How can the Fédération Internationale de l'Automobile attract the general public to their FIA Smart Cities initiative?

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by

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Executive Summary

In collaboration with the Fédération Internationale de l'Automobile (FIA), the governing body of motor sport, this thesis searched to give recommendations on how to attract the general public to their global FIA Smart Cities initiative. Currently, the participants of the three yearly events linked to the initiative are limited to attendees from the public and private sector. Representing the main users of smart mobility, the general public should however be one of the most important components of an initiative promoting just this, smart mobility.

Based on secondary and primary research as well as the analysis and participation of past FIA Smart Cities events, some recommendation could be given to the FIA. The recommendations were created based on a Design Thinking approach, putting the end users in the center of the analysis. Having chosen Paris as showcase city, Parisian residents represented the general public the recommendations given were based on.

The recommendations were split into three subsections: Communication, Content and Structure. In the first section, this thesis recommended the FIA to integrate a digital communication strategy in order to spread awareness of the event. In this prospect, the utilization of the social media platforms Instagram and Facebook were found to be the most appropriate. Furthermore, the cooperation with influencers and ambassadors was recommended as well as the elaboration of partners and sponsoring of the event.

The second section searched to ensure that the FIA Smart Cities event covers the topics perceived as the most important and urgent in the eyes of Parisian residents in terms of mobility and transportation. Three topics could be recommended, touching the public transportation, road safety and the inclusion of minorities.

Finally, it was found that the structure of the event needs to be adapted in order to be attractive in the eyes of the general public. It was recommended to stay with physical events but to plan much more interactive exchange sessions, digitalizing a part of the sessions. In addition, it was found that a lot more entertainment and animation content need to be added in order to sustainably attract the general public. This adds a fun part to the event, creating unforgettable experiences. In order to enhance the above recommended main three topics of the event, this thesis recommends to plan the experience part in line with those topics.

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Abbreviations

FIA	Fédération Internationale de l'Automobile
UN DESA	United Nations, Department of Economic and Social Affairs
IMD	International Institute for Management Development
SUTD	Singapore University of Technology and Design
CIMI	Cities in Motion Index
IESE	Instituto de Estudios Superiores de la Empresa (Institute of Higher Business Studies)
UN	United Nations
SUMP	Sustainable Urban Mobility Plan
PPMC	Paris Process of Mobility and Climate
DLV	Digital Leader Ventures
IoT	Internet of Things
B2G	Business to Government
SCEWC	Smart City Expo World Congress
H.S.H.	High Serene Highness
MaaS	Mobility as a Service
INSEE	National Institute of Statistics and Economic Studies of France
LGBTQ	Lesbian, Gay, Bisexual, Transgender and Queer or Questioning
GDP	Gross Domestic Product
GDP per capita	Gross Domestic Product per Capita
ICCA	International Congress and Convention Association

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1. Introduction

1.1 *Structure of the Thesis*

This report will start with a brief presentation of the partner organization "Fédération Internationale de l'Automobile", followed by a short overview of the concept Smart City. These theoretical explanations will then help to better understand the core of this thesis, the FIA Smart Cities initiative. This initiative, executed through several events per year, searches to encourage exchanges and discussions on the topic of smart mobility, with the idea to generate ranges of mobility solutions that then can be implemented by cities. Currently this initiative brings together mobility experts, public authorities and industry players but leaves out the general public. This thesis searches to change just this. The general public being the main users of mobility all around the world, inevitably need to be included in this kind of initiative to ensure tackling relevant subjects and suggesting pertinent solutions. In order to ensure just this, this thesis aims to respond the following question:

How can the Fédération Internationale de l'Automobile include end users in their FIA Smart Cities initiative?

After having given a general overview of the most important concepts for this thesis the research objectives and expected outcomes will be explained in detail. Then, the secondary research will be introduced. The secondary research will introduce two Smart City indexes aiming to point out current mobility issues of the chosen showcase city Paris. Then, the past FIA Smart Cities seasons will be outlined and explained, in order to maximize the reader's knowledge on the current FIA Smart Cities initiative.

The third chapter methodology will then introduce the analysis part of the thesis. After having gained an overview on how the FIA Smart Cities initiative run off up until now, new possibilities have to be explored in order to make the events attractive for the general public. In this prospect, first and most importantly accurate and relevant discussion topics have to be chosen. In order to determine pertinent subjects it will be reverted to the two Smart City indexes introduced in the literature review. The in-depth analysis of those indexes on the showcase city Paris will enable to determine some of the main pain points of the city. In order to confirm that those pain points are also perceived by the general public as most urgent challenges, primary researches will be

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conducted. Those primary researches also have as goal to split the defined pain points, if confirmed, into more specific challenges faced by the general public in their everyday life. In this way, several specific pain points should be determined, which will then be ranked according to their attributed priority. Based on this ranking, the as most urgent perceived challenges by the general public can be determined and implemented in the FIA Smart Cities initiative. Choosing an as important and urgent perceived challenge as topic for the FIA Smart Cities initiative serves as foundation stone of gathering the attention from the general public.

However, not only the topic definition counts as important when wanting to integrate end users in an initiative. Also the communication tools in order to attract the potential participants' attention counts a lot. If an event achieves to tackle the as most urgent perceived challenges, however, fails to attract and engage to the grand public, the event cannot be successful. Therefore, the primary and secondary research will search to determine the most effective ways of communication for the chosen showcase city, confirming or denying assumptions and statements made based on the analysis of the past FIA Smart Cities event-

Not to forget, the structure and composition of the FIA Smart Cities initiative's events are key. Even if including suitable content and well communicating the happening of the FIA Smart Cities events, the general public might not feel attracted by the same structure of event than mobility experts, public authorities and industry players. Mainly the primary research will therefore try to find out what kind of event structures attracts most of Parisian end users. This structure needs then to be well connected to the defined content and appropriately communicated to the grand public, in order to ensure attracting a maximum participants to the FIA Smart Cities events.

The detailed recommendation of these main three sections will be outlined in the recommendation part of the analysis. This thesis does not search to determine a thorough implementation plan, but rather to outline several options for the FIA to choose from.

Regarding the text structure, there are 5 main chapters: the Introduction, the Literature Review, the Methodology, the Analysis and the Conclusion. All the sources used are immediately indicated in the text, with the author and the date between brackets. The

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detailed bibliography can then be find prior to the Appendix. All figures and tables are numbered and summarized in the List of Tables and List of Figures respectively, located just after the Table of Contents. The sources of the tables and figures are always listed immediately below themselves, with the same structure of author and date. The detailed bibliography can also be find prior to the Appendix. In case a table or figure has been established by the author, it is marked with *Internal Document.* Images implemented with the solely reason of visual improvement do not have their source below, however, are listed in the Bibliography of Images. Big Chapters and subchapters are often summarized in order to facilitate the reading. Those summaries are highlighted with a blue background. A list with the most important abbreviations used during this thesis can be found prior to the Introduction.

1.2 *La Fédération Internationale de l'Automobile*

1.2.1 Goals

The non-profit association "Fédération Internationale de l'Automobile", or short FIA, was established in 1904 in Paris with the aim to enhance governance and safety in motorsport. As time went by, the FIA has grown into a global organization, today bringing together over 233 international motoring and sporting organizations based in 146 countries all over the world (FIA 2020a). Their vision is to create "***Safe, Sustainable and Accessible Motor Sport and Mobility for All***" (FIA 2020b), while their overall Missions is "*To Support our strong, connected and global network of Members, and serve their interests*" (FIA 2020b). The Federation highlights 6 corporate values, in which it fundamentally believes and upon which its business and behavior is based: Member-Orientation, Excellence, Collaboration, Innovation, Trust and Sustainability (FIA 2020b).

1.2.2 Key Areas of Activity

The following three interlinked key areas of activity can be determined in the federation: (FIA 2020c).

- **Sport**
- **Campaigns**
- **Mobility**

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The area **Sport** includes the management of motorsport worldwide with the following specific Mission:

"to lead the future of exciting, safe, sustainable and inclusive global motor sport and ensure its continued relevance by implementing fair regulation, fostering innovation, and developing our Members throughout the sporting pathway" (FIA 2020b).

The FIA organizes, inter alia, the world's foremost single-seat racing series Formula1 (FIA 2020d), the global electric racing series Formula E (FIA 2020e) and the World Rally Championship.

The second key activity of the FIA contains of organizing **Campaigns** concerning motoring-related issues. Currently the FIA has launched four main campaigns.

- The "Action for Road Safety" campaign, which has the goal to halve the global road deaths by the end of the decade.
- The "Action for Environment" campaign, where the FIA tries to push a green future for the motoring scene.
- The "FIA Women in Motorsport", trying to encourage an increased participation of women in motorsport.
- And the anti-doping campaign called "FIA Race True" (FIA 2020f).

The third and last key area of the federation is **Mobility** with the specific Mission "*to empower our Members to be relevant for the future of smart mobility through collaboration, knowledge sharing and advocacy* (FIA 2020b). The aim of this key area is to ensure the availability of safe, sustainable and affordable systems of transport for all road users. In order to approach this goal, the company has developed the **FIA Smart Cities** event, on which this thesis is based on. In addition, they have put in place different campaigns, for example the #3500LIVES campaign for roads safety and also other activities such as conferences or university programs (FIA 2020g).

1.2.3 Administration

As demonstrated on *Figure* 1, the FIA is split into three locations. The federation has its historic headquarter as well as the mobility and tourism division and the communications department in Paris. Their sports division and administration is located in Geneva and

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its logistics and archives as well as the FIA center of excellence are situated in Valleiry in France (FIA 2020b).

Figure 1, Locations of the FIA

As resumed on *Figure 2*, by the end of 2019, the FIA counted 181 permanent employees, representing 25 nationalities. The average age of the employees amounted up to 41 years and 38% of the associations' workforce is female (FIA 2020b). Furthermore, the employees are divided into three different pillars: the Sport division, the Mobility division and the Administration and Support Functions division. The aim of the latter division is to assist the first two divisions. The distribution of the employees on the 3 divisions by the end of 2019 can also be seen on *Figure 2*. It can be observed, that the Sport division is the biggest in terms of employees, while only a minority of the staff is engaged in the Mobility division (FIA 2020b).

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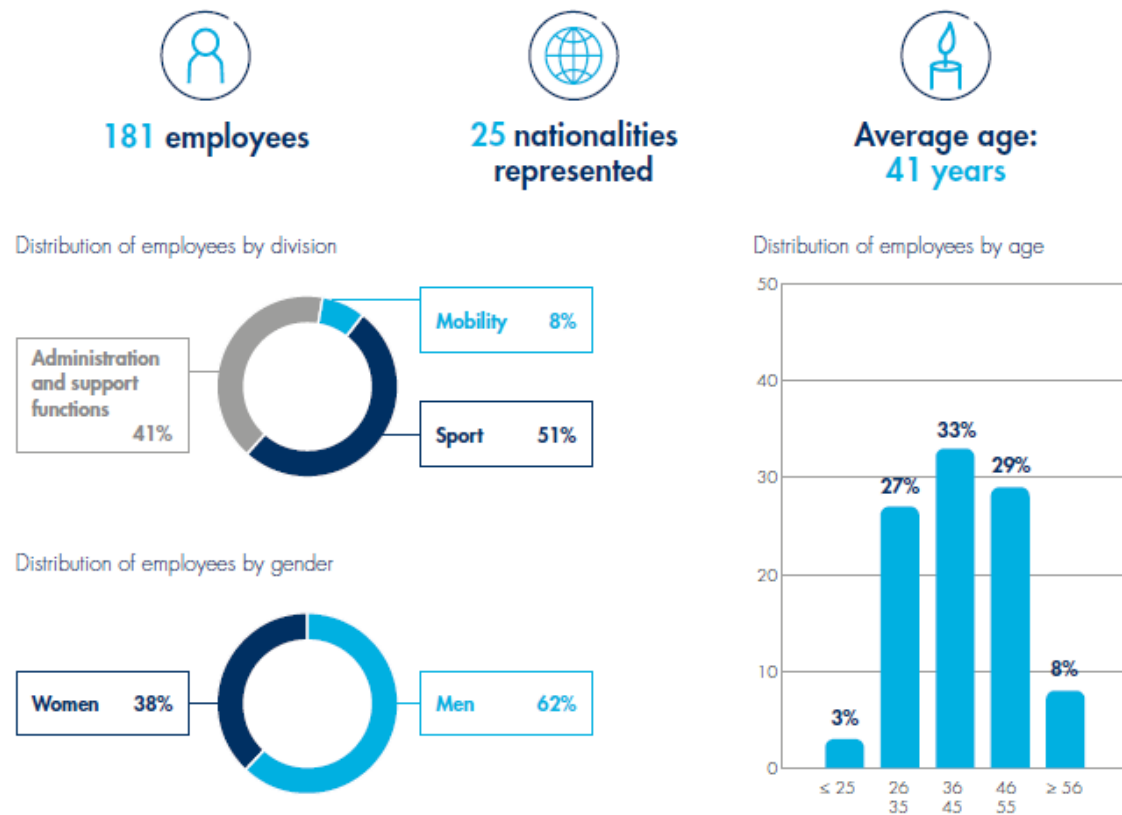
1.2.4 Structure

In the overall structure of the "Fédération Internationale de l'Automobile" on *Figure 3* those three different divisions are reflected very clearly. For a better view of the figure, please refer to *Appendix 1, 2 and 3*. Peter Bayer is the Secretary General of the Motor Sport division, managing 11 departments including the development, rally, technical and the safety and management department. On the other side, there is the Mobility and Tourism division with Andrew McKellar as Secretary General. As the only pillar located in Paris, he leads the following three departments: Membership and Services, Road Safety and Global Advocacy and Tourism Services. Finally, there is the Administrative pillar with Jean-Baptiste Pinton in the Chief position. This division includes supportive tasks for the two other pillars such as Accounting and Finance, Human Resources, IT and Marketing and Events (FIA 2020h).

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The entirety of these three divisions are directly managed by the President of the federation Jean Todt. Jean Todt was born in in 1946 in Cantal, France. With 20 years, he began his career as a rally co-driver in the World Rally Championship. He was very successful and won many international rallies. After his retirement as an active member of the Championship in 1981 he was appointed Director of Racing at the French car manufacturer Peugeot. Also with this team he won several prizes up until 1990, when he became Director of Sporting Activities of the PSA Peugeot Citroen Groups. Three years later Jean Todt left Peugeot and started a new chapter by becoming Director of Ferrari's Racing Division. During his time at Ferrari, that ended in 2009, he was appointed General Manager of Ferrari and then CEO of Ferrari. In his last year at Ferrari he served as Special Advisor to the President of Ferrari. On October 23rd 2009 Jean Todt was elected President of the "Fédération Internationale de l'Automobile", and was twice re-elected since, in 2013 and 2017. In addition, on April 29th 2015 he was appointed Special Envoy for Road Safety by the UN Secretary-General (FIA 2020i).

PRESIDENT
Jean TODT

In a functional reporting relationship to Jean Todd are three people: Graham Stocker, the Deputy President Sport, Brian Gibbons, the Senate President and Thierry Willermarck, the Deputy President Mobility. Also, there are four detached departments, the Cabinet, Communications, Compliance and FIA Innovation Fund (FIA 2020b).

In order to better understand the structure behind the FIA Smart Cities initiative, that will be elaborated in point 1.4 FIA Smart Cities, some specific parts of the general organizational diagram on *Figure 3* will be analyzed more in detail. To start with, the light will be put on the Road Safety & Global Advocacy department that is framed in a green square on *Figure 3* and led by Stefano Ammirati in Paris. In the green box, the detailed structure of the department can be seen. It is the subdivision sustainability programs that is in charge of the FIA Smart Cities Initiative, with Maria Strigunova at its head. The initiative has its focus on environment and sustainability. Maria Strigunova and her team are reinforced and strongly supported by the marketing and event department of the second pillar administration. Also a zoom on this department, led by Alexadre Gueschir, can be found in the red box on *Figure 3*. Engaged in the Smart Cities Initiative are mainly the subdivisions CSR fundraising and strategic alliances as well as events. It is in collaboration with the head of the CSR fundraising and strategic alliances, Stéphane Dézérable, that this thesis has been initiated and created. Stéphane Dézérable and its

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team are responsible for detecting, managing and retaining appropriate and motivated partners and therefore ensuring the funding of the FIA Smart Cities Initiative.

Figure 3, Structure of the FIA by March 2020
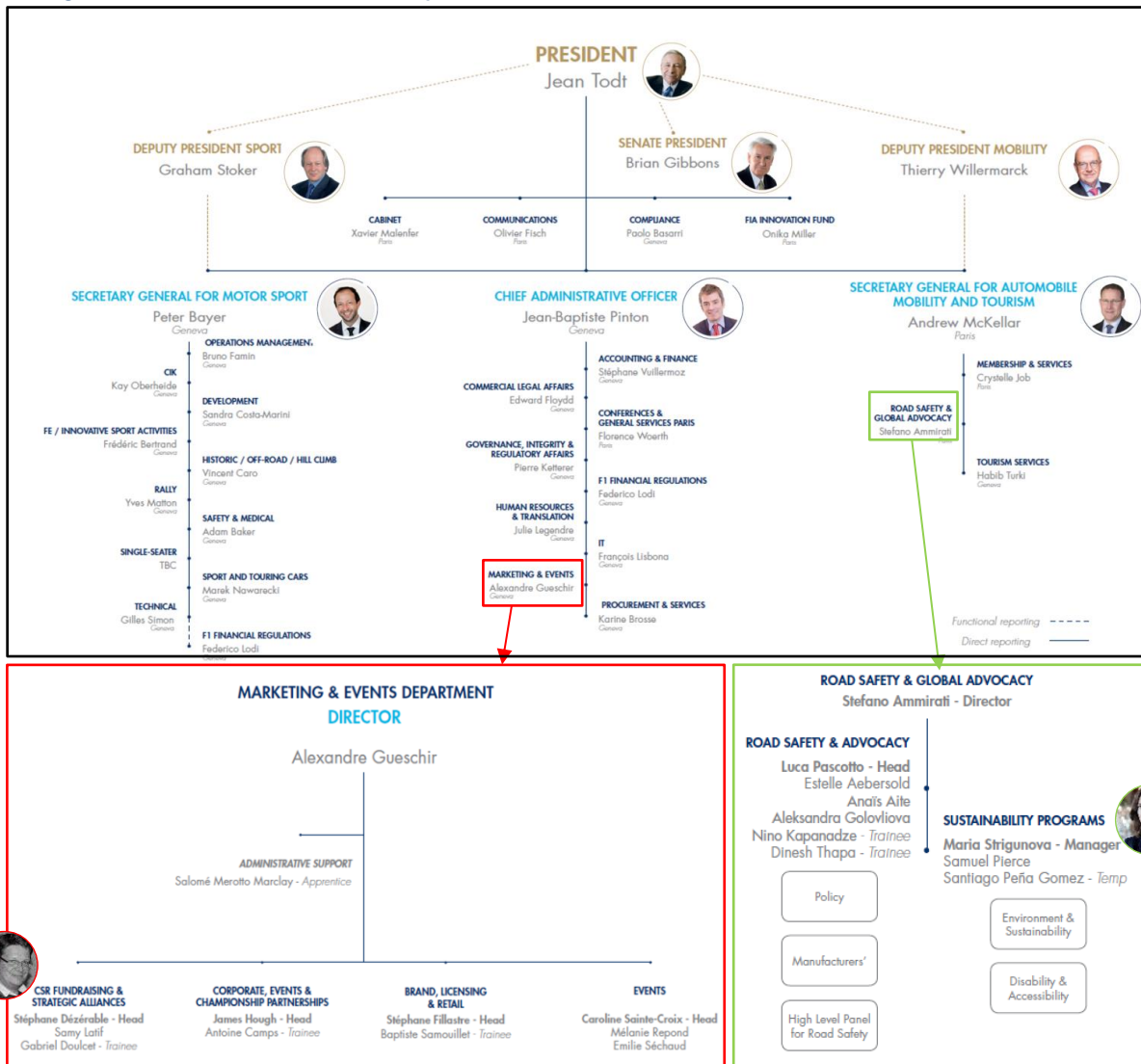
1.2.5 Governance

The main duties of the "Fédération Internationale de l'Automobile" are clearly structured and can be split up into four subgroups:

1. Reviewing, enacting and enforcing sporting rules
2. Promoting accessible, sustainable and safer mobility for all

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3. Taking executive decisions
4. Resolving disputes

In order to ensure that these duties are performed correctly, the FIA has put in place a governance and decision-making structure that can be seen on *Figure 4.* Jean Todt, the President of the FIA, Brian Gibbson, the President of the Senate, Thierry Willemarck, the Deputy President for Automobile Mobility and Tourism and Graham Stocker, the Deputy President for Sport as well as the 7 FIA Vice-Presidents are selected for a period of 4 years by an absolute majority of the General Assembly (FIA 2020b).

Figure 4, FIA Governance Structure as of Mid-December 2019
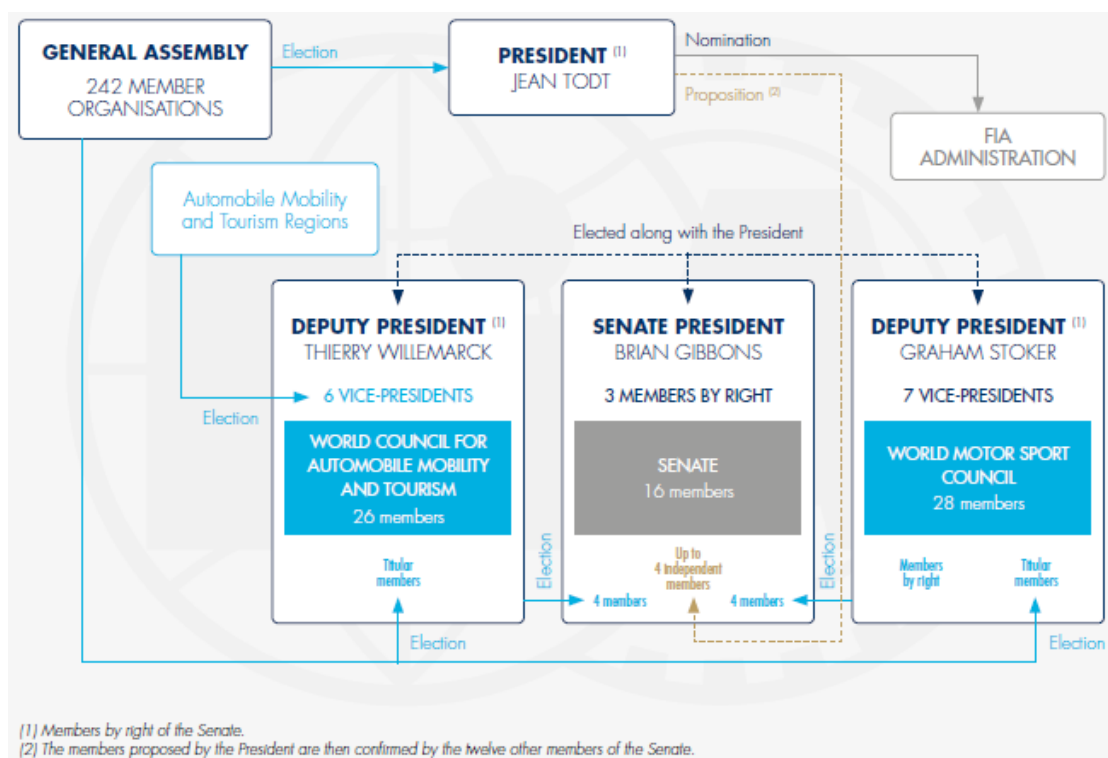
Source: FIA Activity Report 2019 (FIA 2020b)

The **World Council for Automobile Mobility and Tourism (WCAMT)** is responsible for all issues touching the automobile in society. Counting the FIA President, the Deputy President for Mobility, 6 Vice Presidents and 18 ordinary members, the Council WCAMT composes of 26 members. They meet at least twice a year in order to discuss proposals received from the FIA's Mobility Commissions and Working Groups (FIA 2020j).

The duties of the **World Motor Sport Council (WMSC)** covers everything related to international motor sport, including rules, regulations, safety and the development of

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motor sport from karting to Formula 1. The WMSC is made of the following 28 members: the FIA President, the Deputy President for Sport, 7 Vice Presidents, 14 titular members as well as 5 members by right (FIA 2020k).

The **Senate** represents one of the most important bodies of the FIA. Its main responsibility is overseeing the finances of the federation but it covers also management and general policy issues that cannot be covered by either of the World Councils. It is composed of 16 members including the FIA President, the Senate President, the two Deputy Presidents and 3 members by right (FIA 2020l).

The decision-making process of the FIA is based on the principles of good governance. Besides the two World Councils and the Senate, the driving forces in the decision-making process are the Commissions who forward their draft proposals to the Councils, which then examine, adapt or approve the propoommissions clustered into the following 4 supersets: International Historical Commission, World Motor Sporting Commissions, Mobility Commissions and the Joint Sporting and Mobility Commission (FIA 2020m).

1.2.6 Budget

Based on the numbers of 2018, the FIA disposed of a regular budget of €115 million which represents a 3% decrease compared to the budget of 2017. The majority of the budget is used for its Sports division. The budget is based on several different income sources, as can be seen in detail in the *Appendix 4* on the Profit and Loss statement 2018 of the FIA.

In 2018, 35% of the income of the federation was based on registration and entry fees, 20% on sporting regulation fees and 10% on partnership, sponsoring and other contracts. 11% of the income was due to an exceptional sale of an asset in 2018. Furthermore, around 40% of the income can be traced back to its activities in the FIA Formula 1 World Championship.

In total in 2018, the federation has achieved an income of EUR 130,370,437. Compared to the total expenses of EUR 129,971,769 the FIA has recorded a benefit of CHF 398,668 in the fiscal year of 2018. The financial statements of the federation were controlled and signed by the audit company KPMG.

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1.3 _Smart City_

The goal of this thesis is to fully understand the FIA Smart Cities initiative and to give recommendations to the FIA on how to expand this event. In order to achieve this goal it is crucial to entirely comprehend the concept of a Smart City.

The term "Smart City" was recorded for the first time during the nineties, deriving from the "Smart Growth" movement, which suggested to _"approach urban challenges through community-driven measures"_ (Ahmed, Boudhir, Santos, Aroussi, Karas 2020). Today, the term "Smart Cities" is widespread and definitions and characteristics vary greatly. The description of smart cities given by the European Commission is the following:

"_A smart city_ is _a place where traditional networks and services are made more efficient with the use of digital and telecommunication technologies for the benefit of its inhabitants and businesses._" (European Commission 2020)

However, this is only one definition out of many others. In general, two distinct approaches of Smart City concepts, which not seldomly go hand in hand, can be identified. The first one is a **technocentric approach** and is largely promoted by the Information and Communication Technology (ICT) sector. It says that in a city that is connected urban processes can be implemented much more efficiently and effectively. Therefore, it suggests a massive data collection in order to improve urban management. The second one is the **holistic approach**, that aims to balance out the social, economic, environmental, human, cultural and technological aspects in a city. This approach is being put in practice the longer the more through the launch of many Smart City projects. The aim of both approaches is to improve the quality of urban lifes of the continuously increasing number of urban citizens (Johannes 2019). Examples of a Smart City approach is a Smart Transport System, that enables people to travel saver and quicker or Smart Buildings, that do not waste energy (The Explorer 2019).

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1.3.1 Urbanization

This shift to an increasingly urban world is the main reason of the rising importance and acknowledgement of smart city initiatives. While this shift generates great opportunities, it is also responsible for the increase of economic, social and environmental risks and that at a speed that challenges urban planning and governance (Clos 2015). This so called urbanization has been defined by the UN Department of Economic and Social Affairs as one of the four demographic mega-trends, next to technological innovation, climate change and international migration (Swiaczny 2019). By 2050, according to the UN 2018 World Urbanization Prospects, 68.4% of the world's population will be living in urban areas. This represents an increase of over fifty percent compared to 1950 (UN DESA 2019). Looking at urbanization in terms of numbers of people, it can be observed on *Figure 5* that the urban population surpassed the rural population in 2007 (Ritchie, Roser 2019). Today, well over half of the population is living in urban settings, whereas it is projected that this number will increase up to two-thirds of the population by 2050 (Wilmoth 2018).

Figure 5, Number of People living in Urban and Rural areas around the World
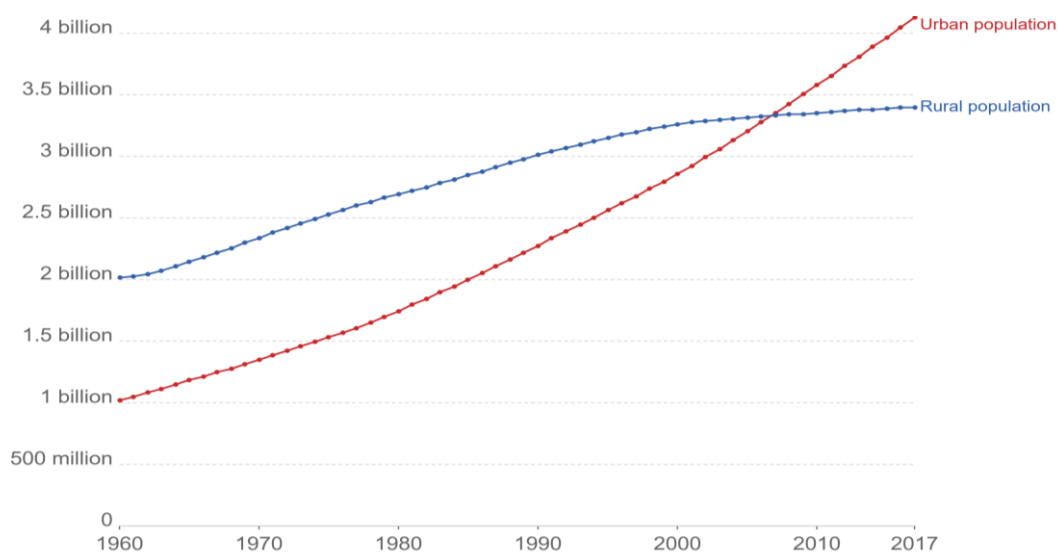
Source: UN World Urbanization Prospects (2018) (Ritchie, Roser 2019)

As can be observed on *Figure 6*, Asia and Africa show the lowest degree of urbanization in 2019 with 49% and 43% respectively, when comparing on a continental level. The degree of urbanization can be described as the percentage of urban population in the total population. On the same figure if can be seen, that Northern America reached the

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highest degree of urbanization with 82%, while Europe was located in the very middle with 74% urban population. (Duffin 2019). However, referring to a Study of the UN, the degree of urbanization in low-income and lower-middle-income countries, widely represented in Africa and Asia, will grow much more intensely in the coming ten years compared to other countries. This might lead many countries into challenging situations for example in terms of affordable housings and adequate transportation services (Johannes 2019).

Figure 6, Degree of Urbanization by Continent in 2019
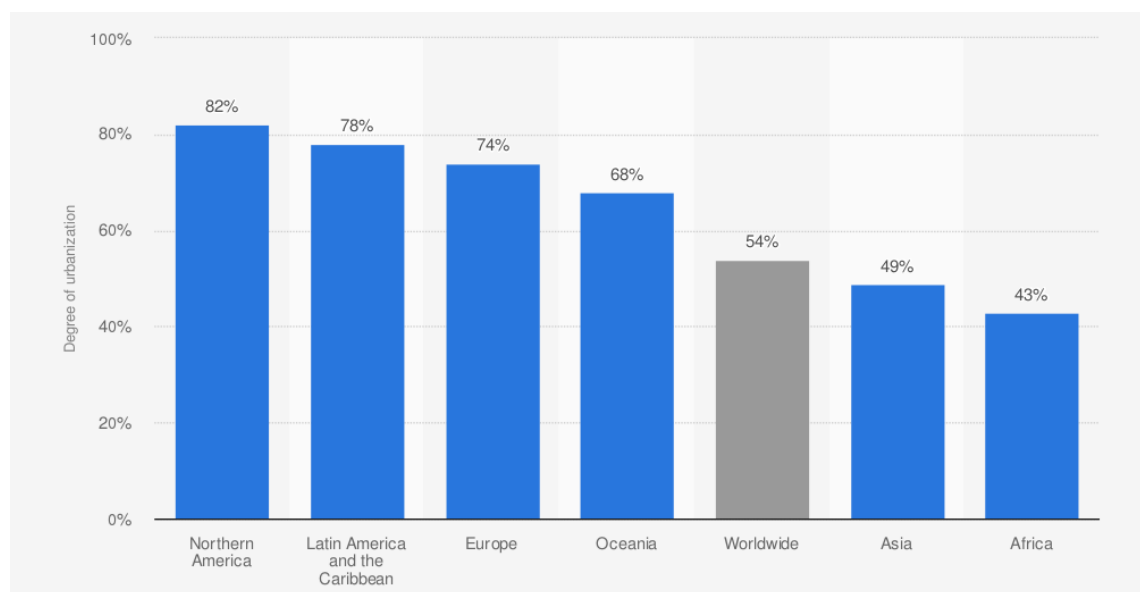
Source: Population Reference Bureau Statista (Duffin 2019)

But what exactly are the roots of the increasing shift towards urbanization? According to the UN 2018 World Urbanization Prospects, these are the three main reasons of urban growth (UN DESA 2019).

1. The natural increase of urban populations, meaning the excess of births over deaths
2. Migration, meaning the migration of people from rural areas to urban areas
3. Reclassification, meaning the expansion of urban areas

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1.3.2 Smart City Indexes

Smart City initiatives have often been stated as the best strategy for facing the challenges involved in urbanization and sustainable development (Johannes 2019). Today, various Smart City assessment indexes exist, reaching from local to global ones. Their goal is to evaluate and compare the different cities based on diverse criteria. Those criteria often involve in a way or another the following dimensions: economy, governance, civil society, sustainability, mobility, energy and environment. Examples of Smart City indexes are the Smart City Strategy Index 2019 from the Roland Berger GmbH, the Smart City Index 2019 from Bitkom or the Smart Cities Index 2019 from Easypark. In this paper, however, the main focus will be put on the following two indexes, the **IMD Smart City Index** and the **IESE Cities in Motion Index**, since they are the most relevant to the topic. Both of them are going to be introduced in the Literature Review under *2.1 Smart City Indexes* and will be analyzed in detail in the discussion part of the thesis under *4.2 Overview of Paris.*

1.4   *FIA Smart Cities*

For the concept of Smart Cities explained above a huge amount of different initiatives already exist with the goal to encourage creating smarter cities. Those initiatives are introduced by both private and public institutions. Also the Fédération Internationale de l'Automobile searched to contribute to this movement using their wide reach and unique position to speak about smart cities in terms of urban mobility. This is when the FIA Smart Cities initiative was born in 2017. It is an initiative that is solely focused on the subcategory mobility in the broad concept of Smart Cities, however does not solely focus on automobility as could be imagined but includes the entire range of road mobility. Compared to other subcategories for Smart Cities such as energy or environment, there are yet not many other institutions dedicated to Smart Mobility. The three main players of the Smart Mobility movement are outlined below and presented on *Figure 7*.

The current leader in sustainable mobility events is **Movin' On**. Movin' On is a global mobility summit, launched over 20 years ago by Michelin, the French multinational tire manufacturer. Each of the Movin' On's annual events is hold over several days, usually three, and hosts approximately 4000 policy makers and over 90 speakers. Besides discussions and panels, Movin' On also includes an exhibition part. Their events are

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focused on Business to Business (B2B) participants and do not include end consumers (B2C). Past events included topics such as the fuel cell technology, autonomous or electric cars (Michelin 2020).

Figure 7, The three main players of the smart mobility movement

The **Smart Cities Expo World Congress (SCEWC)** is another event of the Smart City ecosystem. This three-day event was initiated by the city of Barcelona in 2011. In its 2019 edition the event has counted 24,399 visitors and over 400 speakers. The congress, who includes side events and exhibitions, focuses on all categories of the Smart City ecosystem including safety and security, energy and environment and infrastructure and buildings (SCEWC 2020a). After stating an extraordinarily high demand for the Mobility part of the congress, a separate **Smart Mobility Congress** was created in 2017. This sub-congress takes place alongside of the Smart City expo World Congress. It focuses on the future of mobility and covers topics such as low carbon, intelligent mobility or transport networks. Also in the **Retail and Brand Experience World Congress**, another sub-congress of the SCEW, can be seen as part of the Smart Mobility movement. It provides insight on first and last mile deliveries and future mobility trends for shoppers. All of the events are mainly focused on B2B attendees, only including students as B2C participants (SCEWC 2020b).

A third follower of the Smart Mobility movement is the **ERTICO – ITS Congress**, where ITS stands for Intelligent Transport System. The **ERTICO – ITS Europe Congress** was brought to life in 1991 by 15 organizations from 5 distinct business sectors, called ERTICO (ERTICO 2020a). Up until today ERTICO organizes yearly a version of the ERTICO – ITS Congress. Their main focus is put on the Intelligent Transport Systems (ITS) of the event's host cities. Also, they serve as important channel to raise the

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awareness of Smart Mobility Solutions. The events include policy makers, experts and the general public, as can be understood mainly B2B. The ERTICO – ITS Congress consist of a live session, where the latest developments of the ITS sector are presented, a showcase of cutting-edge technology as well as a huge exhibition (ERTICO 2020b). In 1994, ERTICO also co-organized the first **ITS World Congress**. This event continued to take place once a year, co-organized by ERTICO and with the same focus than the European version of the Congress. The vision of the congresses is to encourage safer, smarter and cleaner mobility by bringing together private companies and public institutions. Their goal is to develop, promote and deploy technology solutions for smarter mobility through stakeholder engagement and leadership (ERTICO 2020c).

Compared to these three players of the Smart Mobility ecosystem, the FIA Smart Cities initiative turns out to be a younger and smaller event. They currently count around 400 participants per event, holding 3 of them per year. The main differentiation point of the FIA Smart Cities initiative is, that the FIA uses an electric motor sport series as platform for its event. Currently, the initiative of the FIA receives professional and governmental participants, just as the other Smart Mobility players do, but this should be a subject of change for the FIA Smart Cities initiative. The Fédération Internationale de l'Automobile believes that the end users of urban mobility are an important part of the future mobility. This is why this thesis, in collaboration with the FIA, tries to find solutions to include the citizens in the FIA Smart Cities Initiative. But before elaborating more on the research objectives of this thesis, the FIA Smart Cities Initiative will be explained in detail below.

1.4.1 Goal of the FIA Smart Cities Initiative

In 2016, the UN New Urban Agenda was launched, setting new global standards for sustainable urban development (Martin 2016). In order to support this agenda, which is based on the threat of the increasing urbanization, the 2030 Agenda for Sustainable Development, the Paris Agreement (COP 21) and many other global frameworks, the FIA took a proactive stance and created the FIA Smart Cities initiative in 2017. With this initiative the FIA searches to help cities defining new models for more sustainable urban mobility (MassChallenge 2019a).

More in detail, the main goal of the FIA Smart Cities initiative is, **to promote the development of innovative mobility solutions and especially to drive the**

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discussion around safer, better accessible and more sustainable mobility systems, with the main focus on the cities hosting the event. (FIA 2019a).

- **Safer mobility** systems includes improved infrastructure and efficient road safety management.
- **Accessible mobility** systems is all about the accessibility of urban mobility in terms of cost, choice and ease of access for every road user
- **Sustainable mobility** systems comprise air pollution, decarbonization and urban planning (FIA 2020n).

Even though the FIA itself focuses a lot on automobiles, this initiative does by far not only concern automobiles, but includes road mobility of any kind. The concept of Smart Cities are defined by the FIA as *"leveraging **Policy, Innovation and Connectivity** to promote the lives of its citizens."* (FIA 2020n). Government *policies* have a huge impact on the development of smart cities and therefore the FIA Smart Cities initiative searches to encourage a transport policy mix that ensures the safest, most sustainable and most accessible form of mobility. The willingness for and acceptance of new technologies in cities can facilitate the improvement of their mobility. Some of the current trends regarding **innovation** are information technology, electrification, big data and autonomy. Thirdly, the collection and analysis of data in real time, seen as **connectivity**, allows to improve the resource allocation and to implement the most appropriate mobility solution for each individual city at the right place and to the right time (FIA 2020o).

As quickly mentioned before, the "Fédération Internationale de l'Automobile" decided to use their global electric racing series, the ABB FIA Formula E Championship, as platform for the FIA Smart Cities initiative. The FIA Smart Cities initiative is resumed in three international events a year. Using the Formula E championship as platform of those events allows to present new innovations in motor sport that might serve as springboard for mobility solutions in cities. The three yearly FIA Smart Cities events take place on the Friday previous to Formula E races and are held on the very same location. The events brings together actors from various fields including committed city authorities, mobility experts, city planners, technology specialists, entrepreneurs, high-level political leaders and policy makers. The FIA Smart City Initiative enables them to exchange expertise and generate knowledge in the field of sustainable urban mobility (FIA 2018a). The initiative does not mainly search to help implement mobility solutions but offer a platform that encourages discussions and exchange on the topic of future mobility.

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The past FIA Smart Cities events counted up to 400 professional attendees and were split into three core pillars, the Forum, the Global Start-Up Contest and the Legacy (FIA 2020o), that can be seen on *Figure 8* and will be explained in more detail below.

Figure 8, The 3 Pillars of the FIA Smart Cities Initiative

1.4.1.1 Pillar 1: Forum

The goal of this main part of each FIA Smart Cities event is to bring together experts from various fields of sustainable mobility and create high level discussions and practical sessions about urban mobility in cities. This forum aims to assist cities in their efforts to promote smart mobility for all road users, by exchanging thoughts and finding solution. Those solutions are then put in the hands of the participants to realize. Diverse speakers are invited for each forum, including members of public authorities, research institutes, industry players or FIA Members. They all present innovations, findings and experiences on cleaner, safer and more accessible mobility solutions during their speeches (FIA 2020p). The forum takes place during an FIA Smart Cities event on the Friday prior to the selected race weekend and is hold in a conference setting close to the Formula E track. This allows the FIA Smart Cities events to offer a Formula E Village visit to its

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Public as closing of the forum. (FIA 2017a). More details about this last part can be found under Pillar 3: Legacy.

1.4.1.2 Pillar 2: Startup Contest

The second pillar of the FIA Smart Cities events is the Startup Contest which is hold in collaboration with the start-up accelerator organization MassChallenge (see 1.4.2.5 MassChallenge for more details). The Startup Contest takes place on the Thursday previous to the forum. It aims to identify, support and invest in some of the world's most innovative and impactful start-ups. The focus is put on mobility-focused technology start-ups who address urban challenges through technologies such as the Internet of Things, autonomous mobility, smart infrastructure, big data, artificial intelligence, sharing economy or digital services (MassChallenge 2019a).

For each Smart Cities event, 6 to 10 start-ups get elected to pitch in front of a jury composed of around 10 partners and mobility experts. The jury then chooses one winner per FIA Smart City event, which will receive the possibility to pitch on the FIA Smart Cities Forum on the following day, in front of the up to 400 VIP attendees from the mobility and urban transport field (MassChallenge 2019a). The winner will therefore be able to benefit from the huge network of the FIA Smart Cities' partners and experts, including MassChallenge. In addition, an investment of $100K will be granted to the winners (FIA 2018a).

Some examples of winners during the last seasons are the following (FIA 2020q):

- Parknav, who uses artificial intelligence to reflect open on-street parking in real time
- Econduce, who created a network of shared electric scooters in Mexico City
- Kapo, who invented a system that allows governments to identify missing bike lanes on busy routes

1.4.1.3 Pillar 3: Legacy

The third pillar of the FIA Smart Cities event is the Legacy pillar. It is split into three subcategories, which include the FIA Smart Cities Award, the Innovation Lab as well as the Measuring Smart Cities part.

Starting with the FIA Smart Cities Award, a concept who identifies, highlights and recognizes cities for innovative solutions encouraging safe, efficient, intelligent and

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integrated urban mobility. Only cities hosting the ABB FIA Formula E Championship can participate in the award. The FIA identifies and rates then the best practices of urban mobility systems of those host cities. The ratings focus on strategies, projects and policies put in place to advance the mobility of the city. The winner is selected by an external expert panel, based on five main areas: quality of life, governance, economic performance, mobility efficiency and environmental sustainability (Strigunova 2018). In the first season, Montreal was the winning city (FIA 2018b), in 2018, Santiago de Chile won the award for its intermodal mobility system (Strigunova 2018), and in 2019, Rome won the prize for its Sustainable Urban Mobility Plan (SUMP) (FIA 2020n, p. 3)

The second part of the Legacy is the Innovation Lab. It represents a platform provided by the ABB FIA Formula E Championship that offers the participants of the FIA Smart Cities Forum a behind-the-scenes view of the Formula E championship. This includes track tours, exclusive access to team garages, watching the Formula E Shakedown and visits of the E-Village entertainment area, reflected on *Figure 9*. The Formula E Shakedown is the testing session for the Formula E teams on Fridays prior to the race weekend, used to check the electronic systems and reliability of the cars as well as the track (Formula E 2019a). The Allianz E-Village offer a huge range of different performances and activities to its visitors, including musical performances, a gaming area, racecar displays and the trial of new technologies such as virtual reality, robotics or simulations (Nehmer 2018). Based on those activities, the Innovation Lab offers an exclusive insight in the motor sport, where participants can observe technological breakthroughs and how those innovations may have an impact on the road car development (FIA 2020r). This part takes place at the end of each FIA Smart Cities event.

The third pillar of Legacy measures Smart Cities through the Innovative Urban Mobility Platform developed by the FIA. It comprises the measuring, benchmarking, modelling and simulating of the current and future urban mobility trends by the organization. The federation and its global 240 Member Clubs work together towards a safer, more sustainable and more accessible urban mobility future.

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Source: Presseportal, obs/Allianz Suisse (Nehmer 2018)

1.4.2 Partners

The Smart Cities Initiative went into its fourth season in 2020, inter alia, thanks to its several partner organizations. All of them play a key role in reaching the goal of creating a safe, accessible and sustainable future of urban mobility. They are outlined in the following part.

1.4.2.1 ABB FIA Formula E Championship

The ABB FIA Formula E Championship is the official FIA Smart Cities partner. It is the world's first all-electric international single-seater category in motor sport and was launched in 2014 (Formula E 2019b). Besides the sports and adrenaline aspect, this championship aims to be a platform for testing and developing the latest road-relevant innovations, such as electric vehicle technologies or alternative energy solutions. Formula E races are being hold in some of the most iconic cities in the world, including Hong Kong, Monaco, Paris, Berlin, New York and Montreal (FIA 2018b).

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1.4.2.2 ABB

ABB is a global technology company and leader in electrification, automation, robotics and motion since over 130 years (ABB 2020). Since 2018, they are the title partner of the FIA Formula E Championship and the Smart Cities initiative. Digitalization in transportation and infrastructure is a main focus of the company and they encourage collaborative work towards a sustainable future (FIA 2020n).

1.4.2.3 Julius Bär

Julius Bär, the leading Swiss private banking group, partners with the FIA Smart Cities initiative since its very beginning in 2017. The private banking group is the founding Global Partner of the ABB FIA Formula E Championship. The forward-thinking and innovative approach of both the Formula E but also the FIA Smart Cities initiative correspond well with the corporate values of Julius Bär. Also the Next Generation philosophy, that considers the impact of our actions today on the next generation, is essential to both organizations (Julius Baer [no date]). By partnering closely with the FIA, Julius Bär encourages the development of alternative mobility solutions (FIA 2020n).

1.4.2.4 Michelin

Michelin is a very dedicated supporter of sustainable mobility for everyone. Not only is this reflected in the sustainable products and services they sell (The Michelin Group 2020a), but also in their commitment to more accessible, safer, greener and more efficient mobility. In this sense, they have created the think and action exchange platform "Movin'On Labs", the international event "Movin'On Summit", participate in the "Paris Process on Mobility and Climate (PPMC)" and support other events such as FIA Smart Cities, where they have played a part since the very beginning in 2017 (The Michelin Group 2020b). Also, Michelin has been partnering with the FIA Formula E Championship from its outset.

1.4.2.5 MassChallenge

MassChallenge's raison d'être is to accelerate high-potential start-ups across all industries for zero-equity taken. Their goal is to make it as easy as possible for entrepreneurs to launch and grow new ventures (MassChallenge 2019b).

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MassChallenge, headquartered in the United States, partners with the FIA Smart Cities initiative since 2019, with the aim to support the most innovative start-ups in the field of urban mobility.

1.4.2.6 Others

Some of the partners have been replaced since the beginning of the FIA Smart Cities initiative. Before the FIA partnered with MassChallenge for the FIA Smart Cities Global Start-Up Contest in 2019, the FIA collaborated with the Luxembourg-based investment firm **Digital Leader Ventures** (DLV) (FIA 2018b). Furthermore, **Enel**, the ABB FIA Formula E Championship's official Power Partner and a global leader in e-mobility technology development, was also a pioneer partner in the first two years of the FIA Smart Cities initiative (FIA 2019a). Finally, **JCDecaux**, the leading global outdoor advertising company and a key player in the development of smart cities, partnered with the FIA Smart Cities initiative during its second season in 2018 (FIA 2019a).

For the future, the FIA is in discussion with two other possible sponsors for the FIA Smart Cities initiative, that were initially planned for 2020 but will be postponed for the 5th season 2021. The first of these sponsors is SAP the international IT organization and market leader in enterprise application software. They put a huge focus on machine learning, Internet of Things (IoT) and advances analytics technologies and are therefore a great fit as a sponsor for the FIA Smart Cities initiative (SAP 2020). The second probable future sponsor of the event will be the international cyber protection company Acronis, headquartered in Switzerland. Its specialization of cyber protection plays a huge role in the future of the mobility, and therefore also this organization fits perfectly in the scope of sponsors.

1.4.3 Attendees

During the first season, the FIA Smart Cities Forum counted a total of 625 attendees for its four events. The number of participants per event varied between 110 and 200 (FIA 2018b, p. 4). In the second season in 2018, the Forum hosted 890 attendees during its three events, varying from 160 to 380 depending on the location (FIA 2019a). In average, this represents a 50% increase in attendees, compared to season 1. In the latest season in 2019, a total of 1136 event attendees divided onto four events have been registered, on a range between 299 and 430 participants per event (FIA 2020n). This results in an

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increase of 20%. The quick growth and increased popularity of the FIA Smart Cities initiative is well reflected in these number.

Regarding the distribution per sector it can be seen on *Figure 10*, that the majority of the attendees of the FIA Smart Cities forum in 2018 were government agencies, representing 48% of the total 890 attendees. In the same year, 40% of the participants were from the private sector and the remaining 12% were NGO's, non-profit organizations and bilateral and multilateral agencies (FIA 2019a, p. 2). The distribution varied remarkably for the following season in 2019, where the majority of the attendees were from the public sector, representing 60% of the total of 1136 participants. Only 22% came from the public sector and 18% from the non-profit sector (FIA 2020n). On the one hand, an increase of 20% in the private sector can be stated, and on the other hand, a decrease of 26% of the public sector.

Figure 10, Distribution per Sector, Season 2 (2018) and 3 (2019)
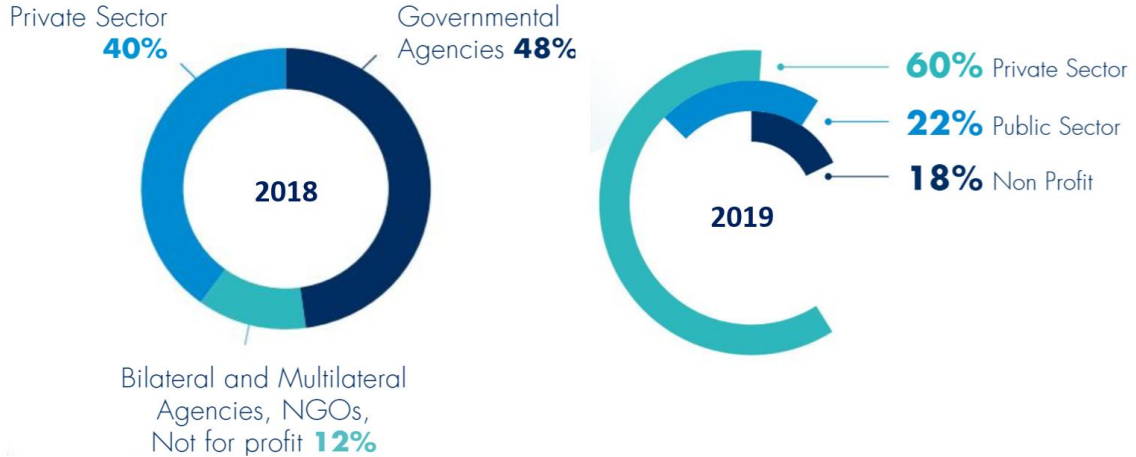
Source: FIA Smart Cities Activity Report 2018 (FIA 2019a) and 2019 (FIA 2020n)

Figure 11 shows the distribution of attendees of the FIA Smart Cities event in 2018, according to their area of expertise. With a share of 30% of the total of 890 attendees, unsurprisingly, the automotive and mobility sector was the best represented sector. The banking, finance and insurance category occupied the second rank with 18%, closely followed by the telecom and high-end technology sector. With a percentage of 12% were entrepreneurs, small scale industries, private equity investors and venture capitalists

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represented. The urban planning and real estate sector as well as the energy and utilities sector were the least represented at the Smart Cities Forum in 2018 (FIA 2019a).

Figure 11, Distribution per Area of Expertise, Season 2
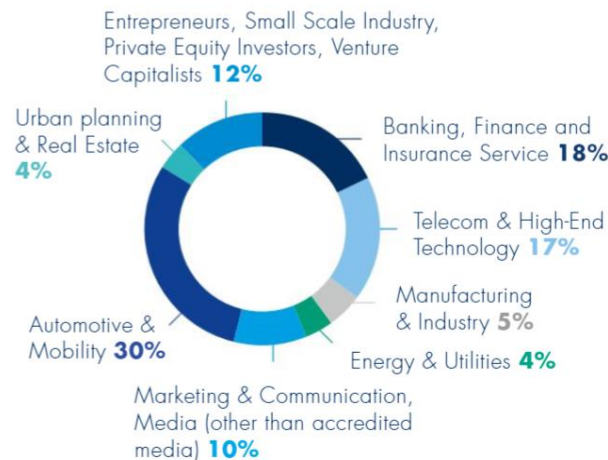
Source: FIA Smart Cities Season 2 Activity Report (FIA 2019a, p. 2)

1.5 *Problem Statement*

Based on the analysis of the attendees of the FIA Smart Cities event it can be observed, that its participants are either Business to Business (B2B) or Business to Government (B2G) attendees. The future of the urban mobility, however, does no solely impact these two target segments, but also to a large extent the public, meaning the citizens of the cities (B2C). This is the reason why the "Fédération Internationale de l'Automobile" searches to expand the FIA Smart Cities initiative into an event open for the general public. As of the latest season, on average about 400 participants were counted per event. According to Stephane Dezerable, head of CSR fundraising and strategic alliances of the FIA, the organization aims to increase the number of attendees up to around 2000 to 4000 attendees by including B2C participants.

This plan brings along some major challenges to tackle.

- What are the major interests of the citizens in the topic of urban mobility?
- How can the demand of B2C attendees be sustainably ensured?
- What major adjustments have to be done in order to include the public in the event?
- How can the forum be adapted to be understood by laypersons?
- How can a great communication with potential B2C attendees be ensured.

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1.6 Research Objectives

Based on these questions, this thesis aims to find recommendations on how to sustainably include B2C participants in the FIA Smart Cities initiative. In order to accurately adapt the events to the needs and wants of B2C attendees, an in-depth analysis of the population and cities is crucial. In this report, one showcase city will be chosen and analyzed in detail, aiming to serve as a guideline and basis model for other FIA Smart Cities host cities.

This showcase city is going to be Paris, the capital and most populous city of France and, at the same time, the home of the headquarter of the "Fédération Internationale de l'Automobile". This city has already some experience with FIA Smart Cities events, since during the very first season in 2017, an extraordinary FIA Smart Cities event was hold in Paris (FIA 2018b). Also, it was planned to hold an FIA Smart Cities event in Paris in 2020.

This leads to the first and most relevant research objective: to analyze the needs of the citizens of Paris in detail in order to accurately define their interests, motivations and expectations regarding the future of mobility and linked events. It will be important for the FIA to know exactly what kind of mobility challenges are currently faced by Parisian citizen, and which of them are perceived as being the most important or urgent ones. Also, it needs to be find out what motivates Parisian citizen to participate on an event linked to the future of mobility and what event formats they feel attracted to the most.

In order to ensure understanding the needs of Parisian citizens linked to the transportation and mobility, the current urban mobility situation of the showcase city Paris needs to be analyzed. This basic knowledge acquisition might go beyond the transportation and mobility of the city, since sometimes challenges can have their roots further down the road. This research objective really aims to provide a general insight into the life in Paris.

In addition to the B2C participants aiming to be acquired, all the current stakeholders of the FIA Smart Cities event need to be taken into consideration. This is why the continuous satisfaction of current participants (B2G and B2B) of the FIA Smart Cities events as well as its partners need to be ensured. In the same aspect, a potential inclusion of new partners needs to be considered, thinking of the broad expansion of the

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initiative. Not to forget, also the objectives and expectations of the FIA itself towards its project must be kept closely in mind.

The objective is to suggest realistic and viable recommendations to the Fédération Internationale de l'Automobile, enabling them to implement an accurate expansion strategy for the FIA Smart Cities initiative.

1.7 *Expected Outcome*

The expected outcome of this thesis is to deliver relevant and feasible recommendations to the Fédération Internationale de l'Automobile in order to sustainably expand their FIA Smart Cities event by opening it up to the public. The recommendations should not only cover topics perceived as important and urgent in the eyes of the end users, and therefore help attract them to the FIA Smart Cities event. But also should they include appropriate communication strategies in order to ensure reaching potential B2C participants sustainably. Finally, suggestions on how to implement the recommended topics adequately in an event as well as what format the event might take in order to be successful should be included.

The recommendations will be based on detailed insights on reflections, needs and motivations of stakeholders of the FIA Smart Cities initiative, in particular the residents of Paris. Based on the showcase city Pairs, these recommendations will then allow the FIA to create an implementation strategy for an FIA Smart Cities event open to the grand public. Using this report as a guideline and basis model, this implementation strategy can then be adapted for events in other cities.

The goal of this thesis is not to deliver a perfectly developed implementation plan, but rather to give recommendations to the FIA on what action might be of value.

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2. Literature review

The literature review will start by quickly introducing two Smart City indexes, the IMD Smart City Index and the IESE Cities in Motion Index (CIMI), which later on, in chapter 4, will be used for determining the smartness of the city of Paris. This analysis will then allow to accurately define current challenges faced by Paris, and therefore help to point out the main topics a FIA Smart Cities event hold in Paris needs to address.

Following the introduction of the two Smart City indexes, all past seasons of the FIA Smart Cities initiative will be outlined in detail. Acquiring an in-depth understanding of the past events will allow to better understand the challenge and recognize the adjustments needed for integrating B2C participants in the FIA Smart Cities events. The recap will be started at the very beginning of the FIA Smart Cities initiative in 2017 and then gradually approach the ongoing season 2020.

2.1 *Smart City Indexes*

As mentioned in the introduction, a huge amount of different Smart City indexes exist. This thesis focuses on the IESE Cities in Motion Index and the IMD Smart City Index. The IESE Cities in Motion Index has already been used by the FIA as basis for decision making in other concerns and provides a wide ranging and holistic overview of the cities based on several key dimensions. The IMD Smart City Index, on the other hand, is considered as being one of the most relevant Indexes at the time being, taking into consideration the citizens perceptions, and therefore connects humane dimensions with economic and technological aspects.

2.1.1 IESE Cities in Motion Index (CIMI)

The CIMI, short for IESE Cities in Motion Index CIMI, is a very popular and broadly used index, existing already since several years measuring the smartness of a city. The IESE Business School Center for Globalization and Strategy in collaboration with the IESE Department of Strategy has launched already its sixth edition of the IESE Cities in Motion Index in 2019. The latest edition has become one of the city indexes with the widest geographical scope, covering 174 cities in 80 countries. All the cities have been evaluated according to the following nine dimensions, considered as key to truly

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sustainable cities: Human Capital, Social Cohesion, Economy, Governance, Environment, Mobility and Transportation, Urban Planning, International Outreach and Technology. The results are based on 96 indicators from different sources, a large number of success stories and a series of in-depth interviews with city leaders, entrepreneurs, academics and experts linked to the development of cities. The aim of this Index is to show cities their weaknesses and strengths promoting changes on a local level and encourage cities to develop ideas and innovative tools to create more sustainable and smarter cities (Berrone, Ricart, Duch, Carrasco 2019). In this thesis, the IESE Cities in Motion Index will allow to generate a general overview of the strengths and weaknesses of the city of Paris. It will give insights not only into the area of mobility and transportation, but cover a much broader range of key areas of a city, that in a way or another might also be linked to the mobility of the city.

2.1.2 IMD Smart City Index

The IMD Smart City Index, on the other hand, is a much more recent index. The index was created in 2019 by the Smart City Observatory of the IMD World Competitiveness Center, in collaboration with the Singapore University of Technology and Design (SUTD). It is one of the most popular and the only global index of its kind, ranking urban areas based on the perception of citizens (IMD 2019). The index ranks 102 cities worldwide and is based on the inquiry of 120 citizens of each city. The focus is on the perception towards the scope and impact of efforts cities take in order to transform themselves into smart cities. Therefore, in this index the resident's perspective of a city weighs heavily and shows the importance of aligning policies with the life and needs of citizens. The index is divided into two main pillars: the Structures pillar, taking in account the existing infrastructure of the city and the Technology pillar, referring to the technological provisions and services available to the population. Both of those pillars are evaluated based on five criteria, including not only economic, but also human and technological dimensions: Health and Safety, Mobility, Activities, Opportunities, Governance (Smart City Observatory 2019). This second index will allow this thesis to address challenges faced by the city of Paris, heavily based on the perception of its residents. This will enable, in accordance with the results from the CIMI, to define some main pain points of the city.

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2.2 *Past FIA Smart Cities Seasons*

After this short introduction into the two Smart City Indexes, this thesis is going to present all the past FIA Smart Cities events. As already mentioned before, the FIA Smart Cities initiative has been launched in 2017. Since then, already three seasons of the initiative have taken place, counting a total of 9 past FIA Smart Cities events. In order to being able to take decisions on the future of this initiative, first the past has to be analyzed and understood in detail. This is why the following parts outlines the past 9 internationally spread FIA Smart Cities events.

2.2.1 Season 1, 2017

In 2017, the very first FIA Smart Cities season took place in the following three locations: Mexico City, Berlin and Montreal, including a special version of the event in Paris. Each of the three basic events were based on the three pillars (explained under 1.4.1. Goal of the FIA Smart Cities Initiative): Forum, Startup Contest and Legacy. As reflected on *Figure 12,* the first season of the FIA Smart Cities initiative counted 625 participants in total, including 10 members of public authorities, 5 Formula E ecosystem representatives, 4 academic institutions, 4 leading international organizations, 4 mobility projects implementers, 3 founding partners, 7 high level FIA representatives as well as 150 journalists (FIA 2018b, p. 4-5).

The FIA Global Startup Contest of the first season received 300 applications in total, out of which 9 finalists were chosen. Those finalists were then able to pitch in front of an international jury. Which finally elected 3 winners, one winner per FIA Smart Cities event. Each winner originated from another country and focused on a distinct key area of mobility. The areas were the following: on-demand mobility services, connected and automated technologies and clean energy solutions (FIA 2018b, p. 5).

In the first season, the FIA Smart Cities Global Award was given to Montreal. The innovative mobility project handed in by the largest city of the Canadian province of Quebec was chosen as the best application, covering all the important criteria of relevance, impact and scalability. Their successful mobility-focused initiatives were then shared with all Formula E host cities, in order to serve as inspiration (FIA 2018b, p. 29).

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At the end of each forum the innovation lab part took place. As mentioned in the introduction, this on-track experience includes exclusive access to the ABB FIA Formula E Village. FIA Smart Cities attendees had then the opportunity to take part in track tours, access team garages, watch the Formula E shakedown and visit the E-Village entertainment area (FIA 2018b).

Figure 12, Forum Participants of the Season 1

Source: Internal Document, Numbers based on FIA Smart Cities Activity Report (FIA 2018b, p. 1)

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2.2.1.1 *Mexico City*

The very first FIA Smart Cities event was hosted by Mexico City on March 31st 2017, under the topic "**unlocking clean mobility solutions**". Many renowned mobility experts participated on the opening ceremony, including the persons present on *Figure 13*. From the left to the right it can be seen José Abed, President of OMDAI and FIA Vice-President for Sport, Carlos Slim Domit, Chairman of the Board of Telmex, Alejandro Agag, the CEO of Formula E and Laura Ballesteros, the Undersecretary for Mobility of Mexico City can be seen (FIA 2020s).

Figure 13, Speakers of the Opening Ceremony in Mexico City

Source: FIA Website Recap Season 1, Mexico City (FIA 2020s)

The opening ceremony was followed by two panels, bringing together experienced panelists such as local authorities, UN institutions, research and development agencies or the FIA network. The panels addressed policies and services implemented in Mexico City and how they could be adopted by other cities in their move towards sustainable urban mobility. Air-pollution and traffic congestion, known as serious challenges faced by the capital of Mexico, were also popular topics. Electrification of vehicles, on-demand mobility services and more efficient urban planning, key areas of Mexico Citie's sustainable mobility plan, were other subjects touched during this very first FIA Smart Cities forum. Finally, the private sector spoke about some recent developments in smart grid infrastructure, a technology that uses computer technology in order to improve the communication, automation and connectivity of a cities' infrastructure (Defranza 2012).

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The panel concluded in an unanimous agreement, that technology is absolutely crucial and synergetic when more and more cities are moving towards an efficient and sustainable transport system (FIA 2018b, p. 10) (FIA 2017b).

The very first winner of the Smart Cities Global Startup Contest was the Mexican startup Econduce. Mexico City being one of the most polluted and congested cities in the world, Econduce provides a network of shared electric scooters to the city. A preview of the concept of Econduce can be seen on *Figure 14*. In addition to being environmentally friendly, the service of Econduce enables citizens to avoid traffic hours and searching for parking. (*Econduce* 2020). Their offer is resumed as being affordable, reliable, efficient and fun (FIA 2018b, p. 13).

Figure 14, Electric Scooters of the Startup EConduce

Source: Smartcitylab.com (Pardo 2019)

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2.2.1.2 Paris

In the framework of the FIA Smart Cities initiative and the FIA #3500LIVES Campaign, a special event called **FIA Smart Cities Talk** took place in May 2017 in Paris. This event was not an official FIA Smart Cities event, but a debate organized under its name and the name of the #3500LIVES campaign. Using the Formula E race in Paris as platform, a discussion was arranged between Jean Todt, the President of the FIA and Anne Hidalgo, the Mayor of Paris. The key topic was **the future of urban road safety** (FIA 2018b, p. 16).

The FIA #3500LIVES Campaign searches to call attention to the fact, that every day 3500 people are killed on the roads. This number leads to about 1.25 million people annually losing their lives as a result of car accidents. Young people are particularly affected, since road traffic injuries are the main cause of death for people aged between 15 and 29 years. This is why the FIA #3500LIVES Campaign searches to reduce this numbers by raising the awareness and outlining some "Golden Rules" (FIA 2020t).

Wayde van Niekerk, the South African 400m Olympic Gold Medal Winner and World Champion, was invited to the FIA Smart Cities Talk in Paris. He is one out of 18 ambassadors of the #3500LIVES Campaign. Also Erik Solheim, executive director of the UN Environment Program (UNEP), joined the debate, encouraging the implementation of urban technologies based on safety but also sustainability (FIA 2018b, p. 16). All four above mentioned speakers can be seen on the *Figure 15*, with Jean Todt and Anne Hidalgo in the center.

Figure 15, Speakers of the FIA Smart Cities Talk

Source: FIA Smart Cities Activity Report 2017 (FIA 2018b)

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2.2.1.3 Berlin

The capital of Germany was chosen as stage for the first European Edition of the FIA Smart Cities Initiative, taking place on June 9th 2017. The topic of this event was "**unlocking new mobility solutions**" and its location can be seen on *Figure 16*. New mobility solutions become the longer the more flexible, customized and easily adaptable, and are closely linked to the automotive sector. Electrification and vehicle automation, for example, are crucial trends in the automotive sector. Germany announced, in line with its zero emission mobility plan, that their aim is to reach the status of main electric mobility provider by 2020. The conclusion of the panel discussion was, that cities should strive for linking public and private transport, in order to create a harmonized real-time multi-model transport system (FIA 2018b, p. 20) (FIA 2017c).

Figure 16, FIA Smart Cities Forum in Berlin

Source: FIA Website Recap Season 1, Berlin (FIA 2020u)

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The FIA Smart Cities Global Startup Contest in Berlin elected the Spanish startup OnTruck as winner. OnTruck is an online freight shipping platform, similar to the one from Uber or Cabify. The platform links companies to professional frights carriers, similar to the one linked on *Figure 17,* based on a real-time connectivity technology. Companies that wish to ship their goods can simply upload their jobs to an application and professional fright carriers who are located closely will pass by for the transportation. Its aim is to modernize and facilitate the transportation of goods. This process drastically reduces the amount of kilometers made by empty trucks and consequently optimizes their utilization. The service of OnTruck also helps reducing CO_2 emissions (OnTruck 2019) (FIA 2018b, p. 22).

Figure 17, Truck of the Startup OnTruck

Source: Website of El Referente (Utrera 2019)

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2.2.1.4 Montreal

The last Smart Cities initiative of the season was hold on July 28th 2017 in Montreal. Its focus was on "**unlocking Smart Data Solutions**" and the environment of the event can be seen on *Figure 18*. The main speakers of the forum were the FIA president, Jean Todt and the Mayor of Montreal, Dennis Coderre. Through regular introductions of new services and initiatives Canadian cities are becoming increasingly digital. This enables city leaders to more efficiently and practically collect and analyze transport-related data of the cities. There are two different sides of the use of technology linked to the transportation sector: on the one side, smart data helps cities to be more innovative and run smarter technology, on the other side, smart data allows the design of demand-driven policies. The discussion panels of the FIA Smart Cities event focused strongly on the importance of including the community in the technological advancement of transportation systems. Residents need to be informed in detail about the type of data that is going to be collected and the way the data will be used and implemented in urban mobility systems (FIA 2018b, p. 26) (FIA 2017d).

Figure 18, FIA Smart Cities Forum in Montreal

Source: FIA Website Recap Season 1, Montreal (FIA 2020v)

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The third and last FIA Smart Cities Global Startup Contest winner was Wavelite. This startup was elected in Montreal for its autonomous connectivity platform that enables ultra-low power sensors. Sensors can be found everywhere in today's world. They allow to understand, predict, and maximize an environment's utility. Examples are occupancy sensors in offices or smart parking systems (SWISSTRAFFIC AG 2020). In order to operate these sensors, they need a power source. Often these sources are batteries. But batteries are a finite source and need to be replaced after some time. This is where Wavelite comes in play. They have created ultra-low power sensors, which reduce the power consumption of wireless sensors and therefore dramatically increase its lifetime (Mason 2018). Consequently their connectivity platform includes sensors which are much more environmentally friendly than initial ones (FIA 2018b, p. 28).

Figure 19, Wavelite's innovating sensor transmission platform

Source: FIA Website Recap Season 1, Montreal (FIA 2020v)

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2.2.1.5 Recap of Season 1

The very first FIA Smart Cities event took place in Mexico City, on the topic of "unlocking clean mobility solutions". The conclusion of this event was, that a huge focus needs to be put on technology in a time where more and more cities are moving towards an efficient and sustainable transport system. The winning startup of this event was the Mexican startup Econduce, providing a huge network of shared scooters.

An exceptional FIA Smart Cities Talk was scheduled in this first season, taking place in Paris. This discussion went all around the future of urban road safety and was organized in collaboration with the FIA #3500LIVES Campaign.

The second real FIA Smart Cities event went down in Berlin and turned around "unlocking new mobility solutions". In this prospect, the event concluded on the idea, that cities should strive for linking public and privates transportations in order to create a harmonized real-time multi-model transport system. The second start-up contest winner was OnTruck, a Spanish online fright shipping platform.

The last FIA Smart Cities event of the season took place in Montreal and covered the topic "unlocking smart data solutions". The conclusion of this event can be resumed on the idea, that in order to guarantee a technological advancement of transportation systems the community needs to be included and informed on a regular basis. The third winning startup was Wavelite, proposing an autonomous connectivity platform that enables ultra-low power sensors.

The FIA Smart Cities award of the first season was given to the city of Montreal.

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2.2.2 Season 2, 2018

The host cities of the second season of the FIA Smart Cities initiative were the following: Santiago de Chile, Rome and Zurich. As seen in *Figure 20*, in total 890 people attended the events in 2018, which reflects a 30% increase compared to season 1. Put of those 890 attendees, 5 were Formula E ecosystem representatives, 10 were leading international organizations, 3 were academic institutions, 8 were members of public authorities, 6 were partners, 4 were high level FIA representatives, 3 were private sector representatives and 150 were journalists (FIA 2019b, p. 6-7).

Figure 20, Forum Participants of the Season 2

Source: Internal Document, Numbers based on FIA Smart Cities Activity Report (FIA 2019a, p. 2)

Regarding the FIA Smart Cities Global Startup Contest, in total there were 27 startups chosen to present their ideas in front of a jury on the Thursday before the Smart Cities Event. This reflects an extreme extension of 300% compared to the total of 9 chosen in the season before. On every of the three events taking place in season 2, 9 startups would pitch in front of the jury. One winning startup was then chosen per event to pitch in front of the FIA Smart Cities forum participants on the following day. In 2018 the three

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winners were from the following three key areas: Efficient data collection and use, shared clean mobility solutions and diversification of transport solutions (FIA 2019b, p. 8).

In the second season, the FIA Smart Cities Award counted 10 Formula E host cities who applied with an innovative mobility programs for the award. Out of those 10 applicant cities, Santiago de Chile was chosen as winner (FIA 2019b, p. 9). On *Figure 21* the award ceremony is visualized. The Plan Integral de Santiago had convinced the juries. This plan, launched in 2013, represents an agenda for improving sustainable mobility throughout Santiago de Chile as well as organizing public spaces to accommodate all road users. The plan includes the improvement of existing pedestrian infrastructures, the development of 346 km cycle lanes, the introduction of a city-wide dockless bike systems, the creation of 7 new parking areas and 12 public-transport-prioritized passages as well as the implementation of 300 electric buses and 13 bus-only streets (FIA 2019b, p. 30).

Figure 21, Handing over of the FIA Smart Cities Award 2018 to Chile de Santiago

Source: FIA Smart Cities Activity Report Season 2 (FIA 2019a, p. 31)

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2.2.2.1 Santiago de Chile

The second season of the FIA Smart Cities initiative was launched in Santiago de Chile on February 2nd 2018. The forum focused on the topic "**clean mobility for a strong economy**" and addressed topics such as vehicle emission, fuel efficiency standards or air quality measurement. The event started with opening remarks about the future urban mobility systems in Latin America (FIA 2019b, p.14). The discussion was led by Jean Todt, President of the FIA, as well as the Mayors of Santiago de Chile, Mexico City and Seville. The implementation of an e-mobility strategy in Santiago de Chile was highlighted, with a focus on the integration of electric power into the public transportation system. The opening discussion was followed by two keynotes about the decarbonization of transport and the connection for climate action across smart cities. Afterwards, a 45 minutes panel discussion took place addressing the benefits of clean transport solution. Then, a pitch of the winning startup of the FIA Smart Cities Global Startup Contest was on the agenda. The second part of the FIA Smart Cities event contained an interview with the Formula E driver Lucas di Grassi as well as track and garage visits. As usual, the FIA Smart Forum day finished with the Shakedown of the Formula E (FIA 2020w).

Figure 22, Speakers of the Opening Remarks

Source: FIA Website Recap Season 2, Santiago de Chile (FIA 2020w)

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The winner of the Smart Cities Startup Contest in Santiago de Chile was KAPPO Bike, a mobile social game with the aim to encourage bicycle use by turning every bicycle trip into an adventure. It serves as navigation tool and tracks every trip done by bicycle including the distance, time, weather, speed, altitude and jumps. Depending on the different conditions, a bicycler can get more or less points to level up as well as BikeCoins to improve the profile (*KAPPO* 2020). A reflection of a KAPPO bike app's user results can be seen on *Figure 23.* The game interface also provides its gathered user data in order to improve safety and urban planning. *"Our vision is to have a world where most of you feel motivated to use a bike every morning, feel save while using it and get home safely at the end of the day"*, stated Iván Páez Mora, the founder of KAPPO bike (FIA 2019a, p. 16)..

Figure 23, Preview of the Application of KAPPO Bike

Source: Official Website of KAPPO (*KAPPO* 2020)

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2.2.2.2 Rome

The second FIA Smart Cities event in 2018 was hold in Rome on April 13th and 14th. The event covered the subject of "**innovation in the eternal city**". Rome, the ever expanding eternal city, has one of the highest levels of motorization in Europe. Thus, in order to face the transportation challenges created, the city has launched a 10-year Sustainable Mobility Plan. The plan's aim is to improve road performance management through an assessment of congestion, urban planning and infrastructures in the city. The goal of Rome is to create efficient, inclusive and environmentally friendly mobility for all.

In this context the FIA Smart Cities forum was opened up with two keynote speeches. During this FIA Smart Cities Forum, various topics were addressed, including the scope and actions of the Mobility Plan of Rome, modern smart urban mobility innovations related to mobility and infrastructure as well as the link between new motor sport technologies and sustainable urban development. Also, as usual, panel discussion were on the plan on similar topics with speakers such as Jean Todt, the FIA President, Virginia Raggi, the Mayor of Rome, Angelo Sticchi Damiani, the President of the Automobile Club d'Italia and Enzo Bianco, FIA Vice-President for Sport (FIA 2019b, p. 20). The FIA Smart Cities Global Start-up Contest winner of Rome also held a 30 minutes pitch, In the afternoon, the FIA Smart Cities attendees could enjoy track and garage visits, as is represented on *Figure 24,* as well as the shakedown of Formula E (FIA 2020x).

Figure 24, Garage visits in Rome

Source: FIA Website Recap Season 2, Rome (FIA 2020x)

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The FIA Smart Cities Global Contest winner in Rome was Scuter, a start-up providing ultra-lights three-wheeled electric scooters. Scuter has created an affordable and sustainable way of movement in cities. The platform allows its community not only to use the three-wheeled sustainable scooters in their home town, but also in other participating cities around the world. Their service includes an app that offers tourist guides and local information. The global start-up works with franchisees and offers them all the essential hardware, software and support as well as the possibility to brand the fleets (FIA 2019b, p. 22).

Figure 25, Scuter's Scooters and its Application

Source: Scuter Website Recap Season 2, Rome (Scuter 2018)

The Rome edition of the FIA Smart Cities event included an extraordinary high-level discussion about the importance of sustainable mobility and the impact climate change has on cities. It was held between Jean Todt, the FIA President, Alejandro Agag, the CEO of Formula E Holdings and HSH Prince Albert II of Monaco. The discussion took place on Saturday after the Formula E race. During the discussion Prince Albert spoke about environmental protection and sustainable development, the main goals of its foundation created in 2006. Following, the discussion turned towards the topic of road safety in cities. Jean Todt stated: *"Our cities are not only centers of economic growth and integrations, they are also places where people should be able to move in a safe, efficient and sustainable manner."* (FIA 2019b, p. 23)

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2.2.2.3 Zurich

For the first time after long 64 years, Switzerland accepted again to host a circuit racing. The FIA Smart Cities initiative took advantage of this event and scheduled its last FIA Smart Cities event for the season on June 9th 2018 in Zurich. The subject of this last gathering of the year was "smart data to shape the cities of tomorrow". Alejandro Agag, CEO of Formula E Holdings, Peter Goetschi, President of the Touring Club Suisse and Filippo Leutenegger, Deputy Major of the city of Zurich opened up this FIA Smart Cities initiative. Their discourse covered the integration of technology in sustainable mobility as well as the importance of changing public behaviors. The two keynote speakers David Zipper, Resident Fellow of the Urban and Regional Policy Program of the German Marshall Fund and Karen Vancluysen, Polis Secretary General, followed. In their speeches they addressed data flows to optimize public-private cooperation and the use of data for more efficient policy making. Then, Sébastien Buemi, a professional Formula E driver, was interviewed about the sustainable future of the Formula E championship. This interview is visualized in *Figure 26.* The following panel discussion addressed the digital future of Smart Cities. Also, an extraordinary presentation on the United Nations' work on sustainable innovation was on the agenda. This talk was held by Natha Borgford-Parnell, Science Affairs Officer at the Climate and Clean Air Coalition of the United Nations Environment Program (FIA 2019b, p. 26). After the lunch break the pitch of the winning startup of the FIA Smart City Global Startup Contest was held. And finally, the participants were invited to some track activities and the shakedown (FIA 2020y).

Figure 26, Interview with Sébastien Buemi

Source: FIA Website Recap Season 2, Rome (FIA 2020x)

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The last Global FIA Smart Cities Startup Contest of the season elected the startup Parquery as winner. Using CCTV cameras and computer vision software, Parquery has created a scalable real-time smart parking solution that helps to monitor the use and availability of parking spaces. The cameras take images of the parking spaces on a regular basis, usually every 1 to 5 minutes. These pictures are then sent to the cloud server of Parquery, where their software analyzes parking occupancy in real time. Parquery can be used by city administrations in order to increase parking efficiency. The strengths of the solution presented by the startup was the easy implementation through limited hardware investment and existing CCTV camera networks. Furthermore, it can help cities to generate revenues from illegal parking enforcement and can be used to plan and manage congestion and occupancy of the cities' roads.

Figure 27, Parquery Parking System

Source: Scuter Website Recap Season 2, Rome (Scuter 2018)

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2.2.2.4 Recap of Season 2

The second season of the FIA Smart Cities initiative was introduced in Santiago de Chile on the topic of "clean mobility for a strong economy". It addressed the integration of electric power in the public transportation system in Santiago de Chile as part of their e-mobility strategy. The first winner of the season of the FIA Smart Cities Global Startup Contest was KAPPO Bike, a startup who offers a mobile social game turning every bicycle trip into an adventure.

The second FIA Smart Cities host city was Rome. The event was held about the "innovation in the eternal city". It mainly addressed the scope and actions of the 10-years sustainable mobility plan of Rome as well as modern smart urban mobility innovations. The second startup contest winner was Scuter, a startup providing ultra-light three-wheeled electric scooters to the population. This FIA Smart Cities event also included an extraordinary high level discussion about the importance of sustainable mobility and the impact climate change has on cities.

The last event of the second season was held in Zurich covering the topic of "smart data to shape the cities of tomorrow". The main focus of this event was on the integration of technology in sustainable mobility. This included the gathering of data flows in order optimize the cooperation between public and private mobility as well as to turn policy making more efficient. The last startup contest winner of the season was Parquery, a startup offering scalable real-time smart parking solutions.

Santiage de Chile was the city who won the FIA Smart Cities award in season 2, due to their Plan Integral de Santiago.

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2.2.3 Season 3, 2019

The third season of the FIA Smart Cities initiative took place in Hong Kong, Mexico City and Rome. By including Hong Kong, the FIA Smart Cities spread for the first time to Asia. Mexico City and Rome were keen to host the event already for the second time. As can be seen on *Figure 28,* the total number of attendees of the third season has again increased compared to the prior year, with a total of 1136 attendees. The events of 2019 counted with a rate of 60% much more participants from the private sector than in 2018. Summarized on *Figure 28* it can be recognized*,* that there were 6 Formula E representatives among the events, as well as 7 FIA clubs and high-level representatives, 3 academic institutions, 5 international organizations, 4 members of public authorities, 5 partners and 17 private sector representatives. Also in this figure the increase in the participation of the private sector is well reflected (FIA 2020n, p. 6-7).

Figure 28, Forum Participants of the Season 3

Source: Internal Document, Numbers based on FIA Smart Cities Activity Report (FIA 2020n)

In 2019, the FIA Smart Cities Global Startup Contest was newly driven by MassChallenge Switzerland, a Swiss start-up accelerator organization (see 1.4.2.5. MassChallenge for more details). A total of 108 startups applied in this season,

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representing a lot less than in the first season. Out of those 108, 18 startups were chosen for pitching in front of a jury of mobility experts. These selected startups were divided into the three FIA Smart Cities events of the season, leading to inviting 6 startups per event. In total 4 contest winners were elected, two of them in Hong Kong since the juries struggled to decide on one single winner. The winners came from three different countries and were active in the following key areas: Internet of Things (IoT), autonomous driving and mobility, the sharing economy, digital services smart infrastructure, big data and artificial intelligence (FIA 2020n, p. 8-9).

The third edition of the FIA Smart Cities Award was given to Rome for its Capstone Project on Mobility. The goal of this project was to create a report providing an overview of Rome's urban mobility statistics, with a primary focus on the city's Sustainable Urban Mobility Plan (PUMS) and its objectives. This report offered some short-term, medium-term and long-term recommendations to Rome. These recommendations included introducing safe mobility solutions for children in the short term, encouraging the use of electric cars in the medium term and upgrading the existing public transport network in the long-term (FIA 2020n, p. 10-11).

In the third edition of the FIA Smart Cities initiative, the FIA decided to help create and participate in three side events in cooperation with different organizations. All of those events shared the FIA Smart Cities' main goal of creating smart and sustainable mobility. The three side events were the following: EVER Monaco, the GreenTech Festival and Movin'On. They are going to be quickly outlined below and visualized on *Figure 29*:

- On May 10th 2019, the first side event took place in Monaco, on the occasion of the **EVER Monaco** and the Formula E race. EVER Monaco is a three-days international conference and exhibition on ecological vehicles and renewable energies (EVER Monaco 2020). H.S.H Prince Albert II of Monaco, who collaborates on several levels with the FIA, was one of the main sponsors of this event. The FIA Smart Cities has created a high-level panel on sustainable urban mobility for the EVER Monaco. Invited speakers were inter alia Jean Todt, the FIA President, Alejandro Agag, CEO of the Formula E Holdings and Lucas di Grassi, a Formula E Driver (FIA 2020n, p. 32).
- On May 23rd 2019, the FIA Smart Cities participated on the **GreenTech Festival**. Again, this event took place in conjunction with the Formula E Race, this time in Berlin. The GreenTech Festival is a huge three-day festival on the topic of future-oriented

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green technologies. This event includes conferences, exhibitions, concerts and award ceremonies (GreenTech 2020). The FIA Smart Cities agreed to organize the whole future mobility section of this event. The FIA President Jean Todt was invited to hold a keynote speech and an "FIA Smart Cities sessions", representing an interactive panel discussion, was organized. Also, three FIA Smart Cities Global Startup Contest winners had the chance to pitch on this event. (FIA 2020n, p. 33).

- The third side event took place in Montreal on June 4th – 6th. Michelin, a founding partner of the FIA Smart Cities initiative, invited the FIA to its **Movin'On Summit.** As mentioned in the introduction, the Movin'On Summit is known as currently being the leading smart mobility event in its environment. The Movin'On Summit presents technical solutions and concepts for sustainable mobility in road traffic (Movin'On 2020). In this side event, the FIA Smart Cities could involve themselves to a high extent, by organizing different speakers, an interactive panel discussions and a booth (FIA 2020n, p. 34).

Figure 29, Insight in the three side events of 2019

Source: FIA Smart Cities Season 3 Activity Report (FIA 2020n)

The main part of the FIA Smart Cities initiative, however, obviously remained the three FIA Smart Cities events. As for the other seasons before, these three events are going to be outlined more in detail in the following section.

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2.2.3.1 Mexico City

In 2017, the first FIA Smart Cities event, being the very first event of its kind, took place on March 31st 2017 in Mexico City. Two years later, on February 15th 2019, the event returned to the Mexican capital. The topic this time was "**measuring smart mobility**". José Abed, FIA Vice President for Sport, opened the Forum with a speech about the successful development of the FIA Smart Cities Initiative. The opening ceremony continued with three other speeches about the mobility transformation of today and tomorrow.

Figure 30, Caption of the Opening Ceremony in Mexico City 2019

Source: FIA Smart Cities Season 3 Activity Report (FIA 2020n, p. 17)

The ceremony was followed by an opening panel about Mexico City and its vision towards the smart cities movement. The importance of focusing on the users' needs when defining public policies was one of the main points highlighted. Two keynote speeches followed the opening panel about the mobility in the age of the 4th industrial revolution and smart cities indicators. Both keynotes highlighted the importance of cooperation between the public and private sector in the creation of urban mobility. Two panel discussion followed, enabling different city officials to debate about and exchange on their strategies and best-practices. Their discussions put a main focus on electrification and decarbonization, since many Latin American cities face challenges linked to those topics (FIA 2020n, p. 16). After a short pitch of the winner of the startup contest, the attendees could enjoy a Formula E insight, a garage visit at Jaguar and the pleasure of watching the Formula E Shakedown. During the Formula E insight, the

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attendees had the opportunity to meet a Formula E Driver as well as the Director of the Panasonic Jaguar Racing team (FIA 2019b, p.8-9).

The Mexican start-up **Urbvan** won this first-of-the-season FIA Smart Cities Global Start-up Contest in Mexico City. They were able to prevail against 5 other start-ups. The objective of Urbvan is to improve commuting in Mexico by making it more affordable, efficient, secure and comfortable. As solution they have created a shared shuttle service in vans such as the one on *Figure 31.* This shuttle service has predefined stops along the busiest routes of Mexico City. The schedule, routes and reservation possibilities are all gathered in an application called Urbvan and are therefore very easily accessible. (Urbvan 2020) (FIA 2020n, p.18).

Figure 31, The Van Model of the startup Urbvan

Source: Urbvan Website (Urbvan 2020)

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2.2.3.2 Hong Kong

The second FIA Smart Cities event of season took place in Hong Kong on March 9th. The event turned around the topic of **disruptive technologies**, including drones, driverless cars and automated technologies. Since the inception of the FIA Smart Cities initiative two years ago, the Hong Kong edition was the first of its kind performed in Asia. This is, inter alia, why the event was opened up by a speech of Ringo Lee, President of the Hong Kong Automobile Association. He highlighted the positive impact of initiatives such as the FIA Smart Cities. The forum continued with a keynote speech of Dr. Marija Zima, the Research Team Manager of Power and Energy Systems at ABB, discussing how cities prepare for the urban revolution. Further discussions and panels were held, addressing the mobilizing for smart cities, automation technologies and new opportunities established through urban logistics.

Figure 32, Insight in the FIA Smart Cities Forum in Hong Kong

Source: FIA Smart Cities Season 3 Activity Report (FIA 2020n, p. 17)

Ian McBeth, Head of Foresight at the Transport for London, accentuated in one of the discussion the importance of taking into consideration the users' needs when implementing new technological developments. As for the previous FIA Smart Cities events, attendees were then enabled to enjoy Formula E insights, a meeting with a Formula E driver and exchanges about the advancing electrification in racing with two team principals (FIA 2019c). The two winners of the FIA Smart Cities Global Start-up Contest pitched then in front of the forum participants, before they could go on a garage tour, visit the circuit and watch the formula E shakedown(FIA 2020n, p. 22).

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As already mentioned in the introduction of the 3rd season, the Hong Kong edition of the FIA Smart Cities event elected not one but two winners for its FIA Smart Cities Global Start-up Contest. According to Stephane Dézérable, Head of CSR Fundraising and Strategic Alliances at the FIA, this was because the jury struggled to decide on one winner. The first of the winning start-ups was the USA based **NOHMS Technologies**. They have discovered a way to make batteries run longer, faster and safer. All this can be offered at an affordable price, through the use of non-flammable liquid electrolytes. A comparison of a normal battery compared to one of NOHM Technologies can be seen on *Figure 33*. NOHMS Technologies focuses on batteries for electric vehicles as well as mobile devices (NOHMS 2020). (FIA 2020n, p. 24)

Figure 33, A Commercial Li-ion Battery vs. a NOHMS Electrolyte Li-ion Battery
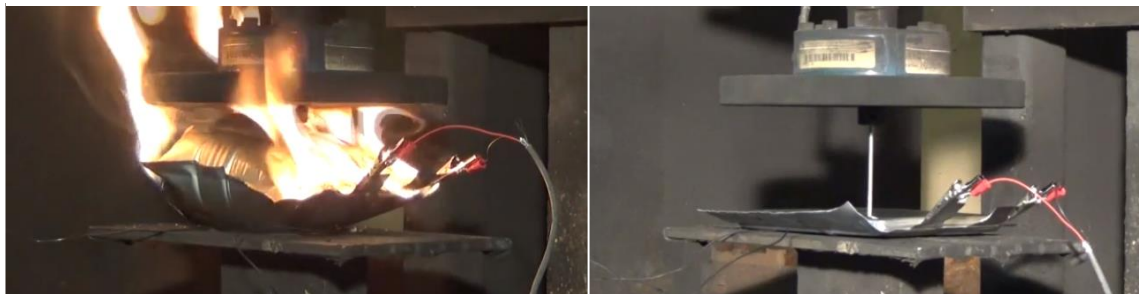
Source: Vulcan Post (NOHMS 2020)

The second winner of the FIA Smart Cities Global Start-up Contest was the Singaporean start-up **MOOVAZ**. This start-up searches to improve international relocation by turning it into a much less stressful process. Currently, the process of relocation includes issues in terms of visibility, communication and transparency (Tan 2020). MOOVAZ uses big data and machine learning to ensure transparency, efficiency and convenience for its users (FIA 2020n, p. 24).

Figure 34, Global Relocation Startup Moovaz

Source: Vulcan Post (Tan 2020)

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2.2.3.3 Rome

Rome hosted the third and last FIA Smart Cities event of the season 3. The event was built up around the question **how public and private actors can lead the new mobility transition**. Victoria Raggi, the Mayor of Rome, Alejandro Agag, the Founder, CEO and Chairman of Formula E Holdings as well as two other speakers opened up the forum, as is visible on *Figure 35.* Alejandro Agag highlighted the close connection between the Formula E Championship and the means of transport in the urban environments.

Figure 35, Alejandro Agag at the Opening Ceremony in Rome

Source: FIA Smart Cities Activity Report Season 3 (FIA 2020n, p. 29)

A discussion session about policies for the cities of the future followed, where Philippe Close, Mayor of Brussels and Virginia Raggi, Major of Rome, rose to speak. Philippe Close underlined, that cooperation for public policies are key in order to successfully implement technological innovations. According to the Mayor of Rome, a main point to consider is also the creation of consumer confidence towards new technologies. The FIA Smart Cities Forum continued with two keynote speeches and two panel discussions. They addressed the challenge of finding a balance between conventional and new mobility and finding the right innovative solution in order to meet the user demand. Then, a pitch of the winner of the FIA Smart Cities Global Startup Contest was scheduled. The FIA Smart Cities event in Rome ended with a Formula E Team presentation, a garage tour and the watching of the Formula E shakedown (FIA 2019d).

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PARKNAV was the FIA Smart Cities Global Startup Contest winner in Rome. The American start-up uses artificial intelligence to detect open on-street parking slots in real time. They do not use any hardware or sensors and the system works 24 hours a day during 7 days a week. The application provides the possibility to choose between free, paid and permit on-street parking types. It also takes into account parking restrictions and calculates the probability to find a parking in a street (Parknav 2020) (FIA 2020n, p. 30).

Figure 36, Parknav Application Preview

Source: Website Parknav (Parknav 2020)

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2.2.3.4 Recap of Season 3

The third season of the FIA Smart Cities initiative was started in Mexico City. This event turned around the topic of focusing on users' needs when defining public policies. It highlighted the importance of cooperation between the public and private sector in the creation of urban mobility. The first startup contest winner of the third season was Urbvan, a startup who offers a shared shuttle service to its residents.

The second FIA Smart Cities event was hosted by Hong Kong and covered the topic of disruptive technologies. It reflected the importance of taking into consideration the user's needs when implementing new technological developments. The two winning startups of this event were NOHMS Technologies, who have discovered a way to make batteries run longer, faster and safer, and MOOVAZ, a startup who searches to improve the international relocation process..

Rome hosted the last event of the season, searching to answer the question how public and private actors can lead the new mobility transition. One of the conclusions of the forum were, that cooperation for public policies are key in order to successfully implement technological innovations. Another point highlighted during the forum was the importance of creating consumer confidence towards new technologies. The chosen startup winner of this FIA Smart Cities event was Parknav, offering an application helping to detect open on-street parking slots in real time.

The FIA Smart Cities award of the third season went to Rome as recompense for its capstone project on mobility.

This season also went a bit further than the previous ones by participating on three side events: EVER Monaco, the GreenTech Festival and the Movin' On Summit.

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2.2.4 Season 4, 2020

The fourth season of the FIA Smart Cities initiative has taken a slightly different course than planned. Initially, the "Fédération Internationale de l'Automobile" intended to organize four, instead of the usual three FIA Smart Cities events listed on *Table 1*. The plan was to start in Paris on April 17th with an event on "data-driven mobility in smart cities" (FIA 2020z). A few weeks later, on May 2nd, the next FIA Smart Cities event would have been hosted in Seoul on the topic of "mobility in the megacity of the future" (FIA 2020aa). The third event was scheduled for July 10th in New York City on "making transport more sustainable" (FIA 2020ab). And on July 24th the last FIA Smart Cities initiative of the 4th season would have taken place in London, covering topics regarding "managing transportation" (FIA 2020ac). The entire initial planning can be seen on

Table 1, Initial planning of the FIA Smart Cities season 4

	Forum 1	Forum 2	Forum 3	Forum 4
Location	**Paris**	**Seoul**	**New York City**	**London**
Date	April 17th	May 2nd	July 10th	July 24th
Topic	**Data-driven mobility in smart cities**	**Mobility in the megacity of the future**	**Making transport more sustainable**	**Managing transportation**

Source: Internal Document, based on numbers mentioned above

The FIA expected that the number of participants of the 4th season will exceeded the number of participants of the previous season, continuing its increasing trend. According to Stephane Dézérable, Head of CSR Fundraising and Strategic Alliances at the FIA, the expected numbers of attendees varied according to the different locations. While the FIA expected around 600 participants in Seoul, they expected only around 250 in Paris. For London and New York City, around 500 attendees were anticipated. These numbers were visually summarized on *Figure 37*. The variations might be due to the limitations of the locations as well as the fact, that Asian countries host Smart Cities less regularly than European or American ones.

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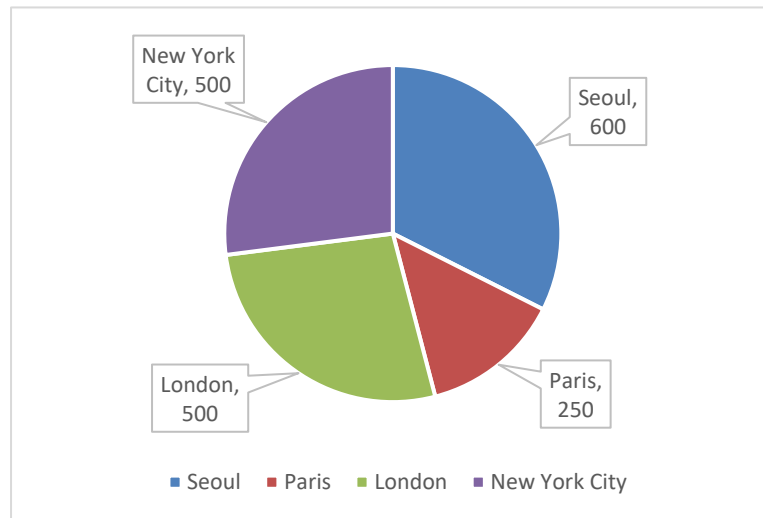
Source: Internal Document, Numbers based on discussion with Stéphane Dézérable

The scheduled program of each FIA Smart Cities event in 2020 was very similar to the one from the past seasons. The forum was still planned to represent the main part of each event, including keynotes, panels and on-stage interviews. The Innovation Lab with garage and track visits, E-village insights and the shakedown was also still on the agenda. Four FIA Smart Cities Global Startup Contest were planned in collaboration with MassChallenge, choosing one winner start-up per event. Also the FIA Smart Cities Award was envisaged to be handed over again to a Formula E host city, as reward for its innovative solutions encouraging safe, efficient, intelligent and integrated urban mobility.

As a result of the global outbreak of the coronavirus disease (COVID-19), however, all the FIA Smart Cities events had to be postponed. Due to the high risk of infection and rapid dissemination of COVID-19, the realization of any kind of people-gathering events seemed absolutely irresponsible. As result, an official mail from Andres McKellar, the Secretary General for Automobile Mobility and Tourism at the FIA, was sent on March 23rd 2020, confirming the postponement of the 4th season of the FIA Smart Cities initiative. The COVID-19 pandemic turned out to be more persistent than initially hoped. Therefore other alternatives for the execution of the FIA Smart Cities were researched.

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This is where the FIA has decided to switch to a virtual version of the FIA Smart Cities initiative. This decision did not only allow to respect the provisions taken concerning the COVID-19, but also enables an international audience to attend and engage with the initiative.

2.2.4.1 FIA Smart Cities Digital Forum 2020

In the new agenda, three FIA Smart Cities Digital Forums were scheduled, each of them focusing on another regional area, in order to ensure convenience in time zones. The dates, topics and regional zones of the FIA Smart Cities Digital Forums 2020 are listed on *Table 2*. The topics of the so called eForums have been adapted to the COVID-19 crisis. In order to hold these eForumes, a new webpage has been created, called fiasmartcities.tv. A snapshot of this platform can be seen on *Figure 38.*This website is only accessible on subscription, in order for the FIA to gather data of all the participants and facilitate networking. Each attendant has then to create an account with some personal information including its job, his name or even a picture, in order to turn the e-event a bit more personal.

Figure 38, The platform FIA Smart Cities TV

Source: FIA Smart Cities TV (FIA 2020ad)

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Table 2, FIA Smart Cities Digital Forums 2020

	Forum 1	**Forum 2**	**Forum 3**
Date	July 22nd	September 23rd	November 12th
Title	**COVID-19 and its Impact on Urban Mobility**	**Resilience and Adaptation to a new Mobility Normal**	**Planning for a Smarter City**
Regional Focus	Europe	Asia	America
Topics Covered	• Scenario planning for sustainable urban mobility in the current crisis • Ensuring freedom of personal mobility • Behavioral shift of road users in urban mobility	• New consumer demands and new goods and services opportunities • Accelerating innovation • Preserving gains in air-quality, electrification and low emissions drivetrains	• Remarking urban mobility that is fir for purpose • Connectivity and data to future proof cities • Ensuring safety, sustainability and accessibility for all road users I a COVID-19 world

Source: Internal Document, Numbers and Images based on FIA Smart Cities Plan for 2020 (FIA 2020ae)

The virtual version of the FIA Smart Cities eForums had to be cut down from one day into two hours, in order to ensure the digestibility of this online event. Moreover, the FIA has decided to split the eForums into two sessions of one hour each, with the aim of further lightening the virtual meeting. Also, the sessions were planned to be pre-recorded and broadcasted in order to ensure professionalism and relevancy. A final question & answer part, where participants have the chance to write their questions in a chat box, however, was planned to be hold in live. The entirety of program of a FIA Smart Cities Digital Forum can be seen in the list below (FIA 2020ac):

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1. either a keynote or opening remarks,
2. a panel discussion with internal and external participants
3. a pitch of a winner of the FIA Smart Cities Global Startup Contest 2020
4. Live Q&A session

In addition to the above listed program, arrangement have been made for having a virtual exposition space available. In this "Expo-space", FIA Smart Cities Partners such as MassChallenge, ABB or Julius Bär as well as other interested parties can apply for having like a virtual booth. During the breaks and after the FIA Smart Cities eForum, the participants can virtually visit those expo-spaces. The exhibitor has there the possibility to introduce their organization and their projects in written form, by uploading documents or videos or simply linking their platform. Attendees can there also request to have a small networking session with a representative of the organization or simply send a mail. An extract of the exhibition space of the World Business Council for Sustainable Development can be seen on *Figure 39*.

Since a main part of the usual FIA Smart Cities events also consisted of networking between the participants, the platform fiasmartcities.tv also included a networking corner. In this corner the participants were given an overview of all the other attendees and they might then start a chat-conversation between each other in order to do some networking.

Figure 39, Expo-space of the World Business Council for Sustainable Developments

Source: FIA Smart Cities TV (FIA 2020ad)

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eForum 1, Europe

As of the deadline of this thesis, only one eForum has took place. Working with the tools available, this eForum is going to be resumed in the following part.

On July 22nd 2020, the first FIA Smart Cities eForum was held online on the topic of "**COVID-19 and its Impact on Urban Mobility**". It regional focus was put on Europe. The eforum was opened up by a speech of Jean Todt, the FIA President. He highlighted the mobility challenges and opportunities created by the COVID-19 crisis and that safety needs, more than ever, to be put at the core value of all transportation systems. The event continued with opening remarks from Andrew McKellar, FIA Secretary General for Automobile Mobility and Tourism. He shed light on the way FIA Member Clubs had to adapt to the crisis in order to continue meeting consumer's needs in this challenging environment (FIA 2020af).

"Immediately after the lockdown, individual transport modes increased while shared transport modes remained low in usage" (Wiesinger, 2020), Bernhard Wiesinger, Director for Consumer and Member Interests of the automobile, motorcycle and touring club of Austria (ÖAMTC) highlighted in the following keynote session. He expects, however, that shared services will increase again up to the level they were before the COVID-19 crisis, as soon issues related to its cleanliness are resolved. Up until this point the ÖAMTC will focus on shared mobility with their Easy Way eScooter platform (FIA 2020af).

The next part of the eforum consisted of a panel session addressing the challenge of using real-time data to measure shifts in road users' behavior. This discussion took place between Thomas Deloison, Director for Mobility of the World Business Council for Sustainable Development, Dr. Young Tae Kim, Secretary General of the International Transport Forum and Karen Vancluysen, Secretary General of POLIS Network. This panel session highlighted the need of a better integration between public transportation services and shared mobility services and therefore improved cooperation between public and private sectors (FIA 2020af). Dr. Young Tae Kim also mentioned:

"Connection was considered as a good thing so far. We tried to connect people and goods, but now we know that sometimes too much connection can create some problems because a virus can be propagated more easily. So, maybe, we need a more

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solid resilience system which can facilitate connection and disconnection according to the situation." (Dr. Young Tae Kim, 2020)

Finally, the winning startup of the European version of the FIA Smart Cities Digital Global Startup Contest, explained more in detail in the following paragraph, pitched in front of the eforum participants. Being a data aggregator specialized in shared mobility services, this startup explained how they currently adapt their offer in order to stay relevant in a new mobility reality (FIA 2020af).

2.2.4.2 FIA Smart Cities Digital Global Startup Contest 2020

Also the FIA Smart Cities Global Startup Contest was digitalized due to the coronavirus disease. In order to being in accordance with the FIA Smart Cities eForum, it was decided that the Startup Contest will take place three times as well, divided on the same three regional areas Europe, Asia and America. However, since startup applications of North American and South American startups are very hard to compare, the decision was taken to choose a winner of each of the two regions, leading to the initially planned total of 4 winning startups. In this season, 200 startup applications were received in total. Out of those, 6 startups per above mentioned continent were chosen for digitally pitching in front of an international jury of mobility experts (FIA 2020ag). As for the previous season, the startup challenge was powered by the start-up accelerator MassChallenge Switzerland (see 1.4.2.5 MassChallenge for further information). For the FIA Smart Cities Digital Global Startup Contest, the digitalization did not ask for a lot of adjustments, since the contest has always been hold behind closed doors, not open to any B2B, B2G or B2C public, and rather short in time. As could be seen in the outlining of the European eForum, the winning startups will still have the possibility to hold a pitch during the FIA Smart Cities eForums. The adapted schedule for the FIA Smart Cities Digital Global Startup Contest including the winner startups can be seen on *Table 3.*

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	European Edition	**Asian Edition**	**American Edition**
Date	April 16th	May 28th	July 9th
Regional Focus	Europe	Asia	North America
			South America
Winners	fluctuo	Aurassure	Commutifi
			inmotiongroup

Source: Internal Document, Numbers based on FIA Website and FIA Smart Cities Plan for 2020 (FIA 2020ae) (FIA 2020ag) (FIA 2020ah)

The French Startup **Fluctuo** has won the first virtual FIA Smart Cities Global Startup Contest. The winner of the European edition is an independent data specialist, that focuses on shared-mobility services including bikes, scooters, mopeds and cars. As can be seen on *Figure 40,* the startup Fluctuo offers a map with many different shared-mobility vehicles and their real-time location and availability. On the maps, over 90 operators are listed in more than 400 cities. In addition, the startup makes a city-centric board available offering powerful data insights such as fleets or trips in over 28 European cities (Fluctuo 2020).

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Source: Website Fluctuo.com (Fluctuo 2020)

The Indian startup **Aurassure** was elected as winner of the Asian edition of the FIA Smart Cities Digital Global Startup Contest. Aurassure offers a system that addresses environmental concerns. May it be pollution, weather or flood, the product of Aurassure never misses to send alerts. Its devices, mapped on *Figure 41,* capture data from different zones in a city such as public places, traffic posts, parks or residential areas. Then, this data is sent to their platform. As result, the platform can offer round-the-clock and real-time monitoring as well as environmental visualizations, trends, predictions and forecasts, as seen on *Figure 41.* The platform, that is accessible through a mobile app or web service, is also able to send regular messages, alerts and notifications. The solution of Aurassure helps Governments and citizens to take data-driven and environmentally responsible decisions (Aurassure 2018).

Figure 41, Device and Software Platform of Aurassure

Source: Website Aurassure.com (Aurassure 2018)

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The winning startup of the North American FIA Smart Cities Digital Startup Contest is **Commutify**. This startup provides insights on commuting behaviors and targeted mobility solutions to businesses, real estates and municipalities. Their goal is to help achieve faster, cheaper and greener commutes for everyone. They can, for example, help a business find out commuting challenges of their employees and help them resolve them in order to save time, money and enhance employee productivity (Commutify 2020). An extract of the Commutify platform can be seen on *Figure 42.*

Figure 42, Extract of the Commutify platform
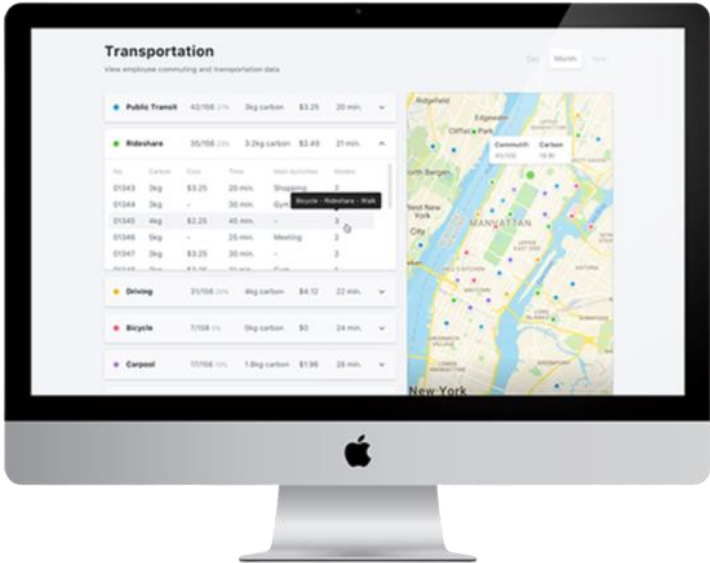
Souce: Website Commutify (Commutify 2020)

The South American winner of the FIA Smart Cities Digital Startup Contest is the **Inmotiongroup**. This startup offers cities the possibilities to understand and optimize the mobility of people an things. Their offer is split into three parts, the "data analytics" part, where they acquire in-depth knowledge about the community's mobility, the "product and service aggregators" part, finding mobility solutions in order to improve the communities experience, budget and environmental impact and the "turn-key operation and monitoring" part, where the startups offer to manage all the mobility operations (Inmotiongroup 2020). The three steps are visually presented on *Figure 43.*

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Souce: Internal Document, Based on Website Inmotiongroup (Inmotiongroup 2020)

2.2.4.3 FIA Smart Cities Digital High Level Panel

In the virtual season 4 of the FIA Smart Cities initiative a new element has been added. This element consists of a High Level Panel that will take place in November 2020. This panel will be hold between Jean Todt, the President of the FIA, and the CEOs of all the partners of FIA Smart Cities. This will include the CEO's of Formula E, ABB, Michelin and Julius Bär and MassChallenge (FIA 2020ae). More details on the FIA Smart cities Digital High Level Panel, such as the discussed topics, will be published as the due date moves closer.

2.2.4.4 FIA Smart Cities Voices

Another newly added element of the FIA Smart Cities initiative is the FIA Smart Cities Voices. The FIA Smart Cities Voices is a series of podcasts and video interviews with global mobility experts. The experts will discuss the ongoing changes in the urban mobility environments and share their views on how the cities of tomorrow might be navigated. It will enable the FIA to digitally communicate the latest ideas and developments in smart urban transport transformation (FIA 2020ai). This new digital communication strategy will allow the FIA to increase the awareness of their initiative and drive community engagement. The podcast series will be posted on the website of FIA Smart Cities fiasmartcities.com as well as on all main podcast directories including Spotify, Apple Podcasts, Ausha and Deezer.

In the prospect of digital communication, also a LinkedIn profile has been created, dedicated to FIA Smart Cities. This will help to keep in touch with, and further engage, any kind of end users (BB, B2G, B2C). Therefore, the FIA Smart Cities Voices podcasts will also be available on this profile as well as on the FIA's social media channels (FIA

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2020ai). The planning of the releases of the podcasts during the 4th season of the FIA Smart Cities initiative is detailed in the following *Table 4*.

Table 4, FIA Smart Cities Voices Agenda 2020

	Podcast 1	Podcast 2	Podcast 3
Date	May 28th	June 25nd	July 21th
Expert	**Carlos Moreno** Smart Cities Special Envoy for Mayor of Paris	**Ian James** Team Principal, Mercedes Benz EQ FE Team	**Luis Puerto** Director of the RACC Foundation
Topic	The 15-Minute City	Formula E: An Incubator for Tomorrow's Mobility	Rethinking Mobility Services

Source: Internal Document, Numbers based on FIA Website and FIA Smart Cities Plan for 2020 (FIA 2020ae), and Ausha Podcast Website (Ausha 2020)

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2.2.4.5 Recap of Season 4

The entire Season 4 of the FIA Smart Cities initiative had to be turned into a virtual one, due to the outbreak of the COVID-19 crisis. In this prospect, the platform FIA Smart Cities TV was introduced, aiming to host all FIA Smart Cities eForums. This platform also offers virtual expo-spaces and a networking corner.

It was decided on holding three FIA Smart Cities eForums in Season 4, each with a distinct regional area focus. The first of them was scheduled for July 22nd, focusing on the regional area Europe. The topic of this eForum covered "Covid-19 and its impact on urban mobility. The second eForum is planned for September 23rd, focusing on Asia and talking about the "resilience and adaptation to a new mobility normal". The last event of the season is going to focus on the regional area America and will be hold on November 12th on the topic of "planning for a smarter city".

Also the FIA Smart Cities Startup Contest was transformed into a virtual event, though still closed to the public. The winner of the European Edition was Fluctuo, an independent data specialist startup, which focuses on shared-mobility services. The Asian winning startup was Aurassure, offering a system that addresses environmental concerns. Commutify was the winner of the North American Startup Contest, providing insights on commuting behaviors and targeted mobility solutions. Finally, the inmotiongroup could outperform the other startup with a regional focus on South America, offering cities the possibilities to understand and optimize the mobility of people an things.

A completely new event in season 4 will be the FIA Smart Cities Digital High Level Panel, bringing together the President of the FIA and all the CEO's of the FIA Smart Cities Partners, in order to discuss topics linked to urban mobility.

In this recent season, also the digital communication strategy was a bit reconsidered by creating a LinkedIn profile dedicated to the FIA Smart Cities initiative. Also regular podcasts will now be created, accessible to the grand public.

Due to the circumstances with COVID-19, the third pillar Legacy was shifted in the background of this year's FIA Smart Cities imitative.

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3. Methodology

The main goal of this thesis is to give recommendations to the "Fédération Internationale de l'Automobile" on how to encourage the general public to get included in the FIA Smart Cities Initiative. This chapter lists different methodologies used in order to reach those recommendations.

3.1 _FIA Smart Cities initiative_

To start with, the literature review outlined all the of the past FIA Smart Cities initiatives. This aimed at giving a detailed understanding of what the FIA Smart Cities events looked like up until now. It is crucial to have this basis knowledge, in order to give accurate recommendations on how to adapt the event for integrating end consumers. These data were acquired through secondary data. The participation in some main meetings of the FIA Smart Cities and its partners allowed to have an insight into current challenges faced by the FIA Smart Cities initiative. In addition, it permitted to understand the different point of views of the official partners of the FIA.

In the same idea, the participation of the FIA Smart Cities event in Paris on April 17th 2020 was scheduled. This would have allowed to do observations and therefore have an even better idea of the initiative, its program, its atmosphere and current participants. The fact that it was scheduled to take place in the chosen showcase city of this thesis, Paris, would have been another advantage. In addition, the real-life participation of an event would have given the possibility to hold interviews with participants and representatives of the different partners of the FIA Smart Cities Initiative. To know the opinions and feelings of the partners towards the future and possible integration of end users in the initiative, adds an additional value. However, due to the global outbreak of the coronavirus pandemic (COVID-19), all the FIA Smart Cities events of 2020 had to be cancelled. This is why, unfortunately, this part of the strategy had to be adapted.

Up until the submission date of this thesis, the planning of the season 4 of the FIA Smart Cities Initiative was very vague and projects were changed and adapted on a regular basis. This added an unexpected challenge to the task in terms of organization, communication and time management. However, it opened up completely new doors, such as the exploration and participation of virtual events including the usually closed-

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door FIA Smart Cities Global Startup Contest. Unfortunately, most of the virtual events were postponed to after the submission deadline of this thesis, but still two events could be attended: the FIA Smart Cities Digital Global Startup Contest for North and South America on July 9th 2020 as well as one FIA Smart Cities Digital Forum on July 24th.

Based on the examination of the past FIA Smart Cities events in the literature review and the participation of the above mentioned events, some assumptions and statements will be able to be made at the beginning of the analysis part of thesis. These assumptions and statements will covered the parts communication, content and event structure of the FIA Smart Cities initiative. Some of the main points covered in this part are the definition of the target audience, some insights on the communication strategy and a comparison of virtual vs. physical events. Also a lot of outstanding questions will be addressed, in order to ensure including them in the continuation of the analysis.

3.2 *Analysis of the Needs of Parisian Citizens*

Since events and results in general might differ widely depending on the city, the recommendations resulting out of this thesis will be based on the showcase city Paris. It was decided to not only focus on the city of Paris but on the entire Region of Paris, with a focus on the city of Paris. There are for example a huge number of people working in Paris but living in the Region of Paris. Therefore, the mobility exchange in the whole region is from importance.

In order to encourage residents of Paris to participate on a FIA Smart Cities event, the most important point is to understand what main issues in terms of mobility and transportation Paris faces in the point of view of their residents. If the FIA Smart Cities initiative manages to address these main pain points and give the Parisians a voice, their initiative will very quickly grow in popularity. Based on this assumption, the French capital will first be analyzed based on secondary data including two Smart City Indexes, introduced in the literature review. This will allow to determine the main pain points of Paris in terms of mobility and transportation. User journeys, a survey and interviews conducted with Parisian citizens will then allow to confirm or deny those pain points and find some of their sources. Using the technique of Design Thinking, the recommendations for the FIA will be based on empathy maps, user's needs and POV's. All those steps and techniques and how they finally were implemented will be explained below.

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3.2.1 Overview of Paris

To start with, a very general overview of the Region Parisienne will be given. This includes the structure of the Parisian Region and the city of Paris, its demography and its topography. Then, in order to find the main pain points in terms of mobility and transportation of the city, the two Smart City Indexes, introduced in the literature review, will be analyzed.

3.2.1.1 Smart City Indexes

Already quickly introduced in the literature review, two distinct Smart City Indexes were chosen for analyzing the mobility and transportation in Paris.

The first Index is the IESE Cities in Motion Index (CIMI), which is based on 96 different indicators, divided into 6 dimensions. The CIMI is mainly based on secondary data[1], but also on some success stories and in-depth interviews. This index covers a broad range of topics, which makes this index perfectly suited for giving an general overview of all the strengths and weaknesses of Paris.

The second Index used in this context is the IMD Smart Cities Index. This index is based on primary data[2], more in detail, on the inquiry of 120 citizens per city. This second Index is a bit more narrow in terms of topics covered but will allow to put the focus on the most important challenges. It will also help to confirm or deny findings from the analysis of the first Index, based on opinions and perceptions of Parisian citizens. The goal is then to define the three or four main pain points of the mobility in Paris.

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[1] Secondary data are data collected by someone else, made available to use for third parties. The advantages of this data collection method are its easy and quick availability. Nevertheless, secondary data might be expensive or not specific to the researcher's purpose. In this last case, it is recommended to complete or verify it by a primary research.

[2] Primary data are data that are collected from first-hand sources using methods like surveys, interviews or experiments. The main advantages of primary data collection are a high degree of accuracy, increased reliability and for some enquiries, secondary data is simply not available.

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3.2.2 User Journeys

Disposing now of a rather well overview of the main transportation means used by Parisian citizens, and all the challenges linked to them, different User Journeys can be created. User Journeys demonstrate the various steps an end user goes through when using a product or service and highlights the experience and emotions of the end user in each step. The analysis of those steps will help to understand the challenges and needs of end users along their journeys.

In this case, the User Journeys will show the different steps Parisian citizens go through when using different means of transport for commuting. It was decided on focusing on commuting journeys in Paris, since this resumes well the mains share of the journeys taken in Paris and facilitates comparison. Since the user journeys might differ a lot depending on the transportation mean used, several user journeys will need to be created. The idea is to create the following three user journeys:

- A journey by car
- A journey by the most popular two-wheeler transportation mean of Paris
- A journey by the most popular public transportation mean of Paris

The most popular two-wheeler and public transportation means will be defined based on the results of the two Smart City Indexes. The three or four main pain points of the mobility in Paris defined in the Overview of Paris will be well reflected in those user journeys.

3.2.3 Survey

In order to verify the accuracy of the created user journeys and the three or four main pain points of the mobility in Paris, defined based on the Smart City indexes, primary data will be created through a survey. This survey will also give the possibility find out how much knowledge Parisian citizens have about the FIA Smart Cities initiative, how to best attract this population to such kind of events and through which communication tools Parisians are reached the easiest.

In order to achieve the desired result of this survey, the target audience will be limited to citizens of the Parisian Region. It will be important to diversify the targets in terms of gender, occupation, economic situation, lifestyle and life-cycle stage in order to have an accurate representation of Parisian citizens. Nevertheless, the biggest focus should be

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put on people fitting the target audience, that will be defined at the beginning of the analysis. The fact that the author of this thesis has a no network in Paris might represent a challenge. However, it will be tried to send the survey to several people who have a diversified network in Paris. The fact that therefore the survey will have to go over several people has as consequence, that more response time will needed to be calculated.

The survey itself will contain a mix of 30 to 40 questions, including open ended questions, multiple choice questions, checkbox questions, linear scale questions and multiple-choice grid questions. The questions will be divided into several sections, starting with a verification question, that the respondent really lives in the Parisian Region. The next section will contain general questions about the mobility in Paris. Then three or four sections will follow, each of them about one main pain point of the mobility in Paris, found and defined in the part "Overview of Paris". The next two sections will be about the FIA Smart Cities Initiative and the personal details of the respondents. Finally, the respondents will be asked whether they will be willing to participate on a virtual interview session. The goal of this last question will be explained more in detail in the following part *3.2.4 Interviews.*

The rather high number of questions in the survey was decided on in order to confirm or deny as many statements as possible. Also, due to the lack of a direct network in Paris, the number of people willing to participate in a follow-up interview is not guaranteed.

When creating the survey, some main structural points will be considered. First, the digital questionnaire tool Google Forms will be used to collect the data. This site was chosen because it is a free online tool that allows to collect information easily, efficiently and with only very limited restrictions. It also allows to generate an Excel file of the outcomes, which will help in the analysis of the results. The survey will be written in French and English in order to minimize language barriers. When using rating scales, they will be created based on the rules learned in the Consumer Behavior and Market Research class. Scale levels will be clearly labeled and a midpoint will be added only in case it has a conceptual meaning (Catenazzo 2018).

For this project it was decided on a targeted sample size of 50 people. According to Customer Thermometer, a company focusing on customer feedback (Customer Thermometer 2020), the average survey response rate is 33%, meaning that only every

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third person to which a survey was distributed will also complete it (Willott 2019). Based on this number, in order to reach 50 responses, the survey about the mobility in Paris would have to be distributed to at least 150 people. Taking into consideration the limited Parisian network of the researcher, this seems an accurate target sample.

3.2.4 Interviews

The survey mentioned above will allow to efficiently gather quantitative data from a set of respondents. These results will help to set a direction and discover trends. However, surveys often only scratch on the surface. For capturing personal feelings, perceptions and opinions of respondent, interviews are much better suited tools. Asking open-ended, in-depth questions to users allow to understand their challenges and needs covered below the surface. People feel much more at ease sharing their opinion and feelings in a one-to-one discussion than on a written survey. Also, interviews are much more easily adaptable and individualizable than surveys. While multiple-choice questions can very well and time-efficiently demonstrate a trend or confirm assumptions, they also easily bias respondents. When well handled, interviews can diminish the risk of bias of an interviewee to a minimum. Based on those reasons, interviews will be added to the survey, by inviting some survey respondents to follow-up interviews.

Due to the geographical distance and the COVID-19 restriction, all the interviews will be held virtually, meaning on tools such as Skype, Zoom, FaceTime or WhatsApp. It is the interviewee's decision which tool will be used.

During the interviews, open-ended questions will be asked including the 5-Why's, a technique of interrogation used to discover the cause-and-effect relationship of a particular problem. Some main questions will be prepared as a guideline for the interviews, which will take on average between 30 and 60 minutes.

The target number of interviews lays between 5 to 10, but is mainly defined according to the moment, where no additional information come out of an interview. The language of the interview will mainly be French, however, can also be English depending on the preference of the interviewee. Also, interviews will only be hold with people unknown to the researcher, in order to further diminish the risk of biased answers.

Initially, also interviews with some partners of the FIA Smart Cities initiative were planned to be hold during the FIA Smart Cities event in Paris. As mentioned above, however, due to the COVID 19 this event did not take place. Due to internal FIA meetings and

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discussions with Stéphane Dézérable, head of the CSR Fundraising and Strategic Alliances of the FIA, however, quite a deep understanding of the point of view of the different partners regarding the inclusion of end consumers in the FIA Smart Cities initiative could be gathered.

3.2.5 Empathy Maps

Based on the one-to-one interviews conducted in the previous step, empathy maps are going to be created. Empathy maps are a useful tool to understand what users are saying, doing, thinking and feeling. They summarize and visualize what is currently known about the users and create a detailed understanding of their needs in order to ensure making adequate decisions. Also, it occurs quite often, that interviewees say one thing but think something different. To catch the hidden thoughts and feelings of the interviewees enables to uncover the roots of their statements and opinions. Usually, the data gathered in the empathy maps are then clustered into different themes or categories, resuming the most important points. The maps are then the first step towards creating personas, which is going to be explained in the next part.

3.2.6 Users' Needs

Once the empathy maps are created, logistical needs and emotional needs can be derived from those maps. A logistical need represents a practical need of a user, whereas emotional needs call for values, beliefs and personal opinions of the users. The listing of the user's need in a form of a table gives a great overview of the main needs of the users and the emotional needs linked to it.

3.2.7 POV's

Point of views (POVs), are then derived from the user's needs table. POV's are fictional characters used to personify the logistical and emotional needs. Those personas allows to get a clearer vision of resumed consumer needs and translates requirements gathered during the interviews into an easier understandable approach. The POV's should be taken into account in the solution creation phase.

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3.2.8 Ranking

Based on all the different steps of the analysis performed at this point, different rankings can be made. First of all, a ranking of the main pain points of Paris, resulting of the overview of Paris including the Smart City indexes, can be created. This ranking reflects an overall overview of the main issues faced in Paris linked to mobility and transportation. These main pain points are then to be analyzed in detail in the user journey, survey and interview step. Another, much more specific ranking is going to result out of the specific needs of the users. Usually different needs and POV's are going to be created. It is then to be determined based on the primary research which need is perceived as being the most important one in the eyes of Parisian residents. This ranking will enable to show the FIA on what topics to focus on first for their FIA Smart Cities initiative in Paris. The first ranking is not sufficient, because it is important to include the perception of citizens and go into detail for the topics. The share of people feeling attracted to an event is much higher, if the event addresses issues perceived as important in the point of view of the citizen.

3.2.9 Recommendations

Based on all the work done up until that point a brainstorming will be done in order to determine the recommendations. The recommendations will then retake the categories created in the FIA Smart Cities initiative analysis: Communication, Content and Event Structure. In order to ensure the attraction of the general public to a FIA Smart Cities event, the occurring of this event has to be communicated to the targeted public. Without an effective communication strategy, no awareness of the event can be raised. Once an effective communication strategy has been recommended in detail, the topics and content covered in the FIA Smart Cities event has to be defined. Based on the primary and secondary research mentioned above, a ranking of the topics perceived as the most important by Parisian citizens will be created. The top 3 subjects of this list will then be recommended to be included in the event. Finally, recommendations on the event structure will be given, based on primary and secondary research.

These recommendation will offer the FIA a large portfolio of possible solutions to implement. It is very well possible for the FIA to decide on implementing only some of the recommendations, they are in no way compulsory, but the additional benefits offered by each recommendation will be clarified in the recommendations.

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4. Analysis

4.1 _FIA Smart Cities initiative_

In this part the FIA Smart Cities initiative, outlined more in detail in the Literature Review, will be analyzed with regards to attracting the general public to the event.

4.1.1 Communication

4.1.1.1 Raising Awareness

In order to attract the grand public to an event such as the FIA Smart Cities, first and foremost the public need to be made aware of the event. In the primary research performed on a later point of this these, it will be important to measure the current awareness of end users, in this case Parisian end user, in regards to the FIA Smart Cities initiative. Are the citizen aware that the FIA regularly holds events on the topic of smart mobility? If yes, how did they get to know the event? Through which channels?

If the primary research results show that the Parisian residents are not aware yet of the FIA Smart Cities initiative, the first measure of the FIA needs to be raising awareness on their event. Probably there are a lot of people out there interested by such an event, but if the information of the happening of this event does not reach those people, how should they be able to participate and show their interest?

It could be seen that in season 4 the FIA initiated some first steps in the direction of introducing a digital communication strategy. The organization has introduced their proper FIA Smart Cities LinkedIn page as well as three podcasts accessible for the public. The next question to ask is, are those steps enough? And do these initiations help to reach the envisaged target population?

4.1.1.2 Target Audience

Taking into consideration that the topic of the FIA Smart Cities initiative is focused on the smart mobility of the future, the target audience for this event should also include the population of the future. This means, that the main focus should not be put on people aged between 40 and 60 but rather on people aged between 20 and 40. Representing the future urban population, those people have to be made aware of the issues we are

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currently facing in terms of mobility. Also, the inclusion of citizens of this age range in the solution searching process will enable to define solutions for the long term. The younger generations might bring new or different views into play. In order to extract exactly this important data of the future participants, exchanges will have to be created during the event. Solely inviting end users, without asking them for their opinion, making them aware of something or integrating them in the solution making process, will ignore a lot of the added value.

4.1.1.3 Digital Communication Strategy

In order to reach this target audience, choosing a digital communication strategy has been a great approach. However, has LinkedIn been the right social media platform in order to increase the awareness on this target audience? The big advantage of LinkedIn is, that it enables to reach an extremely broad range of people, of very different ages, as well as companies and public people. The defined target audience, however, is known for spending much more time on social media platforms such as Instagram and Facebook, or what about Snapchat, YouTube or TikTok? It will be important to find out based on a primary research, mainly focusing on the chosen target audience, which social media platforms are the most popular in the showcase city Paris.

4.1.1.4 Partnerships / Sponsorships

Another part of the communication includes the partners of the FIA Smart Cities initiative. As could be understood due to the participation of several meetings between the FIA and the FIA Smart Cities Partner companies, the current partners do not see a huge advantage in opening up the event to the grand public, since most of the partners are B2B companies. The inclusion of B2C participants could, however, attract potential new partners and sponsors. Supporting an event with such a sustainable background does not only improve the public image and the credibility of a potential partner organization, but can also raises brand awareness and brand preference. Since including the grand public in the FIA Smart Cities Initiative is linked to huge expenses, looking for further, more B2C focused sponsors and partners might be a valuable step for the initiative. In the recommendation part, some more specific suggestions will be given regarding future partnerships.

Another form of partnership might also be valuable for attracting the grand public and raising awareness at the same time. This form of partnership includes partnerships with

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ambassadors. During the first season of the FIA Smart Cities initiative, an FIA Smart Cities Talk was organized in Paris in collaboration with the FIA #3500LIVES Campaign. It can be remembered that Wayde van Niekerk, the South African 400m Olympic Gold Medal Winner and World Champion, was invited to this talk. He is one out of 18 ambassadors of the #3500LIVES Campaign. Some of the other ambassadors are visualized on *Table 5*, including Patrick Dempsey, Pharrell Williams, Antoine Griezmann Rafael Nadal and Charles Leclerc. Such kind of a collaboration might be very interesting for the FIA Smart Cities initiative. Not only does the inclusion of famous people make the awareness of the event spread faster and give the campaign a face, but it also motivates a lot of people to participate on an event, especially if some of those ambassadors are going to be present for the events. It might therefore be suggested to create a similar portfolio for the FIA Smart Cities initiative. Some more detailed suggestions on this topic can be found in the recommendation part.

Table 5, Ambassadors FIA #3500LIVES Campaign

Source: Website FIA, #3500LIVES Campaign (FIA 2020aj)

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Finally, also valuable for spreading awareness focused on the defined target audience can be partnerships with influencers. **Influencers** are people with a large digital community and therefore a wide reach on social media platforms such as Instagram. Influencers are often used for product placements. In the case of the FIA Smart Cities initiative, some local influencers might be invited to the FIA Smart Cities event, being paid to advertise the event in advance as well as during the event. More detailed suggestions on this topic can also be found in the recommendation part.

4.1.2 Content

Once it has been ensured that potential B2C participants have been made aware of the FIA Smart Cities initiative, it needs to be focused on the topic and content choice. As can be imagined, B2B and B2G participants might not be interested in the same content than B2C attendees. Also, the knowledge level on smart mobility might very possibly not be equal amongst those three groups. Since this thesis searches to recommend possibilities of how to include the end users in the FIA Smart Cities events, the main focus is put on adapting the event on their needs.

When remembering the outcomes and conclusions of a lot of past FIA Smart Cities events, it can be understood that two of the current main issues in the field of mobility are the following:

- An insufficient cooperation between public and private stakeholders
- A lack of inclusion of the end users

The FIA has tried hard with its past events to encourage and enforce the cooperation and exchange between public and private stakeholders. What was still missing, however, was the inclusion, information and preparation of the end users for the future of the mobility. A real inclusion of B2C participants in the FIA Smart Cities events might enable to change just this. This means not only opening up the event to end consumers, but also adapting the content to their interests and understandings.

4.1.2.1 Topics

In order to achieve defining accurate topics attracting the local community, their needs must be analyzed. Often, there is a gap between what is known as being an important challenge and what is perceived by the citizens as being an important challenge. While it can for instance be officially known that water pollution is a big issue in a city, its citizens

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might be so used to not being able to drink the tab water, that they do not perceive it as an urgent matter anymore. In their eyes, for example, it is much more important, that they can use the public transportations without being scared for their security. In order to maximize incentives for the general public to participate on FIA Smart Cities events, therefore, challenges need to be found that are perceived as being important in the eyes of the citizens. In the analysis that will follow this part, exactly this will be tried to find. First, a secondary research will allow to give an overview of the showcase city Paris and its challenges linked to mobility. Then, based on a primary research, those challenges will be confirmed or denied and defined more in detail based on the perceptions of Parisian citizens.

When remembering the topics chosen for the past FIA Smart Cities events, some of them might quickly become too challenging to understand for laypersons, when addressing too much details. A good example for this challenge is the topic "unlocking smart data solutions", that was chosen for the last event in the first season in Montreal. It needs to be ensured, that technical terms are explained and words are well chosen. Otherwise, the attention of the B2C attendees will be quickly lost.

4.1.2.2 FIA Smart Cities Global Startup Contest

The same applies for the pitch of the FIA Smart Cities Global Startup Contest winner. It needs to be ensured, that the pitches are adapted to the understanding of a layperson. Most of the winning startups of the past presented very interesting and easy to understand concepts, that can have a very positive impact on the daily life of a citizen. Then, there are also startups such as Wavelite with its innovating sensor transmission platform or NOHMS Technology with its electrolyte Li-ion battery. Those startups need to ensure pitching in a way that the general public can follow.

Another interesting idea is, inspired from the concurrence event Movin' On and the fact that the researcher had the chance to participate a startup elimination process from the FIA Smart Cities, to make the elimination process of the last 6 startups public. This means, that the public will be able to watch all the 6 pitches and maybe even vote for the one perceived as the most relevant in the eyes of citizens. The problematic of confidential data might be resolved in a short private exchange between the jury and the startup ahead or just after the pitch, in case needed.

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When participating the FIA Smart Cities Startup elimination process, the researcher found that there are many very inspiring ideas out there. Some of the visitors might even want to invest themselves in one of the startups, which adds an incentive for the startups to participate in the contest. In general, the public likes the excitement and suspense a contest brings with it and likes discovering new innovations. If giving the possibility to the end users to vote for their preferred one, the feel even more integrated and included in the process. It can also help the jury to decide, by letting the public voices count, for example, for 35%.

4.1.3 Event Structure

4.1.3.1 Virtual vs. Physical Event

Due to the COVID-19 pandemic, the FIA hat to test out the virtual structure of the FIA Smart Cities event. Due to the deadline of this thesis, the research had the chance to participate in only one virtual FIA Smart Cities eForum and one virtual Startup Contest. Nevertheless, it was possible to gather some first impressions. The following statements will be based on this experience.

As participant it was found that it is very hard to keep focused on the discussion or speech when watching it virtually. There are a lot of distraction possibilities. Also, the participants do not feel integrated, included or important at all. It feels more like watching a review on the television or on YouTube. Therefore, the entire exciting part of an event is vanished. A virtual event is less likely to be retained as a highlight and also stays less long in mind, the entire event is quickly forgotten, just like when watching a TV show.

During the FIA Smart Cities eForum also some technical incidents occurred, which can happen of course, but makes it even easier to lose the attention of the spectators. In addition, it makes the event seem less professional.

Regarding the networking corner and the expo-space it need to be said, the reflections behind are very well, but the realization was a bit more complicated, especially with regards to the inclusion of end users. As mentioned above, a virtual event has a hard time to make a viewer feel important and included. Therefore, they might not feel at ease starting a chat out of nowhere with someone unknown in order to network. The same counts for the expo-space. B2C customers might quickly feel too unimportant to schedule for a meeting with an organization representative. During physical events a lot happens

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through gestures and facial expressions, or someone dares to talk to a representative on a physical expo-space because he can see that he is available.

There are of course also the positive elements of the virtual events that have to be mentioned. Firstly it enables people to participate from all around the world, without any travel expenses. Taking into consideration the fact, that the eForums are held on business days, it allows also a much larger range of people to participate and listen to the discussions. In addition, participants also have the possibility to solely participate on discussions they regard as interesting and skip others.

Advantages from the point of view of the FIA are diminished expenses and reduced organization time. It also allows the FIA to be more flexible, for example in inviting speakers from all over the world without the need of having them on the spot. Virtual events also allow an organization to easily collect feedback. A great example of this is a short questionnaire that popped up on the screen at the end of the eForum, in order for the participants to leave a feedback. It might also be easier to measure the results of a virtual event than of a physical event, for example by tracking when the attendees logged in, where from they have logged in, the number of people attending and at what moment they have left-

As already mentioned, the above listed statements were solely based on the participation of the researcher on two virtual FIA Smart Cities events. The idea is to confirm or deny those claims through a primary research.

4.1.3.2 Entertainment and Animation

In order for the FIA to entirely benefit from the participation of end consumers of the mobility, the FIA Smart Cities events need to be organized in a manner focused on exchanges. B2C participants need to be integrated in the event and the discussions, in order to ensure gathering their opinions, point of views, perceptions and ideas. This data can be extremely useful for the FIA Smart Cities initiative as well as for the B2G and B2B attendees. In order to attain a high attendance rate of the target audience aged between 20 and 40, it needs to be taken into consideration that most of them do not reflect on the future mobility on a daily basis. Offer interesting discussions and debates on the subject might therefore not be enough incentive to attract the target audience. More incentive might be offered by creating a whole experience out of the event. Keeping the discussion

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as main parts, but adding a lot of different animations and entertainments linked to the topic might allow to dramatically increase the motivation for participating the FIA Smart Cities event. Again, similar as for the content decision, animations need to be adapted to the attendees desires, which will be defined adapted to the showcase city Paris in the primary research.

Additional benefits resulting of including fun and attractive animations in an event are an increased customer engagement rate and a broader range of participants, since some people will participate the event not based on their interest on smart mobility but because of the attractive experience provided. This is especially true for B2C participants in the targeted age range. According to a study from Eventbrite, 78% of Millennials would rather spend money on experiences than on things, like concerts,, travel, festivals or restaurants (Callahan 2018). Including animations might also encourage families to participate the event. But more concretely speaking, what could be possible ideas of animations? On the following *Table 6* some example of entertainments and animations are listed, useful for creating a more interactive and engaging and exciting event:

Table 6, Entertainment and Animation examples

Workshops	Game corner	Quizzes	Live Polls	Singers
Dancers	Ted Talks	Simulators	Augmented Reality	Escape Rooms
Playgrounds	Presentation of Innovations	Exhibitions	Photo booths	Drone show
Holograms	Celebrities	Comedians	Visual Artists	Booths of organizations
Scavenger hunts	Street Food	Votes	Improvisations	Crash Tests

Source: Internal Document

The exact choice of the animation, however, will mainly depend on the content and budget of the FIA Smart Cities event. It is important to link the animations to the current topics of the event. Also, the animations must be adapted to the wants and needs of the residents of the host city of the event. In the primary research part, it will therefore have to be determined what Parisian residents experience as attractive and fun animations.

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4.2 Overview of Paris

This part of the analyze will start by quickly presenting Paris as a city, including its population, surface, demography and topography. Then, two indexes will allow to understand the strong and weak points of the city. The goal is to find challenges faced by the city which particularly stand in the interest of its population. This allows to create FIA Smart Cities events tailored not only for the interest of B2G and B2B participants, but also for B2C participants..

4.2.1 Paris at a Glance

Paris is known as being the center of the economy, politics, traffic and culture of the country. It is the capital city of France as well as of the region Île-de-France. The region Île-de-France is located in the northcentral part of the country, as displayed on *Figure 44*, and is crossed by the Seine river. The Seine divides Paris into two parts, known as the right bank and the left bank. With a surface of 12,012 km², l'Île-de-France is one of France's smallest regions (La préfecture et les services de l'Etat 2018).

Figure 44, Ile de France
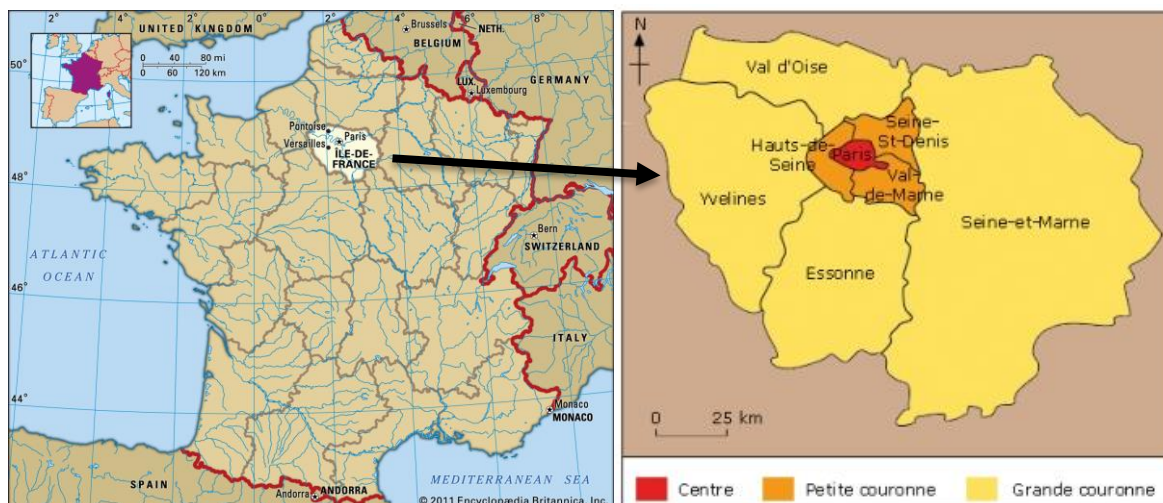
Source: Britannica.com (Luebering 2011) and Maxicours.com (Maxicours 2020)

As can be seen on *Figure 44,* right hand side, the region Île-de-France is split into eight departments. Highlighted in red, the capital city Paris is located in the very middle of the region. This center is surrounded by the three departments Hauts-de-Seine, Seine-Saint-Denis and Val-de-Marne. These three departments build the so called small crown "petite

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couronne", or the "Grand Paris Region". The four departments Val-d'Oise, Essonne, Yvelines and Seine-et-Marne build the big crown called "grande couronne" (Maxicours 2020).

Figure 45, French Population by Region, by January 1ˢᵗ 2020
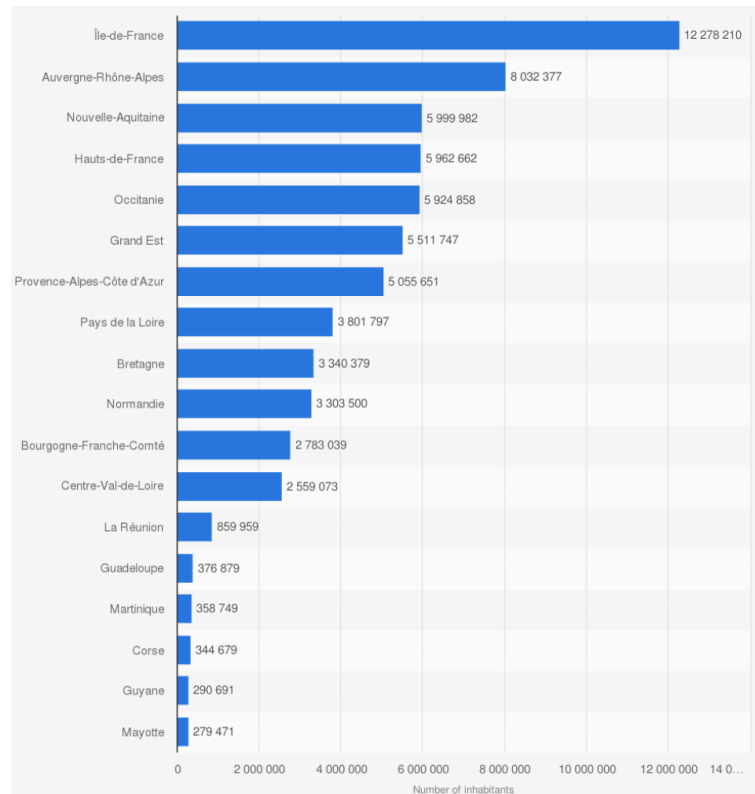
Source: Statista.com (Statista Research Department 2020a)

Île-de-France is known as being the most populated region in Europe. Its clear difference in terms of population compared to other French regions is outlined on *Figure 45,* a figure created by Statista.com. The Figure displays, that Île-de-France counted 12,3 million inhabitants by January 1ˢᵗ 2020, while Auvergne-Rhône-Alpes, covering the second place, only counted 8 million inhabitants.

Paris, the capital city of Île-de-France, counts 2.2 million habitants, representing a bit less than 20% of the population of the Île-de-France region. This makes Paris being the most populated department in France (JLL Grand Paris 2020). However, according to Statista, a decreasing trend in the population of Paris can be observed. As shown on *Figure 46,* since reaching a peak in 2012, the number of habitants of Paris has

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continuously being decreasing. This might be explained by the high and constantly increasing rent prices of the French capital (Statista Research Department 2020b).

Figure 46, Estimated Population of Paris from 1989 to 2019 (in million inhabitants)
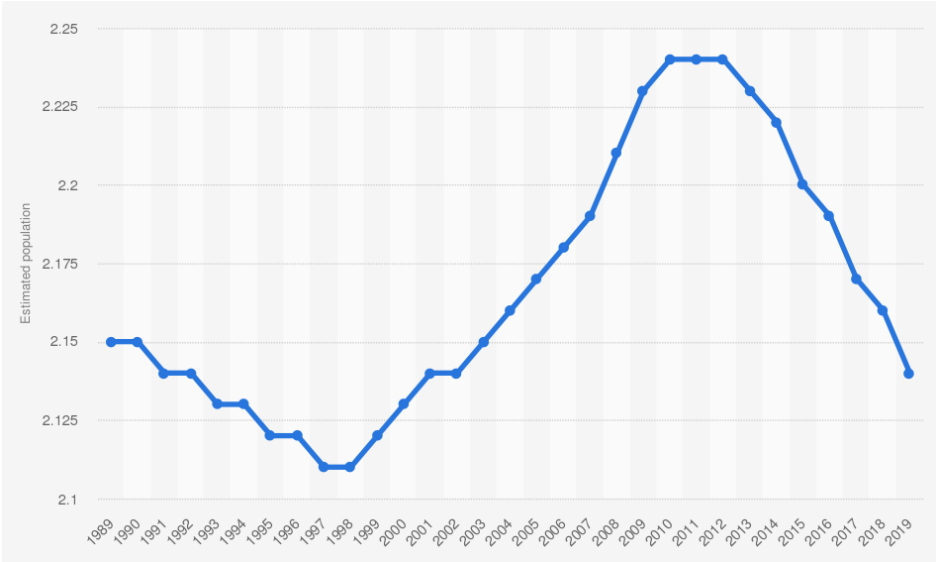
<div align="right">Source: Statista.com (Statista Research Department 2020b)</div>

Covering a surface of only 105.4 km^2, Paris has a particularly high population density (World's Capital Cities 2020). Record levels have been reached with over 20'000 inhabitants per square kilometer, which puts the city above some major US and Asian world cities. However, when taking into consideration the suburbs surrounding Paris (la petite couronne), the population density turns out to be much lower, leaving some future development potential for the area (JLL Grand Paris 2020). In *Figure 47*, published by Statista in 2020, the population densities of the 8 departments of the Île-de-France region can be compared. Confirming the statements above, Paris shows by far the highest population density. The rest of the departments show a pattern saying the closer a department is to the center, the higher its density. According to this, departments of the small crown count much more habitants per km^2 than the departments of the bigger crown.

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Figure 47, Estimated population density of the Greater Paris Area in 2018
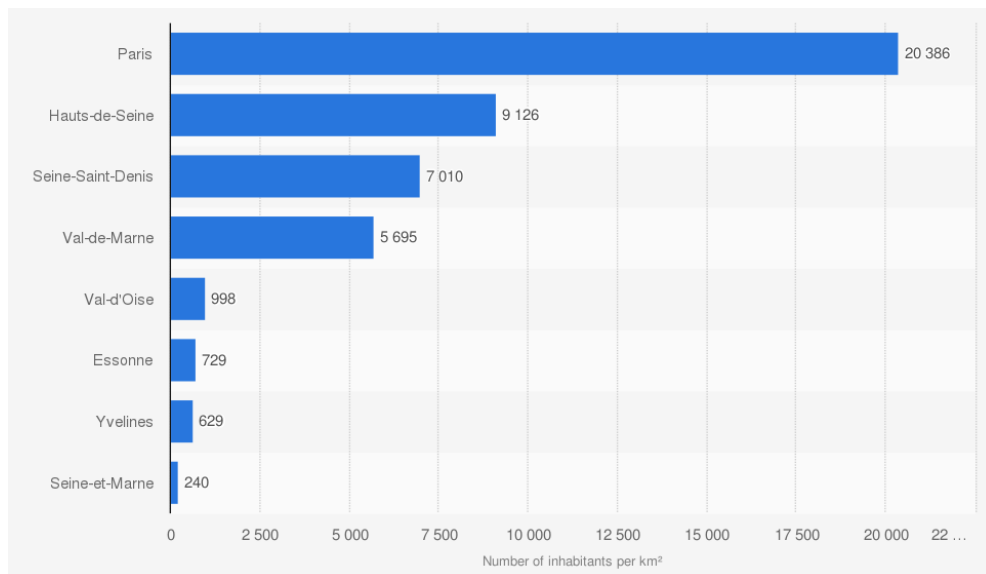
Source: Statista.com (Statista Research Department 2020c)

As represented in *Figure 48,* compared to other cities in France, Paris shows a particularly young and well qualified population. 39% of its population is aged between 25 and 39 years old. According to a forecast of INSEE, the National Institute of Statistics and Economic Studies of France, by 2030 the Greater Paris Region (small crown) will be the only French region counting more people below 20 years old than those over 60 (JLL Grand Paris 2020). Furthermore, the population is very well divided in terms of gender. The education level is high in the Paris Region, reflected in the 40% of its working population being university graduates and 27% management level staff (IAU île-de-France 2019). Another fact about Paris is, that its share of foreigners is higher than in any other French city, accounting for 14% in Paris compared to 6% on a national level (JLL Grand Paris 2020).

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Ages 25-39	Women	University graduates	Executives	Foreign population
39 %	49.4 %	40.4 %	27.4 %	13.7 %
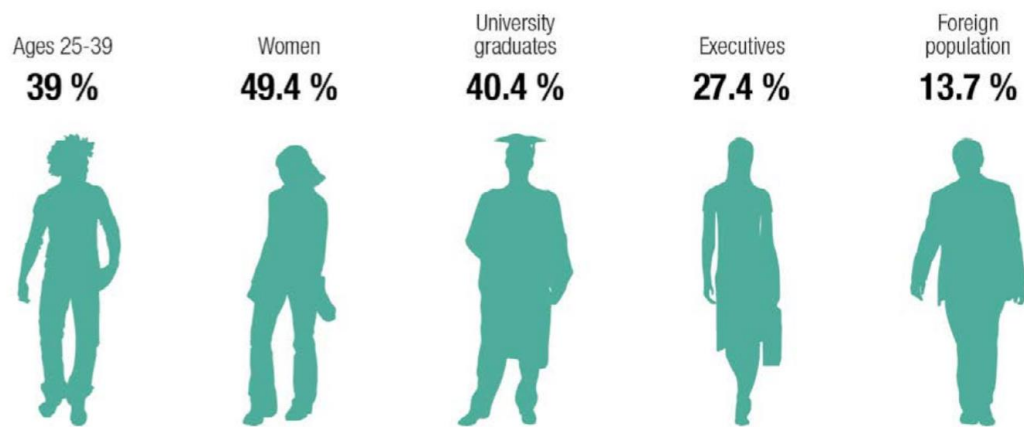
Source: Paris Region Key Figures Report 2019 (IAU île-de-France 2019)

Talking more about the topography, Paris is a rather flat city with an elevation of 35m above sea levels. There are some hills in the city, with Montmartre and Belleville being the highest hills reaching 130,53 and 128,64m above sea level respectively (Barbat 2019). The most important river in Paris is the Seine, of which around 13 km passes through the French capital. The Seine is covered by 37 bridges, out of which 23 are celebrated by the Unesco as a World Heritage cultural site (Sciolino 2019).

Regarding the urban structure, Paris is divided into 20 administrative districts, more simply referred to as "arrondissements". As can be seen on *Figure 49*, the arrondissements are arranged in the form of a clockwise spiral, reminding of a snail shell, with the first arrondissement being on the right bank of the river Seine. Each of the 20 arrondissements is then divided into four administrative quartiers, also visible on *Figure 49*. The numbers of the arrondissements were given based on the last two digits in most Parisian postal codes, reaching from 75001 up to 75020. (Wikiwand 2019).
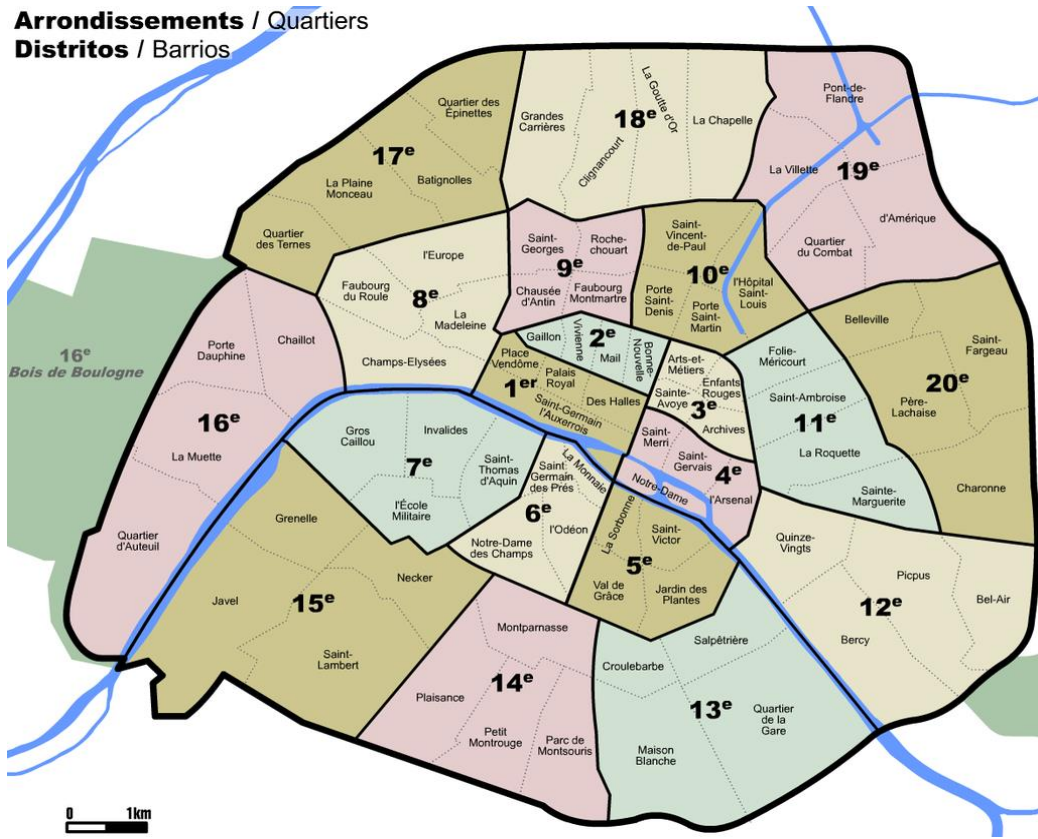
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Figure 49, The Arrondissements of Paris

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4.2.2 IESE Cities In Motion Index

The ranking of cities in the Cities in Motion Index (CIMI) is based on the evaluation of the following 9 dimensions: Economy, Human Capital, International Outreach, Mobility and Transportation, Environment, Technology, Urban Planning, Governance and Social Cohesion. For each dimension a city can reach a number of so called CIMIs between 0 and 100, 100 meaning that a city performs perfectly, 0 meaning a city performs very poorly. Calculating the average of CIMIs a city has reached in all the different dimensions allows then to rank the cities according to their performance.

In the sixth version of the IESE Cities in Motion Index of 2019, Paris was ranked 4th out of the 174 cities analyzed, by reaching a total of 86,7 CIMIs, reflecting the already well advanced smartness of the city. There are only three cities who have performed better than Paris, these are London, New York and Amsterdam. The complete ranking list of the IESE Cities in Motion Index 2019 can be found in *Appendix 5*.

On *Figure 50* the scores Paris has reached in each of the 9 dimensions in terms of CIMI points are displayed. Following this introduction into the IESE CIMI, the individual dimensions of Paris will be analyzed in order to gain an overview of the strength and weaknesses of the capital city of France.

Figure 50, Cities in Motion Index 2019 of Paris by Dimension
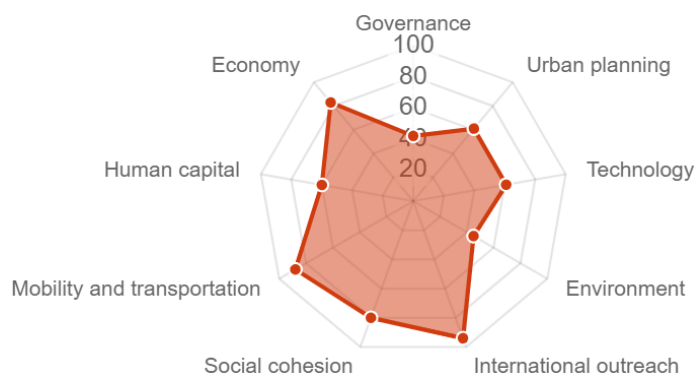
Source: IESE Cities in Motion Index 2019 (IESE Business School 2019)

The rank Paris has reached compared to the other cities in each dimension is displayed on *Table 7*. It can be seen, that Paris particularly stands out in five dimensions: International Outreach (3.), Mobility and Transportation (4), Human Capital (6), Economy (8.), as well as Technology (15). Lower performances were noted especially in the

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dimension Social Cohesion (86), but also Environment (54), Urban Planning (50) and Governance (37). However, having rank 86 as worst performance is still a good overall performance for a city, taking into account that there are 174 ranks in total. More precisely does that mean, that Paris has always been ranked in the better half of the countries. This great overall result is reflected in the 4th rank Paris has earned in the CIMI ranking 2019. In order to see the performances of other cities in the different dimensions, *Appendix 7* has listed the top 10 cities of each dimension (Berrone, Ricart, Duch, Carrasco 2019).

Table 7, CIMI Paris Ranking by Dimensions

Dimension	Rank	Dimension	Rank
Human Capital	6.	Urban Planning	50.
Social Cohesion	86.	International Outreach	3.
Economy	8.	Technology	15.
Governance	37.	Mobility and Transportation	4.
Environment	54.	**TOTAL rank in CIMI**	4th

Source: Internal Document, Numbers based on IESE CIMI 2019 (Berrone, Ricart, Duch, Carrasco 2019)

In total there are 96 indicator on which the IESE CIMI ranking is based. All the 96 indicators can be extracted from *Appendix 6*. Each indicator is assigned to one of the 9 dimensions, as will be seen in the following part. In order to match the focus of this report, the dimension "Mobility and Transportation" will be analyzed more in detail compared to the other dimensions.

One of the most significant limitations of the CIMI is in fact, that not all the sources of the indicators are open data sources. The different dimensions will therefore be analyzed with the realms of possibility. Sometimes sources deviating from the CIMI sources will be used and referenced. Also, it was tried to use the most recent data, therefore sometimes data from 2020 is included.

All the following data are based on the IESE Cities in Motion Index 2019 (Berrone, Ricart, Duch, Carrasco 2019).

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4.2.2.1 Human Capital

 To start with, a short insight into the dimension "Human Capital" will be given. This dimensions shows how a city performs in terms of education and access to culture. The CIMI Index has used 10 different indicators to determine the Human Capital of a city, that are listed on the *Table 8,* including its sources.

Table 8, CIMI Human Capital Indicators

No.	Indicator	Description / Unit of measurement	Source
1	Higher education	Proportion of population with secondary and higher education.	Euromonitor
2	Business schools	Number of business schools (top 100).	*Financial Times*
3	Movement of students	International movement of higher-level students. Number of students.	UNESCO
4	Universities	Number of universities in the city that are in the top 500.	QS Top Universities
5	Museums and art galleries	Number of museums and art galleries per city.	OpenStreetMap
6	Schools	Number of public or private schools per city.	OpenStreetMap
7	Theaters	Number of theaters per city.	OpenStreetMap
8	Expenditure on leisure and recreation	Expenditure on leisure and recreation per capita.	Euromonitor
9	Expenditure on leisure and recreation	Expenditure on leisure and recreation. In millions of dollars, according to 2016 prices.	Euromonitor
10	Expenditure on education	Expenditure on education per capita.	Euromonitor

Source: IESE Cities in Motion Index 2019 (Berrone, Ricart, Duch, Carrasco 2019)

Paris has been ranked 6th in this dimension. Paris is indeed very well known for its good education. According to the Paris Region Report 2019, the city hosts over 700'000 students, representing Europe's largest concentration of higher education students. These numbers include over 26'000 PhD students. Paris counts 16 public universities as well as 70 "Grandes Ecoles" (elite schools) and engineering schools. In total, 40.4% of the Parisian adult population holds at least a bachelor's degree (IAU île-de-France 2019). On the other hand, Paris is known as being a center of culture of art, fashion, cuisine and architecture. According to an official document of the Parisian Tourist Office published in 2019, Paris hosts 3 operas, 191 museums, 2198 listed monuments and 29 cabarets (Office du Tourism et des Congrès 2019).

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An overview of the dimension Human Capital in Paris can be seen on the *Figure 51.*

Figure 51, CIMI Education and Culture in Paris

40,4%
Population with Bachelor's Degree

706'842
Students

16
Public Universities

70
Elite Schools

3
Operas

191
Museums

2198
Monuments

29
Cabarets
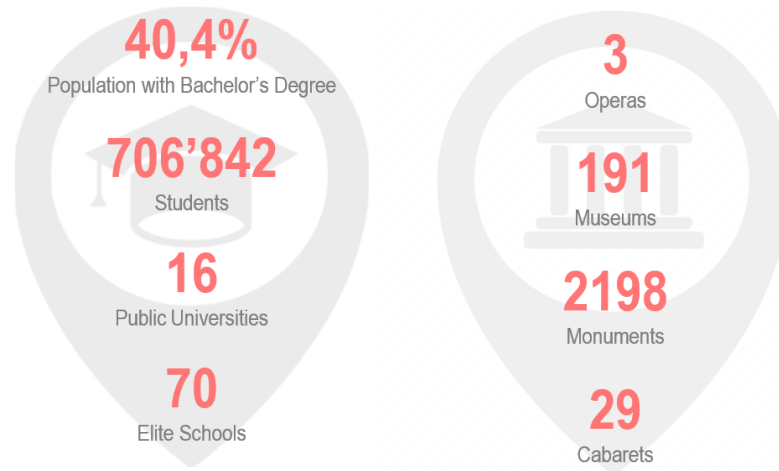
Source: Internal Document, Numbers based on text above.

The city achieving the best result in the dimension of Human Capital was London. This result was attained mainly due to its top-level business schools, its high number of universities within the best 500 in the world and its broad cultural offerings such as theaters, museums and art galleries.

4.2.2.2 Social Cohesion

The second dimension is Social Cohesion, which includes all about the intensity of social interaction within a city. Its evaluation in the CIMI is based on 16 different indicators, including the crime rate, unemployment, health, and suicides. The detailed indicators including its sources are displayed in *Table 9.*

In this dimension, the city of Paris has reached its worst results in terms of ranking, by being placed 86 among the 174 countries. This might inter alia be due to the fact, that the crime rate in Paris is rather high. According to Numbeo, the world's largest database of user contributed data about cities and countries worldwide (Numbeo 2020a), the crime index of Paris amounts to 51,91 and its safety index to 49,09. These indexes are based on the perceptions of citizens and show whether they perceive crimes as a problem in their community. Crimes include property crimes, violent crimes, corruption or other crimes. In the index, 0 means perceived as low and 100 perceived as high (Numbeo

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2020b). As comparison, the Crime Index of Zurich is 16,65 and its Safety Index 83.37 (Numbeo 2020c). (Numbeo 2020b).

According to the Health Care System Index, Parisians are rather satisfied (78,46 out of 100) with their health care system including the staff, equipment, cost and location (Numbeo 2020d).

Another aspect explaining the low placement of Paris in the Social Cohesion dimension is its suicide rate. With approximately 9,000 deaths by suicide a year, France has one of the highest suicide rates in Europe (Santé Publique France 2019).

Concerning the unemployment rate, Paris was at 7,7% in 2018 (Statista Research Department 2020d). Compared to the national rate of 9,18% a rather positive number (Plecher 2020). However, compared to the unemployment rate in Switzerland of 4.71%, there is still some improvement potential in Paris (Macrotrends 2020).

According to the website Nomadlist, Paris does not reflect any issues in terms of female-friendliness. To be mentioned is also the high LGBTQ-friendliness of the city (Nomadlist 2020a).

An overview of the dimension Human Capital in Paris can be seen on the *Figure 52.*

Figure 52, CIMI Social Cohesion in Paris

51,91
Crime Index

49,09
Safety Index

78,46
Health Care Index

9,000
Annual Suicides (FR)

7,7 %
Unemployment Rate

9,18%
Unemployment Rate (FR)

Good
Female-Friendly

Great
LGBTQ-Friendly

Source: Internal Document, Numbers based on text above.

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Table 9, CIMI Social Cohesion Indicators

No.	Indicator	Description / Unit of measurement	Source
11	Mortality	Ratio of deaths per 100,000 inhabitants.	Euromonitor
12	Crime rate	Crime rate.	Numbeo
13	Health	Health index.	Numbeo
14	Unemployment	Unemployment rate (number of unemployed out of the workforce).	Euromonitor
15	Gini index	Measure of social inequality. It varies from 0 to 100, with 0 being a situation of perfect equality and 100 that of perfect inequality.	Euromonitor
16	Price of property	Price of property as percentage of income.	Numbeo
17	Female workers	Ratio of female workers in the public administration.	International Labour Organization (ILO)
18	Global Peace Index	An index that measures the peacefulness and the absence of violence in a country or region. The bottom-ranking positions correspond to countries with a high level of violence.	Institute for Economics and Peace
19	Hospitals	Number of public and private hospitals and health centers per city.	OpenStreetMap
20	Happiness index	An index that measures the level of happiness of a country. The highest values correspond to countries that have a higher degree of overall happiness.	World Happiness Index
21	Global Slavery Index	Ranking that considers the proportion of people in a situation of slavery in the country. The countries occupying the top positions in the ranking are those with the highest proportion.	Walk Free Foundation
22	Government response to situations of slavery	This variable measures how the government deals with situations of slavery in the country. The top positions in the ranking indicate countries that have a more effective and comprehensive response.	Walk Free Foundation
23	Terrorism	Number of terrorist incidents by city in the previous three years.	Global Terrorism Database (GTD) of the University of Maryland
24	Female-friendly	The variable seeks to measure whether a city provides a friendly environment for women on a scale of 1 to 5. Cities with a value of 1 have a more hostile environment, while those whose value is 5 are very friendly.	Nomad List
25	Suicides	Suicide rate by city.	Nomad List
26	Homicides	Homicide rate by city.	Nomad List

Source: IESE Cities in Motion Index 2019 (Berrone, Ricart, Duch, Carrasco 2019)

Three of the top 10 cities in the dimensions Social Cohesion of the CIMI are Swiss cities. Zurich covered rank one of the dimension. This is due to its high quality of life and sustainability, its low homicide and crime rates and one of the world's highest happiness indexes.

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4.2.2.3 Economy

The next dimension of the CIMI is Economy, including all aspects that promote the economic development of a city. It is based on 13 different indicators, including productivity, ease of starting a business and the salary. The exact indicators as well as its sources are listed on *Table 10.*

Table 10, CIMI Economy Indicators

No.	Indicator	Description / Unit of measurement	Source
27	Productivity	Labor productivity calculated as GDP per working population (in thousands).	Euromonitor
28	Time required to start a business	Number of calendar days needed so a business can operate legally.	World Bank
29	Ease of starting a business	The top positions in the ranking indicate a more favorable regulatory environment for creating and developing a local company.	World Bank
30	Headquarters	Number of headquarters of publicly traded companies.	Globalization and World Cities (GaWC)
31	Motivation to get started in TEA (total early-stage entrepreneurial activity)	Percentage of people involved in TEA (that is, novice entrepreneurs and owners or managers of a new business), driven by an opportunity for improvement, divided by the percentage of TEA that is, in turn, motivated by need.	Global Entrepreneurship Monitor (GEM)
32	GDP estimate	Estimated annual GDP growth.	Euromonitor
33	GDP	GDP in millions of dollars at 2016 prices.	Euromonitor
34	GDP per capita	GDP per capita at 2016 prices.	Euromonitor
35	Mortgage	Mortgage as a percentage of income. It is calculated as a proportion of the real monthly cost of the mortgage with respect to the family income (estimated via the average monthly salary). The lower the percentage, the better.	Numbeo
36	Glovo	The variable assumes the value of 1 if the city has the Glovo service and 0 otherwise.	Glovo
37	Uber	The variable assumes the value of 1 if the city has the Uber service and 0 otherwise.	Uber
38	Salary	Hourly wage in the city.	Euromonitor
39	Purchasing power	Purchasing power (determined by the average salary) for the purchase of goods and services in the city, compared with the purchasing power in New York City.	Numbeo

Source: IESE Cities in Motion Index 2019 (Berrone, Ricart, Duch, Carrasco 2019)

Paris is ranked 8th in this category, alongside from 7 US cities in the top 10. The high number of US cities is mainly due to their high GDP per capita. New York is the dimension leader, also because of its high number of publicly traded parent companies.

Paris has clearly deserved to be at the top of this ranking list. To start with, Paris hosts almost half of the headquarters of the largest French companies as well as 20

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headquarters out of the 100 largest companies worldwide (Berrone, Ricart, Duch, Carrasco 2019).

With a GDP per capita of $41,469.9 in 2018, France is not at the top of the list, but still outperforms many countries. Higher in the list is the US with a GDP per capita of $62,886.8 and Switzerland with a GDP per capita of $82,828.8 (Worldbank 2020a).

In terms of time required to start a business in days, Paris also rates at the top of the list with 4 days, equal to the US (Worldbank 2020b). Also the ease of doing business, on a scale of 0 to 100, is at 77 relatively high in France (Worldbank 2020c).

The local purchasing power index, describing the financial ability of buying goods and services compared to New York City (100), is rated good in Paris with a score of 71,17.

Furthermore, Paris has integrated a Uber service in their city (value of 1 if integrated, 0 if not) (Uber 2020).

Finally, the average annual salary in 2020 in Paris amounts to $61,769 (SalaryExplorer 2020a) while it is at $114,000 in New York (SalaryExplorer 2020b).

Following on *Figure 53,* the main numbers of this dimension are summarized.

Figure 53, CIMI Economy in Paris

1/2
Headquarters of largest FR companies

77
Ease of doing business (FR) (Scale 1 – 100)

20
Headquarters out of 100 largest companies worldwide

71,17
Purchasing Power Index

41,470
GDP per Capita (FR) ($)

1
Uber Service

4
Time to start a business (days)

61,769
Avg annual salary ($)

Source: Internal Document, Numbers based on text above.

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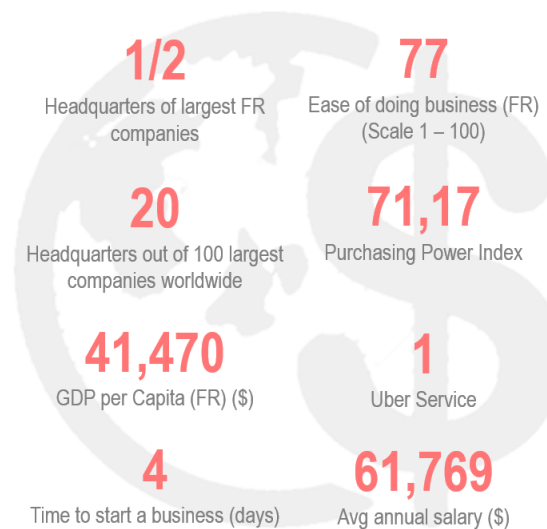
4.2.2.4 Governance

The fourth dimension is Governance, measuring the quality and effectiveness of state interventions. This dimension is built upon 12 different indicators, including reserves, research centers, corruption perceptions index and democracy ranking. The details including the sources the CIMI indicators are based on can be seen on *Table 11.*

Table 11, CIMI Governance Indicators

No.	Indicator	Description / Unit of measurement	Source
40	Reserves	Total reserves in millions of current dollars. Estimate at city level according to the population.	World Bank
41	Reserves per capita	Reserves per capita in millions of current dollars.	World Bank
42	Embassies	Number of embassies and consulates per city.	OpenStreetMap
43	ISO 37120 certification	This establishes whether or not the city has ISO 37120 certification. Certified cities are committed to improving their services and quality of life. It is a variable coded from 0 to 6. Cities that have been certified for the longest time have the highest value. The value 0 is for those cities without certification.	World Council on City Data (WCCD)
44	Research centers	Number of research and technology centers per city.	OpenStreetMap
45	Government buildings	Number of government buildings and premises in the city.	OpenStreetMap
46	Strength of legal rights index	The strength of legal rights index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate access to loans. The values go from 0 (low) to 12 (high), where the highest ratings indicate that the laws are better designed to expand access to credit.	World Bank
47	Corruption perceptions index	Countries with values close to 0 are perceived as very corrupt and those with an index close to 100 as very transparent.	Transparency International
48	Open data platform	This describes whether the city has an open data system.	CTIC Foundation and Open World Bank
49	E-Government Development Index (EGDI)	The EGDI reflects how a country is using information technology to promote access and inclusion for its citizens.	United Nations
50	Democracy ranking	Ranking where the countries in the highest positions are those considered more democratic.	*The Economist* Intelligence Unit
51	Employment in the public administration	Percentage of population employed in public administration and defense; education; health; community, social and personal service activities; and other activities.	Euromonitor

Source: IESE Cities in Motion Index 2019 (Berrone, Ricart, Duch, Carrasco 2019)

In total, Paris can be found on rank number 37 of the dimension Governance. Three Swiss countries are ranked under the top ten, with Bern on its peak. This is due to its good performance of Switzerland in the indexes of corruption perceptions, reserves per capita and number of embassies.

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Even though rank 37 out of 174 is a good result, it also shows that there still is some space for improvement. The Strength of Legal Rights Index of the World Bank measures the extent to which laws protect borrowers and lenders in a country and therefore facilitate the access to loans. On a scale from 0 to 12, 0 being low and 12 being high, in 2019 France has reached a result of 4. Switzerland is at a score of 6, while the United States has reached 11 (Worldbank 2020d). This shows, that there can be some improvement made in Paris.

According to the World Council on City Data (WCCD), whether Paris nor Berne have an ISO 37120 certification (WCCD 2020). This certification measures the performance of cities in terms of services and quality of life, in a comparable and verifiable manner (ISO 2018).

In the Corruption Perception Index (CPI) of 2019, France has reached a result of 69 out of 100, putting them on rank 23 out of 180 countries (Transparency International 2020a). Switzerland, on the other hand, is with 85/100 on rank 4 (Transparency International 2020b).

In the 2019 Democracy ranking of the Economist, 167 countries are ranked on a score between 0 and 10, 0 being authoritarian regimes and 10 being full democracy, based on 60 indicators. France is with a score of 8.12 ranked 20th, which puts the country on the very limit between full democracy and flawed democracy. Switzerland ranks 10th with a score of 9.03 (The Economist 2020).

Finally, according to the official data website of the French government, there are 156 embassies placed in Paris (data.gouv.fr 2016), compared to 176 in Berne (Botschaft-Konsulat.com 2020).

An overview of the results achieved by Paris in the dimension Economy can be seen on *Figure 54.*

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4
Strength of Legal Rights Index,
Score (FR)

8.12
Democracy Ranking,
Score (FR)

0
ISO 37120 certification

20th
Democracy Ranking, Rank (FR)

69
Corruption Perception Index,
Score (FR)

156
Embassies

23rd
Corruption Perception Index,
Rank (FR)

Source: Internal Document, Numbers based on text above.

4.2.2.5 Environment

Environment is another one of the nine dimensions of the CIMI. This dimension includes measures of cities concerning sustainable development. This dimension in based on 11 indicators, listed on *Table 12,* including CO_2 emissions, access to water supply, pollution or solid waste.

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Table 12, CIMI Environment Indicators

No.	Indicator	Description / Unit of measurement	Source
52	CO_2 emissions	CO_2 emissions from the burning of fossil fuels and the manufacture of cement. Measured in kilotons (kt).	World Bank
53	CO_2 emission index	CO_2 emission index.	Numbeo
54	Methane emissions	Methane emissions that arise from human activities such as agriculture and the industrial production of methane. Measured in kt of CO_2 equivalent.	World Bank
55	Access to the water supply	Percentage of the population with reasonable access to an appropriate quantity of water resulting from an improvement in the supply.	World Bank
56	PM2.5	The indicator PM2.5 measures the number of particles in the air whose diameter is less than 2.5 micrometers (μm). Annual mean.	World Health Organization (WHO)
57	PM10	The indicator PM10 measures the amount of particles in the air whose diameter is less than 10 μm. Annual mean.	WHO
58	Pollution	Pollution index.	Numbeo
59	Environmental Performance Index (EPI)	This measures environmental health and ecosystem vitality. Scale from 1 (poor) to 100 (good).	Yale University
60	Renewable water resources	Total renewable water sources per capita.	Food and Agriculture Organization of the United Nations (FAO)
61	Future climate	Percentage of the rise in temperature in the city during the summer forecast for 2100 if pollution caused by carbon emissions continues to increase.	Climate Central
62	Solid waste	Average amount of municipal solid waste (garbage) generated annually per person (kg/year).	Waste Management for Everyone

Source: IESE Cities in Motion Index 2019 (Berrone, Ricart, Duch, Carrasco 2019)

Paris is ranked only 54th in this section, while Reykjavik took the first place. Reykjavik earned this rank mainly due to low pollution and widespread renewable water sources.

Based on the CO_2 emission metrics of the world bank, France has created 4.6 kilotons of CO_2 per capita in 2014. As comparison, Switzerland has created 4.3 kiloton and Iceland 6,06 kilotons in the same year (Worldbank 2020e). On the CO_2 emission index of Numbeo, which has more recent numbers and is split into cities, Paris counts as having one of the lowest CO_2 emissions compared worldwide in 2020. In the category of the lowest emissions worldwide, however, Paris is far from being the leader (Numbeo 2020e).

Regarding the methane emissions, France has a lot of improving potential. According to the Worldbank, in 2012 France has created 81,179 kilotons of methane emissions, while Switzerland only created 4,900 kilotons and Iceland even less with 359 kilotons of CO_2 equivalent (Worldbank 2020f). Methane emissions result from human activities such as agriculture and industrial production, and have become the second most important man-

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made greenhouse gas. Also, methane creates 28 times more heat than CO_2 and is therefore a serious threat to the world (Vidard 2019).

Talking about the city of Paris, the Pollution Index 2019 from Numbeo has reflected rather negative results for the capital of France. On a scale from 0 to 100, 0 being very low and 100 being very high, Paris has scored 67,71. As comparison, Zurich and Reykjavik have scored 15,94 and 14,73 respectively (Numbeo 2019a). Here it can be seen that there is an remarkable difference between the country France and Paris in terms of pollution. According to Airparif, a non-profit organization accredited by the Ministry of Environment of France for monitoring the air quality in Paris (Airparif 2010), there are three main sources of pollution in Paris: transport, heating and industry. Those three sources represent nearly 95% of CO_2 emissions in Paris. By far the biggest issue of those three, however, is road transport, including cars, vehicles of delivery, two wheels motorized and heavy trucks (Citeair 2009).

More in general, the Yale University has created an Environmental Performance Index 2020 for comparing 180 countries on their environmental performance. In this index, where the best performing country is placed first, France has achieved a rather pleasing result, with 80 scores leading to being ranked the 5th best country. Switzerland achieved an even better result by obtaining the 3rd rank (Yale University 2020).

An overview of the achieved results of the dimension Environment can be viewed on *Figure 55.*

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4.6
Kilotons of CO_2 per capita (FR)

80
Environmental Performance Index, score (FR)

81,179
Kilotons of Methane per year (FR)

5th
Environmental Performance Index, rank (FR)

67,71
Pollution Index 2019, score

95%
Of CO_2 due to transport, heating and industry
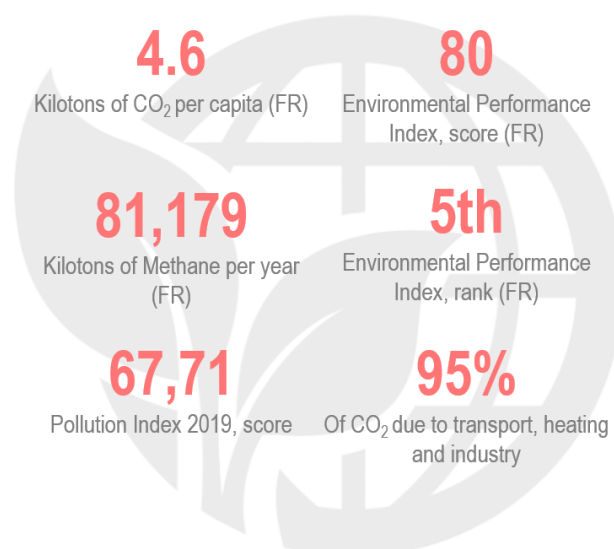
Source: Internal Document, Numbers based on text above.

4.2.2.6 Urban Planning

The next dimension is Urban planning, which is closely related to sustainability. Actual urban planning methods should focus on creating well connected and compact cities with accessible public services. Therefore some of the 5 indicators are high-rise buildings and the number of bike-rentals. The rest of the indicators can be seen on *Table 13*.

Table 13, CIMI Urban Planning Indicators

No.	Indicator	Description / Unit of measurement	Source
73	Bicycles for rent	Number of bike-rental or bike-sharing points, based on docking stations where they can be picked up or dropped off.	OpenStreetMap
74	Percentage of the urban population with adequate sanitation facilities	Percentage of the urban population that uses at least basic sanitation services—that is, improved sanitation facilities that are not shared with other households.	World Bank
75	Number of people per household	Number of people per household. Occupancy by household is measured compared to the average. This makes it possible to estimate if a city has overoccupied or underoccupied households.	Euromonitor
76	High-rise buildings	Percentage of buildings considered high-rises. A high-rise is a building of at least 12 stories or 35 meters (115 feet) high.	Skyscraper Source Media
77	Buildings	This variable is the number of completed buildings in the city. It includes structures such as high-rises, towers and low-rise buildings but excludes other various others, as well as buildings in different states of completion (in construction, planned, etc.).	Skyscraper Source Media

Source: IESE Cities in Motion Index 2019 (Berrone, Ricart, Duch, Carrasco 2019)

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In this dimension, Paris is ranked 50th, whereas Toronto occupies the first place. The strong points of Toronto are its well-developed infrastructure, its large number of buildings and skyscrapers and its access to adequate sanitation facilities for almost the entire population.

Compare to Toronto, Paris counts much more bicycle docking stations. According to the Bike Share Map, Paris counts 1,360 bicycle docking stations with 42,831 docks (Bike Share Map 2020), covering its 105,4 km^2 (World's Capital Cities 2020b). Toronto bike sharing, on the other hand, offers access to 625 docking stations with 12,000 docking points across the 200 km^2 of the city (Bike Share Toronto 2020).

Regarding the percentage of the population having access to adequate sanitation facilities, the World Bank notes 98,65% in France, 99,89% in Switzerland and 99% in Canada by 2017. This clearly reflects that sanitation facilities are a main issue in none of those countries (Worldbank 2020g).

The number of people per household in the Paris Region has continuously decreased between 2007 and 2012, while the number of households itself has increased by 6% per year. According to INSEE, these trends are due to the population aging and an increasing number of child-free couples (INSEE 2016). The average household size in Paris in 2017 was 1,9 (INSEE 2020).

Furthermore, Paris has much less high-rise buildings than Toronto. High-rise buildings signify buildings with at least 12 stories or 35m height. While Paris counts 199 of them (Skyscraper Source Media 2020a), Toronto counts a remarkable number of 2,377 high-rise buildings (Skyscraper Source Media 2020b). Taking into consideration the size of the cities, the difference in the number of high-rise buildings is still enormous.

Please refer to *Figure 56*, for an overview of the results of Paris in this dimension.

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1,360
Bicycle Docking Stations

1,9
Average Household Size

42,831
Bicycle Docking Points

199
High-Rise Buildings

98,65%
Percentage of Population with access to adequate sanitation facilities (FR)
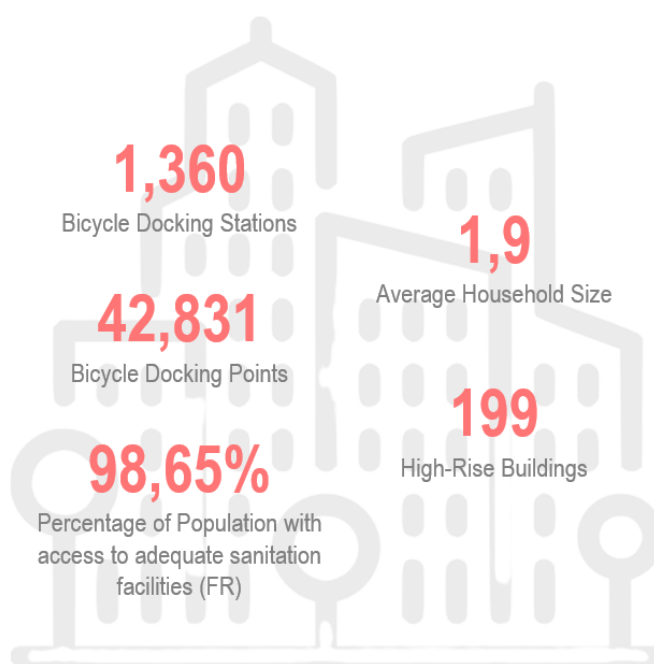
Source: Internal Document, Numbers based on text above.

4.2.2.7   International Outreach

 The seventh dimension is International Outreach, which contains also the degree of national openness. Its 6 indicators include hotels, restaurants and the number of passengers per airport. The sources used for evaluating those indicators, as well as the remaining indicators can be seen on *Table 14.*

Table 14, CIMI International Outreach Indicators

No.	Indicator	Description / Unit of measurement	Source
78	McDonald's	Number of McDonald's chain restaurants per city.	OpenStreetMap
79	Number of passengers per airport	Number of passengers per airport in thousands.	Euromonitor
80	Sightsmap	Ranking of cities according to the number of photos taken there and uploaded to Panoramio (community where photographs were shared online). The top positions correspond to the cities with the most photographs.	Sightsmap
81	Number of conferences and meetings	Number of international conferences and meetings that are held in a city.	International Congress and Convention Association (ICCA)
82	Hotels	Number of hotels per capita.	OpenStreetMap
83	Restaurant index	The index shows the prices of food and beverages in restaurants and bars compared to New York City.	Numbeo

Source: IESE Cities in Motion Index 2019 (Berrone, Ricart, Duch, Carrasco 2019)

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International Outreach is the dimension where Paris achieved the best results, by being ranked 3rd. The city was outperformed only by London and Amsterdam, mainly due to its higher number of airline passengers.

If taking a look at the other indicators, we can see that Paris counts less McDonald's restaurants, with 84 in total (McDonald's 2020a), compared to over 200 in London (McDonald's 2020b).

The website Sightsmap ranks cities according to its number of photos taken and uploaded to the online sharing website Panoramio. In this ranking, Amsterdam reached rank 44, London rank 15 and Paris achieved the best result with rank 4. This might be linked to the reputation of Paris of being the most beautiful and romantic city as well as all of the historical and cultural treasures Paris offers its visitors. Not to forget all the art, fashion, food and design Paris is known for (Sightsmap 2020).

Paris outplays London and Amsterdam also in terms of the number of international conferences and meetings. According to the 2018 ranking of the International Congress and Convention Association (ICCA), Paris is the number 1 city for international association meetings, having held 212 of it in 2018. London covers rank 7 with 150 meetings and Amsterdam rank 13 with 123 meetings (ICCA 2019).

In the Restaurant Price Index, Numbeo compares the prices of food and beverages in restaurants and bars of different cities to the ones from New York City (100). Paris reaches there 81,35, London 89,04 and Amsterdam 81,90. Paris is therefore the least expensive city in terms of restaurants of the three mentioned, while all of them are cheaper than New York City (Numbeo 2020f).

A simple overview of the international outreach in terms of numbers can be seen on *Figure 57.*

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84
McDonald's Restaurants

4th
Sightsmap Pictures Ranking

1st
ICCA International Meetings,
Rank

212
International Meetings held,
Number

81,35
Restaurant Price Index

Source: Internal Document, Numbers based on text above.

4.2.2.8 Technology

Technology is another dimension of the IESE Cities in Motion Index. The Implementation of technology in a city has a huge impact on its security, education and health. The CIMI ranking of this dimension is based on 13 indicators, such as the number of mobile phones, LinkedIn users or internet speed. The detailed list of the indicators including its sources can be found on *Table 15.*

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Table 15, CIMI Technology Indicators

No.	Indicator	Description / Unit of measurement	Source
84	Twitter	Registered Twitter users in the city. This is part of the social media variable.	Tweepsmap
85	LinkedIn	Number of users in the city. This is part of the social media variable.	LinkedIn
86	Mobile phones	Number of mobile phones in the city via estimates based on country-level data.	International Telecommunication Union
87	Wi-Fi hot spot	Number of wireless access points globally. These represent the options in the city for connecting to the Internet.	WiFi Map app
88	Innovation Cities Index	Innovation index of the city. Valuation of 0 (no innovation) to 60 (a lot of innovation).	Innovation Cities Program
89	Landline subscriptions	Number of landline subscriptions per 100 inhabitants.	International Telecommunication Union
90	Broadband subscriptions	Broadband subscriptions per 100 inhabitants.	International Telecommunication Union
91	Internet	Percentage of households with access to the Internet.	Euromonitor
92	Mobile telephony	Percentage of households with mobile phones in the city.	Euromonitor
93	Web Index	The Web Index seeks to measure the economic, social and political benefit that countries obtain from the Internet.	World Wide Web Foundation
94	Telephony	Percentage of households with some kind of telephone service.	Euromonitor
95	Internet speed	Internet speed in the city.	Nomad List
96	Computers	Percentage of households with a personal computer in the city.	Euromonitor

Source: IESE Cities in Motion Index 2019 (Berrone, Ricart, Duch, Carrasco 2019)

Paris is ranked 15th in this dimension. The category is led by Singapore, due to its fast internet speed, the high number of mobile phones and its innovative culture.

Following, an analysis of Paris, based on some of the 13 CIMI indicators of the dimension technology, compared to Singapore, the dimension leader: Singapore is nearly 7 times as big as Paris in terms of square kilometers, having a total land area of 719,7 km^2 (Data.gov.sg 2019) compared to 105,4 km^2 in Paris (World's Capital Cities 2020b).

According to the WIFI Map, Paris has 10,663 free WIFI hotspots (WiFi Map 2019a), while Singapore counts 9,580 hotspots (WiFi Map 2019b). Taking into consideration the size of the two cities, Paris clearly offers wider spread free WIFI.

On the Innovation City Index, which ranks the innovation of a city on a scale from 0 (no innovation) to 60 (a lot of innovation), Paris was ranked 6th in 2019 with a score of 55.

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The exact same result was attributed to Singapore. The leader of the Index is New York, with a score of 59 (Innovation Cities Program 2019).

According to a statistic of the World Bank in 2018, France has 59 fixed telephone subscriptions per 100 people. In Singapore there are a few less, counting 35 landline subscriptions per 100 people (Worldbank 2018). This might be due to a switching trend to mobile phones.

Regarding home internet access, the numbers are inversed. While there were 98% of the population of Singapore having internet access at home in 2019 (imda.gov.sg 2020), there were only 90% in the Paris Region (Gautier (Statista) 2020). Nevertheless, the scores are high in both cities.

The internet speed is quicker in Paris than in Singapore, according to a ranking of Nomadlist (Nomadlist 2020b).

The professional social network LinkedIn was used in June 2020 by 47.9% of the population of Singapore (Napoleoncat 2020a), while only by 31.2% of the French population (Napoleoncat 2020b). According to Statcounter Global Stats, the use of Facebook is the most spread social media in France, having a 77,41% usage rate between June 2019 and June 2020 (Statcounter GlobalStats 2020).

Please refer to *Figure 58*, for an overview of the results of Paris in this dimension.

Figure 58, CIMI Technology in Paris

10,663	90%
Free WIFI Hotspots	Home Internet Access
6th	Quick
Innovation City Index, Rank	Internet Speed
55	31,2%
Innovation City Index, Score	LinkedIn usage in France
59	77,41%
Fixed Telephone Subscriptions per 100 people (FR)	Facebook usage in France

Source: Internal Document, Numbers based on text above.

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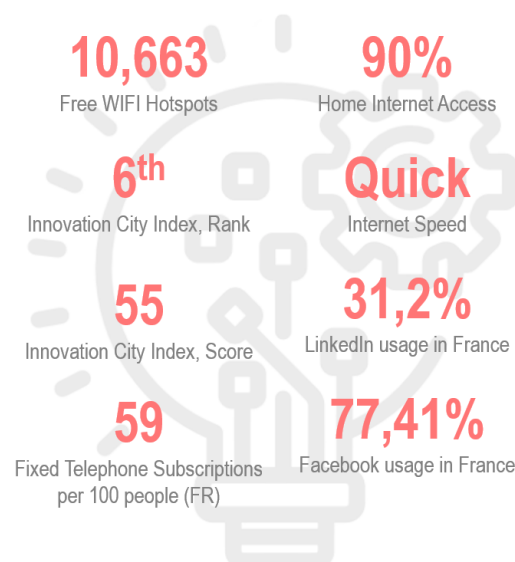
4.2.2.9 Mobility and Transportation

The last and most important dimension for this thesis is Mobility and Transportation. This is why it is going to be analyzed slightly more in detail than the other dimensions. There are two main challenges for smart cities in the field of mobility and transportation, first, the facilitation of movement and second, the access to public services.

The dimension Mobility and Transportation includes everything with regard to the infrastructure of roads and routes, vehicle fleets and public- and air transportation. The mobility of a city has a huge impact on the livability of a city and might be crucial to the sustainability of it over time.

The indicators on which the CIMI dimension Mobility and Transport is based are listed in *Table 16.* Paris achieved its second best result in this category by being ranked 4th, just after Shanghai (1st), Beijing (2nd) and London (3rd).

Table 16, CIMI Mobility and Transportation Indicators

No.	Indicator	Description / Unit of measurement	Source
63	Traffic index	Consideration of the time spent in traffic, the dissatisfaction this generates, CO_2 consumption and other inefficiencies of the traffic system.	Numbeo
64	Inefficiency index	Estimation of traffic inefficiencies (such as long journey times). High values represent high rates of inefficiency in driving.	Numbeo
65	Index of traffic for commuting to work	Index of time that takes into account how many minutes it takes to commute to work.	Numbeo
66	Bike sharing	This system shows the automated services for the public use of shared bicycles that provide transport from one location to another within a city. The indicator varies between 0 and 8 according to how developed the system is.	Bike-Sharing World Map
67	Length of the metro system	Length of the metro system per city.	Metrobits
68	Metro stations	Number of metro stations per city.	Metrobits
69	Flights	Number of arrival flights (air routes) in a city.	OpenFlights
70	High-speed train	Binary variable that shows whether the city has a high-speed train or not.	OpenRailwayMap
71	Vehicles	Number of commercial vehicles in the city (in thousands).	Euromonitor
72	Bicycles per household	Percentage of bicycles per household.	Euromonitor

Source: IESE Cities in Motion Index 2019 (Berrone, Ricart, Duch, Carrasco 2019)

An overview of the most important results of Pars can be extracted from **Figure 59**.

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83rd	**7**	**70-79,9%**
Traffic Index, Rank	Bike Sharing Organization	Households having Bicycles (FR)
42.64	**219,9 km**	**730 km**
Minutes, One-Way Commute	Length of Metro system	High-Speed Train
166th	**383**	**5%**
Time Experience Index, Rank	Metro Stations	Mobility by Bicycle
100th	**524**	**10%**
Inefficiency Index, Rank	Air Routes	Commuting by Bicycle
41th	**1**	
CO$_2$ Emission Index	High-Speed Train	
40%	**404,919**	
Train/Metro use (commute)	LCVs entering	

Source: Source: Internal Document, Numbers based on text below.

Traffic Index, Time Index and Inefficiency Index

These first three indexes are based on a research done by Numbeo, the world's largest database of user contributed data about cities and countries worldwide (Numbeo 2020a). The indexes were lastly updated in April 2020 and in the case of Paris are based on 116 contributors (Numbeo 2020g).

The Traffic Index is a total of four sub-indexes. It includes the time consumed in traffic due to job commute, the estimation of time consumption dissatisfaction, the CO$_2$ consumption estimation in traffic and the overall inefficiencies in the traffic system (Numbeo 2020h). All of the sub-indexes will be explained more in detail below. Paris was ranked 83rd out of a total of 238 cities in the traffic index. As comparison, Shanghai was ranked 33rd and London 62nd (Numbeo 2019b).

- According to the Time Index, it takes a Parisian on average 42.64 minutes to commute to work, one way. In this sub-index, Paris performed quite similar to the dimension leaders of the CIMI: inhabitants of Shanghai and London count 49,75 and 47,03 minutes in average per way. Much more at the top of the list are Reykjavik (20.04 minutes), Vienna (24,76 minutes) or Geneva (24,81 minutes) The most time is needed for commuting Dhakata, Bangladesh, taking 63,25 minutes in average. (Numbeo 2020i).

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- The <u>Time Experience Index</u> tells us the dissatisfaction of residents due to long commute times. In this index it is assumed, that the dissatisfaction increases exponentially with each minute after a one way commute exceeds 25 minutes. Paris performed a bit better than Shanghai and London in this sub-index and achieved rank 166, compared to the 188th and 182nd rank for Shanghai and London respectively (Numbeo 2019c). But it can still be mentioned, that there is a dissatisfaction present of the Parisian commuters.

- The <u>Inefficiency Index</u> is an estimation of inefficiencies in the traffic of a city. Examples are people using their car instead of public transport or too long commuting times. Also in this index Paris performed better than the dimension leaders. So reached Paris rank 100 amongst the total of 238 cities, while Shanghai was ranked 147th and London 154th (Numbeo 2019b). Nevertheless, there is still a lot of room for improvement for Paris.

- Finally, the <u>CO_2 Emission Index</u> shows the CO_2 consumption of a city due to its traffic time. It is measured in grams and is the only category based on the return trip, and not the one way trip to work. Paris reaches in this index a good result with 3151.27 grams per return, ranking the city on place 41. Shanghai is ranked 61st with 3685,45 grams and London is with the 15th rank at the top of the index, measuring only 2177,87 grams per return. Based on those results, annually, each Parisian passenger produces approximately 705.53kg of CO_2 due to commuting. Therefore, 32,31 trees for each passenger would be needed in order to produce enough oxygen. (Numbeo 2019b).

In addition to the traffic index, Numbeo has listed the main means of transportation that are used in Paris for commuting to work or school. On *Figure 60*, it can be observed that the most popular mean for commuting in Paris is the Train or Metro, with a share of 40%. With half of the stake, the car is used the second most often in Paris. Then, 14% of the respondents are going to work or school by walking and 10% by bike. The motorbike and Tram, on the other hand, are the two most unpopular means for going to work or school (Numbeo 2020g).

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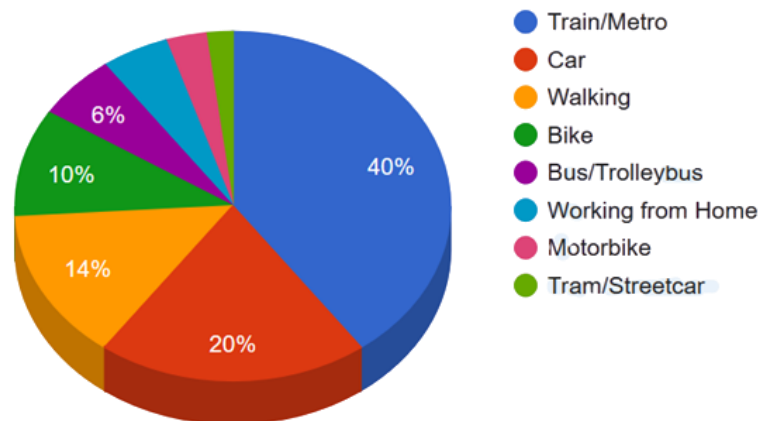
Source: Numbeo (Numbeo 2020g)

Bike Sharing

This indicator is based on the source of Bike-Sharing World Map. It shows the automated bike sharing services, open for the public use. According to this World Map, Paris currently has 7 bike-sharing organizations. By 2019, 6 bike-sharing organizations have stopped their services, either due to the large number of theft and vandalism, or in order to being overtaken by another bike-sharing company. According to the same source, in 2019 there were approximately 20,000 bikes for rental in Paris. (*The Bike-sharing World Map* 2020).

The oldest and biggest bike-sharing company in Paris is Vélib'1, which was launched in 2007 and has been taken over by its successor Vélib'2 in 2018 when changing its operator from JCDecaux to Smoovengo. In 2019, this bike-sharing organization offered 9440 bikes and 5480 e-bikes in 1370 stations (*The Bike-sharing World Map* 2020).

Length of the Metro System and Metro stations

These two linked indicators for the Mobility and Transportation dimension of the IESE Cities in Motion Index, are based on Metrobits as source. It can be found, that the length of the metro system in Paris is 219.9 km and that the city has 16 lines with 383 stations in total, resulting in an average of 24 stations per line. The average station distance is 599 meters and the average line length is 13.74 km (Serradell 2013).

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For comparison, today there are 761 metro lines in total worldwide. Combined, they reach a length of 16,678 km, serve 13,575 stations and show a 1.3 km station distance in average (Rohde 2020).

Flights

With this indicator the IESE Cities in Motion index searches to find and compare the total number of air routes (arrival flights) in a city. According to their source OpenFlights, Paris currently counts 524 air routes. The international JFK airport in New York, as comparison, has only 456 air routes (OpenFlights 2019).

High Speed Train

This indicator helps defining whether a city has or has not a high-speed train. It is a binary variable, meaning, this indicator can only be answered by yes or no. According to their source OpenRailwayMap, Paris is in possession of a high-speed train. (OpenRailwayMap 2020).

Vehicles

The CIMI indicator Vehicles analyzes the number of commercial vehicles in a city. However, unfortunately it is not possible to access the original dataset used for the Index. Therefore the following numbers will be based on a dataset of Frost & Sullivan. According to their analyze, the 2020 average number of Light Commercial Vehicles (LCVs) entering Paris is 404,919, while the worldwide average is 153,503. (Frost&Sullivan 2020).

Bicycles per Household

This last CIMI indicator reflects the percentage of bicycles per household. According to the data graphic from Euromonitor International seen on *Figure 61,* in 2013 there were 70% to 79.9% of French households in possession of a bicycle (Euromonitor International 2014). In comparison to other countries evident on the data graphic, France had already implemented some incentives for encourage bicycle use, however, there is still a long way to go.

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Possession of Bicycle
% of households, 2013
- 80.0-100.0
- 70.0-79.9
- 50.0-69.9
- 30.0-49.9
- 0.0-29.9
- Not Illustrated

Northern Europe on Top
Top-Five: Possession of Bicycle
% of households 2013

Netherlands
Sweden
Finland
Japan
Norway
0%   100%

On the Rise
Bicycle Ownership
% of households

Czech Republic — Argentina — United Kingdom
70%
20%
1980 2013 80 13 80 13
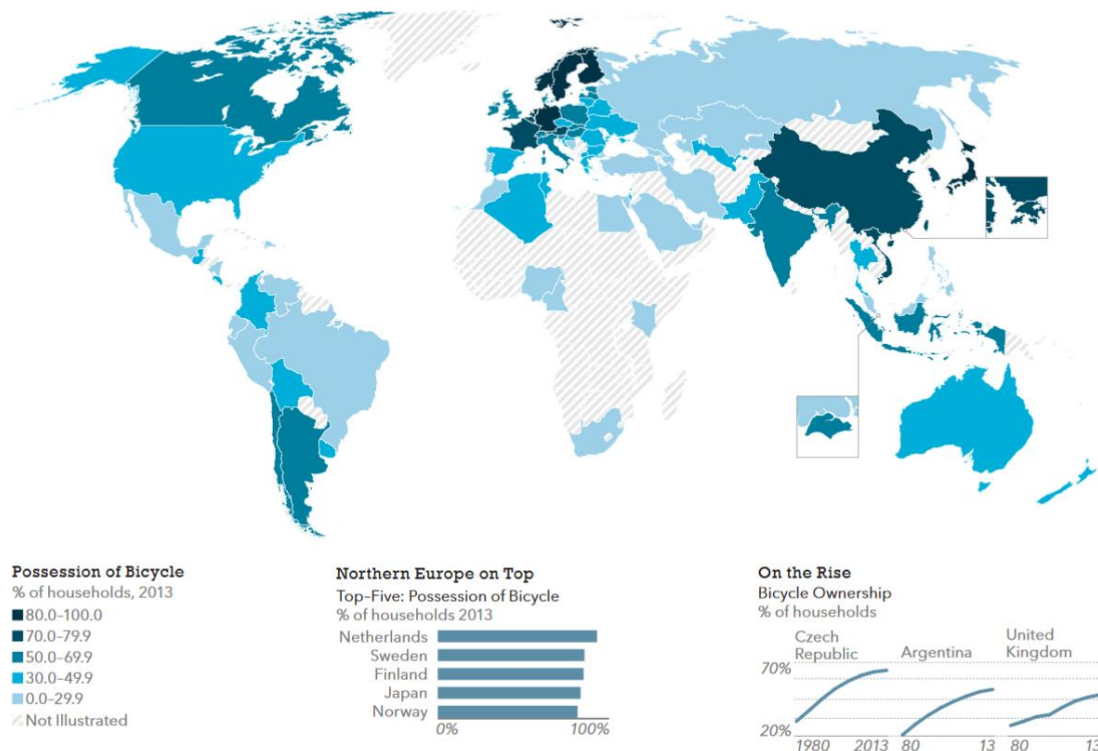
Source: Euromonitor International (Euromonitor International 2014)

Based on data taken from a database of Frost & Sullivan, the length of the cycle network in Paris amounts to 730 km. Compared to the global average of 42kms, Paris has already done quite some work in this aspect. Furthermore, 5% of the mobility of the city is done by cycling (Frost&Sullivan 2020), while 10% of the commuters use their bike for going to work or school (Numbeo 2020g).

4.2.2.10 IESE Cities in Motion Index, Results

To sum up, it has been outlined that Paris is a city which offers a lot of educational and cultural opportunities to its citizens. leading to an above-average educated population and many high-level jobs. It is not for nothing that a large share of the world's largest companies have located their headquarters in Paris. Furthermore, it does not take a lot of time to open up a new business in Paris and the ease of business is perceived as being great. Moreso, women and the LGBTQ-community are well accepted and Paris citizens are generally satisfied with the medical services provided by its city. The international outreach including the air routes of Paris are excellent, this is also why it is a popular destination for holding international conferences.

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It could also be seen, that bicycles are rather popular in the city of lights, which is reflected in its large bicycle sharing network and the high percentage of bicycles per household. Nevertheless, for commuting the metro is the most acclaimed tool in Paris, which might be led back to its good metro system. In terms of technology the city offers a lot of free WIFI spots, high internet speed and a lot of home internet accesses. In general, Paris is known as being a very innovative city, what might be highly advantageous for the future of mobility in Paris.

On the other side, the crime rate in Paris is perceived as being rather high, in other words, people do not feel very safe. Also, the city of light records the highest suicide rate in Europe. Regarding the governance, the strength of legal rights might not be sufficient and the implementation of the ISO 37120 label would not harm. Environmentally speaking, the results showed that the CO_2 emission in France is below average, while the country performs poorly in the matter of methane emissions. Focusing on Paris as a city, however, the CO_2 emission is much more elevated than the countries average. This fact must be taken into consideration when planning for smart mobility in Paris. Another result which is important to retain in mind is the aging population and increase in child-free couples, which leads to a decreasing number of habitants per household. In this context, Paris still has a lot of unused potential in terms of high-rise buildings. When planning to include end-users in the FIA Smart Cities initiative it also needs to be aware of the fact that only around one-third of the French population actively uses the social network LinkedIn. Facebook is with an usage rate of over three-fourth of the population much more popular.

Regarding the mobility and transportation of Paris, it was outlaid that the commuting time clearly exceeds the global average. This elevated traffic time also adds its share to the CO_2 emissions of the city. Furthermore, trams, buses and motorbikes are not very popular transportation means for commuting. Also the use of bicycles for commuting to work or school is only at 10%. Finally, it was also shown that home office is not a very widespread way of working in the capital of France.

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4.2.3 IMD Smart Cities Index

The IMD Smart Cities Index is the second index that is going to be analyzed more in detail, with an emphasis on Paris. The index has its main focus on the perception of citizens towards issues related to structures and technology applications available in their city.

As mentioned in the literature review, the IMD Smart Cities Index was composed in a very distinct way compared to the IESE Cities in Motion Index. The IMD Smart Cities Index includes 102 cities and is based on the random inquiry of 120 residents per city. Instead of being based on secondary data, the IMD Smart Cities Index is based on self-gathered, primary data. In total, the index is based on more than 12,000 surveys with 40 questions each, always having four options as answer: strongly agree (+1.5), agree (+1), disagree (-1), strongly disagree (-1.5). In some cases, two additional options were added: "do not know" (-1) and "not available in my city" (-1.5). The percentages of the different answers were then weighted by the respective values in the brackets and calibrated to offer a scale of 0 to 100. This allowed to rank the cities on a rating scale from AAA to D, creating 10 categories (IMD Smart City Index 2019a).

In order to ensure a more pertinent assessment, the cities were also split into four groups based on the UN Human Development Index (HDI). The UN Human Development Index (HDI) focuses on people and their capabilities in a city, rather than economic growth. It is based on three dimensions:

1. a long and healthy life (life expectancy at birth)
2. being knowledgeable (expected years of schooling and mean years of schooling)
3. having a decent standard of living (GNI per capita (PPP $))

The results of each question were then compared between the countries in the same HDI group, in order to avoid comparing apples and oranges (IMD Smart City Index 2019a). In total there were 4 different HDI groups created, visible in *Appendix 9*.

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Paris has been assigned a much lower position in the IMD Cities in Motion Index than in the IESE Cities in Motion Index. In the IMD Smart Cities Index, the city of lights has been ranked in the very middle on rank 51 out of 102. The top three ranks were given to Singapore, Zurich and Oslo. The complete overall ranking of the IMD Smart Cities Index can be found in *Appendix 8*. Paris has achieved an overall rating of BB, having reached BB ratings for both the Structures pillar and the Technologies pillar, as is reflected on *Figure 62*. Other BB countries are Barcelona, Chicago, Dubai and Seoul as well as 11 others. Also, Paris was assigned to the second HDI Group, alongside 22

Source: IMD Smart City Index Report 2019
(IMD Smart City Index 2019b)

other countries including London, Tokyo, and Brussels. The entirety of the HDI group 2 is visible on *Table 17*. There are only two cities in this ranking with a rating of AAA: Singapore, occupying the first place, followed by Zurich (IMD Smart City Index 2019b).

Table 17, IMD Smart Cities Index, HDI Group 2

HDI Group 2			
1. Auckland	7. Busan	13. Osaka	19. Tel Aviv
2. Barcelona	8. Helsinki	14. Paris	20. Tokyo
3. Bilbao	9. London	15. Prague	21. Vienna
4. Birmingham	10. Lyon	16. Rome	22. Zaragoza
5. Bologna	11. Madrid	17. Seoul	
6. Brussels	12. Milan	18. Taipei City	

Source: Internal Document, based on IMD Smart Cities Index Methodology (IMD Smart City Index 2019a)

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The IMD survey given to citizens was split into four parts, with Structures and Technologies representing the two main parts. The two pillars were based on 36 out of the 40 questions in total. In addition, three questions were asked regarding the use of personal data. The last question included a ranking of the most urgent areas of a city (IMD Smart City Index 2019b). The complete city profile of Paris in the IMD Smart Cities Index can be seen in *Appendix 10.*

All of the below written numbers are based on the official IMD Smart Cities Index report (IMD Smart City Index 2019b).

4.2.3.1 *Structures and Technologies*

The pillars Structures and Technologies are sub-divided into 5 categories: Health and Safety, Mobility, Activities, Opportunities (Work and School) and Governance. Each category contains several statements, which were evaluated on a scale between 0 and 100. The score of each statement was given based on the answers of the respondents, as explained earlier. 0 means that all the respondents strongly disagreed and 100 means they strongly agreed. As explained in the literature review, the statements in the pillar Structures concern the existing infrastructure of a city while the pillar Technologies relate to the technological provisions and services of a city.

The score of each statement is then compared to the mean result achieved by the other cities of the HDI group. This comparison is presented as shown on *Figure 63.* The orange bar represent the range of all the result of the other HDI group members, ranging from the minimum to the maximum score. A small gap on the bar represents the group mean. The blue dot stands for the result of a specific city, in this case Paris.

Figure 63, IMD Smart Cities Index, Legend for the pillars Structure and Technology
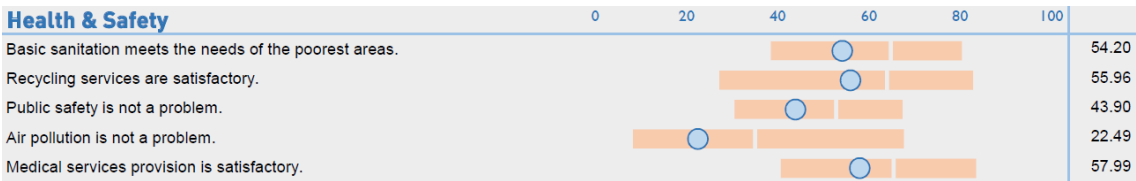

Source: IMD Smart City Index Report 2019 (IMD Smart City Index 2019b)

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Pillar Structures

In the first category Health and Safety there are five statements about the infrastructure as can be seen on *Figure 64*. In general, Paris did not score very well in this category, reaching only below-average scores compared to the other members of the HDI group 2. Paris has achieved its best result in this category for the provision of medical services, confirming the results of the IESE Cities in Motion index. For the recycling services and the sanitation needs of the poorest areas of Paris some efforts should be done. The worst scores of Paris, however, were reached for public safety and air pollution, again, matching with the results of the CIMI. The score of air pollution, 22.49, is the lowest score Paris as reached in the entire pillar Structures, which reflects the urgent need of amelioration.

Figure 64, IMD Smart Cities Index, Health and Safety Structures

Source: IMD Smart City Index Report 2019 (IMD Smart City Index 2019b)

The second category is Mobility. This category contains only two statements as shown on *Figure 65*. Again, for both statements Paris has achieved a below-average score. Corresponding with results of the CIMI, traffic congestion is listed as a rather important issue, displaying the second lowest score of Paris in the entire pillar Structures, with only 27,10. Not entirely matching with the results of the IESE Cities in Motion Index is the public transport satisfaction. While especially the metro line scored a lot of points in the CIMI, the citizens' satisfaction of the public transport reflects a rather sobering result in the IMD Smart Cities Index. The score is above 50, however, below the group mean, meaning there is still a lot of space for improvement.
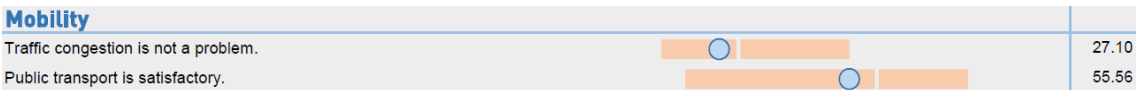
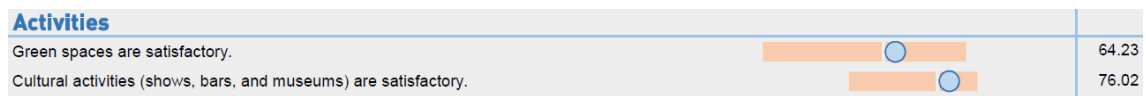*Figure 65, IMD Smart Cities Index, Mobility Structures*

Source: IMD Smart City Index Report 2019 (IMD Smart City Index 2019b)

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In the third category Activities of the pillar Structures, two statements about activities are listed, visualized on *Figure 66*. In both statement Paris has reached an above average score. According to the perception of the respondents, the green spaces in the city of lights are satisfactory. For its cultural activities Paris has achieved its best results out of the whole pillar Structures. As already mentioned in the CIMI, Paris offers many different cultural treasures reaching from its history to architecture, art, cuisine and fashion.
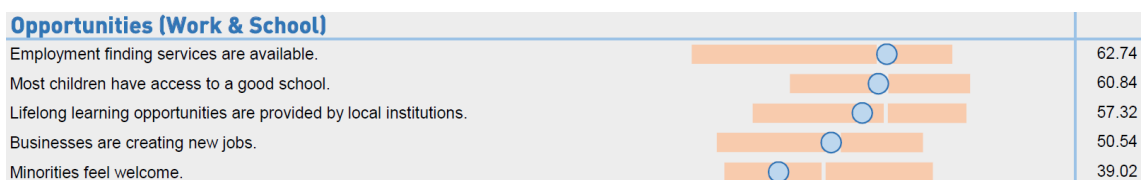
Figure 66, IMD Smart Cities Index, Activity Structures

Activities		
Green spaces are satisfactory.		64.23
Cultural activities (shows, bars, and museums) are satisfactory.		76.02

Source: IMD Smart City Index Report 2019 (IMD Smart City Index 2019b)

Opportunities in terms of work and school represent the fourth category of the pillar Structures, reflected on *Figure 67*. In average, Paris did not cope too bad, reaching in three out of the five statements the HDI group mean. According to the perception of Parisian citizens, there are a number of employment finding services available. Also, in general most children have access to a good school and business are creating new jobs. An improvement could still be made by the local institutions of Paris in offering more lifelong learning opportunities. Being placed below-average in this statement might be astonishing, taking into consideration the positive feedback in the CIMI concerning education. Another mismatch with the IESE Cities in Motion Index can be observed in the last statement "Minorities feel welcome". According to the perception of the respondents of the IMD Smart Cities Index, the openness towards minorities is really limited in Paris, having achieved a low result with 39,02, far away from the other HDI group 2 cities. Even though in the CIMI analysis no focus was put on disabled people, the results showed an extraordinary openness towards the LGTBQ community and a great acceptance of women.

Figure 67, IMD Smart Cities Index, Opportunity Structures

Opportunities (Work & School)		
Employment finding services are available.		62.74
Most children have access to a good school.		60.84
Lifelong learning opportunities are provided by local institutions.		57.32
Businesses are creating new jobs.		50.54
Minorities feel welcome.		39.02

Source: IMD Smart City Index Report 2019 (IMD Smart City Index 2019b)

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The last category of the pillar Structures is Governance, containing 4 statements shown on *Figure 68*. The results look quite similar as in the previous category when comparing to other HDI group 2 cities. In some statements Paris reached the mean, in some other the results are below-average. However, in general are the results very low in this category, most of the scores being below 50. According to the respondents, information concerning decisions taken by the local government can be accessed rather easily. The corruption of city officials is an issue of concern, however, not going beyond the average in the member cities of HDI group 2. This has been stated similarly in the CIMI. More of a concern, however, are the inclusion of residents in the decision making of the local government and the possibility for residents to give feedback on local government projects. These are two point wit a clear need of improvement, especially the feedback on projects, being positioned rather far away from the mean of other cities.

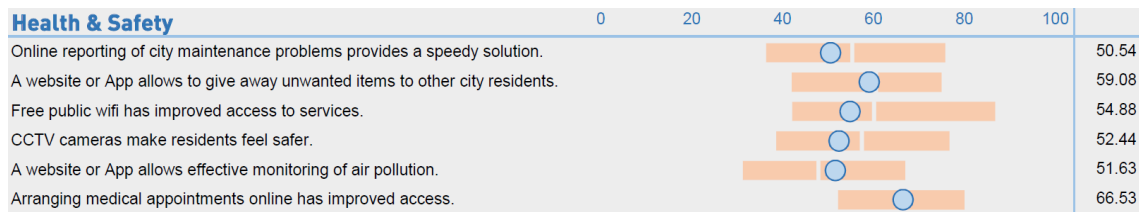*Figure 68, IMD Smart Cities Index, Governance Structures*

Governance		
Information on local government decisions are easily accessible.		54.34
Corruption of city officials is not an issue of concern.		40.65
Residents contribute to decision making of local government.		39.57
Residents provide feedback on local government projects.		36.72
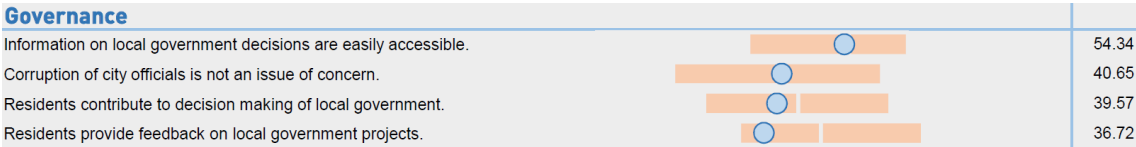
Source: IMD Smart City Index Report 2019 (IMD Smart City Index 2019b)

Pillar Technologies

Starting with six statements about the technologies in the area of Health and Safety, the first impressions of Paris' scores are not too bad, all of them being above 50 as reflected on *Figure 69*. Three statements reached results below-average, two achieved the mean score and one even an above-average result. Compared to other HDI group 2 cities, Paris has integrated better websites or Apps allowing to monitor air pollution, however, remembering the overall scores of air pollution investing even more in this kind of technology would clearly not harm the city. Paris has offered approximately the same services than the other cities in terms of websites and Apps for giving away unwanted items to other city residents and arranging medical appointments online. Some improvement should be made in Paris in the possibilities to online report city maintenance problems of the city. Also, it came out that CCTV cameras did not necessarily make residents feel safer. Finally, in Paris free public WIFI has improved the access to services, but less than in other cities of the HDI group 2. Comparing to the

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CIMI results that means, that the city counts a lot of free public WIFIs, however, that they do not assist to improve the access to services.
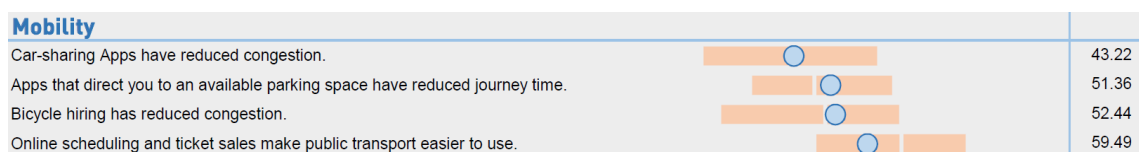
Figure 69, IMD Smart Cities Index, Health and Safety Technologies

Health & Safety		Score
Online reporting of city maintenance problems provides a speedy solution.		50.54
A website or App allows to give away unwanted items to other city residents.		59.08
Free public wifi has improved access to services.		54.88
CCTV cameras make residents feel safer.		52.44
A website or App allows effective monitoring of air pollution.		51.63
Arranging medical appointments online has improved access.		66.53

Source: IMD Smart City Index Report 2019 (IMD Smart City Index 2019b)

The second category is Mobility seen on *Figure 70*, containing four statements. Except for one statement, the results of Paris compared to other HDI group 2 cities are rather positive. According to the respondents, there were some car-sharing apps, helping to reduce the congestion, such as for the mean of the other HDI group 2 cities. However, by reaching a result of below 50, there can clearly be done more in this aspect. As seen in the CIMI, there were several opportunities in Paris to hire bycicles. Parisians believed that this has helped reducing congestion, which can be seen in the lightly above-average result. Even more satisfied than the average HDI group 2 cities were Parisian respondents with Apps directing to an available parking space. In general it can be seen that the city of lights has already shown some efforts trying to reduce the congestion. The technology for online scheduling and ticket sales for public transport in Paris has achieved a rather good result from the respondents with a score of nearly 60. However, compared to other cities Paris could put even more effort in this point.

Figure 70, IMD Smart Cities Index, Mobility Technologies

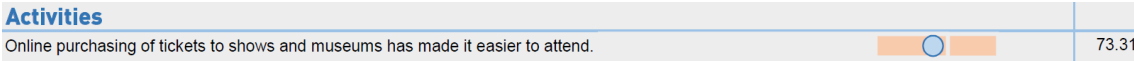| Mobility		Score
Car-sharing Apps have reduced congestion.		43.22
Apps that direct you to an available parking space have reduced journey time.		51.36
Bicycle hiring has reduced congestion.		52.44
Online scheduling and ticket sales make public transport easier to use.		59.49

Source: IMD Smart City Index Report 2019 (IMD Smart City Index 2019b)

The third category Activities contains one single statement for the pillar Technologies, visualized on *Figure 71*. Respondents gave Paris a very high general score for technologies concerning online purchasing of tickets for cultural activities, indeed the highest score of the whole pillar Technologies. This is a rather good news, regarding the high number of cultural activities offered by Paris. However, most other HDI group 2

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cities scored high as well. This is why Paris is placed just below the mean with a score of 73.31.

Figure 71, IMD Smart Cities Index, Activity Technologies

Activities		
Online purchasing of tickets to shows and museums has made it easier to attend.	◯	73.31

Source: IMD Smart City Index Report 2019 (IMD Smart City Index 2019b)

Opportunities in terms of work and school is the fourth category in the pillar Technologies, containing three statements as seen on *Figure 72*. Parisians seem to be equally satisfied of technologies providing online access to job listings and the IT skills taught in schools. However, compared to other HDI group 2 cities, Paris lags behind in online job listing services. Also rather well perceived were online services provided for facilitating starting a business. Corresponding to the learnings from the CIMI, France had very efficient tools for quickly opening a new business.
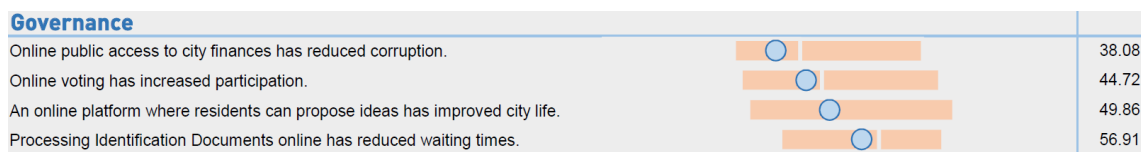
Figure 72, IMD Smart Cities Index, Opportunity Technologies

Opportunities (Work & School)		
Online access to job listings has made it easier to find work.	◯	57.99
IT skills are taught well in schools.	◯	57.86
Online services provided by the city has made it easier to start a new business.	◯	52.17
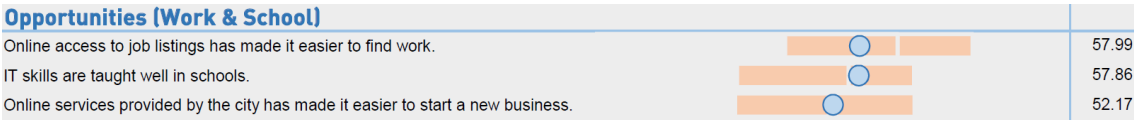
Source: IMD Smart City Index Report 2019 (IMD Smart City Index 2019b)

The last category of the pillar Technologies is Governance, containing four statements reflected on *Figure 73*. In this category Paris often lagged behind just a little bit compared to the mean of the other HDI group 2 cities. The lowest result of the whole pillar Technologies has been scored for a service providing online public access to city finances in order to reduce corruption. As has been seen in the CIMI and Structures pillar, corruption is not one of the main issues of Paris but should not be underestimated neither. According to the respondents, processing identification documents online has clearly reduced waiting times. An online voting system for increasing the participation, on the other hand, has reached a rather low score. A slightly more positive effect has been perceived for online platforms for residents, where they can suggest ideas.

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Figure 73, IMD Smart Cities Index, Governance Technologies

Governance

|	
Online public access to city finances has reduced corruption.	38.08
Online voting has increased participation.	44.72
An online platform where residents can propose ideas has improved city life.	49.86
Processing Identification Documents online has reduced waiting times.	56.91

Source: IMD Smart City Index Report 2019 (IMD Smart City Index 2019b)

4.2.3.2 Attitudes

Besides the two key pillars Structures and Technologies, the survey for the IMD Smart Cities Index also asked three questions assessing the attitudes of the respondents towards the use of personal data, face recognition and overall trust towards local authorities (IMD Smart City Index 2019a). The results on this section, gathered from Paris citizens, can be seen on *Figure 74*. The results represent the percentage of respondents who agreed or strongly agreed with the statements.

Figure 74, IMD Smart Cities Index, Attitudes of Parisians, 2019
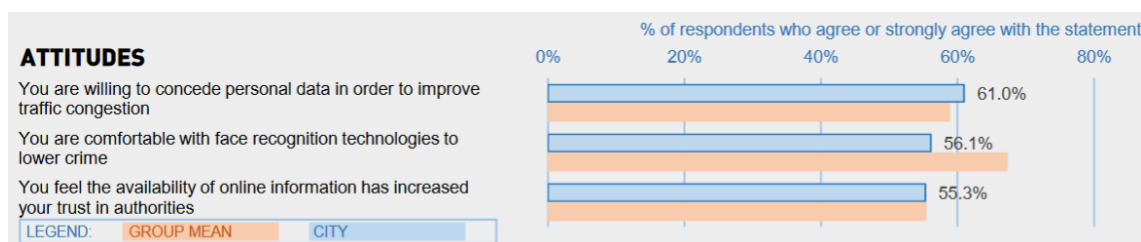
Source: IMD Smart Cities Index (IMD Smart City Index 2019b)

In the first statement it can be observed, that Parisians are a bit more willing to concede personal data in order to improve traffic congestion than the group mean. As learned up until now, traffic congestion is a serious issue in Paris.

The second part shows that Paris residents are much less comfortable with face recognition technologies than the average of the second HDI group. Still, over half of the respondents have agreed to being comfortable with face recognition technologies in order to lower crime. Again, security seemed being one of the main challenges faced by Paris.

Finally, representing the perfect mean of the group, 55,3% of Parisians feel that the availability of online information has increased the trust in authorities. If remembering the statement of the pillar Technology concerning the corruption, however, there is still a lot

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of improvement possible. Ensuring the trust of citizens is the groundwork of the future of mobility, as has been stated several times during past FIA Smart Cities events.

4.2.3.3 Priority Areas

The last out of the 40 questions of the IMD survey was about areas that respondents perceive as priority areas for their city. The citizens have received a list of 15 indicators and were asked to select the 5 perceived the most urgent for their city. The results of the showcase city Paris are demonstrated on *Figure 75*. It can be observed, that in the top half of the priority areas at least 4 are linked to Transportation and Mobility.

Figure 75, IMD SCI Priority Areas of Paris, 2019
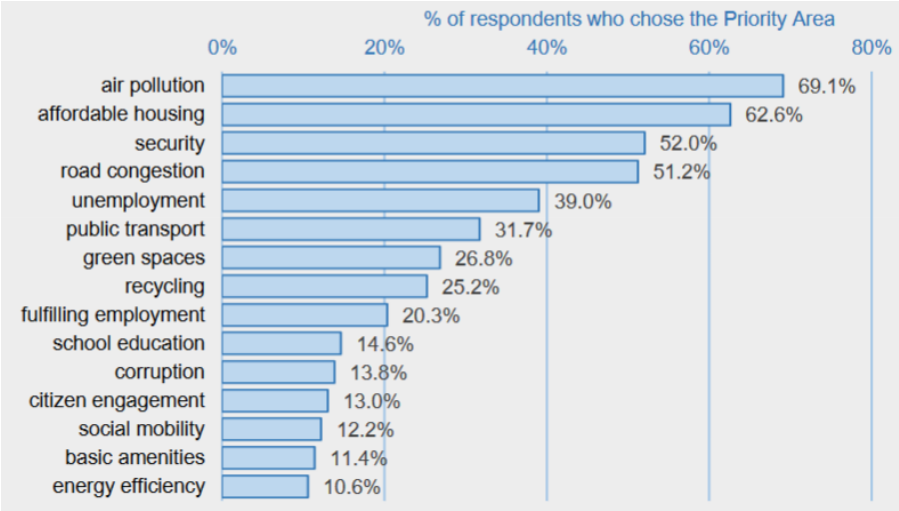
Source: IMD Smart Cities Index (IMD Smart City Index 2019b)

The highest share of respondents chose air pollution as the most urgent priority area, a topic which has already been addressed in the first part of the survey as well as the CIMI. It was chosen from 69,1% of Parisians. Security, also already heard of in the first part and the CIMI, achieved the third position with a percentage of 52%. Very close behind is road congestion, chosen from every second respondent as a priority area. And finally, public transport can be found on rank 6, also already attracting some attention in the first part of the analysis because of its below-average satisfaction results Here, it can be seen that one third of the respondents believe that it is an urgent priority area.

(IMD Smart City Index 2019b)

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4.2.3.4 IMD Smart Cities Index, Results

To sum up, the main findings linked to the future of smart mobility will be lined up. Not very surprisingly, air pollution pops up as number one priority area of Paris in the IMD Smart Cities Index. This topic has been mentioned several times in the IESE Cities in Motion Index with road transport being the biggest source. Air pollution has also turned out to be the worst rated statement in the pillar Structures in terms of score. It could be understood, that air pollution represents an extremely relevant topic for Parisian inhabitants. And even though Paris as a city has already tried to tackle this issue in several ways, for example by showing a rather competitive score for websites and Apps regarding air pollution, the dissatisfaction of Parisian citizens is still very present.

Traffic congestion, closely linked to air pollution, also popped up as a very important issue for Parisian citizens. In terms of priority areas, it reached the 4th rank. In the structures pillar, it reached the second worst score. In the CIMI the long commuting times were also mentioned, Solutions such as car sharing apps or bicycle sharing systems have been implemented in order to reduce traffic congestion, however, they have never reached more than average results in the IMD Smart Cities Index. To be mentioned as well is the fact, that Parisian respondents were rather satisfied with implemented technologies regarding finding parking spaces in Paris.

Rather surprisingly it has been stated, that the public transport in Paris is not as satisfying for citizens than for the mean comparison group. It was selected as being the 6th priority area in Paris. And in terms of online scheduling and ticketing technology for public transports, Paris is located behind the average of comparable cities. On the other hand, in the IESE Cities in Motion Index the metro system in Paris has been highlighted rather positively. The satisfaction regarding public transport might be an important point to be confirmed or denied in a primary research.

Another surprise needing to be confirmed is the openness of Paris towards minorities. Results of the IMD Smart Cities Index stated, that minorities do not feel welcome in Paris, reaching the fourth worst result of the structures pillar. In the IESE Cities in Motion Index, on the other hand, it was understood that the LGBTQ-community and women are very well accepted. However, it might be interesting to verify whether this pattern also reflects on disabled and restricted citizens and their access to mobility.

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Security has turned out to be another important, frequently mentioned issue of Paris. This is why, unsurprisingly, it was elected the third most important priority area for Paris in the IMD Smart Cities Index. In the structures pillar respondents stated that public safety is a problem. In terms of technologies, respondents answered that CCTV cameras do not resolve the issue by making them feel safer. It would need to be verified, what kind of impact the security issues have on the mobility in Paris.

Furthermore, it could be learned from the IMD Smart Cities index that there is a need to reinforce the exchange between the local government of Paris and its residents. In the structures pillar results showed, that the contribution of residents to the decision making of the local government is very low and also below the average of other cities. Even a lower score was reached for residents to provide feedback on local governments projects. This statement reached the third lowest score in the whole pillar structures and was very far behind the mean of comparable cities. In terms of technologies Paris seems to have an online platform where residents can propose ideas to improve the city life. However, this technology is not above-average compared to similar cities.

Regarding the attitudes of Parisian citizens, the IMD Smart Cities Index revealed a willingness of conceding personal data for improving traffic congestion. Over half of Parisian residents are also comfortable with face recognition technologies in order to lower crime. This attitude needs to be kept in mind, in order to tackle two of the biggest challenges faced by Paris.

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4.2.4 Main Transport and Mobility issues in Paris

Deriving from the analysis of the two Smart City Indexes, four main pain points in terms of transport and mobility could be determined in Paris. Each of them with a strong importance for the citizens of Paris. The four challenges are listed on *Figure 76.*

Figure 76, Main Transport and Mobility Issues in Paris
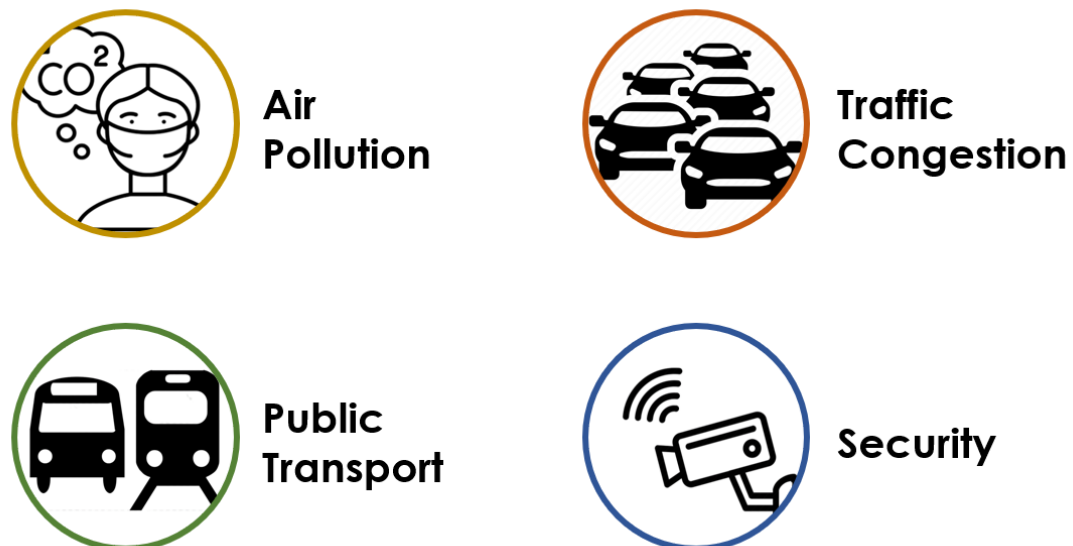
Source: Internal Document, based on findings of the analyzed Indexes

In order to confirm or deny those challenges and better understand the reasons behind them, a survey and some interviews are going to be conducted with Parisian citizens. But before jumping into the primary research, a quick overview will be given on what the city of Paris has already implemented and plans to implement in terms of mobility and transportation.

Paris has set itself the target to become carbon neutral and entirely powered by renewable energy by 2050. Planned is to phase out diesel-powered mobility by 2024 and petrol cars by 2030 (City of Paris 2018). Also on the plan is to electrify the urban transport (Dundas 2019).

While car alternatives such as bikes, scooters, unicycles or hoverboards are becoming increasingly popular in the French capital, it turned out to be more challenging to convince Parisian citizens to switch to cleaner cars. This is why the city of Paris offers € 5,000 to every resident buying a so called "clean vehicle" as well as free parking for

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electric vehicles (Dundas 2019). Even a step further is the city planning to go, by implementing a parking system where the prices are adapted to the vehicle emission. In addition to the already widespread self-service bicycle-hire company Vélib', the city of Paris has added the electric car sharing rental service Autolib' as well as its utility version for business users called Utilib' (Dusart 2015). Also part of this chain will be Prolib', a parking service where spaces can be booked online in advance. This service is planned to be implemented by 2024 and will give priority access to low-carbon vehicles (City of Paris 2018).

According to the Paris Climate Action Plan, the city already benefits from a well-developed public transport system, an extensive cycle-path network, inland waterway routes along the Seine river and a dense and high-quality rail network. These assets will facilitate the implementation of clean, active and shared transport modes (City of Paris 2018). By 2030 Paris plans to implement the Grand Paris Express project. The Grand Paris Express will be the new underground metro, bypassing central Paris from suburb to suburb (City of Paris 2018). This metro system will be automatic to 100% and have a train every 2 to 3 minutes (Socitété du Grand Paris 2017). This project is therefore planned to reduce congestion and traffic time by a lot.

In 2015, the first Low Emission Zone has been established in Paris. In this aspect the French capital aims to limit access to central Paris by strongly polluting vehicles. By the mean of Crit'Air stickers access can be restricted to vehicles with a high level of pollution (City of Paris 2018).

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4.3 *User Journeys*

Based on the analysis of the mobility in Paris, it is now possible to create three User Journeys of the key users of the Parisian mobility: Parisian citizens. The survey and interviews conducted, outlined in the next chapters, helped to adjust the journeys correctly. The user journeys resumes the different steps a user goes through when using a specific transportation tool for commuting. Of course each journey might be different and include more or less obstacles. These journeys simply serve as giving a small insight in the struggles faced on commuting journeys.

The first user journey will be a commuting journey in Paris by **car**. There are still a lot of Parisian residents using their car for going to work. However, even more would love to use this transportation mean for commuting, but simply face too many barriers and obstacles on their journey, that they decide to use transportation substitutes. These different barriers and obstacles will be presented in this first user journey.

The second user journey shows the experience of a Parisian resident commuting by **bicycle**. Identified based on the two Smart Mobility Indexes and confirmed by the following survey, the bicycle is the most common two-wheeler transportation mean in Paris. Still, this commuting journey is not solely linked to positive feelings, as will be reflected in the second user journey.
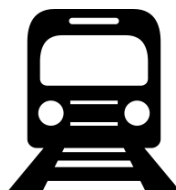
The third user journey reflects the commuting way of a Parisian resident by **metro**. The metro was identified as being the most popular transportation mean of Paris due to the two Smart Mobility indexes and the survey results. This might be due to the fact that the metro is the main public transportation tool used in the center of Paris. People living in the suburbs of Paris, however, usually first have to take a RER train or a bus in order to access to a metro stop. Therefore, people living in the suburbs of Paris might face a lot of additional challenges compared to the ones listed in the third user journey. For example, the RER and buses have much more unregular schedules and are even less reliable than the metro. This has to be kept in mind closely.

All the user journeys will be commuting journeys, as explained more in detail in the Methodology. Since this thesis has a focus on the city of Paris, and most of the main

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mobility pain points are linked to the urban area, it was decided that all three user journeys start and end in Paris, and do not directly take into consideration the suburb.

Also, none of the user journeys take into consideration the adaptation that have to be done by parents. This decision was based on the discovery in the IESE CIMI, that said that the number of child-free couples in Paris is increasing. Nevertheless, it needs to be aware of the fact, that parents have even more challenging journeys. Taking the bicycle or motorcycle, for example, with a newborn is very challenging up to impossible. The same is true for entering public transportations during rush hours with a baby buggy. Therefore, solutions have to be found for bringing children or babies to school, kindergarten, the nursery or similar places before going to work. This adds a bunch of additional steps before even leaving for work to the user's journey. This has to be understood and kept in mind when reading through the user journeys.

Furthermore, in none of the journeys are challenges listed linked to disabilities. The survey conducted as well as the interviews, which will be introduced at a later point of the thesis, have confirmed that the public transportations of Paris are not adapted at all to disabilities. So is it very rare, for example, to find stair substitutions such as elevators or escalators, which makes using public transportations for a person in a wheelchair extremely challenging up to impossible. Also, not all public transportation entries dispose of ramps in order for wheelchairs to enter. Moreover, the next stops of public transportations are often listed inside the public transportation for example on a wall, however, a person with a visual impairment struggles to know when he has arrived at his destination. A quotation of interviewee 2 is the following: *"It is absolutely embarrassing to admit to what extent disabled people are excluded from the public transportation network of Paris"* (Interviewee 2 2020 (personal translation))

The user journeys are displayed in several columns, each representing a further step in the journey. The different steps are then grouped into four different stages of the journey: duty, process until departure, journey to work and arrival at work. The step itself is explained in the section "Activities", accompanied by an image. Below, a feeling curve reflects the different moods a user goes through by each step. The section "Experiences" explains what the user goes through exactly in each step, how he feels, why he feels that way and what he thinks. Under the section "Pain Points" the general challenges of each step are highlighted.

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The first user journey reflects a Parisian citizen on its journey to work by **car**. The feeling curve on *Figure 77* shows, that the whole journey by car is rather painful. Issues such as robbery, vandalism, tickets, traffic jams and parking issues were confronted during this journey.

Figure 77, User Journey by Car

Stages of the Journey	Duty	Process until departure						Journey to work					Arrival at work	
Activities	Needs to go to work	Walks to the location where the car is parked	Finds his car window broken and jacket stolen, which he has left on the passenger seat	Finds a parking ticket on the car	Notices scratches on his car, made by another car	Wants to leave, but struggles to get out of the parking spot	Gets into the car and can finally set off	Needs to do the queue at the gas station to fill the gas tank of the car	Gets stuck in a huge traffic jam	Does not feel secure on the street	Has to do many detours because there are a lot of road works, one-way streets and bicycle-only ways	Struggles to find a free parking space	Finds an empty parking space and parks the car	Spots the price for parking the car an entire day	Sneaks into work, hoping to not being noticed by his boss
Feelings															
Very Happy	☺												☺		
Overall Satisfied		☺						☺	☺					☺	☺
Unhappy			☹	☹	☹	☹				☹	☹	☹			
Experiences	- Needs to stand up in order to go to work - has excluded taking the bicycle or public transportation, because of road security, schedules, costs, delays and discomfort	- A bit tired, because the walking distance to the car is rather far	- Frustrated, because the jacket was expensive, and the reparation of the window will be so as well, not to forget, time consuming - Does not call the police, because knows they will not find the robber	- Very annoyed and frustrated, because tickets are expensive	- Angry, because this happens too often and is not covered by his insurance - Frustrated, close to crying because all the costs add up	- Frustrated and angry, because the other road users were so unrespectful	- Happy, since the car is very comfortable incl. nice smell, air conditioning, comfortable seats etc. and protects against any kind of weather - Relieved to finally being able to leave but still irritated	- Frustrated, because more time is lost, he had to wait in the queue for an eternity - Irritated, because it again costs money - Knows once it's done it will not have to be done in the following days	- Angry, because it creates more and more delay - Tired, annoyed and irritated of the other, unrespectful car drivers - Regrets to have chosen to take the car for commuting	- Scared, since there are so many uncareful car-, bicycle-, and motorbike drivers on the street -Irritated and Aggressive, because gets insulted and honked on all the time	- Frustrated, because it adds additional time to the journey - Angry, because cars are no priority for the city - Worried about losing his job, because for the first time he will arrive late at work	- Frustrated, because does not manage to find an empty parking space - Loses time searching for a parking space	- Happy and excited, to finally having found a parking space - Relieved that the entire journey is over	- Shocked about the prices - Frustrated, because it makes him again spend a lot of money	- Relieved to finally being arrived at work - Worried to become a remark from his boss about his delay or to even lose his job -Still feels annoyed and exhausted from the whole journey
Pain Points	- Needs to get up early in order to arrive on time at work - Checks his phone and sees that there will be huge traffic jams on the way to work	- There are not enough empty parking spaces close to the apartment	- There are so many similar cases, that the police usually has no chance to find the robber	- Parking spaces are only free from 8pm to 9am - Parking places are very expensive	- This kind of incidences are usually not covered by insurances in France, because it happens too often, unless a ton of insurance premium is paid	- The low number of parking spaces available make cars park anyhow and anywhere	- Leaves later than expected because of all the trouble - Starts his journey already irritated	- Time consuming - Often there are long queues during rush hour - Expensive oil prices - Bad for the environment	- Time consuming - Stressful, nerve-racking, tiring, energy losing - Pollutes the environment	- Most two-wheelers do not respect the rules - The high level of congestion leads to aggressive and inpatient drivers, which easily provokes accidents	Paris puts no focus on car users, but more on pedestrians and cyclists	- There are far from enough empty parking spaces - It takes too much time to search for an empty space	- It is very rare to find an empty parking spot close to the destination (company)	- Prices for parking a car an entire working day are very high in Paris	- The entire journey takes fatigue and exhaustion with it - Coming too late to work on a regular basis might have severe consequences

Source: Internal Document

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The second User Journey on *Figure 78,* describes a journey to work by bicycle. The feelings-curve indicates that this journey is linked to more positive experiences than the one by car. Still, issues such as a low road security, robbery, vandalism, and discomfort were outlined in this journey.

Figure 78, User Journey by Bicycle

Stages of the Journey	Duty	Process until departure				Journey to work						Arrival at work	
Activities	Needs to go to work	Needs to get the bicycle out of the apartment in the 3rd floor	Puts on all the protective gear	Checks weather app and puts on raining gear	Gets on the bicycle and starts riding	Starts becoming anxious in the middle of the huge traffic	Can avoid the traffic jam by slaloming between the cars	Gets insulted and honked on by other road users	Is finally able to switch to a bicycle only path	Easily finds a parking space for the bicycle	Needs to secure the bicycle with a lock to limit the risk of robbery	Needs to freshen up from the exhausting bicycle ride	Arrives at work
Feelings													
Very Happy	☺				☺				☺	☺			
Overall Satisfied		☺	☺	☺			☺					☺	☺
Unhappy						☹		☹			☹		
Experiences	- Needs to stand up in order to go to work - has excluded taking the car or public transportation, because of traffic congestion, schedules, costs, delays and discomfort	- Does not lose too much time, since the bicycle is not far away - Dirties the apartment and is quite exhausting to carry the bicycle down the stairs	- Gets mentally and physically prepared for the dangers of the streets of Paris	- Annoyed, because it rains very often in Paris, and this makes bicycling more dangerous - Frustrated, because despite raining gear he will surely get a bit wet - has to think of taking a change of dry clothes	- Happy to being able to start the journey and enjoy the beautiful city of Paris on bicycle	- Does not feel safe on the streets because of the rain and other road users - Is scared of an accident	- Scared, because does dangerous maneuvers between the cars - Excited, because can gain a lot of time by avoiding all the traffic	- Feels intimidated by the other street users - Starts feeling anxious and out of place	- Happy and relieved, because finally feels in security and can enjoy the beautiful surrounding	- Happy, because it is very easy to find a space for parking the bicycle	- Anxious and scared of robbery or vandalism on the bicycle - Frustrated, because the locks are nearly as expensive as the bicycles	- Feels good to wash off the sweat - would like to take a shower, but needs to wash in the sink and change inside the WC box - Annoyed, because loses time redoing the makeup, exchanging the sweaty t-shirt etc.	- Relieved to finally being arrived at work - Still feels a little exhausted from the ride to work
Pain Points	- Needs to get up early enough in order to arrive on time at work	- Having the bicycle in the apartment is the most secure option, however, it uses a lot of space - Leaving the bicycle outside on an open bike rack or in a storage room would be more practical, but is very risky in terms of robbery and vandalism	- There are so many vehicles on the Parisian streets, that bicycle drivers are seriously put in danger	- Must always check the weather in advance in order to not being surprised by a storm and to take the accurate protection gear - Adds some additional weight to the bag to carry the protection gear - slippery roads and an affected view can be dangerous	- There is always a rather important security risk linked to taking the bicycle in Paris, which makes the driver unconsciously be alerted and nervous	- There are so many other road users such as cars, scooters and motorcycles, that a lot of critical situations evolve - Bicycle drivers are the most vulnerable road users	- Bicycles are so small, that they can maneuver between the other street user and advance much quicker, however, often they are overlooked and accidents happen - There are quite a number of roads in Paris, where bicycle riders are on the same lane than cars	- Street users (mainly car drivers) gets very angry and annoyed because of the enormous traffic congestion. This anger is then taken out on other road users, especially bicycle drivers	- There are more and more bicycle paths getting created in Paris thanks to the mayor Anne Hidalgo, however, there are still a lot of streets where cars and bicycles are on the same lane	- A lot of people do not search a bike rack but randomly attach their bicycles on object like streetlights, trees or fences. - The police is not very severe with illegal bicycle parking	- Vandalism and robbery of bicycles are a serious pain point of the city - The most secure solution would be to park the bicycle inside the building, however, not all companies allow their employees to take their bicycles inside the office	- When not having an electric bicycle a ride to work can be exhausting - Electric bicycles are expensive - The office buildings inside Paris are only rarely furnished with showers and changing rooms	- The entire journey takes fatigue and exhaustion with it

Source: Internal Document

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The third User Journey reflects a commuting experience by public transportation. The feelings curve on *Figure 79* shows, that the user was confronted to many unhappy moments during its journey due to long queues, delays, insecurity, crowdedness or bad hygiene.

Figure 79, User Journey by the Metro

Stages of the Journey	Duty	Process until departure			Journey to work						Arrival at work		
Activities	Needs to go to work	Walks to the metro station	Needs to refill the Navigo (public transportation card)	Pays the Navigo pass	Wants to catch the next metro	Cannot enter the metro, because it is so crowded	Catches the following metro	Is not able to find any possibility to sit because of the many people	Feels insecure and uncomfortable in the crowd of people	Gets aware of the dirt and smell in the metro	Arrives at the destination	Walks from the station to work	Arrives at work
Feelings	Very Happy / Overall Satisfied / Unhappy curve (see figure)												
Experiences	- Needs to stand up in order to go to work - Checks his phone for the schedule and to spot any mechanical incident or strike on the line he takes - has excluded taking the car or bicycle, because of traffic congestion and road security	- Happy because it usually is a short distance to walk - The time spent walking is easily predictable, since it is always the same path - When it rains or when in a hurry, it can seem very long	- Frustrated, because has to wait in a queue for a long time - Annoyed that it is not possible to refill the card online	- Frustrated, because the pass is rather expensive - Makes sure to not be robbed of his credit card while paying for his Navigo pass	- Satisfied, because next metro arrives quickly - Confused, because metro did not arrive at predicted time predicted of App - Frustrated, because witnesses teenagers jumping over the entrance barriers without paying and not being stopped by the police	- Frustrated, because loses time and people are not willing to make some space - Annoyed of the crowd of people	- Relieved, because the next metro arrives quickly - Satisfied, because there was enough empty space in the metro so that he could enter	- Does not feel comfortable to stay, sticking closely to other people - Loses balance several times due to the abrupt movements of the metro - Starts feeling tired in the legs	- Overstrained of the many people in its private space, touching, pushing, pulling and just coming too close - Scared of robbery, has to well protect its bag, phone etc. - Observes other people and feels observed, looks on his phone to avoid looking at others	- Feels uncomfortable with the mix of the bad smell of the crowd and the bad smell of the metro - Starts sweating himself, because of the crowd and heat in the metro - Tries to not touch a lot too many things, since everything seems so dirty	- Is very relieved and happy to being able to exit the metro and take some distance of the people	- Makes lose some more time, but not too much since the station is very close to the working place - When it rains or when in a hurry, this short distance can seem very long	- Relieved to finally being arrived at work - Still feels a little exhausted from the metro ride to work
Pain Points	- Often there are strikes or mechanical incidents on the metro lines - Needs to calculate how much time the journey will take - Has to know when and where to take the metro	- Has to know which station is the closest - Less enjoyable when it rains	- At the end of the month, a huge number of people (with a monthly subscription of the Navigo transportation card) have to charge the card	- The transportation pass costs EUR 75 per month which is perceived as expensive, even though sometimes the employers pay 50% of the public transportation pass - Must avoid buying the Navigo pass late nights, because the risk of robbery of the credit card increases heavily	- Even though the metro in the city center usually arrives every 3 to 4 minute, the real-time data of the App is very inconsistent - Often especially younger people do not pay their ticket, but the security is so low that they do not do anything against it	- The metros during the rush hours are so crowded, that sometimes people are not able to enter anymore	- Especially during the rush hours, metros arrive on a very regular basis	- The metros during the rush hours are very crowded, it is very rare to find an empty sear	- Thieves take benefit from crowded metros. It is difficult to change the compartment when feeling uneasy - In a crowded metro it is impossible to keep some private space - Especially women can experience harassment in the metro	- A huge crowd in an enclosed space creates bad smells - The metro is known as not being very clean - In summer, the outside temperature and the crowd make the metro very hot	- Feels exhausted from the journey in the metro - It could have potentially happened, that strikes, mechanical incidents or a suicide happens. In this case the users often have no indication when the metro will leave again	- Less enjoyable when it rains - Time consuming	- The entire journey takes fatigue and exhaustion with it

Source: Internal Docu

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4.4 *Survey*

As explained more in detail in the Methodology, a survey has been conducted in order to gather primary data on the mobility of Paris. This data will allow to verify the accuracy of the User Journeys as well as the four main pain points of the mobility in Paris: air pollution, traffic congestion, public transport and security. It also enables to have a better insight in the current challenges Paris faces and how they are perceived by its residents.

The survey contained 37 questions in total, divided into open questions, multiple choice questions, checkbox questions, linear scale questions and multiple choice grids. The exact division of the questions can be seen on *Table18.* The survey was divided into the following 8 sections: Introduction, Mobility in Paris, Air pollution, Traffic congestion, Public Transportation, Security, FIA Smart Cities and Personal details. The exact number of questions per section is also listed on *Table 18.* The complete survey in English and French can be consulted in Appendix 11 and 12 respectively.

Table 18, Survey structure

Type of Questions	Number	Section Name	Number of Questions
Open Questions	10	Introduction	2
Multiple Choice Questions	9	Mobility in Paris	4
Checkbox Questions	6	Air Pollution	3
Linear Scale Questions	11	Traffic Congestion	8
Multiple Choice Grid	1	Public Transportation	6
Total	**37**	Security	5
		FIA Smart Cities	4
		Personal Details	5
		Total	**37**

Source: Internal Document, based on the survey

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4.4.1   Survey Results

The targeted number of responses was achieved with a total of 59 responses. Before analyzing them in detail, however, the data had to be cleaned up. The survey was sent out in two languages, English and French, taking into consideration the high percentage of internationalization of the city. Therefore, as first step of the cleaning process, the results of both questionnaires were merged and translated into English. It was detected that some answers were sent double. To be exact, 7 duplicates were found and eliminated. Unfortunately, the reason behind the duplicates could not be determined. After this cleaning step there were still 52 answers left. But the cleaning process was not over yet. There were also some participants who do not live in the Paris Region. Those have been sorted out as well, as explained more in detail in the following section. The result of the cleaning up process can be seen on *Table 19.*

Table 19, Cleaning up process of the survey responses

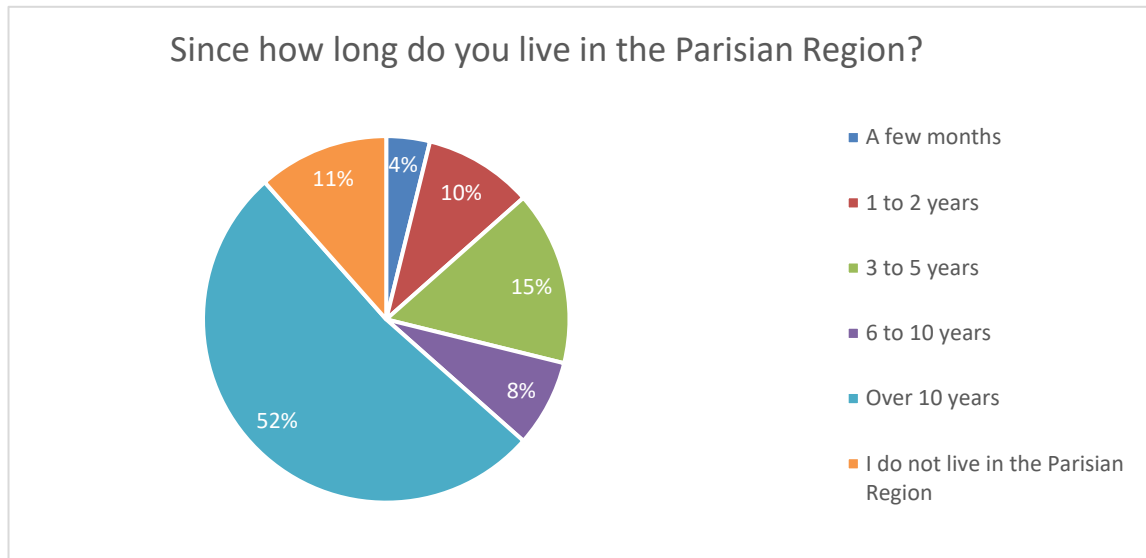| Total Survey Answers	59
- Duplicates	- 7
- Respondents not living in Paris Region	- 6
Total VALID Survey Answers	**46**

Source: Internal Document, based on results of the survey

The results of the survey are going to be discussed and analyzed in the following part, section by section.

4.4.1.1   Introduction

The very first question in the survey, summarized in *Figure 80,* had as idea to sort our people not living in the region of Paris and determine at the same time how long the other respondents already live there. People not living in Paris were automatically sent to the end of the survey. Due to this precaution, 6 other respondents could be sort out, leaving a total of 46 valid responses, as can be seen on *Table 19*. It was found that over half of the respondents live already since over 10 years in Paris, which reinforces the accuracy of the results.
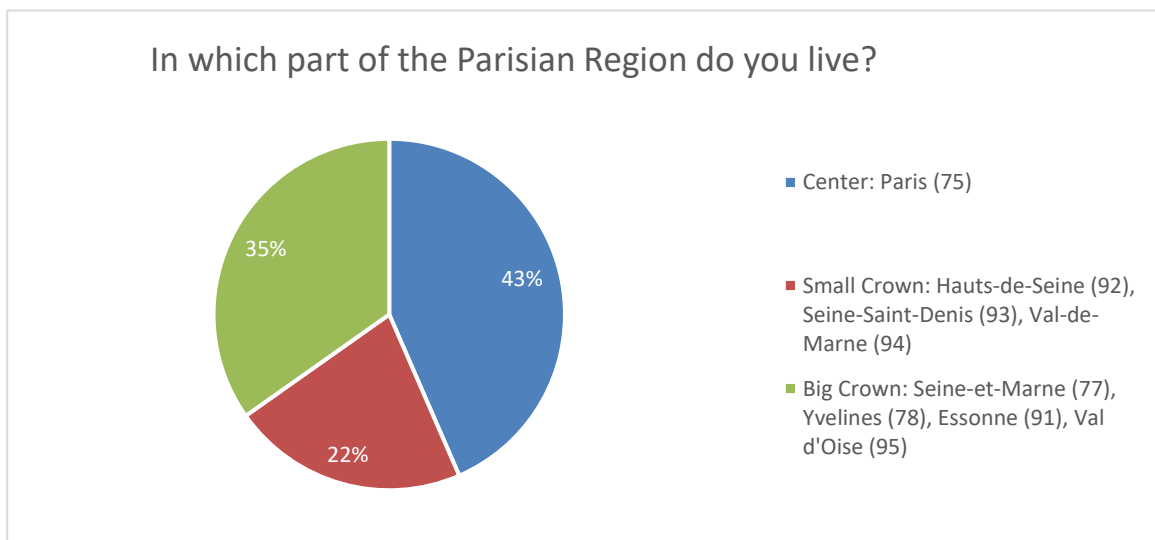
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Figure 80, Graph on how long survey respondents have been living in the Region of Paris

Source: Internal Document, based on results of the survey

With another question could be determined that 43% of the respondents live in the center of Paris, while the rest of the respondents live in the suburbs of Paris. The suburbs were divided into the small crown and the big crown. 36% of the respondents live in a department of the big crown, as can be seen on *Figure 81.* The smallest share of respondents live in the small crown.

Figure 81, Graph of the distribution of respondents on parts of the Paris Region

Source: Internal Document, based on results of the survey

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4.4.1.2 Mobility in Paris

After those introduction questions, the first section of the questionnaire contained questions about the mobility in Paris. The goal of this part was to determine the main challenges in terms of mobility and transportation based on the perception of Parisian residents. This section also aimed at confirming or denying the four main transportation and mobility issues found based on the two Smart City Indexes, and to rank them according to the perceived priority of urgence of Parisian citizen. In order to avoid bias in the responses, an open question was asked for establishing the most important challenges faced by Paris, that can be seen on *Figure 82*.

Figure 82, The most important mobility challenges Paris is facing
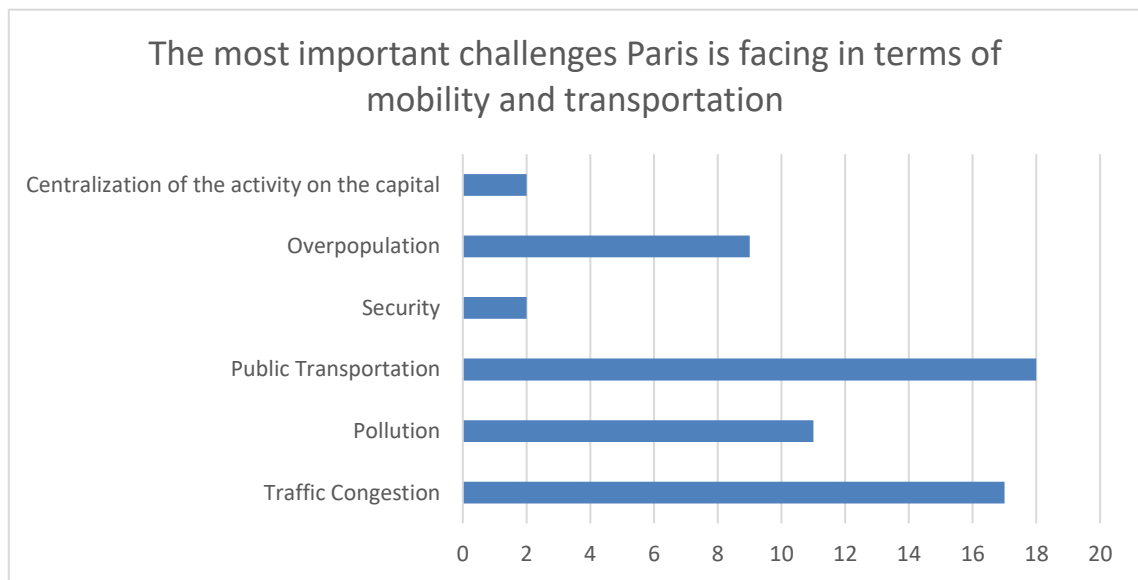
Source: Internal Document, based on results of the survey

The results confirmed the four main transport and mobility issues of Paris, determined in section 4.2.4: Public Transportation, Pollution, Traffic Congestion and Security, Also overpopulation was mentioned rather often, which can be seen as root of all the four pain points just mentioned, leading for example to crowded public transportations or congestion.

When comparing the answers from people living in the city center and people living in the suburbs, visible on *Figure 83,* it can be understood, that pollution is a bigger issue in the city center than in the suburbs. However, traffic congestion and public transportation are very important challenges for both parts of the Parisian Region. Furthermore, the

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centralization of the acitivty on the city center is perceived as a big challenge manily by people living in the center. Security issues seem occuring in the whole Parisian Region.

Figure 83, Mobility Challenges from Paris Center vs. its Suburbs
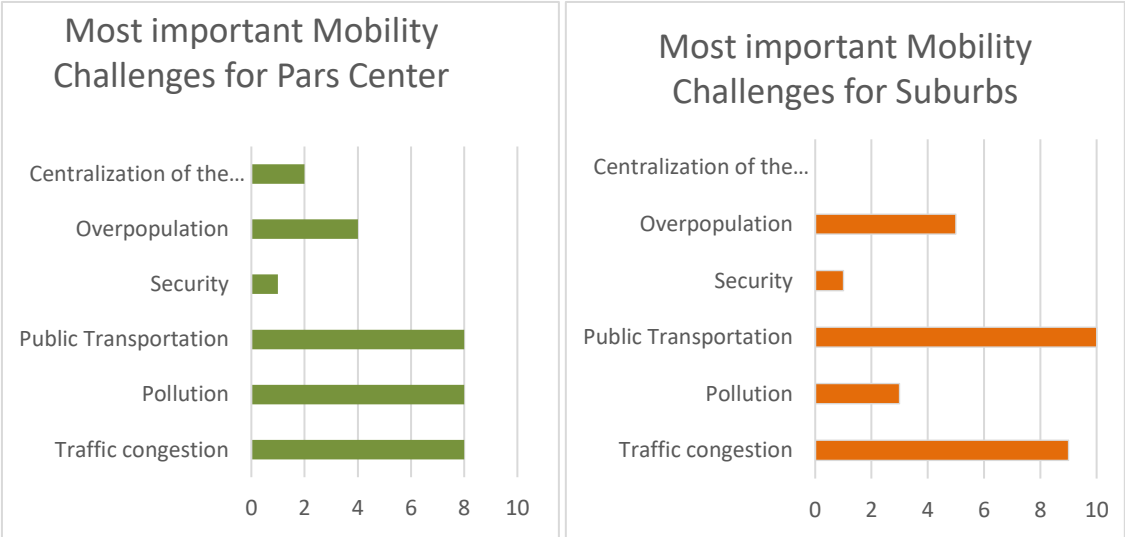
Source: Internal Document, based on results of the survey

The results look a bit different, when asking the respondents to rank the four pain points according to its urgency priority in Paris. The results can be seen on *Figure 84.* The majority of the respondents ranked pollution as the most urgent challenge. The second rank of urgency was given to the public transportation. Traffic congestion and security were ranked 3rd and 4th respectively in terms of urgency priority.

Figure 84, Urgency Priority ranking of the 4 main Pain Points of the Mobility in Paris
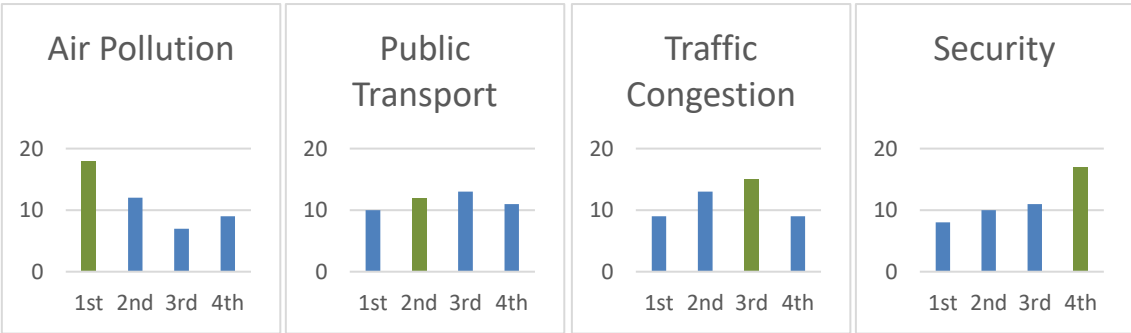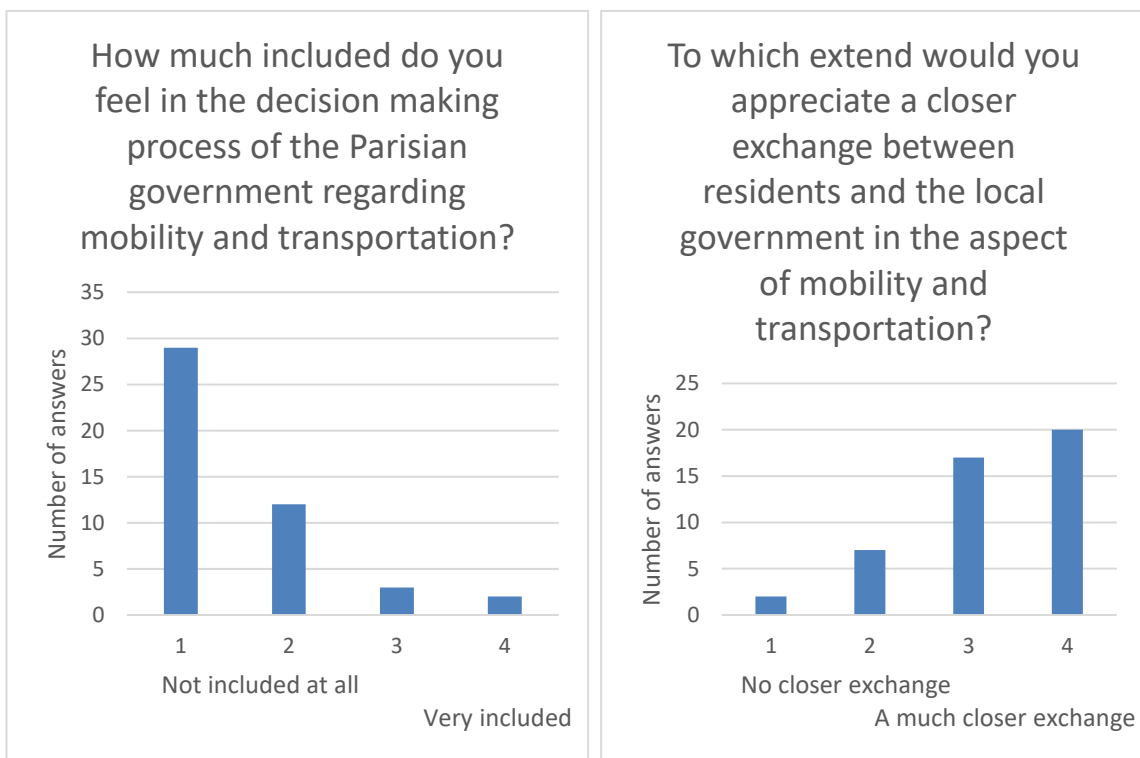

Source: Internal Document, based on results of the survey

The last two questions of the section Mobility in Paris concerned the interaction between the Parisian government and its residents. They enabled to discover, that the vast majority of Parisian residents do not feel included at all in the decision making process

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of the local government regarding mobility and transportation. When comparing the answers of the different parts of the Parisian Region, it can be seen that both, people living in Paris and in its suburbs do not feel included.

Also, most of the residents would appreciate a closer or even much closer exchange between the residents and the local government in the aspect of mobility and transportation. The visual presentation of the answers to those questions can be seen on *Figure 85.*

Figure 85, Interaction between the Parisian Government and its Residents
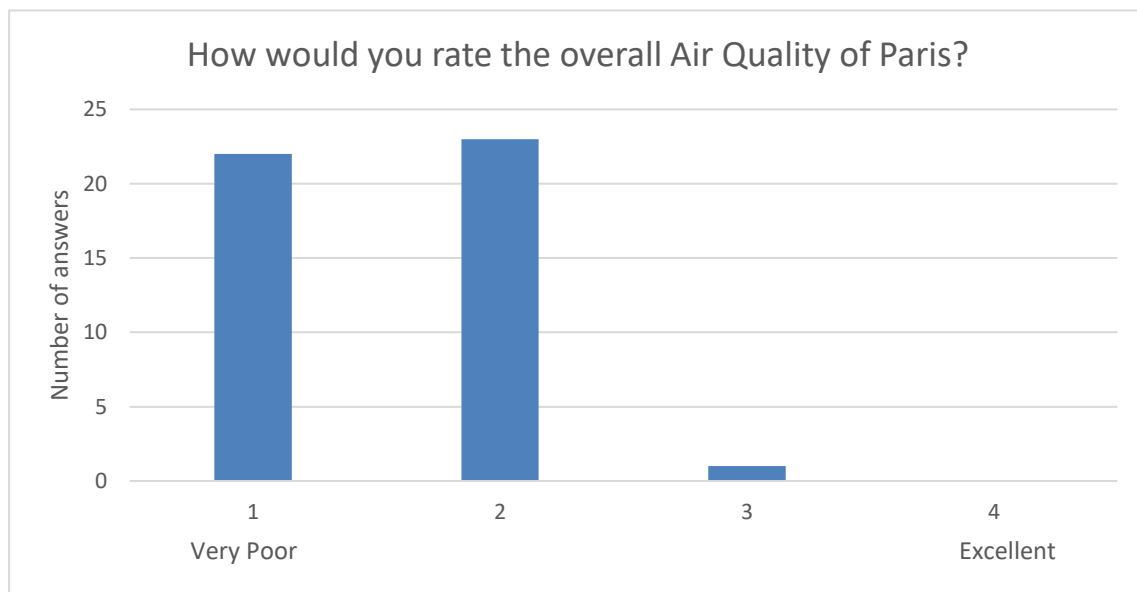

Source: Internal Document, based on results of the survey

4.4.1.3 Air Pollution

The very first question of this section had the aim to understand the perception of the air quality in Paris. Nearly all of the respondents perceive the air quality of Paris as poor or very poor. No single respondent found the air quality being excellent in Paris, as can be seen on *Figure 86.*
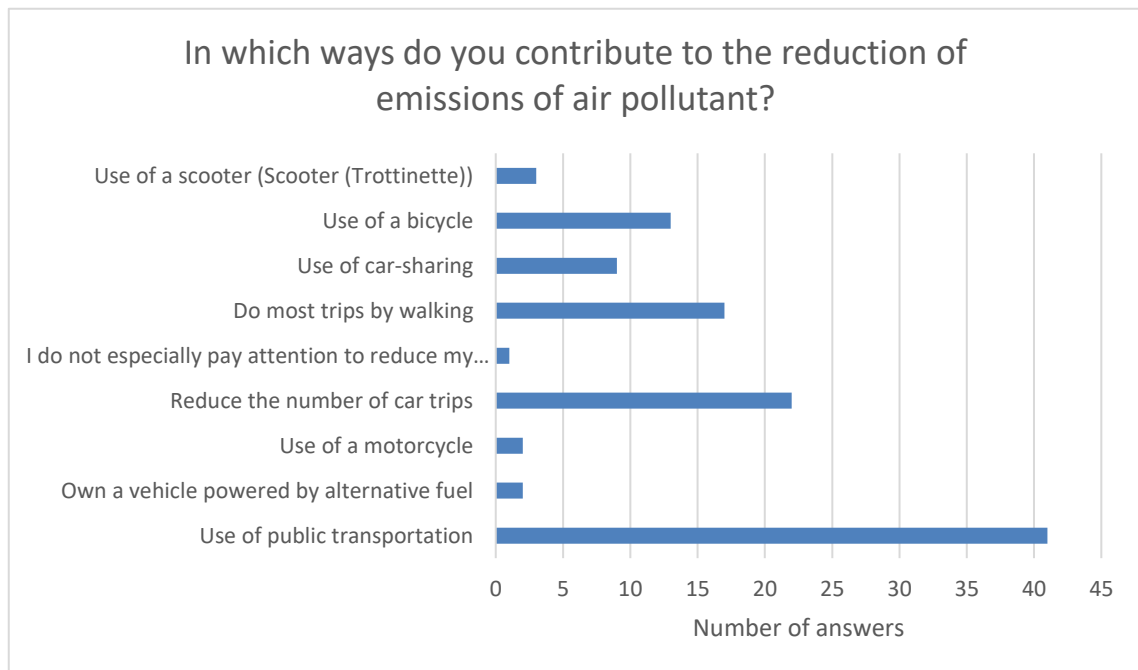
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How would you rate the overall Air Quality of Paris?

Source: Internal Document, based on results of the survey

Even though the air quality of Paris is perceived as poor by its residents, that does not automatically mean that the residents are willing to do something in order to improve the air quality. In order to verify the willingness to improve the air quality, the next question asked the respondents to outline their personal actions for reducing air pollutants. It can be understood with *Figure 87*, that most of the respondents use public transportation and reduce the number of car trips in order to contribute to the improvement of the air quality. Also doing trips by bicycle, by foot or with car-sharing are popular ways to contribute to this goal. Much less frequent is the use of a scooter, motorcycle or a vehicle powered by alternative fuel. Also, there is only a very small minority stating, that they don't especially pay attention to reducing their emission of air pollutants.

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In which ways do you contribute to the reduction of emissions of air pollutant?
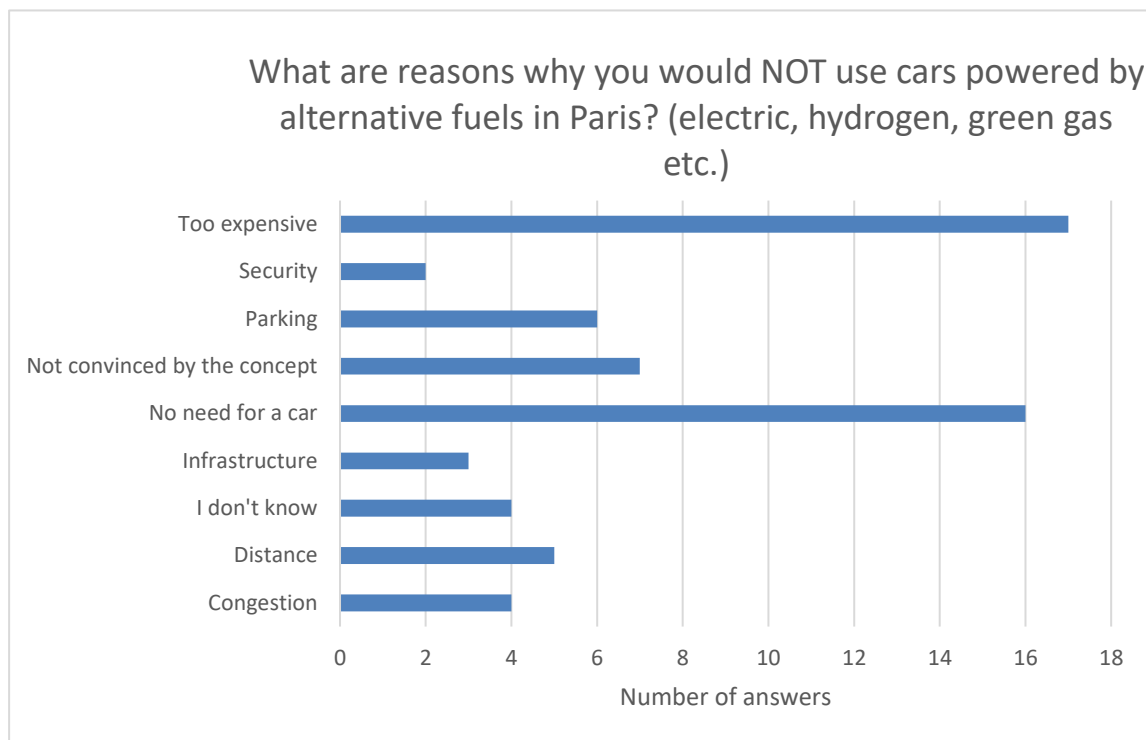
Source: Internal Document, based on results of the survey

The last question of this section was searching to determine why Parisian residents would not be willing to use a vehicle powered by alternative fuel, as defined in the Smart City indexes. Taking into account that only 2 survey respondents own a vehicle powered by alternative fuel, as could be determined with the previous question, this question turned out to be justified. The main reasons why people are not willing to own a vehicle powered by alternative fuel are the large expenses linked to it as well as the fact that people are not in need of a vehicle. Not in need of a vehicle are mainly people living in Paris itself, however, also some respondents living in the suburbs.

There are also around 26% of the respondents who are simply not convinced by the concept of vehicles powered by alternative fuels, including its limited reach. Other reasons are closely linked to the city of Paris including difficulties of finding a parking, congestion, security or the infrastructure provided for alternative vehicles. The detailed results of this question can be seen on *Figure 88.*

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4.4.1.4 Traffic Congestion

In the third section Traffic Congestion, the goal was to find out the opinion of Parisian residents towards the traffic congestion in their city as well as their movement habitudes. With the first question of the section it was determined, that Parisian residents perceive the traffic congestion in their city as heavy. Besides a very few exceptions, all the respondents agreed on this point, as can be seen on *Figure 89.*

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Figure 89, Perception of traffic congestion in Paris
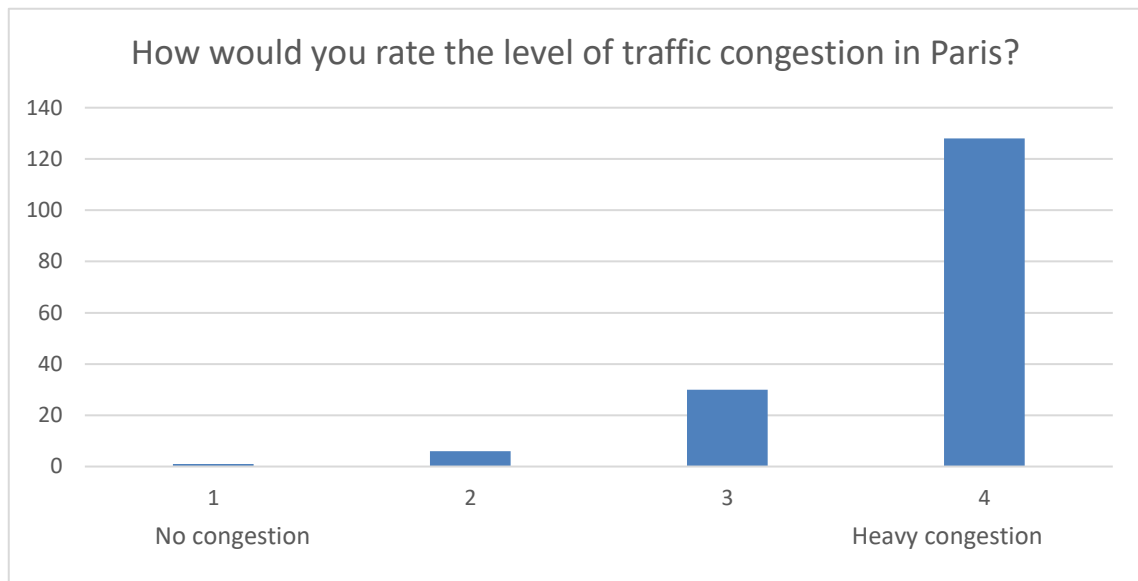
How would you rate the level of traffic congestion in Paris?

Source: Internal Document, based on results of the survey

In order to better understand the roots and effects of this heavy traffic congestion, the different movement habitudes of the Parisian citizen were analyzed. In this context, two questions were asked about the use of transportation means for commuting and during the free time. The results of these questions can be seen on *Figure 90.* For commuting, the main transportation mean used is the metro. Also very popular is walking to work, or taking other public transportation such as the bus, train or tram. Using the proper car powered by diesel or petrol, on the other hand, is way less popular. The same counts for the use of a bicycle. Noteworthy, however, is, that more citizen use bicycle sharing services than using their own bicycle for commuting. Also, no single respondent uses a car powered by an alternative fuel for going to work. Car-sharing, taxi services, a motorcycle or a scooter are at the bottom of the list of transportation means used to commuting.

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When comparing to the transportation means used during the free time it can be seen, that there is a strong resemblance in the results. Walking is the most popular way for getting around followed by the metro. In the free time, Parisian citizen use more often their own car, powered by petrol or diesel. However, also in the free time, no respondent uses a car powered by electricity, hydrogen or green gas. Remarkable is also, that no respondent uses car-sharing in their free time. And again, scooters and motorcycles are at the end of the list.

Figure 90, Use of transportation means for commuting vs. in the free time
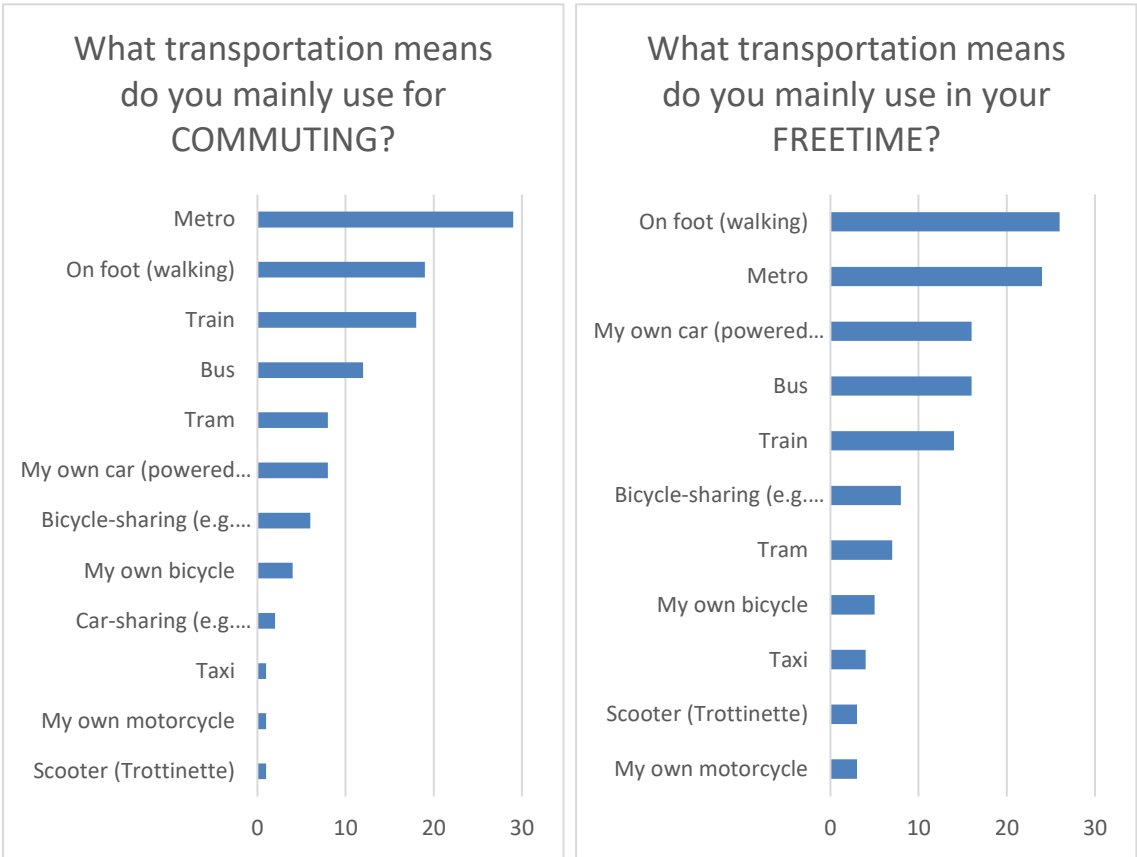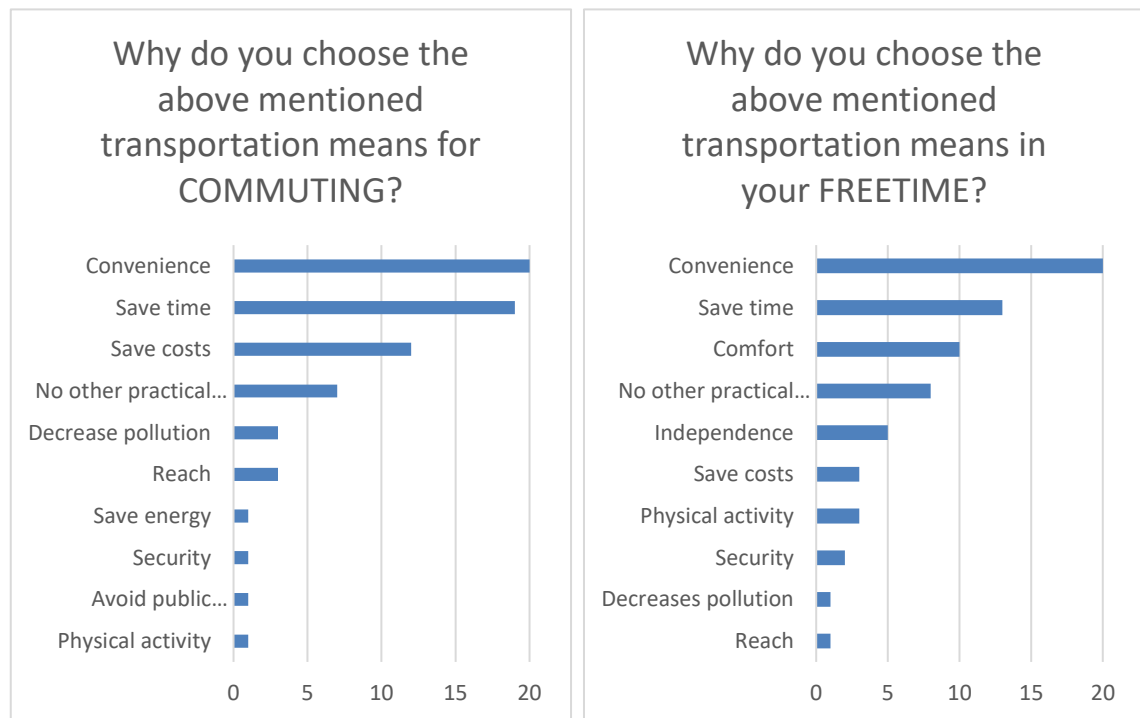

Source: Internal Document, based on results of the survey

In order to better understand the reasons behind the choices of transportation means for commuting vs. in the free time, the survey asked the respondents to justify their choices in two open questions. The summarized results of these open questions are reflected on *Figure 91*. Both, for commuting and in the free time, convenience and time saving are the most crucial criteria for choosing a transportation mean. When going to work, people also try to limit the expenses for the transportation, while this criteria is less crucial in the

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free time. In the free time comfort also plays a much more important role. Both results reflect also, that a lot of Parisian residents simply do not have any choice. This response was often given by people living in the suburbs of Paris. Security was mentioned in both cases as well as a criteria for choosing a transportation mean. Noticeable is also, that people pay more attention to reduce the impacts on the pollution when commuting compared to in their free time.
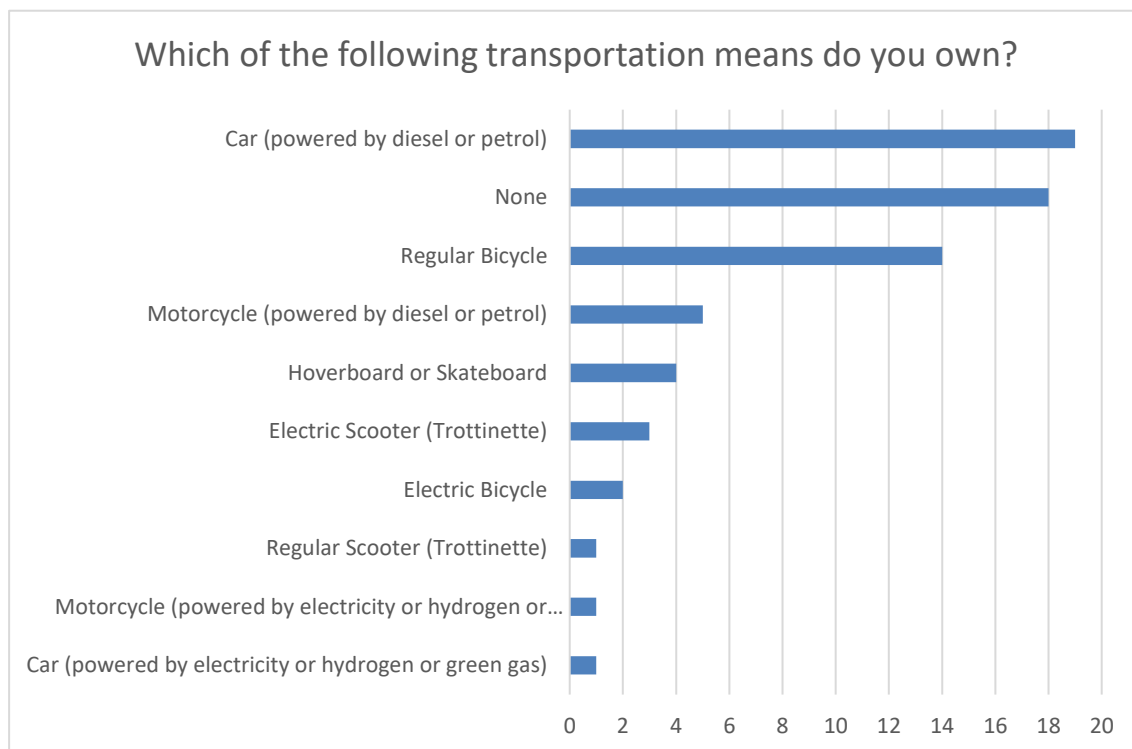
Figure 91, Reasons for choosing the transportation means

Source: Internal Document, based on results of the survey

The next question of the section traffic congestion tried to identify what kind of transportation mean Parisian citizen are in possession of. In general, the results show that the majority of Parisian citizen either own a car powered by diesel or petrol, a regular bicycle or do not own transportation mean at all. Alternatively powered vehicles are still not very popular. Also a regular scooter is rather unpopular compared to other transportation means. The exact results can be observed on *Figure 92.*
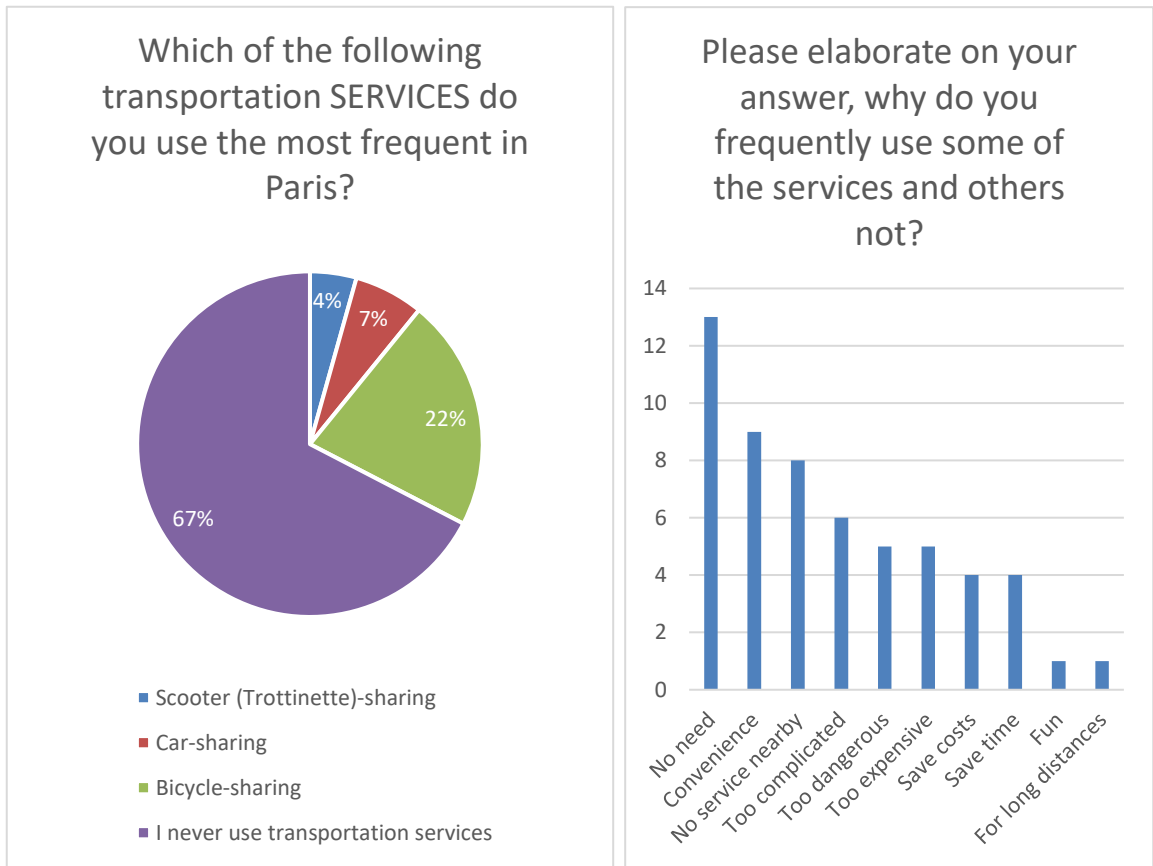
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As comparison, a question was asked about the usage of transportation services. According to the results of the survey, reflected on *Figure 93*, transportation services are not very popular in Paris, especially not in the suburbs of Paris. In the city center, bicycle sharing is the most popular renting service provided, used by 22% of the respondents. Less important are car- and scooter sharing services. Motorcycle sharing services did not even get one vote, and is therefore not visible on the following figure.

When asking for more argumentative responses concerning the usage of transportation services, the majority answers that they do not feel a need for using these services, as can be observed on *Figure 93,* right hand side*.* There are still some respondents who appreciate the convenience of the service, in terms of proximity, security and responsibility. There are also some respondents who would like to use transportation services, however, do not have any in their surroundings. Respondents having answered this mostly live in the suburbs, meaning that transportation services are less widely spread in the suburbs than in the center. For a share of the questioned people, the services offered are also simply too complicated, too dangerous or too expensive.

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Which of the following transportation SERVICES do you use the most frequent in Paris?

- Scooter (Trottinette)-sharing
- Car-sharing
- Bicycle-sharing
- I never use transportation services

Please elaborate on your answer, why do you frequently use some of the services and others not?
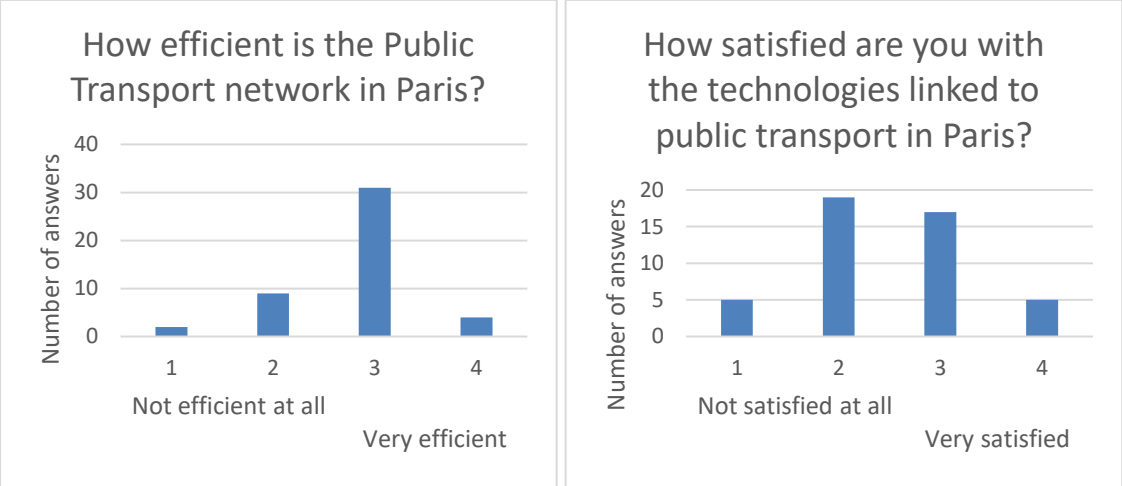
Source: Internal Document, based on results of the survey

4.4.1.5 Public Transportation

As could have been understood up until now, the public transportation, especially the metro, are extremely popular means of transportation in Paris. But how efficient is the public transportation really in the eyes of Parisian residents. The results of the two Smart City Indexed reflected quite distinct results. According to the results of the survey, the majority of the respondents perceive the public transportations as efficient, as can be seen on *Figure 94,* left hand side*.*

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When talking about the technologies linked to public transportation, such as for online ticket sales or real time arrival information, the responses are less clear, as stated on *Figure 94,* right hand side. The majority is not satisfied with the technology, but also a huge part of respondents are satisfied. It seems like the technologies linked to the public transportation are on average level.
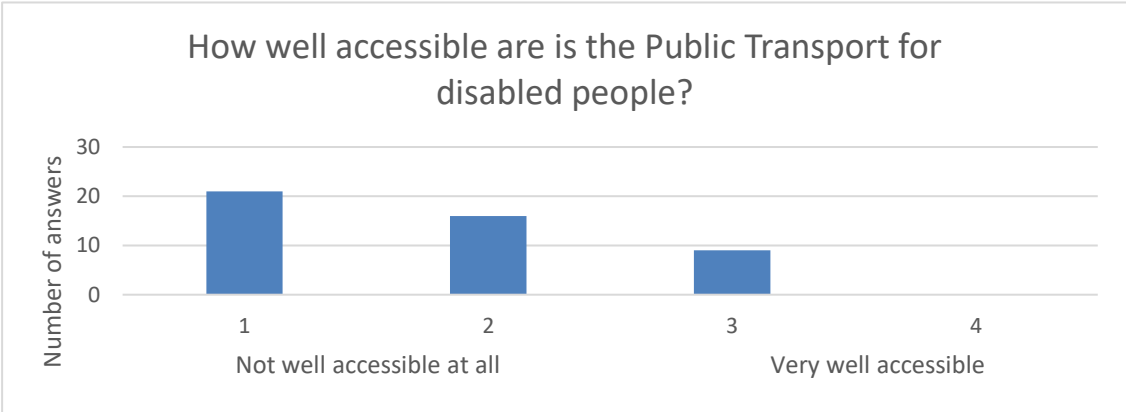
Figure 94, Satisfaction with public transportation in Paris

Source: Internal Document, based on results of the survey

When taking into consideration disabled people, according to the responses of the survey, the efficiency of the public transportation decreases by a lot. The results, which are visible on *Figure 95,* reflect that Parisian public transportations are perceived as not well accessible at all for disabled people.

Figure 95, Accessibility of public transportation for disabled people

Source: Internal Document, based on results of the survey

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As already well reflected in previous answers and the Smart City indexes, the next question confirmed that the most used public transportation mode in Paris is by far the metro. The second most popular mode is the train, mainly used by people living in the suburbs. The tram or bus are used less frequently. And there is only a small share who never uses public transportations. The detailed results are presented on *Figure 96.*
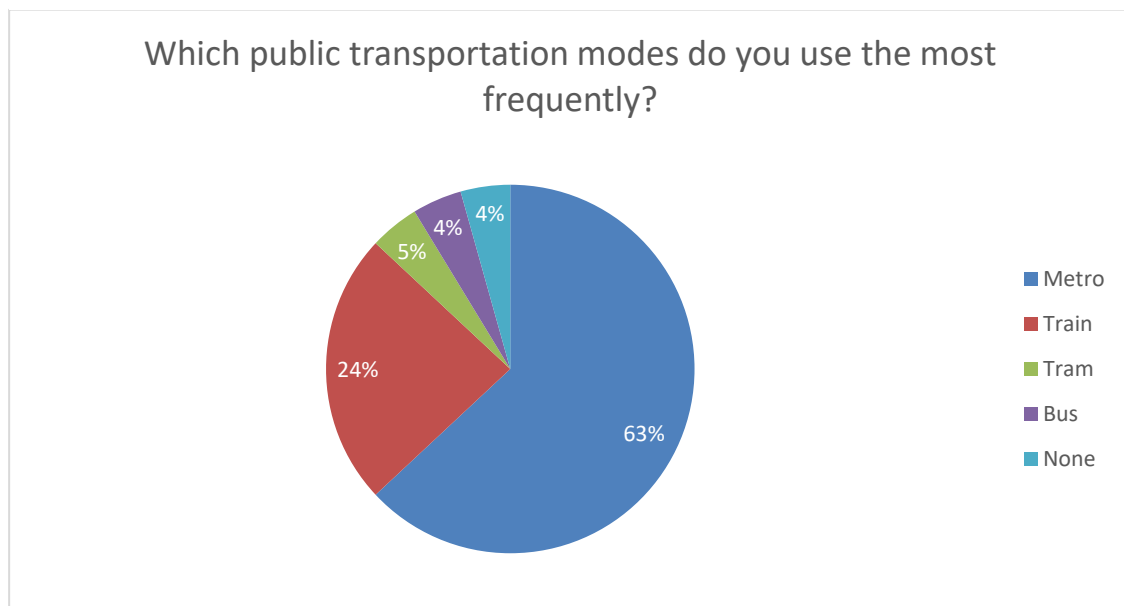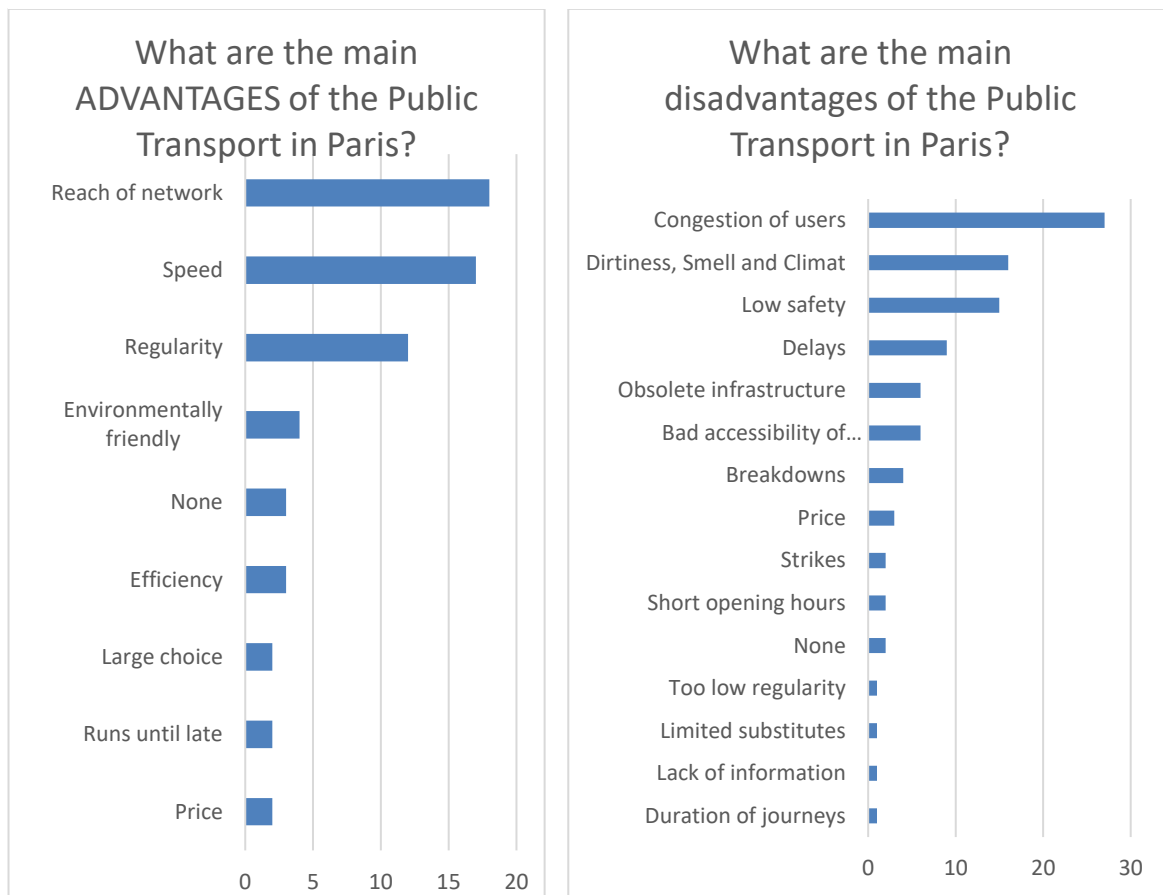
The last question of the section public transportation in Paris searched to find out the main key drivers and main challenges of the public transportation network in Paris. In *Figure 97*, the perceived advantages and disadvantages were set against each other. The main three advantages turned out to be the wide reach of the network, its speed and the linked time saving as well as its regularity. The main disadvantages seem to be the crowdedness, dirtiness, low safety and delays of the public transportation. All the other grouped answers can be learned on the Figures below.

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What are the main ADVANTAGES of the Public Transport in Paris?

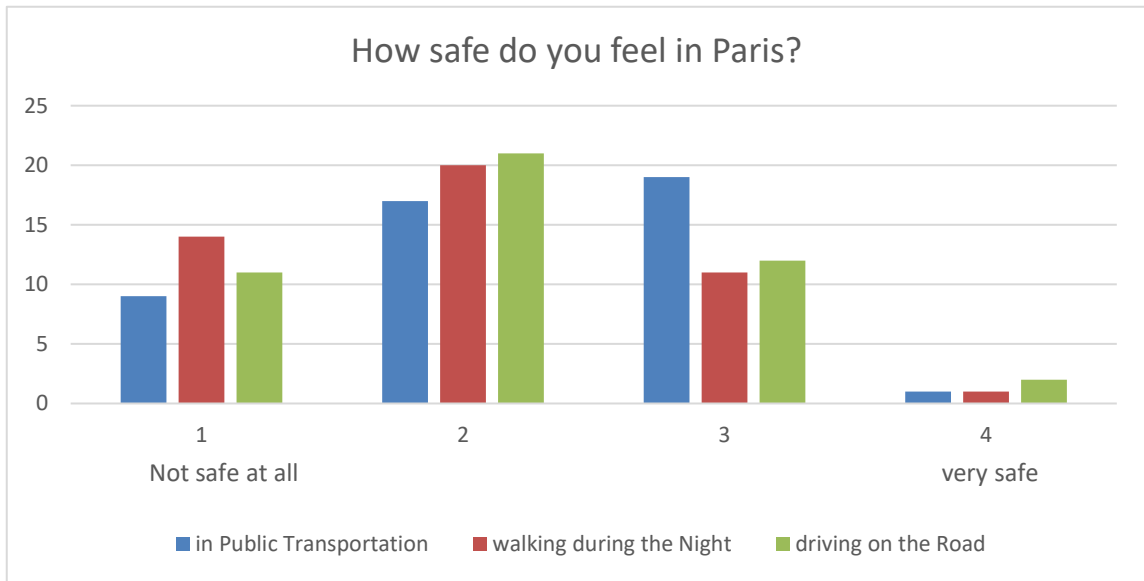*What are the main disadvantages of the Public Transport in Paris?*

Source: Internal Document, based on results of the survey

4.4.1.6 Security

The fourth pain point found in the discovery phase was security. In the survey, it was tried to find out in which prospect the security is a main issue. Therefore this topic was split up in three parts: security in public transportations, security by walking in the streets during the night and security while driving on the roads, as can be observed on *Figure 98*. The results show, that Parisian residents in general never feel very safe. The least safe they feel walking alone through the streets of Paris by night. When driving on the road by car, bicycle or motorcycle people feel a bit safer, however, most of the respondents also do not feel safe in this situation. The best result achieved the safety in public transportation, with a few more votes for safe than for not safe. The overall results are however rather alerting.
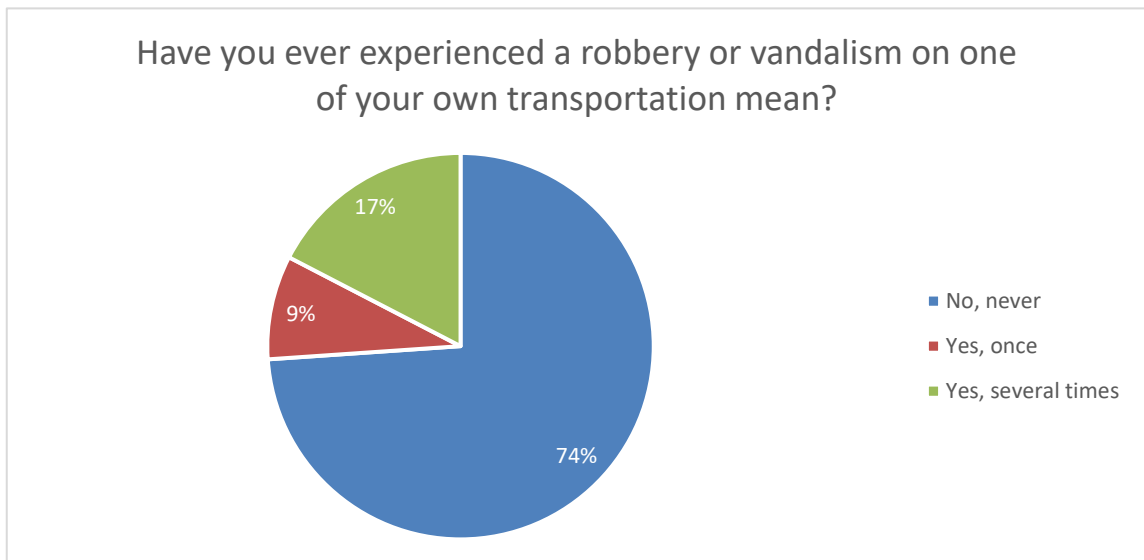
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How safe do you feel in Paris?

The biggest share of the respondents have never experienced a robbery of vandalism on one of their own transportation means. Still, 17% have already experienced robbery or vandalism of one of their transportation vehicle more than once, as can be withdrawn from *Figure 99,* representing one-fourth of the survey respondents.

Have you ever experienced a robbery or vandalism on one of your own transportation mean?

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On the question what is the main issue in terms of security in Paris, theft and aggressions were the most common answers. Also the lack of security in public transportations, the lack of security agents in the city in general and harassment were popular answers. The entirety of the summarized responses can be consulted on *Figure 100.*
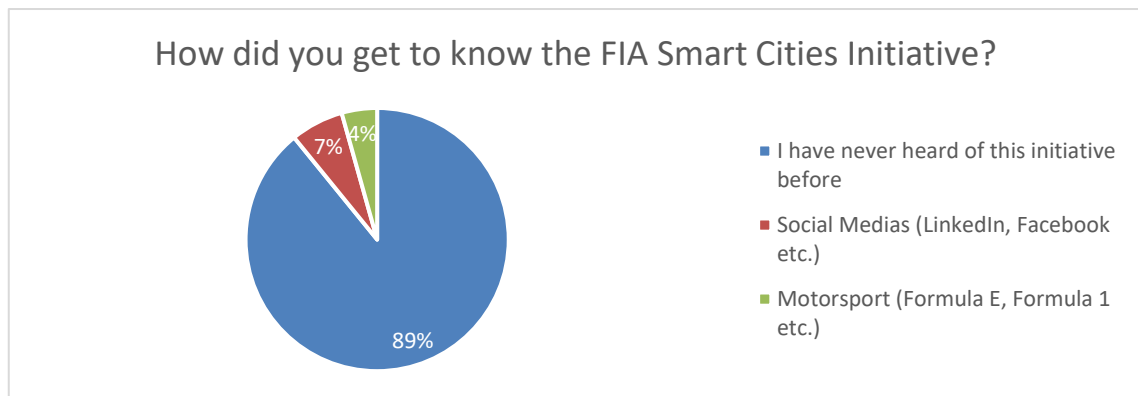
Figure 100, Main security issues in Paris

What is the main issue in terms of security in Paris?
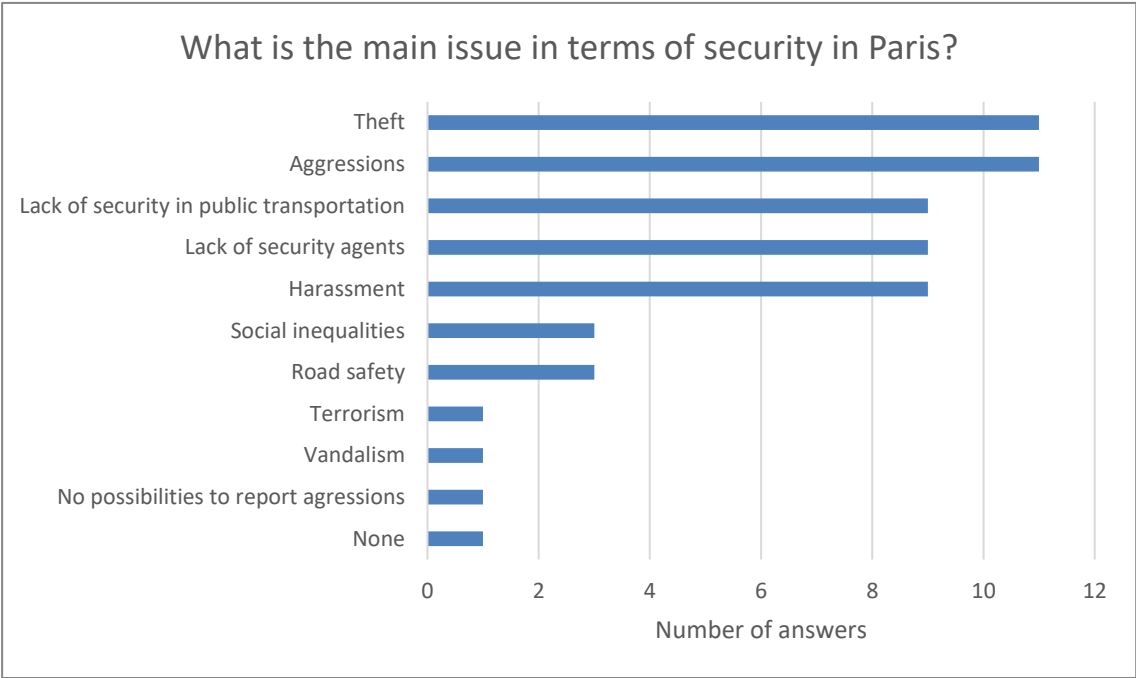
Source: Internal Document, based on results of the survey

4.4.1.7 FIA Smart Cities Initiative

The last but one part of the survey contained some questions useful for the future development of the FIA Smart Cities initiative. Out of all the respondents, only around 10% have already heard of the FIA Smart Cities initiative, as visualized on *Figure 101.* This point was important to be determined in order to recommend an accurate communications strategy, as has been outlined at the beginning of the analysis chapter. Out of the 10%, 7% heard of it due to social medias, mainly LinkedIn, and 4% due to motorsport. This result clearly reflects an urgency of improving the communication with the general public and raising awareness of the event.

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How did you get to know the FIA Smart Cities Initiative?

- I have never heard of this initiative before
- Social Medias (LinkedIn, Facebook etc.)
- Motorsport (Formula E, Formula 1 etc.)

89%
7%
4%

Source: Internal Document, based on results of the survey

Observing the measures the FIA has taken for its Smart Cities event in 2020 as an answer to the prohibition of physical events, another interesting question was whether people feel at ease on virtual events or not. Clear advantages of virtual events are its great and international audience reach and low operating costs. But before planning on a full virtual strategy, it should be clarified whether end users are motivated to participate on virtual events. And indeed, the following *Figure 102* shows, that the majority of Parisian end users are not comfortable or even not comfortable at all with virtually participating on an event, a panel, a conference or a discussion. This confirms the experience of the researcher and shouts out for other solutions than solely virtual events, including at least partially, physical events.

Figure 102, Comfortability with virtual events

How comfortable do you feel with virtually participating on an event/discussion/conference/panel?

Number of answers

1 — Not comfortable at all
2
3
4 — Very comfortable

Source: Internal Document, based on results of the survey

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Another topic linked to this question is the presence of the FIA Smart Cities initiative on social networks. Since 2020, the event benefits from its own LinkedIn page. However is the presence on this social media channel enough to spread words to end users? According to the results of the survey represented in *Figure 103* it is not. The majority of the respondents are the most active on Instagram and Facebook, confirming the assumptions made in the first part of the analysis. These social media channels are especially popular amongst people aged between 14 and 35 years old. LinkedIn is ranked only third. Also YouTube and Snapchat turn out to be frequently used. In order to effectively communicate with end users, marketing actions therefore should be focused on those social media channels.
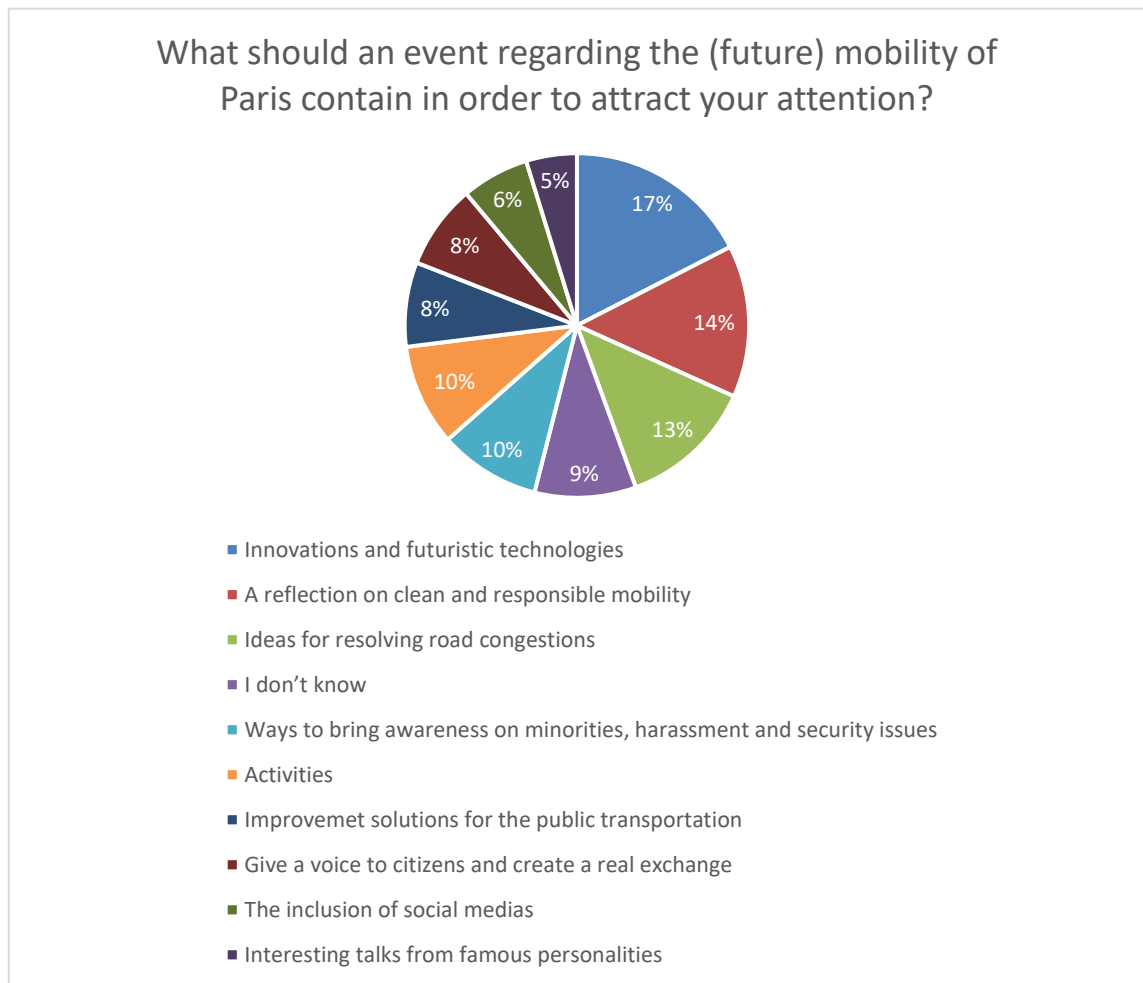
Figure 103, Most used social media channels
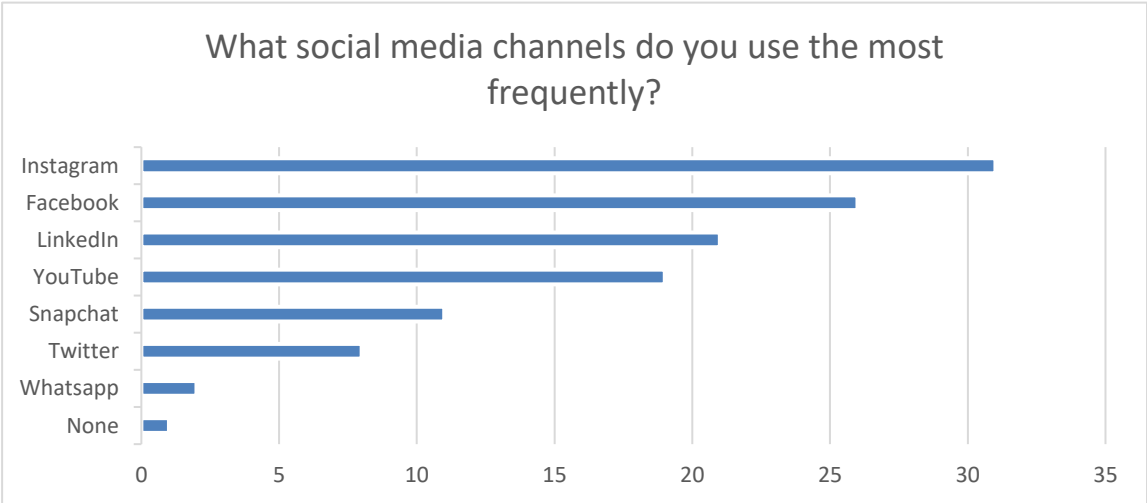
Source: Internal Document, based on results of the survey

In order to better understand what Parisians would motivate to attend an event such as the FIA Smart Cities initiative the following open question was asked: What should an event regarding the (future) mobility of Paris contain in order to attract your attention? The answers were very widely spread but could be grouped into 10 subgroups, listed on *Figure 104.* The most common answer was the inclusion of innovations and futuristic technologies. People seemingly have a hard time to motivate themselves to participate an future mobility event without learning about something new. Also solutions and discussions regarding the above mentioned four pain points of the mobility in Paris (air pollution, traffic congestion, public transportation and security) were mentioned as

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possible incentives. An important number of respondents also feel more motivated to participate on this kind of event when activities are organized and when voices are given to the citizens in order to create an exchange between the local government and its residents. Other survey participants feel attracted when social medias are included in such kind of an event, be it in the communication part or the solution part. Interesting talks from famous personalities could further encourage Parisian residents to participate an event linked to the future of mobility. Nearly 10% of the respondents could not think of anything special attracting their attention for this kind of event.

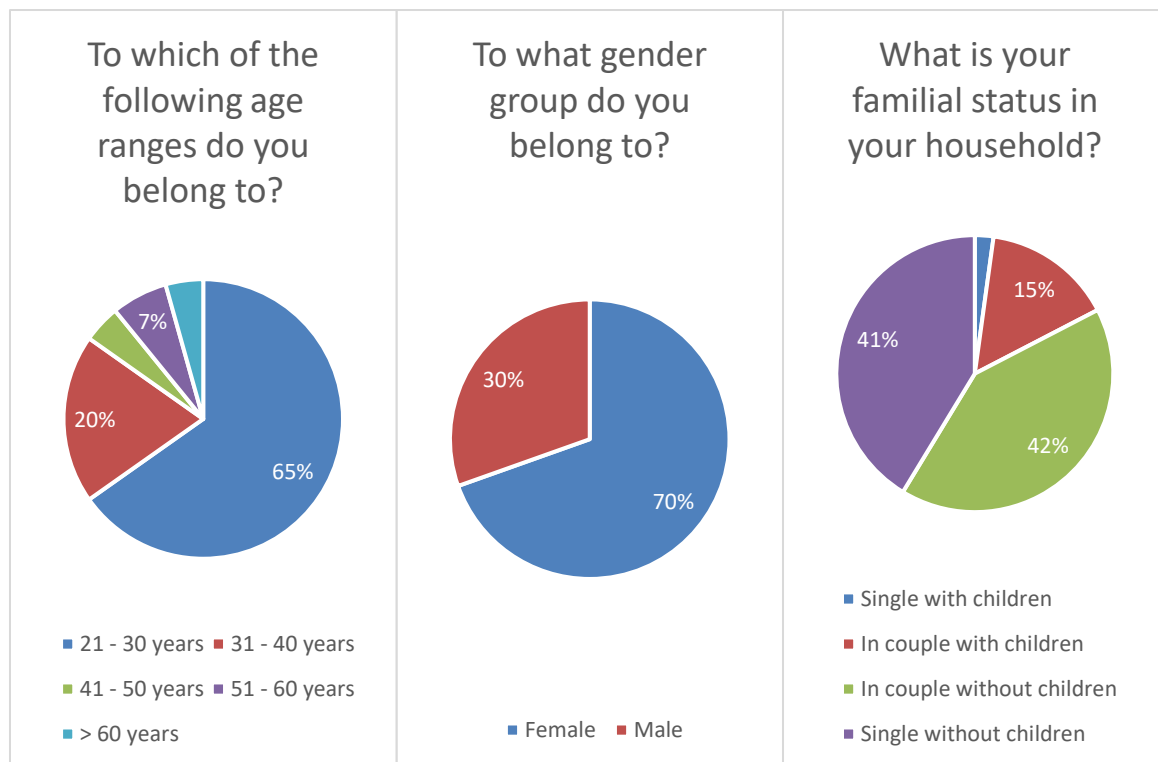*Figure 104, Attributes needed in a mobility event in order to attract end users*

What should an event regarding the (future) mobility of Paris contain in order to attract your attention?

- Innovations and futuristic technologies
- A reflection on clean and responsible mobility
- Ideas for resolving road congestions
- I don't know
- Ways to bring awareness on minorities, harassment and security issues
- Activities
- Improvemet solutions for the public transportation
- Give a voice to citizens and create a real exchange
- The inclusion of social medias
- Interesting talks from famous personalities

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4.4.1.8 Personal Details

On the graphs on *Figure 105,* the ages and genders of the survey respondents are listed. In can be seen that the majority of survey participants are aged between 21 and 40 years. As mentioned before, this represents a target segment for the FIA Smart Cities event, because this part of the population represents the future of smart mobility and smart cities. In terms of gender, a 70% share of the respondents were female. In this prospect no objective was set, the assembly of male and female survey participants was random.

The personal details also reveal, that less than 20% of the respondents live with children in their household, confirming the trend of increasing childless couples determined in the Smart City indexes. This needs to be kept in mind, since this can have a great impact on the answers. Besides that, the split between single and in-couple respondents is well balanced, as can be seen on *Figure 105,* on the right hand side*.*
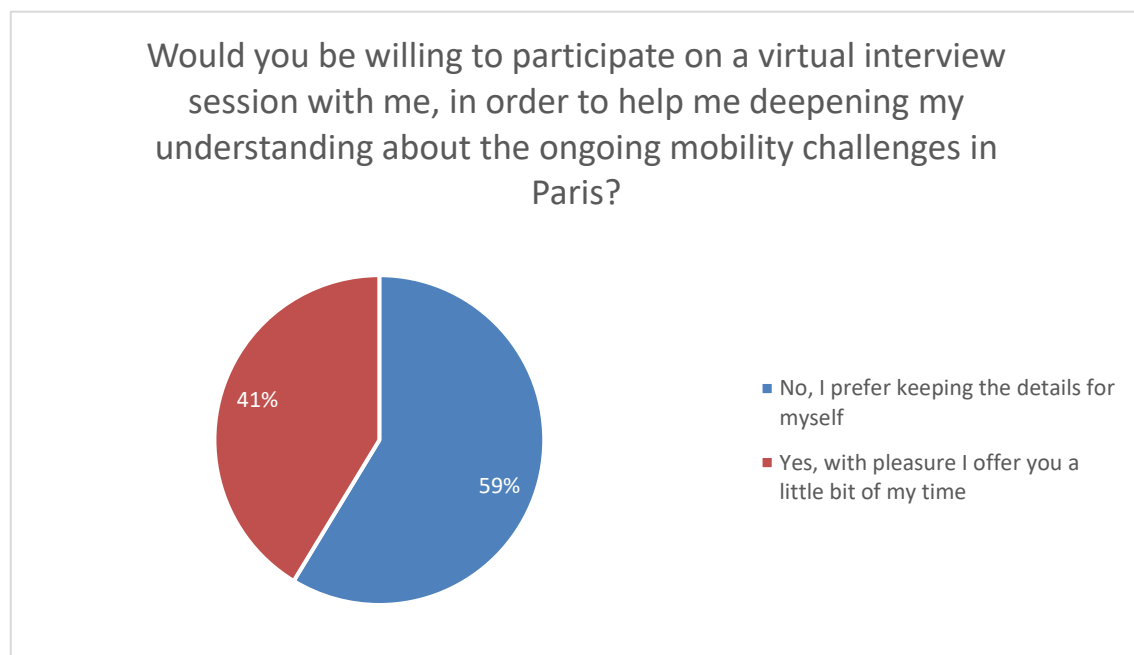
Figure 105, Age and gender of respondents

Source: Internal Document, based on results of the survey

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The very last question of the survey asked respondents, whether they are willing to participate on a virtual interview session per Skype, Facetime, WhatsApp of Zoom, in order to help deepening the understanding about the ongoing mobility challenges in Paris. The results of the survey allowed to discover some patterns and trends, however, surveys often only scratch on the surface of the answers. In order to dig below the surface personal interviews with some of the respondents were planned to be held, with the idea of capturing personal feelings, perceptions and opinions. As displayed on *Figure 106,* 41% of the respondents agreed to being contacted for a follow-up interview.

Figure 106, Willingness of participating on an interview

Source: Internal Document, based on results of the survey

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4.4.2 Summary Survey Results

The two small introduction questions enabled to sort out some inappropriate survey participants as well as define the place of residence of the respondents.

The section Mobility in Paris confirmed that air pollution, public transportation, traffic congestion and security are the main pain points of Paris. Air pollution seems to be a way bigger issue in the center of Paris compared to its suburbs. Also, air pollution is pervceived as being the most urgent challenge out of the four mentioned above in terms of importance. But when asking an open question of the most important issue in terms of mobility, public transportation and traffic congestion has been mentioned the most often. This section also reflected, that Parisian citizen do not feel included in the decision making of the local government concerning mobility and transportation and that the majority of residents would desire a closer exchange in this perspective.

In the section Air Pollution it could be concluded, that Parisian residents are aware of the issue of bad air quality in their city. It could also be determined that the residents are willing to take actions for reducing the air pollution. However, it needs to be analyzed further why scooters and motorcycles are not a popular tool used for moving around Paris. Also, vehicles powered by alternative fuel are not very popular in Paris, mainly due to the expenses linked to it and the pain points linked to the use of a car in Paris in general.

The section traffic congestion displayed, that Parisian citizen perceive the traffic congestion in Paris as heavy. Therefore, they mainly use the metro or walking for moving along. In general, bicycle sharing is more widespread than owning a bicycle. Again, scooters and motorcycles are very unpopular transportation tools, as are alternatively powered vehicles. Parisian often either own a petrol or diesel powered car, a bicycle or no transportation mean at all. When having to choose a transportation mean for moving around in general, the most important criteria are the convenience and time saving. For commuting, also the price is taken into consideration. In the free time, more weight is given to comfort. Furthermore, transportation services are rather unpopular in Paris, either because there is no need for it, they are too expensive, too complicated or simply impossible to reach. Especially people living in the suburbs of Paris use rarely transportation services. Out of all the services, bicycle-sharing turned out to be the most popular one, while motorcycle-sharing is the least popular service.

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The section public transportation taught, that the Parisian public transportations are in general rather efficient. The technologies linked to the public transportation, however, are only average up to bad. A point that stood out was that public transportation services in Paris are not user-friendly for disabled people at all. Those two points will be important to elaborate during interviews to better understand the background of the challenges. Moreover, the metro is by far the most popular public transportation mean in Paris. The main advantages of the public transportations are its large network, its speed and its regularity, while the congestion of users, the dirtiness, smell and climate as well as the safety are perceived as main disadvantages.

According to the data gathered in the section Security, it can be assumed that the main security issues of Paris are not directly linked to the mobility and transportation. Residents feel the least safe when walking alone in the streets of Paris during night. However, people are also scared for their safety, to a little lower extent, when driving on the roads and being in public transportations. Only around one fourth of the respondents have ever experienced robbery or vandalism on one of their own transportation mean. When asking for the main security challenges, theft and aggressions pop up as the main two issues, Theft, however, not necessarily linked to transportation modes.

Finally, the FIA Smart Cities part of the survey taught, that by far the biggest share of Parisian end user have never heard of the FIA Smart Cities initiative before. A huge focus needs to be put on communication in order to raise the awareness of this event. Also, results show that Parisian residents do not feel at ease participating on virtual events. In terms of social media, Instagram and Facebook turned out to be the most frequently used ones. When thinking about communication, this point needs to be kept in mind. A huge part of the survey respondents stated to feel attracted to an event linked to the future of mobility when futuristic innovations and technologies are a topic, and when issues such as air pollution, traffic congestion, public transportation or the security of Paris are addressed.

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4.5 *Interviews*

In order to better understand the answers given in the survey, several interviews have been conducted. The last part of the survey asked the participants whether they are willing to be contacted for a follow-up interview. In total, 19 respondents answered positively to this question. Out of those 19 people, 3 people failed to leave a valid medium of contact such as a phone number or e-mail address. The remaining 16 respondents were contacted on their preferred communication tool. 9 out of the 16 survey respondents replied and were willing to fix an appointment for a virtual interview. The remaining 7 survey participants unfortunately never replied, even after a second attempt of contact establishment. Since the answers of the interviews, however, started repeating after around 6 interviews and the additional interviews failed to add a lot of value, it was decided to move on with the 9 interviews conducted.

All the 9 interviews were hold virtually on Skype and WhatsApp and lasted in average between 30 and 45 minutes. The interviews were hold in French, in order to put the respondents as much at ease as possible. The structure of the interviews was semi-structured and let interviewees talk as much as possible in order to collect unbiased opinions. Based on their individual answers given in the survey, interviewees were asked to elaborate on some of the responses. Then, more general questions regarding the results obtained due to the survey were asked. The answers gathered in the interviews will be summarized and displayed in the following part Empathy Map.

4.6 *Empathy Map*

As explained in the methodology, an empathy map enables to understand what users are saying, thinking, doing and feeling. In *Appendix 13*, the entire empathy map, based on the results of the interviews, can be found. The empathy map is used to summarize the most important statements of the interviews. In order to ensure including all important statements gathered during the interviews and provide a proper insight in the answers given, the empathy map went quite into detail. In total, 30 statement were noted and analyzed. The different statements were grouped into 7 categories, in order to simplify the reading and understanding. The categories were separated by color, and the

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identical color classification can be found on the original empathy map in *Appendix 13.* The 7 categories and its assigned colors are listed below:

- ▶ Public transportation in Paris
- ▶ Technology of the public transportation in Paris
- ▶ Exchange between Parisian residents and its government in terms of mobility
- ▶ Two-wheeler mobility in Paris (bicycle, scooter, motorcycle…)
- ▶ Cars in Paris
- ▶ FIA Smart Cities Initiative
- ▶ Security in Paris

4.6.1 Public Transportation in Paris

SAY	THINK
3. "I like to walk in Paris"	3. I already pay a lot for the Navigo subscription, why should I additionally pay for another transportation service such as bike or scooter rental.
5. "The public transportation connections from the big crown to Paris are not reliable and not regular enough"	5. I lose a lot of time and energy due to public transportation, but the substitutes are not much better
7. "It is nearly impossible for disabled people to use the metro in Paris"	7. It is horrible that it is so challenging for disabled people to use the public transportation in Paris
13. "I always move by public transport, because it is simply the easiest"	13. Scooters are not more than a chaotic and unstructured trend, and bicycles are expensive
21. "I wished the public transportation in the "big crown" would be more frequent and regular"	21. I hate losing time waiting for a public transport, why can't they be as regular as in the city center
25. "Up until now it is free to take a bicycle in the public transportation"	25. I would like to do it, but Public transportations are often so crowded, that people would be annoyed and angry seeing me taking my bicycle in the train
27. "The smell in the public transportations of Paris is disgusting"	27. I feel so dirty after having used a public transportation mean in Paris
30. "I live in the suburbs and rarely go clubbing in Paris, because public transportation services stop at 0.30 am and then I have only very expensive possibilities left for going back home"	30. I would love to go more often clubbing in Paris

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DO	FEEL
3. Has a Navigo, uses the metro frequently	3. Exploited
5. Still uses the public transportation but schedules in enough time	5. Frustrated, forced, powerless
7. Sees blind people and people in wheel chairs struggling in metros, because the next stops are not always announced are there only few elevators as stair substitution	7. Bad, guilty, inactive
13. Never uses scooters or bicycles	13. Never uses scooters or bicycles
21. Waits very often and quite long for the public transportation to arrive	21. Neglected, frustrated
25. Still never takes the bicycle in the public transportation	25. Divided, frustrated
27. Tries not to touch anything, and prefers walking or using the bicycle	27. Disgusted, restricted
30. Avoids going to Paris for partying	30. Restricted, frustrated, unhappy

4.6.2 Technology of the Public Transportation in Paris

SAY	THINK
1. "It is horrible to charge the Navigo (public transportation) card at the end of the month, because then everyone wants to charge it and this creates huge cues"	1. It is unbelievable that there is no possibility to charge the card online
8. "The technology linked to the public transportation in Paris is very bad, especially in terms of live transmission of information"	8. Too bad the technology linked to the public transportation is so bad, because it could be really useful
15. "Paris needs better invention in terms of technology and applications linked to public transportation"	15. There is a lot of improvement potential in the technology linked to the metro, if compared to London for example

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DO	FEEL
1. Pays now on a yearly basis, even though this is very expensive for her as a student.	1. Frustrated, powerless
8. Does not trust the live transmission of the public transportation applications	8. Disappointed, frustrated
15. Uses the metro very often	15. Frustrated, unhappy, unsatisfied

4.6.3 Exchange between Parisian residents and its government in terms of mobility

SAY	THINK
2. "We have not enough possibilities to participate in the decision making process of the local government concerning mobility and transportation"	2. I wished to have easier tools such as social media in order to ensure a simple, integrated and close relationship with representatives of the local authorities
19. "I would love to be more involved in the decision making process concerning the Parisian mobility"	19. I am not heavy enough to change anything, I don't know how to raise my voice
26. "There is no way to easily share my opinion with the local government about decisions taken regarding mobility in Paris"	26. The local government deliberately excludes us residents from decisions, but an exchange would be profitable for both sides

DO	FEEL
2. Nothing, because it is feels like one single person has so few power	2. Excluded, unimportant, powerless
19. Does not try to raise his voice	19. Frustrated, controlled, unsatisfied
26. Keeps his opinion for himself	26. Excluded, bound, held back

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4.6.4 Two-wheeler mobility in Paris

SAY	THINK
4. "We bicycle- and scooter drivers are the most vulnerable street users"	4. I do not want to lose time stuck in traffic
12. "When being by scooter in Paris, I am always very scared"	12. I have seen so many bad accidents in Paris with two-wheelers involved, I don't want it to be me one day
16. "I am too scared to buy my own bicycle"	16. The risk of robbery and vandalism of a bicycle in Paris is enormous, Vélib' has reasonable offers
24. "I am way too scared to ride a bicycle on the streets of Paris"	24. People drive live crazy in Paris and there are way too many road users on the street

DO	FEEL
4. Slaloms between the cars and does not respect street lights	4. unprotected, stressed, angry
12. Has chosen to buy a scooter with a security belt and a roof, in order to increase the security	12. Scared, alerted, uneasy
16. Regularly rents a bicycle from the bicycle renting company Vélib'	16. Scared, contented
24. Chooses public transportation or a car over two-wheeled transportation means in Paris	24. Frightened, scared, uneasy

4.6.5 Cars in Paris

SAY	THINK
11. "There are an incredible high number of cars in Paris, leading to air pollution"	11. I don't want to lose time and energy being stuck in traffic jam
14. "I don't own a car by myself, because I don't feel the need for it, living in the center of Paris"	14. Owning a car would be too expensive and complicated in terms of parking
18. "Being stuck in traffic jam makes me aggressive"	18. I love taking my car, but don't want my mental wellbeing being impacted by it

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22. "When going to Paris by car, I count an average of 20 minutes if not more for finding an empty parking spot"	22. It is so time consuming to take the car for trips to Paris (from the suburbs)
DO	**FEEL**
11. Decided not to do the car driver license	11. Disgusted, uninterested
14. Rents a car when in need of a transportation mean	14. Disappointed
18. Avoids going to Paris by car (lives in the big crown)	18. Frustrated, angry, disappointed
22. Tries to avoid taking the car for trips to Paris (from the suburbs)	22. Unhappy, restricted, frustrated

4.6.6 FIA Smart Cities initiative

SAY	**THINK**
6. "I need some exchange when participating on events"	6. It is boring to watch events online, I do not feel as part of the event
10. "I am not interested in events such as the FIA Smart Cities initiative"	10. The event must be something for car and motorsport fans
17. "The most effective way to attract people to an event such as the FIA Smart Cities, is by using social medias, especially Instagram"	17. Social media is the most effective communication tool for people aged between 18 and 35
20. "Events need to include both, physical and virtual engagement"	20. A 100% virtual event is boring
29. "I like going to events where I my presence can change something"	29. I want to be active, I don't like just listening to people talking
DO	**FEEL**
6. Falls asleep during virtual events	6. excluded, unimportant, sleepy
10. Does not try to inform about the event and does not participate	10. Uninterested, unconcerned
17. Works in an event agency, creates competitions, pictures etc. on social media as communication tools for events on a regular basis	17. Convinced, sure, experienced

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20. Is active on social media and physically participates on a lot of events	20. Active, interested
29. Participates on events with activities, votes and personal exchanges, dislikes virtual conferences	29. Included, important

4.6.7 Security in Paris

SAY	THINK
9. "I feel very safe walking alone during the night in the city of Paris"	9. It is more dangerous for women to walk alone during the night in Paris than for men
23. "I do not always feel safe in Paris"	23. I am cautious, several friends of mine have already been aggressed in Paris, I don't want to provoke anything
28. "Women get often harassed in public transportations or the streets of Paris"	28. The city does not do enough to go against the harassment of women, and people rarely help

DO	FEEL
9. Instinctively avoids some of the streets or metro stations	9. Secure, aware
23. Happens to choose a different direction or avoid a street because of a uneasy feeling	23. Alarmed, aware
28. Tries to avoid being alone in the public transportations and the streets in the late/early hours	28. Left alone, scared, unsettled

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4.7 *User's Needs*

Derived from the empathy maps, the most important practical and emotional needs of the end consumers of the Parisian mobility could be determined. Practical needs represent logistical and more trivial needs, whereas emotional needs cover more profound needs such as values, beliefs and personal opinions of the users. The user's needs are displayed in form of a table, split into two columns, one for the practical needs and one for the emotional needs.

PRACTICAL NEEDS	EMOTIONAL NEEDS
Have reliable and regular public transportation connections	Maximize time spent with family
Improved access to the public transportation for disabled people	Be independent
Increase cleanliness in public transportations	Feel at ease
Decrease the number of people in the public transportation	Dispose of enough private space
Improved possibilities to charge the NAVIGO pass	Gain time
Have easy access to an exchange platform between the Parisian government and its residents	Feel important
Safer bicycle paths	Feel in security
improved traffic congestion management	Be reliable
Improve parking possibilities	Reliably plan activities
A mix between virtual and physical in terms of events	Feel engaged
Increased personal safety	Feel secure

In order to better understand these needs, they are going to be transformed into POV's in the coming step.

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4.8 Point of Views (POV's)

Point of views represent so called personas. Personas are fictional characters used to personify the logistical and emotional needs, which were determined in the previous section. POV's enable to better understand and empathize the needs of end users. One POV per practical and emotional needs was created, leading to 11 personas listed below.

François is a 35-year-old business man, living in the suburbs of Paris. He lives with his wife and baby daughter and tries to balance out his busy work life with his family life. He needs to minimize his time spent commuting, in order to fit everything under one hat. This is why he chooses to take the public transportation for going to work.

François needs to have reliable and regular public transportation connections, because he wants to maximize his time spent with its family.

Bernard is 80-years-old senior, who has lived his entire life in the close suburbs of Paris. During the past 20 years, his sight ability has decreased significantly. Also, his legs get the longer the weaker. Due to its sight issues Bernard is not allowed to drive a vehicle anymore, therefore he is reliant on public transportation.

Bernard needs an improved access to public transportation for disabled people, because he wants to be independent.

Alice is a 28-years old dental assistant, living in the center of Paris. She is someone very tidy and good hygiene is important for her, also due to the fact that she works very closely with her clients. Even though public transportation would be the easiest commuting tool for her, she walks to work every morning, since the dirt, low hygiene standards and bad smell in the public transportation are unbearable for her.

Alice needs increased cleanliness in the public transportation, because she needs to feel at ease.

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Emma is a 35 years old yoga teacher, living in the center of Paris since 6 years. She loves her job and in her free time she likes going for walks, reading books or cooking. Emma is a rather introvert person which loves her privacy. She does not like being in a crowd, because it stresses her out to being surrounded and touched by so many people and having no control over it. Emma uses her bicycle to move around in Paris, even though she would prefer taking public transportations in terms of security. However, the crowded public transportations make her anxious.

Emma needs a decreased number of people in the public transportation, because she needs to dispose of enough private space.

Hugo is a 28-years old trainee in software development living in the center of Paris. He has a very busy working lifestyle and always takes public transportation for commuting. Therefore he disposes of a NAVIGO public transportation card. With his trainee salary, however, he is not able to pay the annual subscription fees, and therefore has to recharge its NAVIGO pass monthly. The cues on the NAVIGO recharging stations are always enormous at the end of the month and make him lose a lot of time he could invest in his work.

Hugo needs improved possibilities to charge the NAVIGO pass, because he needs to gain time.

Louise is a 23 years old student with a majors degree in sustainable development. She is a very creative and engaged person and has joined a lot of clubs on her universities' campus. She has detected several issues and solutions in terms of sustainability linked to the mobility in Paris. Being an engaged person, she would love to share her opinion with the local government, however, does not know where she could raise her voice. Also, she doubts that her small voice could change anything and therefore contents herself discussing this topic with her friends.

Louise needs to have easy access to an exchange platform between the Parisian government and its residents, because she needs to feel important.

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Thomas is a 23-years old student who moved from its hometown Strasbourg to Paris for his studies. Strasbourg having a very well established urban cycling network, Thomas was used to take his bicycle for every opportunity. Arriving with his bicycle in Paris, he was shocked about the low road security. He has already had 2 small bicycle accidents and has avoided many others only due to a huge bunch of luck. Thomas is now hesitating to take back his bicycle to Strasbourg and start using public transportations.

Thomas needs safer bicycle paths, because he needs to feel in security.

Alexandre is a 45 years old bank employee, who always takes his car for any kind of trip. He appreciates the comfort and independence his car can offer him. On the other hand, the huge traffic congestion prevailing the city of Paris drives him crazy and aggressive every morning and evening and, even worse, make him arrive late for some appointments. Reliability and trust is key in his business and he has already had several remarks from his boss that he needs to improve his punctuality.

Alexandre needs an improved traffic congestion management, because he needs to be more reliable.
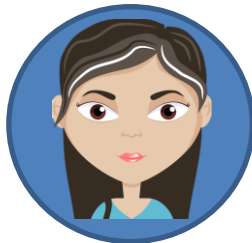
Léonie is a 40 years old mother of 2 children. She lives in Paris and usually likes to use her car in her free time. However, she is hesitating to sell her car, because she has become so frustrated about searching for parking possibilities. Last weekend she has missed a theatre performance because she could not find an empty parking spot. On Monday she had promised her kids to go to their favorite playground but have had to cancel, because she could not find an empty parking space. Having the kids crying and becoming impatient in the back of the car did not help at all in this kind of frustrating situation.

Léonie needs improved parking possibilities, because she needs to be able to reliably plan activities

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Arnaud is a very active, interested and engaged 26-years old journalist. He likes to participate any kind of event. During the COVID-19 crisis, most of the events were switched on virtual. He discovered the wide reach and simplicity in terms of communication virtual events bring with it. However, Arnaud was not happy at all, because his thoughts wandered off so quickly during virtual events and it even happened that he fell asleep. Being a journalist he loves interacting with people but virtual events make him feel unimportant and unengaged.

Arnaud needs a mix between virtual and physical in terms of events, because he needs to feel engaged.

Laïla is a 33 years old hairdresser. Her passions are hair, make-up and fashion. In this prospect Laïla moved to the French capital Paris two years ago and opened up her own hairdresser salon. In order to satisfy her clients she located her salon in the city center and works late in the evening. When walking home after work, however, she is the longer the more anxious and scared. People whistling after her or making unappropriated comments, people following her up until her home or even worse. She has already experienced and heard so many things, that she wisely chooses the streets for walking home now. Also, she always carries pepper spray and a panic button with her.

Laïla needs increased personal safety, because she needs to feel secure.

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4.9 _Ranking_

A lot of different challenging points linked to the mobility and transportation in Paris has been mentioned throughout this entire thesis. Based on the smart city indexes and the primary research, two different rankings of the four main pain points linked to mobility and transportation have already been established. The results were the following:

The ranking of the four main pain points in terms of mobility and transportation according to the respondents' personal **IMPORTANCE**:

1. **Public Transportation**
2. **Traffic Congestion**
3. **Pollution**
4. **Security**

The ranking of the four main pain points in terms of mobility and transportation according to its general **URGENCY**:

1. **Air pollution**
2. **Public Transportation**
3. **Traffic Congestion**
4. **Security**

Is could be seen that Security occupies the last rank in both cases. Other than that, Air Pollution seems very urgent in the mind or Parisian citizens, however, is a less important topic for them personally. More important is the pain point public transportation and traffic congestion, which are in a way linked to air pollution. This change might be due to the fact, that people are much more often exposed to public transportation and traffic congestion than to air pollution directly. If an event touches a topic of someone's personal importance, that person might feel much more motivated to participate than when touching a subject that is generally urgent.

Switching now to a third ranking, based on the practical and emotional needs and the POV's linked to it:

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It could be seen, that 5 out of the 11 topics mentioned in the POV's are linked to public transportation. Since the POV's are based on the content of the interviews, this reflects again how important this topic is for Parisian citizens on a personal basis. François, the first POV, is linked to the public transportation mentioning the urgency of having **more reliable and regular public transportation services** in Paris and its suburbs. According to the different responses in the interviews, this seemed being one of the main issues perceived by the residents. Metros, buses and trains are very often delayed or have breakdowns. Also, especially in the suburbs, they do not arrive enough regularly. And the fact that at 0.30am the last metro leaves makes it hard to people from the suburbs to spend a long evening in Paris. Also strikes happen very often, which is extremely annoying for the public transportation users.

The **crowdedness** of the metros, trains and buses has been mentioned several times as important issue as well and is personified in the POV of Emma. Very often there is no possibility to find a seat in the public transportation, even worse, there is no possibility to keep some private space. Not rarely the public transportations are so full that it is impossible to hop on, and so people have to wait for the next one and hope it will be less crowded.

Another topic where nearly all respondents of the survey shared the same opinion, is the extraordinarily **bad accessibility to public transportation for disabled people**, reflected in the POV of Bernard. Many public transportation stations are not accessible for people in wheelchairs or with restricted mobility. This counts also for parents with strollers, which are also heavily impacted by the over-crowdedness of the public transportations. Other issues in this prospect were mentioned, such as the fact that stops are not always announced, therefore it is very hard for blind people to know when they arrive at their destination. For a big city such as Paris this result is shocking and urgently needs to be reviewed.

The last two topics linked to public transportations were its **dirtiness** and its **below average technology**. Interviewees mentioned, that they were discussed using the public transportations in Paris, because of is bad smell, unhygienic conditions and outdated infrastructure. Furthermore, in terms of technologies such as live-schedules, online ticket payments etc. the Parisian public transportation are clearly behind schedule. Some interviewees explained, that sometimes the train would just stop and during 10 minutes

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no one would be informed about what is going on. Several POV's were dedicated to these topics.

Besides the public transportations, three of the User's Needs are linked to traffic congestion. It could be understood in the interviews, that Parisian residents simply got used to not using their car too often in order to avoid the **heavy traffic congestions** and **parking issues**. This can be looked at as positive taking into consideration the urgency of the reduction or air pollution. However, if this is a strategy of the city of Paris the city then must be able to offer safe and attractive substitutes. This refers of course to the above mentioned challenges linked to the public transportation, but also to **safer two-wheeler paths**. Most of the respondents do not take into consideration using a bicycle or motorcycle in Paris, because they are simply too scared of the roads and its users. Currently, some projects are ongoing for implementation more bicycle-only paths, but what about motorcycles? And the fact that still people are not willing to take the bicycle reflects, that much more two-wheeler paths and security controls on normal roads need to be implemented. According to interviewees, scooters (trottinettes) are even less popular than bicycles and motorcycles, because there are no clear rules about where to drive, how fast to drive, where to park etc. Clearer definitions and therefore increased safety in this prospect could create an incentive for Parisian residents to change to scooters as transportation mean. If there is a possibility to attract people living in Paris but also in its suburbs to switch to safe and well managed car substitutes, automatically the issues of traffic congestion and parking can be reduced.

Increased incentives and improved infrastructure is also needed in the context of **alternatively fueled vehicles**, such as cars but also for example motorcycles. This might include benefits such as more or cheaper parking, a specific track etc. for alternatively fueled vehicles. The incentives need to be major, because often Parisians decide not to buy for example an electric car because it is too expensive and they don't see the need for it. Also, the infrastructure such as charging stations should be boosted more.

Air pollution has never been directly mentioned, however, can be found in both, the public transportation and traffic congestion challenges. When the city achieves to address

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issues linked to public transportation, two-wheeled mobility and the reduction of traffic congestion, the degree of air pollution reduces as well.

Only the POV of Laïla was linked to safety, because interviewees showed less concern for the **safety** linked to goods and people, besides the road safety for bicyclists. The POV reflects, that safety is a huge issue in Paris, however, not necessarily mainly linked to the mobility and transportation. Robbery and vandalism of public transportation means has occurred only to a minority of survey respondents. The pain point Security always finds itself at the end of all the rankings, which shows that there are more important and urgent issues, However, just because Parisians have learned how to well protect their transportation means, does not mean that this does not represent an issue. It might just explain why it is less urgent in their point of view.

The POV of Louise concerning the **exchange between the Parisian government and its residents** turned out to be a quite important one. The survey results showed that nearly all residents, no matter if living in Paris or its suburbs, did not feel included in the decision making process of the government and would wish for a closer exchange. This might be advantageous in several ways: it makes the residents feel more important and appreciated but also enables the government to have a better understanding of the needs and wants of the citizen. It also enables the citizen to give solution suggestions for any challenges in relation to the mobility or other topics. The FIA Smart Cities events might be one of a platform used for this exchange, but also the building of other platforms need to be encouraged. The easiest way might be to create an online platform, with a high interaction rate. Since this might be one of the solutions the easiest to discuss and implement on an FIA Smart Cities event, and also enables to ensure being aware of the user's needs in the future.

Based on the Smart City indexes, the survey results and mainly also the interview answers a ranking could be determined of the topics perceived as most important on a personal basis by Parisian residents. The ranking can be seen on *Table 20.*

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1.	More regular and reliable public transportation connections	
2.	Decrease the crowdedness of public transportations	
3.	Safer two-wheeler paths	
4.	Improved access to public transportations for disabled people	
5.	Cleanliness of public transportations	
6.	Creation of a simple and accessible exchange platform between the government and its residents	
7.	Improved technologies linked to the public transportation	
8.	Increased incentives for the use of alternatively powered vehicles	
9.	Improved traffic congestion management	
10.	Improved parking situation	

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11.	Increased personal safety	
12.	Increased goods safety	

There was also the POV or Arnaud regarding the realization of the FIA Smart Cities event. The interviews confirmed the results gathered in the survey and the perception station of the researcher, that Parisian citizens in general are not at ease with participating a 100% virtual event. Interviewees suggested to organize the communication and marketing strategy online on social medias such as Instagram, Facebook, LinkedIn or Snapchat and also to post live stories, images and videos during the event for people who cannot participate, but to still organize an event with activities, workshops and talks. In order to organize such an event adapted to the city, it might be best to work with a local event management company. A more detailed explanation about this topic can be found in the recommendation part.

The aim of this ranking is to give the FIA an overview of what topics are important in the eyes of Parisian citizens. The goal is not to suggest solutions in any kind in this thesis, but to encourage to plan the next FIA Smart Cities event on some of this topics. Based on the interaction between B2G, B2C and B2B participants solutions might be created for those topics perceived as most important.

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4.10 Recommendations

The last part of the analysis consists of the recommendations. The recommendations aim to respond to the main question of this thesis: "How can the Fédération Internationale de l'Automobile attract the general public to their FIA Smart Cities initiative?"

As already addressed in the methodology, the recommendations will be separated into several parts, based on the FIA Smart Cities initiative analysis part. The most important part to start with is the elaboration of an appropriate communication strategy. If great content has been decided on for the FIA Smart Cities event and a very attiring event structure has been come up with, but this information fails to reach potential B2C participants to make them aware of the fact, that an event is going to take place, the participation rate can only turn out to be low. This is why, the recommendations regarding communication of the FIA Smart Cities initiative will be presented first.

Then, the second part of the recommendations will include the suggested topics and contents a potential FIA Smart Cities event in Paris should include. These recommendations will be based on the main findings of the secondary and primary research conducted in this thesis, in terms of challenges perceived as being the most important by Parisian citizens.

The third part of the recommendations include realization and implementation suggestions of an FIA Smart Cities event, focused on the showcase city Paris. Having the goal to include end users of the urban mobility in an event, takes huge adaptions with it. Having a great communication strategy and interesting topics is great, but how to ensure attracting B2C participants in a sustainable way? How to ensure that they feel included and important on such kind of an event and will want to come back to another event? And how to make sure to integrate them to a point, that the FIA Smart Cities initiative can benefit from the data of those new participants?
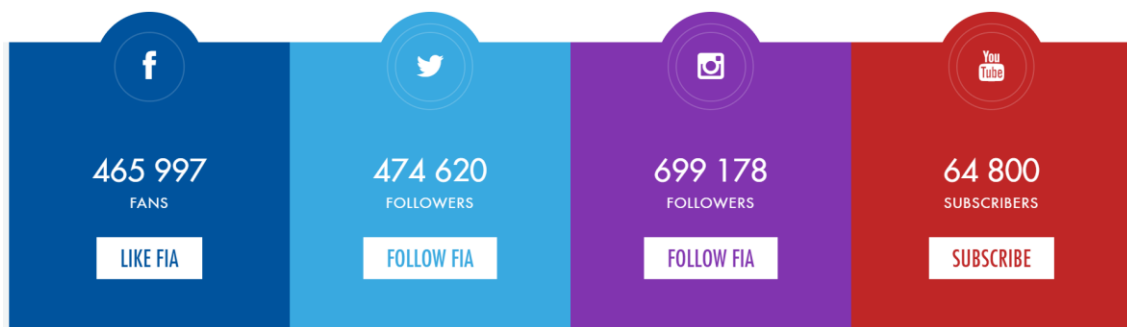
4.10.1 Communication Recommendations

The following question asked in the FIA Smart Cities initiative analysis and could be answered based on the results of the survey: Are Parisian citizen aware of the existence of the FIA Smart Cities initiative? The results showed a clear No, they are not aware. Incredible 89% of the respondents of the survey answered, that they have never heard

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of the FIA Smart Cities initiative before. In order to successfully attract the general public to the FIA Smart Cities events, therefore, this is a challenge that urgently has to be tackled. No awareness of the event equals no participants. It was therefore decided to elaborate on the topics introduced in *4.1 FIA Smart Cities initiative*.

4.10.1.1 Digital Communication Strategy

The quickest, most efficient and most cost-effective way to raise awareness of a project targeting participants aged between 20 and 40 years old, is with a wide digital communication strategy. Based on the secondary and primary research conducted, it could be seen that mainly Instagram but also Facebook are the most frequently used social media channels in Paris. Therefore the very first recommendation to the FIA is, to create a FIA Smart Cities dedicated Facebook and Instagram page. The created LinkedIn page should be retained, since this page allows to address a different target public, however, the focus should be put on the Instagram and Facebook accounts. The idea would be to promote the events, podcasts and other initiatives on their social media pages on a regular basis, in order to create their own community. In the beginning, in order to raise awareness of the page, the FIA might make use of their official FIA and Formula E social media pages. Regular interaction with the community becomes then key, in order to sustainably create a community. In *Figure 107*, the current followers of the official FIA social media accounts are reflected. It shows, that they already have a very large community on Facebook and Instagram, which will be able to help promoting the FIA Smart Cities page gathering awareness.

Figure 107, Followers of the official FIA social media accounts

Source: FIA Website (FIA 2020ak)

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In order to keep the community interested and engaged, the Instagram and Facebook account need to interact with them on a regular basis. But how can this be done? Some recommendations are listed below.

Ask Questions

People love sharing their opinions and the FIA can gather very useful data receiving answers from their community on some of their questions. The fact is, that end consumer are more willing to share their opinions online than physically, might it be due the familiar surroundings or increased confidence online, it does not matter. Asking questions gives end consumers the impression that they matter, like the FIA really wants to know THEIR opinion on a specific topic. Sharing the results of the questions then further engages the community and motivates the ones who did not answer this time, to participate as well the next time. Examples of questions in the connection with the FIA Smart Cities initiative can be seen on *Figure 108.*

Figure 108, Examples of Instagram questions

Source: Internal Document

Host a Contest

Contests are perceived as being fun. People can win prizes and this is something they like. The FIA, on the other hand, can benefit from an increased engagement rate, an increased follower rate and increased awareness rate. The suggested prize does not

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have to be big to engage, but it helps to increase the engagement. Suggestions, therefore, could be to offer a new bicycle or 2 Formula E tickets.

There are several kind of contests than can be executed. In order to spread awareness, the best contest is a "like, share and comment to win" contest. It asks the community to like the picture describing the contest and to comment on the picture for example tagging a friend with whom riding a bicycle or visiting a Formula E race is the funniest. Finally, participants will have to share their story in order to be eligible for winning the prize. As can be seen, this method will allow to spread awareness of the new FIA Smart Cities initiative social media accounts quickly. An example from sixthreezero, who uploaded a similar contest, can be seen on *Figure 109*.

Also evident on this figure is the fact, that it must be defined for whom the giveaway is open. Does it include people worldwide or only people living in the city of the next FIA Smart Cities Initiative? The beginning and ending of the contest also needs to be specified, as well as the fact that it is not associated with Instagram. Finally, it must be ensured to well explain the rules of participation.

Figure 109, Example of Instagram contest

Source: RafflePress website: (RafflePress 2020)

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Weekly Activities

Even though the FIA Smart Cities events do only take place three times a year, the initiative needs to be stuck in the heads of the community. This is why they have to be reminded on a regular basis of the existence of the FIA Smart Cities initiative. Therefore it is recommended to post weekly activities on the social media accounts. These activities can include questions and contest, as mentioned before, but also other content. For example, the page could decide to share every Wednesday, a "Smart Mobility Best Practices – Wednesday" post. This might for example include to highlight a small or big achievement or goal a city has set, in order to make their mobility smarter. Also, the different podcasts can be shared this way. The fact is, that people like social media pages who interact and who share contents on a regular basis. The online community follows so many different pages, if the FIA Smart Cities account does not regularly pop up, they quickly forget about it.

Ask for feedback

This is a very valuable recommendation for the data collection of the FIA. Whether it is a feedback on a past FIA Smart Cities event or a feedback on a social media contest, it is important to use the possibility to ask the community about their opinion. As for the questions in general, it will make the community feel important and valued, but also enable the FIA to adapt campaigns and events according to the feedback.

Go Live

Live streaming has become very popular on Instagram as well as Facebook, because it allows to share content in real time and interact with the community. Once recorded the video stays online, allowing people who have missed the live to still watch the video. According to AdWeek, live videos even receive 5 times more engagement than standard photo posts, showing the increasing popularity of this feature (The Social Shake-Up 2019). This thesis recommends to use live streams for promoting the FIA Smart Cities event, by streaming directly from the event. This will allow to engage new customers who will not want to miss the next FIA Smart Cities event and give a better understanding on what this event includes.

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4.10.1.2 Influencers

In accordance with the digital communication strategy and with the creation of an Instagram and Facebook account, another recommendation of this thesis is to work in collaboration with some influencers. Influencers, already quickly introduced in the FIA Smart Cities initiative analysis part, are people with a huge online community and therefore a wide reach. This collaboration will allow the FIA to further spread the awareness of the FIA Smart Cities initiative and engage more end users to participate on the events. Recommended is to focus on 2 to 3 influencers per event. Those influencers, located in the host cities of the targeted FIA Smart Cities event, will then be contacted well in advance of the events. They are going to be invited for the event. The goal is, that they share with their community the reasons of their motivation to participate on the FIA Smart Cities event. This alone will already attract a big range of B2C participants, as well as the simple fact that those famous influencers will be able to come across during the event.

For the specific case of Paris, three propositions of Influencers, that could be taken into consideration by the FIA, are listed in *Figure 110*. Each of the three suggested influencer will attract another category of end users. All of them have a wide reach and live in Paris.

Figure 110, Parisian influencer recommendations
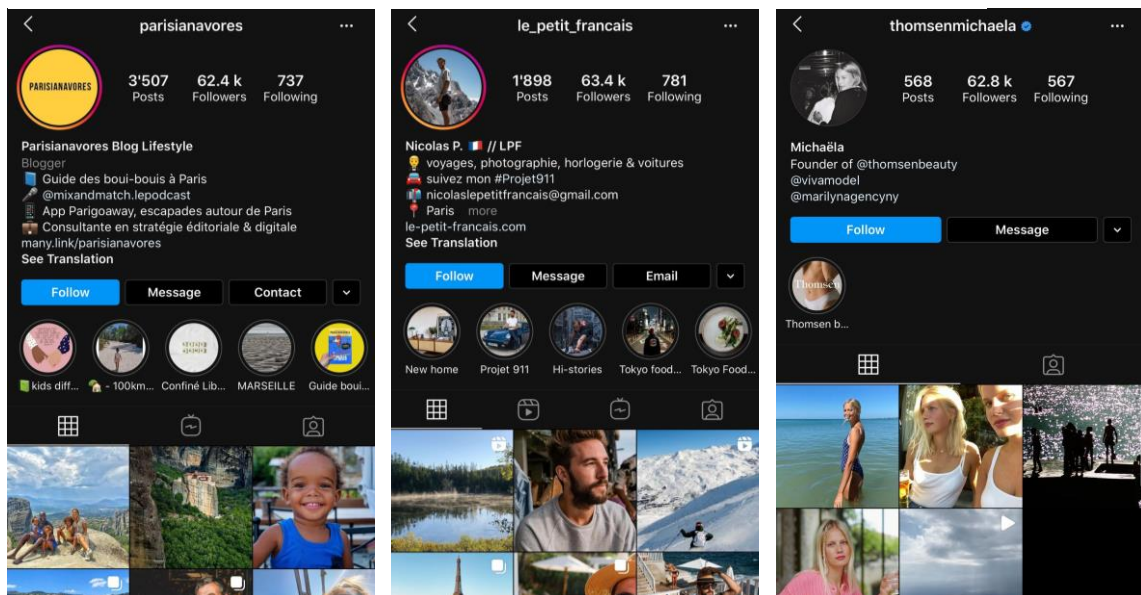
Souce: Instagram (Instagram 2020a) (Instagram 2020b) (Instagram 2020c)

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Parisianavores

Parisianavores is an Instagram account of Anaïs Lema, the young mother of three mixt-race children. On her Instagram as well as on her blog she mainly suggests nice Parisian addresses, including restaurants and activities, with and without children. She currently has over 62k followers. Approximately three-fourth of her followers are feminine, and the majority of her audience is aged between 20 and 30. Over 60% of her followers are French, with an incredible rate of 40% even living in the Parisian region itself (Kolsquare 2019).

Le_petit_francais

The second influencer recommended by this thesis is Nicolas, owner of the Instagram page le_petit_francais. Living in Paris he is known for his passion for cars, travelling, photography and watchmaking. Next to his job as influencer he works in a publicity agency and might therefore also have some knowledge in this aspect. He currently counts over 63k followers, of which the majority are male. This represent a great balance to the first influencer (Instagram 2020b).

Michaëla Thomsen

Michaëla Thomson, named the Parisian of the moment by Vogue in January 2019, is the third influencer recommended by this thesis (Vogue 2019). Michaëla Thomsen is known as model, influencer and beauty-queen. She currently is 28 years old and lives in Paris. With her sister, Emilie Thomsen, she recently launched a green cosmetic label called Thomsen Beauty, which well reflects her interest in sustainability. Michaëla currently has 62k followers, most of them female and aged between 20 and 30 (Instagram 2020c). Again, she covers a totally different public, enabling to reach a broad portfolio of the general public.

4.10.1.3 Ambassadors

A third methodology recommended for spreading awareness on the FIA Smart Cities initiative is to engage with ambassadors. Introduced in the FIA Smart Cities initiative analysis, the ambassadors of the #3500LIVES Campaign from the FIA have been presented. It is believed, that credible brand ambassadors such as the ones from the

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#3500LIVES Campaign will be able to offer many benefits for the FIA. Not only can they publicize the event in their networks, but they also humanize the event by giving it a face.

The choices taken for the Road Safety Campaign are believed of being very accurate and well implemented ranging from soccer and tennis players, over singer and actors to Formula 1 Drivers and politicians.

As could be seen in the analysis, road security plays an important role in terms of main pain points of Paris. In order to test the concept of ambassadors in relation with the FIA Smart Cities initiative, while limiting the efforts invested, this thesis therefore recommends to work together with some of the road safety ambassadors important for the geographical zone of France. The suggested three ambassadors are reflected on *Figure 111.*

Figure 111, Recommended Ambassadors

Charles Leclerc
FIA Formula 1
Racing Driver from
Monaco

Anne Hidalgo
Major of Paris and
Chair of C40

Antoine Griezmann
International Football
Player from France

Source: Internal document

All of the ambassadors were chose, firstly, because their mother tongue is French. Charles Leclerc and Antoine Griezmann were chosen, because they match well the target audience of end users the FIA Smart Cities event would like to attract. Both of them are well known, good looking, young sportsmen. It is believed, that the presence of those two persons on an FIA Smart Cities event in Paris could increase the incentives for many targeted end users to participate the event as well. Anne Hidalgo was chosen, because of her job as mayor of Paris since 2014, being the first woman to hold the office. She is already well engaged in the FIA Smart Cities initiative and well known in Paris for

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her goal for a green city. She seems therefore perfect as representative ambassador of the FIA Smart Cities event of Paris. Her presence on the FIA Smart Cities initiative is indispensable, so why not using her as flagship for attracting a broader range of the general public.

4.10.1.4 Partnerships and Sponsoring

At the beginning of this chapter it has been explained, that the inclusion of B2C participants in the FIA Smart Cities initiative exposes new opportunities in terms of partnerships and sponsoring. It could be understood, that the current partners of the initiative do not see the inclusion of end users in the events as an exceptional added value, since they are mainly focused on B2B customers. Since the FIA Smart Cities initiative keeps the B2B participants integrated in the event, not a lot changes in the perspective of the current partners, except on the fact that the event will be known by a larger public. Therefore it is recommended to continue maintaining the relationships with them.

Nevertheless, the inclusion of the grand public comes with a huge bunch of new expenses. This forces the FIA Smart Cities to look for new possibilities of raising funds. One recommended possibility is to include 3 new sponsors and partners, completing the existing ones. Those new sponsors and partners should see an added value in the addition of the general public to the event. There are some main criteria that need to be taken into account when choosing the 2 partners: firstly, they need to be internationally established, since the FIA Smart Cities event are held on a global basis. Then, they should also in a way or another have a link to the future of mobility, promoted by the FIA Smart Cities initiative. The three recommendations for new partners can be seen on *Figure 112*:

Figure 112, Recommended Partnerships and Sponsoring

Source: Internal document

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Red Bull

Currently, the company Red Bull is very engaged in the Formula 1 motorsport, inter alia by having their own Aston Martin Red Bull Racing Team and their racetrack Red Bull Ring in Spielberg. They do not have yet a racing Team in the Formula E series, but are official sponsors of Sébastian Bumi, a Formula E driver. The energy drink producer Red Bull is clearly a B2C focused company. Becoming a FIA Smart Cities sponsor could enable the company to improve their brand image, by showing not only interest in Formula 1 but also focusing on the future, cleaner mobility.

Nike

Nike's aim is to "make the world better for all athletes". Making the world better for all athletes does not only include offering great sport apparel, equipment and services, but it also includes tackling climate change (Nike 2020). Since a big part of the climate change is due to pollution coming from the mobility, the B2C company Nike might gain a lot investing in the FIA Smart Cities initiative, that focuses on improving future mobility also in terms of pollution. Furthermore, Nike has a very large E-Commerce page. It is also in their interest to ensure a constantly improving last-mile delivery, in order to satisfy their customer to a maximum. Another point motivating Nike to become a partner of the FIA Smart Cities initiative is the fact, that if a population does not lose too much time commuting, they have more time to spend on sport. As can be understood, there are many incentives offered for Nike by joining the FIA Smart Cities initiative as a sponsor or partner.

DHL

Keeping the focus on the last-mile delivery, DHL is the third recommendation in this section. The global courier service is very interested in finding adapted future mobility solutions for the last-mile delivery, ensuring quick delivery to the lowest possible environmental impact. In this prospect they have announced their new environmental protection target: zero emissions logistics by 2050(DHL 2020). This reflects the huge interest of the company in the future mobility development. Becoming an official partner of the FIA Smart Cities initiative shows to their B2C customers their big interest and engagement. A first step in this direction has been committed by DHL by becoming the Official Logistics Partner of the Formula E series.

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4.10.2 Content Recommendations

Once the above listed communication recommendation have been implemented, it can be ensured that end users will be made aware of the FIA Smart Cities initiative and the linked FIA Smart Cities event in Paris. Now, in order to give the Parisian citizens incentives for participating on this event and recommending the event to its close relatives, the content suggested for the event needs to be perceived as important by the Parisian end users.

But about what to talk during the discussion and panel sessions? In order to define topics relevant in the eyes of Parisian citizen, the detailed secondary and primary research has been conducted. Based on these results, in the section *4.9 Ranking* a final ranking of topics currently perceived as the most important and relevant by Parisian citizens could be made. This ranking has been based on interviews and a survey conducted with Parisian mobility end users, which ensures its relevance and adequacy. Obviously it is impossible to include 12 topics in one FIA Smart Cities event, this thesis therefore suggests to choose the most pertinent 3 topics.

Extracted from this ranking on *Table 20* in the section *4.9 Ranking,* the top four topics perceived as being the most important and urgent in the opinion of Parisian citizen are listed on *Table 21*. It can be seen, that the first two on the list are both closely linked to public transportations. Namely these topics are: **More regular and reliable public transportation connections** and **a decrease in the crowdedness of public transportations**. As can be remembered from the emotional and logistical needs in general, a lot of important mobility challenges are linked to public transportations. It can therefore be assumed that addressing this topic will address the needs of many Parisians and offer them strong incentives to participate on the event. It is recommended, however, to merge these two topics into one, since they are very close. In other words, the second challenge might be resolved once a solution has been found for the first one. As soon as a solution for more regular and reliable public transportation connections can be ensured, the transportation means itself will very likely automatically become less crowded. Both of this will therefore be resumed in the recommended topic number 1.

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The recommended topic number 2 is to **create safer two-wheeler paths**. In the survey results as well as in the interview results it could be seen, that many Parisians do not dare taking a two-wheeler for commuting or in their free time, because of the road safety perceived as being very low. If the safety aspect could be increased, many interviewees answered to preferring taking the bicycle over the public transportation. This, on the other hand, would again help to reduce the crowdedness of public transportations. Interviews also revealed, that Parisian citizen perceive that their Mayor Anne Hidalgo has already done a great job in increasing bicycle-paths. Nevertheless, there is still a long way to go. Also , what about motorcycles or scooters? Should not they also be allowed to have their own paths, in order to avoid dangerous situations in connection with cars or pedestrians? Or should they simply be allowed to use bicycle tracks? Would it be an idea to add a separated lane on the road, dedicated to motorcycles? These are questions that should be addressed during the FIA Smart Cities event in Paris. Finding solution propositions in this prospect could change the citizen's preferences regarding the transportation means they use regularly. This, on the other hand, could positively impact traffic congestion and public transportation crowdedness.

Based on the ranking, the third topic recommended to include in a Parisian FIA Smart Cities event is the following: **improving access to public transportation for disabled people**. The results of the survey showed, how complicated up to impossible it is for disabled people in Paris to use public transportations. Feedbacks from interviewees reflected, that this point is rarely addressed and therefore hardly present in their awareness. Some interviewees even expressed their shame and disbelieve regarding the ignorance of this minority in terms of public transportation. Before filling in the survey, many survey participants have rarely thought of this issue, as have been confirmed during the interviews. This shows, that if not confronted themselves with restrictions, people tend to forget that there are people who suffer of restrictions, in need of adapted solutions. This thesis recommends therefore strongly to include this topic in the FIA Smart Cities event, in order to raise awareness and address possible solutions in this prospect.

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1.	More regular and reliable public transportation connections	
	Decrease the crowdedness of public transportations	
2.	Safer two-wheeler paths	
3.	Improved access to public transportations for disabled people	

Source: Internal Document

Remembering the initial goal of the FIA Smart Cities Initiative: **drive the discussion around safer, better accessible and more sustainable mobility systems.** It can be quickly understood, that all three recommended topics match perfectly with the goal of the initiative. While the first and the last topic offer discussions about better accessible mobility systems the second topic focuses more on safety. For all three topics it is also possible to link the discussion in the direction of more sustainable mobility, offering the citizens enough space and access to the electric public transportation. Also, finding solutions for safer two-wheeler paths encourages citizens to use two-wheelers instead of four-wheelers, creating in general less pollution.

4.10.3 Event Structure Recommendations

4.10.3.1 Virtual vs. Physical Event

The researcher having had the opportunity to participate on a virtual FIA Smart Cities eForum, the main experiences of this event structure could be outlined in the FIA Smart Cities initiative analysis part. Some positive points linked to virtual events were highlighted, namely the reduced costs, increased reach and facility of participation. However, the majority of the experience was rather negative. Feedbacks of the

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researcher but also the interview participants included, that it is hard to stay focused on long virtual discussions and that participants have a hard time to feel integrated and engaged as the experience resembles more to watching a YouTube video. Also, the experience was rather quickly forgotten compared to a physical event. In addition, the entire networking part is rather challenging virtually.

In order to confirm or deny this statements based on the experience of the researcher, the survey and interviews addressed this topic as well. It could be found, that over 70% of Parisian citizens do not or not at all feel at ease participating a virtual event. Explanations of interviewees confirmed the experience of the researcher. As already mentioned earlier in the thesis, in order to attract millennials, experiences have to be created. As conclusion, this thesis suggests the FIA to continue holding the FIA Smart Cities events as physical events. In addition, however, digital communication such as live sessions explained more in detail in the communication recommendations, will be of value, enable end users who were not able to participate to still be part of the experience.

4.10.3.2 Entertainment and Animation

This thesis recommends to continue placing the discussions, conferences and debates on the above mentioned topics at the center of the event, including engaging mobility experts, public institutions and private organizations as speakers. Different animations and entertainment should then be built around these knowledge acquisition and solution searching sessions, elaborated below. This thesis, however, suggest some adaptions regarding the discussion sessions, in order to better include the general public. First of all, it is suggested to offer the flexibility to attendees to participate only on the panels and discussion they regard as important. This means, it is suggested to announce a clear planning of when and where exactly the discussions and panels are going to take place. This will allow to include very different kind of end users in the event, including the ones only interested in the discussions and panels and the ones particularly interested in the activities built around the exchange sessions. Another recommendation is, as explained more in detail in the part 4.1.2.2 FIA Smart Cities Global Startup Contest, to open up to the public the selection process of the startup contest. It can even be gone one step further and include the public in the decision making process, ensuring to choose the startup perceived as adding most value for the citizens. How they can be integrated will be explained in the next section.

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One main benefit of including the general public as participants on the FIA Smart Cities events is the possibility of gathering a lot of data from the mobility end users. In order to ensure extracting a maximum of opinions and point of views from the different participants, this thesis suggests to plan to include a maximum of exchange in the sessions. Since it is difficult to take time to ask the opinions on all of the participants, a more digital version of inclusion is suggested to be used. During the virtual eForum the participants had the opportunity to write their questions in a chat. It could be seen that a lot of questions were asked, showing that participants dare more easily to ask questions when not having them to ask in front of all the participants. Platforms such **Pigeonhole live** (www.pigeonholelive.com) allow just this in real life. Pigeonhole live is a website, allowing participants to easily connect and ask their questions virtually, not using more than their own smartphone. All the other participants are then able to see the asked questions, and can even vote for the most crucial ones. The person(s) holding the panel or discussion can then choose to answer to the most important questions (Pigeonhole Live 2020). The questions left out can then be answered after the event, allowing to keep in touch with the participants. But this is not all this platform offers. It also allows to gather a lot of crucial data and ensure the audience's attention by permitting to integrate the participants in the event. This is done through live Q&As and interactive quizzes, that can be transmitted live on the screen in order to encourage participation. The participant's attention can be quickly lost, especially in discussions during over 15 to 20 minutes. This is how to bring them back into the game, asking them their own opinion or estimation on something. The Q&As and interactive quizzes is also exactly how the FIA will be able to integrate the public in the decision making process of the startup contest.

Coming back to the above mentioned integration of entertainments and animation alongside the exchange sessions. Some primary research has been done in order to understand what mainly attracts Parisian citizens to events such as the FIA Smart Cities. The results showed, that most of the survey participants would appreciate seeing or even trying out some new innovations and futuristic technologies linked to smart mobility on a FIA Smart Cities event. Also the inclusion of topics such as clean and responsible mobility, road congestions and minorities seem attracting to many Parisians. When asking more detailed questions during interviews, the majority of respondents highlighted, that they feel attracted to events linking knowledge accumulation and

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experiences. This finding confirms the statement, that the Millennials' attention can be gathered by creating an experience.

These experiences, however, have to be well planned and implemented in order to reach the goal of attracting and retaining end users. This thesis therefore recommends to adapt the entertainment and animation to each FIA Smart Cities event and the contents chosen. In the case of Paris it will therefore be recommended to choose animations directly or indirectly related to the topics defined in the Content Recommendation part. In order to give an idea of how to link the entertainment and the topics, three animation suggestions per topic are going to be listed below. Those animations are also in line with the preferences of the Parisian citizens.

1. **More regular and reliable public transportation connections, including a decrease in the crowdedness of public transportations**

Escape train

In the idea of the current trend of escape games, a very attractive entertainment to offer on the FIA Smart Cities event is an escape train. This would ask to work in collaboration with an escape game company, such as for example escape hunt, the world leader on the escape games, travelling their games in the whole country of France (Escape Hunt 2020). This company has created several pop-up escape games, enabling them to move their escape rooms. Escape Hunt offers bespoke escape rooms, enabling to adapt escape games to fit any occasion. In order to be in the range of the topic, an escape game linked to public transportation should therefore be created. One escape game can take from 10 minutes to 45 minutes depending the degree of difficulty. In order to maximize participation, shorter escape games should be preferred.

Bus Burger

Another recommendation for the event structure is to include street food. When spending an entire day on an event, switching between discussions and animations, sooner or later attendees will become hungry. And what matches better an event such as the FIA Smart Cities than street food. In order to even better match the topic of public transportation, this thesis recommends to cooperate with bus restaurants such as the Parisian Bus Burger. The Bus Burger in Paris offers discovering the city riding a bus decorated as an American Dinner from the 70's. In addition, it is also possible to rent the

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bus burger for events, such as the FIA Smart Cities event. This will enable participants to eat in a nice atmosphere and at the same time might improve their opinion on the always delayed, crowded and dirty public transportations (Julie 2017). An image of the interior of the Bus Burger can be seen on *Figure 113.*

Figure 113, Interior of the Bus Burger

Source: Sortiraparis.com (Julie 2017)

Quiz and Games

The third recommendation regarding the topic of public transportations is to create a corner with several touch-screen tables, enabling attendees to participate on quizzes and games linked to public transportations. The participation on quizzes enabled the FIA at the same time to gather some data. There are several companies offering touch screen tables, either in the format of tables or of displays. One specialized company in this sector is TouchLay, who rents their TouchLay Nova model out for exhibitions and events (TouchLay 2020). A personalized example of the TouchLay Nova model is represented on *Figure 114.*

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Source: Touchlay.com (TouchLay 2020)

2. Safer two-wheeler paths

Two-Wheeler Simulators

The first animation recommended linked to the increase of two-wheeler safety is a motorcycle simulator. This simulator might provide real-life training experience for riders of motorcycles and allow laypersons to understand what it means to ride a bike. In order to create a challenge out of it, the simulator can be installed to ride an obstacle course and the best three riders of the day can be displayed besides. This animation allows the participants to have a fun experience, but also to increase awareness of the motorcycle drivers. An example of a motorcycle simulator can be seen on *Figure 115.*

Figure 115, Example of an motorcycle simulator

Source: Pinterest (Millward 2020)

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Road Safety Ambassadors

Another recommendation linked to the safety part of the topic, is to invite some of the ambassadors of the campaign road safety, presented in the communication part and organize an autograph and picture session, probably even including an interview with the ambassador. It can even be gone further and the ambassador can be asked to hold a short speech about road safety, including the safety of two-wheelers on Parisian roads. The chosen ambassador(s) should be well known and be important in the eyes of the target audience. A suggestion would therefore be to choose the French soccer player Antoine Griezmann, well known and admired by people of the target public.

Presentation of a new two-wheeler concept vehicle

A third recommendation linked to two-wheeler safety is the presentation of a new two-wheeler concept vehicle. This proposition allows the FIA Smart Cities participants to become aware of new, safer two-wheeler concepts. It also picks up the interests of Parisian citizens in new technologies and innovation, expressed in the survey. For this animation it is recommended to partner with a company, such as for example Wello. Wello has launched this year a solar-powered compact tricycle. This vehicle is a mix between a bicycle and an electric car, offering flexibility close to the one of a bicycle and the security and comfort close to the one of a car. It comes with a pair of conventional pedals, but also disposes of a build-in rechargeable battery and solar panels. This hybrid vehicle could therefore represent a nice alternative for commuters, also putting a focus on its environmental friendliness (Archipanic 2020). The image of the concept created by Wello can be seen on Figure 116.

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Figure 116, Concept vehicle of Wello

Source: Archipanic.com (Archipanic 2020)

3. Improved access to public transportations for disabled people

Obstacle course with wheelchairs

In order to increase the awareness on the challenges faced by people in wheelchairs, a recommendation in this topic is to include obstacle courses with wheel chairs. This activity will enable participants of the FIA Smart Cities event to get an insights in the challenges faced by people in wheel chairs. The idea is to create a path including different grounds and obstacles and letting the FIA Smart Cities attendants trying to overcome those obstacles. This activity has the idea to make Parisian residents aware of the difficulties. For this animation it is recommended to work together with the Association des paralysés de France (AFP). They have already participated on several events with similar activities (Trousselle 2016). An example of their booth on the salon "Autour du Handicap" in Granville can be seen on Figure 117.

Figure 117, Obstacles parcours "Autour du Handicap"

Source:Lamanchelibre.fr (Trousselle 2016)

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Presentation of Wheelchair Innovations

The second recommendation in terms of entertainment and animation linked to this topic is to present a new innovation in the field of wheelchairs. A wheelchair is one of the rare things that has not evolved a lot over the past years. Nevertheless, there are different innovations on the market linked to this topic. This thesis therefore recommends to collaborate with organizations in order to include some innovations in this aspect. An example of a project worthy to include in a FIA Smart Cities event is the Italsdesign's "Moby" project. This project is the first mobility service, similar to a bicycle sharing service, for wheelchairs. It enables people with lightweight and manual wheelchairs to facilitate travelling around a city (Italdesign 2019). A prototype picture of the "Moby" project of Italdesign is visualized on Figure 118.

Figure 118, Italdesign's "Moby" Project

Source: Italdesign.it (Italdesign 2019)

Dialogue in the Dark

The last recommendation in this section is to recreate a journey of a blind person for the attendees of the FIA Smart Cities event. This recommendation, based on the "dialogue in the dark" exhibition, should enable the participants to find orientation and move in the dark, to identify the world through the remaining senses and to generate trust and cope with the unknown. The organization "dialogue in the dark" offers to plan the layout and concept in order to enable enterprises to run their entire exhibition on their own. A collaboration with "dialogue in the dark" might therefore be of big value, enabling the

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participant to become aware of challenges faced by blind people (Dialogue Social Enterprise 2020).

If including different animations and entertainments such as the ones suggested above, it is still important to not forgetting to put a main focus on the discussions, debates and panels. An adequate location has to be found, where the implementation of the entertainment area as well as the conference hall is possible. The advantage offered on the virtual eForum, that people could attend only the discussions and debates they regard as interesting could therefore be maintained. The inclusion of a more children-focused corner with for example a playground or a carousel could on a further point allow to attract families.

The goal of the structural part is not only to offer interesting think tank and reflections on global mobility to its participants, but to give them a voice. A lot of survey respondents answered, that they do not feel integrated in the decision making process of the local government in terms of mobility and that they would appreciate a closer exchange. This one of the points offered by the new version of the FIA Smart Cities initiative. The interactive version of the discussions enable the participants to express their visions, ideas, feelings and suggestions in front of their public authorities, in short, make them feel important and valorized. But since most of the interviewees did not express a lot of excitement for an event offering only discussion sessions, the experience part has been added to the forum. This part enables to offer an event program mixed between fun experiences and interesting interactions, in brief offer an unforgettable day attracting a broad range of participants. The focus enables to include a wide range of public, going from a mobility fanatics to a family who wants to experience a great day, by learning some new points about the future of mobility. It is the choice of the participants to come to the FIA Smart Cities event with the idea to only participate the discussions, to only visit the experience part or to create a balanced mix between them both. What is for sure is that there will be something for every taste.

Since the creation of this kind of event can quickly become extremely time consuming and the knowledge of the local market is crucial, this thesis recommends to work together with an international event agency for the organization and implementation of the FIA Smart Cities event. More specifically for Paris but also on an international basis, this thesis recommends the FIA to go with the event agency Live ! by GL events, the world leader in events management. One of the big advantages of this agency is that they

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centralize all services of event management in one single group, having divisions in each player of the event industry such as design, audiovisual, furniture, event venues etc. This enables to facilitate the process for the FIA and allows for advantageous and competitive offers. But the main upside of this agency is, that they have already had the opportunity to collaborate with the FIA on the "E" days in 2019 on the occasion of the Formula E race in Paris. This means that they are already aware of the conditions of the FIA and have a knowledge on the Formula E races. Further information about the company can be found on their website: https://www.livebyglevents.com/.

4.10.4 Action Plan

The action plan of the implementation of the new FIA Smart Cities model of course has to be adapted to the evolution of the COVID-19 crisis. Keeping this in mind, this thesis recommends the FIA to take one year for preparing the totally restructured FIA Smart Cities initiative and to launch it in 2022. This gives the public some time recovering from the pandemic, since in 2021, no matter the evolution of the COVID-19 crisis, the grand public might still be very cautious with participating crowded events. Also, this offers the opportunity to use 2021 as experimental year, by including step by step some small changes in the B2B initiative, such as more interactive discussions or the opening up of the FIA Smart Cities Global Startup event. Then, it will also allow the FIA to announce and communicate the new version of the FIA Smart Cities initiative well in advance in order to create excitement in the grand public.

The launch of the FIA Smart Cities initiative opened up for the grand public needs to be impeccable. It needs to be well planned and implemented, because too many negative words spread at the beginning might represent the end of the initiative before it even really begun. Launching the event in 2022 also gives the opportunity to take enough time to negotiate contracts with possible future partners and sponsors and prepare similar strategies than the one for Paris outlined in this thesis for two other host cities. Staying with three official events per year seems as being correct, enabling the event to be hosted once in America, once in Europe and once in Asia, remaining with the three continents covered by the past events.

Furthermore, it is recommended to keep the connection to the Formula E series as one of the main diversification strategies, compared to other, similar events. Using the

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platform of Formula E not only enables the FIA Smart Cities initiative to access to their large participants base, but also to show the innovations used in the electric cars that might also be from value for the urban mobility. Furthermore, it enables to create emotions and enthusiasm for the participants, for example by continuing to include the shakedown of the Formal E race in the event schedule.

4.10.5 KPI's

In order to sustainably hold FIA Smart Cities events opened up for the public, the performance of the individual events have to be measured. There are a lot of different so called Key Performance Indicators (KPI's), helping to evaluate the success of an event. Some of the most crucial and highly recommended ones for the FIA Smart Cities initiative are going to be outlined below:

4.10.5.1 Event Attendance

To measure the attendance is one of the key metrics of any event. Before holding an FIA Smart Cities event, an estimation of event attendance should be conducted based on the advertising expenses, experience and the data gathered through the communication strategy. The goal of the 2000 to 4000 attendees should be kept in mind. The event attendance metric validates the expectations. Over time, it can then be observed which month and locations are the most successful of if the pre-event promotion was efficient. It also enables to do easier forecasts for coming events and understand quickly how realistic the target of 2000 to 4000 attendees was.

4.10.5.2 Attendee, Partner and Sponsor Satisfaction

The experience of the event participants is one of the most important factors deciding over success of failure of an event. Even if the target number of attendees, partners or sponsors have been reached, that does not mean that those people have been satisfied of the even. If the attendees are satisfied, they will spread a positive word of mouth of the event and associate the FIA Smart Cities initiative with a pleasant and exciting experience. If the sponsors and partners are satisfied, they will be willing to continue the path with the FIA's initiative and probably even increase their investment. In order to find out about the audience's overall experience of the event, a post-event surveys is recommended to being created, including simple scale-questions regarding their satisfaction. In addition, social media mentions about the event can be verified, and the

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sentiments of the comments measured. The emotions of the comments can also be compared to the ones before the event (Targosz 2018).

4.10.5.3 Social Media Engagement

In accordance with the social media communication strategy, this KPI addresses the customer engagement rate. Not only does this rate show how well the communication strategy works, but it is also an indicator for customer loyalty. Questions should be asked such as: How many attendees have used hashtags related to the FIA Smart Cities initiative? How many people shared images of videos from the event on social media? How many participants tagged the event location or FIA Smart Cities account in a picture or vides? Also the number of comments and likes on event post might be from interest as well as the number of people following a live tweet held by the FIA Smart Cities account during an event. The answers of those questions can than be compared over time, locations and events (Katz 2020).

4.10.5.4 Return on Investment (ROI)

This KPI enables to determine how much money needs to be generated in order to organize the FIA Smart Cities event. Currently, no entry fees are asked. It might be interesting to reflect on the idea to ask a small entry fee for B2C participants, taking into consideration the activities and entertainment offered. This decision might depend a lot on the additional investment of the new partners and sponsored, recommended to add to the current ones. The ROI therefore also helps to better define the investment needed from partners and sponsors. The return on investment is calculated by adding all the expenses of the event including the venue, food corner, speakers, promotion spending etc. and compare it to the financial benefits gained due to hosting this event.

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5. Conclusion

The aim of this thesis was to offer the Fédération Internationale de l'Automobile recommendations on how to include end users in their FIA Smart Cities initiative, based on the showcase city Paris. In order to well understand the FIA Smart Cities initiative the way it was up until now, this thesis gave an insight in each past FIA Smart Cities event. Based on this knowledge, already some assumptions and statements could be made. They were then analyzed based on a secondary and primary research. This enabled firstly, to confirm or deny the assumptions and statements and in a second step to elaborate and detail them.

At the same time the secondary research allowed to give a quite detailed insight into the showcase city Paris and its current strength and weaknesses. Based on this insight, 4 main pain points in terms of mobility and transportation of the city could be determined. The idea was then to verify the accuracy of these pain points by carrying out a primary research based on the opinions and perceptions of Parisian residents. While analyzing the results of the primary research it could be seen, that the four pain points defined based on the secondary research hit the nail on the head. Nevertheless, some of the pain points turned out to be much more urgent and important in the minds of Parisian residents compared to others. This analysis enabled to determine the topics and contents recommended to include in a FIA Smart Cities event hosted by Paris. Those recommendation will give the possibility to the FIA to address the topics perceived as the most urgent and important by Parisian citizens, creating huge incentives for them to participate the event and therefore ensuring a high participation rate.

The research not only enabled to define the most accurate topics to include in an FIA Smart Cities event in Paris, but also to recommend an appropriate communication strategy and the event structure. At the time being, the most urgent action the FIA has to take in order to ensure the inclusion of end consumers in their FIA Smart Cities initiative, is to create awareness of their event. The recommended communication strategy therefore includes the creation of an interactive Facebook and Instagram account. Those social media channels turned out to be to most effective ones, taking into consideration the defined target audience, showcase location, the reach of the initiative and the urgency of the subject. Several interaction strategies in order to create an active online community were recommended. Also the cooperation with influencers and ambassadors was recommended, in order to further raise awareness and attract

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end users to the FIA Smart Cities event. Finally, it was recommended to search for additional sponsoring and partnering contracts, based on the expansion of the audience.

As mentioned above, the analysis also enabled to recommend some topics around which the FIA Smart Cities event in Paris, particularly the discussions and debates, should be built. Those recommendations are based on the perceptions and opinions of Parisian citizens. The first of those topics included a solution for more regular and reliable public transportation connections and the linked decrease in the crowdedness of public transportations. The second topic suggested is the focus on safer two-wheeler paths and the third recommendation was to put a focus on how to improve the access to public transportation for disabled people.

Having recommended now how to rise and keep awareness on the FIA Smart Cities initiative and around which topic the Parisian event should be built, another controversial question pops up: should the event be hold virtually or physically. The results of the primary research enabled to give a clear answer to this question: Parisian citizens are not ready yet for virtual events and put still too much weight on the experience factor of an event. Therefore, this thesis recommended to turn back to physical events once the COVID-10 crisis has been tackled.

In order to ensure the broad and sustainable participation of the end users of mobility, however, the just mentioned experience factor needs to be ensured. Debates and discussions will stay the main part of the event, nevertheless, other attractions, entertainments and animations need to be offered in order to create a balance between knowledge acquisition and fun experiences. In this regard, different entertainment ideas have been recommended, going hand in hand with the three themes of the event: public transportation, two-wheeler road security and the integration of disabled people. Among others, the inclusion of escape games, two-wheeler simulators and new wheelchair innovations as part of the experience creation have been recommended.

It has been recommended to work together with an international event agency, in order to ensure a smooth execution of the event. Recommended has been the event agency Live! By GL due to their local market knowledge and centralization of event management services. Finally, an action plan and KPI's suggested will then enable the event to be sustainably successful.

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Bibliography Images

Section: 1.2 La Fédération Internationale de l'Automobile

Image	Location	Reference
	1.2.4 Structure	FIA, 2020. FIA Activity Report 2019. *Federation Internationale de l'Automobile* [online]. 15 April 2020. [Accessed 28 April 2020]. Available from: https://www.FIA.com/multimedia/publication/FIA-activity-report-2019
	Figure 3, Structure of the FIA by March 2020	FIA, 2020. FIA Activity Report 2019. *Federation Internationale de l'Automobile* [online]. 15 April 2020. [Accessed 28 April 2020]. Available from: https://www.FIA.com/multimedia/publication/FIA-activity-report-2019
	Figure 3, Structure of the FIA by March 2020	FIA, 2020. FIA Activity Report 2019. *Federation Internationale de l'Automobile* [online]. 15 April 2020. [Accessed 28 April 2020]. Available from: https://www.FIA.com/multimedia/publication/FIA-activity-report-2019
	Figure 3, Structure of the FIA by March 2020	FIA, 2020. FIA Activity Report 2019. *Federation Internationale de l'Automobile* [online]. 15 April 2020. [Accessed 28 April 2020]. Available from: https://www.FIA.com/multimedia/publication/FIA-activity-report-2019
	Figure 3, Structure of the FIA by March 2020	FIA, 2020. FIA Activity Report 2019. *Federation Internationale de l'Automobile* [online]. 15 April 2020. [Accessed 28 April 2020]. Available from: https://www.FIA.com/multimedia/publication/FIA-activity-report-2019
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	Figure 3, Structure of the FIA by March 2020	Stephane Dezerable - Head of CSR Fundraising and Strategic Alliances - Fédération Internationale de l'Automobile (FIA)	LinkedIn, 2020. [online]. [Accessed 30 June 2020]. Available from: https://ch.linkedin.com/in/stephanedezerable

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Image	Location	Reference
	Figure 3, Structure of the FIA by March 2020	*OESS & ESSYB alumni story - Kseniya Shvedova & Maria Strigunova*, 2018. [online]. [Accessed 30 June 2020]. Available from: https://www.youtube.com/watch?v=V7K4U28yJgY

Section: 1.4 FIA Smart Cities

Image	Location	Reference
MOVIN'ON	*Figure 7, The three main players of the smart mobility movement*	The Michelin Challenge Bibendum is now Movin'On, 2016. *Movin'On Summit* [online]. [Accessed 12 August 2020]. Available from: https://summit.movinonconnect.com/en/news/the-michelin-challenge-bibendum-is-now-movinon/
SMARTCITY EXPO WORLD CONGRESS	*Figure 7, The three main players of the smart mobility movement*	Smart City Expo World Congress 2020 | SMARTER-TOGETHER, [no date]. [online]. [Accessed 12 August 2020]. Available from: https://www.smarter-together.eu/events/smart-city-expo-world-congress-2020
SMARTMOBILITY WORLD CONGRESS	*Figure 7, The three main players of the smart mobility movement*	VALENTI, Ugo, 2017. Smart City Expo World Congress will focus on citizen empowerment and mobility. *Medium* [online]. 3 November 2017. [Accessed 12 August 2020]. Available from: https://medium.com/cities-the-future/smart-city-expo-world-congress-will-focus-on-citizen-empowerment-and-mobility-e4bfc4bb6b9c
RETAIL & BRAND EXPERIENCE WORLD CONGRESS	*Figure 7, The three main players of the smart mobility movement*	RBEWC, [no date]. Retail & Brand Experience World Congress | RBEWC. [online]. [Accessed 12 August 2020]. Available from: https://retailandbrandexperience.com/

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Image	Location	Reference
	Figure 7, The three main players of the smart mobility movement	ITS - Europe (@ERTICO) / Twitter, [no date]. *Twitter* [online]. [Accessed 12 August 2020]. Available from: https://twitter.com/ertico

Section: 1.4.1 Goal of the FIA Smart Cities Initiative

Image	Location	Reference
	Figure 8, The 3 pillars of the FIA Smart Cities initiative	FIA, 2020. FIA Activity Report 2019. *Federation Internationale de l'Automobile* [online]. 15 April 2020. [Accessed 28 April 2020]. Available from: https://www.FIA.com/multimedia/publication/FIA-activity-report-2019
	Figure 8, The 3 pillars of the FIA Smart Cities initiative	FIA, 2020. FIA Activity Report 2019. *Federation Internationale de l'Automobile* [online]. 15 April 2020. [Accessed 28 April 2020]. Available from: https://www.FIA.com/multimedia/publication/FIA-activity-report-2019
	Figure 8, The 3 pillars of the FIA Smart Cities initiative	FIA, 2020. FIA Activity Report 2019. *Federation Internationale de l'Automobile* [online]. 15 April 2020. [Accessed 28 April 2020]. Available from: https://www.FIA.com/multimedia/publication/FIA-activity-report-2019

Section: 1.4.2 Partners

Image	Location	Reference
	1.4.2.1 ABB FIA Formula E Champtionship	FIA, 2020. Das offizielle Zuhause der Formula E. *FIA Formula E* [online]. 2020. [Accessed 30 June 2020]. Available from: http://www.fiaformulae.com/de/
	1.4.2.2 ABB	ABB, [no date]. ABB Konzern ABB Sace S. p.Ein. Brand Logo Produkt - abb Elektro - Unlimited Download. cleanpng.com. *cleanpng.com* [online]. [Accessed 30 June 2020]. Available from: https://de.cleanpng.com/png-cpim80/

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Image	Location	Reference
Julius Bär	1.4.2.3 Julius Bär	Datei:Julius Bär Logo.svg, [no date]. *Wikipedia* [online]. [Accessed 30 June 2020]. Available from: https://de.wikipedia.org/wiki/Datei:Julius_B%C3%A4r_Logo.svg
MICHELIN	1.4.2.4 Michelin	Michelin, 2020. *Wikipedia* [online]. [Accessed 30 June 2020]. Available from: https://de.wikipedia.org/w/index.php?title=Michelin&oldid=201004466
MC MASSCHALLENGE	1.4.2.5 MassChallenge	More than just an accelerator, [no date]. [online]. [Accessed 30 June 2020]. Available from: https://masschallenge.org/

Section: 2.2.4 Season 4, 2020

Image	Location	Reference
	Table 1, Initial planning of the FIA Smart Cities season 4	Paris again named world's top destination for international meetings, [no date]. [online]. [Accessed 15 August 2020]. Available from: https://www.eturbonews.com/572149/paris-again-named-worlds-top-destination-for-international-meetings/
	Table 1, Initial planning of the FIA Smart Cities season 4	Seoul, South Korea, 2020. *WFUNA - World Federation of United Nations Associations* [online]. [Accessed 15 August 2020]. Available from: https://wfuna.org/wimun/seoul-south-korea
	Table 1, Initial planning of the FIA Smart Cities season 4	The Results Are In: The Mansion Tax Has New York City Real Estate Sales Plummeting, [no date]. [online]. [Accessed 15 August 2020]. Available from: https://www.forbes.com/sites/alyyale/2019/10/02/the-results-are-in-the-mansion-tax-has-nyc-real-estate-sales-plummeting/#4de2a7ed343c
	Table 1, Initial planning of the FIA Smart Cities season 4	Seven reasons why London will thrive regardless of Brexit, 2020. *CityAM* [online]. [Accessed 15 August 2020]. Available from: https://www.cityam.com/seven-reasons-why-london-will-thrive-regardless-of-brexit/

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Section: 2.2.5.1 FIA Smart Cities Digital Forum 2020

Image	Location	Reference
	Table 4, FIA Smart Cities Digital Forums 2020	FIA, 2020ad. *FIA Smart Cities Plan for 2020*. 2020.
	Table 4, FIA Smart Cities Digital Forums 2020	FIA, 2020ad. *FIA Smart Cities Plan for 2020*. 2020.
	Table 4, FIA Smart Cities Digital Forums 2020	FIA, 2020ad. *FIA Smart Cities Plan for 2020*. 2020.

Section: 2.2.5.2 FIA Smart Cities Digital Global Startup Contest 2020

Image	Location	Reference
	Table 5, FIA Smart Cities Digital Global Startup Contest 2020	Latest European Newspaper Lists online, [no date]. *Latest European Newspaper Lists online* [online]. [Accessed 30 June 2020]. Available from: https://newspaperlists.com/europe
	Table 5, FIA Smart Cities Digital Global Startup Contest 2020	Flag map Asia | Asia, Asian flags, Asia map, [no date]. *Pinterest* [online]. [Accessed 30 June 2020]. Available from: https://www.pinterest.com/pin/409123947370417913/
	Table 5, FIA Smart Cities Digital Global Startup Contest 2020	Kuba Lizenzfreie Bilder Und Fotos Kaufen - 123RF, [no date]. *123RF Stock Photos* [online]. [Accessed 30 June 2020]. Available from: https://de.123rf.com/lizenzfreie-bilder/kuba.html

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Image	Location	Reference
	Table 5, FIA Smart Cities Digital Global Startup Contest 2020	fluctuo (@fluctuo) / Twitter, [no date]. *Twitter* [online]. [Accessed 30 June 2020]. Available from: https://twitter.com/fluctuo
	Table 5, FIA Smart Cities Digital Global Startup Contest 2020	*Aurassure - Platform for Environmental Awareness*, 2018. [online]. [Accessed 30 June 2020]. Available from: https://www.youtube.com/watch?v=6bitlR4CINE
	Table 5, FIA Smart Cities Digital Global Startup Contest 2020	Home	INMOTION GROUP, [no date]. [online]. [Accessed 15 August 2020]. Available from: https://www.i-g.co/
	Table 5, FIA Smart Cities Digital Global Startup Contest 2020	COMMUTIFY, [no date]. MUNICIPALITY. *commutifi* [online]. [Accessed 15 August 2020]. Available from: http://www.commutifi.com/municipality

Section: 2.2.5.3 FIA Smart Cities Voices

Image	Location	Reference
	Table 6, FIA Smart Cities Voices Agenda 2020	Carlos Moreno - Keynote Speaker, [no date]. *London Speaker Bureau* [online]. [Accessed 30 June 2020]. Available from: https://londonspeakerbureau.com/speaker-profile/carlos-moreno/

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Image	Location	Reference
	Table 6, FIA Smart Cities Voices Agenda 2020	PAPE, Timo, [no date]. Mercedes-Teamchef James im Exklusiv-Interview: Konkurrenz mit Audi & Co. "für den Sport nur förderlich." *e-Formel.de* [online]. [Accessed 30 June 2020]. Available from: http://www.e-formel.de/
	Table 6, FIA Smart Cities Voices Agenda 2020	Ali Izadi-Najafabadi, [no date]. *Generation E HQ* [online]. [Accessed 30 June 2020]. Available from: https://generationehq.com/speakers/ali-izadi-najafabadi/

Section: 5.2.2 IESE Cities in Motion Index

Image	Location	Reference
	5.3.1 Human Capital	BERRONE, Pascual, RICART, Joan Enric, DUCH, Ana and CARRASCO, Carlos, 2019. *IESE Cities in Motion Index 2019* [online]. Servicio de Publicaciones de la Universidad de Navarra. [Accessed 22 March 2020]. Available from: https://www.ieseinsight.com/fichaMaterial.aspx?pk=154263&idi=2&origen=3
	Figure 41, Education and Culture in Paris, Education	University School Svg, [no date]. *OnlineWebFonts.COM* [online]. [Accessed 30 June 2020]. Available from: https://www.onlinewebfonts.com/icon/465559
	Figure 41, Education and Culture in Paris, Education	Museum Icon Png #258981 - Free Icons Library, [no date]. [online]. [Accessed 30 June 2020]. Available from: https://icon-library.com/icon/museum-icon-png-0.html
	5.3.2 Social Cohesion	BERRONE, Pascual, RICART, Joan Enric, DUCH, Ana and CARRASCO, Carlos, 2019. *IESE Cities in Motion Index 2019* [online]. Servicio de Publicaciones de la Universidad de Navarra. [Accessed 22 March 2020]. Available from: https://www.ieseinsight.com/fichaMaterial.aspx?pk=154263&idi=2&origen=3
	Figure 42, Social Cohesion in Paris	STALL, Creative, [no date]. "Business Management and Growth" by Creative Stall. *Iconfinder* [online]. [Accessed 30 June 2020]. Available from: https://www.iconfinder.com/icons/1978692/coherence_hands_social_social_cohesion_social_media_icon

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	5.3.3 Economy	BERRONE, Pascual, RICART, Joan Enric, DUCH, Ana and CARRASCO, Carlos, 2019. *IESE Cities in Motion Index 2019* [online]. Servicio de Publicaciones de la Universidad de Navarra. [Accessed 22 March 2020]. Available from: https://www.ieseinsight.com/fichaMaterial.aspx?pk=154263&idi=2&origen=3
	Figure 43, Economy in Paris	V, Siwat, [no date]. "Economy" by Siwat V. *Iconfinder* [online]. [Accessed 1 July 2020]. Available from: https://www.iconfinder.com/icons/308057/economy_exchange_rate_finance_financial_international_world_economic_world_economy_icon
	5.3.4 Governance	BERRONE, Pascual, RICART, Joan Enric, DUCH, Ana and CARRASCO, Carlos, 2019. *IESE Cities in Motion Index 2019* [online]. Servicio de Publicaciones de la Universidad de Navarra. [Accessed 22 March 2020]. Available from: https://www.ieseinsight.com/fichaMaterial.aspx?pk=154263&idi=2&origen=3
	Figure 44, Governance in Paris	Corporate Governance Icon of Line style - Available in SVG, PNG, EPS, AI & Icon fonts, [no date]. [online]. [Accessed 1 July 2020]. Available from: https://iconscout.com/icon/corporate-governance-2166412
	5.3.5 Environment	BERRONE, Pascual, RICART, Joan Enric, DUCH, Ana and CARRASCO, Carlos, 2019. *IESE Cities in Motion Index 2019* [online]. Servicio de Publicaciones de la Universidad de Navarra. [Accessed 22 March 2020]. Available from: https://www.ieseinsight.com/fichaMaterial.aspx?pk=154263&idi=2&origen=3
	Figure 45, Environment in Paris	WENDPAP, Alex, [no date]. "Education Set #2" by Alex Wendpap. *Iconfinder* [online]. [Accessed 2 July 2020]. Available from: https://www.iconfinder.com/icons/240164/environment_environmental_classes_environmental_sciences_icon
	5.3.6 Urban Planning	BERRONE, Pascual, RICART, Joan Enric, DUCH, Ana and CARRASCO, Carlos, 2019. *IESE Cities in Motion Index 2019* [online]. Servicio de Publicaciones de la Universidad de Navarra. [Accessed 22 March 2020]. Available from: https://www.ieseinsight.com/fichaMaterial.aspx?pk=154263&idi=2&origen=3

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	Figure 46, Urban Planning in Paris	Computer Icons Building Urban planning, building, building, text png | PNGEgg, [no date]. [online]. [Accessed 6 July 2020]. Available from: https://www.pngegg.com/en/png-tbbbh
	5.3.7 International Oureach	BERRONE, Pascual, RICART, Joan Enric, DUCH, Ana and CARRASCO, Carlos, 2019. *IESE Cities in Motion Index 2019* [online]. Servicio de Publicaciones de la Universidad de Navarra. [Accessed 22 March 2020]. Available from: https://www.ieseinsight.com/fichaMaterial.aspx?pk=154263&idi=2&origen=3
	Figure 47, International Outreach of Paris	Internationale Lieferung kostenlose Vektor-Icons entworfen von Freepik, [no date]. *Flaticon* [online]. [Accessed 6 July 2020]. Available from: https://www.flaticon.com/de/kostenloses-icon/internationale-lieferung_45924
	5.3.8 Technology	BERRONE, Pascual, RICART, Joan Enric, DUCH, Ana and CARRASCO, Carlos, 2019. *IESE Cities in Motion Index 2019* [online]. Servicio de Publicaciones de la Universidad de Navarra. [Accessed 22 March 2020]. Available from: https://www.ieseinsight.com/fichaMaterial.aspx?pk=154263&idi=2&origen=3
	Figure 48, Technology in Paris	innovation - Kostenlose technologie Icons, [no date]. [online]. [Accessed 6 July 2020]. Available from: https://www.flaticon.com/de/premium-icon/innovation_900967
	5.3.9 Mobility and Transportation	BERRONE, Pascual, RICART, Joan Enric, DUCH, Ana and CARRASCO, Carlos, 2019. *IESE Cities in Motion Index 2019* [online]. Servicio de Publicaciones de la Universidad de Navarra. [Accessed 22 March 2020]. Available from: https://www.ieseinsight.com/fichaMaterial.aspx?pk=154263&idi=2&origen=3
	Figure 50, Mobility and Transportation in Paris	PORT, icon, [no date]. "Real Estate Bold 4" by icon port. *Iconfinder* [online]. [Accessed 8 July 2020]. Available from: https://www.iconfinder.com/icons/3583731/car_mobility_order_phone_smart_taxi_transport_icon

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Section: 5.2.4 Mobility in Paris

Image	Location	Reference
	Figure 66, Main Mobility Issues in Paris	BERRONE, Pascual, RICART, Joan Enric, DUCH, Ana and CARRASCO, Carlos, 2019. *IESE Cities in Motion Index 2019* [online]. Servicio de Publicaciones de la Universidad de Navarra. [Accessed 22 March 2020]. Available from: https://www.ieseinsight.com/fichaMaterial.aspx?pk=154263&idi=2&origen=3
	Figure 66, Main Mobility Issues in Paris	traffic jam icon - Google Search, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.google.com/search?q=traffic+jam+icon&safe=strict&client=firefox-b-d&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjkvYnfwaXrAhWq-ioKHaR-BQUQ_AUoAXoECAwQAw&biw=1235&bih=675&dpr=1.76#imgrc=KaWOWWwwHTjX9M
	Figure 66, Main Mobility Issues in Paris	transport, Bus, Public transport, traveling, vehicle, train icon, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.shareicon.net/transport-bus-public-transport-traveling-vehicle-train-644468
	Figure 66, Main Mobility Issues in Paris	Video Camera Device Security Saftey - Smart Security Camera Icon, HD Png Download - kindpng, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.kindpng.com/imgv/ixTmbxo_video-camera-device-security-saftey-smart-security-camera/

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Section: 4.3 User Journeys

Image	Location	Reference
	4.3 User Journey	Sedan Car Front free vector icons designed by Freepik, [no date]. Flaticon [online]. [Accessed 18 August 2020]. Available from: https://www.flaticon.com/free-icon/sedan-car-front_48688
	4.3 User Journey	Datei:USDOT highway sign bicycle symbol - black.svg, [no date]. *Wikipedia* [online]. [Accessed 18 August 2020]. Available from: https://de.wikipedia.org/wiki/Datei:USDOT_highway_sign_bicycle_symbol_-_black.svg
	4.3 User Journey	The Noun Project, [no date]. *The Noun Project* [online]. [Accessed 18 August 2020]. Available from: https://thenounproject.com/term/metro-train/861464/
	Figure 77, User Journey by car	Free Work icon	Flaticon, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.flaticon.com/free-icon/work_835939
	Figure 77, User Journey by car	STALL, Creative, [no date]. "Hotel and Restaurant 1" by Creative Stall. *Iconfinder* [online]. [Accessed 18 August 2020]. Available from: https://www.iconfinder.com/icons/2927758/car_park_spot_car_parking_parked_car_parking_lot_parking_ticket_icon
	Figure 77, User Journey by car	Vector Illustration Of Law Enforcement Police Office - Polizei Strafzettel Clipart, HD Png Download - 470x700 (#2856454) - PinPng, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.pinpng.com/picture/iToohbh_vector-illustration-of-law-enforcement-police-office-polizei/
	Figure 77, User Journey by car	Happy male driver rides car driving trip taxi vector image on VectorStock, [no date]. *VectorStock* [online]. [Accessed 18 August 2020]. Available from: https://www.vectorstock.com/royalty-free-vector/happy-male-driver-rides-car-driving-trip-taxi-vector-20656610
	Figure 77, User Journey by car	Gas Station Color Icons Set - Download Free Vectors, Clipart Graphics & Vector Art, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.vecteezy.com/vector-art/466798-gas-station-color-icons-set
	Figure 77, User	Things you can do while you stuck in Traffic Jam	AllizHealth, [no date]. [online].

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	Journey by car	[Accessed 18 August 2020]. Available from: https://blogs.allizhealth.com/things-can-stuck-traffic-jam/
	Figure 77, User Journey by car	Asustado Conducir: Imágenes, fotos de stock y vectores | Shutterstock, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.shutterstock.com/es/search/asustado+conducir?ref_site=photo&version=llv1&anyorall=all&use_local_boost=1&show_color_wheel=1&media_type=images&inline=192062309
	Figure 77, User Journey by car	Free No Parking Cliparts, Download Free Clip Art, Free Clip Art on Clipart Library, [no date]. [online]. [Accessed 18 August 2020]. Available from: http://clipart-library.com/no-parking-cliparts.html
	Figure 77, User Journey by car	Road Closed Barricade Stock Illustrations – 1,470 Road Closed Barricade Stock Illustrations, Vectors & Clipart - Dreamstime, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.dreamstime.com/illustration/road-closed-barricade.html
	Figure 77, User Journey by car	Free Parked Cars Cliparts, Download Free Clip Art, Free Clip Art on Clipart Library, [no date]. [online]. [Accessed 18 August 2020]. Available from: http://clipart-library.com/parked-cars-cliparts.html
	Figure 77, User Journey by car	Happy Rich Parking Disc Cartoon Character With Money Bag Stock Vector - Illustration of plaik, bezahlen: 168971228, [no date]. *Dreamstime* [online]. [Accessed 18 August 2020]. Available from: https://www.dreamstime.com/happy-rich-parking-disc-cartoon-character-money-bag-happy-rich-parking-disc-cartoon-character-money-bag-vector-image168971228
	Figure 77, User Journey by car	Businessman enter open door concept | Premium Vector, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.freepik.com/premium-vector/businessman-enter-open-door-concept_2734272.htm

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	Figure 78, User Journey by bicycle	Bicycle Parking With Two Bicycles, Simple Flat Illustration. Vector. Stock Illustration - Illustration of illustration, parking: 107916271, [no date]. *Dreamstime* [online]. [Accessed 18 August 2020]. Available from: https://www.dreamstime.com/bicycle-parking-two-bicycles-simple-flat-illustration-vector-bicycle-parking-two-bicycles-simple-flat-illustration-image107916271
	Figure 78, User Journey by bicycle	Bicycle Theft PNG and Bicycle Theft Transparent Clipart Free Download. - CleanPNG / KissPNG, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.cleanpng.com/free/bicycle-theft.html
	Figure 78, User Journey by bicycle	Bicycle Helmet Motorcycle Helmet Clip Art - Bike Helmet Clipart - Free Transparent PNG Clipart Images Download, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.clipartmax.com/middle/m2i8K9H7b1i8m2N4_bicycle-helmet-motorcycle-helmet-clip-art-bike-helmet-clipart/
	Figure 78, User Journey by bicycle	Girl riding bike Clipart	+1,566,198 clip arts, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.clipartlogo.com/istock/girl-riding-bike-1528457.html
	Figure 78, User Journey by bicycle	Bicycle Accident Vektorgrafiken, Cliparts Und Illustrationen Kaufen - 123RF, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://de.123rf.com/clipart-vector/bicycle_accident.html?sti=ngvgok03uh1e4rlu7g l
	Figure 78, User Journey by bicycle	Speech balloon Thought Bubble, Online Thinking s, love, comics, white png	PNGWing, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.pngwing.com/en/free-png-zmdos
	Figure 78, User Journey by bicycle	Worried Man Vector Stock Illustrations – 4,977 Worried Man Vector Stock Illustrations, Vectors & Clipart - Dreamstime, [no date]. *Worried Man Vector Stock Illustrations – 4,977 Worried Man Vector Stock Illustrations, Vectors & Clipart - Dreamstime* [online]. [Accessed 18 August 2020]. Available from: https://www.dreamstime.com/illustration/worried-man-vector.html

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	Figure 78, User Journey by bicycle	Funny boy in blue shirt washing face cartoon Vector Image, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.vectorstock.com/royalty-free-vector/funny-boy-in-blue-shirt-washing-face-cartoon-vector-27005325
	Figure 78, User Journey by bicycle	Broken Bike Cartoon Stock Illustrations – 79 Broken Bike Cartoon Stock Illustrations, Vectors & Clipart - Dreamstime, [no date]. *Broken Bike Cartoon Stock Illustrations – 79 Broken Bike Cartoon Stock Illustrations, Vectors & Clipart - Dreamstime* [online]. [Accessed 18 August 2020]. Available from: https://www.dreamstime.com/illustration/broken-bike-cartoon.html
	Figure 78, User Journey by bicycle	Furious Driver Stock Illustrations – 185 Furious Driver Stock Illustrations, Vectors & Clipart - Dreamstime, [no date]. *Furious Driver Stock Illustrations – 185 Furious Driver Stock Illustrations, Vectors & Clipart - Dreamstime* [online]. [Accessed 18 August 2020]. Available from: https://www.dreamstime.com/illustration/furious-driver.html
	Figure 78, User Journey by bicycle	INC, Depositphotos, [no date]. Voitures particulières dans l'illustration du vecteur ville. *Depositphotos* [online]. [Accessed 18 August 2020]. Available from: https://fr.depositphotos.com/231544962/stock-illustration-road-traffic-cars-urban-street.html
	Figure 78, User Journey by bicycle	Bicycle PNG Images	Vector and PSD Files	Free Download on Pngtree, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://pngtree.com/so/bicycle
	Figure 79, User Journey by the metro	Comment - Clipart Go For A Walk - Png Download (#1416685) - PinClipart, [no date]. *PinClipart.com* [online]. [Accessed 18 August 2020]. Available from: https://www.pinclipart.com/pindetail/boxioJ_comment-clipart-go-for-a-walk-png-download/
	Figure 79, User Journey by the metro	BEHANCE, [no date]. Navigo · Illustration&Design. *Behance* [online]. [Accessed 18 August 2020]. Available from: https://www.behance.net/gallery/67635301/Navigo-Illustration-Design

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	Figure 79, User Journey by the metro	Amazon.com: Divine Designs Simple Cold Hard Cash in Money Sack Cartoon Vinyl Decal Sticker (12" Tall): Automotive, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.amazon.com/Simple-Money-Cartoon-Vinyl-Sticker/dp/B075Q2MF9D
	Figure 79, User Journey by the metro	Cartoons - China Daily - Opinion - Chinadaily.com.cn, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.chinadaily.com.cn/opinion/cartoon/index_11.html
	Figure 79, User Journey by the metro	Top 8 Factors Determining Train Punctuality in India | RailMitra Blog, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.railmitra.com/blog/top-8-factors-determining-train-punctuality-in-india
	Figure 79, User Journey by the metro	TLEWINSON, [no date]. 'The Commute' … An Illustration By Michele Melcher, As Featured In Creative Quarterly – RideShark. [online]. [Accessed 18 August 2020]. Available from: https://www.rideshark.com/2017/03/28/thecommuteillustration/
	Figure 79, User Journey by the metro	Pickpocket trying to steal money from smiling man vector image on VectorStock, [no date]. *VectorStock* [online]. [Accessed 18 August 2020]. Available from: https://www.vectorstock.com/royalty-free-vector/pickpocket-trying-to-steal-money-from-smiling-man-vector-14240306
	Figure 79, User Journey by the metro	Bad Smell Cartoon Stock Illustrations – 593 Bad Smell Cartoon Stock Illustrations, Vectors & Clipart - Dreamstime, [no date]. *Bad Smell Cartoon Stock Illustrations – 593 Bad Smell Cartoon Stock Illustrations, Vectors & Clipart - Dreamstime* [online]. [Accessed 18 August 2020]. Available from: https://www.dreamstime.com/illustration/bad-smell-cartoon.html

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Image	Location	Reference
	Figure 79, User Journey by the metro	Getting Off Train: Imágenes, fotos de stock y vectores | Shutterstock, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.shutterstock.com/es/search/getting+off+train
	Figure 79, User Journey by the metro	Ilustraciones, imágenes y vectores de stock sobre Car Window Crack | Shutterstock, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.shutterstock.com/es/search/car+window+crack?image_type=illustration&category=People&original_query=spray%20designe%20for%20textile%20printing

Section 4.9 Ranking

Image	Location	Reference
	Table 19, Topic recommendations	Drapeau de Paris, 2020. *Wikipédia* [online]. [Accessed 18 August 2020]. Available from: https://fr.wikipedia.org/w/index.php?title=Drapeau_de_Paris&oldid=171198145
	Table 19, Topic recommendations	Computer Exchangesymbol Flache Grafik Design Stock Vektor Art und mehr Bilder von Icon - iStock, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.istockphoto.com/de/vektor/computer-exchange-symbol-flache-grafik-design-gm506245502-84123075
	Table 19, Topic recommendations	person icon | EIT RawMaterials, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://eitrawmaterials.eu/clc-location/clc-west/person-icon/
	Table 19, Topic recommendations	Smart transportation vector icon. Online transport system icon for..., [no date]. *iStock* [online]. [Accessed 18 August 2020]. Available from: https://www.istockphoto.com/de/vektor/intelligentes-transportvektorsymbol-online-transport-system-symbol-f%C3%BCr-web-mobile-gm1186712141-334931315
	Table 19, Topic recommendations	Crowded Icon of Glyph style - Available in SVG, PNG, EPS, AI & Icon fonts, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://iconscout.com/icon/crowded-1649507

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	Table 19, Topic recommendations	ZIRSOLOSTUDIO, [no date]. "Bicycle outline" by ZIRSOLOSTUDIO. *Iconfinder* [online]. [Accessed 18 August 2020]. Available from: https://www.iconfinder.com/icons/3179973/bicycle_bike_lane_road_way_icon
	Table 19, Topic recommendations	Motorbike icon simple style vector image on VectorStock, [no date]. *VectorStock* [online]. [Accessed 18 August 2020]. Available from: https://www.vectorstock.com/royalty-free-vector/motorbike-icon-simple-style-vector-9795997
	Table 19, Topic recommendations	Icon person disabled vector image on VectorStock, [no date]. *VectorStock* [online]. [Accessed 18 August 2020]. Available from: https://www.vectorstock.com/royalty-free-vector/icon-person-disabled-vector-19076980
	Table 19, Topic recommendations	The Noun Project, [no date]. *The Noun Project* [online]. [Accessed 18 August 2020]. Available from: https://thenounproject.com/term/cleanliness/336969/
	Table 19, Topic recommendations	Vianch Group – The Global Business, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.vianchgroup.com/
	Table 19, Topic recommendations	BUCHARSKII, Iurii, [no date]. "Electric car" by Iurii Bucharskii. *Iconfinder* [online]. [Accessed 18 August 2020]. Available from: https://www.iconfinder.com/icons/4012728/car_electric_ev_vehicle_icon
	Table 19, Topic recommendations	DONUT, Plastic, [no date]. "Transport" by Plastic Donut. *Iconfinder* [online]. [Accessed 18 August 2020]. Available from: https://www.iconfinder.com/icons/2135409/auto_congestion_jam_queue_road_traffic_transport_icon
	Table 19, Topic recommendations	Free Parked Car icon	Flaticon, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.flaticon.com/free-icon/parked-car_75905
	Table 19, Topic recommendations	Personal protection, personal safety, personal security, team safety, team security icon, [no date]. [online]. [Accessed 18 August 2020]. Available from: https://www.iconfinder.com/icons/3900106/personal_protection_personal_safety_personal_security_team_safety_team_security_icon

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Image	Location	Reference
	Table 19, Topic recommend ations	Shipping Mark Guide, [no date]. *Freight Filter* [online]. [Accessed 18 August 2020]. Available from: http://freightfilter.com/shipping-mark-guide/

Section: 4.10.1.3 Ambassadors

Image	Location	Reference
	Figure 111, Recommen ded ambassador s	H.S.H. Princess Charlène of Monaco and Charles Leclerc join the #3500LIVES Global Road Safety Campaign, 2019. *Federation Internationale de l'Automobile* [online]. [Accessed 16 August 2020]. Available from: https://www.fia.com/news/hsh-princess-charlene-monaco-and-charles-leclerc-join-3500lives-global-road-safety-campaign
	Figure 111, Recommen ded ambassador s	#3500LIVES campaign: global celebrities unite to urge personal and political action for safer roads, [no date]. *Fia Foundation* [online]. [Accessed 16 August 2020]. Available from: https://www.fiafoundation.org/blog/2017/march/3500lives-campaign-global-celebrities-unite-to-urge-personal-and-political-action-for-safer-roads
	Figure 111, Recommen ded ambassador s	FIA, 2020. The VINCI Autoroutes Foundation supports the FIA #3500LIVES campaign | Federation Internationale de l'Automobile. [online]. 2020. [Accessed 16 August 2020]. Available from: https://www.fia.com/news/vinci-autoroutes-foundation-supports-fia-3500lives-campaign

Section: 4.10.1.4 Partnerships and Sponsoring

Image	Location	Reference
	Figure 112, Recommend ed partnerships and sponsoring	Pin by Tiffany Yeager on Dry Erase | Bull logo, Red bull, Red logo design, [no date]. [online]. [Accessed 16 August 2020]. Available from: https://www.pinterest.ch/pin/550987335653887161/

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	Figure 112, Recommended partnerships and sponsoring	File:General Electric logo.svg, [no date]. *Wikipedia* [online]. [Accessed 16 August 2020]. Available from: https://en.wikipedia.org/wiki/File:General_Electric_logo.svg
	Figure 112, Recommended partnerships and sponsoring	Nike Bought "Swoosh" Logo For $35 - Business Insider, [no date]. [online]. [Accessed 16 August 2020]. Available from: https://www.businessinsider.com/nike-bought-swoosh-logo-for-35-2014-7?r=US&IR=T
	Figure 112, Recommended partnerships and sponsoring	Microsoft, [no date]. [online]. [Accessed 16 August 2020]. Available from: https://www.shure.com/en-US/about-us/partners/microsoft
	Figure 112, Recommended partnerships and sponsoring	Fashion Innovation Week, [no date]. *Fashion Innovation Week* [online]. [Accessed 16 August 2020]. Available from: https://fashioninnovationweek.ch

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Appendices

Appendix 1: FIA Structure by March 2020

PRESIDENT
Jean Todt

DEPUTY PRESIDENT SPORT
Graham Stoker

SENATE PRESIDENT
Brian Gibbons

DEPUTY PRESIDENT MOBILITY
Thierry Willermarck

CABINET
Xavier Malenfer
Paris

COMMUNICATIONS
Olivier Fisch
Paris

COMPLIANCE
Paolo Basarri
Geneva

FIA INNOVATION FUND
Onika Miller
Paris

SECRETARY GENERAL FOR MOTOR SPORT
Peter Bayer
Geneva

OPERATIONS MANAGEMENT
Bruno Famin
Geneva

CIK
Kay Oberheide
Geneva

DEVELOPMENT
Sandra Costa-Marini
Geneva

FE / INNOVATIVE SPORT ACTIVITIES
Frédéric Bertrand
Geneva

HISTORIC / OFF-ROAD / HILL CLIMB
Vincent Caro
Geneva

RALLY
Yves Matton
Geneva

SAFETY & MEDICAL
Adam Baker
Geneva

SINGLE-SEATER
TBC

SPORT AND TOURING CARS
Marek Nawarecki
Geneva

TECHNICAL
Gilles Simon
Geneva

F1 FINANCIAL REGULATIONS
Federico Lodi
Geneva

CHIEF ADMINISTRATIVE OFFICER
Jean-Baptiste Pinton
Geneva

ACCOUNTING & FINANCE
Stéphane Vuillermoz
Geneva

COMMERCIAL LEGAL AFFAIRS
Edward Floydd
Geneva

CONFERENCES & GENERAL SERVICES PARIS
Florence Woerth
Paris

GOVERNANCE, INTEGRITY & REGULATORY AFFAIRS
Pierre Ketterer
Geneva

F1 FINANCIAL REGULATIONS
Federico Lodi
Geneva

HUMAN RESOURCES & TRANSLATION
Julie Legendre
Geneva

IT
François Lisbona
Geneva

MARKETING & EVENTS
Alexandre Gueschir
Geneva

PROCUREMENT & SERVICES
Karine Brosse
Geneva

SECRETARY GENERAL FOR AUTOMOBILE MOBILITY AND TOURISM
Andrew McKellar
Paris

MEMBERSHIP & SERVICES
Crystelle Job
Paris

ROAD SAFETY & GLOBAL ADVOCACY
Stefano Ammirati
Paris

TOURISM SERVICES
Habib Turki
Geneva

Functional reporting - - - - -
Direct reporting ————

Source: FIA Internal Document of Human Resources, Organigram Staff

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Appendix 2: FIA Mobility Division Structure by March 2020

SECRETARY GENERAL FOR AUTOMOBILE MOBILITY & TOURISM

Andrew McKellar

WCAMT

ADMINISTRATIVE SUPPORT
Larissa Caspar Moradians

WCAMT COORDINATION
Jennifer Sabin

International Historical

Founding Members Club

MEMBERSHIP & SERVICES
Crystelle Job - Director

Léa Futschik
Viktoriya Karpenko
Benjamin Lenne
Emily Mora

Services

FIA University Board

Governing body

Commission Committee

TOURISM SERVICES
Habib Turki - Director (G)
Björn Nordlund
Thimothy Stuart - *Trainee* (G)

Customs Council

ROAD SAFETY & GLOBAL ADVOCACY
Stefano Ammirati - Director

ROAD SAFETY & ADVOCACY
Luca Pascotto - Head
Estelle Aebersold
Anaïs Aite
Aleksandra Golovliova
Nino Kapanadze - *Trainee*
Dinesh Thapa - *Trainee*

Policy

Manufacturers'

High Level Panel for Road Safety

SUSTAINABILITY PROGRAMS
Maria Strigunova - Manager
Samuel Pierce
Santiago Peña Gomez - *Temp*

Environment & Sustainability

Disability & Accessibility

Source: FIA Internal Document of Human Resources, Organigram Staff

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Appendix 3: FIA Marketing & Event Structure by March 2020
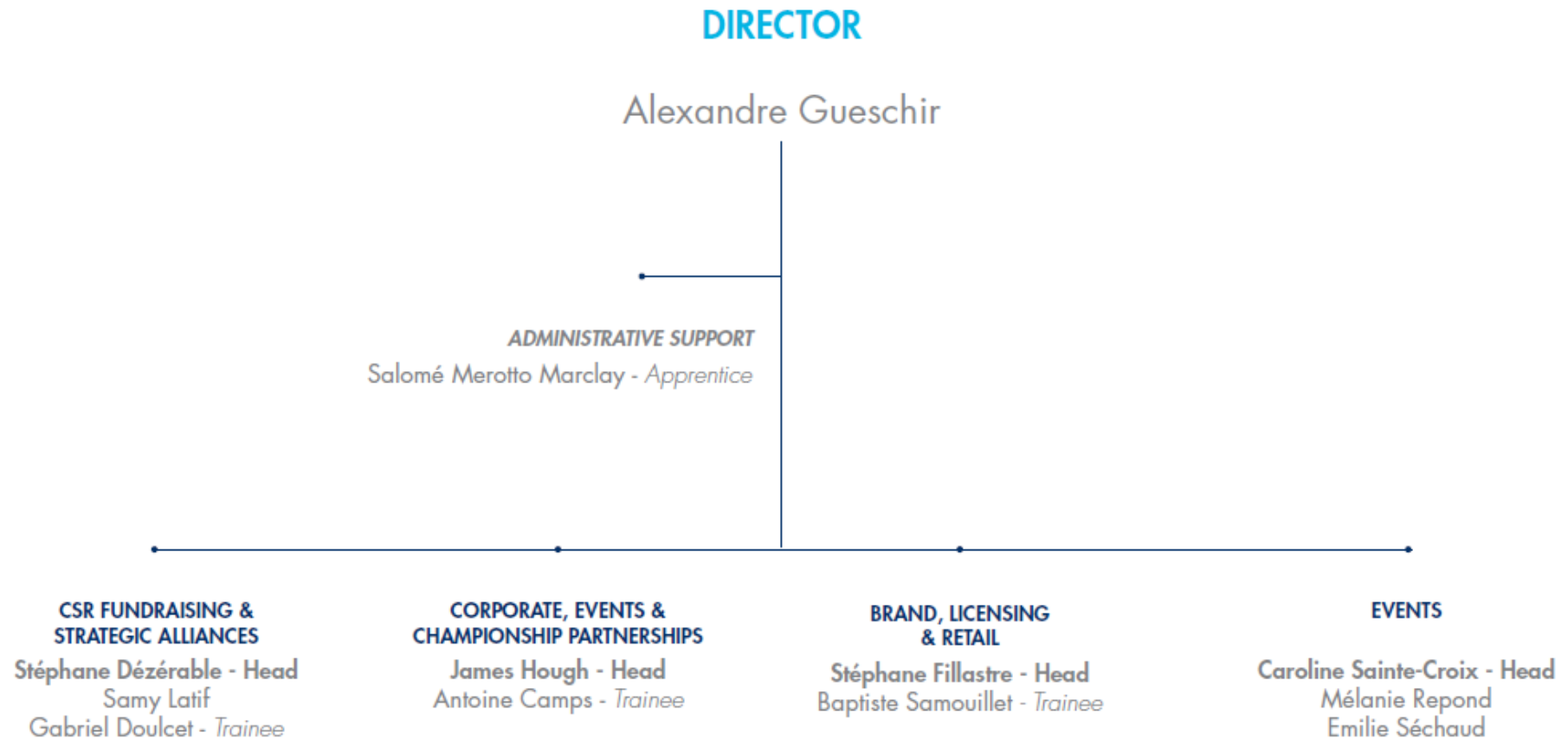
DIRECTOR

Alexandre Gueschir

ADMINISTRATIVE SUPPORT
Salomé Merotto Marclay - *Apprentice*

CSR FUNDRAISING & STRATEGIC ALLIANCES	CORPORATE, EVENTS & CHAMPIONSHIP PARTNERSHIPS	BRAND, LICENSING & RETAIL	EVENTS
Stéphane Dézérable - Head	James Hough - Head	Stéphane Fillastre - Head	Caroline Sainte-Croix - Head
Samy Latif	Antoine Camps - *Trainee*	Baptiste Samouillet - *Trainee*	Mélanie Repond
Gabriel Doulcet - *Trainee*			Emilie Séchaud

Source: FIA Internal Document of Human Resources, Organigram Staff

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Appendix 4: FIA Combined Profit and Loss

France + Switzerland + Global Institute, in EUR

EXPENSES	2018	2018 FIA Innovation Fund	2018 without FIF	2017
Miscellaneous supplies and equipment	2,985,554		2,985,554	3,613,250
MISCELLANEOUS SUPPLIES AND EQUIPMENT	**2,985,554**		**2,985,554**	**3,613,250**
Rent, leases, maintenance and repairs	5,030,620		5,030,620	4,553,165
Subcontracting	12,390,863	360,632	12,030,231	11,578,178
Agencies expenses and specialists' fees	14,139,393	678,020	13,461,373	12,309,053
Expenses of Region 1	1,306,473		1,306,473	1,254,202
Retrocessions to sport championships	8,117,702		8,117,702	5,839,117
Grants to members (Sport and Mobility)	6,678,702		6,678,702	5,584,141
Freight, travel expenses, missions, receptions and events	19,418,401	400,398	19,018,003	19,288,901
Postal and telecommunications expenses	632,604	144	632,460	748,768
Bank services and customs duties	1,157,352	266,052	891,300	852,660
Miscellaneous external expenses	3,160,673	4,627	3,156,046	4,238,767
TOTAL EXTERNAL EXPENSES	**72,032,783**	**1,709,873**	**70,322,910**	**66,246,952**
Fiscal taxes and dues	720,330		720,330	369,093
FISCAL TAXES AND DUES	**720,330**		**720,330**	**369,093**
Salaries	23,896,034		23,896,034	23,729,521
Social security and fiscal contributions	6,231,379		6,231,379	5,524,056
PERSONNEL EXPENSES	**30,127,413**		**30,127,413**	**29,253,577**
Depreciation and amortisation	3,485,163		3,485,163	3,278,625
DEPRECIATION AND AMORTISATION	**3,485,163**		**3,485,163**	**3,278,625**
Allocation to provisions	1,988,147		1,988,147	3,084,836
ALLOCATION TO PROVISIONS	**1,988,147**		**1,988,147**	**3,084,836**
OPERATING EXPENSES	**111,339,390**	**1,709,873**	**109,629,517**	**105,846,333**
Interest expenses and other financial expenses	57,471		57,471	55,797
Net charges on disposal of securities	605,221	213,153	392,068	511,706
Foreign exchange losses	3,603,320	1,243,457	2,359,863	2,359,863
Allocation to financial provisions	2,847,356	1,067,267	1,780,089	1,056,419
FINANCIAL EXPENSES	**7,113,368**	**2,523,877**	**4,589,491**	**7,669,264**
Non-operating management expenses	59,592		59,592	64,270
Exceptional expenses from previous years	79,517		79,517	87,519
Net book value of assets disposed of	11,353,055	11,358,520	-5,465	18,505,636
EXCEPTIONAL EXPENSES	**11,492,164**	**11,358,520**	**133,644**	**18,657,425**
Income tax	26,847		26,847	16,275
INCOME TAX	**26,847**		**26,847**	**16,275**
TOTAL EXPENSES	**129,971,769**	**15,592,270**	**114,379,499**	**132,189,297**

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INCOME	2018	2018 FIA Innovation Fund	2018 without FIF	2017
Sales of documents, CPD and various products	1,067,785		1,067,785	1,484,760
SALES OF DOCUMENTS, CPD AND VARIOUS PRODUCTS	**1,067,785**		**1,067,785**	**1,484,760**
Clubs subscriptions	3,791,597		3,791,597	3,658,756
CLUBS SUBSCRIPTIONS	**3,791,597**		**3,791,597**	**3,658,756**
Calendar fees	14,371,304		14,371,304	13,964,215
Entry fees	30,839,087		30,839,087	29,952,221
REGISTRATION AND ENTRY FEES	**45,210,391**		**45,210,391**	**43,916,436**
Income from grants received from the FIA Foundation	6,622,960		6,622,960	6,386,854
Homologations	5,126,518		5,126,518	5,528,705
Various income	7,794,620		7,794,620	7,785,463
OTHER INCOME	**19,544,098**		**19,544,098**	**19,701,023**
Income from sporting regulatory fees	25,992,702		25,992,702	24,996,404
INCOME FROM SPORTING REGULATORY FEES	**25,992,702**		**25,992,702**	**24,996,404**
Income from partnership and sponsoring contracts	8,309,172		8,309,172	6,675,176
Other income from contracts	4,312,834		4,312,834	4,177,089
INCOME FROM CONTRACTS	**12,622,006**		**12,622,006**	**10,852,265**
Income from Region 1	1,008,389		1,008,389	744,379
INCOME FROM REGIONS	**1,008,389**		**1,008,389**	**744,379**
Reversal of provisions	2,375,562		2,375,562	1,971,444
REVERSAL OF PROVISIONS	**2,375,562**		**2,375,562**	**1,971,444**
OPERATING INCOME	**111,612,530**		**111,612,530**	**107,325,466**
Income from security investments	1,799,160	643,303	1,155,857	3,375,214
Credit interests and related income				4,798
Foreign exchange gains	1,534,126	77,876	1,456,250	8,223,433
Reversal of financial provisions	1,049,189	399,736	649,453	4,244,907
FINANCIAL INCOME	**4,382,475**	**1,120,915**	**3,261,560**	**15,848,352**
Non-operating management income and reversal of exceptional provisions	50,000		50,000	51,765
Prior period income	38,626		38,626	120,211
Income from sales of assets	14,286,806	14,285,817	989	52,801,195
EXCEPTIONAL INCOME	**14,375,432**	**14,285,817**	**89,615**	**52,973,171**
TOTAL INCOME	**130,370,437**	**15,406,732**	**114,963,705**	**176,146,990**
RESULT OF THE YEAR	**398,668**	**-185,538**	**584,206**	**43,957,693***

Source: FIA Activity Report 2019

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Appendix 5: IESE CIMI, Ranking

Ranking	City	Performance	CIMI	Ranking	City	Performance	CIMI
1	London - United Kingdom	H	100,00	62	San Antonio - USA	RH	61,33
2	New York - USA	H	94,63	63	Birmingham - United Kingdom	RH	61,30
3	Amsterdam - Netherlands	RH	86,70	64	Glasgow - United Kingdom	RH	61,23
4	Paris - France	RH	86,23	65	Tallinn - Estonia	RH	60,96
5	Reykjavík - Iceland	RH	85,35	66	Santiago - Chile	RH	60,96
6	Tokyo - Japan	RH	84,11	67	Quebec - Canada	RH	60,64
7	Singapore - Singapore	RH	82,73	68	Osaka - Japan	RH	60,50
8	Copenhagen - Denmark	RH	81,80	69	Warsaw - Poland	RH	60,13
9	Berlin - Germany	RH	80,88	70	Bratislava - Slovakia	M	59,92
10	Vienna - Austria	RH	78,85	71	Baltimore - USA	M	59,86
11	Hong Kong - China	RH	78,76	72	Antwerp - Belgium	M	59,84
12	Seoul - South Korea	RH	78,13	73	Budapest - Hungary	M	59,65
13	Stockholm - Sweden	RH	77,89	74	Vilnius - Lithuania	M	59,15
14	Oslo - Norway	RH	77,45	75	Rome - Italy	M	59,09
15	Zurich - Switzerland	RH	76,66	76	Seville - Spain	M	58,57
16	Los Angeles - USA	RH	76,04	77	Buenos Aires - Argentina	M	58,42
17	Chicago - USA	RH	75,55	78	Manchester - United Kingdom	M	58,05
18	Toronto - Canada	RH	75,30	79	Leeds - United Kingdom	M	57,98
19	Sydney - Australia	RH	75,26	80	Málaga - Spain	M	57,59
20	Melbourne - Australia	RH	75,08	81	Tel Aviv - Israel	M	57,47
21	San Francisco - USA	RH	75,07	82	Nagoya - Japan	M	57,26
22	Helsinki - Finland	RH	74,08	83	Beijing - China	M	56,81
23	Washington - USA	RH	73,14	84	Riga - Latvia	M	56,27
24	Madrid - Spain	RH	73,02	85	Nice - France	M	56,09
25	Boston - USA	RH	72,91	86	Moscow - Russia	M	55,91
26	Wellington - New Zealand	RH	72,82	87	Linz - Austria	M	55,89
27	Munich - Germany	RH	72,71	88	Palma de Mallorca - Spain	M	55,57
28	Barcelona - Spain	RH	72,25	89	Marseille - France	M	55,10
29	Basel - Switzerland	RH	70,39	90	Duisburg - Germany	M	54,93
30	Taipei - Taiwan	RH	70,04	91	Porto - Portugal	M	54,76
31	Bern - Switzerland	RH	70,03	92	Montevideo - Uruguay	M	54,75
32	Geneva - Switzerland	RH	69,78	93	Ljubljana - Slovenia	M	54,41
33	Frankfurt - Germany	RH	69,39	94	Liverpool - United Kingdom	M	53,52
34	Hamburg - Germany	RH	69,23	95	Wroclaw - Poland	M	53,39
35	Auckland - New Zealand	RH	69,10	96	Nottingham - United Kingdom	M	53,36
36	Göteborg - Sweden	RH	68,65	97	Zagreb - Croatia	M	53,30
37	Dublin - Ireland	RH	68,19	98	Lille - France	M	52,93
38	Montreal - Canada	RH	66,82	99	Dubai - United Arab Emirates	M	52,92
39	Ottawa - Canada	RH	66,68	100	Kuala Lumpur - Malaysia	M	52,83
40	Miami - USA	RH	66,31	101	Zaragoza - Spain	M	52,53
41	Milan - Italy	RH	65,94	102	A Coruña - Spain	M	51,85
42	Phoenix - USA	RH	65,73	103	Bucharest - Romania	M	51,49
43	Rotterdam - Netherlands	RH	65,38	104	Bangkok - Thailand	M	51,35
44	Lisbon - Portugal	RH	65,32	105	Murcia - Spain	M	51,19
45	Dallas - USA	RH	65,13	106	Athens - Greece	M	50,71
46	Edinburgh - United Kingdom	RH	65,06	107	Bilbao - Spain	M	50,14
47	Prague - Czech Republic	RH	64,97	108	Florence - Italy	M	49,54
48	Brussels - Belgium	RH	64,79	109	Turin - Italy	M	49,51
49	San Diego - USA	RH	64,43	110	Minsk - Belarus	M	49,23
50	Düsseldorf - Germany	RH	64,34	111	Kiev - Ukraine	M	49,11
51	Cologne - Germany	RH	64,19	112	San José - Costa Rica	M	49,01
52	Denver - USA	RH	64,01	113	Guangzhou - China	M	48,40
53	Stuttgart - Germany	RH	64,01	114	Panama - Panama	M	47,51
54	Philadelphia - USA	RH	63,27	115	Sofia - Bulgaria	M	46,71
55	Vancouver - Canada	RH	63,15	116	Naples - Italy	M	46,62
56	Lyon - France	RH	62,56	117	Bogotá - Colombia	M	46,01
57	Eindhoven - Netherlands	RH	62,35	118	Istanbul - Turkey	M	45,85
58	Seattle - USA	RH	61,96	119	Shenzhen - China	M	45,28
59	Shanghai - China	RH	61,78	120	Belgrade - Serbia	L	44,86
60	Houston - USA	RH	61,74	121	Saint Petersburg - Russia	L	44,12
61	Valencia - Spain	RH	61,52	122	Ho Chi Minh City - Vietnam	L	43,49

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Ranking	City	Performance	CIMI	Ranking	City	Performance	CIMI
123	Jerusalem - Israel	L	43,27	149	Skopje - North Macedonia	L	33,88
124	Tbilisi - Georgia	L	42,96	150	Amman - Jordan	L	33,61
125	Rosario - Argentina	L	42,45	151	Belo Horizonte - Brazil	L	33,40
126	Doha - Qatar	L	42,14	152	Guayaquil - Ecuador	L	33,10
127	Abu Dhabi - United Arab Emirates	L	42,12	153	Bangalore - India	L	32,65
128	Rio de Janeiro - Brazil	L	42,08	154	Tianjin - China	L	32,62
129	Almaty - Kazakhstan	L	42,04	155	Casablanca - Morocco	L	32,31
130	Brasília - Brazil	L	41,84	156	Novosibirsk - Russia	L	32,05
131	Baku - Azerbaijan	L	41,24	157	Tunis - Tunisia	L	31,36
132	São Paulo - Brazil	L	40,90	158	Cape Town - South Africa	L	30,68
133	Mexico City - Mexico	L	40,79	159	Manama - Bahrain	L	30,06
134	Medellín - Colombia	L	40,67	160	Guatemala City - Guatemala	L	30,06
135	Ankara - Turkey	L	39,61	161	Mumbai - India	L	28,36
136	Córdoba - Argentina	L	38,38	162	Nairobi - Kenya	L	27,99
137	Quito - Ecuador	L	38,19	163	Manila - Philippines	L	27,73
138	Lima - Perú	L	38,14	164	Riyadh - Saudi Arabia	L	27,71
139	Santo Domingo - Dominican Republic	L	37,43	165	Cairo - Egypt	L	26,74
140	Curitiba - Brazil	L	37,33	166	New Delhi - India	L	26,52
141	Asunción - Paraguay	L	37,25	167	Johannesburg - South Africa	L	25,95
142	Jakarta - Indonesia	L	35,96	168	Rabat - Morocco	L	24,78
143	Kuwait City - Kuwait	L	35,61	169	Kolkata - India	L	19,54
144	Sarajevo - Bosnia-Herzegovina	L	35,39	170	Douala - Cameroon	L	17,03
145	La Paz - Bolivia	L	35,12	171	Lagos - Nigeria	VL	10,24
146	Salvador - Brazil	L	34,20	172	Caracas - Venezuela	VL	6,71
147	Santa Cruz - Bolivia	L	34,16	173	Lahore - Pakistan	VL	6,27
148	Cali - Colombia	L	34,04	174	Karachi - Pakistan	VL	4,57

Source: IESE Cities in Motion Index 2019

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Appendix 6: IESE CIMI, Indicators

No.	Indicator	Description / Unit of measurement	Dimension	Source
1	Higher education	Proportion of population with secondary and higher education.	Human capital	Euromonitor
2	Business schools	Number of business schools (top 100).	Human capital	*Financial Times*
3	Movement of students	International movement of higher-level students. Number of students.	Human capital	UNESCO
4	Universities	Number of universities in the city that are in the top 500.	Human capital	QS Top Universities
5	Museums and art galleries	Number of museums and art galleries per city.	Human capital	OpenStreetMap
6	Schools	Number of public or private schools per city.	Human capital	OpenStreetMap
7	Theaters	Number of theaters per city.	Human capital	OpenStreetMap
8	Expenditure on leisure and recreation	Expenditure on leisure and recreation per capita.	Human capital	Euromonitor
9	Expenditure on leisure and recreation	Expenditure on leisure and recreation. In millions of dollars, according to 2016 prices.	Human capital	Euromonitor
10	Expenditure on education	Expenditure on education per capita.	Human capital	Euromonitor
11	Mortality	Ratio of deaths per 100,000 inhabitants.	Social cohesion	Euromonitor
12	Crime rate	Crime rate.	Social cohesion	Numbeo
13	Health	Health index.	Social cohesion	Numbeo
14	Unemployment	Unemployment rate (number of unemployed out of the workforce).	Social cohesion	Euromonitor
15	Gini index	Measure of social inequality. It varies from 0 to 100, with 0 being a situation of perfect equality and 100 that of perfect inequality.	Social cohesion	Euromonitor
16	Price of property	Price of property as percentage of income.	Social cohesion	Numbeo
17	Female workers	Ratio of female workers in the public administration.	Social cohesion	International Labour Organization (ILO)
18	Global Peace Index	An index that measures the peacefulness and the absence of violence in a country or region. The bottom-ranking positions correspond to countries with a high level of violence.	Social cohesion	Institute for Economics and Peace
19	Hospitals	Numbers of public and private hospitals and health centers per city.	Social cohesion	OpenStreetMap
20	Happiness index	An index that measures the level of happiness of a country. The highest values correspond to countries that have a higher degree of overall happiness.	Social cohesion	World Happiness Index

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No.	Indicator	Description / Unit of measurement	Dimension	Source
21	Global Slavery Index	Ranking that considers the proportion of people in a situation of slavery in the country. The countries occupying the top positions in the ranking are those with the highest proportion.	Social cohesion	Walk Free Foundation
22	Government response to situations of slavery	This variable measures how the government deals with situations of slavery in the country. The top positions in the ranking indicate countries that have a more effective and comprehensive response.	Social cohesion	Walk Free Foundation
23	Terrorism	Number of terrorist incidents by city in the previous three years.	Social cohesion	Global Terrorism Database (GTD) of the University of Maryland
24	Female-friendly	The variable seeks to measure whether a city provides a friendly environment for women on a scale of 1 to 5. Cities with a value of 1 have a more hostile environment, while those that have a value of 5 are very friendly.	Social cohesion	Nomad List
25	Suicides	Suicide rate by city.	Social cohesion	Nomad List
26	Homicides	Homicide rate by city.	Social cohesion	Nomad List
27	Productivity	Labor productivity calculated as GDP per working population (in thousands).	Economy	Euromonitor
28	Time required to start a business	Number of calendar days needed so a business can operate legally.	Economy	World Bank
29	Ease of starting a business	The top positions in the ranking indicate a more favorable regulatory environment for creating and developing a local company.	Economy	World Bank
30	Headquarters	Number of headquarters of publicly traded companies.	Economy	Globalization and World Cities (GaWC)
31	Motivation to get started in TEA (total early-stage entrepreneurial activity)	Percentage of people involved in TEA (that is, novice entrepreneurs and owners or managers of a new business), driven by an opportunity for improvement, divided by the percentage of TEA motivated by need.	Economy	Global Entrepreneurship Monitor (GEM)
32	GDP estimate	Estimated annual GDP growth.	Economy	Euromonitor
33	GDP	GDP in millions of dollars at 2016 prices.	Economy	Euromonitor
34	GDP per capita	GDP per capita at 2016 prices.	Economy	Euromonitor
35	Mortgage	Mortgage as a percentage of income. It is calculated as a proportion of the real monthly cost of the mortgage with respect to the family income (estimated via the average monthly salary). The lower the percentage, the better.	Economy	Numbeo

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No.	Indicator	Description / Unit of measurement	Dimension	Source
36	Glovo	The variable assumes the value of 1 if the city has the Glovo service and 0 otherwise.	Economy	Glovo
37	Uber	The variable assumes the value of 1 if the city has the Uber service and 0 otherwise.	Economy	Uber
38	Salary	Hourly wage in the city.	Economy	Euromonitor
39	Purchasing power	Purchasing power (determined by the average salary) for the purchase of goods and services in the city, compared with the purchasing power in New York City.	Economy	Numbeo
40	Reserves	Total reserves in millions of current dollars. Estimate at urban level according to the population.	Governance	World Bank
41	Reserves per capita	Reserves per capita in millions of current dollars.	Governance	World Bank
42	Embassies	Number of embassies and consulates per city.	Governance	OpenStreetMap
43	ISO 37120 certification	This establishes whether or not the city has ISO 37120 certification. Certified cities are committed to improving their services and quality of life. It is a variable coded from 0 to 6. Cities that have been certified for the longest time have the highest value. The value 0 is for those cities without certification.	Governance	World Council on City Data (WCCD)
44	Research centers	Number of research and technology centers per city.	Governance	OpenStreetMap
45	Government buildings	Number of government buildings and premises in the city.	Governance	OpenStreetMap
46	Strength of legal rights index	The strength of legal rights index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate access to loans. The values go from 0 (low) to 12 (high), where the highest ratings indicate that the laws are better designed to expand access to credit.	Governance	World Bank
47	Corruption perceptions index	Countries with values close to 0 are perceived as very corrupt and those with an index close to 100 as very transparent.	Governance	Transparency International
48	Open data platform	This describes whether the city has an open data system.	Governance	CTIC Foundation and Open World Bank
49	E-Government Development Index (EGDI)	The EGDI reflects how a country uses information technology to promote access and inclusion for its citizens.	Governance	United Nations
50	Democracy ranking	Ranking where the countries in the highest positions are those considered more democratic.	Governance	*The Economist* Intelligence Unit

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No.	Indicator	Description / Unit of measurement	Dimension	Source
51	Employment in the public administration	Percentage of population employed in public administration and defense; education; health; community, social and personal service activities; and other activities.	Governance	Euromonitor
52	CO_2 emissions	CO_2 emissions from the burning of fossil fuels and the manufacture of cement. Measured in kilotons (kt).	The environment	World Bank
53	CO_2 emission index	CO_2 emission index.	The environment	Numbeo
54	Methane emissions	Methane emissions that arise from human activities such as agriculture and the industrial production of methane. Measured in kt of CO_2 equivalent.	The environment	World Bank
55	Access to the water supply	Percentage of the population with reasonable access to an appropriate quantity of water resulting from an improvement in the supply.	The environment	World Bank
56	PM2.5	The indicator PM2.5 measures the number of particles in the air whose diameter is less than 2.5 micrometers (μm). Annual mean.	The environment	World Health Organization (WHO)
57	PM10	The indicator PM10 measures the amount of particles in the air whose diameter is less than 10 μm. Annual mean.	The environment	WHO
58	Pollution	Pollution index.	The environment	Numbeo
59	Environmental Performance Index (EPI)	This measures environmental health and ecosystem vitality. Scale from 1 (poor) to 100 (good).	The environment	Yale University
60	Renewable water resources	Total renewable water sources per capita.	The environment	Food and Agriculture Organization of the United Nations (FAO)
61	Future climate	Percentage of the rise in temperature in the city during the summer forecast for 2100 if pollution caused by carbon emissions continues to increase.	The environment	Climate Central
62	Solid waste	Average amount of municipal solid waste (garbage) generated annually per person (kg/year).	The environment	Waste Management for Everyone
63	Traffic index	Consideration of the time spent in traffic, the dissatisfaction this generates, CO_2 consumption and other inefficiencies of the traffic system.	Mobility and transportation	Numbeo
64	Inefficiency index	Estimation of traffic inefficiencies (such as long journey times). High values represent high rates of inefficiency in driving.	Mobility and transportation	Numbeo
65	Index of traffic for commuting to work	Index of time that takes into account how many minutes it takes to commute to work.	Mobility and transportation	Numbeo
66	Bike sharing	This system shows the automated services for the public use of shared bicycles that provide transport from one location to another within a city. The indicator varies between 0 and 8 according to how developed the system is.	Mobility and transportation	Bike-Sharing World Map

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No.	Indicator	Description / Unit of measurement	Dimension	Source
67	Length of the metro system	Length of the metro system per city.	Mobility and transportation	Metrobits
68	Metro stations	Number of metro stations per city.	Mobility and transportation	Metrobits
69	Flights	Number of arrival flights (air routes) in a city.	Mobility and transportation	OpenFlights
70	High-speed train	Binary variable that shows whether the city has a high-speed train or not.	Mobility and transportation	OpenRailwayMap
71	Vehicles	Number of commercial vehicles in the city (in thousands).	Mobility and transportation	Euromonitor
72	Bicycles per household	Percentage of bicycles per household.	Mobility and transportation	Euromonitor
73	Bicycles for rent	Number of bike-rental or bike-sharing points, based on docking stations where they can be picked up or dropped off.	Urban planning	OpenStreetMap
74	Percentage of the urban population with adequate sanitation facilities	Percentage of the urban population that uses at least basic sanitation services—that is, improved sanitation facilities that are not shared with other households.	Urban planning	World Bank
75	Number of people per household	Number of people per household. Occupancy by household is measured compared to the average. This makes it possible to estimate if a city has overoccupied or underoccupied households.	Urban planning	Euromonitor
76	High-rise buildings	Percentage of buildings considered high-rises. A high-rise is a building of at least 12 stories or 35 meters (115 feet) high.	Urban planning	Skyscraper Source Media
77	Buildings	This variable is the number of completed buildings in the city. It includes structures such as high-rises, towers and low-rise buildings but excludes other various others, as well as buildings in different states of completion (in construction, planned, etc.).	Urban planning	Skyscraper Source Media
78	McDonald's	Number of McDonald's chain restaurants per city.	International outreach	OpenStreetMap
79	Number of passengers per airport	Number of passengers per airport in thousands.	International outreach	Euromonitor
80	Sightsmap	Ranking of cities according to the number of photos taken there and uploaded to Panoramio (community where photographs were shared online). The top positions correspond to the cities with the most photographs.	International outreach	Sightsmap

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No.	Indicator	Description / Unit of measurement	Dimension	Source
81	Number of conferences and meetings	Number of international conferences and meetings that are held in a city.	International outreach	International Congress and Convention Association (ICCA)
82	Hotels	Number of hotels per capita.	International outreach	OpenStreetMap
83	Restaurant index	The index shows the prices of food and beverages in restaurants and bars compared to New York City.	International outreach	Numbeo
84	Twitter	Registered Twitter users in the city. This is part of the social media variable.	Technology	Tweepsmap
85	LinkedIn	Number of users in the city. This is part of the social media variable.	Technology	LinkedIn
86	Mobile phones	Number of mobile phones in the city via estimates based on country-level data.	Technology	International Telecommunication Union
87	Wi-Fi hot spot	Number of wireless access points globally. These represent the options in the city for connecting to the Internet.	Technology	WiFi Map app
88	Innovation cities index	Innovation index of the city. Valuation of 0 (no innovation) to 60 (a lot of innovation).	Technology	Innovation Cities Program
89	Landline subscriptions	Number of landline subscriptions per 100 inhabitants.	Technology	International Telecommunication Union
90	Broadband subscriptions	Broadband subscriptions per 100 inhabitants.	Technology	International Telecommunication Union
91	Internet	Percentage of households with access to the Internet in the city.	Technology	Euromonitor
92	Mobile telephony	Percentage of households with mobile phones in the city.	Technology	Euromonitor
93	Web Index	The Web Index seeks to measure the economic, social and political benefit that countries obtain from the Internet.	Technology	World Wide Web Foundation
94	Telephony	Percentage of households with some kind of telephone service.	Technology	Euromonitor
95	Internet speed	Internet speed in the city.	Technology	Nomad List
96	Computers	Percentage of households with a personal computer in the city.	Technology	Euromonitor

Source: IESE Cities in Motion Index 2019

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Appendix 7: IESE CIMI, Top 10 Cities by Dimension

ECONOMY

1	New York - USA
2	Los Angeles - USA
3	Tokyo - Japan
4	San Francisco - USA
5	Washington - USA
6	Dallas - USA
7	Chicago - USA
8	Paris - France
9	Boston - USA
10	Amsterdam - Netherlands

HUMAN CAPITAL

1	London - United Kingdom
2	Los Angeles - USA
3	New York - USA
4	Boston - USA
5	Berlin - Germany
6	Paris - France
7	Moscow - Russia
8	Washington - USA
9	Tokyo - Japan
10	Chicago - USA

SOCIAL COHESION

1	Zurich - Switzerland
2	Bern - Switzerland
3	Taipei - Taiwan
4	Basel - Switzerland
5	Linz - Austria
6	Wellington - New Zealand
7	Quebec - Canada
8	Abu Dhabi - United Arab Emirates
9	Eindhoven - Netherlands
10	Helsinki - Finland

THE ENVIRONMENT

1	Reykjavík - Iceland
2	Wellington - New Zealand
3	Copenhagen - Denmark
4	Montevideo - Uruguay
5	Stockholm - Sweden
6	Tokyo - Japan
7	Auckland - New Zealand
8	Oslo - Norway
9	Asunción - Paraguay
10	Singapore - Singapore

GOVERNANCE

1	Bern - Switzerland
2	Geneva - Switzerland
3	Taipei - Taiwan
4	Melbourne - Australia
5	Los Angeles - USA
6	Berlin - Germany
7	London - United Kingdom
8	Helsinki - Finland
9	Zurich - Switzerland
10	San Diego - USA

URBAN PLANNING

1	Toronto - Canada
2	New York - USA
3	Vancouver - Canada
4	Kiev - Ukraine
5	Chicago - USA
6	Ottawa - Canada
7	Montreal - Canada
8	Hong Kong - China
9	London - United Kingdom
10	Washington - USA

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INTERNATIONAL OUTREACH	TECHNOLOGY	MOBILITY AND TRANSPORTATION
1 London - United Kingdom	1 Singapore - Singapore	1 Shanghai - China
2 Amsterdam - Netherlands	2 Hong Kong - China	2 Beijing - China
3 Paris - France	3 San Francisco - USA	3 London - United Kingdom
4 Singapore - Singapore	4 Reykjavík - Iceland	4 Paris - France
5 Berlin - Germany	5 Dubai - United Arab Emirates	5 New York - USA
6 Melbourne - Australia	6 Seoul - South Korea	6 Berlin - Germany
7 Vienna - Austria	7 Amsterdam - Netherlands	7 Vienna - Austria
8 New York - USA	8 London - United Kingdom	8 Munich - Germany
9 Miami - USA	9 Eindhoven - Netherlands	9 Madrid - Spain
10 Sydney - Australia	10 Copenhagen - Denmark	10 Taipei - Taiwan

Source: IESE Cities in Motion Index 2019

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Appendix 8: IMD Smart Cities Index, Overall Ranking

Overall ranking	City	Overall rating	Overall ranking	City	Overall rating	Overall ranking	City	Overall rating	Overall ranking	City	Overall rating
1	Singapore	A A A	27	Brisbane	B B B	53	Chicago	B B	79	Bengaluru	C C
2	Zurich	A A A	28	Gothenburg	B B B	54	Philadelphia	B B	80	Makassar	C C
3	Oslo	A A	29	The Hague	B B B	55	Nanjing	B	81	Jakarta	C C
4	Geneva	A A	30	Dublin	B B B	56	Abu Dhabi	B	82	Medan	C C
5	Copenhagen	A A	31	Washington D.C.	B B B	57	Guangzhou	B	83	Budapest	C C
6	Auckland	A	32	Boston	B B B	58	Chengdu	B	84	Bratislava	C C
7	Taipei City	A	33	Denver	B B B	59	Shanghai	B	85	Bucharest	C C
8	Helsinki	A	34	Seattle	B B B	60	Beijing	B	86	Santiago	C C
9	Bilbao	A	35	Los Angeles	B B B	61	Warsaw	B	87	Buenos Aires	C C
10	Dusseldorf	A	36	Rotterdam	B B B	62	Tokyo	B	88	Mexico City	C C
11	Amsterdam	A	37	Hong Kong	B B B	63	Osaka	B	89	Sofia	C C
12	San Francisco	A	38	New York	B B B	64	Brussels	B	90	São Paulo	C C
13	Vancouver	A	39	Berlin	B B B	65	Ho Chi Minh City	C C C	91	Medellin	C
14	Sydney	A	40	Zhuhai	B B	66	Hanoi	C C C	92	Kiev	C
15	Toronto	A	41	Tianjin	B B	67	Hyderabad	C C C	93	Cape Town	C
16	Montreal	A	42	Chongqing	B B	68	New Delhi	C C C	94	Manila	C
17	Vienna	B B B	43	Shenzhen	B B	69	Krakow	C C C	95	Athens	C
18	Bologna	B B B	44	Hangzhou	B B	70	Kuala Lumpur	C C C	96	Rio de Janeiro	C
19	Prague	B B B	45	Dubai	B B	71	Riyadh	C C C	97	Abuja	D
20	London	B B B	46	Tel Aviv	B B	72	Moscow	C C C	98	Bogota	D
21	Madrid	B B B	47	Seoul	B B	73	St. Petersburg	C C C	99	Cairo	D
22	Milan	B B B	48	Barcelona	B B	74	Ankara	C C C	100	Nairobi	D
23	Lyon	B B B	49	Zaragoza	B B	75	Bangkok	C C C	101	Rabat	D
24	Melbourne	B B B	50	Busan	B B	76	Lisbon	C C C	102	Lagos	D
25	Stockholm	B B B	51	Paris	B B	77	Rome	C C C			
26	Hanover	B B B	52	Birmingham	B B	78	Mumbai	C C			

Source: IMD Smart Cities Index Report 20

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Appendix 9: IMD Smart Cities Index, HDI ranking

First Group	Second Group	Third group	Fourth Group
Amsterdam	Auckland	Abu Dhabi	Abuja
Berlin	Barcelona	Ankara	Bengaluru
Boston	Bilbao	Athens	Bogota
Brisbane	Birmingham	Bangkok	Cairo
Chicago	Bologna	Beijing	Cape Town
Copenhagen	Brussels	Bratislava	Hanoi
Denver	Busan	Bucharest	Ho Chi Minh City
Dublin	Helsinki	Budapest	Hyderabad
Dusseldorf	London	Buenos Aires	Jakarta
Geneva	Lyon	Chengdu	Kiev
Gothenburg	Madrid	Chongqing	Lagos
Hanover	Milan	Dubai	Makassar
Hong Kong	Osaka	Guangzhou	Manila
Los Angeles	Paris	Hangzhou	Medan
Melbourne	Prague	Krakow	Medellin
Montreal	Rome	Kuala Lumpur	Mumbai
New York	Seoul	Lisbon	Nairobi
Oslo	Taipei City	Mexico City	New Delhi
Philadelphia	Tel Aviv	Moscow	Rabat
Rotterdam	Tokyo	Nanjing	
San Francisco	Vienna	Rio de Janeiro	
Seattle	Zaragoza	Riyadh	
Singapore		Santiago	
Stockholm		Sao Paulo	
Sydney		Shanghai	
The Hague		Shenzhen	
Toronto		Sofia	
Vancouver		St. Petersburg	
Washington D.C.		Tianjin	
Zurich		Warsaw	
		Zhuhai	

Source: IMD Smart Cities Index Methodology 2019

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Appendix 10: IMD Smart Cities Index, City Profile Paris

SMART CITY RANKING
51st
Out of 102

GROUP
2

RATING
B B
From A A A to D

FACTOR RATINGS
B B
Structures

B B
Technologies

BACKGROUND INFORMATION

Country	2015	2016	2017
UN HDI	0.898	0.899	0.901
Life expectancy at Birth	82.4	82.5	82.7
Expected years of schooling	16.4	16.4	16.4
Mean years of schooling	11.5	11.5	11.5
GNI per capita (PPP $)	38,367	38,702	39,254
City			
Population (UN World Cities Report)			10,843,000

Map tiles by Stamen Design CC BY 3.0 Map Data © OpenStreetMap

STRUCTURES

LEGEND: CITY GROUP MEAN
GROUP MIN / GROUP MAX

Score
0   20   40   60   80   100

Health & Safety
Basic sanitation meets the needs of the poorest areas.	54.20
Recycling services are satisfactory.	55.96
Public safety is not a problem.	43.90
Air pollution is not a problem.	22.49
Medical services provision is satisfactory.	57.99

Mobility
Traffic congestion is not a problem.	27.10
Public transport is satisfactory.	55.56

Activities
Green spaces are satisfactory.	64.23
Cultural activities (shows, bars, and museums) are satisfactory.	76.02

Opportunities (Work & School)
Employment finding services are available.	62.74
Most children have access to a good school.	60.84
Lifelong learning opportunities are provided by local institutions.	57.32
Businesses are creating new jobs.	50.54
Minorities feel welcome.	39.02

Governance
Information on local government decisions are easily accessible.	54.34
Corruption of city officials is not an issue of concern.	40.65
Residents contribute to decision making of local government.	39.57
Residents provide feedback on local government projects.	36.72

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PRIORITY AREAS

From a list of 15 indicators, survey respondents were asked to select 5 that they perceived as the most urgent for their city. The higher the percentage of responses per area, the greater the priority for the city.

% of respondents who chose the Priority Area

Priority Area	%
air pollution	69.1%
affordable housing	62.6%
security	52.0%
road congestion	51.2%
unemployment	39.0%
public transport	31.7%
green spaces	26.8%
recycling	25.2%
fulfilling employment	20.3%
school education	14.6%
corruption	13.8%
citizen engagement	13.0%
social mobility	12.2%
basic amenities	11.4%
energy efficiency	10.6%

ATTITUDES

% of respondents who agree or strongly agree with the statement

Statement	%
You are willing to concede personal data in order to improve traffic congestion	61.0%
You are comfortable with face recognition technologies to lower crime	56.1%
You feel the availability of online information has increased your trust in authorities	55.3%

LEGEND: GROUP MEAN | CITY

TECHNOLOGIES

LEGEND: CITY | GROUP MEAN | GROUP MIN ○ | GROUP MAX

Score

Health & Safety

	Score
Online reporting of city maintenance problems provides a speedy solution.	50.54
A website or App allows to give away unwanted items to other city residents.	59.08
Free public wifi has improved access to services.	54.88
CCTV cameras make residents feel safer.	52.44
A website or App allows effective monitoring of air pollution.	51.63
Arranging medical appointments online has improved access.	66.53

Mobility

	Score
Car-sharing Apps have reduced congestion.	43.22
Apps that direct you to an available parking space have reduced journey time.	51.36
Bicycle hiring has reduced congestion.	52.44
Online scheduling and ticket sales make public transport easier to use.	59.49

Activities

	Score
Online purchasing of tickets to shows and museums has made it easier to attend.	73.31

Opportunities (Work & School)

	Score
Online access to job listings has made it easier to find work.	57.99
IT skills are taught well in schools.	57.86
Online services provided by the city has made it easier to start a new business.	52.17

Governance

	Score
Online public access to city finances has reduced corruption.	38.08
Online voting has increased participation.	44.72
An online platform where residents can propose ideas has improved city life.	49.86
Processing Identification Documents online has reduced waiting times.	56.91

Source: IMD Smart Cities Index Report 2019

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Appendix 11: Survey Questions in English

Mobility in Paris

A FEW MINUTES OF YOUR TIME CAN MAKE A HUGE DIFFERENCE.

As part of my bachelor's degree in International Business Management in Geneva, I am currently writing my bachelor thesis in collaboration with the Fédération Internationale de l'Automobile (FIA). The FIA is the governing body of motor sport and promotes safe, sustainable and accessible mobility for all road users across the world. To the general public, the FIA is mostly known as the governing body for many auto racing events, such as the well known Formula One.

Based on the showcase city Paris, I aim to answer the following question: How can the FIA include end users in their FIA Smart Cities initiative?

The FIA Smart Cities initiative is an event bringing together the FIA, the Formula-E, city officials, industry players and mobility experts in order to advocate on solutions and ideas around safe, connected and sustainable urban mobility. In order to include Parisian citizens in such kind of an event, their opinion on the mobility of Paris and on events such as the FIA Smart Cities initiative is crucial. This is why I decided to send out a survey to Parisian residents as part of my research .

The survey contains 35 questions and is split into the following seven sections (n° of questions per section) :
1. Mobility in Paris (4)
2. Air Pollution (3)
3. Traffic Congestion (8)
4. Public Transport (6)
5. Security (5)
6. FIA Smart Cities Initiative (4)
7. Personal Details (4)

Answering this survey will you take you approximately 10 minutes. This might sound like a lot, but YOUR 10 minutes will make a huge difference in my results. I highly appreciate your participation and thank you in advance for your time.

In case you have any further questions, please do not hesitate to contact me on LinkedIn or by mail (maela-karin.welti@etu.hesge.ch)

Appreciatively,
Maëla Welti

How can the Fédération Internationale de l'Automobile attract the general public to their FIA Smart Cities initiative?
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Since how long do you live in the "Région Parisenne"? *

○ A few months

○ 1 to 2 years

○ 3 to 5 years

○ 5 to 10 years

○ Over 10 years

○ I am not a Parisian citizen

In which part of the Paris region do you live?

○ Center: Paris (75)

○ Small Crown: Hauts-de-Seine (92), Seine-Saint-Denis (93), Val-de-Marne (94)

○ Big Crown: Seine-et-Marne (77), Yvelines (78), Essonne (91), Val d'Oise (95)

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Mobility in Paris

⌄ ⋮

To start with, there are 4 generic questions about the mobility in Paris.

Please note down the most important challenge Paris is facing in terms of mobility and transportation. *

Short-answer text

Please rank the following topics according to its urgency priority in Paris. *

	1st	2nd	3rd	4th
Air Pollution	○	○	○	○
Traffic Congestion	○	○	○	○
Public Transport	○	○	○	○
Security	○	○	○	○

How much included do you feel in the decision making process of the Parisian government regarding mobility and transportation? *

	1	2	3	4	
Not included at all	○	○	○	○	Very included

To which extend would you appreciate a closer exchange between residents and the local government in the aspect of mobility and transportation? *

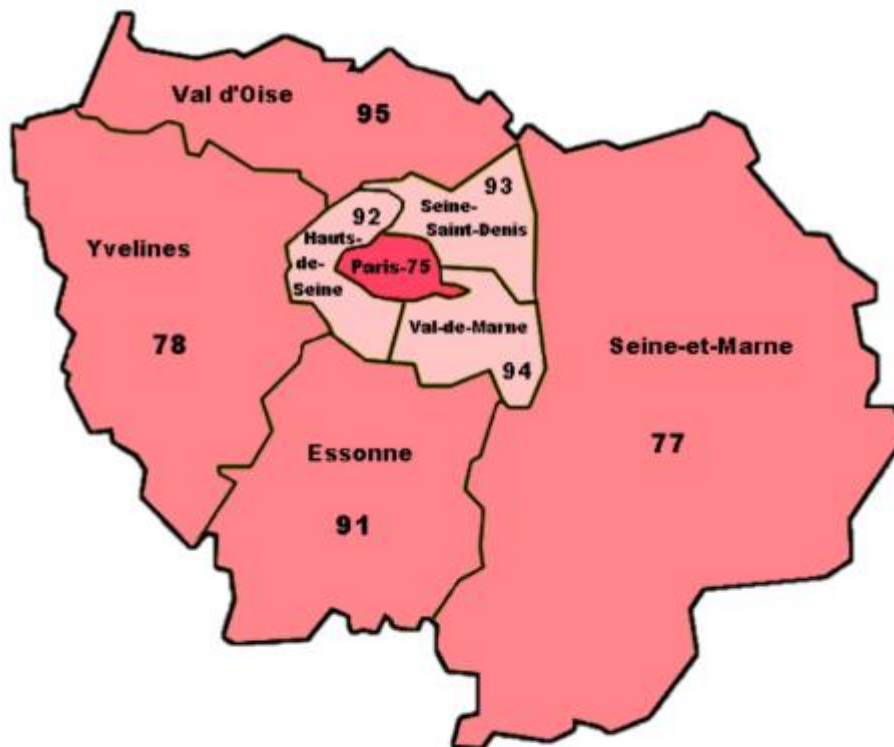|	1	2	3	4	
No closer exchange	○	○	○	○	A much closer exchange

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Air Pollution

In this second part, 3 questions are going to be asked regarding the air pollution in Paris.

How would you rate the overall Air Quality of Paris? *

	1	2	3	4	
Very Poor	○	○	○	○	Excellent

In which ways do you contribute to the reduction of emissions of air pollutant? *

☐ Own a vehicle powered by alternative fuel

☐ Regular use of public transportation

☐ Reduce the number of car trips

☐ Regular use of car-sharing

☐ Regular use of a bicycle

☐ Regular use of a scooter

☐ Regular use of a motorcycle

☐ Do most trips by walking

☐ I do not especially pay attention to reduce my emission of air pollutants

☐ Other...

What are reasons why you would NOT use cars powered by alternative fuels in Paris? (electric, hydrogen, green gas etc.) *

Long-answer text

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Traffic Congestion

⌄ ⋮

In the third part, you will be asked 8 questions concerning the traffic congestion in Paris. This is the biggest section out of the seven parts in terms of numbers of questions.

What transportation means do you mainly use for COMMUTING? *

- [ ] My own car (powered by diesel or petrol)
- [ ] My own car (powered by electricity, hydrogen or green gas)
- [ ] Car-sharing (e.g. Autolib', or car sharing with colleagues)
- [ ] Train
- [ ] My own bicycle
- [ ] Bicycle-sharing (e.g. Vélib')
- [ ] My own Motorcycle
- [ ] Scooter (Trottinette)
- [ ] On foot (walking)
- [ ] Bus
- [ ] Tram
- [ ] Taxi
- [ ] Metro
- [ ] Other...

Why do you choose the above mentioned transportation means for COMMUTING? *

Long-answer text

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What transportation means do you mainly use in your FREETIME? *

☐ My own car (powered by diesel or petrol)

☐ My own car (powered by electricity, hydrogen or green gas)

☐ Car-sharing (e.g. Autolib', or car sharing with colleagues)

☐ Train / Metro

☐ My own bicycle

☐ Bicycle-sharing (e.g. Vélib')

☐ My own Motorcycle

☐ Scooter (Trottinette)

☐ On foot (walking)

☐ Bus / Trolleybus

☐ Tram / Streetcar

☐ Taxi

☐ Other...

Why do you choose the above mentioned transportation means in your FREETIME? *

Long-answer text

How would you rate the level of traffic congestion in Paris? *

	1	2	3	4	
No congestion	○	○	○	○	Heavy congestion

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Which of the following transportation means do you own? *

- [ ] Car (powered by diesel or petrol)

- [ ] Car (powered by electricity, hydrogen or green gas)

- [ ] Motorcycle (powered by diesel or petrol)

- [ ] Motorcycle (powered by electricity, hydrogen or green gas)

- [ ] Regular Bicycle

- [ ] Electric Bicycle

- [ ] Regular Scooter

- [ ] Electric Scooter

- [ ] Hoverboard, Skateboard

- [ ] Other...

Which of the following transportation SERVICES do you use the most frequent in Paris? *

- [ ] Bicycle-sharing

- [ ] Car-sharing

- [ ] Motorcycle-sharing

- [ ] Scooter-sharing

- [ ] I never use transportation services

- [ ] Other...

Please elaborate on your answer, why do you frequently use some of the services and others not? *

Long-answer text

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Public Transport

This is the fourth section, containing of 6 questions about the public transportation in Paris.

How efficient is the Public Transport network in Paris? *

	1	2	3	4	
Not efficient at all	○	○	○	○	Very efficient

How satisfied are you with the technologies linked to public transport in Paris? (online ticket sales, real time arrival information etc.) *

	1	2	3	4	
Not satisfied at all	○	○	○	○	Very satisfied

How well accessible are is the Public Transport for disabled people? *

	1	2	3	4	
Not well accessible at all	○	○	○	○	Very well accessible

Which Public Transportation modes do you use the most frequently? *

○ Metro / Train

○ Tram

○ Bus

○ Other...

What are the main advantages of the Public Transport in Paris? *

Long-answer text

What are the main disadvantages of the Public Transport in Paris? *

Long-answer text

How can the Fédération Internationale de l'Automobile attract the general public to their FIA Smart Cities initiative?
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Security

The fifth section of this survey is split into 5 questions regarding the security in Paris.

How safe do you feel in the public transport in Paris? *

	1	2	3	4	
Not safe at all	○	○	○	○	Very safe

How safe do you feel in Paris, walking by night? *

	1	2	3	4	
Not safe at all	○	○	○	○	Very safe

How safe do you feel on the roads of Paris (by bicycle, car, motorcycle) *

	1	2	3	4	
Not safe at all	○	○	○	○	Very safe

Have you ever experienced a robbery or vandalism on one of your own transportation mean? *

○ Yes, several times

○ Yes, once

○ No, never

What is the main issue in terms of security in Paris? *

Short-answer text

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FIA Smart Cities Initiative

The survey slowly comes to an end. This penultimate section contains 4 questions linked to the FIA Smart Cities Initiative.

How did you get to know the FIA Smart Cities Initiative? *

○ Motorsport (Formula E, Formula 1 etc.)

○ Social Medias (LinkedIn, Facebook etc.)

○ Work for the Fédération Internationale de l'Automobile

○ I have never heard of this event before

○ Other...

What should an event regarding the (future) mobility of Paris contain in order to attract your attention? *

Short-answer text

How comfortable do you feel with virtually participating on an event/discussion/panel? *

	1	2	3	4	
Not comfortable at all	○	○	○	○	Very comfortable

What social media channels do you use the most frequently? *

☐ LinkedIn

☐ Facebook

☐ Instagram

☐ Twitter

☐ YouTube

☐ Snapchat

☐ Other...

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Personal Details

Congratulation! You have nearly reached the end of this survey! There are only a few demographic questions left, which will allow me to identify patterns and create data groups.

To which of the following age ranges do you belong to? *

○ < 20 years

○ 21 - 30 years

○ 31 - 40 years

○ 41 - 50 years

○ 51 - 60 years

○ > 60 years

To what gender group do you belong to? *

○ Male

○ Female

○ Nonbinary

What is your familial status in your household? *

○ Single without children

○ Single with children

○ In couple without children

○ In couple with children

○ Other...

How can the Fédération Internationale de l'Automobile attract the general public to their FIA Smart Cities initiative?
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Continuation after the survey

Finally, there is only one question left until the end of this survey.

The results of this survey will allow to discover some patterns and trends, however, surveys often only scratch on the surface of the answers. In order to dig below the surface, I would like to hold personal interviews with some of the respondents. This will help to capture personal feelings, perceptions and opinions of the respondents and therefore allow to better understand the given answers. In case you are willing to support this research further by assisting an interview, please answer the following question with yes. In any case your support is highly appreciated and I would like to express my gratitude for your participation. A little time from you changes a lot for me. Thank you!

Would you be willing to participate on a virtual interview session (Skype, Facetime, WhatsApp, Zoom...) with me, in order to help me deepening my understanding about the ongoing mobility challenges in Paris? *

○ Yes, with pleasure I offer you a little bit of my time

○ No, I prefer keeping the details for myself

After section 9   Continue to next section   ▼

Interviews

Thank you so much! I greatly appreciate your approval on an interview. This will allow me to achieve more accurate recommendations for the Fédération Internationale de l'Automobile.

Please enter your preferred communication tool (email address, phone number), so that I can contact you as soon as possible in order to fix an appointment for the interview. *

Short-answer text

How can the Fédération Internationale de l'Automobile attract the general public to their FIA Smart Cities initiative?
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Appendix 12: Survey Questions in French

Section 1 of 10

La Mobilité à Paris

QUELQUES MINUTES DE VOTRE TEMPS PEUVENT FAIRE UNE ÉNORME DIFFÉRENCE.

Dans le cadre de mon bachelor en gestion des affaires internationales à Genève, je rédige actuellement ma thèse de bachelor en collaboration avec la Fédération Internationale de l'Automobile (FIA). La FIA est l'organe directeur du sport automobile et promeut une mobilité sûre, durable et accessible à tous les usagers de la route dans le monde entier. Pour le grand public, la FIA est surtout connue comme l'organe directeur de nombreux événements de course automobile, comme la célèbre Formule 1.

En me basant sur la ville témoin de Paris, j'ai pour objectif de répondre à la question suivante : Comment est-ce que la FIA peut-elle inclure les utilisateurs finaux dans son initiative FIA Smart Cities ?

L'initiative "Villes intelligentes" de la FIA, appelé « FIA Smart Cities initiative », est un événement réunissant la FIA, la Formule E, des responsables municipaux, des acteurs du secteur et des experts en mobilité afin de promouvoir des solutions et des idées en matière de mobilité urbaine sûre, connectée et durable. Afin d'inclure les citoyens parisiens dans un tel événement, leur opinion sur la mobilité de Paris et sur des événements tels que l'initiative "FIA Smart Cities" est cruciale. C'est pourquoi j'ai décidé d'envoyer un questionnaire aux résidents parisiens dans le cadre de mes recherches.

Le questionnaire contient 35 questions et est divisé en sept sections (nombre de questions par section) :
1. La mobilité à Paris (4)
2. Pollution de l'air (3)
3. Congestion du trafic (8)
4. Transports publics (6)
5. Sécurité (5)
6. FIA Smart Cities Initiative (5)
7. Données personnelles (4)

Répondre à cet questionnaire vous prendra environ 10 minutes. Cela peut sembler beaucoup, mais VOS 10 minutes feront une énorme différence dans mes résultats. Je suis très reconnaissante de votre participation et vous remercie d'avance pour votre temps.

Si vous avez d'autres questions, n'hésitez pas à me contacter sur LinkedIn ou par email (maela-karin.welti@etu.hesge.ch)

Cordialement,
Maëla Welti

How can the Fédération Internationale de l'Automobile attract the general public to their FIA Smart Cities initiative?
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Depuis combien de temps habitez-vous dans la Région Parisienne (Île-de-France)? *

○ Quelques mois

○ 1 à 2 ans

○ 3 à 5 ans

○ 6 à 10 ans

○ Plus de 10 ans

○ Je n'habite pas dans la Région Parisienne (Île-de-France)

Dans quel secteur de la Région Parisienne habitez-vous?

○ Centre: Paris (75)

○ Petite Couronne: Hauts-de-Seine (92), Seine-Saint-Denis (93), Val-de-Marne (94)

○ Grande Couronne: Seine-et-Marne (77), Yvelines (78), Essonne (91), Val d'Oise (95)

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La Mobilité à Paris

Pour commencer, 4 questions générales sur la mobilité à Paris vous attendent

A votre avis, quel est le défi le plus important auquel Paris est confronté en termes de mobilité et * de transport?

Short-answer text

Veuillez classer les sujets suivants en fonction de leur priorité d'urgence à Paris, en vous basant * sur votre opinion personnelle.

	1er	2ème	3ème	4ème
La pollution de l'air	○	○	○	○
Congestion du trafic	○	○	○	○
Transports publics	○	○	○	○
Sécurité	○	○	○	○

Dans quelle mesure vous sentez-vous inclus dans le processus de décision du gouvernement * parisien en matière de mobilité et de transport ?

	1	2	3	4	
Pas du tout inclus	○	○	○	○	Très inclus

Dans quelle mesure apprécieriez-vous un échange plus étroit entre les résidents et le * gouvernement local en matière de mobilité et de transport ?

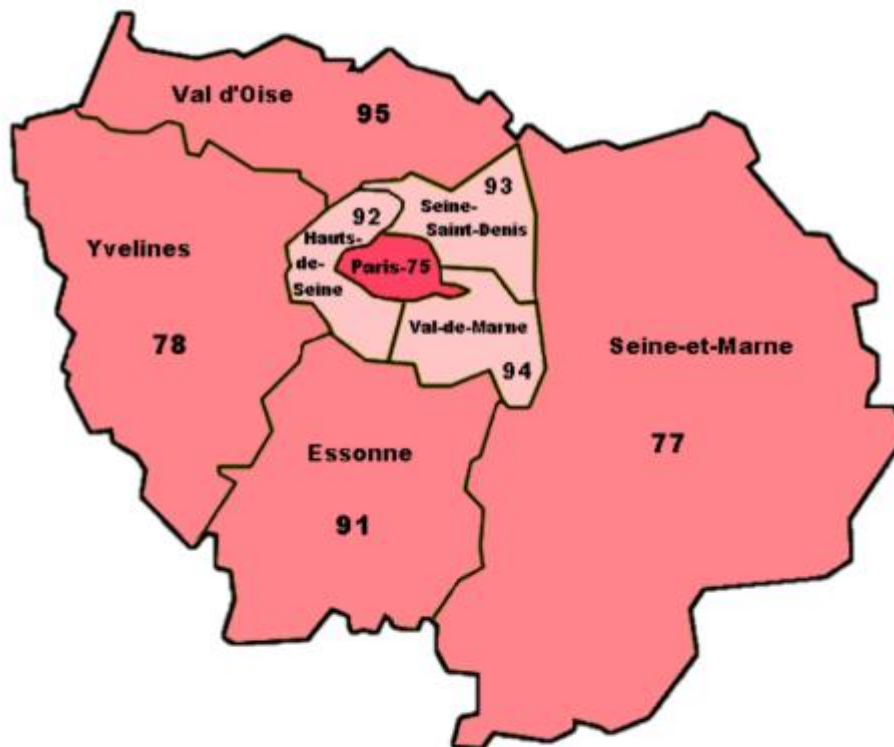|	1	2	3	4	
Pas d'échange plus étroit	○	○	○	○	Un échange beaucoup plus étroit

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Pollution de l'air

× ⋮

Dans cette deuxième partie, 3 questions vous seront posées concernant la pollution de l'air à Paris.

Comment évaluez-vous la qualité globale de l'air à Paris ? *

	1	2	3	4	
Mauvaise	○	○	○	○	Excellent

De quelle manière contribuez-vous à la RÉDUCTION des émissions de polluants atmosphériques *
?

☐ Posséder un véhicule alimenté par un carburant alternatif

☐ Utilisation des transports publics

☐ Réduction du nombre de trajets en voiture

☐ Utilisation du covoiturage

☐ Utilisation d'une bicyclette

☐ Utilisation d'une trottinette

☐ Utilisation d'un motocycle

☐ La plupart des trajets se font à pied

☐ Je ne fais pas particulièrement attention à réduire mes émissions de polluants atmosphériques

☐ Other...

Quelles sont les raisons pour lesquelles vous n'utiliseriez PAS de véhicules à carburants *
alternatifs à Paris ? (électrique, hydrogène, gaz vert, etc.)

Long-answer text

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La congestion du trafic

Dans la troisième partie, 8 questions vous seront posées concernant les embouteillages à Paris. Il s'agit de la section la plus importante des sept parties en termes de nombre de questions.

Quels sont les moyens de transport que vous utilisez principalement pour vous déplacer au travail / à l'école? *

- [ ] Ma propre voiture (diesel ou essence)

- [ ] Ma propre voiture (fonctionnant à l'électricité, à l'hydrogène ou au gaz vert)

- [ ] Covoiturage (par exemple Autolib', Blabla Car ou partage de voitures avec des collègues)

- [ ] Métro

- [ ] Ma propre bicyclette

- [ ] Vélo-partage (par exemple Vélib')

- [ ] Ma propre moto

- [ ] Trottinette

- [ ] A pied (marche)

- [ ] Bus

- [ ] Train

- [ ] Tram

- [ ] Taxi

- [ ] Other...

Pourquoi choisissez-vous les moyens de transport mentionnés ci-dessus pour vous déplacer au travail / à l'école? *

Long-answer text

How can the Fédération Internationale de l'Automobile attract the general public to their FIA Smart Cities initiative?
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Quels sont les moyens de transport que vous utilisez principalement pendant votre temps libre ? *

- [ ] Ma propre voiture (alimentée au diesel ou à l'essence)
- [ ] Ma propre voiture (fonctionnant à l'électricité, à l'hydrogène ou au gaz vert)
- [ ] Covoiturage (par exemple Autolib', Blabla Car ou partage de voitures avec des collègues)
- [ ] Métro
- [ ] Ma propre bicyclette
- [ ] Vélo-partage (par exemple Vélib')
- [ ] Ma propre moto
- [ ] Trottinette
- [ ] A pied (marche)
- [ ] Bus
- [ ] Train
- [ ] Tram
- [ ] Taxi
- [ ] Other...

Pourquoi choisissez-vous les moyens de transport mentionnés ci-dessus pendant votre temps libre ? *

Long-answer text

Comment évaluez-vous le niveau de congestion du trafic à Paris ? *

	1	2	3	4	
Pas de congestion	○	○	○	○	Lourde congestion

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Parmi les moyens de transport suivants, lequel possédez-vous ? *

- [ ] Voiture (alimentée au diesel ou à l'essence)
- [ ] Voiture (alimentée à l'électricité, à l'hydrogène ou au gaz vert)
- [ ] Moto (alimentée au diesel ou à l'essence)
- [ ] Moto (alimentée à l'électricité, à l'hydrogène ou au gaz vert)
- [ ] Vélo ordinaire
- [ ] Vélo électrique
- [ ] Trottinette ordinaire
- [ ] Trottinette électrique
- [ ] Hoverboard, Skateboard
- [ ] Other...

Parmi les SERVICES de transport suivants, lesquels utilisez-vous le plus fréquemment à Paris ? *

- [ ] Partage de vélos
- [ ] Partage de voitures
- [ ] Partage de motos
- [ ] Partage de scooters
- [ ] Je n'utilise jamais les services de transport
- [ ] Other...

Veuillez préciser votre réponse, pourquoi utilisez-vous fréquemment certains des services susmentionnés et d'autres pas ? *

Long-answer text

How can the Fédération Internationale de l'Automobile attract the general public to their FIA Smart Cities initiative?
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Les Transports Publics

Il s'agit de la quatrième section, contenant 6 questions sur les transports publics à Paris.

Quelle est l'efficacité du réseau de transport public à Paris ? *

	1	2	3	4	
Pas du tout efficace	○	○	○	○	Très efficace

Quel est votre degré de satisfaction concernant les technologies liées aux transports publics à Paris ? (vente de billets en ligne, informations sur les arrivées en temps réel, etc.) *

	1	2	3	4	
Pas du tout satisfait	○	○	○	○	Très satisfait

Quel est le degré d'accessibilité des transports publics pour les personnes handicapées ? *

	1	2	3	4	
Pas accessible du tout	○	○	○	○	Très accessible

Quels modes de transport public utilisez-vous le plus ? *

○ Métro

○ Tram

○ Bus

○ Train

○ Other...

Quels sont les principaux avantages des transports publics à Paris ? *

Long-answer text

Quels sont les principaux inconvénients des transports publics à Paris ? *

Long-answer text

How can the Fédération Internationale de l'Automobile attract the general public to their FIA Smart Cities initiative?
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Sécurité

⌄ ⋮

La cinquième partie de ce questionnaire est divisée en 5 questions concernant la sécurité à Paris.

Dans quelle mesure vous sentez-vous en sécurité dans les transports publics à Paris ? *

	1	2	3	4	
Pas du tout en sécurité	○	○	○	○	Très en sécurité

Dans quelle mesure vous sentez-vous en sécurité à Paris, en marchant la nuit ? *

	1	2	3	4	
Pas du tout en sécurité	○	○	○	○	Très en sécurité

Dans quelle mesure vous sentez-vous en sécurité sur les routes de Paris ? (en vélo, en voiture, en moto) *

	1	2	3	4	
Pas sûr du tout	○	○	○	○	Très en sécurité

Avez-vous déjà été victime d'un vol ou de vandalisme sur l'un de vos propres moyens de transport ? *

○ Oui, à plusieurs reprises

○ Oui, une fois

○ Non, jamais

Quel est le principal problème en terme de sécurité à Paris ? *

Short-answer text
....

How can the Fédération Internationale de l'Automobile attract the general public to their FIA Smart Cities initiative?
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FIA Smart Cities Initiative

Nous arrivons gentiment au terme du questionnaire. Cette avant-dernière section contient 4 questions liées à l'initiative Smart Cities de la FIA.

Comment avez-vous connu l'initiative FIA Smart Cities ? *

○ Le sport automobile (Formule E, Formule 1, etc.)

○ Réseaux sociaux (LinkedIn, Facebook, etc.)

○ Travail pour la Fédération Internationale de l'Automobile

○ Je n'ai jamais entendu parler de cet événement auparavant

○ Other...

Que doit contenir un événement concernant la (future) mobilité de Paris pour attirer votre attention ? *

Short-answer text

Dans quelle mesure vous sentez-vous à l'aise pour participer virtuellement à un événement / une discussion / un workshop? *

	1	2	3	4	
Pas à l'aise du tout	○	○	○	○	Très à l'aise

Quels sont les réseaux sociaux que vous utilisez le plus ? *

☐ LinkedIn

☐ Facebook

☐ Instagram

☐ Twitter

☐ YouTube

☐ Snapchat

☐ Other...

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Les Données Personnelles

⌄ ⋮

Vous avez bientôt atteint la fin de ce questionnaire ! Il ne reste plus que quelques questions démographiques ainsi qu'une dernière question concernant la poursuite après le questionnaire. Cela me permettra d'identifier des tendances potentielles et d'analyser plus précisement les résultats.

À laquelle des tranches d'âge suivantes appartenez-vous ? *

○ < 20 ans

○ 21 - 30 ans

○ 31 - 40 ans

○ 41 - 50 ans

○ 51 - 60 ans

○ > 60 ans

À quel groupe de sexe appartenez-vous ? *

○ Homme

○ Femme

○ Non binaire

Quelle est votre situation familiale dans votre ménage ? *

○ Célibataire sans enfant

○ Célibataire avec enfants

○ En couple sans enfant

○ En couple avec des enfants

○ Other...

How can the Fédération Internationale de l'Automobile attract the general public to their FIA Smart Cities initiative?

Maëla WELTI

Poursuite après le questionnaire

Félicitations ! Il ne reste plus qu'une question à répondre.

Les résultats de ce questionnaire permettront la mise en évidence de certaines tendances et habitudes. Cependant, les réponses ne permettent pas d'analyser en profondeur le sujet. C'est pourquoi, j'aimerais mener des entretiens personnels avec certains des répondants. Cela permettra de distinguer les perceptions et les opinions personnelles des personnes interrogées et donc de mieux comprendre les réponses données. Si vous êtes disposé(e)s à soutenir cette recherche en participant à un entretien, veuillez répondre par l'affirmative à la question suivante. Votre soutien est très apprécié et je tiens à vous exprimer toute ma gratitude pour votre participation. Un peu de temps de votre part change énormément pour moi. Je vous remercie beaucoup !

Seriez-vous disposé à participer à une session d'entretien virtuel (Skype, Facetime, WhatsApp, Zoom etc.) avec moi, afin de m'aider à approfondir ma compréhension des défis actuels de la mobilité à Paris ? *

○ Oui, avec plaisir, je vous offre un peu de mon temps

○ Non, je préfère garder les détails pour moi

After section 9   Continue to next section   ▼

Interviews

Merci beaucoup ! J'apprécie beaucoup votre approbation pour une interview. Cela me permettra d'obtenir des recommandations plus précises pour la Fédération Internationale de l'Automobile.

Veuillez indiquer votre adresse email, numéro de téléphone ou autre, afin que je puisse vous contacter le plus rapidement possible pour fixer un rendez-vous pour l'entretien. *

Short-answer text

How can the Fédération Internationale de l'Automobile attract the general public to their FIA Smart Cities initiative?
Maëla WELTI

Appendix 13: Empathy Map

- ▶ Public transportation in Paris
- ▶ Technology of the public transportation in Paris
- ▶ Exchange between Parisian residents and its government in terms of mobility
- ▶ Two-wheeler mobility in Paris (bicycle, scooter, motorcycle…)
- ▶ Cars in Paris
- ▶ FIA Smart Cities Initiative
- ▶ Security in Paris

SAY	THINK
1. It is horrible to charge the Navigo (public transportation) card at the end of the month, because then everyone wants to charge it and this creates huge cues	1. It is unbelievable that there is no possibility to charge the card online
2. We have not enough possibilities to participate in the decision making process of the local government concerning mobility and transportation	2. I wished to have easier tools such as social media in order to ensure a simple, integrated and close relationship with representatives of the local authorities
3. I like to walk in Paris	3. I already pay a lot for the Navigo subscription, why should I additionally pay for another transportation service such as bike or scooter rental.
4. We bicycle- and scooter drivers are the most vulnerable street users	
5. The public transportation connections from the big crown to Paris are not reliable and not regular enough	4. I do not want to lose time stuck in traffic
6. I need some exchange when participating on events	5. I lose a lot of time and energy due to public transportation, but the substitutes are not much better
7. It is nearly impossible for disabled people to use the metro in Paris	6. It is boring to watch events online, I do not feel as part of the event
8. The technology linked to the public transportation in Paris is very bad, especially in terms of live transmission of information	7. It is horrible that it is so challenging for disabled people to use the public transportation in Paris

How can the Fédération Internationale de l'Automobile attract the general public to their FIA Smart Cities initiative?
Maëla WELTI

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9. I feel very safe walking alone during the night in the city of Paris

10. I am not interested in events such as the FIA Smart Cities initiative

11. There are an incredible high number of cars in Paris, leading to air pollution

12. When being by scooter in Paris, I am always very scared

13. I always move by public transport, because it is simply the easiest

14. I don't own a car by myself, because I don't feel the need for it, living in the center of Paris

15. Paris needs better invention in terms of technology and applications linked to public transportation

16. I am too scared to buy my own bicycle

17. The most effective way to attract people to an event such as the FIA Smart Cities, is by using social medias, especially Instagram

18. Being stuck in traffic jam makes me aggressive

19. I would love to be more involved in the decision making process concerning the Parisian mobility

20. Events need to include both, physical and virtual engagement

8. Too bad the technology linked to the public transportation is so bad, because it could be really useful

9. It is more dangerous for women to walk alone during the night in Paris than for men

10. The event must be something for car and motorsport fans

11. I don't want to lose time and energy being stuck in traffic jam

12. I have seen so many bad accidents in Paris with two-wheelers involved, I don't want it to be me one day

13. Scooters are not more than a chaotic and unstructured trend, and bicycles are expensive

14. Owning a car would be too expensive and complicated in terms of parking

15. There is a lot of improvement potential in the technology linked to the metro, if compared to London for example

16. The risk of robbery and vandalism of a bicycle in Paris is enormous, Vélib' has reasonable offers

17. Social media is the most effective communication tool for people aged between 18 and 35

18. I love taking my car, but don't want my mental wellbeing being impacted by it

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21. I wished the public transportation in the "big crown" would be more frequent and regular

22. When going to Paris by car, I count an average of 20 minutes if not more for finding an empty parking spot

23. I do not always feel safe in Paris

24. I am way too scared to ride a bicycle on the streets of Paris

25. Up until now it is free to take a bicycle in the public transportation

26. There is no way to easily share my opinion with the local government about decisions taken regarding mobility in Paris

27. The smell in the public transportations of Paris is disgusting

28. Women get often harassed in public transportations or the streets of Paris

29. I like going to events where I my presence can change something

30. I live in the suburbs and rarely go clubbing in Paris, because public transportation services stop at 0.30 am and then I have only very expensive possibilities left for going back home

19. I am not heavy enough to change anything, I don't know how to raise my voice

20. A 100% virtual event is boring

21. I hate losing time waiting for a public transport, why can't they be as regular as in the city center

22. It is so time consuming to take the car for trips to Paris (from the suburbs)

23. I am cautious, several friends of mine have already been aggressed in Paris, I don't want to provoke anything

24. People drive live crazy in Paris and there are way too many road users on the street

25. I would like to do it, but Public transportations are often so crowded, that people would be annoyed and angry seeing me taking my bicycle in the train

26. The local government deliberately excludes us residents from decisions, but an exchange would be profitable for both sides

27. I feel so dirty after having used a public transportation mean in Paris

28. The city does not do enough to go against the harassment of women, and people rarely help

29. I want to be active, I don't like just listening to people talking

30. I would love to go more often clubbing in Paris

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DO	**FEEL**
1. Pays now on a yearly basis, even though this is very expensive for her as a student.	1. Frustrated, powerless
2. Nothing, because it is feels like one single person has so few power	2. Excluded, unimportant, powerless
3. Has a Navigo, uses the metro frequently	3. Exploited
4. Slaloms between the cars and does not respect street lights	4. unprotected, stressed, angry
5. Still uses the public transportation but schedules in enough time	5. Frustrated, forced, powerless
6. Falls asleep during virtual events	6. excluded, unimportant, sleepy
7. Sees blind people and people in wheel chairs struggling in metros, because the next stops are not always announced are there only few elevators as stair substitution	7. Bad, guilty, inactive
8. Does not trust the live transmission of the public transportation applications	8. Disappointed, frustrated
9. Instinctively avoids some of the streets or metro stations	9. Secure, aware
10. Does not try to inform about the event and does not participate	10. Uninterested, unconcerned
11. Decided not to do the car driver license	11. Disgusted, uninterested

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12. Has chosen to buy a scooter with a security belt and a roof, in order to increase the security	12. Scared, alerted, uneasy
13. Never uses scooters or bicycles	13. Satisfied
14. Rents a car when in need of a transportation mean	14. Disappointed
15. Uses the metro very often	15. Frustrated, unhappy, unsatisfied
16. Regularly rents a bicycle from the bicycle renting company Vélib'	16. Scared, contented
17. Works in an event agency, creates competitions, pictures etc. on social media as communication tools for events on a regular basis	17. Convinced, sure, experienced
18. Avoids going to Paris by car (lives in the big crown)	18. Frustrated, angry, disappointed
19. Does not try to raise his voice	19. Frustrated, controlled, unsatisfied
20. Is active on social media and physically participates on a lot of events	20. Active, interested
21. Waits very often and quite long for the public transportation to arrive	21. Neglected, frustrated
22. Tries to avoid taking the car for trips to Paris (from the suburbs)	22. Unhappy, restricted, frustrated
23. Happens to choose a different direction or avoid a street because of a uneasy feeling	23. Alarmed, aware
24. Chooses public transportation or a car over two-wheeled transportation means in Paris	24. Frightened, scared, uneasy

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25. Still never takes the bicycle in the public transportation	25. Divided, frustrated
26. Keeps his opinion for himself	26. Excluded, bound, held back
27. Tries not to touch anything, and prefers walking or using the bicycle	27. Disgusted, restricted
28. Tries to avoid being alone in the public transportations and the streets in the late/early hours	28. Left alone, scared, unsettled
29. Participates on events with activities, votes and personal exchanges, dislikes virtual conferences	29. Included, important
30. Avoids going to Paris for partying	30. Restricted, frustrated, unhappy

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