

The Rio de Janeiro, Brazil, Experience Using Digital Initiatives for the Co-production of the Public Good: The Case of the Operations Centre

Marciele Berger Bernardes^(✉), Ranniéry Mazzilly S. de Souza,
Francisco Pacheco de Andrade, and Paulo Novais

University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal
marcieleberger@gmail.com, franc.andrade@gmail.com,
ranniery34@globlo.com, pjon@di.uminho.pt

Abstract. In the scenario of technological changes that were introduced by the waves of globalisation and the construction of an Information Society, together with recent national distresses, Brazilian cities face the challenge of combining competitiveness and sustainable urban development. Having in mind this complex landscape, this article seeks to analyse the experience Rio Operations Centre (ROC) of the city of Rio de Janeiro, Brazil. That purpose will be achieved through the review of bibliography and a case study, which will be conducted with the objective of confronting referred theory with the successful practices implemented in the (inter)national scenario. From the analysis of the experience in ROC, awarded “Smart City Expo World” at the Smart City Expo World Congress (Barcelona, Spain, 2013). Finally, it is believed that the contribution of this research proposal will impact issues of urban quality, such as housing, economy, culture and environmental conditions.

Keywords: New technologies · Smart cities · Urban environment · Rio operations centre · Rio de janeiro · Brazil

1 Introduction

In the 21 Century, with the emergence of the Information Society and the economic, social and cultural changes that emanated from it, new circumstances reveal an inevitable tendency towards a more sophisticated *participation*—of any citizen connected to the *Internet*—in the production of media contents, in the manufacturing of new products or new commercial exchanges, or even in producing data for the conception of public policies.

This outlook is conducive to a debate on the context and perspectives of public policies that would be based on data coproduced by the Public Authorities and the citizens. Following this line of thought, this research effort seeks to examine the extent to which governments use the *Internet* and the new media and to what extent they welcome the citizens’ contributions in order to ameliorate the existing democratic model.

To this end, this study seeks to contextualise both the *Information Society* and the incorporation of Information and Communication Technologies (ICTs) within the Brazilian Public Administration and the ways in which it is possible to reconcile competitiveness and sustainable urban development; furthermore, it presents a revision of concepts of new ways of popular participation, especially that of *Digital Democracy* and, finally focuses on the way these strategies have been adopted by the Rio de Janeiro city council to produce public policies and transform common sense concerning participation in a Democratic State based on the rule of law.

2 The Role of ITCs in the Enhancement of Democracy

With the emergence of the Information Society and the Internet, information and communication ceased to be “localised”, i.e., they were transferred to the cyberspace, enabling the interaction between several people in the same network, regardless of their geo location.

In this context, it is worth mentioning some of the main transformations brought about by the Internet. In this context, [1] stresses that the development of the Internet was accompanied by some impacts: the service sector transformation, the dematerialisation of production and the flexibility of the labour market. A new economy arose as a result of technological innovations and the capability to transform knowledge into products and services.

It is thus understandable that the Internet offers the conditions for the development of new forms of citizenship, since “the human being is invited to cross the aisle and interact in a social-motor way with digital models [2].

It is worth noting that there are opposing positions concerning the impact of new technologies. This ambivalence derives from the fact that the Internet is not just about the opportunity for people to interconnect. Side by side with socialisation, one perceives a series of risks, amongst which is the subtle yet permanent imposition of control tools moved by commerce and the users’ demand.

In this perspective, the debate on the use of the Internet in political life is characterised by a polarisation between those who regard it as a freedom and socialisation tool such as [2] and Castells [3] and those who perceive it as a means of destruction of the “public space” through the State’s and the corporations’ control of the citizenry, such as [4, 5].

The fact is that despite the ambiguities, technology fosters new social relations and new social relations foster new technologies. So, despite the ambivalences and the risks, the technological revolution also induced a revolution in the interaction and participation between people and institutions.

The permeability of ITCs in several segments has become a world trend, even in public administration sectors. In this context, as a response to the fiscal crisis of the 1970s and to the need to make public administration fast and efficient, the 1990s produced the *New Public Management Theory* (NPM), whose mentors were David Osborne and Ted Gaebler, authors of the book *Reinventing Government*.

The NPM proposed the State’s modernisation and the rupture with the traditional models of bureaucratic and mechanistic bias with the goal of adjusting to the new and

emerging model [6]. These NPM directives meet the governments' goals of using ITCs and found their operational mechanism in the precepts of the Electronic Government-GE (public administration online available 24 h a day 7 days a week).

In a restrictive definition of Electronic Government (GE), [7] clarify that its focus is the mere modernisation of the administration's structures through the introduction of ITCs. It is to be noted that the idea of GE is focused on the services' efficiency as in the private sector, and not to promote the opening of the administration to popular participation.

As a response to the NPM, the *New Public Service Theory* (NPS) devised by Janet and Robert Denhardt, [8] makes its appearance in the early 1990s.

Unlike the NPM, which is founded on economic concepts, such as the maximisation of self-interest and the internal demand for the modernisation of the administrations, the NPS is built on the ideas of public interest, valuing the citizen and open dialogue. Here, the establishment of a society-serving democratic space is presented as the crux of the question [9].

The NPS, based on these precepts, seeks inspiration in the democratic theory, mainly in its concern with the connection between the citizens and their governments [10]. It is important to add that there are seven key principles for the New Public Service: to serve citizens, not consumers; to pursue the public interest; to value citizenship more than entrepreneurship; to think strategically and to act democratically; to recognise that accountability is not simple; to serve instead or leading; to value people, not just productivity [8].

While the debate in NPS was restricted to the administration inner works, the focus with NGP shifts to the outside in which the citizen is not merely a consumer of services but a "co-producer" of the public good [11].

The computer networks and other devices enabled the citizens to have, for example, the opportunity for greater interaction with Governments, access to information, besides the chance to take part in the administrative-bureaucratic and the technical-political processes. In a nutshell, the ICTs gave rise to a new possibility in the *management* of cities.

Strategies that involve thinking how technologies can improve life in the cities were given the name of smart cities. They surfaced as a consequence of the movement known as intelligent growth in the mid-1990s which stood for the creation and implementation of innovative urban policies within the administration [12]. Hence, the theme has evolved to mean ways of urban management anchored in ICTs. To define smart city is a complex task since its meaning and context describe alternative approaches, schools of thought and researchers that deal with this phenomenon.

From these, we have selected the proposal, according to which: "A city well performing in a forward-looking way in economy, people, governance, mobility, environment, and living, built on the smart combination of endowments and activities of self-decisive, independent and aware citizens." [13].

It is clear that this is a broad concept that results from the combination of several characteristics, such as, health, economy, development, education, environment, government/transparency, as can be observed in the following diagram: Smart Economy; Smart People; Smart Governance; Smart Mobility; Smart Environment; Smart Living [13].

By the colour and slices of the diagram, one can observe the different fronts that compose the mosaic of *smart cities*. Among them, this study focuses on the “Smart Governance” dimension, i.e. on the analysis of the way that cities use ICTs to increase public participation in the democratic processes, which can be synthesised in the designation *Digital Democracy* [9, 14, 15].

From this point of view, some theoretical approaches to what has become known as *Digital Democracy* are analysed, as well as certain public policies that favour its implementation.

3 Development of Digital Democracy and Implementation of Smart Cities

Several studies have strived to analyse the repercussion the use of new technologies can provoke and do provoke in contemporary democracy. These studies are mostly guided by the following question: how can ICTs be used to increase *democracy*'s functioning and legitimacy? In the quest for answers, one identifies a common feature in these studies: the defence of the *Internet*'s potential, taking into account the development of the horizontal interaction techniques Citizen-Government [16].

In this context it is possible to find different narratives explaining the model of democracy being developed in cyberspace, such as, Digital Democracy, Electronic Democracy, Cyber Democracy, Tele Democracy and E-Democracy. In some cases, the focus is on the use of new technologies to reinforce or promote representative *democracy*, while in others it is rather directed to the use of techniques to make *direct democracy* political experiences viable, i.e. an even more complex deliberative experience.

Searching for a semantic agreement, is taken as a starting point: the term e-democracy associating it to the use of the ICTs to improve the relations between government and citizens through the increase in transparency and accountability by the government's representatives and by providing the citizens with new possibilities of involvement thanks to the capability of connecting them to their representatives. [17].

The wide rhetorical range on this theme notwithstanding, in this article we have used the *Digital Democracy* concept, understood as a quantitative (even a qualitative one) expansion of the contemporary model—representative democracy—so as to both refine and complement it through the use of the *Internet* to bring the citizens and their representatives closer and not as an alternative model to the current one.

Once these basic conceptual elements are assured, the study now seeks to point out feasible public policies which would be important to the development of *Digital Democracy* in Brazilian municipalities.

Considering the innovative character of the use of ICTs, many academic studies have sought to analyse and evaluate the extent to which the *Internet* use, materialised in the electronic sites of the Judicial and Executive Powers, for example, has accomplished the *Digital Democracy* model as understood by the majority of the researchers mentioned above, in the sense of updating the democratic models and engaging the citizen in the process of devising public policies [18]; Bernardes [15, 9, 19].

Among the results, a common finding, with rare exceptions, points towards the inexistence of a real concern with popular interaction behind those sites, but a concern “to be on the net” [3].

It thus seems illusory to expect that the mere computerisation of old bureaucratic structures will solve, per se, the democratic deficits. In fact, the development of these programmes rekindles the hopes of fulfilling the democratic system envisaged in the 1988 Federal Constitution that stipulates in its first article (single paragraph) the mixed model of representative and direct *democracy* that should prevail in the nation.

The *Digital Democracy* project requires the collective design of decisions and governmental programmes, which entails that the citizens be co-producers of that process and its contents and results in a way that each individual’s will can be minimally contemplated in the collective will.

This is in line with the co-production of public goods theory [11]. From the understanding that the actual problem is not so much technological but about political duties, a new question arises: how to use these tools to meet the citizens’ demands so that they are emancipated and integrated into the political projects? The issue of public policies can be a source of answers, they “search for ways to realise human rights, particularly social rights” [20]. The public policies are “the State in action”, the result of institutional and processual policy. “Policies are materialised in directives, programmes, projects and activities that are aimed at solving problems and meeting demands from society” [21].

Once the meaning of the expression has been established, the question of implementation arises. The answer can be found in Schmidt, who presents five implementation stages of a public policy, namely: Phase 1: Perception and definition of problems; Phase 2: Introduction into the political agenda; Phase 3: Formulation of public policy; Phase 4: Implementation; Phase 5: Evaluation [21].

From this analysis, one concludes that materialising *Digital Democracy*’s principles, and consequently those of smart cities is something which underlies the need to implement public policies. In that sense, in the next point one will discuss the implementation stages of a smart city policy by the Rio de Janeiro city council.

4 The Rio de Janeiro, Brazil, Experience Using Digital Initiatives for the Co-production of the Public Good: The Case of the Operations Centre

“The fact is that this is a swerving moment, to turn the corner, to get to the other road” [22]

This quote attests the turning point that these first decades of the 21 Century may represent. The consolidation of an *Information Society*, i.e. a societal model that combines *information* and *knowledge* and to add more *knowledge* to this equation it is obvious that one cannot forget that the *Internet* is a tool and, as such, it does not suffice for the establishment of a *Digital Democracy*. Public policies and political mobilisation—including that of citizens—are necessary energies to make “turning the corner to get to the other road” possible.

In this sense, understanding what the problem is—the distance between representatives and represented, between public servants and service users, besides services turned onto themselves and not to the citizens—and subsequently the inclusion of this problem in the political agenda, already accomplishes the first two phases of the elaboration of public policies studied in the previous item.

Furthermore, the author refers to a third implementation phase of a public policy, the content formulation of public policy; in this sense one can highlight two strategic sectors: inclusion and digital literacy, both recognised by the Brazilian Information Society Programme as central elements for the democratisation of the access to knowledge and indispensable requirements for the citizens to become capable of dealing with the new environments of participation and interaction [23].

Since these minimum requirements for the implementation of a *Digital Democracy* public policy, as one of the features of a smart city that uses ITCs for co-produced and sustainable management, have been confirmed, one will examine a tangibly situated example: the implementation process of the Rio Operations Centre—ROC. The stages infra identified constitute as the “fourth phase, or public policies implementation” [21].

According to the interview given by the Digital Chief Executive, Pedro Perácio [25], the ROC was created in Rio de Janeiro to respond to the floods that hit the city in April 2010. The emergency made the authorities realise that the citizens’ life was affected by the mismatch of different organisms that manage the city; accordingly, the Operations Centre was conceived with the objective of using ITCs to integrate the citizens and for a collective decision-making that enables it to cause an impact on the cities’ everyday life.

Set up on 31st December 2010 in Cidade Nova (Rio de Janeiro, Brazil), the product of a partnership between the Rio de Janeiro city council and International Business Machines-IBM, the ROC had as a mission the consolidation of the information from the various Rio council systems to enable real time visualisation, monitoring and analysis [24].

The above mentioned partnership turned Rio de Janeiro into the first city in the world to be equipped with an intelligent information system like the American Space Agency Control Centre. In addition, a pioneer system of High Resolution Meteorological Forecasting (PMAR), which can predict heavy rain with up to 48 h’ notice, was developed. According to the interview, there are three projects like this one in the world: Situation Room (created to operate the Pan-American Games or the World Cup, this model exists in Gauteng, South Africa); Case Centre (assistance and emergency centre, integrating three departments: firefighters, police and health care); Operations Centre (responsible for integrating the other two), that is how the ROC/RJ functions: the most advanced case in the world [25]

The ROC structure comprises 30 bodies, besides secretariats and concessionaires that monitor the city’s daily life. Its control room operates with 400 (four hundred) workers who take turns to monitor 900 (nine hundred) cameras.

This Centre helps the city in its daily life, in the planning of events, emergency situations, traffic, “blackouts”, floods, and landslides, that is to say, it combines information with risk prevention and emergency circumstances.

Aiming at enlarging the scope of information, a “press room” was created inside the ROC so that the agents can make real time information about what is happening in the city available on the social networks

In the face of this scenario, a question can be put forward. Is the use of ITCs at ROC effectively contributing to implementing the precepts of a smart city?

According to the interviewee, “learning is permanent and the integration of ITCs enables the merging of functions consequently improving life in the city” [25]. It should be highlighted that in the present context in which the majority of the population lives in urban areas, *e.g.* Rio de Janeiro with more than six million inhabitants [26] these tools can assist managers in more efficiently solving problems that occur in everyday life in the big urban centres.

Furthermore, when a crisis situation is identified, the mayor is called upon to take decisions since the ROC is connected to the mayor’s home and with the Rio headquarters of both Civil and Military Defence.

Processing strategic information enables the ROC to have an impact on the city’s life since the citizens become co-producers in this process.

It was within this context that the project to integrate *Waze*, an application of collaborative information on traffic, into the city’s electronic signage panels was developed. The platform of the mobile application *Waze* is integrated into the ROC’s Control Room and works with the users. The city council receives 750.000 daily reports from the application’s users on different types of traffic incidents [27].

The information provided by the citizens through *Waze* is just one of the data types processed by a Google tool used by ROC to monitor the journey times in several of the city’s roads in real time. In addition, the ROC started to publicise this information on routes and roads on digital street clocks: the objective was to employ the data produced by users to help drivers take quick decisions on the best route to follow.

Following public policies’ implementation the road map studied in the previous point, the fifth phase is the “Evaluation” that covers the citizen’s feedback and enables the system’s retro-feeding determining whether the policy should continue or be changed [21]. Such policy can be checked at the ROC from the information sharing through the Waze Platform, which helps in the city’s traffic mapping; other policies adopted by Rio’s city council also help facilitating this phase. As an example, one can mention the project “Rio Vision 500” launched in August 2015 to discuss the city’s future for the next 50 years and assist in drafting the targets and guidelines of the Strategic Plan 2017–2020.

Amongst the above mentioned project’s actions, the emphasis is the availability of the cooperative and participative platform to which the population can send suggestions and vote for the best ideas through the site <http://www.visaorio500.rio>. Moreover, among the project’s objectives, it is expected that the Rio Operations Centre be upgraded to the category of public policy that is transversal to electoral terms, thus being a long-term policy [28].

In the face of these initiatives, the Operations Centre transformed Rio de Janeiro in an example in the use of technology in city management implementing the principles of *Digital Democracy* (since it falls back upon the information produced by users, the citizens themselves, to manage the city); furthermore, the tighter integration between

the different bodies and secretariats, generates more efficiency and transparency in the services and, consequently, the citizen becomes more cooperative.

It cannot be forgotten that this management model is challenged by issues of digital inclusion, overcoming old cultural patterns and resistance from certain bodies that refuse to integrate data with others. Notwithstanding such bottlenecks, this is the 21 Century management model, and for that reason in November 2014 Rio de Janeiro was elected “Smart City of the Year 2013” at the *3th Smart City Expo World Congress*, a fair on *smart cities* that took place in Barcelona, Spain. And, for the second year in a row, the city was considered as one of the 21 “Most Intelligent Communities in the World” by the *Intelligent Community Forum* (ICF) [29].

5 Conclusion

In this study one sought to evince the idea that governance in the 21 Century looks for foundations in, for instance, a culture of participation, or active citizenship that restructures several political and economic and even ethical-moral principles of contemporary societies. This may be accomplished by creating hybrid fora and possibilities to match interests via thoughtful discourse and arguments in a direct republican interaction (social dialogue) instead of there just being an absolute and passive representation of interests through a specialised bureaucracy.

In this regard, it turned out to be necessary to unveil the notion of *Digital Democracy*, which contributes to the retrieval of the normative values that rule any democratic society, such as, “participation”, “equality” and “publicity”. The value-added that the ICTs could—and still can—bring to representative democracy in its present state, allows governments to make their citizens *co-responsible* for the definition and implementation of public policies. If the government’s political existence goes beyond the mere management, it cannot afford to neglect the broad participating energy of other interests when making up the *Public Interest*, especially those that can be directly expressed by the citizens themselves (through popular consultations [e.g. plebiscites and referenda], popular initiative legislation, popular assemblies on the Internet to discuss and submit proposals, mobile phone applications, etc.).

In accordance with what has presented in this paper, the first and main measure to be adopted, in a city that wishes to become a smart city, relates to changes in the model of government. Government needs to be horizontal and open in the relation with the citizen. Thus being, the detailed analysis of the steps of public policy to be adopted for implementing ROC is required in order to assess its efficiency in the provision and deliverance of information and public services through the integration of organs and structures of collaborative government with reflection on the well being of citizens. It must be emphasized that the said initiative was awarded in the Smart City Expo World Congress, in Barcelona and, for that reason, it may be used as a reference for other cities that wish to promote cooperation between government and citizens. This study aims thus to be a contribution for overcoming such gap in research.

Creating a monitoring and cooperative citizenship is a radically new phenomenon inasmuch as it instigates a *plural* Power dialogue in which the State is no longer the

central actor, and neither are the social, economic and political forces; not even the citizens would be. In this new relationship, every actor and every factor matter: freely, equally and fraternally.

Acknowledgments. Our thanks to the CAPES Foundation, Ministry of Education of Brazil, for financing this research, and also to the CIIDH-Interdisciplinary Research Center in Human Rights, and to the Algoritimi Centre, both at University of Minho, for supporting this research. The work of Marciele Berger has been supported by CAPES under Grant nr. BEX - 1788/15-9.

References

1. Sorj, B.: *Brasil@povo.com: a luta contra a desigualdade na sociedade da informação*. In: Zahar, J. (ed.) Rio de Janeiro (2003)
2. Lévy, P.: *Ciberdemocracia*. Tradução de Alexandre Emílio. Instituto Piaget, Lisboa (2002)
3. Castells, M.: *A sociedade em rede. a era da informação: economia, sociedade e cultura*, vol. 1. 14^a reimp. Paz e Terra, São Paulo (1999)
4. Lessig, L.: *Code version 2.0*. Basic Books, New York (2006)
5. Virilio, P.: *Velocidade e política*. Traduzido por Celso M. Paciornik, 2nd edn. Estação Liberdade, São Paulo (1996)
6. Ferguson, M.: *Estratégias de governo eletrônico. O cenário internacional em desenvolvimento*. In: Einseberg, J., Cepik, M. (orgs.) *Internet e Política. Teoria e prática da democracia electrónica*. UFMG, Belo Horizonte (2002)
7. Dias, I.M.; Reinhard, N.: *Governo eletrônico e a sociedade da informação*. In: Polizelli, D., Ozaki, A. (org) *Sociedade da Informação: os desafios da era da colaboração e gestão do conhecimento*. Saraiva, São Paulo (2008)
8. Denhardt, J.V., Denhardt, R.B.: *The New Public Service: Serving, Not Steering*. M.E. Sharpe, New York (2003)
9. Santos, P., Bernardes, M., Rover, A.: *Teoria e Prática de Governo Aberto: Lei de Acesso a Informação nos Executivos Municipais da Região Sul*. Funjab, Florianópolis (2014)
10. Denhardt, R.B.: *Teorias da administração pública*. Cengage Learning, São Paulo (2012)
11. Schommer, P.C., et al.: *Accountability and co-production of information and control: social observatories and their relationship with government agencies*. In: *Revista de Administração Pública*, Rio de Janeiro 49(6), 1375–1400 (2015). http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0034-76122015000601375&lng=en&nrm=iso
12. Van Bastelaer, B.: *Digital cities and transferability of results*. In: *Proceedings of the 4th EDC Conference on Digital Cities*, Salzburg, pp. 61–70, October 29–30 (1998)
13. Giffinger, R.: *Smart Cities. Ranking of European Medium Sized Cities*. Centre of Regional Science, Viena UT (2007). http://www.smart-cities.eu/download/smart_cities_final_report.pdf
14. Gronlund, A.: *E-democracy and e-government: State of the Art*. In: 68th IFLA Council and General Conference. [s.n], Glasgow (2002)
15. Bernardes, M.B.: *Democracia na Sociedade Informacional: O desenvolvimento da democracia digital nos municípios brasileiros*. Saraiva, São Paulo (2013)
16. Estevez, E., et.al.: *Smart Sustainable Cities*. Reconnaissance Studie. IDCR: United Nations University Centre for Policy Research, Canadá (2016)

17. Unesco. Organização das Nações Unidas para a Educação, a Ciência e a Cultura. Informe Mundial de la UNESCO. Defining e-governance. 03. ago. 2005. http://portal.unesco.org/ci/en/ev.php-URL_ID=6289&URL_DO=DO_TOPIC&URL_SECTION=201.html. Accessed June 2016
18. Freire, G.M.C.A., Feitosa, G.R.P.: Cyberdemocracia: limites e fragilidades do governo eletrônico na construção da democracia. In: VI Encontro da Associação Brasileira de Ciência Política, 29 de julho a 01 de agosto de 2007. Unicamp, Campinas, SP, Anais de evento
19. Idalino, S.D.; Bernardes, M.B.: Law of access to information: case study between Brazil and Uruguay. In: International Conference on Theory and Practice of Electronic Governance, Uruguay, ICEGOV, pp. 60–63 (2016)
20. Bucci, M.P.D.: Direito Administrativo e políticas públicas. Saraiva, São Paulo (2002)
21. Schimidt, J.P.: Para entender políticas públicas: aspectos conceituais e metodológicos. In: Direitos Sociais e Políticas Públicas: Desafios contemporâneos. Tomo 8. Org. Jorge Renato dos Reis e Rogério Gesta Leal. EDUNISC, Santa Cruz do Sul, pp. 2307–2333 (2008)
22. Rover, A.J.: Do analógico ao digital: construindo tecnologias emancipadoras. <http://www.infojur.ufsc.br/aires/arquivos/analogico%20digital.htm>
23. Takahashi, T.: Sociedade da informação no Brasil: livro verde. Ministério da Ciência e Tecnologia, Brasília (2000)
24. International Business Machines-IBM. In: Prefeitura e IBM Brasil fecham parceria para tornar cidade do Rio de Janeiro mais inteligente. <https://www-03.ibm.com/press/br/pt/pressrelease/33308.wss>
25. Peracio, P.: Centro de Operações do Rio: depoimento, 7 June 2016. Entrevistador: B.B. Marciele, Rio de Janeiro: ROC (2016). Entrevista concedida ao Projeto de Tese Democracia nas organizações internacionais de Integração regional: uso das tecnologias de informação e Comunicação –tics (internet) para a efetivação do direito Fundamental de inclusão política
26. Instituto Brasileiro de Geografia e Estatística (IBGE). Cidades@. <http://www.cidades.ibge.gov.br/xtras/uf.php?lang=&coduf=33&search=rio-de-janeiro>
27. Rio de Janeiro (2014). http://www.rio.rj.gov.br/exibeconteudo;jsessionid=39196C7EE4E297237E80F7D6B44D5F1B.liferay-inst1?p_p_id=exibirconteudoportlet_WAR_conteudoportlet_INSTANCE_Z0Gv&p_p_lifecycle=0&p_p_state=pop_up&p_p_mode=view&p_p_col_id=column-2&p_p_col_pos=1&p_p_col_count=2&_exibirconteudoportlet_WAR_conteudoportlet_INSTANCE_Z0Gv_struts_action=%2Fjournal_content%2Fview&_exibirconteudoportlet_WAR_conteudoportlet_INSTANCE_Z0Gv_groupId=10136&_exibirconteudoportlet_WAR_conteudoportlet_INSTANCE_Z0Gv_id=4989359&_exibirconteudoportlet_WAR_conteudoportlet_INSTANCE_Z0Gv_viewMode=print. Accessed May 2016
28. Teixeira, P.P.C.: O Rio do Amanhã Visão Rio 500 e Planejamento estratégico 2017–2020. Rio Prefeitura, Rio de Janeiro 203 p. (2015). <http://visaorio500.rio/>
29. Sator. Connected Smart Cities. Rio de Janeiro a cidade mais inteligente do Brasil. https://issuu.com/connectedsmartcities/docs/cat_logo_connected_smart_cities_20



<http://www.springer.com/978-3-319-56534-7>

Recent Advances in Information Systems and
Technologies

Volume 1

Rocha, Á.; Correia, A.M.; Adeli, H.; Reis, L.P.; Costanzo,
S. (Eds.)

2017, XXXII, 930 p. 271 illus., Softcover

ISBN: 978-3-319-56534-7