

To be or not to be a smart city: an empirical study of valued innovations on the cities' website

*Être ou ne pas être une smart city:
une étude empirique des innovations valorisées sur le site web des villes*

Thierry CÔME

Professeur des Universités en sciences de gestion à l'Université de Versailles Saint-Quentin. Ses recherches portent sur le management public.
thierry.come@univ-reims.fr

Stéphane MAGNE

Maître de Conférences en sciences de gestion à l'Université Paris 1 - Panthéon – Sorbonne
(Laboratoire PRISM de l'École de Management de la Sorbonne.) Ses recherches portent sur les relations entre design, marque et innovation.
magne.stephane@yahoo.fr

Alexandre STEYER

Professeur des Universités en sciences de gestion à l'Université Paris 1 Panthéon-Sorbonne
et ancien Recteur des académies de Reims et de Rennes.
Ses recherches portent sur les interactions sociales et plus récemment sur les apports de la physique quantique
à la compréhension des phénomènes cognitifs complexes. Il est le fondateur du laboratoire PRISM.
recteursteyer@free.fr

ABSTRACT

The “innovation” dimension of French big cities is now largely put forward, but what is it really about the constitution of their discourses on their websites? How can this innovation discourse affect their city brand identity?

To explore this phenomenon, the studied corpus will cover all the words of the websites of the 18 French cities of more than 150 000 inhabitants. A comparison by the smart data methods will be carried out between the cities which are classified like “smart city” (according to the classification of Vienna) and those

which do not appear there.

The results show that cities have an interest in communicating concrete innovation and close to citizens to develop their image of smart city. On the other hand, communicating about a conceptual and future innovation does not make it possible to be “smart”.

Key-words

Innovation, Identity, City brand, Website, Smart city.

RÉSUMÉ

La dimension “innovation” des grandes villes françaises est aujourd'hui largement mise en avant mais qu'en est-il réellement dans la constitution de leurs discours sur leurs sites web? En quoi ce discours sur l'innovation peut-il affecter leur identité de “marque-ville”?

Pour explorer ce phénomène, le corpus étudié

portera sur l'ensemble des mots des sites web des 18 villes françaises de plus de 150 000 habitants. Une comparaison par les méthodes du smart data sera effectuée entre les villes qui sont classées comme “smart city” (selon le classement de Vienne) et celles qui n'y figurent pas.

Les résultats montrent que les villes ont intérêt à communiquer sur une innovation concrète et proche des citoyens pour développer leur image

de smart city. À l'inverse, communiquer sur une innovation conceptuelle et future ne permet pas d'être "smart".

Mots-clés

Innovation, Identité, Marque-ville, Site web, Smart city.

INTRODUCTION

Valuing the city's innovations on the web, a factor in the performativity of political discourse?

"On the road to smarter cities: how to think and build the smart city in Villes de France", this is the title of a publication of the Association of French Towns in November 2017. For French cities, becoming "smart" is now a leitmotif and an obligation. Even the medium-sized city is digitalized under the impetus of the law for a Digital Republic of October 7, 2016. But is it enough to say to do? To be smart, cities face two prerequisites: managing a multifaceted innovation and building their city brand for multiform targets.

■ The discourse on innovation

Generators of a multitude of flows (human, physical, financial, information...), cities must manage them as best as possible to render efficient and effective services to their population. They must then evaluate these services to improve them and especially to be transparent with users and taxpayers. To solve this public management problem, the elected representatives advocate a broad innovation, especially based on multiple sensors, connected objects, on new urban mobilities (Côme, Magne and Steyer, 2019) and more precisely on the Internet to make all accessible. The establishment of innovative ecosystems thus becomes the foundation of many local community development plans. Innovation is at the heart of the project and the communication of most major cities potentially transforming them into long-term managers of big data collected on platforms and processed by potentially decision-making algorithms (Côme and Magne, 2016).

■ The construction of the city brand

The other challenge of "big" cities is to remain so by conserving or developing their population, their businesses and their services. The founding works of Davezies (2009, 2012) and Terrier (2010) on the residential economy underline the impact of the populations actually present in a city (tourists, students, retirees, active people...). This need to be attractive is present in most speeches of local elected representative relayed by the municipal websites. One of the factors of attractiveness that is most often put forward is the ability of the municipality to bring innovation and support entrepreneurs and innovative companies. These discourses are part of a broader approach of territorial marketing and highlighting of the city brand. Among all the elements contributing to forging the brand city (quality of life, economic fabric, tax rate, equipment, historical heritage...), the ensemble formed by the innovation capacity of the municipality, its support towards news technologies, its political project resolutely turned towards the future but based on the participation of all the citizens characterizes entities now called "smart cities".

■ The smart city: between innovation management, territorial marketing and public management

The discourse on innovation in major French cities is therefore an interface between a strategic approach of New Public Management (NMP) inspired by corporate practices to improve the effectiveness of public policies and a territorial marketing approach aimed at communicating on the strengths of a territory and forging an identity to build a city brand. The concept of smart city appears both as the strategic objective of a political

project (to provide citizens with the services they have the right to expect from a modern city of the 21st century) and as a quality label for their communication and their effectiveness. The smart city reconciles, in the same concern centered on innovation, the two approaches of territorial marketing and public management. The innovation is at the heart of this duality and the discourse on innovation as an intention and as a realization should therefore be a strong element of a smart city's identity (Kourtit and Nijkamp, 2012, Komninos, 2013). Hence the interest of questioning the link between this multifaceted innovation of French cities of more than 150,000 inhabitants (classified or not as smart cities) and their city brand identity. More precisely, how does the discourse of big cities on innovation affect their identity as a city brand and condition their belonging to the "club" of smart cities?

To answer this question and analyze the discourse on innovation held by major French cities, the 18 major French cities with more than 150 000 inhabitants have been listed and their websites studied. The retained corpus covers all the words of the websites of the studied cities. The comparison between cities was carried out by the methods of the smart data under the software R.

Starting from the hypothesis developed in the first part that innovation is a component of the identity of the city-brand (Ashworth and Kavaratzis, 2009, Kapferer, 1988 and 1992, Michel, 2009), we will specify in a second part the theoretical framework at the confluence of territorial marketing and public management. To try to understand how innovation can affect the identity of the city brand, we will analyze in the third empirical part, the discourse on innovation from the websites of cities (see Appendix 1) A fourth part presenting the results of the research and their discussion will make it possible to link innovation discourses and components of the brand identity of smart cities. The recommendations will specify the lines of communication to be favored to strongly claim its membership in smart cities. Finally, research pathways will be opened towards the operationalization of the smart city concept.

1. INNOVATION, a component of the city-brand identity

The process of building a city-brand identity is long. It involves a constructed, lasting and sufficiently clear discourse to be understandable by all the stakeholders and above all it requires concrete, measurable and effective elements. The process of building a city-brand identity is long, it involves a constructed, lasting and sufficiently clear speech to be understandable by all the stakeholders and above all it requires concrete, measurable and effective elements. The transformation of big cities into flow and communication managers is concomitant with the promotion of innovation as part of their city brand. The transformation of big cities into flow and communication managers is concomitant with the promotion of innovation as part of their city brand. It is therefore not incoherent to analyze the discourse on innovation of large French cities from the premise that innovation is a component of city-brand identity whether or not it is a smart city.

1.1. *Anchoring the smart city in innovation and digital processes*

The smart city, or according to other popular names, smart city, digital city, green city, connected city, eco-city, sustainable city (...) is at the heart of a new service logic allowed by the development of digital technologies and digitization. These terms refer to the awareness of the physical ("classical") city to reinvent itself and open up to new forms of open innovation (Mattsson and Sørensen, 2015), especially to offer new sources of value to their inhabitants.

This "digital transformation" (Barlatier, 2016) of the smart city reveals an unequalled potential in terms of innovation and exploitation of new physical and virtual, collaborative spaces. This new city must offer new services, reduce the environmental impact, rethink access to resources, imagine new forms of mobility, manage energy and waste, develop citizen participation in city decisions. The city, initially a physical place, becomes an innovative dematerialized

city offering new service spaces, some virtual, with ubiquitous logic for an active and connected citizen. The city is enriched by this multiplication of digital data as a new raw material (big data, open data, data management...) (Barlatier, 2016) that changes its identity and further its brand image, transforming it into a data city (Côme and Magne, 2019). It then opens up new areas of intervention. It develops new skills at the borders of the public and private sectors, at the meeting point between citizen and consumer, at the confluence of the disciplines of public management, marketing, management of innovation and information systems.

However, despite this flamboyant future, the smart city, like any label under construction, remains a concept still confusing (Wolfram, 2012). It is considered that it is:

- characterized by its technological content and even more “smart” that it is digitized (Mahizhnan 1999, Attour and Rallet, 2014);

- linked to the emergence of a field of innovative urban services and platforms with participative web logics between community and user;
- modeled by communication strategies for image building and self-promotion in these cities (Hollands, 2008)...

According to Attour and Rallet (2014), “*the city will be smart if it promotes innovation (smart economy), invests in training (smart people), is well governed (smart governance), has a good quality of life (smart living) and good environmental performance (smart environment) in addition to sustainable mobility (smart mobility)*”. In this sense, the smart city uses Information and Communication Technologies (ICT) to offer services to citizens with the aim of increasing the quality of life in the city (Caragliu *et al.*, 2011). Innovation and digitalization are strong substrates of smart cities.

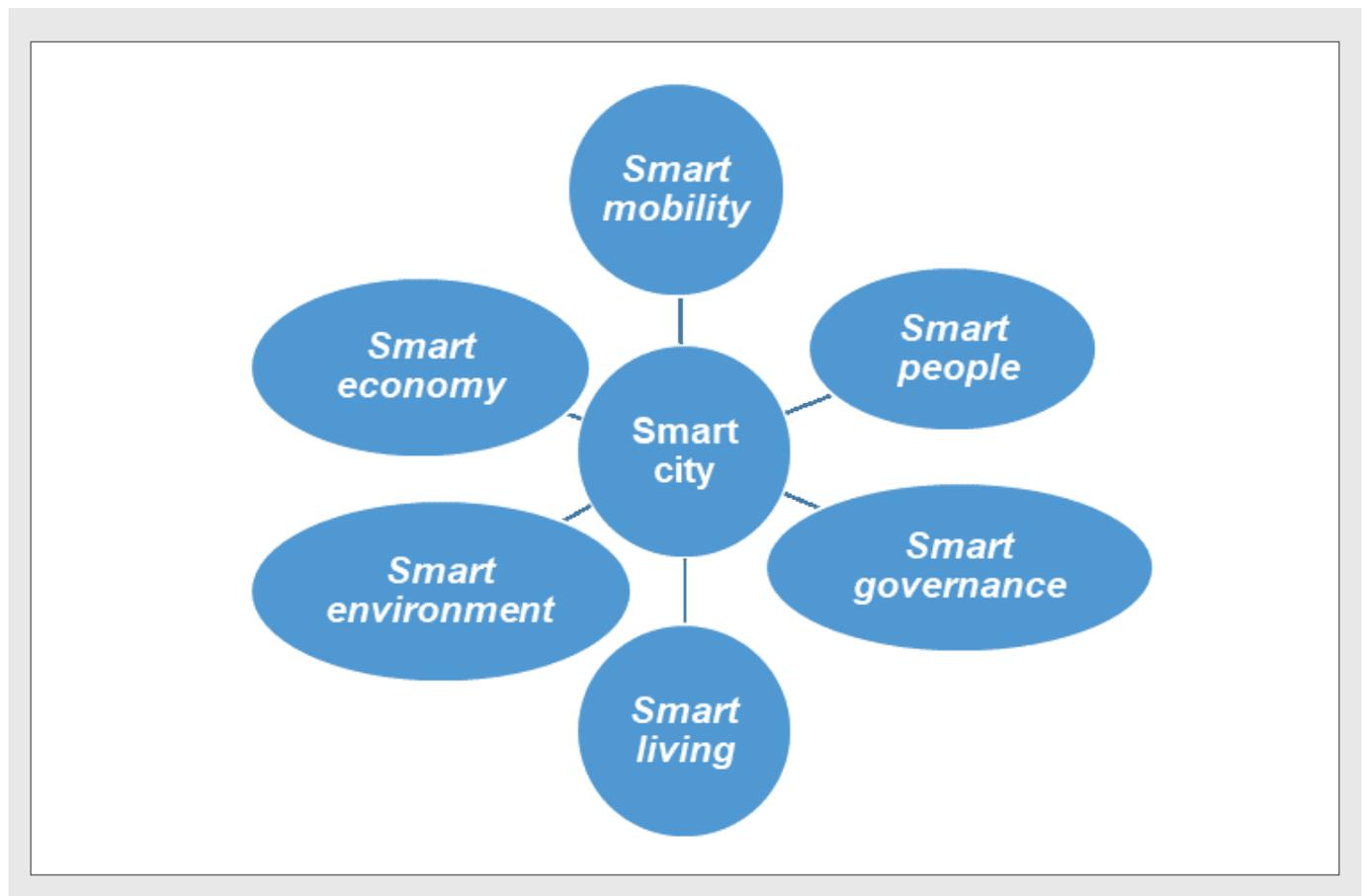


Figure 1 – Criteria for belonging to smart cities
Source: Giffinger *et al.* (2007)

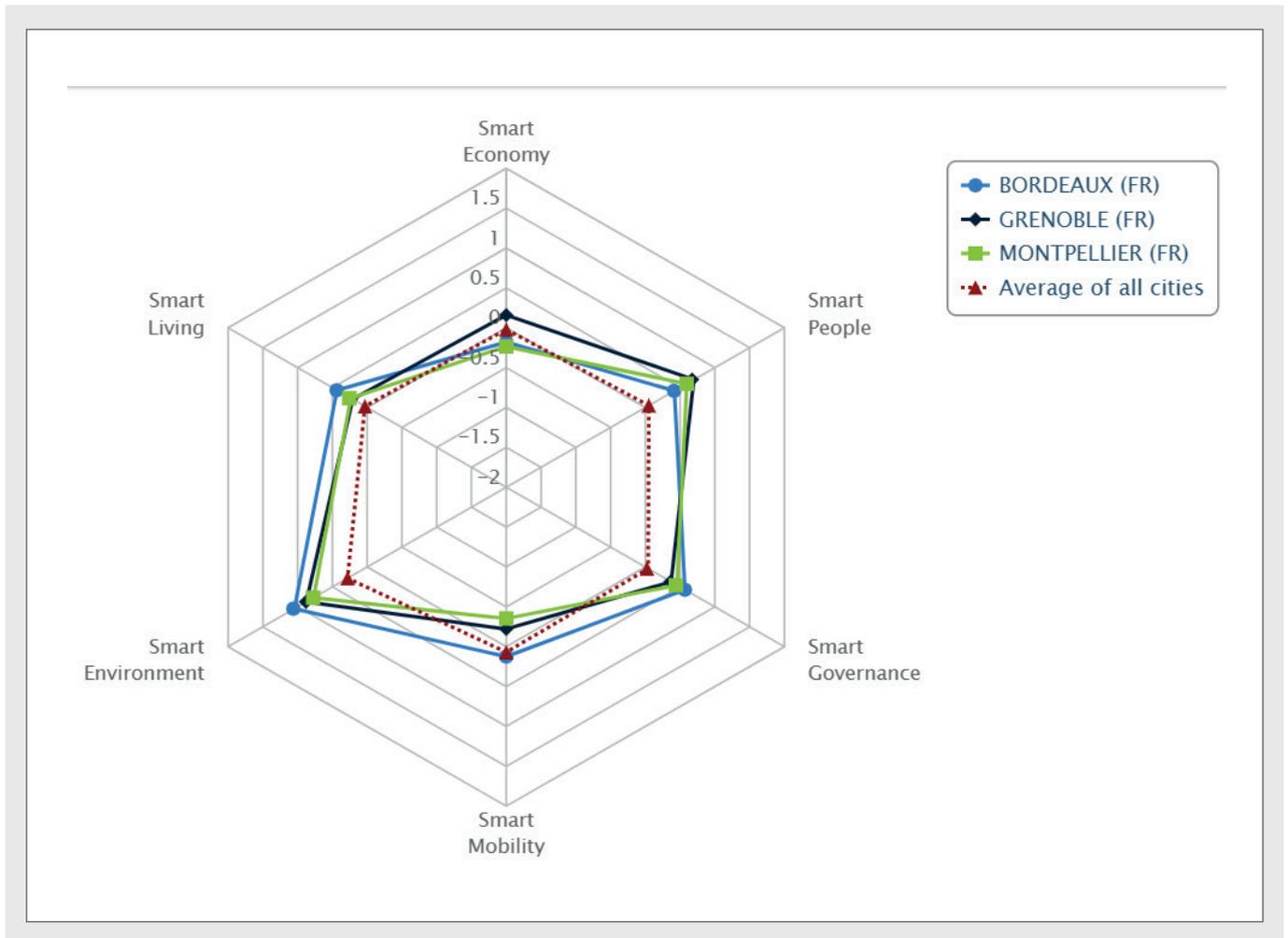


Figure 2 – Comparative Profiles of French Smart Cities

Source: [URL: <http://www.smart-cities.eu>]

1.2. Criteria for belonging to smart cities

A longitudinal project started in 2007 by the Regional Science Center of the Vienna University of Technology (Austria) made it possible to operationalize the notion of smart city and thus evaluate the “smart” degree of 77 medium-sized European cities (2007, 2013, 2014). In 2015, the study was extended to 90 cities between 300,000 and 1 million inhabitants from 21 different countries. This project defined what a smart city should be on six domains of belonging (see Figure 1) and to draw a city profile (see Figure 2).

The six selected dimensions are subdivided into indicators that were used to establish the cities profile and compare them according to an overall score and partial scores (see Appendix 2).

These 6 dimensions are subdivided into sub-criteria that allow calculating scores, and the ranking of smart cities (see Table 1).

However, not all the studied cities in this research necessarily claim to be a smart city (even if all develop a discourse on innovation). We seek through this analysis of the discourse present on the websites of major French cities to verify and evaluate the impact of the website content of the city in the dynamic construction of a city-brand identity (it does not matter whether it is close to a smart city or developing a specific city brand identity).

Smart economy	Smart people	Smart environment
innovative spirit	education	air quality (no pollution)
entrepreneurship	lifelong learning	ecological awareness
city image	ethnic plurality	sustainable resource management
productivity	open-mindedness	
labour market		
international integration		
Smart governance	Smart mobility	Smart living
political awareness	local transport system	cultural and leisure facilities
public and social services	(inter-)national accessibility	health conditions
efficient and transparent administration	Information and Communications Technology -infrastructure	individual security
	sustainability of the transport system	housing quality
		education facilities
		touristic attractiveness
		social cohesion

Table 1 – Dimensions and Indicators of the Vienna Ranking (2015)
Source: [URL: <http://www.smart-cities.eu/index.php?cid=6&ver=4&city=148>]

1.3. From identity to the image of the city brand

The image is the (psychological) resultant of the brand identity (Michel, 2009, Berger-Remy, 2012) that the stakeholders have (more or less) deployed. According to Bartikowski *et al.* (2009), it is possible to transpose the concepts of image and brand to the territory and then to the city. In this variation of a territorial marketing (place branding) and more specifically of the city brand identity, the brand design tools (Bassani *et al.*, 2010) (whose web design is one of the facets) allow to convey and disseminate this image of the city as shown in Figure 3.

Thus, the identity of the smart city is elaborated on the basis of all the components, criteria and items presented in Figure 3. It is perceived by the citizen (and his other publics) on the basis of these different dimensions. Audiences develop an image of the city as a result of these dimensions of a more or less mastered identity. The communication and

the “story-telling” of the cities are essential in this construction.

Innovation, but also the digital dimension, appear as adjvants that can contribute to reinforce these perceptible dimensions. The image of city brands is therefore the final result in the receiver's mind. This is the reason why we will study these two facets through the discourse on innovation of cities on their website.

This research aims to better understand the expression of the themes related to innovation in the websites of major French cities, especially to understand how innovation as a constituent element of a brand-city identity is put forward and how it values the territories and places concerned. With underpinning an auxiliary question: do smart cities better value the “innovation dimension” in their web communication than cities that do not claim this identity trait?

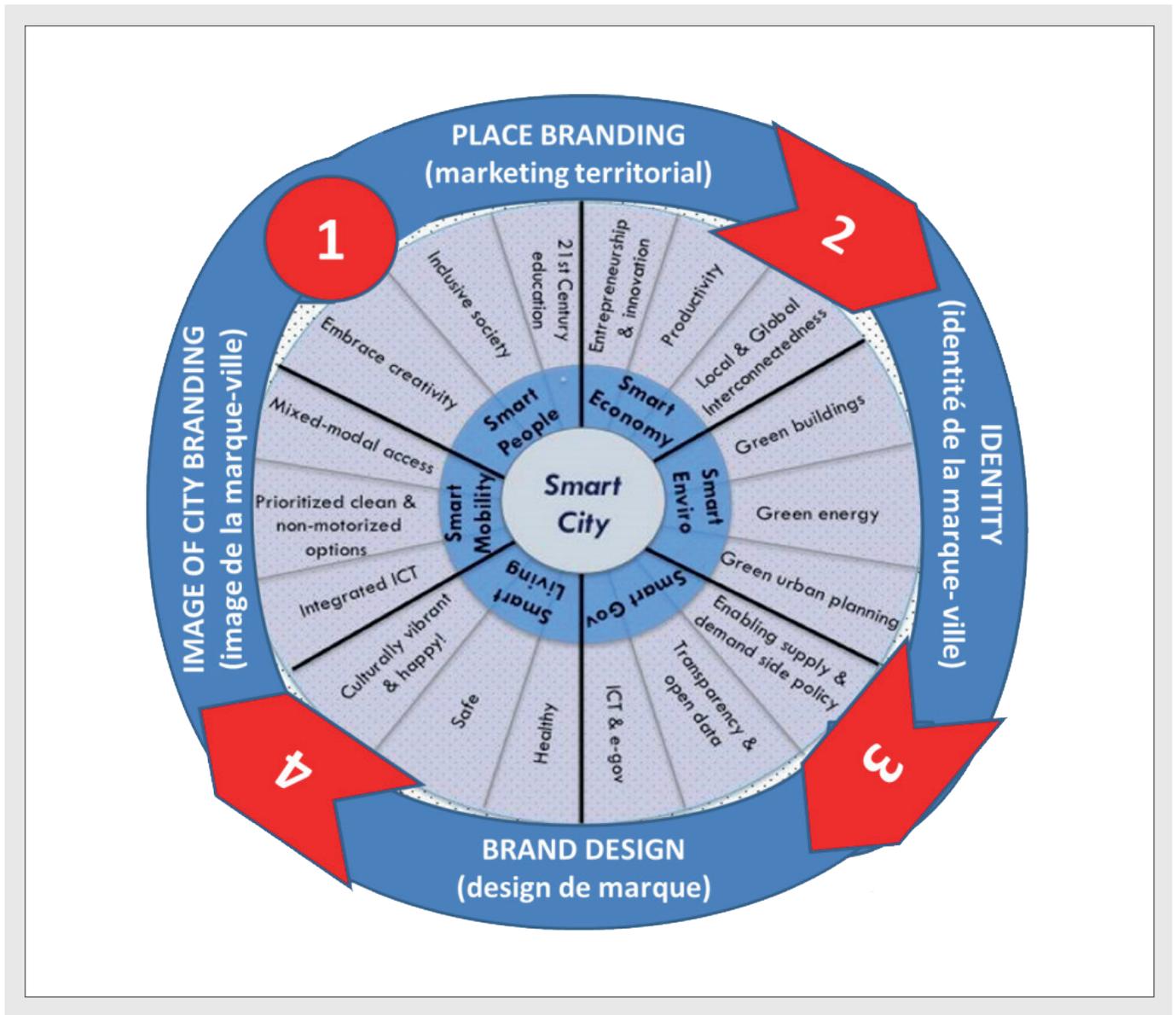


Figure 3 – The process of creating the brand image of smart cities
 Source: adapted by the authors from Boyd Cohen (2012)
 and [URL: www.fastcoexist.com/1680538/what-exactly-is-a-smart-city]

2. THE CONCEPT OF SMART CITY:

between territorial marketing and public management

This research on the city-brand identity of smart cities is situated in a theoretical framework uniting territorial marketing and public management (Meijer and Rodríguez Bolívar, 2016). It is part of an interdisciplinary logic presented in Figure 4.

The marketing prism has been adopted to study the web communication on cities innovation. The innovation of smart cities could be apprehended by other indicators but we are interested here in the discourse on innovation and its occurrences on the smart city website. In the same way, the web communication is not the only contribution of the communication mix to forge the perception of the smart cities identity but, considering the importance of the digital dimension for these cities, we will retain exclusively this communication medium.

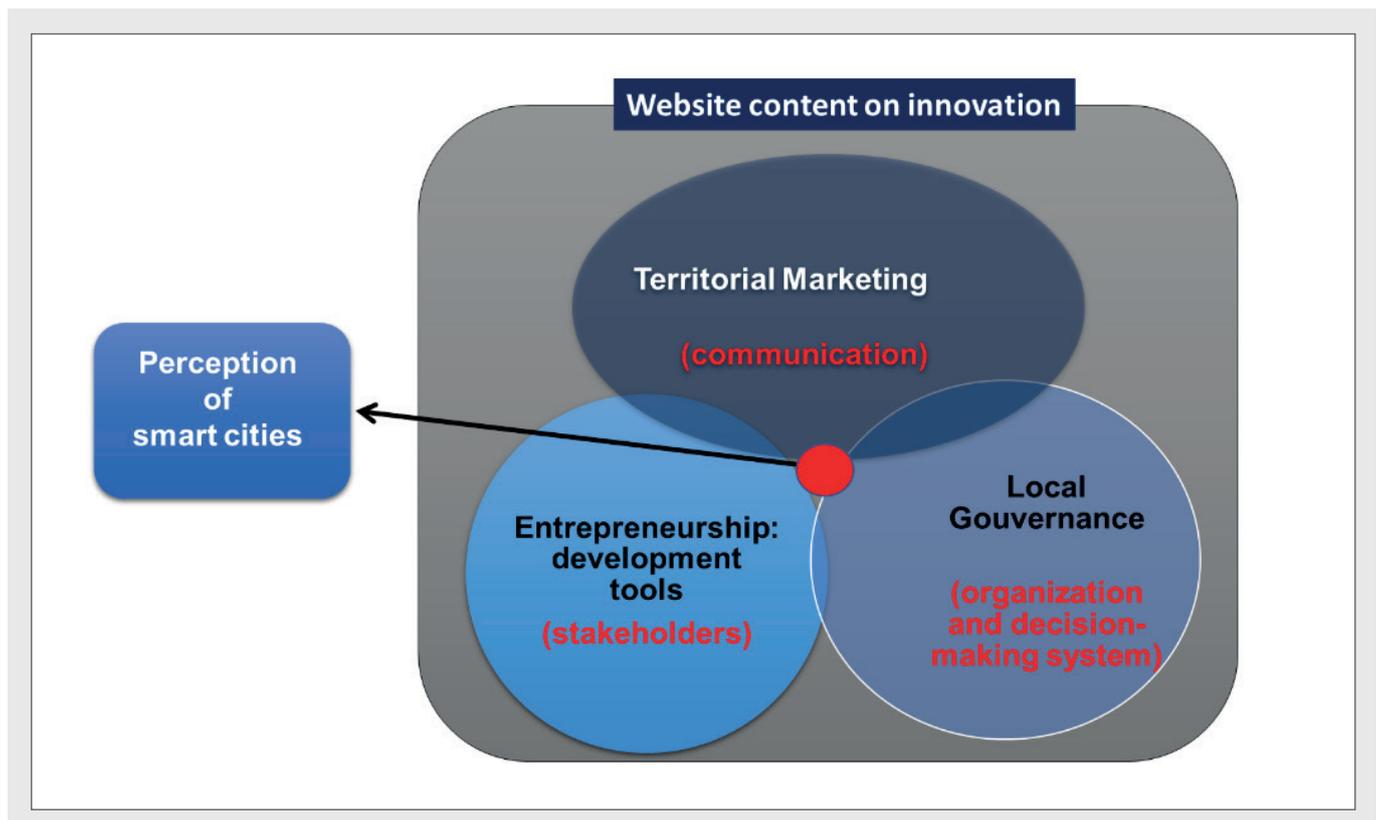


Figure 4 – Theoretical framework: territorial marketing, brand and public management
Source: Authors

2.1. Theoretical axis 1: Territorial marketing to promote the territory, the place

From the 1980s, the territory, the place has become an essential concept in marketing. Researchers go so far as to propose a place branding (territorial marketing). It will then become a component of territorial governance (Eshuis *et al.*, 2014). It is applied to promote cities to attract investors, tourists and residents (Gold and Ward, 1994). This territorial marketing will be defined as the “*managerial principle in which it is essential to think in terms of customers and market*” (Van den Berg and Braun, 1999). Although the definition is succinct, its contribution is essential in the theoretical framing of this research on smart cities because it opens the project on a competitive universe that exceeds the public / private cleavage: the structures working around these territorial innovations are themselves sometimes competitive integrated structures or at least driven by the public sphere. Step by step,

the territory managers adapted the concepts of marketing and developed a urban marketing (Ashworth and Voogd, 1990) and the concept of city branding.

2.2. Theoretical axis 2: City brand perception of smart cities

From the brand to the city brand

Traditionally, the brand ensures identification, differentiation and value creation for the consumer. It evokes associations in the consumer mind, brings additional value to the products that carry it (brand equity). It arouses emotions and allows to create links with the consumer (trust and attachment...) which ultimately result in beneficial behaviors (or not) for the brand, such as buying behavior (repeated or not), fidelity (or not), positive (or negative) word of mouth (Keller, 2007).

This brand concept initially focused on products and / or services has been transposed to the place, the city and even the country. For example, the “Spain brand” has become a shared, declining and innovative project, unlike the “France brand” which is in its infancy.

The city brand of smart cities

The first research in this direction focused on the image of tourist destinations (quality of housing, prices, tourist scenes, climate...) (Echtner and Ritchie, 2003, Jenkins, 1999). The cities have, by definition, a differentiating name (Paris, Moscow, Barcelona, New York...) and are associated with unique characteristics and strong symbols (for example: Reims with its kings and its Champagne; or cities like Cognac, Camembert...) (Bartikowski *et al.*, 2009). These city names can become city brands with physical and functional but also hedonic and experiential characteristics (Frochot and Batat, 2013). In addition, the brand has a brand heritage dimension based on historical heritage symbols (Pecot and De Barnier, 2015). The city even has a brand equity and a brand personality that can be measured (Bartikowski *et al.*, 2009).

For Lucarelli and Berg (2011), city branding is “*the symbolic and intentional incarnation of all information related to a city in order to generate associations of ideas and expectations.*” According to Ashworth and Kavaratzis (2009), a logo and a slogan are not enough to make a city brand. We need to work on identity that can only be dynamic (Kavaratzis and Hatch, 2013). Eshuis *et al.* (2014) added the citizen participation dimension: “*Citizen participation in territorial branding can help to improve the quality of the brand and to integrate citizens’ emotions into governance processes*”. But the innovative capacity of the city has not yet been put forward. Yet the new digital challenges that structures city projects shape the identity of smart cities and consequently their image. In this sense, websites and digital platforms are tools and supports for this dynamic identity.

The multidimensional brand identity

“*Identity is the way the brand wants to be perceived, as opposed to the image, which is the way the brand is actually perceived by consumers. It is the identity that guides the important decisions on the brand and guarantees the consistency of the various actions undertaken over time*” explains Michel (2009). Brand identity is anchored around the characteristics of the brand: the elements of brand design (brand, logo, color...), the operational elements (price, distribution, etc.) as well as the historical brand elements (history of the company, past communication campaigns, etc.) (Bassani *et al.*, 2010).

The question is: what is the website contribution and the place dedicated to innovation on these websites in the formation of the brand identity of smart cities. This brand identity is a multidimensional concept (see Figure 5) as evidenced by the identity prism of Kapferer (1988, 1992). *A priori* the smart cities identity lends itself to this analysis and one can legitimately ask questions the possible need to integrate complementary dimensions such as the “innovation” dimension of the city.

This brand-specific tool can be transposed to city brands (Figure 6). This is why we will make the parallel between business and city, between consumers and citizens (or publics). The city brand will be seen as a specific brand form. In this context, the city brand of the smart city also seems to have specific features. We will try to show that the website and speech on the innovative dimension of the city should be integrated into a dynamic brand identity that reaches different audiences.

The public of the city brand

This transposition of concepts related to the brand towards the city brand and more specifically to the smart city involves determining the targets to which the smart city addresses.

Bartikowski *et al.* (2009) propose a first segmentation in Table 2. To integrate the precepts

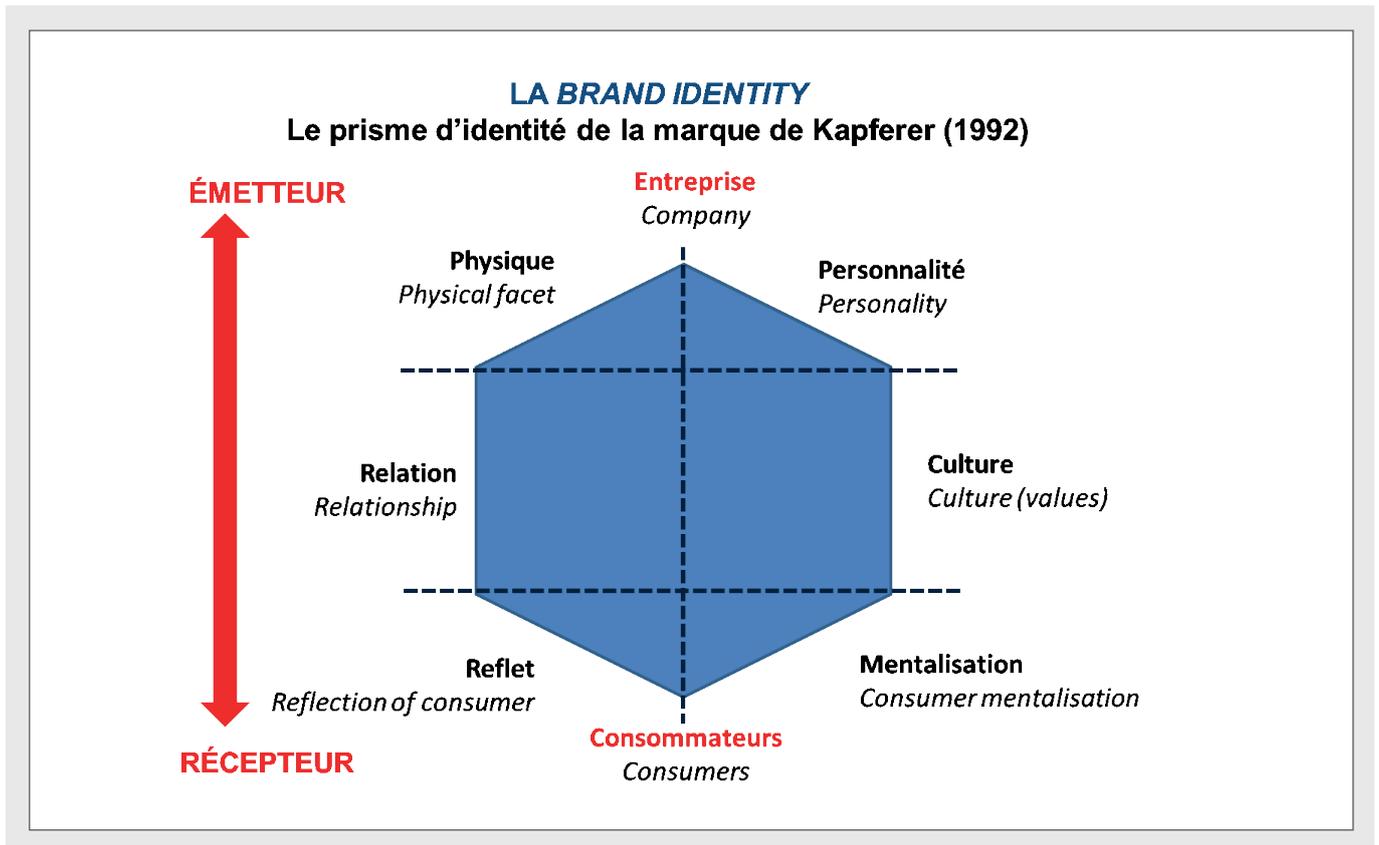


Figure 5 – The Brand Identity Prism

Source: Kapferer (1992)

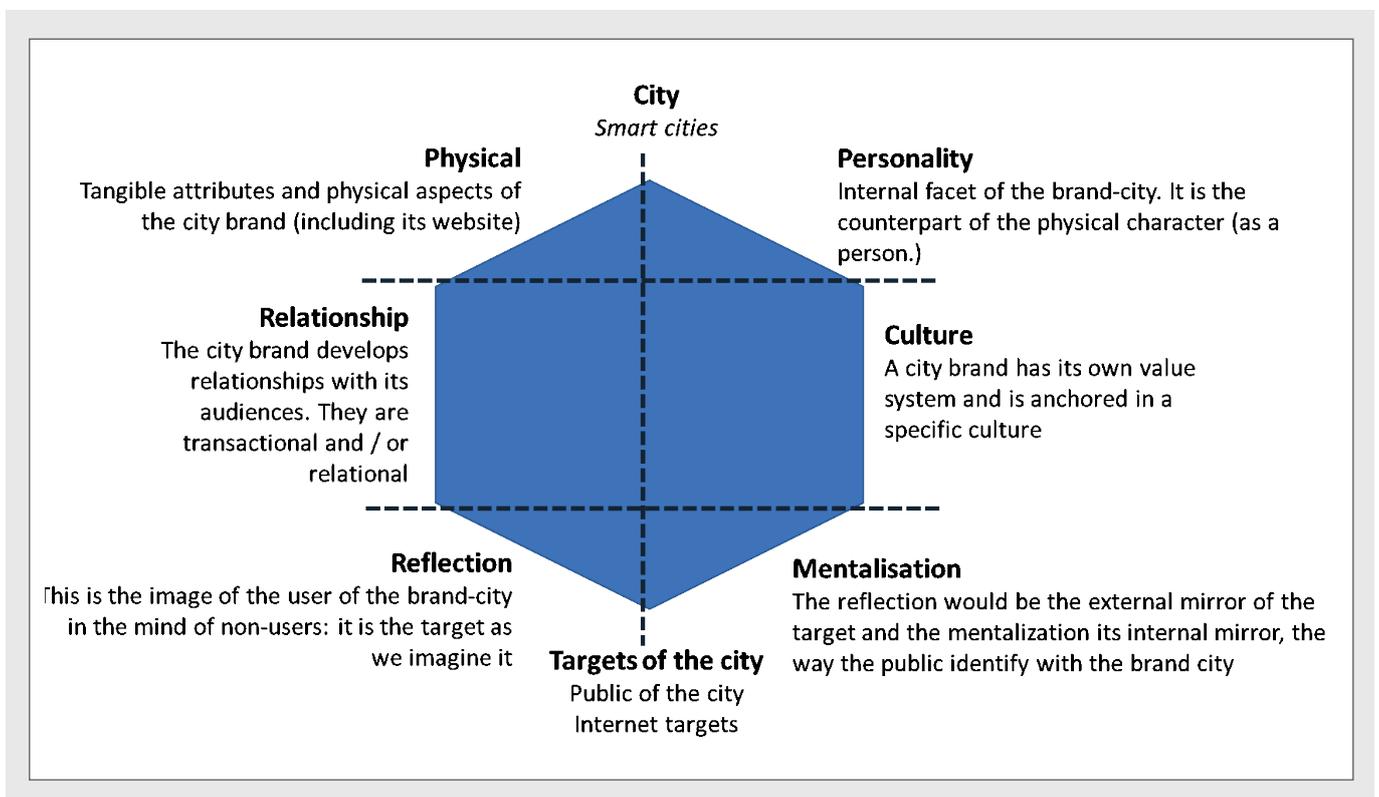


Figure 6 – Prism of identity applied to the city brand of smart cities

Source: adapted by authors from Kapferer (1992)

Tourists	Summer / winter tourists, business tourism, leisure tourism, health tourism...
Investors / companies	National / foreign investors, companies in a specific sector (automotive, energy, IT)
Students	Temporary residents by origin (regional, national, international)
Expatriates	Long-term residents according to their origin (nationality, culture, languages), according to their skills (computer scientists, engineers, etc.)
Permanent residents	Inhabitants who do not necessarily have the right to vote.
Media	Radio, television, press, social networks...
Facilitators	Tour operators, airlines, taxis, traders, web communities.
Territorial communities	National and international partners (town twinning ...)
Collaborators	Tourist authorities (Offices, County and Regional Committees ...), municipalities, public transport ...
Pensioners	Inhabitants with special needs, senior tourists or new residents having made the choice to live their retirement in a new city.
Citizens	Members of a city who exercise a right to vote and participate in the selection of projects of the city.

Table 2 – Brand city targets

Source: adapted by authors from Bartikowski B. et al. (2009), "Les villes ont-elles une personnalité?", *Revue française de gestion*, 7/2009 (n° 197), p. 49-64.

of the residential economy, we will add retirees as the target of the city brand, public that many Portuguese municipalities have already integrated. Finally, from a public management perspective, citizens are also a major target to add and to differentiate permanent residents.

2.3. Theoretical axis 3: Role of innovation and governance of smart cities

Innovation is the (sometimes controversial) instrument most suited to the generalization of the principles of New Public Management (NMP) in local communities. According to this theory, to make public spending more efficient, public services must be empowered, their managers empowered, their actions evaluated, particularly by users. To promote emulation, a quasi-competition between services must be organized. Ultimately, this makes it possible to influence the efficiency of public expenditures and their effectiveness and thus increase the perceived and real quality of provided services. This conceptual break with the image and the usual, and even routine practices of local administrations requires a strong discourse of the elected representatives, especially

towards the users, the citizens and the companies to obtain their support and the expression of their needs. This emergence of a structured demand for quality services, combined with the extension of a systematic practice of evaluation of the provided services, as well as the increasing and systematic individualization of remuneration related to result (with an indicator associated with each action), contributes to increasing competition between services and their ability to innovate to best meet these various expectations. And especially as private companies can compete with them by offering similar services in partnership with the community. Figure 7 summarizes the possible innovation axis for smart cities.

The problem can therefore be redefined and mainly deal with the brand identity of smart cities through this question: how the discourse on innovation found on the official websites of major French cities (more than 150,000 inhabitants) does it help forge the brand identity of smart cities?

The underlying questions will be:

- Is innovation a relevant feature to integrate into the brand identity of smart cities?

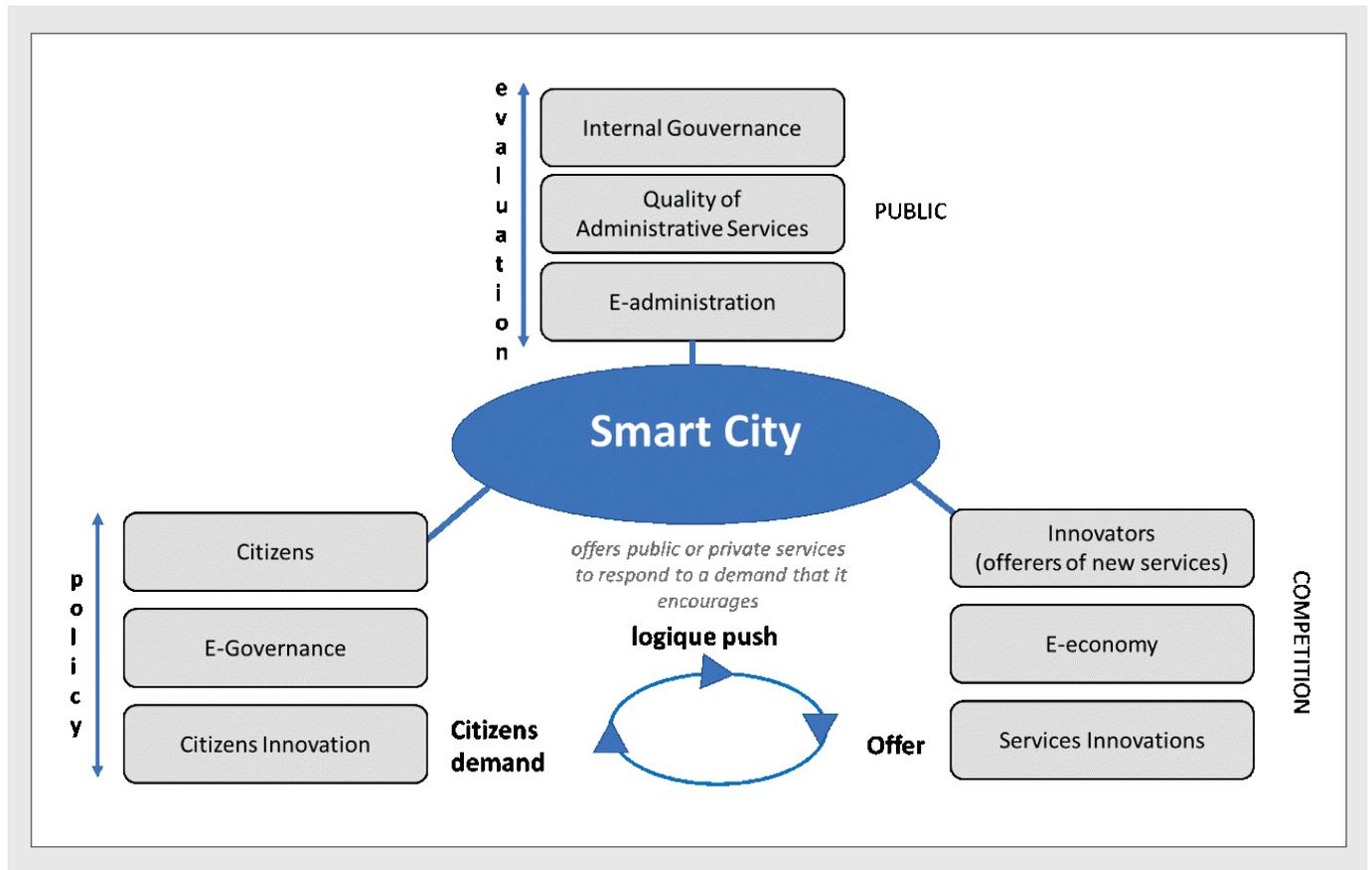


Figure 7 – The fields of smart city innovation
Source: Authors

- What are the dimensions / categories of innovation to highlight in the web content to appear among the smart cities?

To do this, we will compare the discourses on innovation held by some “smart” cities and others cities not included in the Vienna ranking.

3. THE DIMENSIONS OF INNOVATION valued on the websites of major French cities

3.1. Sample of the studied cities

The selected cities have more than 150,000 inhabitants in 2016 and belong (or not) to the Vienna ranking of smart cities (see Table 3). 18 cities were selected but only 17 will be analyzed. Rennes will not be studied because it does not have a specific site. It is integrated to the metropolis site (city+agglomeration), anticipating at the time of our investigation the application of the law NOTRe (January 1, 2017) which now transfers to the metropolis the support for innovation. Our analysis therefore presents a (recent) bias due to the non-continuity of the data. In the long term, it will be necessary to study the sites of the metropolis to analyze the discourse on

City	Smart city	Total population 2016	Web site
Paris	No	2254262	www.paris.fr/
Lyon	No	509233	www.lyon.fr/
Toulouse – smart city	Yes	466219	www.toulouse.fr/
Nice – smart city	Yes	346251	https://www.nice.fr/
Nantes – smart city	Yes	300614	www.nantes.fr/
Strasbourg – smart city	Yes	280114	www.strasbourg.eu/
Montpellier – smart city	Yes	276054	www.montpellier.fr/
Bordeaux – smart city	Yes	247688	www.bordeaux.fr/
Lille	No	238003	http://www.lille.fr/
Rennes – not studied	Yes	217309	http://metropole.rennes.fr/
Reims	No	186505	www.reims.fr/
Saint-Etienne – smart city	Yes	174985	https://www.saint-etienne.fr/
Le Havre	No	174728	https://www.lehavre.fr/
Toulon – smart city	Yes	165862	https://toulon.fr/
Grenoble – smart city	Yes	162780	www.grenoble.fr/
Dijon – smart city	Yes	157182	https://www.dijon.fr/
Angers	No	154463	www.angers.fr/
Nîmes	No	154013	https://www.nimes.fr/

Table 3 – Sample of French cities
Source: Authors

the innovation of the local authorities. The final sample thus includes 10 smart cities and 7 not included in the Vienna ranking (column 2 of table 3).

3.2. Choice of InSpider Insite 5 software

Essentially, InSpider Insite 5 software is designed to spot on a web site all errors (erroneous and broken links, spelling errors, SEO - Search Engine Optimization...) and thus improve the performance of the site, its referencings, the visibility of its pages on the web etc. (See Screenshot 1). Some of its features and affordability have guided our choice.

It is difficult to find a software that analyzes a whole website without completely aspiring the site, which poses the problem of storing this large quantity of files. This software allows the crawling of the site online (i.e. an exhaustive scan of all files, including PDF and RTF, tags etc.) As

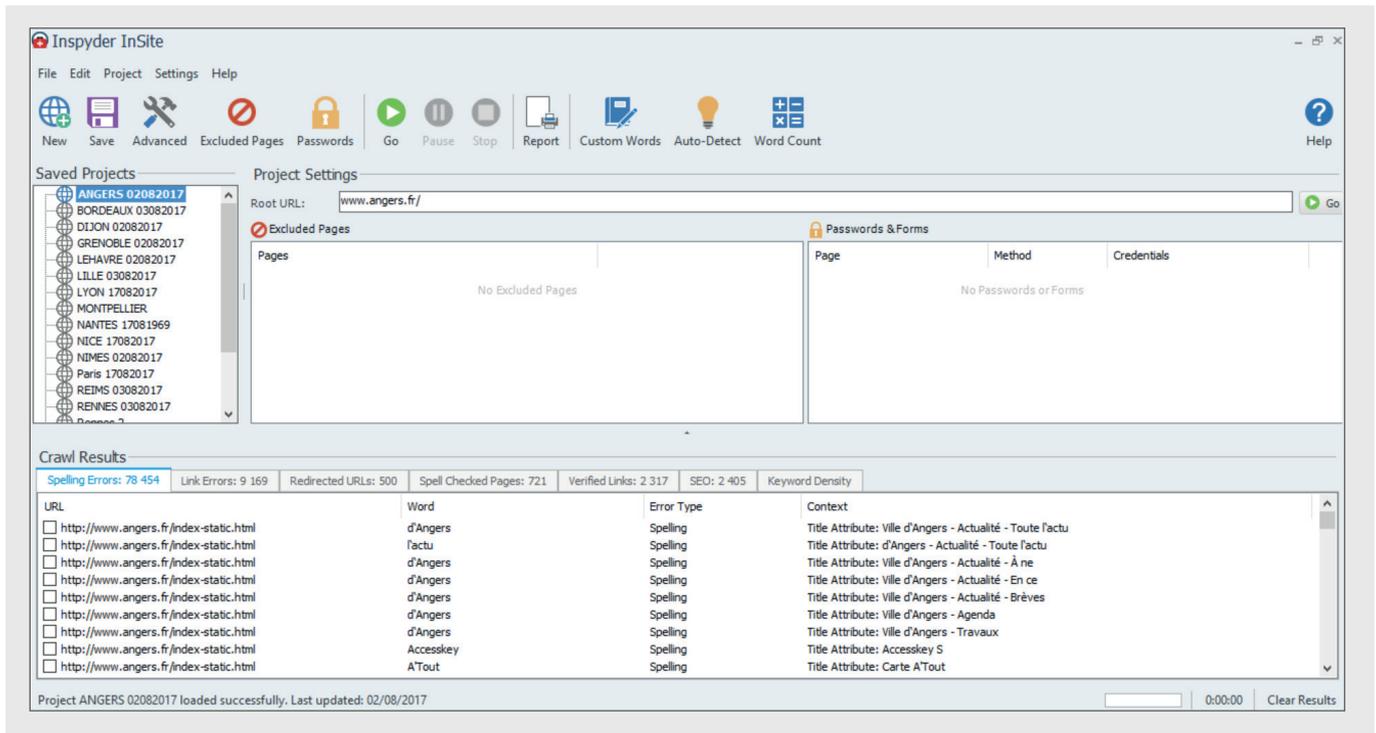
InSite 5 inspects one by one all the web pages of the studied site, it counts the words and calculates the density of the key words (See Screenshot 2).

The InSite 5 word count function provides page and word totals for the surveyed site (See Screenshot 3).

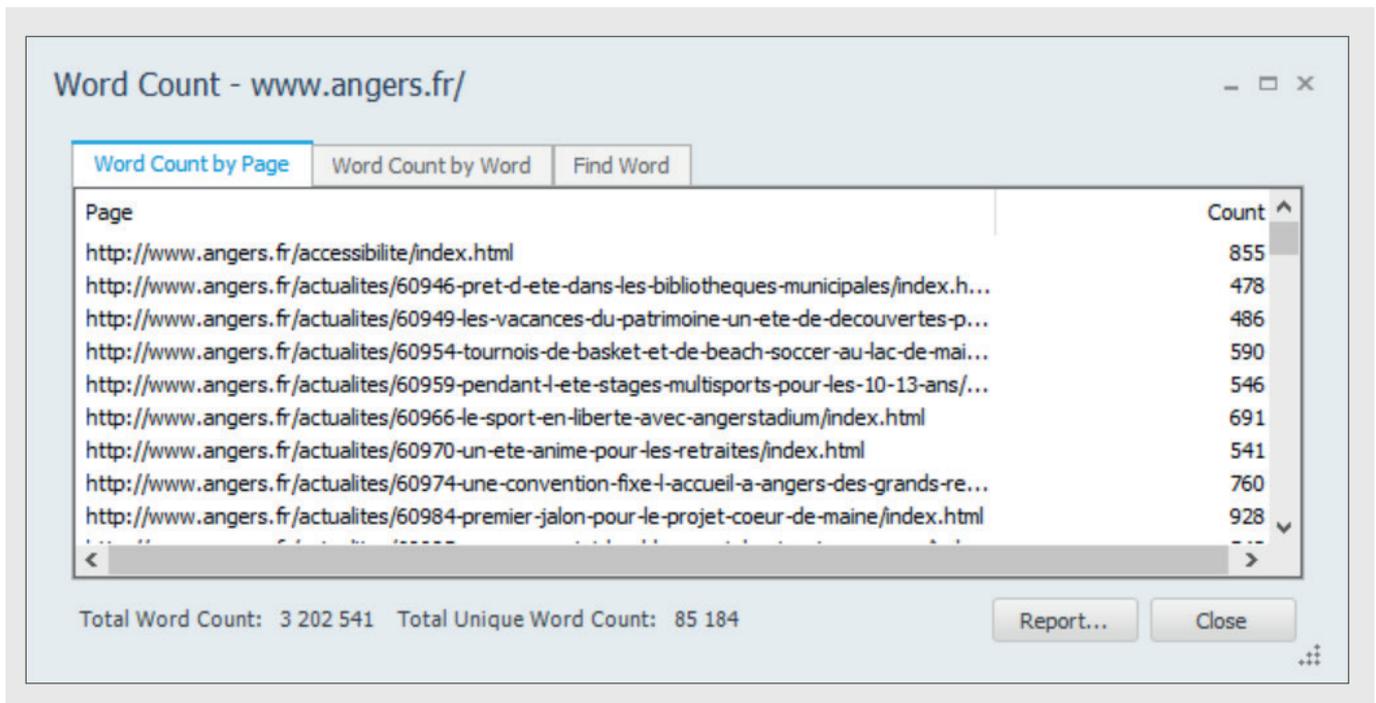
This scanning of the site however requires delays that vary according to the organization and the content of the sites. This time varies from a few minutes per site to several hours. The constitution of the global corpus of the 17 websites thus assumes a scan of nearly 100 hours.

3.3. Search for key words and phrases about innovation

The software offers a summary of the count in an Excel file. This allows for specific manual extractions as in Screenshot 4.



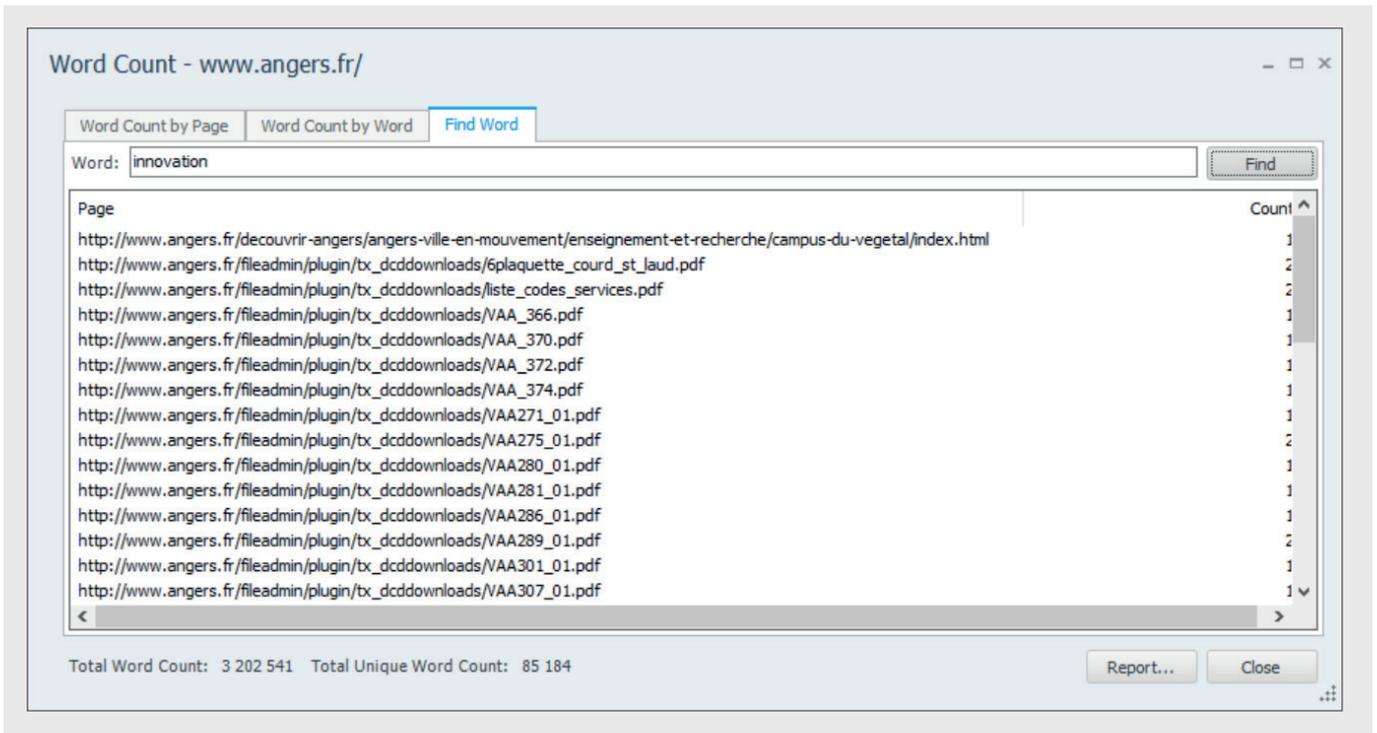
Screenshot 1 – Inspyder Insite 5 Software Interface



Screenshot 2 – Counting words

For the entire website of the city of Angers, InSite 5 has 3,202,541 words including 85,184 different words. A word count is proposed: “d’Angers” is quoted 7353 times. It is then necessary to search

the words linked to this research to know all the words related to the innovation by their lemma. Thus, “innovation” is cited 198 times and the lemma “innov” appears 617 times in total.



Screenshot 3 – Specific word search: “innovation”

(* mots différents = different words; total mots = total words)

d'Angers	7 353	Mots différents	85184
ans	6 989	Total mots	3 202 541
vivre	6 945		
Quartier	6 787	Lemme innov_	617
pas	6 778	l'innovation	198
place	6 707	innovantes	80
centre	6 562	innovant	63
Titre	6 275	innovants	57
son	6 093	innovation	56
morceau	5 905	innovations	39
Deux	5 656	d'innovation	34
Vie	5 440	innovante	29
juin	4 549	innover	27
mai	4 530	d'innover	12
mais	4 500	innove	11
mars	4 424	d'innovations	6
Thierry	4 422	innivent	5

Screenshot 4 – Excel abstract from Angers and occurrences of the lemma “innov”

Page contenant "Innovation"
http://www.angers.fr/decouvrir-angers/angers-ville-en-mouvement/enseignement-et-recherche/campus-du-vegetal/index.html ,1
http://www.angers.fr/fileadmin/plugin/tx_dcddownloads/6plaquette_courd_st_laud.pdf ,2
http://www.angers.fr/fileadmin/plugin/tx_dcddownloads/liste_codes_services.pdf ,2
http://www.angers.fr/quartiers/belle-beille/histoire-du-quartier/index.html ,2
Page contenant "Innovant"
http://www.angers.fr/actualites/agenda/a-ne-pas-manquer-dans-l-agenda/index.html ,1
http://www.angers.fr/actualites/agenda/detail/evenement/52839-l-ile-aux-matieres-du-recyclage-a-l-oeuvre-d-art/index.html?tx_event
http://www.angers.fr/fileadmin/plugin/tx_dcddownloads/angers_ete_2017.pdf ,1
http://www.angers.fr/fileadmin/plugin/tx_dcddownloads/l_engagement_d_angers.pdf ,1
http://www.angers.fr/fileadmin/plugin/tx_dcddownloads/numerique_light_revue_projet_de_quartier_2016.pdf ,1
http://www.angers.fr/fileadmin/plugin/tx_dcddownloads/plaquette_coeur_main_mars_2017_bdp__p.pdf ,1
http://www.angers.fr/fileadmin/plugin/tx_dcddownloads/programme_tempo_rives_2017.pdf ,1

Step 1: InSite 5 provides the web pages concerned by innovation

Codage	Catégorie Innovation
1	enseignement et recherche
2	histoire de la ville
3	recyclage des matériaux
4	numérique
5	énergie
6	services
7	culture musicale
8	projets

Step 2: The coder assigns to a category

Screenshot 5 – Manual coding on Angers and categorization

1	enseignement et recherche
2	histoire
3	recyclage
4	numérique
5	innovation énergétique
6	services
7	culture musicale
8	projets pour la ville
9	engagements mairie
10	actualité - information - communication
11	égalité sociale
12	sport écocitoyen
13	innovation sociale
14	familles
15	innovation citoyenne
16	climat
17	mobilité, transport et stationnement
18	coopération internationale
19	pédagogie
20	vie associative
21	santé
22	culture gastronomique et viticole
23	concours et appels à projets
24	relations usagers
25	droits
26	création d'entreprise et start up
27	cohésion économique et sociale
28	développement durable
29	vie étudiante
30	éclairage
31	culture
32	seniors
33	missions locales
34	tourisme
35	jumelages villes
36	économie créative
37	budget, dotations et subventions
38	restauration collective et innovante
39	innovation territoire
40	écologie - biodiversité
41	propreté et hygiène
42	promenades urbaines
43	sciences

Table 4 – Extracted from the categorization of the innovation valuations

3.4. Horizontal and transversal categorization of innovation themes

The thematic categorization aims to identify by page, by city and then throughout the corpus the dimensions of innovation discussed on the websites of the cities in the sample. For this, the software provides the pages on which the words relating to innovation appear. The encoder then manually assigns this occurrence to a category / dimension of the innovation. For assignment, the encoder is based on the title of the web page.

This categorization operation defines all the categories relating to innovation and makes it possible to identify the specificities for each of the cities. The data will then be compiled into a raw data file with cities and present or absent categories.

3.5. Lexical data processing

The results of horizontal and cross-sectional manual thematic analysis are summarized in Appendix 3 under 99 categories of innovation valuations. These categories, common to all cities, reflect the variety of themes associated with the lemma/words linked to innovation (see Table 4).

The 3 coders converged to 99 different categories. It shows the wide range of valuations between the different cities. It was obtained on the basis of the analysis of the titles of each web page evoking innovation.

3.6. Processing of quantitative data under R

In order to process the lexical data obtained, we made methodological choices. The goal is to know how to distinguish between smart cities or not depending on the themes and variables related to the site itself. The most natural method would be, in this case, Logit regression, which allows the explanation of a binary variable. However, the situation here is particularly delicate for several reasons:

- The first reason is the very small sample size. It is not possible to increase it because it is almost exhaustive: the studied population is composed with the major big French cities.
- In addition to this small size, we can expect strongly non-Gaussian or non-binomial distributions according to the famous 80/20 rule.
- Finally, the number of available variables is much higher than that of cities. In classical statistical methods, however, it is assumed that there are many more individuals than variables.

For these three extreme reasons, the only available methodology is Partial Least Squares (Tenenhaus, 1998) or PLS.

This method is suitable for small samples with many variables. It consists in looking for combinations of the explanatory variables in an iterative way. These factors must be orthogonal and most correlated to the variable to be explained. We have here an additional gain compared with the Logit method. Logit creates a single factor while here we create several. This is a kind of combination of regression and principal component analysis with the difference that the factors are not the ones with the greatest variance but those that are most correlated with the variable to be explained. In addition, we will be able to predict the membership to the club of smart cities, to develop a segmentation of cities along axes that can be interpreted. In terms of software we turned to Free Software R whose PLS functions are up-to-date and complete.

4. TO BE OR NOT TO BE A SMART CITY:

the gap between concrete innovation and conceptual innovation

It appears that to be smart, it is better to do than to say. The starting point is a raw summary data table (see Table 5) on which several types of calculations will be performed.

Ville	Appartenance smart ville	nombre de pages	total mots du site	mots différents	racine Innov	Population totale_2016
	SMARTCITY	NBPAGES	NBSITE	MOTSDIFF	INNOV	POPTOT16
Angers	2	721	3202541	85184	617	154463
Bordeaux	1	8557	22968895	122090	3419	247688
Dijon	1	2500	3202494	55376	540	157182
Grenoble	1	11501	12591573	79290	1322	162780
Le Havre	2	1967	2377741	41827	255	174728
Lille	2	4782	8131923	42766	1374	238003
Lyon	2	10406	23197503	160356	1985	509233
Montpellier	1	3480	14595943	216030	1066	276054
Nantes	1	5796	14703725	120479	2763	300614
Nice	1	125	106139	946	0	346251
Nimes	2	11543	42679455	95617	519	154013
Paris	2	2125	2594832	56253	1686	2254262
Reims	2	2306	3128579	27502	2513	186505
Saint Etienne	1	659	1194281	23366	481	174985
Strasbourg	1	15994	14689061	36381	2534	280114
Toulouse	1	10168	17728929	36956	144	466219
Toulon	1	1291	634412	19840	72	165862

(Coding: yes = 1; no = 2) - (*appartenance = belongs to smart cities; nombre de pages = number of pages; racine = lemma)

Table 5 – Table of Quantitative Variables (obtained from insite5)

4.1. Raw Data Table: Variables and counts

For example, Bordeaux has 3419 occurrences on the lemma “innov” while Toulon speaks very little of innovation with only 72 occurrences.

The website of Nice city has firewalls preventing the scanning of the site. This explains the 0 word about innovation while this city is a smart city.

4.2. Table of contingency of presence-absence of category by city

An absence-presence 0-1 coding was adopted to indicate whether the theme was used on the city's website (see Table 6).

Catégorie	Libellé	Angers	Bordeaux	Dijon	Grenoble	Le Havre	Lille	Lyon	Montpellier	Nantes
1	enseignement et recherche	1	1	0	1	1	1	1	1	1
2	histoire	1	0	1	0	0	0	1	1	0
3	recyclage	1	0	0	0	0	0	0	0	0
4	numérique	1	1	1	0	0	1	1	0	1
5	innovation énergétique	1	0	0	0	1	1	1	0	0
6	services	1	0	0	0	1	0	0	1	0
7	culture musicale	1	0	0	0	0	1	1	0	0
8	projets pour la ville	1	0	0	1	0	1	0	1	1
9	engagements mairie	1	1	0	0	0	0	0	0	0
10	actualité - information - communication	1	0	1	0	1	0	1	1	1
11	égalité sociale	0	1	0	1	0	1	0	0	0
12	sport écocitoyen	1	1	0	0	1	0	0	0	0
13	innovation sociale	0	0	1	0	1	1	0	0	1
14	familles	1	0	0	0	1	0	0	0	0
15	innovation citoyenne	1	0	1	1	1	1	1	1	1
16	climat	1	1	1	0	0	0	0	0	0
17	mobilité, transport et stationnement	0	1	0	1	1	1	1	0	1
18	coopération internationale	0	1	1	0	0	1	0	0	1
19	pédagogie	0	1	0	1	1	0	0	0	0
20	vie associative	0	1	0	1	0	1	0	1	1

(Codage: presence = 1; absence = 0)

Table 6 – Extract from the contingency table

4.3. Study of quantitative explanatory variables

Here, the variable to explain is “belonging to the Vienna ranking as a smart cities”.

Logistic regression PLS with R

In the PLS method, the first question that arises is the number of factors to keep. Classically, the use of the AIC criterion makes it possible to answer this question since it combines both the quality of

the model fit with the data and its parsimony. The smallest AIC leads us to two axes (see Table 7).

Table 8 shows the cities on these two factors. The first factor opposes cities with a large website (many pages) to websites with a large population. It is an extensive factor that takes into account the number of citizens or pages of the site. The second factor is between cities that speak more about innovation and those that talk about it the least. It is a more qualitative factor.

The combination of the two factors makes it possible to obtain the complete forecasting model reported in

Modèle quanti :				Coord_Comp_1		Coord_Comp_2	
	AIC	BIC	Missclassified				
Nb_Comp_0	25.03481	25.86802	7	nbpage	0.29402596	0.45637095	
Nb_Comp_1	24.26773	25.93416	5	nbsite	-0.20287589	-0.41461905	1
Nb_Comp_2	23.71678	26.21642	6	motsdiff	-0.03588829	-0.04558042	
Nb_Comp_3	24.47666	27.80951	5	innov	-0.04928873	0.71602662	
Nb_Comp_4	26.39317	30.55924	6	population	-0.84063462	-0.24920096	
				densite	-0.40249993	-0.14233839	

Table 7 – Logistic regression table

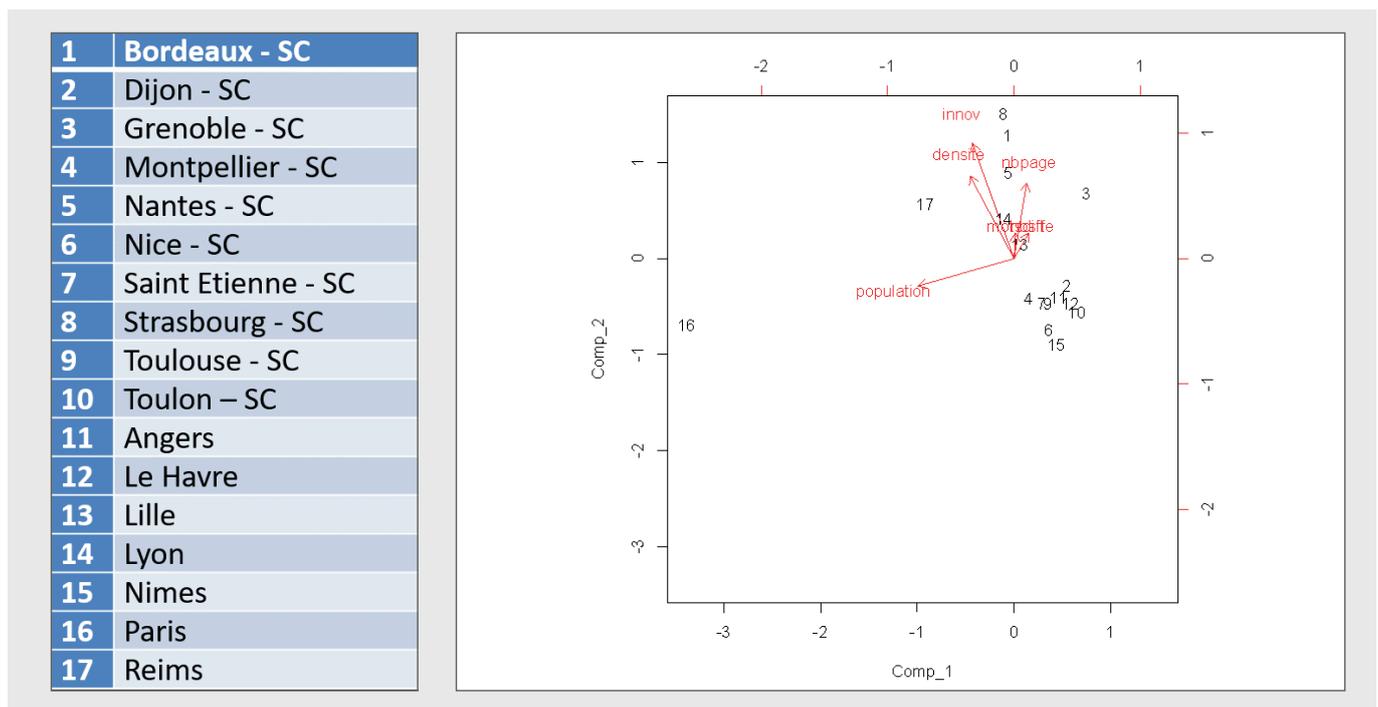


Table 8 – Logistic regression table

Table 9. The coefficients are standardized and therefore can be compared.

m2\$Std.Coeffs	
[,1]	
Intercept	-0.1656057
nbpage	1.7782904
nbsite	-1.3940866
motsdiff	-0.2000945
innov	1.0296799
population	-3.3157211
densite	-1.6261500

Table 9 – Combination of variables

The signs of the coefficients show that:

- The number of pages on the website (nbpage) is a strong “smart” index (the strongest). Smart cities want to communicate in a complete and organized way.

- The total number of words is a strong index of “stupidity” (nbsite). This volume of word is penalizing, while a strong number of pages indicates a structured discourse.
- The number of different words (motsdiff) is weakly negative.
- Talking about innovation (innov) is “smart”, which seems obvious, but less than the total number of pages.
- The population has a very negative impact. One could say that: “smart is small”, although it must be nuanced by the presence of Paris in the sample.

This model allows us to draw a robot portrait of the communication of a smart city. It is a “small” city but its site is however abundant in information (number of pages) without being too technical (motsdiff) and especially not verbose (total number of words). In reality, it is a “small” town (among the big French cities) but a city which is important and intelligent in the virtual world.

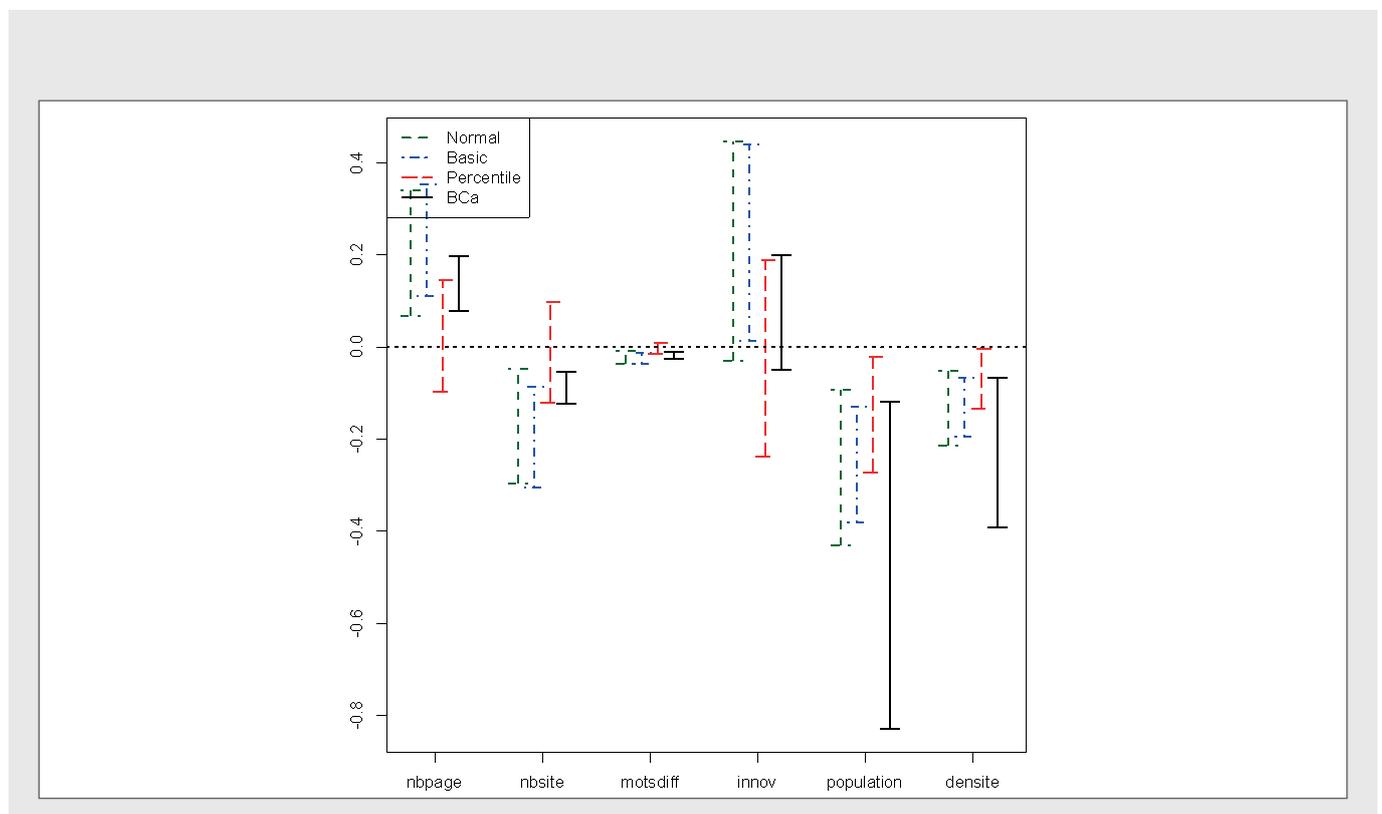


Table 10 – Intervals of significance

Results significance

The previous conclusion must still be validated in terms of significance. As there are no assumptions about the distribution laws in PLS we need to proceed to a Bootstrap. Table 10 shows the confidence interval for each coefficient of the model.

All variables are significant, which confirms the conclusion, except for one: Innov. Thus, contrary to what would seem obvious, it is not the cities that use the word innovation that are smart. Of course, this does not mean that they do not innovate as we will show in the next section, but that their innovations are not always called innovation. It seems to be better to do it than to say it.

4.4. Study of qualitative explanatory variables

The same PLS approach can be used for the binary variables that correspond to each of the chosen

themes to explain the membership to smart cities. Table 11 lists the significant themes after the Bootstrap and their coefficient in the model.

The significant variables (i.e. categories of innovation) are:

- In positive terms: they are valuations of concrete innovation, valuations that affect the daily lives of all. We are in “the present and the local (here and now)”. This is an innovation more centered on the individual.
- In positive terms: they are valuations of concrete innovation, valuations that affect the daily lives of all. We are in “the present and the local (here and now)”. This is an innovation more centered on the individual.

In summary, Table 12 proposes content axes to be used to build an innovative brand identity of smart city.

Valorisations de l'innovation qui agissent l'appartenance aux smart cities	En positif (+)	Valorisations de l'innovation qui agissent l'appartenance aux smart cities	En négatif (-)
pôles de développement	17.483067800	innovation énergétique	-15.629731120
RetD - innovation	8.591038692	sécurité	-11.660713351
missions locales	6.760182611	recyclage	-6.731798683
accueil des habitants	6.233547898	entreprise	-6.518838337
risques	6.024813991	recrutement	-5.985269102
mort des citoyens	6.024813991	crowdfunding	-4.091057741
lieux et équipement	6.024813991	attractivité investisseurs	-4.091057741
accessibilité	5.814525647	voies fluviales	-4.091057741
transition énergétique	5.814525647	serious game	-4.091057741
innovation architecturale	5.807524833	logistique urbaine	-4.091057741
crédit municipal	5.694175140	patrimoine	-2.585340320
relations usagers	5.694175140	histoire	-2.130769027
Europe	5.694175140	vie scolaire	-1.953573565
coopération internationale	0.716442830	développement durable	-1.766108215
plateforme innovante - Lab	0.703521319	propreté et hygiène	-1.701720723
vie associative	0.562723365	seniors	-1.313871139
culture spectacle	0.553125632	mobilité, transport et stationnement	-1.310148186
eau et assainissement	0.489615065	musées	-1.162435333
économie créative	0.378367384	arts et architecture	-1.111721025
restauration collective et innovante	0.223189067	charte graphique	-1.101921708
innovation emploi	0.221140730	pédagogie	-1.085958522
création d'entreprise et start up	0.114743972	aménagement et urbanisme	-0.990204063
numérique	0.088545620	innovation citoyenne	-0.691844998
		jumelages villes	-0.679580291
		actualité - information - communication	-0.218608678
		promenades urbaines	-0.130478173

Table 11 – Significant Variables

"SMART"	"NOT SMART"
<p align="center"><i>Concrete innovation</i> <i>"Here and now"</i></p>	<p align="center"><i>Conceptual innovation</i> <i>"Elsewhere and in the future"</i></p>
<ul style="list-style-type: none"> - Everyday life of citizens - Present action - Local initiative - Individual-centric - Human dimension - Easily decryptable - Accessible to everyone - Actions with tangible results 	<ul style="list-style-type: none"> - Physical distance - Temporal distance - Global Thinking - Conceptual content - Process-centric - Anchored in complexity - Elite content - Ideas for future benefits

Table 12 – Forging the Brand Identity of a Smart City Through Innovation

CONCLUSION

To promote a web content focused on concrete and close-to-citizens innovation is the key to belong to the smart cities club

The major contribution of this research on smart cities is to show in a paradoxical and totally counter-intuitive way the lack of performativity of the discourse on innovation: it is not because the city speaks about innovation on its website that it belongs to smart cities. Only, the most concrete, daily and present elements anchor in the “smart” side. These close elements are the most contributors to belong to the smart city club.

Beyond revealing the criteria for belonging to smart cities, our research insists on the need to rethink the cities’ discourse on their innovation policies, in particular by:

■ **Integrating the social dimension of city brand identity**

Through brand identity, this research relies on a theoretical marketing framework of the identity concept, whereas this notion has a more complex polysemic character in the field of social sciences. It results from an interaction between

social identity, personal or for oneself (Baudry and Juchs, 2007). This social dimension of the brand identity has been left aside but could be integrated by a research on smart cities messages from social media.

■ **Avoiding to value a conceptual or “from the top” innovation**

Our research shows that the website allows you to deploy the innovative characteristics of the brand identity of smart cities. A hundred or so valuations of innovation were initially selected after a manual thematic analysis of the web page titles concerned (this also supposes that the thousands of analyzed pages have all been correctly titled). In the end, only a dozen of key dimensions are statistically relevant for developing an innovative smart city brand identity. The conceptual valuations of an innovation “coming from above” are counter-productive to belong to smart cities.

■ **Promoting concrete projects of an accessible-to-all innovation**

At this stage, the ultimate concrete recommendation concerns elected officials aiming to communicate on innovation policies: projects anchored in a distant and less visible future do not anchor the

city in the clan of smart cities. The innovative and daily actions, immediately visible, are preferable to convince. Proximity is the guarantee of a smart innovation.

Finally, this research paves the way for a redefinition of the smart city concept, notably in:

■ **Integrating the non-verbal dimension of communication on innovation**

On the empirical level, the studied corpus dealt with verbal discourse (word-based and verbal occurrences), but it would be interesting to go deeper into the rhetoric of images that signify innovation. This involves finding descriptors and adequate coding to categorize the iconic (or even video-visual) meaningful material found on websites.

■ **Taking into account the dimensionality of the smart city concept**

The ranking indicators of smart cities in the Vienna ranking are partial because they are all linked to the information provided by the Urban Audit database (Eurostat). The statistical results tend to show that “being a smart city” would conceptually be a one-dimensional concept (the city is either one or the other). It would be a reflexive concept (either we are, or we are not) and not a formative concept (i.e. multidimensional for which one dimension compensates the other). This research shows that the reality is more complex and weakly multidimensional. A more reflective approach could therefore be evoked both in measurement and in conceptual thinking. Perhaps it would be necessary to rethink the validity of the Vienna ranking, at the heart of which are six formative dimensions? All the tools of psychometry should be mobilized, which constitutes a future and indispensable research path.

BIBLIOGRAPHY

- ASHWORTH, G.; KAVARATZIS, M. (2009). "Beyond the logo: Brand Management for Cities". *Journal of Brand Management*. Vol. 16, p.520-531, juillet.
- ASHWORTH, G.; VOOGD, H. (1990). *Selling the city: marketing approaches in public sector urban planning*. Belhaven Press, London.
- ATTOUR, A.; RALLET, A. (2014). "Le rôle des territoires dans le développement des systèmes trans-sectoriels d'innovation locaux: le cas des smart cities". *Innovations*. 1/2014, n° 43, p.253-279.
- BARTIKOWSKI, B.; MERUNKA, D.; OUATTARA, A.; VALETTE-FLORENCE, P. (2009). "Les villes ont-elles une personnalité?". *Revue française de gestion*. 7/2009 (n° 197), p.49-64.
- BARLATIER, P.-J. (2016). "Introduction - Management de l'innovation et nouvelle ère numérique - Enjeux et perspectives". *Revue française de gestion*. n° 254, p.55-63.
- BASSANI, M.; BEN YOUSSEF, K.; MAGNE, S.; SBALCHIERO, S. (2010). *Brand Design – construire la personnalité d'une marque gagnante*. 2^e édition revue et augmentée, De Boeck.
- BAUDRY, R.; JUCHS, J.-P. (2007). "Définir l'identité". *Hypothèses*. 2007/1 (10), p.155-167. Éditions de la Sorbonne, Paris.
- BERGER-REMY, F. (2012). "Gérer l'identité de sa marque: Comment faire un bon usage des modèles de Kapferer et Aaker". *Chaire Marques et Valeurs*. Working paper, Parole d'expert, IAE de Paris, Université Panthéon-Sorbonne, N°2012-05.
- BREUX, S.; DIAZ, J. (2017). "La ville intelligente, Origine, définitions, forces et limites d'une expression polysémique". Rapport INRS – Centre UCS, Montréal.
- CARAGLIU, A.; DEL BO, C.; NIJKAMP, P. (2011). "Smart Cities in Europe". *Journal of Urban Technology*. 18(2), p.65-82.
- CÔME, T.; MAGNE, S. (2019). "Les algorithmes au service de l'implication citoyenne: outil de gestion performant ou illusion démocratique?". *Algorithmes et décisions publiques*. Les essentiels d'Hermès, CNRS éditions, p.193-219.
- CÔME, T.; MAGNE, S.; STEYER A. (2019). "En quoi la sensibilité écoresponsable des citoyens favorise-t-elle l'adoption des nouvelles mobilités urbaines?". 8^e colloque AIRMAP, Territoires intelligents, Paris.
- DAVEZIES, L. (2012). *La crise qui vient. La nouvelle fracture territoriale*. Paris, Seuil, coll. "La république des idées", 111 p., ISBN: 978-2-02-108645.
- DAVEZIES, L. (2009). "L'économie locale "résidentielle"". *Géographie, économie, société*. Vol. 11, n°1, p.47-53.
- ECHTNER, C.M.; RITCHIE, J.R.B (2003). "The meaning and measurement of destination image". *The Journal of Tourism Studies*. Vol. 14, n°1, p.37-48.
- ESHUIS, J.; KLIJN, E.-H.; BRAUN, E. (2014). "Marketing territorial et participation citoyenne: le branding, un moyen de faire face à la dimension émotionnelle de l'élaboration des politiques?". *Revue Internationale des Sciences Administratives*. 1/2014 (Vol. 80), p.153-174.
- FROCHOT, I.; BATAT, W. (2013). *Marketing and designing the tourist experience*. Goodfellow Publishers, London.
- HOLLANDS, R. (2008). "Will the real smart city please stand up?". *City*. 12(3), p.303-320.
- JENKINS, O.H. (1999). "Understanding and measuring tourist destination images". *International Journal of Tourism Research*. Vol. 1, n°1, p.1-15.
- KAPFERER, J.-N. (1988). "Maîtriser l'image de l'entreprise: le prisme d'identité". *Revue Française de Gestion*. Novembre-Décembre, p.76-82.
- KAPFERER, J.-N. (1992). *Strategic Brand Management*. New York: Kogan Page.
- KAVARATZIS, M.; HATCH, M.-J. (2013). "The dynamics of place brands: An identity-based approach to place branding theory". *Marketing Theory*. Vol. 13, p.69-86, janvier.
- KELLER, K.L. (2007). *Strategic brand management*. Prentice Hall, Upper Saddle River.
- KOMNINOS, N.; PALLOT, M.; SCHAFFERS, H. (2013). "Special Issue on Smart Cities and the Future Internet in Europe". *Journal of the Knowledge Economy*. 4(2), p.119-134.
- KOURTIT, K.; NIJKAMP, P. (2012). "Smart Cities in the Innovation Age". *Innovation: The European Journal of Social Science Research*. 25(2), p.93-95.
- LUCARELLI, A.; BERG P.-O. (2011). "City branding: a state-of-the-art review of the research domain". *Journal of Place Management and Development*. Vol. 4, p.9-27.
- MATTSSON, J.; SØRENSEN, F. (2015). "City renewal as open innovation". *Journal of Innovation Economics & Management*. 1, (n° 16), p.195-215.
- MAHIZHNAN, A. (1999). "Smart cities. The Singapore case".

Cities. 16(1), p.13-18.

MEIJER, A.; RODRÍGUEZ BOLÍVAR, M.P. (2016). “La gouvernance des villes intelligentes. Analyse de la littérature sur la gouvernance urbaine intelligente”. *Revue Internationale des Sciences Administratives*. n° 2, vol. 82, p.417-435.

MICHEL, G. (2009). *Au cœur de la marque*. 2^e édition, DUNOD.

PECOT, F.; DE BARNIER, V. (2015). “Stratégies de marques de ville basées sur le patrimoine de marque: le rôle des symboles”. *Management & Avenir*. 4, (n° 78), p.143-159.

TERRIER, C. (2010). *Mobilité touristique et population présente, les bases de l'économie présentielle des départements*. Ouvrage INSEE.

TENENHAUS, M. (1998). *La régression PLS. Théorie et pratique*. Paris, Technip.

WEBSITES

DELENEUVILLE, M. (2017). “Smart city: où sont les villes intelligentes en France?”. *Journal Du Net*. [URL: www.journaldunet.com].

GIFFINGER, R.; FERTNER, C.; KRAMAR, H.; KALASEK, R.; PICHLER-MILANOVIC, N.; MEIJERS, E. (2007). *Smart cities – Ranking of European medium-sized cities*. Centre of Regional Science, Vienna UT. [URL: http://www.smart-cities.eu/download/smart_cities_final_report.pdf].

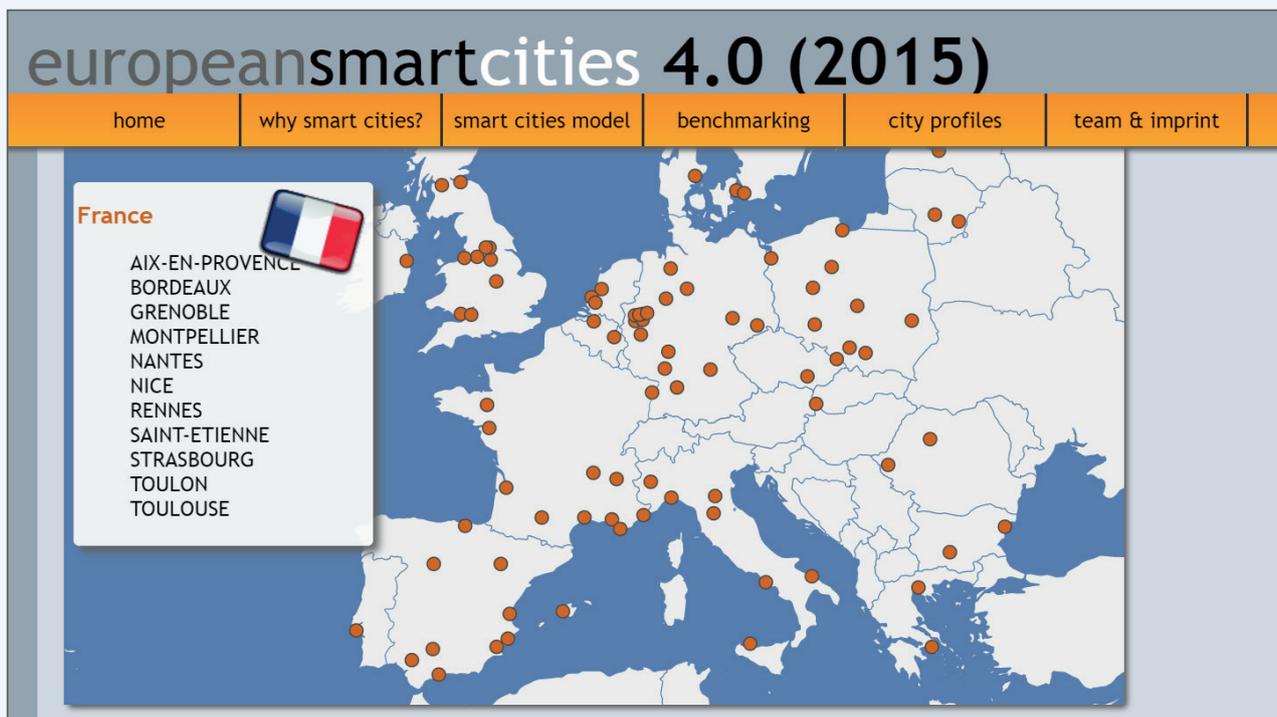
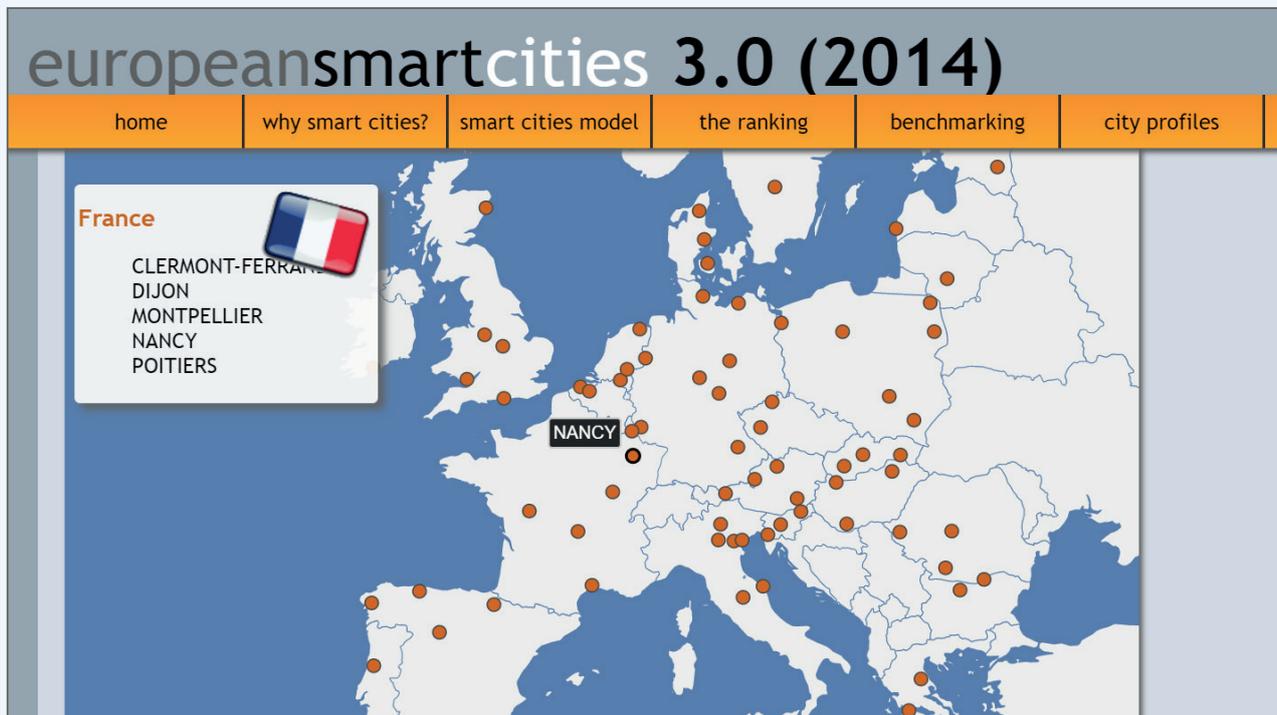
SUEUR, J.-P. (2010). *Villes du futur, futur des villes, Quel avenir pour les villes du monde?* Rapport d'information, n° 594, Sénat Session Ordinaire de 2010-2011, 321 p. [URL: <http://www.senat.fr/rap/r10-594-1/r10-594-11.pdf>].

VAIDIS, D. (2006). “Attitude et comportement dans le rapport cause-effet: quand l'attitude détermine l'acte et quand l'acte détermine l'attitude”. *Linx*. Revue des linguistes de l'université Paris X Nanterre, Presses universitaires de Paris Nanterre. [En ligne], 54 | 2006, mis en ligne le 1^{er} août 2007. [URL: <http://journals.openedition.org/linx/507>].

Dossier “les smart cities”. [URL: <http://www.smartgrids-cre.fr/index.php?p=smartcities>] (consulté le 10/09/2017). [URL: <http://2thinknow.com>]; [URL: <http://www.innovation-cities.com>].

APPENDIX 1 – EUROPEAN CITIES SMART CITIES

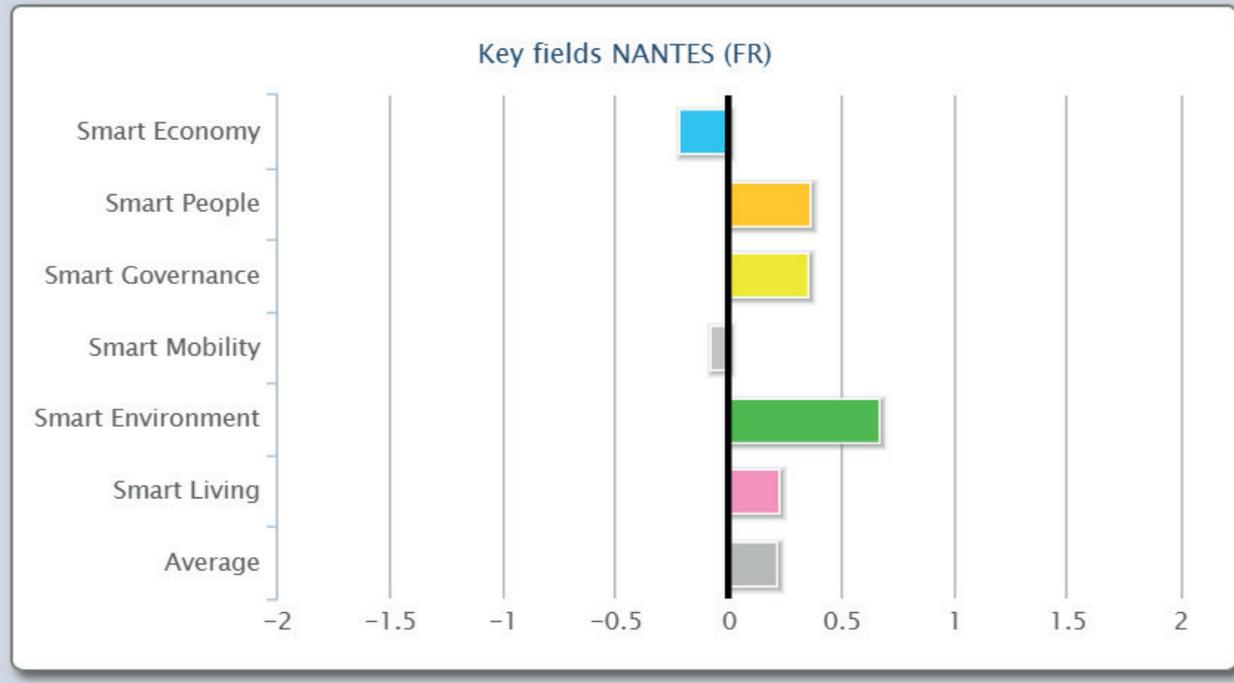
European cities between 100,000 and 500,000 inhabitants



APPENDIX 2 – DIMENSIONS AND INDICATORS OF SMART CITIES

Overall profile on the 6 dimensions

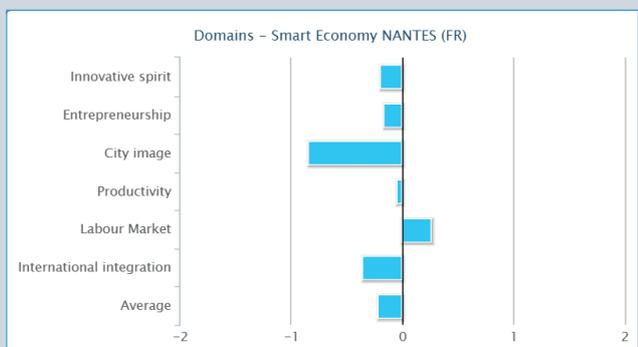
City-Profile: NANTES (FR)



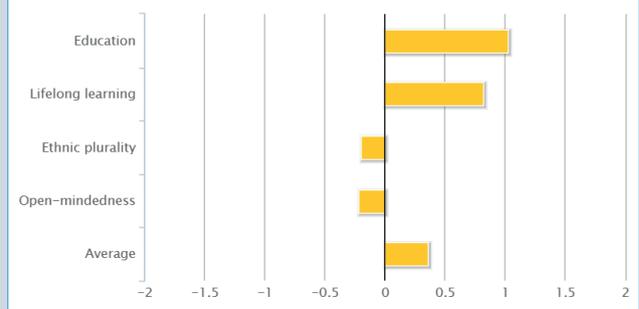
APPENDIX 2 – DIMENSIONS AND INDICATORS OF SMART CITIES

Profiles by indicators

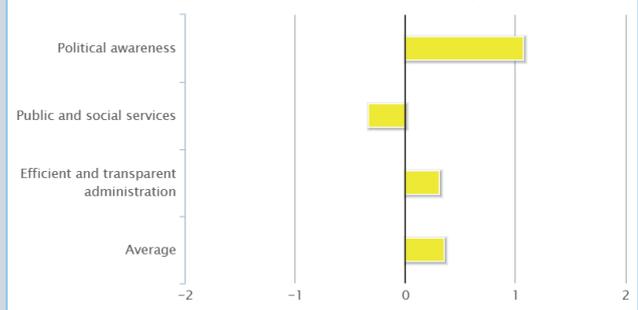
Detailed Overview - Characteristics and Factors



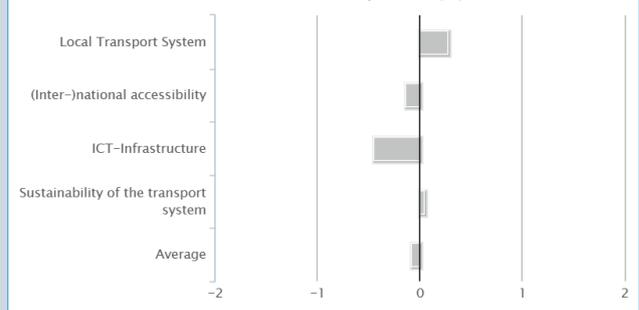
Domains - Smart People NANTES (FR)



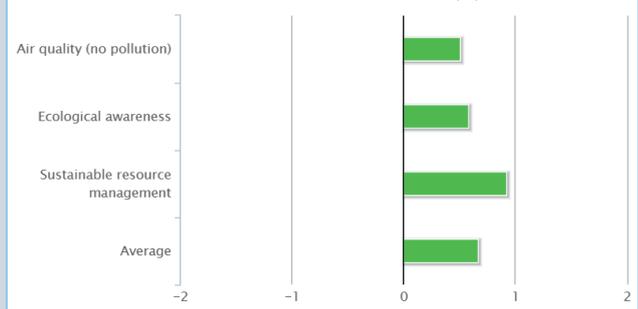
Domains - Smart Governance NANTES (FR)



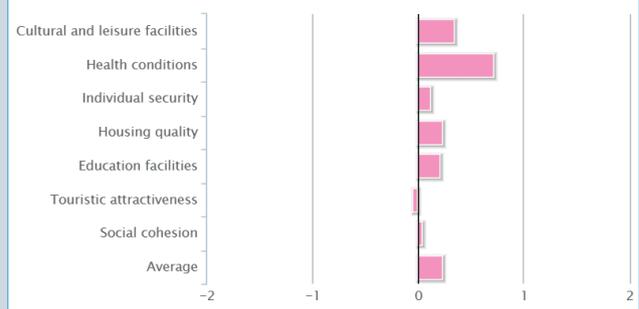
Domains - Smart Mobility NANTES (FR)



Domains - Smart Environment NANTES (FR)



Domains - Smart Living NANTES (FR)



Source: [URL: <http://www.smart-cities.eu/index.php?cid=6&ver=4&city=148>]

APPENDIX 3 - CATEGORIZATION OF THE VALORIZATIONS OF INNOVATION

1	enseignement et recherche
2	histoire
3	recyclage
4	numérique
5	innovation énergétique
6	services
7	culture musicale
8	projets pour la ville
9	engagements mairie
10	actualité - information - communication
11	égalité sociale
12	sport écocitoyen
13	innovation sociale
14	familles
15	innovation citoyenne
16	climat
17	mobilité, transport et stationnement
18	coopération internationale
19	pédagogie
20	vie associative
21	santé
22	culture gastronomique et viticole
23	concours et appels à projets
24	relations usagers
25	droits
26	création d'entreprise et start up
27	cohésion économique et sociale
28	développement durable
29	vie étudiante
30	éclairage
31	culture
32	seniors
33	missions locales
34	tourisme
35	jumelages villes
36	économie créative
37	budget, dotations et subventions
38	restauration collective et innovante
39	innovation territoire
40	écologie - biodiversité
41	propreté et hygiène
42	promenades urbaines
43	sciences
44	quartiers
45	culture spectacle
46	innovation emploi
47	accueil des habitants
48	attractivité investisseurs

49	voies fluviales
50	commerces et boutiques
51	entreprise
52	enfance
53	pôles de développement
54	consommation responsable et locale
55	open data
56	eau et assainissement
57	parcs, jardins et jardinage
58	handicap
59	coworking
60	vie politique et municipale
61	gestion des déchets
62	action du Maire
63	serious game
64	fiscalité locale
65	lieux et équipement
66	environnement - air
67	risques
68	mort des citoyens
69	web et réseaux sociaux
70	aménagement et urbanisme
71	vie pratique
72	logement et habitat durable
73	logistique urbaine
74	innovation design
75	activités sportives
76	jeunesse
77	patrimoine
78	sécurité
79	recrutement
80	charte graphique
81	loisirs
82	arts et architecture
83	musées
84	plateforme innovante - Lab
85	crowdfunding
86	innovation architecturale
87	RetD - innovation
88	culture littéraire
89	vie scolaire
90	qualité de vie
91	administration
92	environnement - réserves naturelles
93	rayonnement
94	labellisations ville - smart city et villes inte
95	innovation agricole
96	accessibilité
97	transition énergétique
98	Europe
99	crédit municipal

