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New mobile traffic data provides a first quantitative evaluation of the 'digital usage gap'

IMDEA Networks researchers have taken a new step in their studies on **the incidence of the 'digital divide'**, after [the work published in January](#), together with the University Carlos III of Madrid (UC3M) and Orange Innovation, on the so-called "usage gap", which refers to how individuals belonging to different social classes, due to diverse digital skills, have contrasting capability to benefit from novel technologies and, therefore, from the services that those technologies enable. This is an emerging cause of social inequality, in the face of which research is striving to provide better understanding and to provide directions for solutions.

The publication '[Second-level Digital Divide: A Longitudinal Study of Mobile Traffic Consumption Imbalance in France](#)', by [Sachit Mishra](#), [Marco Fiore](#) and Zbigniew Smoreda (Orange Labs Paris), presented in April 2022 at the prestigious 'ACM Web Conference', shows the results of the study of the **interaction between the consumption of digital services through mobile devices and levels of urbanization** across France. The data demonstrates, as the study highlights, that there is "an emerging behavior whereby people living in increasingly large and populated urban areas tend to generate higher individual consumption of mobile traffic than those in smaller towns". While such a pattern is not unexpected, the research allowed to quantify for the first time the phenomenon in a precise way: as Marco Fiore, Research Associate Professor at IMDEA Networks, highlights, "we have shown, for example, that **an inhabitant of a city of one million inhabitants generates, on average, about twice as much mobile data traffic as a person in a town of 10,000 inhabitants**".

A critical finding of the study is that the **imbalance in per capita mobile data traffic usage between cities of different sizes** has grown steadily and substantially over the 2014-2019 period in a developed country like France. "One might expect that the spread of 4G mobile broadband connectivity to less urbanized regions would have helped close the gap, but our data shows the opposite." The fact that the digital usage gap increases over time despite similar accessibility conditions for users is a phenomenon that call for further investigations.

The results are the fruit of years of data collection and of the analysis on a massive amount of mobile traffic, including per-service **information on the consumption of the likes of Twitter, Instagram or Tik Tok** that showed how also individual apps are affected by the same disparity in usage. "We explored multiple potential confounding factors, such as income, education or age of people residing in larger and smaller cities in France, but none is sufficient to explain the difference we observed," Dr. Fiore notes.

Dr. Fiore also highlights the great effort involved in this research: "The big challenge we faced and had to solve was the scale of the study. **We used terabytes of data on thousands of**

cities and tens of thousands of radio sites, and we had to merge these data while dealing with measurement errors, inconsistencies and outliers. The research group's competencies in the big data processing platform and data analytics were key to addressing these issues."

This research paves the way for further study and provides valuable clues for intervention by public administrations, shedding light on an interesting area for reflection on the so-called 'second digital divide'.

Source(s): IMDEA Networks Institute

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About us

IMDEA Networks Institute, promoted by the Regional Government of Madrid, is a research organization on computer and communication networks whose multinational team is engaged in cutting-edge fundamental science and technology. As a growing, English speaking institute located in Madrid, Spain, IMDEA Networks offers a unique opportunity for pioneering scientists to develop their ideas. IMDEA Networks has established itself internationally at the forefront in the **development of future network principles and technologies**. Our team of highly-reputed researchers is designing and creating today the networks of tomorrow.

Some keywords that define us: 5G, Big Data, blockchains and distributed ledgers, cloud computing, content delivery networks, data analytics, energy-efficient networks, fog and edge computing, indoor positioning, Internet of Things (IoT), machine learning, millimeter-wave communication, mobile computing, network economics, network measurements, network security, networked systems, network protocols and algorithms, network virtualization (software defined networks – SDN and network function virtualization – NFV), privacy, social networks, underwater networks, vehicular networks, wireless networks and more...

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