# Smart City - A new concept of green and technological city - A survey will explain the differences between two countries with a different vision of these cities

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## Abstract
**Objectives** The search for the meaning of the term of the new cities called "Smart City". **Approach** the search for articles that explain the meaning of smart cities and offer an explanation of this term. A survey is useful for understanding if the population of a nation knows these new cities, and what they think of them. **Results** Several authors speak of smart cities and therefore different definitions of these cities can be found. to overcome this, six characteristics have been identified, which have been accepted by all. From the answers of the survey it can be observed that smart cities are known by almost all the population of Italy and Norway.

**Keywords:** SmartCity, Six characteristics, survey, Italy, Norway.

## 1. Introduction
The city is the center of life for most people and has undergone, throughout history, changes and developments parallel to the progress of civilizations.

The city has changed considerably in the last hundred years and the biggest change has occurred with the appearance of metropolitan cities, where the most advanced technologies of their historical moment were present.

Someone can think about New York, in the early 1900s, where trams and the subway were made to counteract the intense traffic of the city. At the same time, in almost all the rest of the world, people who owned a car were very few.

From 1900 to today the concept of city has evolved further thanks also to globalization which is making uniform the idea of the city, which thanks to the internet can remain connected with all the other cities, thus breaking down every border of communication and knowledge.

Nowadays, efforts are being made to change the look of the metropolitan, chaotic and polluted city. The rulers, the population and the planet itself need a new type of city that is both sustainable and technological and the Smart Cities offer a model that responds to these needs.

It is possible to find many definitions of Smart City on the web and all of them have in common thetechnology and the environmental sustainability.

To cope with a different conceptions of these new cities, six useful characteristics have been widely shared to identify smart cities: economy, population, government, mobility, environment, livability of the city in Smart terms.

It is also interesting to be able to find out what are the features of the Smart cities and its fundamental elements according to the population of two nations with a different lifestyle, such as italians and norwegians.

## 2. The Smart Cities

To date there are various types of cities: as the garden cities, which are "surrounded by greenery" [1], the green cities, which are committed to respecting the environment, the digital cities, highly technological, and the smart cities which contain the characteristics of the cities previously mentioned.

The term Smart City refers to a city that uses the most advanced technology to achieve a high quality of life to make the environment more interactive and the services more efficient, under the dual technological and ecological point of view .

The concept was born with the aim of giving rise to sustainable cities [2] that undertake urban development using information and communication technologies giving life to authentic "innovation ecosystems"[3].

There are many definitions of the Smart Cities and some are particularly interesting, such as the one referred by Dameri, which defines a Smart City as "a well-defined geographical area in which technology cooperates with the government to create benefits for citizens in terms of well-being, inclusion and environmental quality "[4] and it is inhabited by people who use digital tools every day.

With this definition it is possible to understand the main theme of technology and well-being within a Smart City, and it is this feature that makes these cities so coveted. In a world where technology is at the center of every person's daily life, being able to live within a highly technological city undoubtedly attracts the attention of many people.

Smart Cities have recently been introduced as a strategic tool that includes modern urban planning systems "underlining the importance of information and communication technologies to improve the competitive and qualitative profile of a city" [5]. Not only the features related to technology and innovation are taken into consideration, but the "human" aspects of life in the city are also incorporated. This concept can be considered as a new government approach to planning a city that sees the urban area as a socially equitable environment with sustainable development goals [6].

However, "the tendency to believe that the use of innovative technology automatically transforms a city into a Smart City is a distorted use of the term" [7]. Smart Cities go beyond the technolog; it has to be used in an ecological key aimed at the well-being of the population. Smart could hardly be called a city with a low urban green, with traffic problems and emissions beyond the limits set. The city can be called Smart when it will solve these problems with the help of technology

## 3. The six characteristics of a Smart City

The Smart cities model contains within itself something that other cities do not have, that is, the notation by the inhabitants of the existence of this reality, to be part of it and the incentive to strive to improve it. In a Smart City, the government and the inhabitants collaborate by creating a Smart Governance, in order to obtain a peaceful, pollution-free and highly technological environment, inserting cutting-edge public and private transport services and infrastructures.

Smart Cities present new technologies to offer inhabitants a quality of life from a sustainable, technological and social point of view. The promotion of technology, innovation and a high quality of life is based on six fundamental factors that make a city intelligent, namely the economy, the inhabitants, the government, mobility, the environment and the quality of life. These six characteristics are accepted and shared by most of the literature and represent a city that can be defined as Smart when it shows positive performance in these areas and when it is managed on the basis of an "intelligent" combination of these elements and on related activities of citizens. management through participatory governance.

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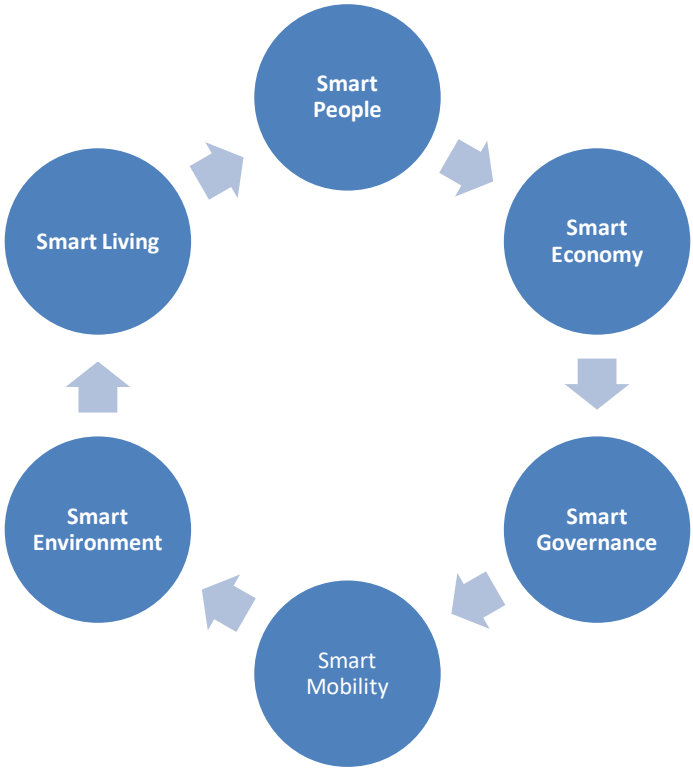


Fig. 1. (a) The six characteristics of the Smart City.
*Source: own processing.*

### *3.1. Smart people*

Smart People can be called as the most important element of a Smart City. It refers to "Smart people in terms of skills and educational levels and based on their ability to open up to changes in the world" [8]. Education and training are the key elements in the development of cities and having well-educated citizens certainly increases the heritage of the local community.

Smart Cities are also those cities where urban services are made simple and responsive to the new needs of the population through technology.

Citizens are no longer just the inhabitants of the city. Their relationship with urban activities changes here. They are encouraged to see the city as a place where they can be a part of it, in which they can customize and interact with, so that their city is an efficient and interactive place as they would like it to be [9].

According to the German IT company "Bee Smart City", Smart People are adopting a new approach to interacting with the public and private sector through digital technologies. In a city that wants to offer services based on new technologies, digital inclusion becomes an important prerequisite as much as social inclusion. The urban strategies supported by the concern the creation of an accessible and inclusive environment aimed at increasing prosperity and innovation within the city. The participation and creativity of the population are fundamental aspects that feed the creation of Smart solutions [10]

A smart city can only exist when the people who live there really want it. They must research the Smart services and lifestyle that this city has to offer. Smart People are the central element of Smart cities because without a population that welcomes and invests in new technologies and demands from the public administration technological and ecological projects and services, you can never have a Smart City.

### *3.2. Smart economy*

The Smart Economy refers to the use of communication and information technologies in the production process by companies and to the enhancement of human capital for the economic progress of the city. It also concerns programs in support of entrepreneurship and for the promotion of innovative industry and commitment to internationalization by addressing effective strategies for establishing global partnerships.

Preserving talent and promoting creativity is essential for a Smart city. In fact, having a high know-how is fundamental in order to be more competitive. These new cities need educated, creative and entrepreneurial citizens [11]. And it is for this reason that many cities, or regions, have developed various initiatives to retain young talents in their territory.

In addition to trying to attract and retain talent and promote entrepreneurship, Smart cities must also have infrastructures to support commercial activities in their territories, for example with science or technology parks and with business incubators.

As far as internationalization is concerned, it consists in the implementation of effective strategies for the creation of global partnerships. These are strategies aimed at strengthening the value of the territory and which take measures aimed at achieving a model of sustainable development [12]. Smart cities are increasingly aware of this need and the proof of this is that most of them have developed a strategy for promoting such initiatives, which include organizing international events and promoting twinning or agreements. with other cities outside national borders.

When the government of a city facilitates companies to become more familiar with the advantages offered by a Smart environment, they can collaborate more with public bodies or with other companies to improve each supply chain in the production chain with the use of technology; from reducing costs in the supply and production phases, to innovation in production, to offer new technological tools to the community and at lower prices.

Ultimately, the Smart Economy includes all actions relating to the enhancement of the economy of the individual city and the country to which it belongs. Smart economy management offers favorable conditions for businesses and stakeholders. Economic development is fundamental for the creation of new businesses and for the progress of existing ones, as well as for increasing employment [13].

### *3.3. Smart governance*

Smart governance refers to a political participation by citizens, aimed at obtaining a smart city government. It also includes the use of the new communication channels by the public administration. The main functions concern the possibility of communicating via the city app with all public offices, receiving advices and requesting documents online so that citizens no longer have to physically go to the municipal offices.

Several Smart Cities have created apps that allow the entire population to offer suggestions and collaborate with the government in order to create a competitive Smart environment.

New technologies can be used also to promote the innovation of the city; therefore investments in ICT as well as being fundamental in a Smart City, represent an opportunity to improve its development through a functional management of public administrations. This significantly improves the productivity and quality of public utility services offered to citizens and businesses. Furthermore, the government of a Smart City must try to promote the importance of ICT [14] in order to be able to innovate relations between the public, businesses and citizens.

Smart Governance, or Smart Government, concerns all concrete actions aimed at enhancing the cooperation between government and stakeholders. The government of a Smart City must pay more attention to the quality of its work and the whole population must actively participate in the decisions of the city.

### *3.4. Smart mobility*

Smart Mobility “focuses on increasing the efficiency and service quality of urban transportation” [15] by updating new cutting-edge solutions and investing in new transport

structures . In this way, the Smart city will be able to achieve the goal of obtaining a cheaper and faster mobility service which will also respects the environment.

Managing urban mobility is a fundamental target of a Smart City. The benefits guaranteed by reducing the road congestion with the help of technology [16] can have significant effects on the air quality of the city and that can be immediately visible.

Smart Mobility is also one of the most tangible aspects of a Smart City. It shows the technological level and skills reached by the city's stakeholders.

Looking at first Smart Cities in the rankings of the best Smart Cities in the world, it is possible to see that them have some revolution in mobility and in the public transport services, in which there is a high competence from the government and of the companies that work transport sector.

A fundamental element of Smart Mobility is the public transport at the international level as it more easily connects the city with the rest of the world and it facilitates the evolution of commercial exchanges which increase the economy of the city itself.

A slightly advanced image of Smart City sees transport in these totally revolutionized cities where there are no longer the busy streets as we know them today.

The tree-lined pedestrian and cycle infrastructures predominate and involve the place of long streets congested by traffic. Public transport continues to exist and it is more efficient to cope with all journeys. Online shopping deliveries are used through robotic delivery using small driverless electric cars or through drones, which eliminate the delivery vehicles.

Some of these revolutions have already been reached or experienced by several Smart Cities. Some like Oslo have reduced selected private car abuse for some years by promoting the abuse of two wheels. However, the cars in these cities are almost all electric and have a significantly lower impact on noise and air pollution. The municipality of Oslo is also working to totally eliminate the use of any cars [17], including the electric cars. The goal of this city is decidedly ambitious, even if, as demonstrated by the commitment to carry out its Smart projects, it will certainly be able to reach its set goal.

A revolution in the field of public transport is given by self-driving buses that have relatively recently made their entry into the most technological cities. Stockholm is one of the first cities in the world which has granted self-driving buses to travel on public roads [18].

Talking about the self-driving vehicles it is possible to see some cities that have accepted the initiatives of innovative companies and have offered them the availability for testing within the city of small electric vehicles with autonomous driving provided for deliveries of items purchased through e-commerce.

It is not possible to know how these innovations will evolve, and what will be next. Everything will be defined according to how people welcome new technologies and which cities will feel ready to manage new modes of life.

### *3.5. Smart environment*

The Smart Cities mission is to solve city problems by finding technological solutions and also by getting support from the community. A Smart environment refers to the use of new technologies to improve the environment of a city [19], to make it more welcoming and safer.

Smart Cities are characterized by the security of its territory and by people's trust in their city, by the use of ICT to improve public safety, by a culture and social identity promoted by public administrations.

In a Smart environment, the pollution is carefully managed in order to reduce the emissions. A careful management of water resources is carried out and a better waste management is sought in order to achieve a zero impact on the whole territory of the city.

Smart Cities offer residents, visitors and all interested parties a quality of life that meets their needs and desires. It implies that these cities are involved in a mechanism of continuous improvement and adaptation to technological progress in all aspects of the daily life of the people who live there. In this way these technological cities offer a new life experiences, new infrastructures and new ways of interacting with the external environment.

### *3.6. Smart living*

Smart Living includes actions aimed at substantially improving the quality of life of citizens within the city, integrating actions that deal with the improvement of private homes and public health services.

When a city introduces digital services within healthcare, we can speak of "e-Healt". It is the adoption of new technological tools for the diagnosis and monitoring of the health status of patients [20].

Smart Living also includes social and digital inclusion. A Smart City is committed to "eliminating the digital divide between people, that is, the gap between those who use information and communication technology as a normal activity of their day and those who do not have access to it or do not know how to use it" [21]. A Smart City must launch social inclusion programs, so that all its inhabitants can have the same study and job opportunities. It must promote digital inclusion programs as free lessons on the use of digital devices aimed at people at risk of exclusion.

The Internet has revolutionized the way we interact, learn and relate to others, to such an extent that today it is difficult to imagine everyday life without its presence.

As a response to the growing use of the internet and users' needs, many cities have increased the areas of high-speed internet coverage in their territories, up to 100% of the municipal area [22]. These high percentages are justified by the use of smartphones that have become part of the lives of most people and more and more users are requesting a fast internet connection.

To meet these needs, most Smart cities have installed free WiFi hotspots, in the most popular areas of the city, with the aim of extending digital services to all citizens.

## 4. The survey

To further investigate the concept of Smart Cities, it may be useful to find out what are the features that distinguish them to other cities and the fundamental elements according to the population of two nations with a different lifestyle, such as the Italian and Norwegian populations. In this way it was possible to compare the thinking of people living in an area where the concept of Smart City is more oriented towards the green and the environment, with the thinking of a population in which the development of Smart Cities is more aimed at technological progress.

Two Surveys were organized, one for Italy in Italian language and one for Norway in Norwegian language. Both surveys were disseminated through social networks.

Norway was chosen because it is one of the countries where there is greater attention towards Smart issues and where it is possible to find many cities that obtain excellent results in Smart Cities rankings.

### *4.1. Data Analysis*

Three hundred respondents were reached in both questionnaires. There were eight questions, the same for both surveys. The first four questions were used to classify the population and the last four are related to Smart Cities.

The first question concerns the gender. In Italy the 43% of men and the 57% of women answered and the 55% of men and the 45% women in Norway.

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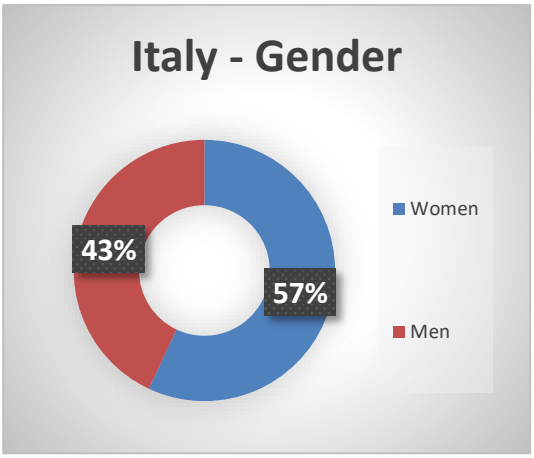


Fig. 2. (b) Distribution by gender of Italian sample.
*Source: own processing.*

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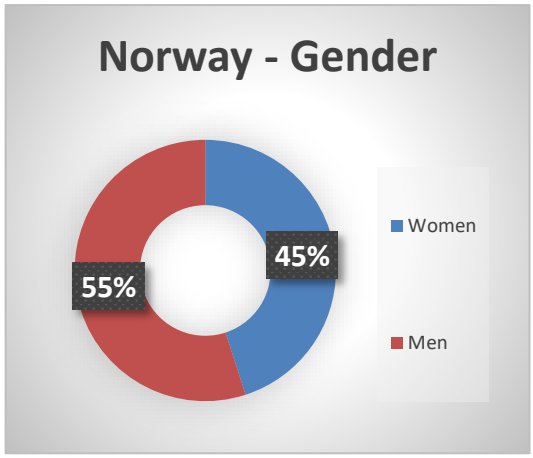


Fig 3 . (c) Distribution by gender of Norwegian sample.
*Source: own processing*

Although the survey was proposed to the whole population, there was a very large percentage of respondents aged between 18 and 30 (the 55% in Italy and around the 45% in Norway). The 30% of the population is aged between 31 and 50 and about 15% is aged between 51 and 65 in both Italy and Norway. The biggest difference was found in the age group of the population over the age of 65, which was only 1% in Italy and about the 10% in Norway. This figure could be due to a greater use of the internet and social networks by the Norwegian population belonging to this age group compared to the Italian one.

The category under the age of 18, about the 1% responded both in Italy and Norway.

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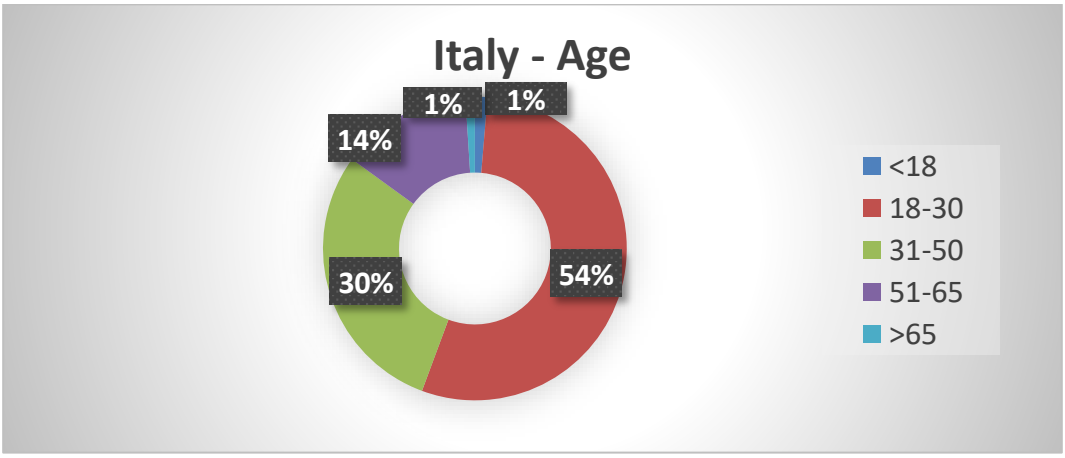


Fig. 4. (d) Age distribution of the sample of Italy.
*Source: own processing.*

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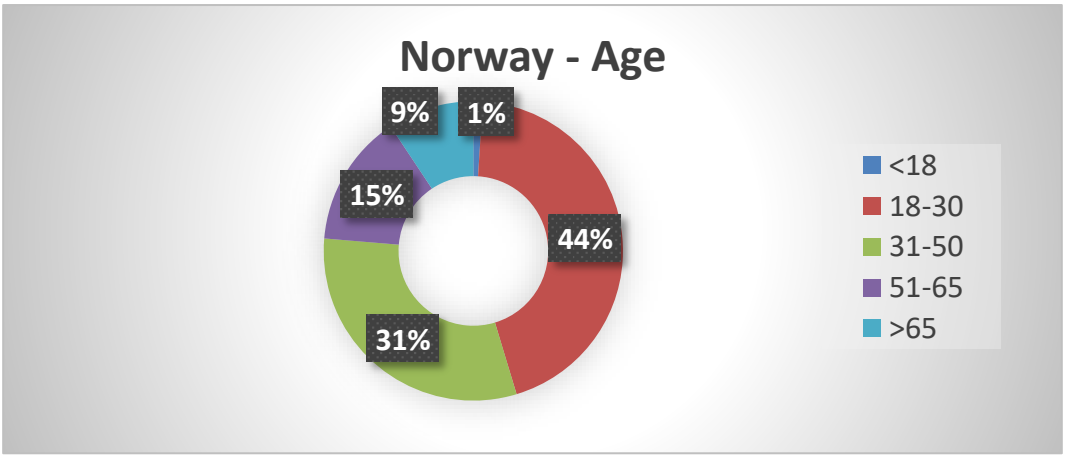


Fig. 5. (e) Age distribution of the sample of Norway.
*Source: own processing.*

As for the qualification, both in Italy and Norway most of the interviewees have an university degree. The 75% of Italians are university graduates and the 80% in Norway. The 15% of Italians have a high school diploma and Norwegians about the 10%. The 10% of Norwegian respondents and the 11% of Italians have at least a Master's or Doctorate degree. The 1% of Italians and Norwegians left school before graduation.

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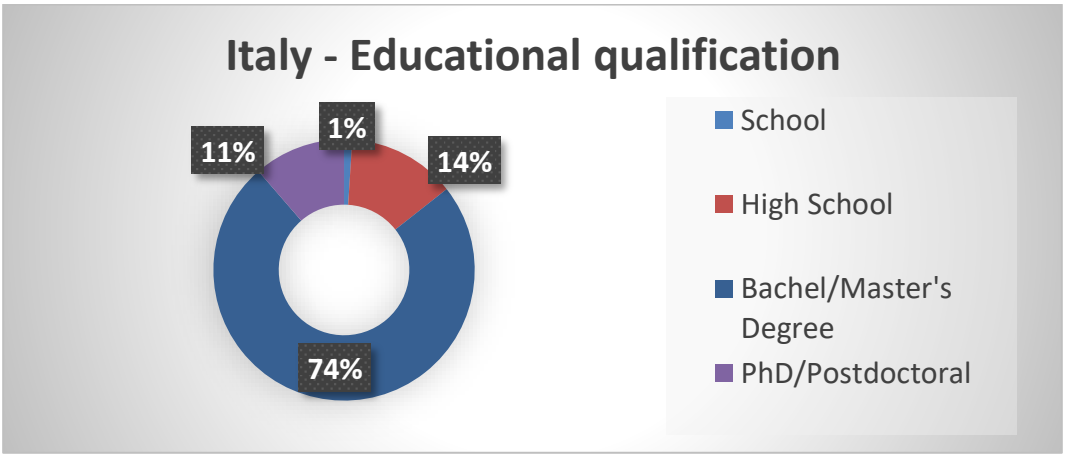


Fig. 6. (f) Distribution by educational qualification of the sample of Italy.
*Source: own processing*

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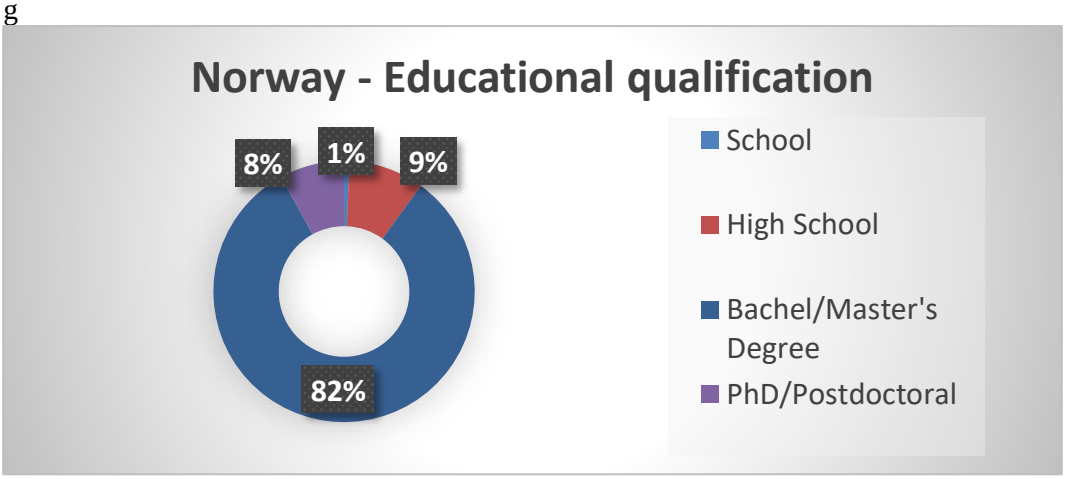


Fig. 7. (g) Distribution by educational qualification of the sample of Norway.
*Source: own processing*

Looking at the answers about the employment, both classes in Italy and Norway achieved a predominantly higher response rate than the others. It is the class of public or private employees (the 36% in Italy and the 38% in Norway) and the class of students or researchers (the 34% in Italy and the 38% in Norway). The 10% of both Italians and Norwegians belong to the class of entrepreneurs. The class of farmers / artisans includes the 5% of Italians and the 3% of Norwegians. In both countries only the 1% claimed to be a musician or an actor. The 11% of respondents in Italy are self-employed and the 9% in Norway. The 3% of Italians and the 1% of Norwegians said they were unemployed.

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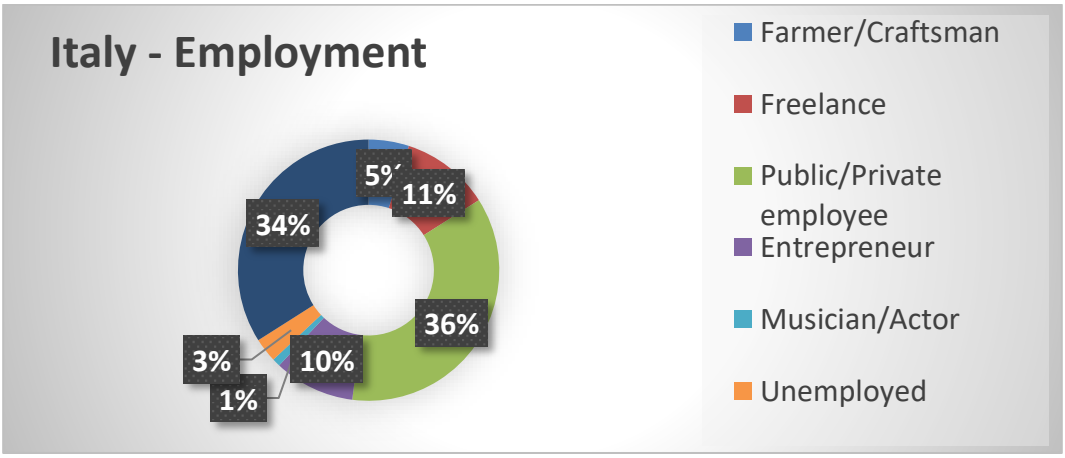


Fig. 8. (h) Distribution by employment of the sample of Italy.
*Source: own processing*

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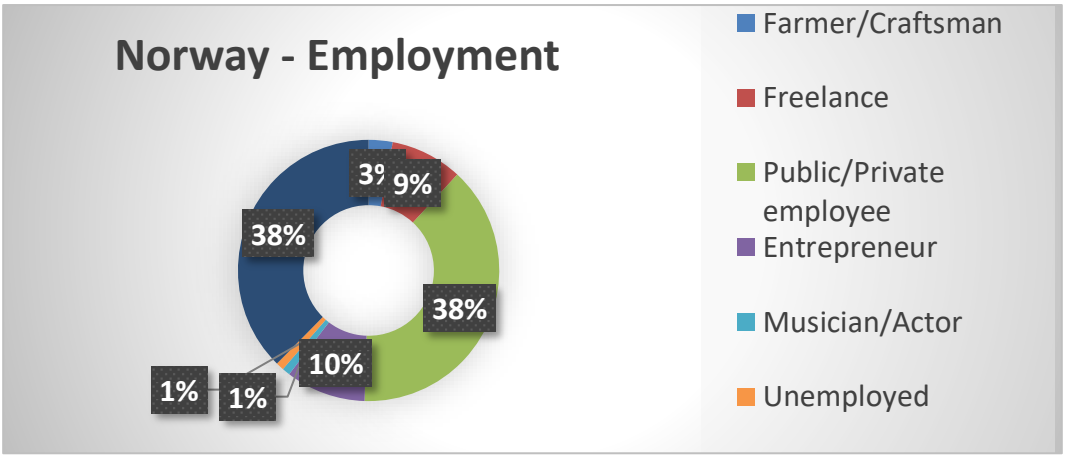


Fig. 9. (i) Distribution by employment of the sample of Norway.
*Source: own processing*

As for the questions related to Smart Cities, respondents were asked if they know this type of city. In Italy about the 78% said they know them and in Norway the 98%. Therefore, almost all Norwegian respondents know Smart Cities and a large percentage in Italy.

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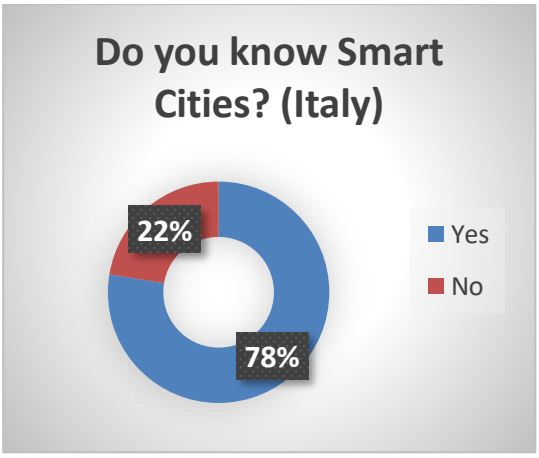


Fig. 10. (l) Knowledge of Smart Cities of Italian sample.
*Source: own processing.*

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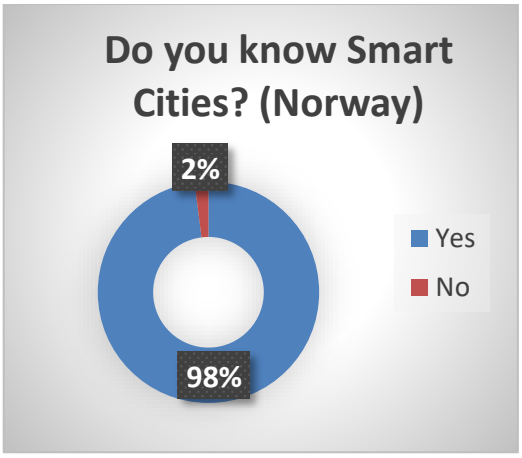


Fig 11 (m) Knowledge of Smart Cities of Norwegian sample.
*Source: own processing*

Subsequently, it was asked which is the smartest city in the world. As for Italian respondents, 44% say Oslo is the smartest city in the world and around 20% have chosen New York. Another 20% of Italians believe that London is the best Smart City. About 10% chose Milan and a small percentage Copenhagen, Paris and Tokyo. Regarding the answers obtained by the Norwegians, most of the interviewees (about 80%) said that Oslo is the smartest city in the world and a small percentage opted for Londa and Tokyo.

This question required an open answer and no particular city was suggested. It is interesting that the answers obtained are concentrated on Oslo and a few other cities.

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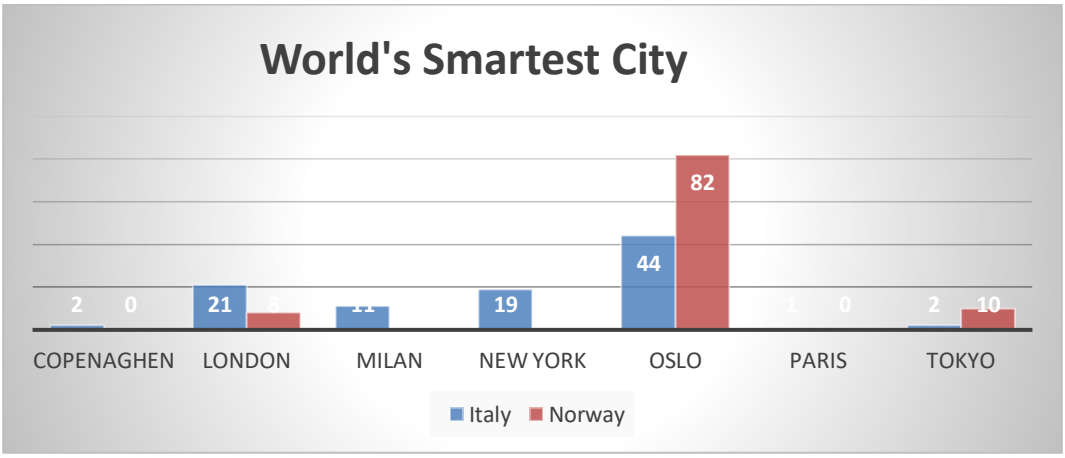


Fig. 12. (n) World's Smartest City.
*Source: own processing*

Subsequently, two questions were proposed to analyze what are the most important features that characterize these cities for the Italian and Norwegian population.

Through the question: "What are the features of a Smart City", six multiple answers were inserted which each contained one of the six characteristics of the Smart Cities (the economy, people, the government, mobility, the environment and the quality of life) and the respondents It was possible to choose more than one answer.

For the 94% of the Italian population, mobility is a feature of Smart cities and for the 91% also mobility. About the 60% of Italians have also chosen the economy, people and the environment. It seems that the government is not so important in determining a Smart City, in fact only the 23% have selected this answer.

In the responses obtained by the Norwegian population it can be seen that for the majority of respondents (99%), the mobility, the external environment and the quality of life of a city are characteristics of a Smart City. The97% chose the people category and the 96% the government. The economy does not seem to be a feature of these cities for the Norwegian population, in fact, as it can be seen from the graph only the 37% have chosen this option.

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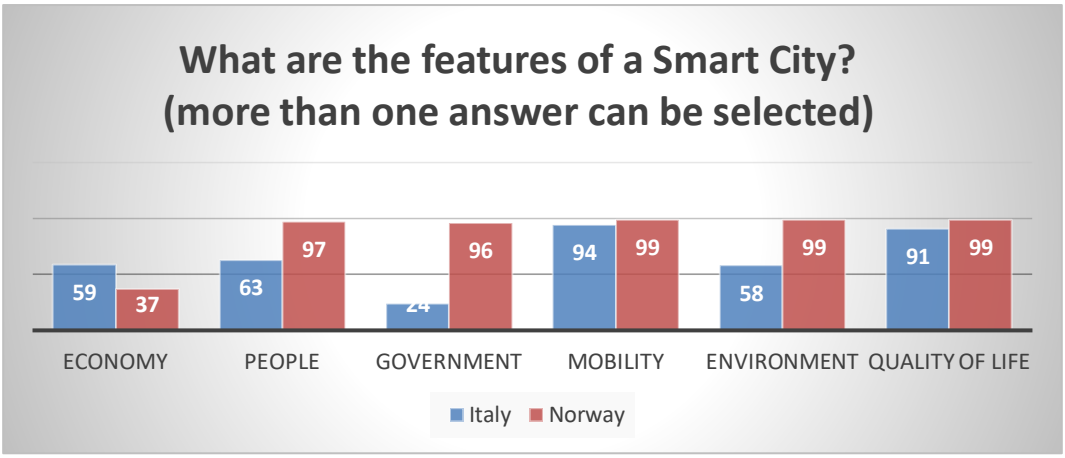


Fig. 13. (o) Features of a Smart City for the sample of Italy and of Norway.
*Source: own processing*

To understand better what are the fundamental elements of a Smart City are for the Italian and Norwegian population, another question has been proposed, more specific than the previous one, with nine multiple answers, each containing nine elements found mostly in the Smart cities analyzed.

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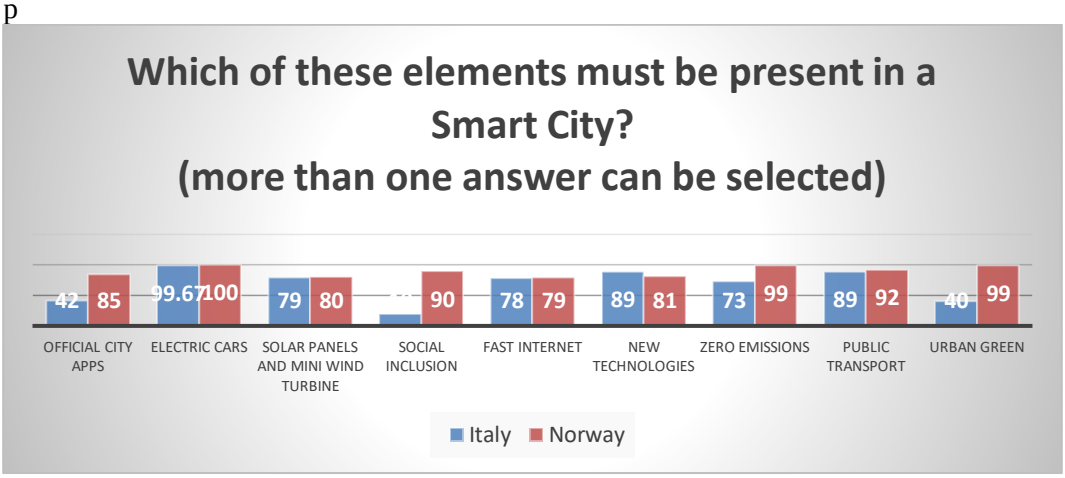


Fig. 14. (p) Elements of a Smart City for the sample of Italy and of Norway.
*Source: own processing*

Looking at the answers obtained, it is possible to notice similar percentages of answers regarding the presence of electric cars, which are important for almost the 100% of Italians and the 100% of Norwegians. The presence of fast internet and efficient public transport are fundamental for about the 90% of both Italians and Norwegians.

The official city apps and urban greenery have been chosen by less than half of the Italian population. Instead, the 85% of Norwegians think that city apps are important for a Smart City and the 99% of urban green must be present in these cities.

Social inclusion does not seem to be particularly important for Italians, in fact only the 19% have chosen this element, while the 90% of Norwegians consider it characteristic.

With regard to the presence of solar panels and the mini-wind turbine and the presence of new technologies, approximately the 80% of the Italian and Norwegian population believe that these elements must be present in a Smart City. Furthermore, these cities must have zero emissions for the 73% of Italians and the 99% of Norwegians.

In the face of all the answers obtained, it can be said that technology and mobility are more important for the Italian population to determine if a city is Smart. These factors are also important for the population of Norway, which however considers elements that concern sustainability and the environment above all important.

## 5. Conclusions

The cities have existed since mankind began their social life and have progressed through commercial exchanges between different populations. Following globalization, most cities in the world are connected via immaterial networks and can exchange information with great simplicity, progress and help each other in technological development.

Today it is possible to observe some types of cities that have shown interest and commitment to greenery and the environment, and others that have shown a greater commitment to digital technologies. A new type of city includes all these features and it is called “Smart City”.

This term has been widely used in recent years to such an extent that it is not easy to find a single definition for this type of city. To face this problem, the six features that let a City became “Smart” have been accepted: the economy, people, the government, mobility, the environment, livability.

A survey about Smart Cities was useful to know the knowledge of Smart Cities in the population of Italy and Norway. Almost all Norwegian respondents and around the 80% of Italian respondents said they know these cities. Most of the Italians interviewed argue that technology and mobility are the fundamental components of Smart Cities. Just like the city of Oslo that has committed itself to the issue of environmental sustainability using cutting-edge technologies, Norwegian respondents said that the well-being of the environment and the population are fundamental for a Smart City.

Taking into consideration the data obtained from the last question of the survey it is possible to find out which elements present in the Smart Cities are more important for the population and it is thus possible to build a Smart City model that comes closest to the expectations of the population because as has been said , people are always the fundamental element of a Smart City.

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