprecise particularly in view of the increased variety of such equipment available on the market.

In order to address this problem and using the data from India, the authors propose a system for managing information pertaining to the use of electrical and electronic equipment by the public sector. The paper identifies information requirements for such a system, including



types, quantities, production years, and users (during the lifespan) or disposers (after the lifespan) of the relevant electrical and electronic equipment. To fulfill the identified requirements, the system comprises three parts. The first is the set of three reference indices to serve as a common coding and classification scheme: Global Commodity Index that categorizes different kinds of electrical and electronic equipment, National Offices Index that identifies all government departments that use such equipment and Disposal Agencies Index that identifies all registered disposal agencies. The second part is the Consumption Database that holds existing stock of equipment across the entire lifespan from request for proposals, through bidding and tendering, to delivery, consumption and disposal. The third part is the user interface to facilitate access and update of the data held in previous two parts. The paper also presents possible scenarios for the usage of the system. As the case involves development of a standard to be adopted by government organizations but not transformation of such organizations, it is classified to belong to the digitalization stage.

Concerning the application of the *Platform-Based Governance for Sustainable Development* framework to this case, the public sector and individual agencies identified in the National Offices Index as the main consumers of the electrical and electronic equipment are represented as *Administration*. The informal sector, currently the main handler of e-waste, and all authorized disposal centers, dismantlers and recyclers identified in the Disposal Agency Index are represented as *Citizens*. The policies and regulations concerning the disposal, recycling and generally handling of e-waste are part of the *Policy* environment, along with three reference indices adopted by government through the *steer* relationship. Standardization of e-waste management practice across the sector and different scenarios for the use of the proposed system are part of the *administer* relationship by *Administration*. *Administration* is also regulating, through the *Policy* environment, how e-waste is handled by *Citizens* through the *regulate* relationship. The actual handling of e-waste is carried out through the *create* relationship.

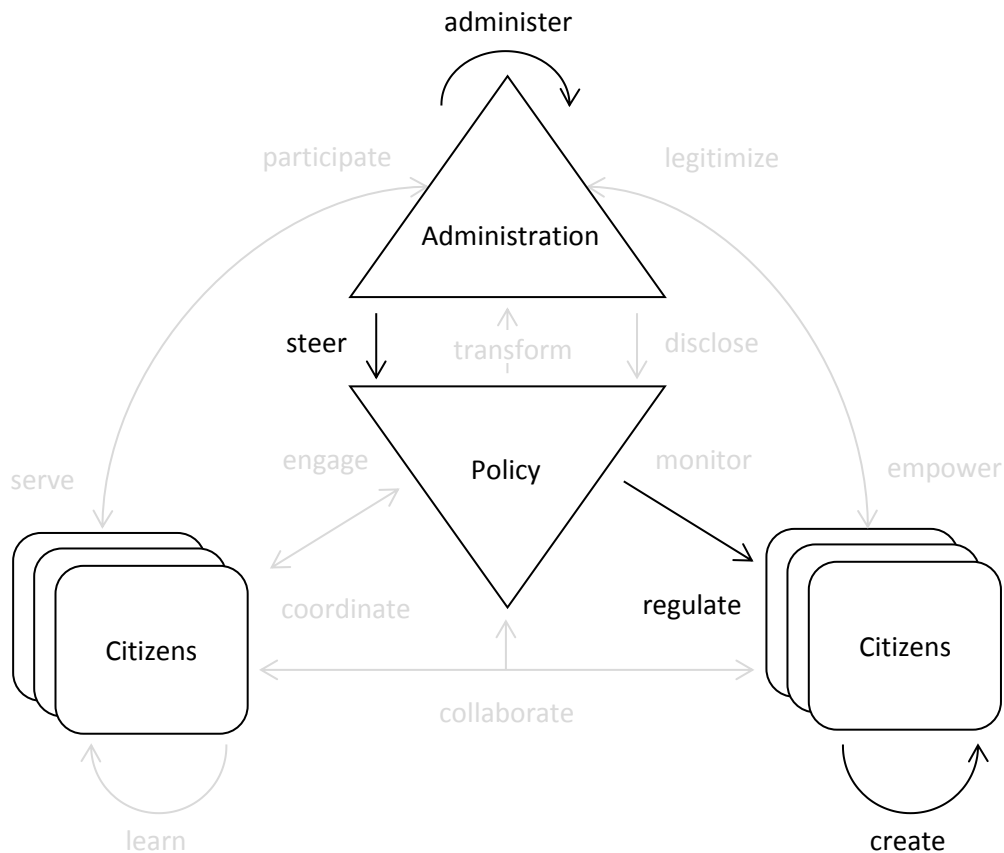


Figure 4. Platform Governance for Sustainable Development framework instantiated to the “Standardizing e-Waste Assessment” case

4.4. Case 4 – Electronic Government Procurement

In the case (Klabi et al., this issue) the authors address the problem of supplier selection by government agencies when the asking price is the only criteria applied to carry out such selection during procurement process. In this scenario, the failure of individual suppliers to deliver on outsourcing contracts increases the total costs of outsourcing for government. However, individual government agencies may have limited experience to minimize the risk of erroneous selection and their inability to systematically learn from the outsourcing experience (positive or negative) and lack of mechanisms to use such learning to inform future procurement decisions may further increase the losses for government.

In order to address this problem, the authors propose a computational model for supplier selection that takes into account the price and suppliers’ reputation. The calculation of suppliers’ reputation is based on three measures. The first is direct reputation, which represents the experience of past arrangements between a given agency and a given supplier, adjusted to consider the importance of the outsourcing area, the timing of the past arrangements, and the economic impact of the arrangement. The second measure is indirect reputation, which is the direct reputation of a given supplier with other government agencies, adjusted for the timing and number of the outsourcing arrangements, combined



over all partner agencies into a global supplier reputation. The third measure is the difference in beliefs, i.e. the difference between the request for proposals issued by the agency and the actual proposals submitted by suppliers. The model was validated through a study concerning procurement of transportation services. In general, considering reputation in procurement decisions increases direct costs but significantly reduces total costs, while exchanging information among agencies results in gains in direct costs, hidden costs and total costs. Issues related to the adoption of the reputation-based procurement practice are also discussed. As the case involves transformation of government procurement practice but not government-business relationships, it is classified to belong to the transformation stage.

Concerning the application of the *Platform-Based Governance for Sustainable Development* framework to this case, government agencies that carry out supplier selection as well as those consulted about their supplier experience are represented by *Administration*, while suppliers are represented by *Citizens*. A process through which government agencies advertise opportunities for suppliers to competitively bid for provision of products or services is realized through the *empower* relationship, i.e. through the provision of opportunities to suppliers, based on which they can bid for provision of products or services through the *participate* relationship. The entire selection process is represented by the *administer* relationship, part of the internal performance of *Administration*. The public procurement laws and guidelines as well as requests for proposals are part of the *Policy* environment. Policies are formulated and enacted by *Administration* using the *steer* relationship. In turn, *Policy* is responsible for regulating (*regulate*) suppliers and for transforming (*transform*) the administration's procurement practice from price-based to reputation-based. Digital technology facilitates the interaction within *Administration* to reduce the risk of selecting non-performing suppliers. Thanks to such technology, suppliers with consistently high performance are empowered (*empower*) while those with low or inconsistent performance are disempowered, helping suppliers *learn*, and resulting in the overall performance improvements of the *Administration* as a whole.

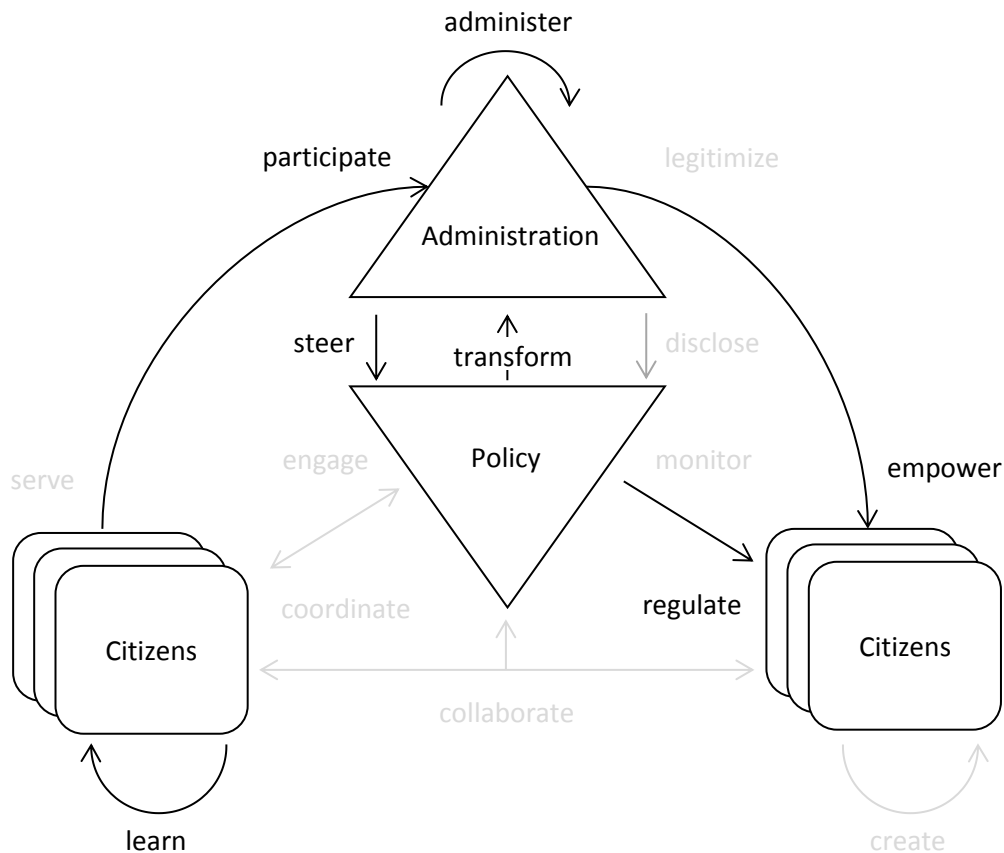


Figure 5. Platform Governance for Sustainable Development framework instantiated to the “Electronic Government Procurement” case

4.5. Case 5 – Cross-Departmental Collaboration

In the case (Liu & Zhang, this issue), the authors address the problem of understanding the factors, strategies and effectiveness of cross-departmental collaboration in the Chinese context. In a bid to improve efficiency and effectiveness, governments around the world are encouraging and facilitating government departments to work together to share roles, information and resources, enhance capabilities and solve complex problems together. However, while considerable research has been carried out on cross-departmental collaboration, few in-depth studies have been conducted in the Chinese context.

To address the identified research gap, the authors present factors that could influence cross-departmental collaboration in the Chinese context, strategies that have been adopted by the Chinese Government to promote cross-departmental collaboration, and the level of effectiveness of cross-departmental collaboration observed. This analysis is based on a case study of a one-stop Administrative Service Centre (ASC) of Xintai City in the Shandong province of East China. The findings show that most factors influencing cross-departmental collaboration found in existing studies also exist in the Chinese context. The main factors found to influence cross-departmental collaboration include: requirements for better service delivery by collaborating departments; avoiding uncertainty by providing agencies



with a platform to work together; the adoption of new technologies; and administrative reforms. Major strategies adopted to promote cross-departmental collaboration include: support from political leadership and resource allocation; institutional arrangements; formal and informal coordination; managerial rules and standards; reengineering service processes; and ensuring system compatibility and security. Challenges that limit the effectiveness of collaboration include: departments above the city level still work separately; some applications are still paper-based, and some agencies are yet to join ASC. As the case involves transformation of government collaboration arrangements but not government-citizen relationships, it is classified to belong to the transformation stage.

Concerning the application of the *Platform-Based Governance for Sustainable Development* framework to this case, the Xintai city government and the ASC are represented by *Administration* while citizens served by this administration as *Citizens*. The establishment of the ASC could be seen as an outcome of the *transform* relationship, with the relevant laws and policies established by the Xintai City Government through the *steer* relationship, to be part of the *Policy* environment. This environment and related transformation also includes the provisions of the top-down administrative reform. The operations of the ASC includes the provision of one-stop services and regulation to *Citizens* through the *serve* and *regulate* relationship respectively, and general improvement in such services and regulations as a measure of empowerment (*empower*). Cross-departmental collaboration falls under internal government performance, i.e. the *administer* relationship, and so is the regulation and coordination of administrative entities, e.g. setting managerial rules and standards according to ASC's policies; improving formal and informal coordination and interaction among agencies; and further development and application of the policies governing ASC via the Commission for Discipline.

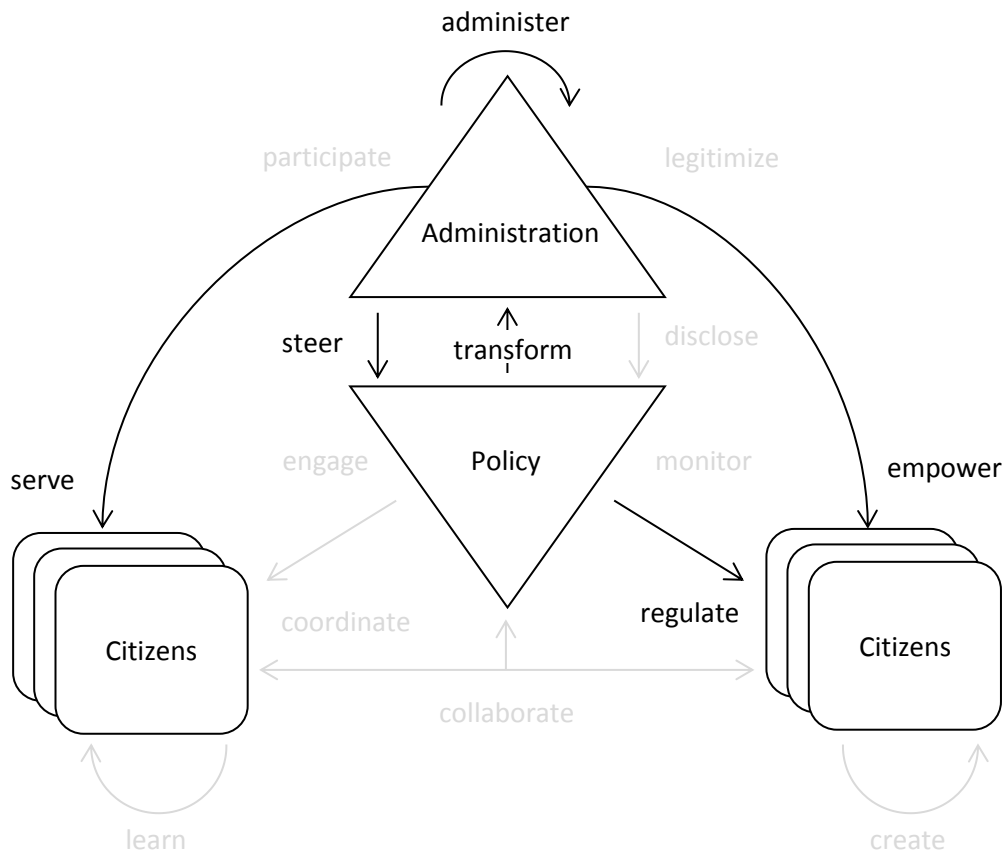


Figure 6. Platform Governance for Sustainable Development framework instantiated to the “Cross-Departmental Collaboration” case

4.6. Case 6 – Adoption of Interoperability Standards

In the case (Henning, this issue), the author addresses the problem of interoperability in Government Information Networks (GINS). GINS are multi-organizational networks supported by digital capacities for storing, processing and sharing information. GINS enable collaboration, sharing information and resources between government and non-government actors, standardizing information and knowledge exchanges and facilitating cross-departmental checks on data integration. However, for this to happen, systems of partner organizations must be compatible (interoperable) with each other. Interoperability is based on adherence to common standards and agreements among collaborating organizations. It requires technical, semantic and organizational standardization covering processes, structures and policies. However, many GINS fail to interoperate because of the failure by some organizations in the collaboration to adopt and comply with the necessary standards.

To address this problem, the author offers a theoretical framework for the determinants of interoperability standards adoption in GINS. The author identifies relevant determinants and conceptually groups them into a conceptual framework comprising: interoperability governance, network characteristics, results, adoption efforts, organization-specific determinants, network-external environment and interoperability standards



characterization, and several sub-constructs. The preliminary framework was then enriched by inductively identifying additional determinants from the case study data derived from two GINS in the Netherlands. Among the main constructs, interoperability governance emerged as the most significant determinant construct for the adoption of standards, followed by network characteristics. The framework provides a useful analytical tool for policy makers and researchers working on interoperability. As the case involves transformation of government organizations to adopt interoperability standards but not transformation of relationships with citizens or businesses, it is classified to belong to the transformation stage.

Concerning the application of the *Platform-Based Governance for Sustainable Development* framework to this case, the Digital Client Dossier (Digitaal Klantdossier, DKD), Studielink and other GINS are represented as *Administration* whereas the interoperability standards comprising laws, regulations, policies and guidelines developed and enacted by *Administration* through the *steer* action are represented by *Policy*. The two case studies i.e. DKD and Studielink, as well as other GINS are responsible for supporting development actions through provision of information that is of common interest to other parts of *Administration*. Such standards enable *Administration* to interoperate (*administer*) and *transform* the way it works by integrating its otherwise disconnected parts. Standards also enable *Administration* to *coordinate* the activities of *Citizens*, e.g. private companies and other non-government entities that collaborate with government institutions and with each other in the delivery of public services. Such entities adopt interoperability standards (*learn*) and interoperate on this basis (*collaborate*). GINS enable government departments to become more efficient and effective by enabling collaboration as well as information, knowledge and resource sharing between government and non-government entities.

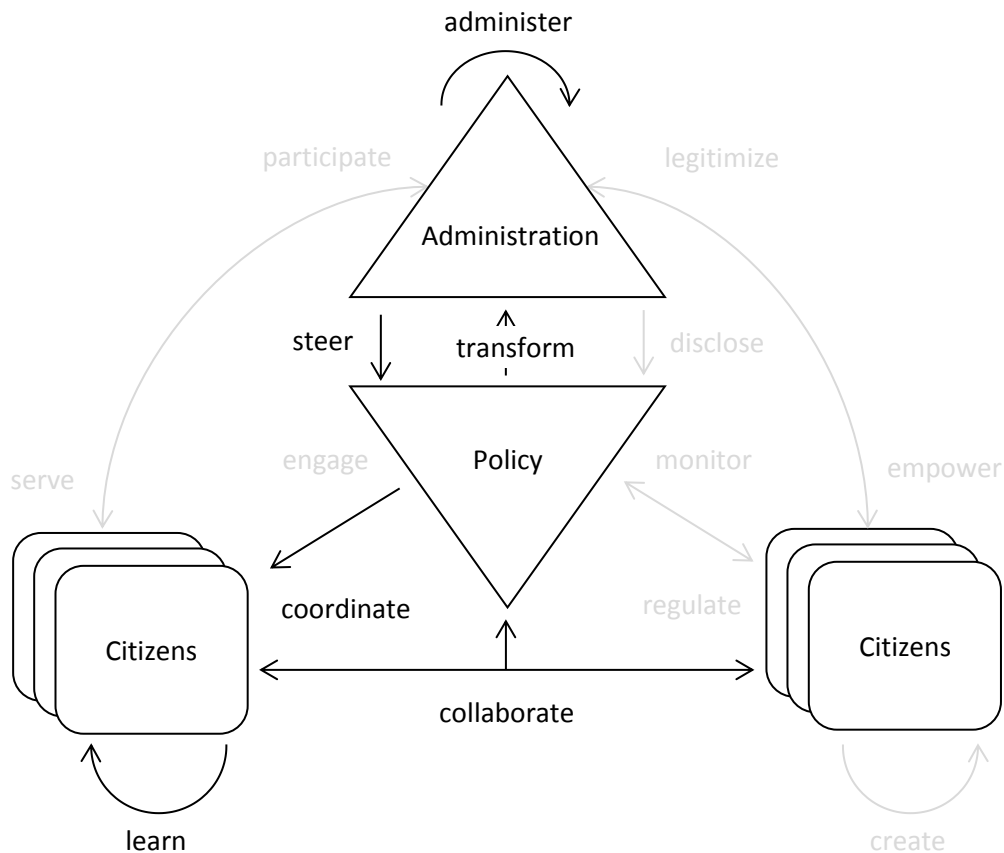


Figure 7. Platform Governance for Sustainable Development framework instantiated to the “Adoption of Interoperability Standards” case

4.7. Case 7 – Proactive e-Governance

In the case (Linders et al., this issue), the authors address the problem of lack of a blueprint on how to realize the transformation in government and governance through use of digital technology. Although the focus of research and practice in digital government has moved beyond digitizing government services to how to use digital technology to drive transformative change in government and governance, traditional maturity models of digital government do not provide sufficient guidance on what to do after digitizing government functions.

To address this gap, the authors examine the implementation of proactive e-governance in Taiwan using three case studies: service excellence (e-Housekeeper), operational efficiency (Taipei 1999) and digital inclusion (Door-to-Door e-Services). The e-Housekeeper initiative is aimed at improving e-government effectiveness by proactively pushing information and services to citizens through a unified messaging platform. The Taipei 1999 initiative empowers call centre employees with robust access to information and systems which enables them to proactively address citizen issues. The purpose of the Door-to-Door e-Services is improving the capacity of the frontline civil servants to provide services to vulnerable citizens, namely the elderly and rural dwellers, through the use of tablets

connected to the e-government infrastructure. The authors used the lessons learnt from the three case studies, together with insights from literature, to develop an Integrated Model for Proactive e-Governance. The framework relies upon three technology families: national e-government platform and network infrastructure, mobile technologies and ubiquitous connectivity, and advances in data analytics; and applies three guiding principles to realize proactive e-governance: citizen centeredness, data drive and context-sensitivity, and empowerment of frontline civil servants with technology. As the case involves government capacity to proactively respond to citizen needs but not transforming government-citizen relationships, it is classified to the transformation stage.

Concerning the application of the *Platform-Based Governance for Sustainable Development* framework to this case, the Taiwan National Development Council, the three case studies and the national e-government portal are represented by *Administration* whereas citizens targeted by the case studies are represented by *Citizens*. The national e-Government Strategic Plan that is the basis for the three case studies as well as other national ICT laws, policies, strategies and plans are represented by *Policy*. The Taiwan National Development Council holds the primary responsibility for e-government development and related instruments through the *steer* role. The policies facilitate the transformation of *Administration* and how it operates through the *transform* and *administer* relationships respectively. The three case studies and the portal provide services to *Citizens* through the *serve* relationship and indirectly empowers them through the *empower* relationship.

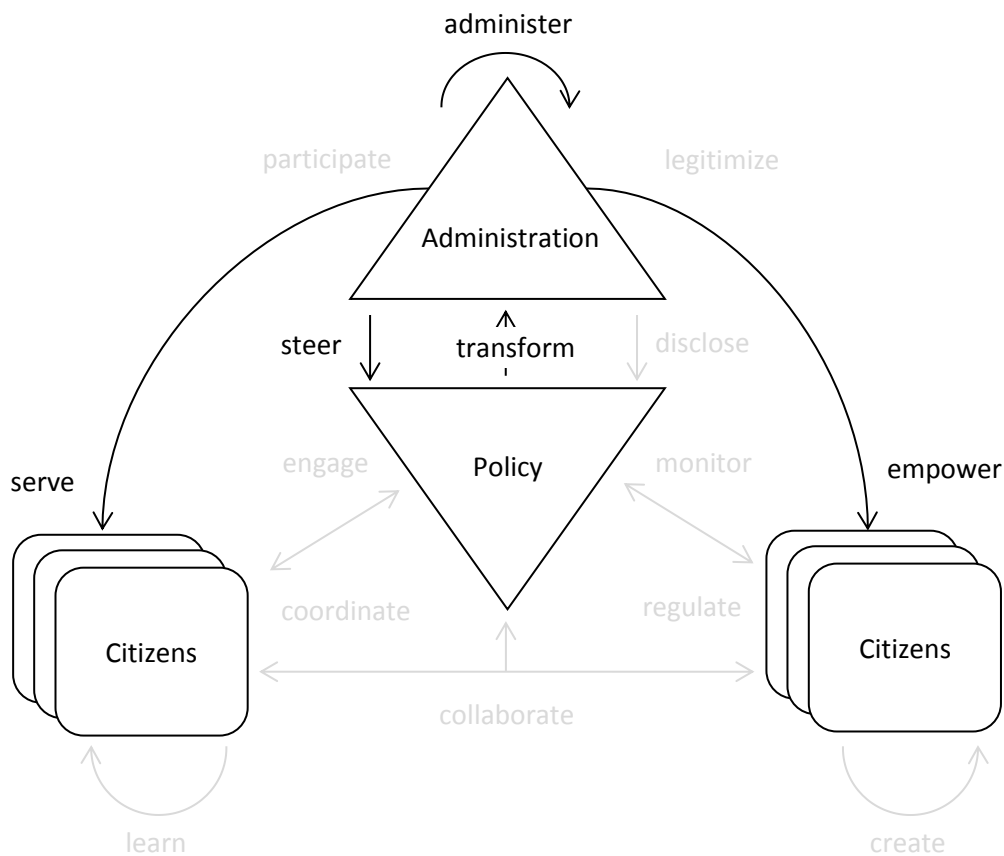


Figure 8. Platform Governance for Sustainable Development framework instantiated to the “Proactive e-Governance” case

4.8. Case 8 – Open Governance Systems

In the case (Millard, this issue), the author outlines the future of the public sector and how digital technology can be used to respond innovatively and effectively to the effects of the economic crisis, inequalities within countries, poverty, corruption, climate change, and other global development challenges. The paper revises the growing sharing movement that started with the non-profit sector but later spread to the for-profit sector, threatening current market actors, legal and regulatory systems and frameworks of trust and ethics. Critical to these innovations is the necessity to meet real social needs in a way that involves the beneficiaries. The author claims that to the public sector this kind of movement is both a challenge and an opportunity; and that old and new digital technologies are transforming government’s ability to play new government-as-a-platform role.

To address the identified problem, a conceptual framework is proposed for open governance system enabled by digital technology. The framework comprises five types of roles for government. The first is an open collaboration platform, supported by digital technology, which actors can use to co-produce public value as well as benefit individually. Secondly, government needs to play the role of an enabler, arbiter, facilitator, regulator and coordinator for others’ activities in the process of delivering public value. The third role is providing tools, guidance, and incentives for collaboration so that service co-creation can happen. Fourth, identifying and deploying assets and resources available in the society that are underused, like finance, people’s time and expertise, data, buildings, networks, etc. Using digital technology in collaboration with other actors, government can identify, broker, match, orchestrate and coordinate assets that can be shared and converted into public value. Fifth, government needs to play the central oversight role, taking responsibility for the overall quality, standards and mechanisms for resource sharing and legal frameworks. As the case involves building government capacity and transforming government-citizen relationships, but not creating conditions for sectors, territories or communities to develop themselves, it is classified to belong to the engagement stage.

Concerning the application of the *Platform-Based Governance for Sustainable Development* framework to this case, the government can be represented as *Administration* whereas entrepreneurs, innovators, citizens and other entities taking part in the open government system can be represented as *Citizens*. Created by Administration through the *steer* relationship, the *Policy* environment includes laws and policies on the development and use of open assets, open services and open engagement, including resource sharing, quality assurance as well as data protection and security. The enabling role of the public sector related to the provision of open assets and open services is implemented through *serve* and *empower* relationships; while the coordination role is played through *disclose* and *coordinate* relationships. The latter is enacted through the *Policy* environment. Additionally, the open governance system calls *Citizens* to *collaborate* by sharing their resources, to *engage* in service co-design and delivery, and to *participate* in public policy and decision-making. By



taking part in the open governance system, *Citizens* co-produce public value and benefit individually through *create* and *learn* relationships respectively. While the framework does not explicitly cover collaboration that is necessary within *Administration* for effective open governance, such collaboration could be part of the *administer* relationship.

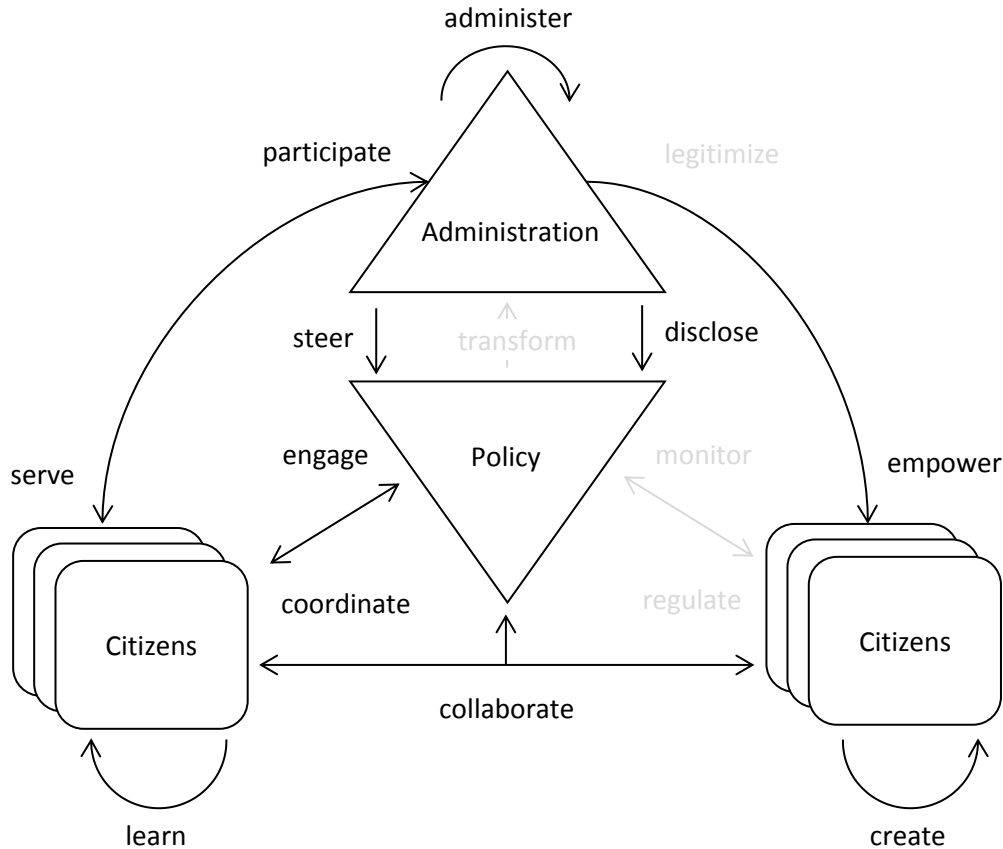


Figure 9. Platform Governance for Sustainable Development framework instantiated to the “Open Governance Systems” case

4.9. Case 9 – Software Infrastructure for e-Participation

In the case (Porwol, Ojo and Breslin, this issue), the authors address the problem of the lack of adequate guidance in existing e-participation models on how to combine traditional e-participation and citizen discussions on social media. Due to this gap, many e-participation platforms lack support to the duality of e-participation, i.e. the combination of citizen-led and government-led e-participation channels. To realize such duality, there is a need for a technical solution that can provide access to government decision makers to relevant information about ongoing citizen discussions on social media platforms.

To address this problem, the authors propose the Social Software Infrastructure (SSI) system which facilitates the duality of e-participation by enabling e-participation stakeholders to harness the synergy and potential of citizen-led and government-led e-participation. The design of the SSI is based on a theoretical framework that identifies key e-participation

capabilities required to support the integration of government-led and citizen-led e-participation channels, such as: empowering citizens to participate and influence decision-making; processing data from different e-participation channels; facilitating government-to-citizen interactions and government feedback to citizens; and monitoring deliberations and acknowledging individual citizen contributions. The SSI includes Information Extraction and Knowledge Discovery components which automatically process textual contents from major social media platforms to generate useful information about citizen comments, opinions and sentiments on public services and government policies. As the case involves transformation of government-citizen relationships but not creating conditions for sectors, territories or communities to develop themselves, it is classified to belong to the engagement stage.

Concerning the application of the *Platform-Based Governance for Sustainable Development* framework to this case, government agencies such as the owners of government-led e-participation channels are represented as *Administration* whereas citizens participating in citizen- and government-led e-participation channels are represented as *Citizens*. Government-led e-participation is part of the internal activities of *Administration*, represented by the *administer* relationship. Traditionally, citizen contributions are part of the *participate* relationship through which they provide feedback, co-produce and in general engage with *Administration*. Citizen-owned e-participation is part of *collaborate* relationship which enables *Citizens* to deliberate (*learn*) as well as share opinions, knowledge and information between themselves and with *Administration* via the *Policy* environment. The integration of government-led and citizen-led e-participation realized through the Social Software Infrastructure system is part of the *Policy* environment. Government adopts this environment through the *steer* relationship and provides feedback to citizens and opens up to them via this environment using the *disclose* relationship. In turn, citizens use this environment to *engage* and *monitor* government decisions. This contributes to empowering (*empower*) *Citizens* to participate in government and policy decision-making and to legitimizing (*legitimize*) government to act on their behalf.

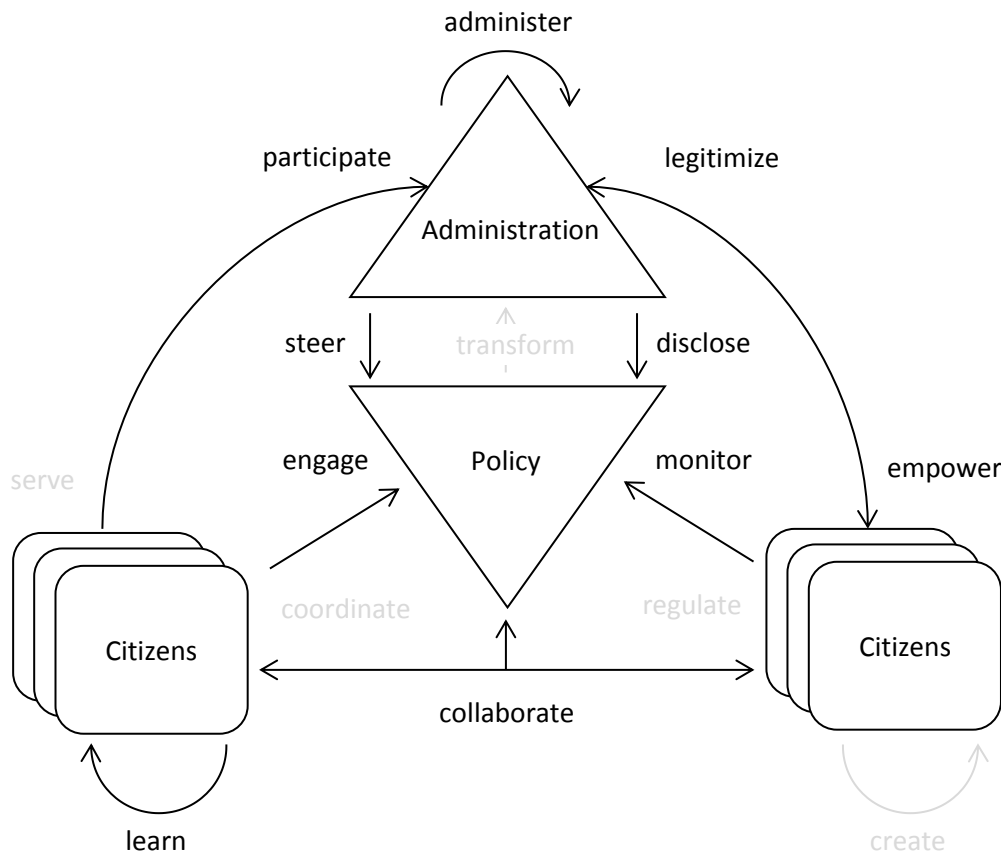


Figure 10. Platform Governance for Sustainable Development framework instantiated to the “Software Infrastructure for e-Participation” case

4.10. Case 10 – Digital Innovations in Policy-Making

In the case (Janssen & Helbig, this issue), the authors address lack of government capabilities to respond to the impact of digital technology on how policy makers and citizens engage in policy-making processes. Developments in ubiquitous civic engagement using social media and mobile devices, open and big data, data analytics, crowdsourcing, visualization, gaming, etc. are motivating new forms of e-democracy and e-participation. However, the impact of such developments on the roles and capabilities of policy makers is unclear.

To address this problem, the authors carry out literature review on various technological developments and their impact on policy making, and analyse two case studies of policy making in the digital age. The two case studies are: citizen self-organization to respond to the impact of earthquakes in the North of the Netherlands caused by the extraction of natural gas and the implementation of the pro-extraction energy policy; and pilot experiments using digital platforms by the Mayor’s office in Boston, Massachusetts to reduce barriers to participation in the urbanisation, clicks and bricks, and education areas. The results show that traditional policy makers’ roles are changing and new ones are emerging. The key emerging roles are: coordination of the policy-making process to ensure consistency and meaningful engagement; assuring engagement quality; assuring legitimacy of the process



and usability of data and information; and aggregating and reporting collected data to draw conclusions and recommendations. Some of the required capabilities are: checking calculations, carrying out complex simulations, falsifying arguments, and validating and verifying models. As the case involves building policymaking capacity and transforming government-citizen relationships but not directly creating conditions for sectors, territories or communities to develop themselves, it is classified to the engagement stage.

Concerning the application of the *Platform-Based Governance for Sustainable Development* framework to this case, government and policy makers are represented as *Administration* whereas citizens are represented as *Citizens*. Policies created and implemented through interactions between policy makers and citizens, such as the pro-extraction energy policy in the Netherlands and citizen reaction to it are represented as *Policy* environment. The environment also includes technologies and tools used throughout the agenda setting, development, implementation and enforcement stages of the policy process such as the e-platforms used to reduce barriers to participation in Boston. *Administration* adopts (*steer*) and populates (*disclose*) the policy environment in response to feedback, co-production and inputs from citizens (*engage*), who can also *participate* in policy processes directly and *legitimize Administration* to act on their behalf. Administration also applies *Policy* to *coordinate* citizen behaviour, who in turn can *monitor* policy performance. Self-organization by citizens relies on sharing information, opinions, knowledge and experiences with each other and with *Administration* (*collaborate*) and on collective deliberation (*learn*). Based on innovations in policy processes, the administration including policy makers transforms their roles and capabilities (*transform*).

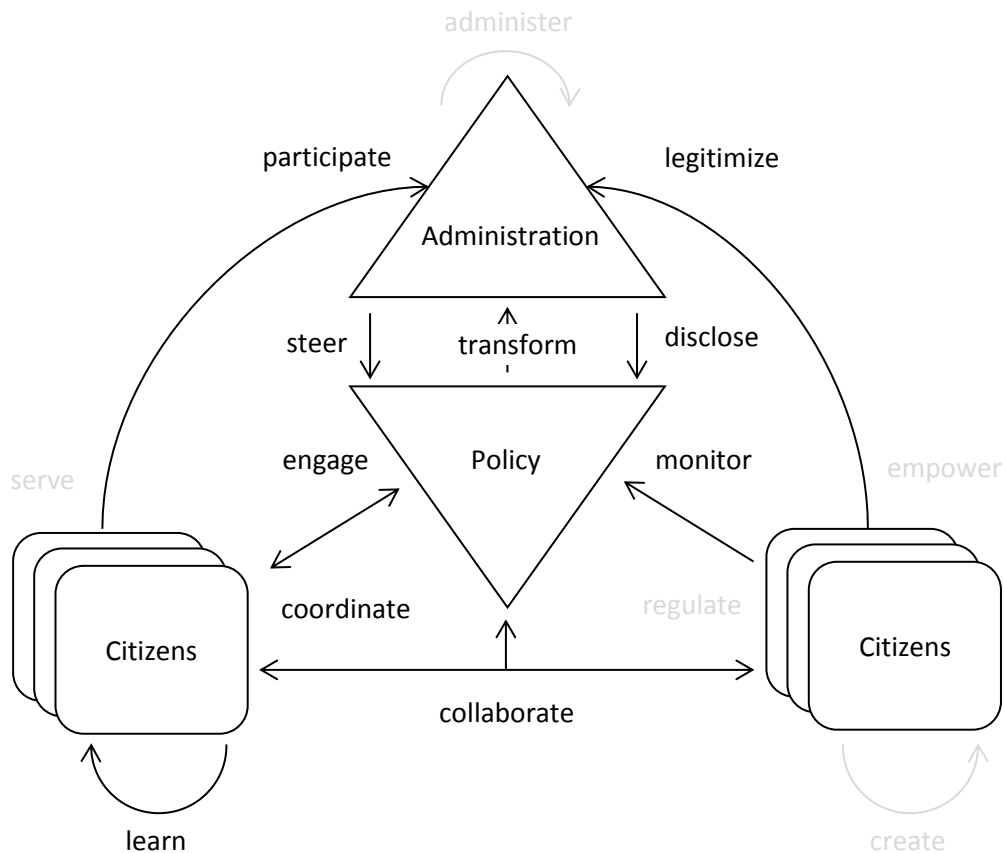


Figure 11. Platform Governance for Sustainable Development framework instantiated to the “Digital Innovations in Policy-Making” case

4.11. Case 11 – Governance Networks for Societal Challenges

In the case (Ojo & Mellouli, this issue), the authors discuss the difficulties involved in obtaining a shared understanding and reaching a certain level of consensus about networked governance as a form of governance innovation. The way public organizations address societal problems is dramatically changing due to the changing nature of such problems and ongoing digital revolution. With the widespread availability and use of digital tools, non-state actors have moved from being passive to active actors in governance networks through which they contribute to finding solutions to dynamic needs of the digitally-enabled society. However, governance networks are composed of diverse participants from all levels of society, economy and government, which makes their management problematic.

To address this problem, the authors present a conceptual framework for governance networks comprising two major elements: a strategy for a governance network which defines the shared and individual objectives of the participating actors, and the network structure which defines the components and their relationships required for implementing the strategy. The framework is applied to describe and analyze six case studies. The key

finding from the case analysis is that governance networks are still largely steered or owned by government entities. Based on this finding, the authors provide several recommendations towards improving governance networks namely: government entities should initiate and clearly demonstrate their commitment to governance networks; a communication strategy for social and traditional media and identification of champions are critical for government-citizen partnerships; governments should build trust and remain accountable for the overall network outcome; engaging citizen experts and the use of financial incentives may be necessary in crowdsourcing; and mobile social media platforms are central for citizen inclusion in governance networks. As the case involves transformation of the relationships between government and various non-state actors but not creating conditions for sectors, territories or communities to develop themselves, it is classified to the engagement stage.

Concerning the application of the *Platform-Based Governance for Sustainable Development* framework to this case, government agencies that are part of the governance networks are represented by *Administration* whereas citizens, businesses and the civil society are represented as *Citizens*. The goals, strategies and structures adopted by individual governance networks as well as MDGs, WCAG, Korean Government 3.0 Strategy, Post-2015 Development Agenda and other relevant laws and policies are part of the *Policy* environment. When governance networks are integrated within administration, their performance is represented by the *administer* relationship. Otherwise, government entities that own governance networks adopt relevant network and other policies through the *steer* relationship, and engage *Citizens* and target communication strategies at them through the *coordinate* and *disclose* roles. Thanks to their participation (*participate*) in governance networks, *Citizens* contribute by informing *Policy* (*engage*), sharing their opinions, knowledge and resources with each other and with *Administration* (*collaborate*), and monitoring the performance of governance networks (*monitor*).

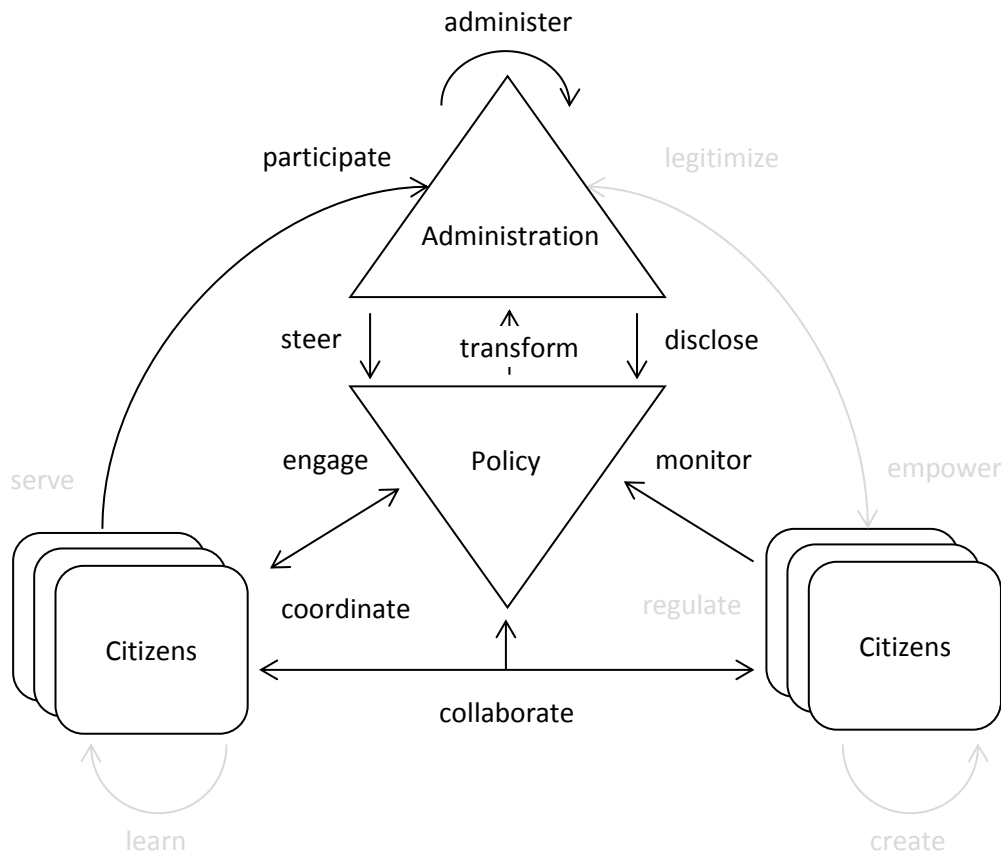


Figure 2. Platform Governance for Sustainable Development framework instantiated to the “Governance Networks for Societal Challenges” case

5. Cross-Case Analysis

This section carries out cross-case analysis of the case studies developed in Section 5 concerning the instantiation of the *Platform Governance for Sustainable Development* framework introduced in Section 3.

As shown in Table 3, the case studies cover the entire spectrum of 15 citizen-administration relationships foreseen by this framework. The case study with the largest number of 11 or 73% of the relationships is *Case 8* (Millard, this issue), followed by *Case 9* (Porwol, Ojo, & Breslin, this issue) and *Case 10* (Janssen & Helbig, this issue) with 10 or 67% of the relationships each, and followed by *Case 11* (Ojo & Mellouli, this issue) with 9 or 60% of the relationships covered. Next, *Case 4* (Klabi, Mellouli, & Rekik, this issue) has 7 or 47% of the relationships, followed by *Case 5* (Liu & Zheng, this issue) and *Case 6* (Henning, this issue) with 6 or 40% of the relationships each, and followed by *Case 2* (Dijk, Kalidie, & Choenni, this issue) with 5 or 33% of the relationships. The least number is covered by *Case 7* (Linders, Liao, & Wang, this issue), *Case 1* (Rykowski & Cellary, this issue) and *Case 3* (Kumar & Rawat, this issue) with 4 or 27% of the relationships covered each.

In addition to taking note of the presence of citizen-administration relationships within the case studies, Table 3 also summarizes such presence across different stages of the Digital

Government Evolution. According to Table 2, only three out of four stages of the Digital Government Evolution – Digitization, Transformation and Engagement – are represented by the case studies. Three case studies, i.e. *Case 1* (Rykowski & Cellary, this issue), *Case 2* (Dijk, Kalidie, & Choenni, this issue) and *Case 3* (Kumar & Rawat, this issue) belong to the Digitization stage, four case studies, i.e. *Case 4* (Klabi, Mellouli, & Rekik, this issue), *Case 5* (Liu & Zheng, this issue), *Case 6* (Henning, this issue) and *Case 7* (Linders, Liao, & Wang, this issue) belong to the Transformation stage, four case studies, i.e. *Case 8* (Millard, this issue), *Case 9* (Porwol, Ojo, & Breslin, this issue), *Case 10* (Janssen & Helbig, this issue) and *Case 11* (Ojo & Mellouli, this issue) belong to the Engagement stage, and none of the case studies belong to the Contextualization stage.

Out of the total of 76 citizen-administration relationships instantiated by the case studies, 40 or 53% belong to Engagement-stage case studies, 23 or 30% belong to the Transformation-stage case studies, and 13 or 17% belong to the Digitization-stage case studies. This is consistent with the coverage of citizen-administration relationships by individual case studies. As noted earlier, Engagement-stage case studies like *Case 8* (Millard, this issue), *Case 9* (Porwol, Ojo, & Breslin, this issue) or *Case 10* (Janssen & Helbig, this issue) have the largest coverage, while Digitization-stage case studies like *Case 7* (Linders, Liao, & Wang, this issue), *Case 1* (Rykowski & Cellary, this issue) or *Case 3* (Kumar & Rawat, this issue) have the smallest coverage of citizen-administration relationships.

The coverage of the basic entities – *Administration*, *Citizens* and *Policy* – by the case studies is 11 instances or 100% of the case studies. The citizen-administration relationship that is most often instantiated in the case studies is *steer* with 10 or 91% of the instantiations, followed by *administer* with 9 or 82% of the instantiations, followed by *transform*, *empower* and *collaborate* with 6 or 55% of the instantiations each, and followed by *serve*, *engage*, *participate* and *learn* with 5 or 45% of the instantiations each. The relationships with the least number of instantiations are *disclose*, *monitor* and *coordinate* with 4 or 36% of the instantiations, followed by *regulate* and *create* with 3 or 27% of the instantiations each, followed by *legitimize* with 2 or 18% of the instantiations.

Table 3 also summarizes the presence of citizen-administration relationships across different governance paradigms. Relationships from all paradigms – Bureaucratic, Consumerist, Participatory and Platform – are present in the case studies. Out of the total of 76 citizen-administration relationships instantiated, 26 or 34% belong the Bureaucratic Paradigm, 13 or 17% belong to the Consumerist and Participatory Paradigms each, and 24 or 32% belong to the Platform Paradigm.

Table 3. Case study analysis through the Platform Governance for Sustainable Development framework

CASE STUDIES AND STAGES	ENTITIES			RELATIONSHIPS AND PARADIGMS																		All	
	Administration	Citizens	Policy	administer	steer	regulate	serve	Bureaucratic Paradigm	engage	transform	legitimize	Consumerist Paradigm	disclose	monitor	participate	Participatory Paradigm	empower	learn	coordinate	create	collaborate		Platform Paradigm
				1	2	3	4		5	6	7		8	9	10		11	12	13	14	15		
1	x	x	x		x		x	2				0				0	x				x	2	4
2	x	x	x	x			x	2	x			1		x		1				x		1	5
3	x	x	x	x	x	x		3				0				0				x		1	4
Digitization	3	3	3	2	2	1	2	7	1	0	0	1	0	1	0	1	1	0	0	2	1	4	13
4	x	x	x	x	x	x		3		x		1			x	1	x	x				2	7
5	x	x	x	x	x	x	x	4		x		1				0	x					1	6
6	x	x	x	x	x			2		x		1				0		x	x		x	3	6
7	x	x	x	x	x		x	2		x		1				0	x					1	4
Transformation	4	4	4	4	4	2	2	11	0	4	0	4	0	0	1	1	3	2	1	0	1	7	23
8	x	x	x	x	x		x	3	x			1	x		x	2	x	x	x	x	x	5	11
9	x	x	x	x	x			2	x		x	2	x	x	x	3	x	x			x	3	10
10	x	x	x		x			1	x	x	x	3	x	x	x	3		x	x		x	3	10
11	x	x	x	x	x			2	x	x		2	x	x	x	3			x		x	2	9
Engagement	4	4	4	3	4	0	1	8	4	2	2	8	4	3	4	11	2	3	3	1	4	13	40
All	11	11	11	9	10	3	5	26	5	6	2	13	4	4	5	13	6	5	4	3	6	24	76



Based on the earlier analysis, the 11 case studies cover all entities and relationships foreseen by the *Platform Governance for Sustainable Development* framework. However, this coverage is unequal. Considering 12 stage-paradigm pairs depicted in Table 3, i.e. the coverage of the citizen-administration relationships that belong to a given governance paradigm, by the case studies that belong to a given digital government evolution stage, is depicted in Table 4. For each pair, Table 4 provides the number of instances by the case studies (Instances), the maximum number of instances possible for a given stage-paradigm pair (Area) and the percentage of the number of instances against the maximum number (Coverage).

According to Table 4, the highest coverage is for citizen-administration relationships under the Participatory paradigm and Engagement-stage case studies, at 11 out of 12 or 92% of possible instances; followed by the Bureaucratic paradigm and Transformation-stage case studies, at 12 out of 16 or 75% of possible instances; followed the Consumerist paradigm and Engagement-stage case studies at 8 out of 12 or 67% of possible instances; followed by the Platform paradigm and Engagement-stage case studies at 13 out of 20 or 65% of possible instances; followed by Bureaucratic paradigm and Digitization-stage case studies at 7 out of 12 or 58% of possible instances; and followed by the Bureaucratic paradigm and Engagement-stage case studies at 8 out of 16 or 50% of possible instances.

The least coverage is for citizen-administration relationships under the Platform paradigm and Transformation-stage case studies at 7 out of 20 or 35% of possible instances; followed by the Consumerist paradigm and Transformation-stage case studies at 4 out of 12 or 33% of possible instances; followed by the Platform paradigm and Digitization-stage case studies at 4 out of 15 or 27% of possible instances; followed by Participatory and Consumerist paradigms and Digitization-stage case studies at 1 out of 9 or 11% of possible instances each; and followed by Participatory paradigm and Transformation-stage case studies at 1 out of 12 or 8% of possible instances.

Table 4. Coverage of the stage-paradigm pairs of the Platform Governance for Sustainable Development framework by the case studies

STAGES	PARADIGMS											
	Bureaucratic			Consumerist			Participatory			Platform		
	Instances	Area	Coverage	Instances	Area	Coverage	Instances	Area	Coverage	Instances	Area	Coverage
Digitization	7	12	58%	1	9	11%	1	9	11%	4	15	27%
Transformation	12	16	75%	4	12	33%	1	12	8%	7	20	35%
Engagement	8	16	50%	8	12	67%	11	12	92%	13	20	65%

6. Conclusions

This paper explored how the challenge of public governance for sustainable development motivates the conceptualization and implementation of the platform paradigm for this application domain, as successor of the bureaucratic, consumerist and participatory



paradigms. Theoretical and conceptual underpinnings for platform governance for sustainable development were explored through analysis of research literature. The analysis uncovered three entities – *Administration, Citizens* and *Policy* – and 15 types of relationships between such entities under different governance paradigms: *administer, steer* and *regulate* under the bureaucratic paradigm; *serve, engage, transform* and *legitimize* under the consumerist paradigm; *disclose, monitor* and *participate* under the participatory paradigm; and *empower, learn, coordinate, create* and *collaborate* under the platform paradigm. These elements were used to build the *Platform Governance for Sustainable Development* framework, which was subsequently used to structure, analyze and compare 11 case studies representing 11 articles included in the current issue.

The analysis found out that: three case studies belong to the digitization stage, four each to the transformation and engagement stages and none to the contextualization stage of the Digital Government Evolution (Janowski, 2015); more than half of the relationships belong to the engagement-stage case studies, one out of three to the transformation-stage case studies and one out of five to the digitalization-stage case studies; among the case studies, the most common relationship is *steer*, followed by *administer*, followed by *transform, empower* and *collaborate*; the least common relationship is *legitimize*, followed by *create* and *regulate*; all paradigms are represented among the case studies but one third of them belong to the bureaucratic paradigm, one third to the platform paradigm and jointly one third to the consumerist and participatory paradigms; the strongest coverage of the framework occurred for participatory paradigm through engagement-stage case studies; the weakest for participatory paradigm through transformation-stage case studies.

The framework could be used as a modelling construct to help deconstruct instances of platform governance for sustainable development, identify their elements, and map them into abstract entities and relationships provided by the framework, as in Section 4. Such representation views platform governance for sustainable development as a system with structure and behavior enacted through a series of relationships. For example, a path of connected relationships could be traced from the administration's decision to disclose a change in policy (disclose), through citizens monitoring such disclosures (monitor) and discussing views on them on social media (collaborate), to citizens influencing administration's position on this change (participate). This representation could facilitate better understanding of governance arrangements and particular outcomes resulting from such arrangements through visualization, simulation and analysis. In turn, gaining better understanding could lead to better (top-down) design or better control of (bottom-up) emergent growth of platform governance for sustainable development. Another application scenario is using the framework to compare instances of platform governance enacted in different contexts in order to facilitate successful transfer of such instances between contexts. Yet another application scenario is using the framework as a common structure for archiving cases of platform governance to facilitating discovery and learning. Exploring such applications is outside the scope of this paper and already part of future work.

The limitation of the research is the presence of a limited number of pre-selected case studies to carry out the testing of the framework, which were not chosen for this particular task. This



pre-selection may imply bias and lack of representativeness among cases. In addition, the authors of the cases were not asked to confirm the accuracy of the analysis carried out. Another limitation is the absence of precise definitions of the relationships in the framework, which makes the task for mapping the case studies to the structure of the framework to some extent subjective. Due to the abstract nature of the framework, it covers external relationships between entities but ignores institutional elements within such entities and their influence on such relationships. The absence of relationships uncovered by the case studies includes: the *regulate* relationship from *Policy* to *Administration*, highlighted by *Case 3* (Kumar & Rawat, this issue); the *learn* relationship for *Administration* itself, uncovered by *Case 4* (Klabi, Mellouli, & Rekik, this issue); and the *empower* relationship targeting *Administration*, uncovered by *Case 7* (Linders, Liao, & Wang, this issue). It should be also noted that the organizational, personnel, financial and other resources required for various relationships are not covered by the framework.

We plan to advance this research in a number of directions. First, we plan to formalize the framework, particularly by adding precise definitions of the citizen-administration relationships and limit the subjectivity of the case-to-framework mapping. Second, we intend to develop guidelines to carry out the mapping of the case studies to match the structure of the framework. Third, we intend to validate the framework through a larger number of case studies, selected to test various aspects of the framework. In particular, we plan to test the framework on the case studies that belong to the contextualization stage of the Digital Government Evolution. Fourth, we plan to test the suitability of the framework to various local or sectoral contexts. Finally, we plan to explore how the framework could enhance existing policy measures aimed at advancing sustainable development. In particular, how *Platform Governance for Sustainable Development* could become one of the implementation means for Sustainable Development Goals.

Acknowledgments

This work was partly funded under the ICEGOV project by the Center for Electronic Governance at the United Nations University International Institute for Software Technology (UNU-IIST) in Macao, China, and later by the United Nations University Operating Unit on Policy-Driven Electronic Governance (UNU-EGOV) in Guimarães, Portugal.

References

- Adams, B. E. (2007). *Citizen lobbyists : local efforts to influence public policy*. Temple University Press. Retrieved from <https://www.jstor.org/stable/j.ctt14bt304>
- Alcaraz-Quiles, F. J., Navarro-Galera, A., & Ortiz-Rodríguez, D. (2014). Factors influencing the transparency of sustainability information in regional governments: an empirical study. *Journal of Cleaner Production*, 82, 179–191. <http://doi.org/10.1016/j.jclepro.2014.06.086>
- Anttiroiko, A.-V., Valkama, P., & Bailey, S. J. (2014). Smart cities in the new service economy: building platforms for smart services. *AI & SOCIETY*, 29(3), 323–334. <http://doi.org/10.1007/s00146-013-0464-0>
- Bäckstrand, K. (2006). Multi-stakeholder partnerships for sustainable development: rethinking legitimacy, accountability and effectiveness. *European Environment*, 16(5), 290–306. <http://doi.org/10.1002/eet.425>
- Barrutia, J. M., & Echebarria, C. (2012). Greening regions: the effect of social entrepreneurship, co-decision and co-creation on the embrace of good sustainable development practices. *Journal of Environmental Planning and Management*, 55(10), 1348–1368. <http://doi.org/10.1080/09640568.2012.657298>
- Benington, J. (2009). Creating the Public In Order To Create Public Value? *International Journal of Public Administration*, 32(3–4), 232–249. <http://doi.org/10.1080/01900690902749578>
- Bevir, M. (2012). *Governance: A Very Short Introduction*. Oxford University Press. Retrieved from https://books.google.pl/books?id=ozjcWlfhoO8C&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false
- Biermann, F., Abbott, K., Andresen, S., Bäckstrand, K., Bernstein, S., Betsill, M. M., ... Zondervan, R. (2012). Transforming governance and institutions for global sustainability: key insights from the Earth System Governance Project. *Current Opinion in Environmental Sustainability*, 4(1), 51–60. <http://doi.org/10.1016/j.cosust.2012.01.014>
- Bogdanor, V. (Ed.). (2005). *Joint-Up Government*. Oxford University Press.
- Brundiers, K., Wiek, A., & Redman, C. L. (2010). Real-world learning opportunities in sustainability: from classroom into the real world. *International Journal of Sustainability in Higher Education*, 11(4), 308–324. <http://doi.org/10.1108/14676371011077540>
- Casado-Asensio, J., & Steurer, R. (2014). Integrated strategies on sustainable development, climate change mitigation and adaptation in Western Europe: communication rather than coordination. *Journal of Public Policy*, 34(03), 437–473. <http://doi.org/10.1017/S0143814X13000287>
- Castell, N., Kobernus, M., Liu, H.-Y., Schneider, P., Lahoz, W., Berre, A. J., & Noll, J. (2015). Mobile technologies and services for environmental monitoring: The Citi-Sense-MOB approach. *Urban Climate*, 14, 370–382. <http://doi.org/10.1016/j.uclim.2014.08.002>
- Connelly, S., Richardson, T., & Miles, T. (2006). Situated legitimacy: Deliberative arenas and the new rural governance. *Journal of Rural Studies*, 22(3), 267–277. <http://doi.org/10.1016/j.jrurstud.2005.11.008>
- Dijk, J. van, Kalidie, S., & Choenni, S. (n.d.). Smart monitoring of the criminal justice system. *Government*



Information Quarterly, (this issue).

- Dijk, J. van, Kalidien, S., & Choenni, S. (2016). Smart Monitoring of the Criminal Justice System. *Government Information ...2*, 33(Supplement 1).
- Emerson, K., Nabatchi, T., & Balogh, S. (2012). An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research and Theory*, 22(1), 1–29. <http://doi.org/10.1093/jopart/mur011>
- Espinosa, A., & Porter, T. (2011). Sustainability, complexity and learning: insights from complex systems approaches. *The Learning Organization*, 18(1), 54–72. <http://doi.org/10.1108/09696471111096000>
- Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., Holling, C. S., & Walker, B. (2002). Resilience and Sustainable Development: Building Adaptive Capacity in a World of Transformations. *AMBIO: A Journal of the Human Environment*, 31(5), 437–440. <http://doi.org/10.1579/0044-7447-31.5.437>
- Geijzendorffer, I. R., Cohen-Shacham, E., Cord, A. F., Cramer, W., Guerra, C., & Martín-López, B. (2017). Ecosystem services in global sustainability policies. *Environmental Science & Policy*, 74, 40–48. <http://doi.org/10.1016/j.envsci.2017.04.017>
- Geissel, B. (2009). Participatory Governance: Hope or Danger for Democracy? A Case Study of Local Agenda 21. *Local Government Studies*, 35(4), 401–414. <http://doi.org/10.1080/03003930902999522>
- Glasbergen, P. (2011). Understanding partnerships for sustainable development analytically: the ladder of partnership activity as a methodological tool. *Environmental Policy and Governance*, 21(1), 1–13. <http://doi.org/10.1002/eet.545>
- Goldsmith, S., & Eggers, W. D. (2004). *Governing by network : the new shape of the public sector*. Brookings Institution Press.
- Grubnic, S., Thomson, I., & Georgakopoulos, G. (2015). New development: Managing and accounting for sustainable development across generations in public services—and call for papers. *Public Money & Management*, 35(3), 245–250. <http://doi.org/10.1080/09540962.2015.1027502>
- Gupta, A., & Mason, M. (2016). Disclosing or obscuring? The politics of transparency in global climate governance. *Current Opinion in Environmental Sustainability*, 18, 82–90. <http://doi.org/10.1016/j.cosust.2015.11.004>
- Gupta, J., Pouw, N. R. M., & Ros-Tonen, M. A. F. (2015). Towards an Elaborated Theory of Inclusive Development. *The European Journal of Development Research*, 27(4), 541–559. <http://doi.org/10.1057/ejdr.2015.30>
- Häikiö, L. (2007). Expertise, Representation and the Common Good: Grounds for Legitimacy in the Urban Governance Network. *Urban Studies*, 44(11), 2147–2162. <http://doi.org/10.1080/00420980701518982>
- Hamari, J., Sjöklint, M., & Ukkonen, A. (2016). The sharing economy: Why people participate in collaborative consumption. *Journal of the Association for Information Science and Technology*, 67(9), 2047–2059. <http://doi.org/10.1002/asi.23552>
- Hawkins, C. V., & Wang, X. (2012). Sustainable Development Governance. *Public Works Management & Policy*, 17(1), 7–29. <http://doi.org/10.1177/1087724X11429045>
- Heinrichs, H., & Laws, N. (2014). “Sustainability State” in the Making? Institutionalization of Sustainability



in German Federal Policy Making. *Sustainability*, 6(5), 2623–2641. <http://doi.org/10.3390/su6052623>

Hendriks, C. M., & Grin, J. (2007). Contextualizing Reflexive Governance: the Politics of Dutch Transitions to Sustainability. *Journal of Environmental Policy & Planning*, 9(3–4), 333–350. <http://doi.org/10.1080/15239080701622790>

Henning, F. (n.d.). A Theoretical Framework on the Determinants of Organisational Adoption of Interoperability Standards in Government Information Networks. *Government Information Quarterly*, (this issue).

Hurlbert, M., & Gupta, J. (2015). The split ladder of participation: A diagnostic, strategic, and evaluation tool to assess when participation is necessary. *Environmental Science & Policy*, 50, 100–113. <http://doi.org/10.1016/j.envsci.2015.01.011>

Janowski, T. (2015). Digital Government Evolution: From Transformation to Contextualization. *Government Information Quarterly*, 32(3), 221–236. <http://doi.org/10.1016/j.giq.2015.07.001>

Janowski, T., Holm, J., & Estevez, E. (Eds.). (2013). *Proceedings of the 7th International Conference on Theory and Practice of Electronic Governance*. ACM Press, International Conference Proceedings Series.

Janssen, M., & Estevez, E. (2013). Lean government and platform-based governance—Doing more with less. *Government Information Quarterly*, 30(1), S1–S8. <http://doi.org/10.1016/j.giq.2012.11.003>

Janssen, M., & Helbig, N. (n.d.). Innovating and Changing the Policy-cycle: Policy-makers be Prepared! *Government Information Quarterly*, (this issue).

Janssen, M., & van der Voort, H. (2016). Adaptive governance: Towards a stable, accountable and responsive government. *Government Information Quarterly*, 33(1), 1–5. <http://doi.org/10.1016/j.giq.2016.02.003>

Jarvis, D., Berkeley, N., & Broughton, K. (2012). Evidencing the impact of community engagement in neighbourhood regeneration: the case of Canley, Coventry. *Community Development Journal*, 47(2), 232–247. <http://doi.org/10.1093/cdj/bsq063>

Kemp, R., Parto, S., & Gibson, R. (2005). Governance for Sustainable Development : Moving from Theory to Practice. *Alternatives Journal*, 8, 12–30.

Klabi, H., Mellouli, S., & Rekik, M. (n.d.). A Reputation Based Electronic Government Procurement Model. *Government Information Quarterly*, (this issue). <http://doi.org/10.1145/2591888.2591904>

Kumar, S., & Rawat, S. (n.d.). Future e-Waste: Standardisation for Reliable Assessment. *Government Information ...*, (this issue). <http://doi.org/10.1017/CBO9781107415324.004>

Kusakabe, E. (2013). Advancing sustainable development at the local level: The case of machizukuri in Japanese cities. *Progress in Planning*, 80, 1–65. <http://doi.org/10.1016/j.progress.2012.06.001>

Lange, P., Driessen, P. P. J., Sauer, A., Bornemann, B., & Burger, P. (2013). Governing Towards Sustainability—Conceptualizing Modes of Governance. *Journal of Environmental Policy & Planning*, 15(3), 403–425. <http://doi.org/10.1080/1523908X.2013.769414>

Linders, D. (2012). From e-government to we-government: Defining a typology for citizen coproduction in the age of social media. *Government Information Quarterly*, 29(4), 446–454.



<http://doi.org/10.1016/j.giq.2012.06.003>

- Linders, D., Liao, C. Z.-P., & Wang, C.-M. (n.d.). Proactive e-Governance: Flipping the Service Delivery Model in Taiwan. *Government Information Quarterly*, (this issue).
- Liu, X., & Zheng, L. (n.d.). Cross-departmental Collaboration in One-Stop Service Center for Smart Governance in China: Factors, Strategies and Effectiveness. *Government Information Quarterly*, (this issue).
- Lozano, R. (2007). Collaboration as a pathway for sustainability. *Sustainable Development*, 15(6), 370–381. <http://doi.org/10.1002/sd.322>
- Lundqvist, L. J. (2001). Implementation from above: The ecology of power in Sweden's environmental governance, 14(3), 319–337. Retrieved from <https://www.scopus.com/record/display.uri?eid=2-s2.0-0039250179&origin=resultslist&sort=cp-f&src=s&st1=%22sustainable+development%22+AND+%28governance+OR+governing%29+AND+%28steer+OR+steering%29&st2=&sid=7a9f3e4bfa3cc3eb3b723046c36324f3&sot=b&sdt=b&sl=94&s=TITLE-ABS-KEY%28%22sustainable+development%22+AND+%28governance+OR+governing%29+AND+%28steer+OR+steering%29%29&relpos=11&citeCnt=45&searchTerm=>
- Macnaghten, P., & Jacobs, M. (1997). Public identification with sustainable development. *Global Environmental Change*, 7(1), 5–24. [http://doi.org/10.1016/S0959-3780\(96\)00023-4](http://doi.org/10.1016/S0959-3780(96)00023-4)
- Mc Lennan, A., & Ngoma, W. Y. (2004). Quality governance for sustainable development? *Progress in Development Studies*, 4(4), 279–293. <http://doi.org/10.1191/1464993404ps091oa>
- Meadowcroft, J. (2004). Participation and sustainable development: modes of citizen, community and organisational involvement. In *Governance for Sustainable Development: The Challenge of Adapting Form to Function* (pp. 162–190). Edward Elgar.
- Meadowcroft, J. (2007). 'Who is in charge here? Governance for sustainable development in a complex world',. *Journal of Environmental Policy and Planning*, 9, 299–314. <http://doi.org/10.1080/15239080701631544>
- Midin, M., Joseph, C., & Mohamed, N. (2017). Promoting societal governance: Stakeholders' engagement disclosure on Malaysian local authorities' websites. *Journal of Cleaner Production*, 142, 1672–1683. <http://doi.org/10.1016/j.jclepro.2016.11.122>
- Millard, J. (n.d.). Open Governance Systems: Doing More with More. *Government Information Quarterly*, (this issue). <http://doi.org/10.1016/j.giq.2015.08.003>
- Moss, M. L., Kaufman, S. M., & Townsend, A. M. (2006). The relationship of sustainability to telecommunications. *Technology in Society*, 28(1–2), 235–244. <http://doi.org/10.1016/j.techsoc.2005.10.011>
- Ojo, A. K., & Mellouli, S. (n.d.). Deploying Governance Networks for Societal Challenges. *Government Information Quarterly*, (this issue). <http://doi.org/10.1017/CBO9781107415324.004>
- Ortiz-Fournier, L. V, Márquez, E., Flores, F. R., Rivera-Vázquez, J. C., & Colon, P. A. (2010). Integrating educational institutions to produce intellectual capital for sustainability in Caguas, Puerto Rico. *Knowledge Management Research & Practice*, 8(3), 203–215. <http://doi.org/10.1057/kmrp.2010.11>



- Porwol, L., Ojo, A., & Breslin, J. (n.d.). Social Software Infrastructure for e-Participation. *Government Information Quarterly*, (this issue).
- Rexhepi, A., Filiposka, S., & Trajkovik, V. (2018). Youth e-participation as a pillar of sustainable societies. *Journal of Cleaner Production*, 174, 114–122. <http://doi.org/10.1016/j.jclepro.2017.10.327>
- Roberts, D., & Diederichs, N. (2002). Durban's Local Agenda 21 programme: tackling sustainable development in a post-apartheid city. *Environment and Urbanization*, 14(1), 189–201. <http://doi.org/10.1177/095624780201400116>
- Rykowski, J., & Cellary, W. (2015). Challenges of Smart Industries - Privacy and Payment in Visible versus Unseen Internet. *Government Information Quarterly*, (this issue). <http://doi.org/10.1017/CBO9781107415324.004>
- Schomaker, R. (2014). Institutional quality and private sector participation: Theory and empirical findings, 3(2), 104–118. Retrieved from <https://www.scopus.com/record/display.uri?eid=2-s2.0-84957718323&origin=resultslist&sort=cp-f&src=s&st1=%22sustainable+development%22+AND+%28governance+OR+governing%29+AND+%28administer+OR+administering+OR+administration%29&nlo=&nlr=&nls=&sid=f447d6de361727ca2ac7b376e97fba4c&sot=b&sdt=cl&cluster=scosubtype%2C%22ar%22%2C%2Bscosubjabbr%2C%22SOCI%22%2C%2Bscolang%2C%22English%22%2C%2Bscsrctype%2C%22j%22%2C%22sl=122&s=TITLE-ABS-KEY%28%22sustainable+development%22+AND+%28governance+OR+governing%29+AND+%28administer+OR+administering+OR+administration%29%29&relpos=23&citeCnt=3&searchTerm=>
- Sharma, R., Fantin, A.-R., Prabhu, N., Guan, C., & Dattakumar, A. (2016). Digital literacy and knowledge societies: A grounded theory investigation of sustainable development. *Telecommunications Policy*, 40(7), 628–643. <http://doi.org/10.1016/j.telpol.2016.05.003>
- Sinclair, A. J., Diduck, A., & Fitzpatrick, P. (2008). Conceptualizing learning for sustainability through environmental assessment: critical reflections on 15 years of research. *Environmental Impact Assessment Review*, 28(7), 415–428. <http://doi.org/10.1016/j.eiar.2007.11.001>
- Sipos, Y., Battisti, B., & Grimm, K. (2008). Achieving transformative sustainability learning: engaging head, hands and heart. *International Journal of Sustainability in Higher Education*, 9(1), 68–86. <http://doi.org/10.1108/14676370810842193>
- Smith, W. (2004). The Role of Monitoring in Cutting Crime. *Journal of Sustainable Forestry*, 19(1–3), 293–317. http://doi.org/10.1300/J091v19n01_13
- Söderholm, K., & Wihlborg, E. (2016). Striving for Sustainable Development and the Coordinating Role of the Central Government: Lessons from Swedish Housing Policy. *Sustainability*, 8(8), 827. <http://doi.org/10.3390/su8080827>
- Steurer, R. (2007). From government strategies to strategic public management: an exploratory outlook on the pursuit of cross-sectoral policy integration. *European Environment*, 17(3), 201–214. <http://doi.org/10.1002/eet.452>
- Steurer, R. (2010). The role of governments in corporate social responsibility: characterising public policies on CSR in Europe. *Policy Sciences*, 43(1), 49–72. <http://doi.org/10.1007/s11077-009-9084-4>
- Steurer, R. (2013). Disentangling governance: a synoptic view of regulation by government, business and civil society. *Policy Sciences*, 46(4), 387–410. <http://doi.org/10.1007/s11077-013-9177-y>



- Steurer, R., & Hametner, M. (2013). Objectives and Indicators in Sustainable Development Strategies: Similarities and Variances across Europe. *Sustainable Development*, 21(4), 224–241. <http://doi.org/10.1002/sd.501>
- Thurston, A. (2015). Access to Reliable Public Records as Evidence for Freedom of Information in Commonwealth Africa. *The Round Table*, 104(6), 703–713. <http://doi.org/10.1080/00358533.2015.1112095>
- Trivellato, B. (2017). How can 'smart' also be socially sustainable? Insights from the case of Milan. *European Urban and Regional Studies*, 24(4), 337–351. <http://doi.org/10.1177/0969776416661016>
- Van den Hove, S. (2006). Between consensus and compromise: acknowledging the negotiation dimension in participatory approaches. *Land Use Policy*, 23(1), 10–17. <http://doi.org/10.1016/j.landusepol.2004.09.001>
- Van der Hel, S., & Biermann, F. (2017). The authority of science in sustainability governance: A structured comparison of six science institutions engaged with the Sustainable Development Goals. *Environmental Science & Policy*, 77, 211–220. <http://doi.org/10.1016/j.envsci.2017.03.008>
- Van Stigt, R., Driessen, P. P. J., & Spit, T. J. M. (2013). Compact City Development and the Challenge of Environmental Policy Integration: A Multi-Level Governance Perspective. *Environmental Policy and Governance*, 23(4), 221–233. <http://doi.org/10.1002/eet.1615>
- Villeneuve, J. (2017). Citizen-Administration Relationships. In *Global Encyclopedia of Public Administration, Public Policy, and Governance* (pp. 1–4). <http://doi.org/10.1007/978-3-319-31816-5>
- Voegtlin, C., & Scherer, A. G. (2017). Responsible Innovation and the Innovation of Responsibility: Governing Sustainable Development in a Globalized World. *Journal of Business Ethics*, 143(2), 227–243. <http://doi.org/10.1007/s10551-015-2769-z>
- Volkery, A., Swanson, D., Jacob, K., Bregha, F., & Pintér, L. (2006). Coordination, Challenges, and Innovations in 19 National Sustainable Development Strategies. *World Development*, 34(12), 2047–2063. <http://doi.org/10.1016/j.worlddev.2006.03.003>
- Voß, J.-P., Newig, J., Kastens, B., Monstadt, J., & Nölting, B. (2007). Steering for Sustainable Development: a Typology of Problems and Strategies with respect to Ambivalence, Uncertainty and Distributed Power. *Journal of Environmental Policy & Planning*, 9(3–4), 193–212. <http://doi.org/10.1080/15239080701622881>
- Walker, G., & Shove, E. (2007). Ambivalence, Sustainability and the Governance of Socio-Technical Transitions. *Journal of Environmental Policy & Planning*, 9(3–4), 213–225. <http://doi.org/10.1080/15239080701622840>
- World Commission on Environment and Development. (1987). *Our Common Future*. Retrieved from <http://www.un-documents.net/our-common-future.pdf>
- Xenias, D., & Whitmarsh, L. (2013). Dimensions and determinants of expert and public attitudes to sustainable transport policies and technologies. *Transportation Research Part A: Policy and Practice*, 48, 75–85. <http://doi.org/10.1016/j.tra.2012.10.007>
- Zhang, J., Liu, H., Sayogo, D. S., Picazo-Vela, S., & Luna-Reyes, L. (2016). Strengthening institutional-based trust for sustainable consumption: Lessons for smart disclosure. *Government Information Quarterly*, 33(3), 552–561. <http://doi.org/10.1016/j.giq.2016.01.009>

