

Understanding urban issues through credit cards

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Digital traces from credit card and mobile phone usage can be used to map urban lifestyles and understand human mobility, according to a report led by UCL, MIT and UC Berkeley.

Credit Card Records (CCRs) are currently used to measure similarities in purchasing activity, but for the first time researchers have used the data along with Call Detailed Records (CDRs) to understand the daily rhythms of [human mobility](#) and communication.

Combining both reveals patterns in citizens' socio-economic behaviours.

For the study, published today in *Nature Communications*, researchers used anonymous and aggregated [credit card](#) data from a major city, with the results allowing them to group the urban population into six clusters.

Older women dominated the 'Homemaker' cluster and tended to have the least expenditure and mobility, with their core transaction being grocery shops. The 'Commuters' cluster was mainly men who lived the farthest from the city centre.

Young people can be split into two groups, with the younger having taxis as their core transaction. The slightly older group also has computer networks and information services, with a higher than average expenditure and operating mainly within the city centre.

The research, conducted in collaboration with Grandata and UN Global Pulse, is part of a wider project funded by the United Nations Foundation and the Gates Foundation to investigate the economic, social and health status of women and girls in developing countries.

Lead researcher Dr. Riccardo Di Clemente (UCL Centre for Advance Spatial Analysis), said: "Our approach brings together human mobility behavioural dynamics with socio-economic and demographic information.

"This may enable policymakers to make more informed decisions about resource allocations to address socio-economic inequality, economic

growth and improve social cohesion."

Principal investigator Professor Marta C. Gonzalez (UC Berkeley College of Environmental Design), said: "Mobile phone data is already used for transport planning. Through this research we found that [credit card data](#) can allow us to understand how groups of citizens move and communicate, as well as revealing their spending patterns.

"The method gives us a lot of information from data passively collected worldwide, uncovering purchase sequences of uses by type and their role in their space and social network."

The team found that analysing CCRs together with CDRs reveals how women cope with stressors such as recessions and macroeconomic policy shifts, and could be used when planning systems to enable more women to use mobile money rather than carry cash.

The method and results can be used when designing and managing effective social protection systems in developing countries and could be particularly valuable for urban development, such as planning infrastructure and mapping neighbourhoods.

More information: Riccardo Di Clemente et al, Sequences of purchases in credit card data reveal lifestyles in urban populations, *Nature Communications* (2018). [DOI: 10.1038/s41467-018-05690-8](https://doi.org/10.1038/s41467-018-05690-8)

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