

## Reviewer: 1

### Comments to the Author

This article aims to demonstrate how Mobile Big Data is being used to help combat COVID-19 in various countries.

However it lacks general overview of existing methods and various publications on this topic (literature is lacking, which

is crucial for peer-reviewed article and essential for any good article).

Moreover article contains numerous orthographic mistakes, which should be corrected (for example, in the abstract, first line, section 2, third paragraph, etc.). Some sentences are not connected to other paragraphs,

such as in section 4 and should be more integrated in the flow.

In Fig.1 where the movements are shown it is necessary to

- put links to data sources

- explain which mobility index is exactly shown on the figure (from which origin, since mobility data is too general category).

The same is related to Figs.2. It would require more information about the type of mobility (or explain what "total mobility" is).

### Responses to the Reviewer 1's comments

As asked, internally, we revised the article and insert references which have been there, but we haven't included the references at that time. We hope these could provide more general overview and connections with other works done by our peers in this sector.

#### References

1. The advantages of data-driven decision making , Harvard, republished on February 19 2021
2. Mobility data have an endless number of possible reuses. ... Data can also be used to advocate for more pro-transport policies such as improving safety, to develop pollution-reducing solutions, and to create new services to bring more people out of individual cars and into more sustainable options. Sept 24, 2018, datainsight
3. Smartphone penetration worldwide as share of global population 2016-2020 published by S. O'Dea, Jun 2, 2021
4. "The state of mobile data for social good" June 2017 GSMA, UN Global pulse
5. Consumer intelligence, by mobile walla/march, 2020
6. Mapping trajectories and flows: facilitating a human-centered approach to movement data analytics
7. Institut national de la santé et de la recherche médicale is the French National Institute of Health and Medical Research
8. Institut National de la Statistique et des études économiques, <https://www.insee.fr/fr/information/2017499>
9. Population mobility reductions during covid 19 epidemic in France under lockdown report 11 , Published: October 28, 2020, DOI: [https://doi.org/10.1016/S2589-7500\(20\)30243-0](https://doi.org/10.1016/S2589-7500(20)30243-0), ARTICLES| VOLUME 2, ISSUE 12, E638-E649, DECEMBER 01, 2020
10. Forecasting the Number of Firefighters Interventions per Region with Local-Differential-Privacy-Based Data, Héber Hwang Arcolezi, Jean-François Couchot, Selene Cerna, Christophe Guyeux, Guillaume Royer, et al.. Forecasting the Number of Firefighters Interventions per Region with Local-Differential-Privacy Based Data. Computers and Security, 2020, 96, pp.101888 (12). fhal-02993831f  
In order to correct multiple orthographic and paragraph errors, an entire lecture and correction have been made by our external partners and co authors.

In Fig 1, put the links to data sources ( coming from Flux vision generic production in France, which is not Open data source. So, we would not be able to put the data sources link)

Otherwise, for all the required points for fig 1 and fig 2, we have put more explanations like Figure 1 (above). Movement evolution in France. Data from weekly movements in microzones (1400 zones), grouping municipalities of France metropolitan over the whole of France and with a mobility time > 1 hr. In late February the number of journeys was reduced by more than two thirds and remained lower through to the beginning of October. Copyright: Orange. This figure has been reproduced with the permission of the copyright holder, and is not included in the Creative Commons licence applied to this article

Figure 2. Observations of daily movements in and out of the Gombe region, Democratic Republic of Congo. The reference period (shown in grey) is from February to March 2020. The event period, when the pandemic struck (shown in blue) is from mid-March to July 2020. Orange Flux Vision continued to provide insights through to early October 2020, when levels of movements were still slightly below the reference period. Copyright: Orange. This figure has been reproduced with the permission of the copyright holder, and is not included in the Creative Commons license applied to this article.

## **Reviewer: 2**

### **Comments to the Author**

The paper covers its main objective, which is to show the value enclosed in Network Event Data gathered by Mobile Network Operators, and the opportunities associated with these data sharing with governments to enable an enhanced decision-taking process for multiple purposes, from mobility analysis to support new infrastructures design, to crisis management, as it was the case of COVID-19 lockdowns monitoring and effectiveness.

In my humble opinion the paper will be suitable for its publication once its authors develop some clarifications, such as the following aspects.

Minor grammatical and spelling revision should be carried out. Some examples: "For many years, Orange have been providing anonymous population movement analyses" should be "For many years, Orange has been providing anonymous population movement analyses", or "the availability of local technical & IT resources might be a challenge to take the full advantage of Flux Vision in the short term", I understand that should be "the availability of local technical & IT resources might be a challenge to take the full advantage of Flux Vision in the short term". I guess some words are missing in this sentence: "The Spanish economy ministry asked for Orange's help, which provided data its with national institute for statistics."

Further detail could be provided about the statistical adjustment tools used to extrapolate the observations recorded by Orange network, regarding the regional variation on this company market share throughout the territory.

Further explanations about some government's reluctance to use telecommunications data could be provided. Privacy issues are mentioned, but, were the only reasons? Have additional barriers, such as perhaps lack of confidence in the statistical representativeness of the data, been identified?

It is mentioned that in Spain and Belgium, national task forces combined Orange's inputs with other operators' inputs to construct a global national observation tour. Did this aim drive to the implementation of some data aggregation standards in order to enable the combination of data from different providers? what kind of adaptations had to be made?

A great demonstration of the initial hypothesis, that this datasource is useful to enhance public management in a context of crisis and urgent need for data, could be sustained by examples of specific public management decisions that were improved thanks to this high resolution vision on mobility flows.

### **Responses to the Reviewer 2's comments:**

As mentioned and recommended internally, we revised the article and correct the spelling and grammatical mistakes. We have been reviewing with some native speakers' help (GSMA help was huge here) to make clearer the sentences and to apply the right wording and more comprehensive syntaxes .

Regarding extrapolation details, we have tried to explain more in general way of applying the extrapolation process part in France. We are mainly using our market share ( users on orange network) + other types of data that we contain to measure B2C and B2B customer share and local or international visitors.

We are using INSEE's available data set to calibrate our weighing process respecting French administrative zone IRIS which are public data (Institut National de la Statistique et des études économiques, <https://www.insee.fr/fr/information/2017499>)

including an extrapolation process to obtain representative population figures, is executed based on observations made about Orange network users over the whole of France (both French residents and international visitors). The indicators are calculated every day based on the 24 million users of the Orange mobile network. This includes consumer and business customers, as well as international visitors moving around France and temporarily using the networks via roaming agreements. This continuous, whole-country observation is carried out based on INSEE<sup>1</sup> breakdowns into administrative areas of around 50,000 people, and assembled in compliance with personal data regulation.

Further explanations about some government's reluctance to use telecommunications data could be provided. Privacy issues are mentioned, but, were the only reasons? From the explanation that we have had, that was the case. Have additional barriers, such as perhaps lack of confidence in the statistical representativeness of the data, been identified? From our experiences, the produced indicators and delivered results have not been challenged or reviewed because of the lack of confidence in the statistical representativeness of the data. In general, we have this type of challenges or revision requirement when our counterpart has processed delivered data and they are willing to use them. So, once they start to use the delivered indicators, we start to have more questions and sometimes, we are asked to review or to share how the results have come ( step by step explanation and where the real gap could be created between what they were expecting and our data shows). But, in these cases of reluctance to use our deliveries, mainly, the government was not favourable for use of these indicators regarding privacy reason ( formal responses from Maroc) and Sierra leon would'nt go further in production of indicators. Burkina faso has put more than 1 year to authorise the exploitation of data that we have procuded and delivered last year.

It is mentioned that in Spain and Belgium, national task forces combined Orange's inputs with other operators' inputs to construct a global national observation tour. Did this aim drive to the implementation of some data aggregation standards in order to enable the combination of data from different providers? what kind of adaptations had to be made?

Flux vision provided data on request of the Orange affiliate. Orange affiliate has a direct discussion with their relevant government. Spain side, they have published the open data studies as well as Belgium combining all national telco's data creating their own way process and own calibration like it has been done by French institution, INSEE/ INSERM. However, the details of this process has not been followed closely by our side. We executed as a supplier that they have required the data (exempting the extrapolation process). So, they can have a raw view of indicators based on each operator's own customer base. Still anonymised totally. However, we are not sure that we can disclose this type of our Government customer's demand in this paper. So, we stayed about only mentioning about our contribution to this demand.

A great demonstration of the initial hypothesis, that this datasource is useful to enhance public management in a context of crisis and urgent need for data, could be sustained by examples of specific public management decisions that were improved thanks to this high resolution vision on mobility flows.

I think this is a statement from my point of view, not asking one feedback or complementary content about. Do we have a same understanding?

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<sup>1</sup> Institut National de la Statistique et des études économiques, <https://www.insee.fr/fr/information/2017499>