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Tracing Smart Cities' Representation on Twitter. An Analysis of the Italian Context*

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Abstract

In recent years, various disciplines have focused on the Smart City concept and phenomenon. Whether people can approach the smart city concept without fear and risk of losing their sensitive data is still a major concern. This paper intends to investigate, through an analysis conducted by extrapolating tweets on the social media Twitter, the relationship existing between the Smart City and Italian citizens. The objective consists in a descriptive content analysis capable of providing a perception and use of the Smart City concept relative to the Italian population.

Keywords: smart city, data mining, technologies.

1. Introduction - the smart city: overview of risks and benefits

"The history of sociology and the study of the urban environment proceed following a parallel track" Massidda Luca, Sociology of the City, A Trilogy.

Although Smart Cities want to establish a dialogue with their citizens, going to fill needs and processes of co-existence between government and citizens, the opinions and concepts that are online and especially on social media seem to be controversial. This study aims at analyzing how smart city-related concepts and technologies are perceived by the Italian population. In particular, it wants to create a social media listening method[1] through Twitter data mining.

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[1] The spread of digital technologies and social networks has multiplied the forms of digital data that can be used for social research.
The two main forms are native digital data, which are produced in social networks, search engines or blogs, and digitised data, which are analogue data transformed into digital data (Rogers, 2013; Amaturo & Aragona, 2019).

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The methodology, therefore, would go to use an approach related to the analysis of social media thus making a perception related to smart cities in the Italian context to make a descriptive analysis of the territory. The choice to use social media is due to the possibility of obtaining a large amount of information generated by a wide audience that can be retrieved in real time. Through Twitter data mining, an in-depth analysis was performed on a set of 4706 tweets from the first extraction.

Of these, 1905 are tweets and 2801 retweets while, the variable for total reactions on each tweet was appropriately classified into high reaction, medium reaction and low reaction. The choice to use Twitter as a social media came from the need to obtain information about communication and the variety of topics it offers in terms of mobility, perception, sustainability, politics, and data sensitivity. Thus, this article aims at contributing to Italian citizens' perceptions of smart cities and how, with the advent of technology and communications, it continues to be a risk and fear of technology and everything new.

The study is divided as follows. Paragraph 1 presents the theoretical framework and hypotheses, paragraph 2 introduces the Methodology and objectives, paragraph 3 presents the results, and paragraph 4 presents the findings.

1.1. Smart city evolution

Population expansion in metropolitan areas has undergone a significant increase, and, cities have evolved into a reality shaping growing modern complexity. A prospective analysis by the United Nations indicates that by 2030, 60 percent of the global population will be expected to live in urban areas, and this growing transition, characterized by an unstoppable momentum, seems to accentuate the urbanization process considerably (Nam and Pardo, 2011; Buhaug and Urdal, 2013).

In analysing the impacts that digital technologies have had on the method of social research, the debate has developed around the contraposition between revolution (digital techniques overturn the method) and involution (digital techniques impoverish the method). The question of innovation, i.e. whether digital techniques should be considered new or not, played a key role in this opposition. The new versus old dichotomy was first promoted by Rogers (2013), who distinguished between digitised and native digital techniques. The former are those that already existed in analogue form, and have 'migrated' to the web (e.g. web surveys and digital ethnography), the latter are those 'born' on the web, such as web scraping techniques, which 'scrape' data from content on the internet and are able to monitor online products, identify site changes, and collect computer metadata. (Amaturo & Aragona, 2019).

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Recent years have seen a growing interest in the study of urban dynamics in Italy, as in the rest of the world. The ever-expanding city has established itself as the symbol of contemporary society. It is an increasingly complex social system that requires increasingly sophisticated forms of governance, in order not only to find ways to become more environmentally sustainable, but also to ensure a supply of public services that can respond to inexorably expanding territories, and sometimes even try to reduce the growing inequalities in different urban areas.

One of these forms of governance on which there is more attention today, not only from public administrationsbut also from civil society and scientific research (Karvonen, 2020); is the so-called smart city (Goodspeed, 2015): a model of a city that is precisely smart, embedded in a highly technological and integrated system, connected to the Internet, which promises automated and efficient management of the urban agglomeration (Kitchin, 2013; Kitchin et al., 2015).

Over time, the concept of smart cities has gained increasing resonance among businesses, government authorities, media and academic communities (Kitchin, 2015; Zheng et al., 2020). This nomenclature has been predominantly adopted to denote, on the one hand, the use of Information and Communication Technologies (ICTs) to promote economic development and, on the other hand, the pervasive deployment of digital platforms in the urban environment, contributing to the increase of e-governance.

Recently, the smart city concept is evolving towards a broader understanding of urban planning and development, including social and environmental aspects (Zheng et al., 2020). However, it remains anchored in a vision of efficient and universal technology. In particular, the development of new technologies and communication modes, coupled with the increasing population density in urban areas, presents an unprecedented opportunity for new technologies, especially in the area of Big Data, to promote smart cities. With Big Data, both urban government and citizens have access to a vast stream of real-time information about the city environment, providing a solid basis for decisions, actions, and future planning in a collaborative context, resulting in reduced inequality and social polarization (Engin et al., 2020). The extensive use of Big Data technologies helps to outline new frameworks and pathways for smart city planning, facilitating the creation and enhancement of social and relational capital (Coe et al., 2001).

Smart city initiatives are not only limited to optimization of mobility patterns, parking management, efficiency in lighting, or improvement of public infrastructure; rather, these initiatives are aimed at catalyzing citizen engagement as a crucial aspect of realizing a path to smart and inclusive growth (Lee, 2019).

The smart city system is mainly based on the collection of huge amounts of data, thanks to the use of two key technologies: the Internet and smart sensors (Kitchin et al., 2015). These sensors are spread throughout the urban territory (e.g. to monitor traffic, smart security cameras, sensors that record air quality, etc.), and once connected through the internet to the city's data centre, they can collect data from the city's data centres. These sensors are spread throughout the urban territory (e.g. to monitor traffic, smart security cameras, sensors that record air quality, etc.), and once connected through the Internet on the same platform, they begin to collect huge amounts of data that they then cross thanks to algorithms, thus returning outputs capable of providing different services, such as managing mobility flows by road and pedestrians, to be able to plan a service offer that responds in real-time and adapts to, or even anticipates, the dynamics at work; or even the incidence of crime in certain areas, such as to allow specific policies, etc.

Undoubtedly, these technological evolutions translate into greater efficiency, cost reductions, speed and much more for cities, but there are risks regarding the use of these technologies in urban space, and several scholars have exposed the dangers and weaknesses of the system. Here we have chosen to use the words of Rob Kitchin (2016) to briefly expose the main among these risks, on which there is now a lively debate, inside and outside the academy:

1. It typically treats the city as a knowable, rational, steerable machine, rather than a complex systemfull of wicked problems and competing interests;
2. It promotes a strong emphasis on creating technical solutions and overly promotes top-down technocratic forms of governance, rather than political/social solutions and citizen-centred deliberative democracy;
3. The technological solutions forwarded often treat cities as ahistorical and aspatial and as genericmarkets, promoting one-size fits all technical fixes rather than recognising the need for bespoke solutions tailored to city characteristics and needs;
4. The technologies deployed are portrayed as being objective, commonsensical, pragmatic and politically benign, rather than thoroughly political, reflecting the views and values of their developers and stakeholders;
5. It promotes the corporatisation and privatisation of city services, with the developers of smart city technologies capturing city functions as market opportunities which are run for profit rather than the public good, and potentially create proprietary technological lock-ins; it prioritises the values and investments of vested interests, reinforces

inequalities, and deepens levels of control and regulation, rather than creating a more socially fair and equal society;

6. The technologies deployed have profound social, political and ethical effects: introducing new forms of social regulation, control and governance; extending surveillance and eroding privacy; and enabling predictive profiling, social sorting and behavioural nudging;
7. The technologies deployed potentially produce buggy, brittle and hackable urban systems which create systemic vulnerabilities across critical infrastructure and compromise data security, rather than producing stable, reliable, resilient, secure systems.

All these risks can be included in three macro-categories: technological solutionism (Bria, Morozov, 2021), the privatisation of public services, and the management of sensitive data (Van Dijck, 2014).

As Kitchin argues, the tendency to interpret technologies as a panacea that is good for all problems creates obvious distortions in the actions taken by policymakers. Indeed, it is impossible not to take into account the profound differences that characterise different cities in different parts of the world: socio-economic, cultural, political, geographical, etc. differences.

In this sense, technologies, as already mentioned, can be an important and useful tool but if integrated with, not replacing, broader policies.

Privatisation of public services refers to the tendency, also driven by the reduction of public spending costs, to contract out strategic public services to private companies. This is even more true when it comes to smart technologies; and this raises several problematic issues: first of all, the emergence of new inequalities and the consolidation of old ones, favouring those who have the means (especially economic ones) to access the new services made available by smart cities, since as is obvious, private companies primarily aim at making a profit. This approach ends up turning citizens into customers and public space into a market. Bria and Morozov (2021) wonder if at this point we can still speak of a right to the city (Lefebvre, 2014), since rights that should guarantee access to the city and a decent way of life, such as health, mobility, safety and housing, are being transformed into services of private actors to be offered to those who can afford it.

Then, there is the question of using the enormous amount of data collected for profiling individuals, which, through the collection of data from the public space crossed with those collected by private parties (such as social networks) could favour the creation of profiles not only based on actions performed, but also the prediction of actions yet to be performed; implying the risk of socially classifying populations, favouring those with a certain socio-economic status and affecting others; e.g. in access to mortgages, or health insurance (profiling lifestyles), or even as a basis for selection at job interviews, etc.

Moreover, as Sadowski (2020) explains, the use of this data for predictive policing operations evokes scenarios that are eerily reminiscent of science fiction films such as 'Minority Report', and for which, Sadowski goes on to say, experience already exists in the United States and China[2].

This last aspect ties in closely with the last macro-category: the management of sensitive data. As mentioned earlier, entrusting so many aspects of urban life to smart forms favours the creation of systems that are increasingly hackable, fragile and vulnerable. A contradiction, considering the attention given to security in the smart city discourse. Such fragile systems put at risk the sensitive data of millions of citizens, who see their privacy threatened in every aspect of their lives, from their individual movements to the diseases they suffer from, to their purchasing intentions or their choices in the political arena.

The Internet has brought us all closer together, and extended our presence in space and our capabilities: today, it is possible to converse without great difficulty with people on the other side of the world, speak in other languages with the help of simultaneous translators, measure one's health parameters with the help of smart watches, address politicians or celebrities directly on social networks, and access all kinds of information thanks to search engines. The city is of course no exception. Such technological developments are so permeated in our social network and everyday life that one sometimes struggles to recognise them as such. Can those who are not insiders recognise the smart technologies used in urban space? The impacts they have on lives and future consequences.

2. Methodology and goals

As described in the introduction, smart cities aim at innovation and renewal in various aspects of a city, that can be technology, organisation or policy. It can also be seen as an 'enabler' of change through the exploration of relevant open innovation processes (Paskaleva, 2011). Smart cities are expected to improve the quality of life of citizens and enable businesses to develop a sustainable urban environment (Vasseur and Dunkels, 2010).

The public discourse around the smart city is often hegemonized by engineers, architects and technocratic professionals in various capacities, who help to focus the issue on the benefits of technology applied to cities. What is

[2] It is recent news that a predictive policing system is also being implemented in Italy, https://www.wired.it/article/giove-polizia-predittiva-software-italiano-come-funziona-garante-privacy/

still missing in the main stream debate - and to be honest, even in academia it is struggling to emerge - is a critical vision (Luque-Ayala and Marvin, 2015).

In this sense, it is worth remembering what Yigitcanlar et al. (2020) say:

Local, regional, and national governments have been working to transform their cities into smart ones through strategies, plans, and projects involving the substantial engagement of technology solutions. Still, expectations from smart cities are highly unrealistic as they are full of speculations. There is limited knowledge and understanding about: trending concepts and technologies; relationships between popular concepts and technologies; policies that influence the perception and use of concepts and technologies.

For this reason, we believe that this work can make a positive contribution to the ongoing discourse, because it helps to better understand the discourses that spontaneously emerge from the net-sphere Yigitcanlar et al. (2020), which can rightly be seen as a mirror of society in a broader sense; of what is the debate around the smart city. This understanding is necessary not only for scholars who want to approach the subject, but also for policy makers who will have to make decisions, in the more or less near future, on this issue. Because a debate on the smart city, transparent and easily accessible to all, is a benefit to society today and in the future.

Smart cities are showing a growing interest in establishing a fruitful dialogue with their residents in order to fully understand their needs and promote the creation of virtual platforms that encourage co-creation processes between government institutions and users, all with the ultimate goal of improving the quality of life and well-being. Social media applications provide a valuable opportunity for dialogic communication, enabling, at relatively low cost, the real-time dissemination of a vast amount of information to a wide audience, thus promoting citizen engagement.

In particular, social media platforms have become increasingly pervasive in citizens' daily lives, with the various content posted having a significant impact on people and their decision-making process. The irrepressible spread of social networks, including Twitter, has paved the way for new and alternative approaches to evaluation (Schwartz and Ungar, 2015). In this article, through content analysis and text mining, we focused on analyzing Italian-language tweets that make mention of "smart cities." The main objective is to delve into the topics and debates with the intent of examining semantic content and conversations related to smart cities, identifying and ranking online topics pertaining to this topic.

This multidisciplinary approach that blends the interaction between smart cities and the increasingly widespread use of social media is of considerable relevance, as it can make a valuable contribution to the development of more effective solutions and policies for the urban communities of the future.

The extracted and automatically collected data in natively digital matrices (Rogers, 2013; Caliandro, 2018) cover a six-month observation period - from 1/12/2022 to 31/05/2023 and include variables such as date, full corpus of tweets, likes, RT (YES/NO dichotomy). Although the analysis of a longer period would have allowed a more complete analysis of the phenomenon, this was not possible due to the objective limitations imposed by the API. In any case, the results that emerged allow for some noteworthy reflections. In order to proceed with the mining work, it was necessary to use text data mining operations with automatic text and content analysis techniques (Losito 1996; Amaturo and Punziano, 2013; Bolasco, 2005). It is precisely through content analysis that it is possible to identify the themes through which communication is organised and the analysis of which words co-occur in the text. Semantic annotation is an approach to making sense of abundant social media data and provides techniques and tools to infer the semantic relationships of electronic resources to enable further reasoning. There are some pitfalls in social media mining. First, text data can be difficult to classify and interpret because the data collected may not provide enough information and meaning to facilitate automatic classification. Furthermore, while coding for geographic origins may solve some limitations, not all profile accounts on social network sites contain geographic information and visible geographic information cannot be easily verified. To avoid the risk of missing relevant information, other strategies were used that better suit the exploratory nature of the objective. We extracted all tweets with 'smart city' keywords. Subsequently, the relevance exclusion methodology includes the elimination of retweets without additional information (comments), returning a set of 4706 tweets from the first extraction. Of these 1905 are tweets and 2801 retweets while, the variable for total reactions on each tweet was appropriately categorised into high reaction, low reaction and medium reaction.

Table 2.1. Count tweet/retweet.

Reaction	Count
No	1905
Yes	2801
Grand total	4706

The research phase allows, thanks to content analysis techniques and lexical correspondence analysis, the reconstruction of "a thread" of discourse in the overall plot of the representation of the smart city constituted by the

corpus or, in this case, by its subsets[3] . This analysis was carried out using the T-lab software[4], which allows a content analysis with thematic classification of the documents and, the specificity of this technique is that of constructing and exploring a representation of the corpus contents through a few thematic clusters madeup of elementary contexts described by the lexical units.

Table 2.2. Total reaction.

Reaction	Count
HighReact	430
LowReact	3769
MediumReact	507
Total	4706

The chosen analysis procedure is that of an unsupervised clustering method and involves grouping the lexical units in the list of keywords under the same root and selecting the keywords according to certain exclusion criteria by eliminating words that belong to the high-frequency rank (drop point) because they are taken for granted in the context of the subject matter (Bolasco, 2005) and words that belong to the low-frequency rank because they make noise and do not allow us to see the regularities[5].

[3] Lexical correspondence analysis (ACL) is a method of factor analysis (Amaturo & Punziano, 2013) that allows one to analyse a lexical contingency table in which the rows contain the graphic forms and the columns contain the texts by reporting in each cell howmany occurrences of each graphic form fall within a certain mode of the variables. The ACL enables three important results: the synthesis of information contained in the data, the visualisation of multiple word associations and the connection between textual dataand context data.

[4] Software consisting of a set of linguistic, statistical and graphical tools for text analysis can be used in the following research practices: Content Analysis, Sentiment Analysis, Semantic Analysis, Thematic Analysis, Text Mining, Perceptual Mapping, Discourse Analysis, Network Text Analysis, Document Clustering, Text Summarisation.

[5] This procedure involves the use of the cosine measure and clustering of the context units by means of the bisection method OK- means, the construction of a table of lexical units per cluster, the chi-square test applied to all cluster x lexical units crossings and the analysis of the correspondences of the contingency table lexical units per cluster (Benzécri, 1984).

3. Discussions

The lexicometric corpus immediately appears rich as the TTR ratio (0.057) is < 0.1 and Hapax/Type (0.445) < 0.50. The keywords were reduced from 1419 to 923. It was thus decided to perform an unsupervised clustering (bisecting kmeans) with a maximum of 10 thematic clusters and with 5 co-occurrences within the context unit. The analysis revealed 3 clusters organised in a factorial space of n=2 factors (two latent dimensions explaining t h e maximum total variance of the data).

From the groups of lemmas extracted for the polarities of the two factors, which in turn were automatically extracted following the algorithm applied by the software, the latent meaning of the representations that emerged for each factor was reconstructed.

Table 3.1 shows the most significant lemmas extracted for each factor. Factor 1, representing 53.78% inertia, encapsulates change. A change that touches Smart Cities both in a positive perception (Pole +) in terms of efficiency, mobility, pollution reduction, circulation, technology, citizens; and in a negative perception (Pole -) regarding Big Data, Digital, Innovation, Service, and Cybersecurity. According to Beck, change, evolution, and transformation are all concepts that can be summed up in one, that of metamorphosis.

"It implies a much more radical transformation, in which the old certainties of modern society break down and something totally new was born […] These 'real' uncertainties, imposed by rapid technological innovations and accelerated social reactions, are creating a fundamentally new global risk landscape. In all these new technologies of uncertain risk, we are separated from the possible and the effects by an ocean of not knowing" (Beck, 2017).

Factor 2, 46.22%, encapsulates the concept of Design which can be observed differently, again both from the + Pole, as Public Services, PNRR, Digital, Services, Sustainable, Transformation. And from the - Pole, as a Design compared among different contexts such as Europe, China, Ukraine, Italy_Politics, Germany.

The repetition of similar words from the 3 clusters analysed made it possible not to override the GAP Index and to reason on a more symmetrical logic. Thus, the words in each axis of Table 1 were interpreted to identify the dimensions of cultural space that characterize them. Three clusters were analysed as the repetition of similar words does not overwrite the GAP Index but rather allows for a more symmetrical analysis. In this way, the words within each axis were interpreted in order to identify the dimensions and cultural space that characterise them.

Table 3.1. Factor summary list of top 12 lexical units sorted by absolute contribution and percentage of inertia explained by factors.

FACTOR	**1 - 53.78%CHANGE**	**FACTOR**	**2 - 46.22%DESIGN**
Pole (+)	Pole (-)	Pole (+)	Pole (-)
Autonomous driving	Intelligence	Smart City	article
Electric vehicles	Improve	Public services	European
Circulation	Innovative	PNRR	Electric
Self Driving Cars	Services	Cyber security	Announce
Robot	Data	New technologies	EU
Pollution	Digital	Services	China
IOT	Innovation	Digital	Ukraine
Startup	Big Data	Projects	Country
Technology	Analysis	Solution	Germany
Citizens	Sustainability	Platform	Italian Politics
Mobility	Cybersecurity	Transformation	Motor
Efficient	Technology	Sustainable	Government

The number of classified elementary contexts is 4588 (=85.33%; out of a total of 5377). The clusters with the greatest weight are number 3 and number 1, with 40.1% and 33.5% of the elementary contexts classified, respectively, while cluster 2 represents 26.4%, as shown in Table 3.2.

Table 3.2: Table of clusters.

Cluster 1	**Cluster 2**	**Cluster 3**
33.50%	40.10%	26.40%

From the thematic analysis of the elementary contexts, three clusters thus emerged. Cluster_1 encompasses all the lemmas concerning sustainability, innovation, improvement and transformation, accounting for 33.5% of the analysed lemmas. Cluster_2 has a lower weight, 26.4%, and encompasses aspects concerning politics, government, countries and contexts other than Italy. Cluster_3 encompasses lemmas where topics such as pollution, traffic, IOT, startups, technology, and Big Data are addressed and have the highest weight, 40.1%, Tab 3.3. Thus, 15 characteristic lemmas emerging from T-lab are reported for each of the 3 clusters. Table 3. These are extrapolated using the Chi-square test, CHI2, a statistical test to check whether the frequency values obtained from a survey, and recorded in a double-entry table, are significantly different from the 'theoretical' (or expected) values (Rossi, 2000).

Tab 3.3. - First 15 headwords ordered by co-occurrences and χ^2.

Cluster_1 Innovation and sustainability dimension for the city and its citizens		Cluster_2 Political aspect dimension		Cluster_3 Technological Dimension	
LEMMA	χ^2	LEMMA	χ^2	LEMMA	χ^2
city	1.137.103	military	427.84	Autonomous driving	2.262.941
Mobility	945.665	article	823.997	autonomous	1.321.323
smart	648.357	details	558.755	Autonomous Vehicles	1315.17
municipality	642.178	Germany	354.917	Self Driving Cars	1315.17
Enterprise	500.582	Fincantieri	323.922	robot	1.296.719
discover	487.554	European	310.948	robotaxi	1292.62
city	487.078	EU	400.079	AVs	1.238.347
services	480.046	contraption	392.597	startup	1.180.579
digital	464.078	group	308.254	tech	1.028.434
innovation	434.831	in-depth study	271.062	technology	1.057.861
sustainable	364.875	Facts	464.938	delivery	871.755

It is possible to define an initial interpretation of the words in the factorial axes, thus identifying the dimensions within the clusters and the themes that are addressed. The first dimension, Factor 1, 53.78% inertia of the factorial space, is the factor with the most weight during the analysis. In its positive polarity, it is possible to find terms such as Technology, Startup, IOT, Mobility, Efficient; while, in its negative polarity, we find terms such as Data, Innovation, Big Data, Cybersecurity, Analysis, Improve. It is therefore possible to hypothesise how the narratives produced by the different actors relate to change and innovation and thus to technology that is new.

The second factor, 46.22 per cent inertia, seems instead to touch on issues related to Smart Cities. In the positive pole, we find words such as PNRR, Municipality, Public Administration, Mobility while in the negative pole we find the different countries China, Germany, Ukraine, European Union, Government, Italian politics.

Cluster_1 and Cluster_3 have more weight on factor 1, *Change* factor, while, Cluster_2 has more weight on factor 2, *Design,* Figure3.1. Whereas, from Figure 3.2, it can be seen that the clusters are located on quadrants that are completely opposite to each other.Examining the three clusters on the factorial plane, it is

possible to observe, how the third cluster has more weight on the first and second factors, renamed *Change* and *Design* respectively.

Figure 3.1: Factor graph.

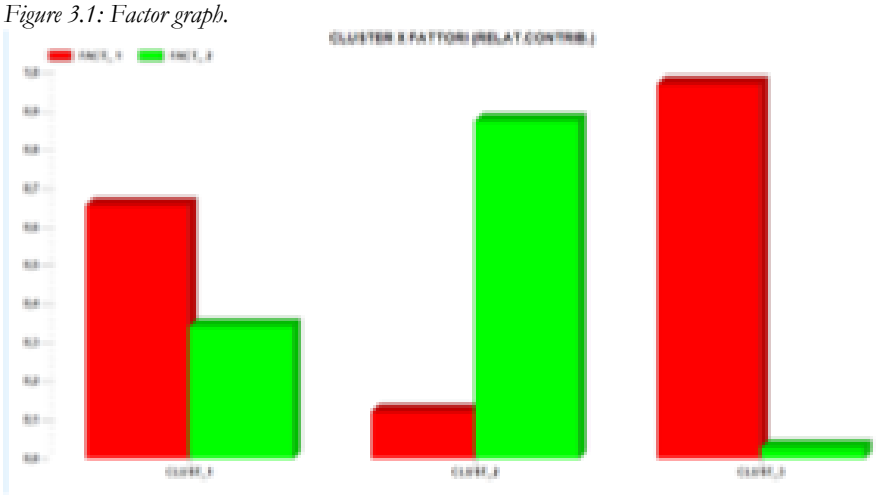


Figure 3.2: Factor axes.

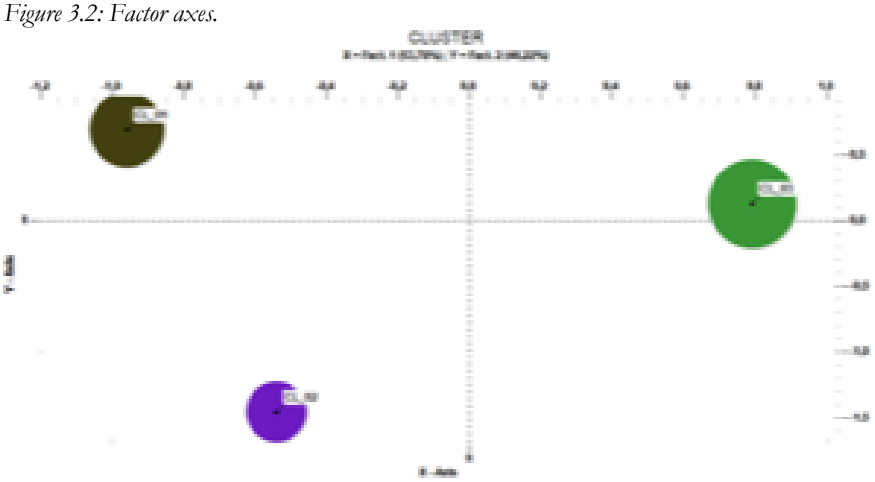
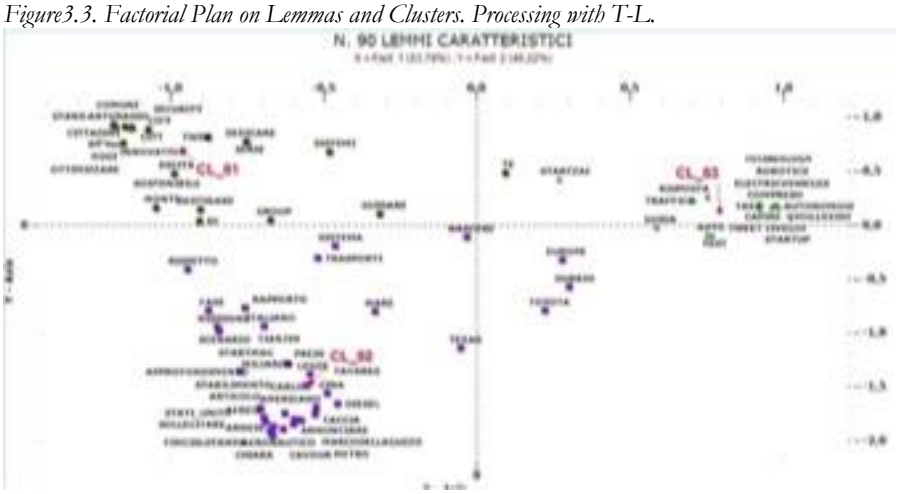


Figure 3.3 reproduces the characteristic headwords for each cluster. In this diagram, the central element of the third cluster, Technological Dimension, is the autonomy inherent in the words "car" and "test". The possibility of being able to invest, through start-ups new realities, is inherent in this dimension so clearly that it is almost repetitive with the lemmas that characterise it. Technology, Robotics, and Autonomous Vehicles are the lemmas we find. We

could hypothesise the third cluster as the Technological Dimension of Smart Cities. Indeed, this dimension is fundamental to make a city smart as it is necessary to have devices connected to the IoT, Internet of Things, to share data with municipalities and public administrations. Smart Cities use the technological dimension to improve the quality of life through the real-time transmission of data using this information to improve and/or to optimise operations useful to citizens and the services offered to them.

Figure3.3. Factorial Plan on Lemmas and Clusters. Processing with T-L.



From the Technological Dimension we move on to Cluster _1 where all the lemmas that group innovation, citizens, optimisation, and sustainability are grouped. From Cluster _1 it is therefore possible to derive the *Dimension for innovation and sustainability for the city and citizens*.

Sustainability is one of the goals of Smart Cities. The possibility of improving the environment such as reducing environmental pollution, conserving energy resources of electricity and gas, or moderating water consumption by detecting leaks or malfunctioning pipes or devices for citizens, are just some of the many operations carried out in a smart city.

Finally, Cluster_2 tends to group all those lemmas that concern a Political Dimension such as, Law, Systems, Transport, Mission, Government, Country Research carried out by the Smart City Observatory of the School of Management of the Politecnico di Milano, 3 May 2023, has shown that all Italian municipalities that have launched projects in recent years want to continue to invest in new Smart City initiatives to improve smart mobility, tourism and smart building projects. The National Recovery and Resilience Plan (PNRR), among its various missions, also includes a focus on Smart Cities. In fact, it

provides a strategic framework of reforms to be initiated by 2027 to invest EUR 750 billion. The research showed that the majority of municipalities, 69%, will use PNRR funds for the Smart City, investing mainly in digitalisation and innovation (76%), sustainable infrastructure (61%) and ecological transition (56%).

Figure 3.4. Italian municipalities seeking PNRR funds, Osservatorio Smart City, School of Management of the Politecnico di Milano.

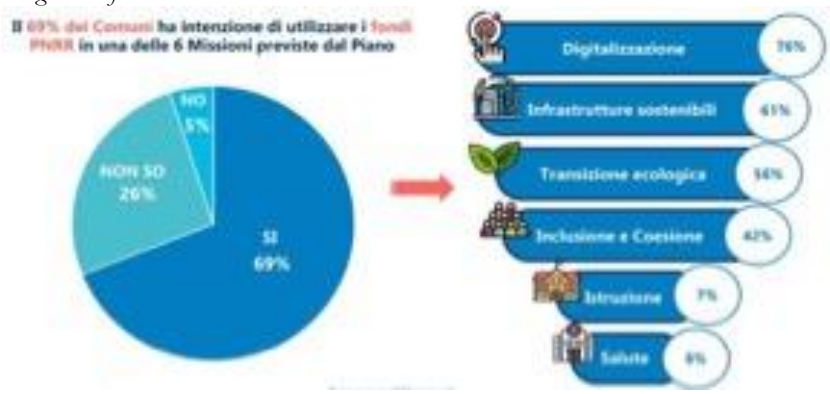


Figure 3.5. Smart City keyword associations.

Next, a radial graph, Figure 3.5 was made by associations for the Smart City concept. Interestingly, it is surrounded bylemmas such as Mobility, Technology, IOT, Startup, Transportation, Robot. The keywords surrounding Smart Cities seem to want to communicate with citizens, thus filling needs and co-existence processes among government, citizens, startups, and technology that can communicate wellbeing in the sense of Mobility and thus enable a future-oriented vision.

Now, trying to synthesise what has been said so far in order to develop prolific reflections, it is worth noting that of the three clusters created by T-Lab, the one with the most weight is the third, "Technology", the second is "Innovation and Sustainability", while the "Politics" cluster appears the smallest; this despite the fact that we are talking about the city, and therefore also a socio-political dimension. This first aspect seems to suggest the technological hegemony of the smart city discourse. The technological and innovation aspects, both in a positive and negative sense, thus hegemonize the discourse; overshadowing the social and political aspects of a place that still remains a social space experienced by individuals and regulated by norms, albeit through so-called smart tools. What has been said above helps us to frame the issue. In fact, as the results show, the urban imaginary is progressively shifting from a social space made up of individuals and socially constructed rules to a technocratic space, where it is technology, seemingly reputed to be neutral, that sets the boundaries and dictates the rules. In this new technocratic imaginary (Kitchin et al., 2017), it seems to emerge that individuals no longer perceive themselves as citizens, as actors interacting with and modifying their environment; but as guests in a space where rules are decided elsewhere and are ineffable, since they are regulated by a technology perceived, again, as neutral. At most as customers, users of paid services offered by private companies. This theory finds confirmation if we continue with the data analysis. First of all, the preponderance of the "Change" factor in the "Technology" and "Innovation" clusters signals the public's awareness of aspects that are profoundly changing the way the city and society as a whole are experienced. This theory finds confirmation if we continue with the data analysis. First of all, the preponderance of the "Change" factor in the "Technology" and "Innovation" clusters signals the public's awareness of aspects that are profoundly changing the way the city and society as a whole are experienced. However, if we delve deeper, adding the "Change" factor headwords found in the negative cluster, we realize that these are mostly related to data, once again returning the perception of a possible threat, experienced with fear and/or distrust. This should come as no surprise, echoing Beck (2000), since the late modernity we are going through is characterized by risk, risks that permeate our life horizon and that we cannot see with our eyes or touch, and often not even understand,

given the strong technological specialization required as a skill to understand many aspects of it. Therefore, not only the difficulty of understanding too specialized themes, but also the impossibility of being able to object to an artificial intelligence that uses complex algorithms, whose impartiality seems to be guaranteed by the fact that they do not have human weaknesses but reason according to rules governed by numbers such as to render them ineffable; and that they are not physically identified in a single and easily identifiable entity, but which in fact is invisible and permeates the entire urban space; they can fully be among the risks of late modernity of which Beck speaks. This creates unease, fears and contributes to radicalising public discourse. What has emerged, therefore, draws a well-defined scenario, and helps to clarify the discourse around the Smart City. In this regard, as mentioned above, this is an initial exploratory work; but for the future, it would be interesting to develop the research along two main lines, on the one hand extending the temporal factor and then, by finding a way to overcome the objective limits imposed by Twitter's policies, to return an analysis that can monitor how the public discourse on social networks has changed over the years. Lastly, the spatial issue: a comparison could then be made among the results that emerged from the Italian sample and those of other European countries, in order to understand whether this phenomenon specifically concerns the Italian context or whether it represents a problem for European citizens as a whole. By cross-referencing the two lines of enquiry, an exhaustive overview of the public discourse on this topic could emerge, which could offer several advantages. First of all, a greater awareness of past and present perceptions regarding the smart city, so as to set up a more transparent narrative and even try to resolve the critical issues reported, consciously or otherwise, by Italian and foreign citizens.

4. Conclusions

The possibility of imagining a smart city today is increasingly common not only for large cities but also for small ones. "In fact, 'harnessing' clean energy is one of the privileges chosen in terms of both costs and benefits to make cities increasingly 'smart'".

The analyzed text offers a rich and detailed overview of the dynamics associated with the smart city concept and its representation in the collective imagination. The preponderance of the technological aspect in the discourse on smart cities clearly emerges, with technology often taking a central role in determining urban and social dynamics. While this technological emphasis can

lead to obvious benefits in terms of innovation and improved well-being, it also seems to obscure crucial social and political aspects of the urban fabric.

However, it is evident from the results that very often citizens remain sceptical of smart city governance. The use of Beck's reflections on the 'risk society' is particularly useful here, as the tools that technology makes available to manage the city are incomprehensible to most and are also invisible in everyday life. The individual is aware of its existence, but struggles to touch its results. Further confirming this thought is the attention given in public discourse today to the dangers of artificial intelligence, which often reaches apocalyptic peaks.

The perception of technological hegemony in smart city discourse suggests that individuals may perceive themselves less as citizens and more as guests in a space governed by technological rules perceived as neutral. This scenario is further complicated by the complexity and inscrutability of technology, which can generate uncertainty and fear among the public.

Fear and mistrust that technology is beyond our control add to the other dangers of late modernity: global warming, viruses, nuclear holocaust. They give form and substance to the risk society evoked by Beck, fueling a state of constant and profound uncertainty that previous eras had never known.

The relevant theme of "Change" emerging from the data reflects public awareness of the profound impacts that technology and innovation are having on urban life and society. However, the presence of keywords associated with "negative" change suggests a perception of threat or uncertainty related to technological transformations, leading to a climate of concern.

The Agenda on New Public Governance stated that for socio-cultural change it is necessary to involve citizens to improve government actions (Bingham et al., 2005). Therefore, following what was said at the beginning of this paper, and bearing in mind the need for the city-system to protect its citizens first and foremost, it may be necessary to involve citizens themselves more in urban governance; first and foremost through clear and comprehensive information on what the smart-city is, what tools it uses and what the possible risks are.

City dwellers must be able to express themselves in an informed manner, so as to allow for true dialogue through active citizen participation tools (Robbins et al., 2008).

Confirming the above, what seems to emerge from the sample analysed is still, albeit to a lesser extent, the difficulty of being able to imagine a relationship among technological development, citizens and cities that can safeguard cybersecurity and give a total sense of confidence in becoming a 'smart city'. Indeed, what emerges from the results (albeit to a lesser extent) is the need for

a comparison between different policy contexts and relatively recent and evolving technological and innovative dimensions.

This is also reflected in the United Nations' Agenda 2030, which states in point 11: "by 2030 enhance inclusive and sustainable urbanization and capacities for participatory, integrated and sustainable human settlement planning and management in all countries".

Although the data analysis represents a first step, it suggests the need for further long-term research to understand how public discourse on this issue is evolving over time and how these perceptions influence urban policies and public participation. A further interesting perspective would be to compare Italian perceptions with those of other European countries to assess whether the observed dynamics represent a specific feature of Italy or reflect a broader trend in Europe.

In summary, this exploratory study provides a solid basis for further research and reflection on the transition to smart cities, emphasizing the importance of considering both technological and social and political aspects to ensure an equitable and sustainable urban future.

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