Mobile Governance in Indian Urban Local Bodies: An Exploratory Study

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Abstract. This paper attempts to collate and derive insights from various initiatives on mobile governance by Urban and local bodies in India. The first generation e-governance initiatives by urban local bodies resulted in computerization of the legacy systems/practices in government with limited ability to internalize the advances in information and communication technologies (ICT). The paradigm shift from e-governance tom-governance results in radical differences in the key processes of creating, maintenance and usage of knowledge, creation of secure mobile transaction and delivery system, establishment of the appropriate infrastructural support for multi-mode direct citizen interface and delivery mechanisms. The paper identifies the various mobile app use case scenarios for residents, urban local body managers, system integrators, telcos, data services provider, and other stakeholders. Based on these mobile apps, it is attempted to classify the cities in various categories.

1. Introduction

The basic and universal corner stone of good governance are quality of service, quick response mechanisms and above all accountable and transparent process mechanism. The first generation e-governance initiatives resulted in computerization of the legacy systems/practices in government with limited ability to internalize the advances in information and communication technologies (ICT). M-government aims to make the interaction between government and citizens (G2C), government and business enterprises (G2B), and inter-agency relationships (G2G) more friendly, convenient, transparent, and inexpensive in designing, managing and administering public realm in urban local body as per Diatha [1]. New Urbanism principles and transect analysis should be conducted, followed by formulation of regulation plan, built form standards, public space standards,

architectural standards, landscape standards, environmental resource standards and administration for the study area and are presented in the web for responses from public and to seek alternative design from citizen or friends of the city living world over. Experts examined how different types of knowledge are incorporated in governance processes, a swell as the extent to which spatial dimensions are included in such knowledge-building processes (e.g. GIS-based; maps, visualizations). Baud [2] examined mainly digitized processes of knowledge management. These are hybrid KM systems, with several modes of interaction (mobile phones, internet, face2face) coordinated by municipal administrations. Today's cities not only have to be interconnected, transit oriented, walkable and cycle-able, they have to be the smart cities of the future. As per Datta residents can drive urbanization through the back of your mobile phone [3]. Pfeffer provides a comprehensive state-of-the-art review of geo-technologies for spatial knowledge co-creation (crowdsourcing) and management for urban governance focusing on (1) the kinds of geo-technologies that feature in the urban governance area; (2) the discourses with respect to geo-technologies in urban governance processes; (3) the kinds of knowledge produced, used, exchanged, and contested in relation to quality of life, economic development and the ecosystem; and (4) the transformative potential of geo-technologies in urban governance processes. Through this review it draws out the capacities and challenges of geo-technologies for inclusive and sustainable urban development [4]. Janowski examined a range of digital technologies have become available to potentially help address such pressures including: government as a platform, i.e. "a common core infrastructure of shared digital systems, technology and processes on which it's easy to build brilliant, user centric government services"; mobile platforms to provide mobile apps to mobile devices; local big data and data mining; wearable devices and mobile health apps; and ad-hoc networks, compute continuum and Internet of Things[5].Even more remarkably, these citizens are not necessarily concentrated in large cities (as in the case of the cluster "Countryside citizens"). This population may represent an important "market" to target in order to develop a habit of e-Government usage, for instance through innovative platforms and systems(e.g., mobile apps).As per Lamberti (2014) a balanced multichannel PA service provision, where online and offline channels are opened is required to meet the diverse expectations and needs by the different profiles[6].Mobile App for Urban Local Bodies should be for three actors – Citizen, Technical Person, and City Stakeholder. This paper provides a comprehensive state-of-the-art review of geo-technologies for spatial knowledge production and management for urban governance.

1. **Mobile Governance Ecosystem**

Mobile Governance ecosystem consists of following stakeholder – Residents, Telecom Service Providers, Urban Local Body management, System Integrators, Special Interest Groups (like environmental groups, animal rights groups, Differently abled groups, senior citizen groups, women empowerment groups, cyber security groups, data privacy groups , academia and the likes), Regulators (TRAI), and Mobile Vale Added Service Providers (like Google, Facebook, WhatsApp, Twitter, Mygov.in, City Open Data, and the likes).The Smart City Mobile Data Ecosystem consist of (Figure1) namely - Mobile Value Added Service Providers (Telcos, GIS service providers, advertisers, and the likes), Basic Free Mobile Service Providers (DBT, Waste Monitoring, Water Delivery, Public Safety, Public Toilets, Services for Senior Citizen and the likes), Premium Mobile Service Providers (Traffic congestion, Utility Bill Payment, Weather data, Air quality data, Job data, Entertainment data, and the likes), Data Service Provider s (Google, Facebook, Twitter, You Tube, Snapdeal,

Amazon, Flipkart, Oyorooms, Zomato, DHL, FedEx, and other supply chain companies), City Open Data and APIs. Smart City Mobile Data Ecosystem is an intersection of mobile value added services, basic free mobile services, premium mobile services, data services, and city open data-APIs. The seamless flow of flow data / information will generate city knowledge for the city's residents, city's students, city tourists, city's senior citizens, city's pets and animals, city's economically weaker section, and other demographic segments.
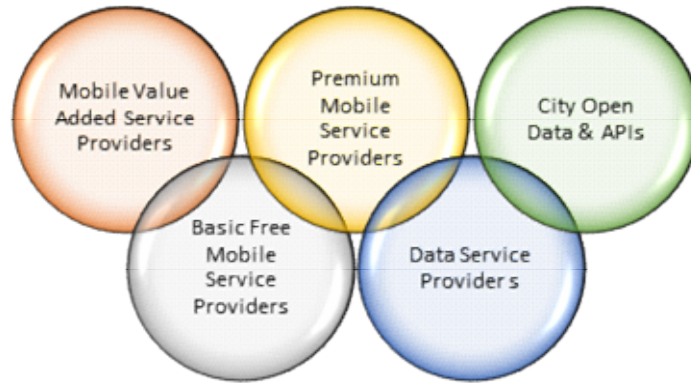

Figure: 1 – Mobile App Stakeholders in Smart Cities / Urban Local Bodies

2. Smart City Ranking and Number of Mobile Apps proposed in Smart City Proposal

Service driven indices may be helpful in categorizing city into leader or laggard. Extending Linders (2015) [7] these are based analysis of Transformation Index, Customer (User) Index, and Environment Index of planned Mobile App of Top 20 Indian Urban Local Bodies (Table1). These indices are leverage for Qualitative analysis and competitive analysis of top 20 urban local bodies in India. Transformation Index refers to relative impact of the mobile governance adoption by top 20 urban local bodies on transforming the governance, service delivery, and accountability of the urban local body, as assessed by the researcher. Customer (User) Index refers to relative impact of the mobile governance adoption by top 20 urban local bodies on resident engagement, resident collaboration, crowdsourcing, and community development within the urban local body precinct, as assessed by the researcher. Environment Index refers to relative impact of the mobile governance adoption by top 20 urban local bodies on air quality, energy saving, water quality, efficient water usage, waste collection-reuse-recyle-reduce, as assessed by the researcher. Urban local body of Bhubaneshwar, Pune, Jaipur scores highest in our research on urban governance using mobile app. Urban local body of Surat, Ahmedabad, Jabalpur, Sholapur score relative second highest. Urban local body of Dhavanagere, Delhi NDMC, Coimbatore, Belgaum / Belgavi, Udaipur, Chennai, Bhopal lowest among the urban local bodies planning mobile app. Urban local bodies of Kochi, Vishakhapatnam, Indore, Kakinada, Guwahati, and Ludhiana have not mentioned mobile app in Smart City Proposal.

Parameter	Purpose
Smart City Rank	As declared by Government of India, Ministry of Urban Development
City Name (with score)	As declared by Government of India, Ministry of Urban Development
Number of Mobile App(s) in Smart City Proposal (SCP)	Smart City proposal as submitted by various urban local bodies to Government of India, Ministry of Urban Development
Transformation	The relative qualitative urban transformation impact the mobile app has on the urban local body vis-à-vis other urban local bodies.
Customer (Users)	The relative qualitative citizen engagement the mobile app has on the urban local body vis-à-vis other urban local bodies.
Environment	The relative qualitative environmental impact the mobile app has on the urban local body vis-à-vis other urban local bodies.

Table 1: Qualitative Analysis of Top 20 Indian Urban Local Bodies

Smart City Rank	City Name (with score)	Number of Mobile App(s) in Smart City Proposal (SCP)	Transformation	Customer (Residents)	Environment	Remark
1.	Bhubaneshwar (78.83%)	03	Mobile app planned to transform service for and Parking Mobile App. "Mo Sathi" women's safety, and Emergency response.	The app addresses safety concerns of only 50% of the residents.	The planned mobile app will help service delivery more energy efficient.	The apps promised in smart city proposal are towards women safety, better space utilization, and energy efficiency.
2.	Pune (77.42%)	03	Public transport ITMS transformation leveraging GPS, real-time tracking, health monitoring in buses, Smart bus stops. Grievance redressal and bill payment through website and mobile app. Pan-	Potential to provide transport convenience to commuters and travelers.	The planned mobile app will help service delivery more energy efficient.	The apps promised in smart city proposal are towards citizen convenience, energy efficiency, and improvement of municipal service

Smart City Rank	City Name (with score)	Number of Mobile App(s) in Smart City Proposal (SCP)	Transformation	Customer (Residents)	Environment	Remark
			city Water Mobile App and Website to be completed by Dec 2016. Passenger Mobile App for passenger convenience. Advertisement on Mobile App for Passengers for location based services.			delivery.
3.	Jaipur (73.83%)	02	Transformative Smart Card Module-Register My Card, Check my balance, Recharge my card, and Help My reward points. Journey planning – Live Bus Time Module, Live Metro Times, Find nearest bus stop, Plan my journey and Help. Incident Reporting Module – Report Bus Breakdown, Report against driver, Report against conductor, Report bus delay, and Help. Transformation of Women empowerment using *MohallaNigraniSamiti* Module - Report Daily Collection by field staff, Report Missed, Collection or delay, Report improper ward cleaning Report Weekly Recyclable Collection. Incident Reporting Module – Report broken bin, Report overflowing bin, Report complaint against field	Seamless city wise smart card for multiple services has the potential to add convenience to residents and tourists.	Seamless city wise mobile app based smart card will help service delivery more energy efficient, water efficient, and waste efficient.	The apps promised in smart city proposal are towards for convenience to tourists, residents, energy-water efficiency and efficient service delivery.

Smart City Rank	City Name (with score)	Number of Mobile App(s) in Smart City Proposal (SCP)	Transformation	Customer (Residents)	Environment	Remark
			staff, and Help.			
4.	Surat (68.16%)	02	Healthcare transformation "Aarogyam" Smart Health Mobile App and "Smile" Health Mobile Lab. Citizens are provided various options for easy complaint registration like through Whatsapp, single no. helpline, mobile app, website, etc. Centralized service delivery by developing SMAC Center (**SMArtCity** Center) for Mobile Apps, Mobile tickets, Social Media, M-Id (Mobile Id).	The app address one part of the Telemedicine value Chain. SMAC centralized plan to centralized resident and visitor management system.	Centralized service delivery center for mobile app service fulfillment request will help service delivery more energy efficient, water efficient, and waste efficient.	The apps promised in smart city proposal are towards mobile app based healthcare delivery (only ULB to promise that), and efficient municipal service delivery.
5.	Kochi (66.98%)	00	Not reported	Not reported	Not reported	Not reported
6.	Ahmedabad (66.84%)	02	Transformative public safety by Monitoring of CCTV feeds through mobile apps to improve safety and service standards for Citizen Safety and Integrated Transit Platform: Mobile App platform for planning and tracking commutes.	The app plans to enhance public safety and security using technology based intelligence and integration drones.	There is specific no focus of planned mobile app on improvement of environment related measurements.	The apps promised in smart city proposal are towards proactive public safety, and energy efficiency in public safety (fewer number of vehicles per residents).
7.	Jabalpur (63.03%)	01	Transformation planned by developing Unified Service Platform providing Government services of all departments and Online access to all the information and data.	An unified mobile app platform plan to get 360 degree of the services that are delivered to residents.	The planned mobile app improves water distribution efficiency, as residents do not have travel to register grievance and solution.	The apps promised in smart city proposal are towards ICT and mobile app based municipal service delivery.
8.	Vishakhapa	00	Not reported	Not reported	Not reported	Not reported

Smart City Rank	City Name (with score)	Number of Mobile App(s) in Smart City Proposal (SCP)	Transformation	Customer (Residents)	Environment	Remark
	tnam (61.12%)					
9.	Sholapur (60.83%)	00	The city aspires to have free wifi zones across the city.	Free Wifi service will enable easy access to mobile based municipal services.	There is specific no focus of planned mobile app on improvement of environment related measurements.	The apps promised in smart city proposal are towards mobile app based municipal service delivery.
10	Dhavanagere (59.63%)	01	Plans to ensure the 24 x 7 energy supply with metering as well as pre-paid metering system to be controlled online and complaints suggestions exchanged through mobile apps.	The mobile app by municipality will ensure seamless delivery, billing, and grievance management of utility services.	The planned mobile app improves water distribution efficiency, as residents do not have travel to register grievance and solution.	The apps promised in smart city proposal are towards efficient delivery of municipal services and energy efficiency.
11	Indore (59.89%)	00	Not reported	Not reported	Not reported	Not reported
12	Delhi NDMC (59.63%)	01	Grievance redressal planned using 'PleaseFix' mobile app. Mobile app - POOCHO has been developed, which can help citizen to locate a vacant parking space and guide it through the traffic to reach it.	The mobile app by municipality will ensure seamless delivery, billing, and grievance management. The second mobile app is already available for residents and taxi drivers for usage, and improved collection from parking lots.	The planned mobile app improves energy efficiency of residents, as they do not have travel to register grievance and solution. Already rolled out mobile improves fuel efficiency of private cars and taxis.	The apps promised in smart city proposal are towards efficient delivery of municipal services and energy efficiency.
13	Coimbatore (58.74%)	01	Plan to build Mobile Governance for Citizen Engagement transformation.	Mobile app plan to enhance collaborative citizen participation.	There is specific focus of planned mobile app on improvement of environment related measurements.	The apps promised in smart city proposal are towards citizen collaboration, and energy efficiency.
14	Kakinada (58.19%)	00	Not reported	Not reported	Not reported	Not reported
15	Belgaum / Belgavi	01	Plans to transform citizen engagement by various	Mobile app plan to enhance collaborative citizen participation.	There is specific no focus of planned mobile app on	The apps promised in smart city proposal

Smart City Rank	City Name (with score)	Number of Mobile App(s) in Smart City Proposal (SCP)	Transformation	Customer (Residents)	Environment	Remark
	(57.99%)		mediums including mobile app and internet for every citizen upto ward level in smart city plan preparation, the same procedure will be adopted for all future projects.		improvement of environment related measurements.	are towards resident collaboration.
16	Udaipur (57.91%)	01	Plan to transform tourist facilities by providing information regarding differently-abled friendly established, availability of wheel chair, audio guide, etc.	Mobile app plan to enhance ease of tourism to visitors, service providers, and municipalities.	There is no specific focus of planned mobile app on improvement of environment related measurements.	The apps promised in smart city proposal are towards for convenience to tourists, residents, energy-water efficiency and efficient service delivery.
17	Guwahati (57.66%)	00	Not reported	Not reported	Not reported	Not reported
18	Chennai (56.16%)	01	Plan to transform leveraging mobile apps based utility services, Public grievance redressal system using mobile app and SMS based systems.	The mobile app by municipality will ensure seamless delivery, billing, and grievance management.	There is specific focus of planned mobile app on improvement of environment related measurements.	The apps promised in smart city proposal are towards energy-water efficiency and efficient service delivery.
19	Ludhiana (55.84%)	00	Not reported	Not reported	Not reported	Not reported
20	Bhopal (55.47%)	02	Plan to transform heritage and tourist sites. Citizen participation transformation for maintaining cleanliness of these sites and capture tourist complaints. Mobile app based enabled transformed Government Services.	The mobile app plan to make the tourist friendly, contribute towards *Swaach Bharat*, and seamless delivery of services.	Mobile app indirectly help quality of air, quality of water, and efficient usage of vehicle.	The apps promised in smart city proposal are towards for convenience to tourists, residents, energy-water efficiency and efficient service delivery.

Summary

Top 20 Indian urban local bodies who have planned mobile app in the Smart City Proposal for governance, citizen collaboration and grievance redressal, energy efficiency, revenue collection efficiency, seamless service to tourists, and healthcare delivery. Transformation Index reflects transformation is urban local body governance, financing, and transparency. Customer (User) Index reflects ease of delivery urban local body services, complaints & redressal, and accountability of officials. Environment Index reflects cost saving due to efficient energy distribution, power distribution, water distribution, waste management, and the likes. This index also reflects air quality, water quality, and sustainable living.

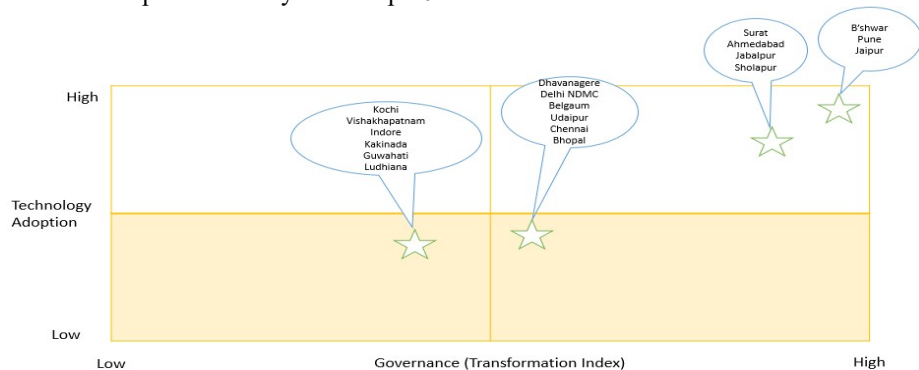Competitive Analysis of Top 20 ULBs on Transformative Index

Figure: 3 – Competitiveness of Top 20 Indian Smart Cities on Transformation Index

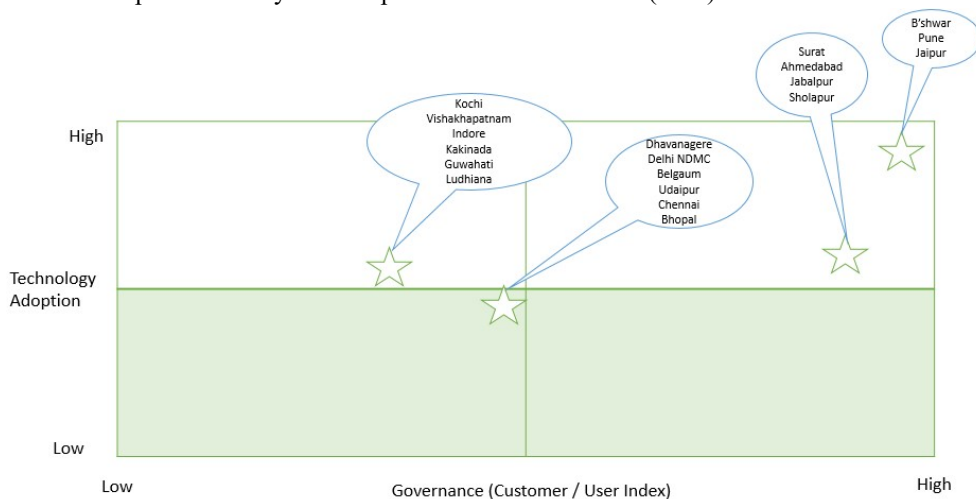Competitive Analysis of Top 20 ULBs on Customer (User) Index

Figure 4 - Competitiveness of Top 20 Indian Smart Cities on Customer (User) Index

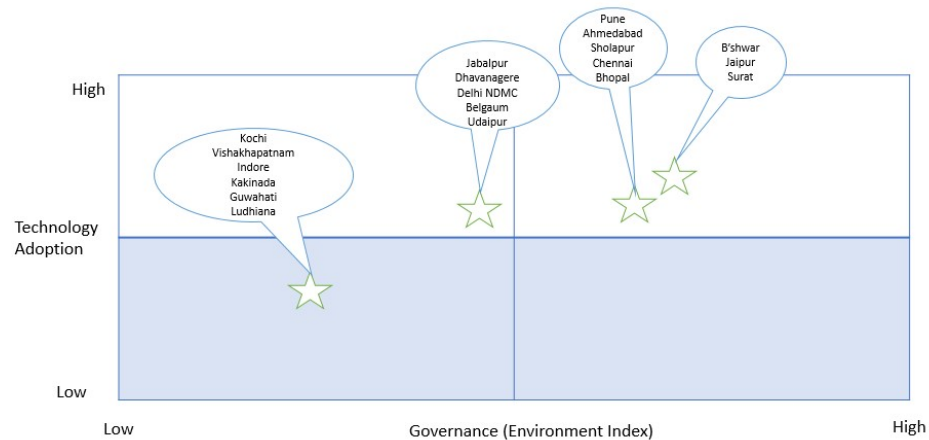Competitive Analysis of Top 20 ULBs on Environment Index

Figure 5 - Competitiveness of Top 20 Indian Smart Cities on Environment Index

Smart City Proposal of several urban local bodies carries plan to roll out mobile app for citizen engagement, service delivery efficiency, and innovative value added services. The competitive position of top 20 Indian urban local bodies in terms of Technology Adoption and Governance for Transformation Index, Customer (User) Index, and Environment Index, as assessed by the researcher (Figure 3, 4 & 5). Based on discussion with experts (urban planning experts, policy experts, technology experts, and environment experts), this papers demonstrates high technology adoption in Bhubaneshwar, Pune, & Jaipur is translating higher degree of transformation. In the cities like Surat, Ahmedabad, Jabalpur, & Solar marginally low technology adoption (as compared to high technology adoption cities), demonstrates marginally low transformation. Cities likes Dhavanagere, Delhi NDMC, Belgaum, Udaipur, Chennai, & Bhopal low technology adoption, however mid-range transformation, because of matured municipal service delivery processes. Cities like Kochi, Vishakhapatnam, Indore, Kakinada, Guwahati, &Ludhiana are low on technology adoption, and so low on transformation. As per experts there is high technology adoption in Bhubaneshwar, Pune, & Jaipur and is translating higher degree of customer (user) index. In the cities like Surat, Ahmedabad, Jabalpur, & Sholapur substantially low technology adoption (as compared to high technology adoption cities), demonstrates marginally low customer (user) index, since in these cities customer (user) participation. Cities likes Dhavanagere, Delhi NDMC, Belgaum, Udaipur, Chennai, & Bhopal are low on technology adoption, and low on customer (user) index. Cities like Kochi, Vishakhapatnam, Indore, Kakinada, Guwahati, &Ludhiana are relatively high on technology adoption, however low on customer (user) index, because in-efficiencies in delivery of municipal services. As per experts there is high technology adoption in Bhubaneshwar, Jaipur, &Surat and is translating higher degree of environment index. In the cities like Pune, Ahmedabad, Chennai, Bhopal & Sholapur marginally low technology adoption (as compared to high technology adoption cities), demonstrates marginally low environment index, since in these cities environment data is effectively analyzed. Cities likes Jabalpur, Dhavanagere, Delhi NDMC, Belgaum, and Udaipur are low on technology adoption, and so low environment index, since

environment data not properly collected. Cities like Kochi, Vishakhapatnam, Indore, Kakinada, Guwahati, &Ludhiana are very on technology adoption, and so low on environment index, because environment monitoring infrastructure is in-efficiencies and in-effective.

3. Conclusion

The rapid uptake of mobile technologies in remote locations and "base-of-the-pyramid" communities – together with the emergence of many innovative mobile applications and services, has increased the potential for ICTs to play a positive role in supporting and establishing good governance. In upcoming time, urban local bodies worldwide will be challenged by the need to look into developing m-government by adopting strategies that will enable them to harness the opportunities offered by mobile technologies and maximise their benefits (energy saving, water saving, power saving, and human capital saving) in order to provide better governance of the urban local body. Despite all its promise though, m-governance in urban local bodies still in its nascent stages and needs more research to improve the effectiveness of m-services development and to attain wide public acceptance and there are still limits in the capacity of m-governance in urban local bodies to reach out to "base-of-the-pyramid" segments of the population, and in order to not widen the digital gap, urban local bodies should avoid enforcing the use of mobile channels, and provide access to new technologies only to those who are willing to use them.

4. References

1. Sundar, D.K., Garg, S.: M-Governance: A Framework for Indian Urban Local Bodies, The Proceedings of Euro mGov (2005)
2. Baud, I., Scott, D., Pfeffer, D., Sydenstricker-Neto, J., Denis, E.: Digital and spatial knowledge management in urban governance: Emerging issues in India, Brazil, South Africa, and Peru. vol. 46, pp. 501–509, Habitat International (2014)
3. Datta, A.: New urban utopias of postcolonial India: Entrepreneurial urbanization in Dholera smart city, Gujarat. Dialogues in Human Geography, vol. 5(1), pp. 3-22, Sage (2015)
4. Pfeffer, K., Martinez, J., O'Sullivan, J., Scott, D.: Geo-Technologies for Spatial Knowledge: Challenges for Inclusive and Sustainable Urban Development, pp. 147-172, On-line ISBN 978-3-319-21272-2, Geographies of Urban Governance Springer International Publishing (2015)
5. Janowski, T.: Digital government evolution: From transformation to contextualization, Volume 32, Issue 3, pp. 221-236, Government Information Quarterly (2015)
6. Lamberti, L., Benedetti, M., Chen, S.: Benefits sought by citizens and channel attitudes for multichannel payment services: Evidence from Italy, Volume 31, Issue 4, pp. 596-609 Government Information Quarterly (2014)
7. Linders, D., Liao, C.Z., Wang, C.: Proactive e-Governance: Flipping the service delivery model from pull to push in Taiwan, pp. 01-09, Government Information Quarterly (2015)