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Public Management Focused to the Smart City

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Abstract— *This study focuses on municipal management through information and communication technology in Smart City modeling. It presents a model for management of a Smart City with information technology resources to demonstrate the process of structuring integrated systems, analyze the benefits that this will bring by modeling local government activities, and introduce innovative measures for local government restructuring. It applies the simulated case study method and related procedures in a qualitative research approach, based on creativity and innovation. It reports the process of structuring integrated systems and analyses the benefits of a model of a Smart City. The Smart City will make the living conditions of the population much more pleasant and will reduce budgetary costs by deploying smart services. Eco-innovation, as set out in the Oslo Manual, extends to public businesses and is confirmed by the organizational innovation of civic processes. The solution in today's conditions is to manage cities using information technology and communication, where millions of citizens may enjoy the maximum benefit of a project of this kind. This study providing a framework for a smart city about its technology, innovation, and public affairs.*

Keywords— Governability; Innovation; Knowledge; Management.

I. INTRODUCTION

This study involves knowledge creation and the modeling of a Smart City, using information and communication technology applied to municipal administration. The global concern is undoubtedly for governments and their structures to solve management problems quickly and return with the solutions expected by citizens paying taxes. This is sufficient justification for bringing study and qualified research to the constructions of creative idealists. A Smart City is one that uses oriented means to achieve its proposed management effectively and fast, disseminating information in accordance with current expectations. This task is structured by topics and sub-topics which are addressed after the introduction – a theoretical and conceptual review followed by the methodology used, results, conclusion, and references.

II. OBJECTIVES

The overall objective is to present a model for running a Smart City with the resources of information technology. As specific objectives, it is proposed: (1) to demonstrate the process of structuring integrated systems;(2) analyze the benefits that this modeling will bring to local government activities; and (3) introduce innovative measures for local government restructuring.

The question to be answered here is: What are the basic features of a city built on information technology and ecological wisdom? The answer lies in the results presented below, including the developments reported and the specific figures and tables on the subject.

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III. THEORETICAL AND CONCEPTUAL REVIEW

The preparation of this task is based on Systems Theory and brings together the concepts of information technology, communication, municipal government, the Smart City idea and eco-innovation. Systems Theory, according to Chiavenato (2014), deals with practical solutions in the production and conceptual formulations to be applied empirically; it assumes the existence of integration between the natural and social sciences, and the orientation of this integration towards a systems theory, covering not only physical studies of scientific knowledge in the social sciences, but the development of cross-unifying principles of the science involved, and an integrative drive in science education.

3.1 Concepts of information and communication technology

The research in Paludo (2013) indicates that information technology is a strategy to support infrastructure and continuous improvement in management and governance. This strategy involves principles and guidelines for e-government which focus on the promotion of citizenship. The digital applications included in the association may have support-free software; actions in the public interest can be used as instruments of articulation between the public administration through its various bodies and the citizens using the public services offered. Therefore, information technology offers a cognitive design for the integration of public policies at the various levels of the governments and authorities involved in public administration.

Information technology offers operational communication; without this, the users interested in public services will not reading the design or configuration of the information system. Paludo (2013) conceptualizes communication as a process of transmitting information between individuals and the organs of a structure that share structured data, since everyone who accesses these data can understand the informational transaction; so, it is only by understanding the origin of the reports and interpreting them that communication becomes possible. In order to perfect this communication, it said author needs a featured setting for the information about emitter and source, the message that is sent between these two, an encoder or means of converting the message data, the transmitter or apparatus by which the message travels, the channel which is the medium between the source and the destination, the decoder that makes the information understandable, the receiver, and the destination, which refers to the person receiving the message. The feedback is a properly understandable return message, whereas the noise is the outside interference of the message.

3.2 Concepts of municipal government

The concept considered in this study is focused on the New Public Management, introduced by the United States as an alternative to amplify the existing standards of government management, as is clear from the reading by Denhardt (2015). This study clarifies the concept of new public management as a pragmatic finding, which comes without specific alternatives; so, it is much friendlier to the discovery of anomalies in the traditional concepts of public management. About municipal administration, this concept is pragmatic about the knowledge of these anomalies in local public administration, in order to provide the appropriate setting in the field of administration, with alternatives now contextualized to meet the conditions of municipal government.

3.3 Smart City concept

The Smart City concept that best approximates to this study is that offered by Coelho (2015). The author relies on the testimony of the quality of life, mass migration pressure, and efficiency in essential services that must not be obstructed; it should be adapted to new ideas that improve living conditions. It would thus meet the attributes of what the authors call the Smart City for your project, focusing on a future designated by the challenge to individuals in their daily lives from the evolution of technology. For the purposes of this study, the Smart City is a concept through which to interpret the configuration of integrated municipal services, bringing your citizens the facilities offered by technology for your well-being and the quality of life in your location.

3.4 Concept of eco-innovation

This paper adopts the concept of innovation as proposed by Schumpeter and Dias (2014), which is considered to be the approach of eco-innovation, referring to the description of products and processes offered with the application of knowledge to improve ecology and secure sustainable development. The author turns to environmental innovation, environmental ecology, eco-efficiency, eco-design, environmental design and sustainable design that call for sustainable innovation. Another concept could be that the focus of this research is the meeting of the features of civic relationships with the scenario that expects facilities for living from public services, with minimal wear and maximum terms of performance.

The Schumpeterian concept of innovation is related to creative destruction, which will result in imbalance in the emergence of new model; this may unbalance traditional structures with consequences for the intensity of use of resources that are already scarce. Thus, a multi-media series will feed a complex structure that significantly

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consumes energy, uses sophisticated equipment with towers, computer and other apparatuses. In a fragile scenario, this structure will impact negatively, though raising the quality of life for stakeholders.

Another concept to focus on spares the destructive innovation that is related to the impotence of the public to combat the rules of capitalism, whose unbridled dynamics result in information. This is a focused development in Ferry (2015), who discusses the progress of an anonymous logical, mechanical, automated innovation; the author records that the continued need for adaptation prevents any truce in competition, which is now inevitable for public and business organizations. In fact, the author fills an academic gap concerning the reconstruction of the French state in the post-war period and at the present time, due to the reconfiguration compelled by the emergence of partnerships between nations, such as the BRICS (Brazil, Russia, India, China and South Africa).Ferry questions the now globalized development control that is reflected every day in recreation projects which more precisely demand natural resources, since the resurgence of innovation will mean new demands once again revealing the destructive power of innovation. Actually, many innovations run upon against restrictions and limitations, precisely because they challenge many systems and processes in the host agency, and therefore the implementation of innovative programs is always the trade-offs (Stewart, 2014).

IV. METHODOLOGY

This work uses the Case Study Method, supporting the techniques of Design Thinking. Research in Prodanov and Freitas (2013) conceptualizes the Case Study as a comprehensive research strategy that involves the study of one or more objects, allowing a broad and detailed knowledge of the studied phenomenon. This is proposed for the present task, in which objective information will result in a proposal for the intelligent public management of a municipality. The task takes a qualitative approach, and its procedures involve the collection of informational data to be analyzed and criticized in order to exploit the essential creativity of the specification.

The literature review in Biscaia (2013) indicates that Design Thinking is a collaborative process, an approach centered on human needs, designed to solve problems and help people and organizations to be more innovative and creative, for business and society, through inspiration, ideation, prototyping and implementation. Techniques of Design Thinking are useful in integrating innovation with business in general and specifically in public affairs as addressed in this task. They aim at a ratio of government organization and the citizens who benefit from government services. The use of this technology needs to be validated as a strategic success; hence, the related activities are designed to follow the procedure in stages. Torquato, Willerding and Lapolli (2015) propose the phases of immersion, namely, reflective involvement in the search for creative solutions; analysis and synthesis, when they constitute the logical preparations; ideation and the aim of legitimizing the actual operation of the discovery; and finally the prototype, which is the phase of preparing the copy or simulation to be tested, confirmed[not sure if this is what you meant] and validated for effectiveness, as expected practice with a Smart City design.

V. MODELING FOR OPERATING IN AN SMART CITY

As stated by FGV (2016), the European Union defines Smart Cities as systems by which people interact using energy, materials, services and financing to catalyze the benefits of development with the quality of life. The institution states that such flows are intelligently interactive by its engagement in planning urban management strategy to infrastructure, services, information, communication, and social and economic needs. This views on the fragile environment in order to optimize eco-innovation by adding the culture, tradition, wisdom and well-being of all citizens.

The functionality of the Smart City does have to involve modeling to meet the service expectations of local governments and citizens interested in public bodies that offer fast and efficient services. It is a simulated case study with three specific objectives, whose results follow the sub-topics discussed below.

5.1 Demonstration of the process of structuring the integrated systems

The structuring process dealt with in this sub-topic involves the essential elements for the operation of the Smart City. Figure 1 shows the integrated structure which is critical for the Smart City.

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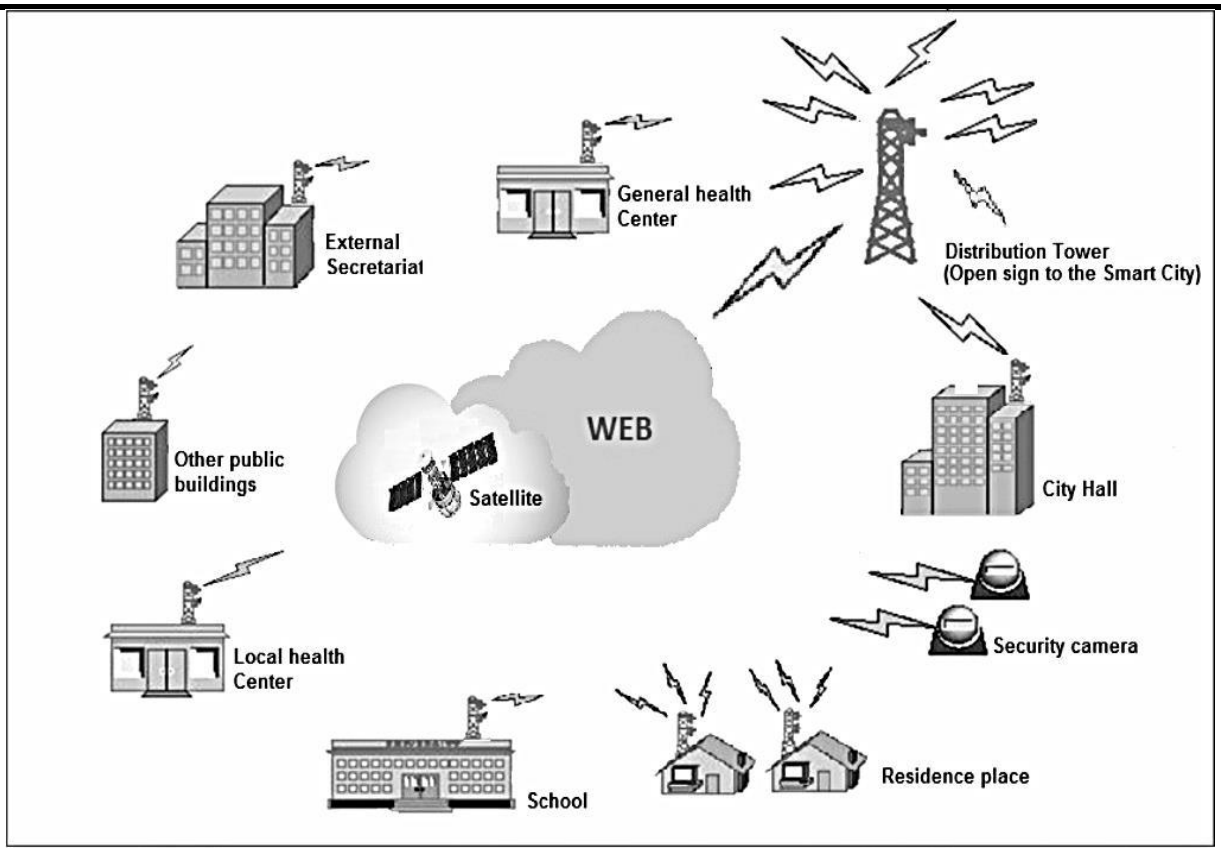

Fig.1: Diagram of the integrated structure proposed for Smart City

Table 1 provides functional description of key components in the structure. Implanting these elements requires a preliminary study of the environmental impact, especially in fragile environments where there are human diversity and biological, cultural and other forms of life which react negatively to the presence of equipment such as this study describes. The Smart City may raise the quality of life, but, as discussed above in the theoretical section, it involves eco-innovation in every context that is assumed by previous research. The implementation structures as specified here must be subject to the decision of a public authority.

Table.1: Specifications of the structure of the Smart City

Elements from the diagram	Descriptive function
Distribution Tower	This connects the satellite with the integrated Smart City. As a technological innovation, it generally requires further studies to support its use, as well as studies of all the other elements listed in this framework.
City Hall	In this building is installed the operational control of the Smart City System. It requires management according to the operating manual and should work with absolute security.
Security câmeras	Their function is to sustain a surveillance system to improve the lives of individuals.
Residences	Their function is to accommodate individuals and their families in overall comfort, providing all the Smart City technology without environmental damage.
School	Its function is to house the interaction of citizens through teaching, research, culture, leisure, and entertainment, contributing to the future success of the population. It contains videoconferencing modules, and `complete equipment for distance learning, virtual libraries, necessary digital services, and other facilities to maintain the users' satisfaction.

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Radio link	Its function is an environmental connection to the distribution tower enabling users to connect to the benefits of the Smart City
Local health center	This connects the health center to the Smart City technologies. It allows users to access such things as emergency care and the prevention and support related to the care offered by a public health service.
Other public buildings	The aim is to set up an administrative body with all the interaction allowed by the Smart City technology.
External secretariat	This maintains the total control of public administration, by `special features of government administration. It focuses on e-government bringing all the improvements and benefits of `Smart City to the users.
General health center	The general management that controls all the benefits offered by the Smart City to individuals work here. It seeks the continuous improvement of its own management in anticipation of innovation.
Satellite	This piece of technological equipment has the function of generating a global connection between Smart Cities in different locations, providing local and global intercity communication.
Web	This is the name of the connection between the members of the worldwide computer network. It enables the users to be interconnected through a pre-configured graphic interface.

5.2 Analysis of the benefits of the Smart City model

In the Smart City modeled here, the data transmission service is of fundamental importance. It connects the e-government organizations internally and connects them with the other institutions involved externally with them. This data transmission allows communication via the web, between a user interested in the available services, and the public institutions or organizations linked to which the citizen can access solutions every day.

The citizens live under one pressure of time, which implies that they seek the quickest and most efficient ways of solving such practical issues as those relating to food, convenience shopping and consumption, their security, gains in knowledge, developmental aspects of education, culture and sports, health and wellbeing, leisure and entertainment; and their mobility and transportation, and other applications that your routines will require. Given these facts, the Smart City will find in information technology for the integrated environment the architects to configure virtual structures that can physically bring solutions. To get these benefits the individual must first have enough resourcefulness to use the data and information from the computer, which is why he needs to access the web system. Guidance and other benefits, provided they are available and well understood by the user, will result from this integrative relationship.

Effective action, since it is supported by strategic parameters, will make a deep impact on the governance scenario in the Smart City. Digital inclusion is the first integrative strategy from information technology; this expectation involves programmers' functional structures for programs and intelligent software. Every public body would have its infrastructure databases compatible with the configuration installed in the Smart City, to provide access for communities and individuals. Because the setting involves both local and global institutions, they will require a free access link previously set up with the public body.

The communication strategy, which involves transmission and access information, comes on the list of benefits. Communication will need the continuous updating of your input, so that the message to be received by individuals arrives on time, or else there will be a loss of value when it comes to decision making. How traffic pressure will react to the volume of hits is one of the questions related to the transmitter structure itself. It must clear the outputs with the required speed and obtain a satisfactory return or feedback as the first benefit to those who use the Smart City.

The modern municipal administration will be responsible for operating the modeling of the Smart City; otherwise, you can decentralize the management of these management outsourcing structures. There will be the pragmatic dynamics to consider, due to the time changes of the logical standards of the management processes; the isonomic certification of the public administration bodies will be the solution of choice. What is called for is a radical paradigm shift, from the previous structure of a bureaucracy seated at physical desks to the virtual functioning of all public structures. This web apparatus will materialize in a way never imagined, once the Smart City gradually replaces the archaic models of municipal management with proper management, without vices and untouched by the corruption that erodes the public purse, it will take away today's institutional deterioration of

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government, due to fraud and will offer instead administrative procedures at unusual speed.

There is no doubting the benefits that the Smart City brings to the relationship of sustainability with eco-innovation. The services offered by the model eliminate the need for cellulose paper, which represents a great advantage because obviates tree felling to meet the input of this industry. The relationship with ecology is healthy, since it is properly used and avoids stress from delays and the inconvenience of waiting. Comfort and convenience can be expected from such facilitative devices as marking time, several schedules [not clear what these refer to] and the like. With the implied innovations in structural design, the environment in which they operate will become much more enjoyable, with less volume of debris thrown away in the wilderness such as commonly occurs in cities where undisciplined individuals live. Until waste collection is regulated by intelligent processes, citizens must plan to impose eco-innovation in the Smart City. Even the current impotence of the government will be influenced by the benefits of eco-innovation, from the use of solar energy, bio-digesters and so on, to the reduced energy consumption that a Smart City could now control. This is the schumpeterian destructive innovation brought to a particular context. So, a list of the actual benefits may be appropriate here (see Table 2 below for the main immediate benefits of the Smart City).

Table.2: Summary of the main benefits for the Smart City

Main benefits	**Reflexes in the daily lives of residents**
1. Social	1.1 Benefits in public security using advanced technology cameras, sensors and micro-drones to patrol. 1.2 Video Networks and monitoring with smart cameras capable of real-time identification. 1.2 Public health services with wireless sensors able to identify and diagnose users in real time. 1.3 Distance learning without locomotion and the development of knowledge or training. 1.4 Traffic control and intelligent transport vehicles capable of flow management and takes account of users per route and alternatives, to avoid congestion.
2. Economic	2.1 Reduced cost of manual labor since all services is operated by smart devices. 2.2 Reduction of budget expenditure by replacing procedures so that paper costs, the maintenance of furniture and equipment and superfluous purchases are eliminated, because the services are web-based. 2.3 Lower costs of telephony, and other uses of energy since communication will operate through a protocol, using a solar energy production apparatus and so on.
3. Environmental	3.1 Reduction in the consumption of utilities because inputs in the Smart Services of Smart City will no longer be made. 3.2 Impact on the environment reduced by replacing the classical management models with eco-friendly ones. 3.3 Implementation of new attitudes that benefit the environment in the face of the backward-looking and preservationist behavior of some who use the Smart City.

5.3 Innovative measures for the restructuring of local government

The traditional service protocols used in public agencies have become outdated by the new power of the web. It is essential for regulating the whole municipal public service with updated laws and regulations. This measure must be approved by local assemblies in order to allow further control by the government. Because bureaucratic structures become virtual, the behavior of internal and external users' needs to be re-shaped to fit the Smart City.

The basis of radical change is organizational innovation, the innovation of public business and innovation processes, as set out in the Oslo Manual. E-government now operates in the Smart City already, to enable this protocol condition to prevail. In Table 3 below are listed the ideal innovations that this indicates.

Table.3: Innovation measures proposed for the Smart City

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Innovation typology	Descriptive of the new conditions
1. Organizational	1.1 Reduction of physical spaces suiting the new demands of storage and virtual reality. 1.2 Electronically increased productivity, dexterity and speed of processes, reducing labor and the demand for workers. 1.3 Include the citizens' organizations, and publishes news about application creation, intelligent design and equipment that can improve organizational processes.
2. Public business	2.1 Allows collected data to be quickly accessed by various institutions. 2.2 Quickly detects failures preventing fraud that damages public property. 2.3 Forecasts non-routine events in the organization promptly, providing the necessary adjustment to reduce the social and economic impact.
3. Process	3.1 Sequences hierarchical organization by virtually monitoring stakeholders. 3.2 Responds promptly to the person concerned. 3.3 Monitors the capability to meet efficiency and suitability standards, for auditing purposes.

VI. CONCLUSION

This work is a pioneer from the point of view of administrative management in the public sector, because it is an integrated model involving technology, information, and communication to meet the requirements of citizens interested in government services. The characteristics are relevant to the operation of Smart City built-in patterns of intelligent living through information technology. There is little doubt that to build a structure like this, people must detach themselves from the traditional Weberian models in the services provided by public organizations. To let millions of people enjoy the maximum benefit that a task like this can provide requires the wise treatment of today's conditions. The possibility of mass unemployment from the reduction in the number of civil servantsis a needless concern; obviously, pensions and public employee reassignments will be needed; there is the possibility that some people who have chosen to resign become entrepreneurs, serving as business owners with the various organs, according to the peculiarities of the work that each goes on to develop.

REFERENCES

[1] Biscaia, H. G.(2013). *Design Thinking e Sustentabilidade: estudo do sistema Mandalla DHSA no combate à fome e à miséria. 2013.* 253 f. Dissertação (Mestrado em Administração) – Programa de Pós-Graduação em Administração, Universidade Federal do Paraná. Curitiba: UFPR.

[2] Chiavenato, I. (2014). Teoria general da administração: abordagens descritivas e explicativas. Baruerí: Manole.

[3] Coelho, N., Paiva, R., Baldaque, S., Almeida, S. & Salgado, S. (2016). Cidades Inteligentes - Smart Cities - Infraestrutura tecnológica: caracterização, desafios e tendências. Projeto FEUP 2014/2015. Porto: Grupo 32 MIEIC/MIEIG, 2015. Available online: http://paginas.fe.up.pt/~projfeup/submit_14_15/uploads/relat_GI32.pdf. Accessed 13 July 2016.

[4] Denhardt, R. B.(2015). *Teorias da administração pública*. São Paulo: Cengage Learning.

[5] Dias, R. (2014). *Eco-inovação: caminho para o crescimento sustentável*. São Paulo: Atlas.

[6] Ferry, L.(2015). *A inovação destruidora: Ensaio sobra a lógica das sociedades modernas*. Rio de Janeiro: Objetiva.

[7] FGV Projetos. (2016). O que é uma cidade inteligente? Availabble online: http://fgvprojetos.fgv.br/notici.as/o-que-e-uma-cidade-inteligente, Accessed 13 July 2016.

[8] Paludo, A. (2013).*Administração publica.* Rio de Janeiro: Elsevier.

[9] Prodanov, C. C. &De Freitas, E. C. (2013). *Metodologia do Trabalho Científico: Métodos e Técnicas da Pesquisa e do Trabalho Acadêmico*. Editora Feevale.

[10] Stewart, J. (2014). Implementing an innovative public sector program: The balance between flexibility and control. *International Journal of Public Sector Management*, 27 (3), 241-250.

[11] Torquato, M., Willerding, I. A. V. & Lapolli, E. M. (2015). *A ferramenta design thinking: uma estratégia da gestão empreendedora da inovação para o despertar criativo em organizações*. Porto Alegre: ALTEC 2015.