

Dimension	Variable	How it can bias mobile phone–based mobility	C
Demographic	Household size	Larger households often share devices and plans, reducing per-person digital visibility; children and older adults are less likely to have active smartphones, biasing observed mobility.	F v
	Female	Gendered differences in smartphone ownership, privacy settings, and app usage patterns can alter detection of trips and time-of-day activity, shifting inferred flows.	F a
	Age bands	Smartphone ownership and background location use peak in working-age groups and are lower among children and older adults, producing under-representation at the age extremes.	F 1
Socioeconomic	Socioeconomic classification	NS-SEC captures income, contract type and work routines that correlate with device affordability, data plan size, and location-sharing intensity—affecting who is captured and when.	F b S
	Qualifications	Education relates to digital literacy and propensity to enable location permissions or use navigation/platform apps, increasing detectable movement for highly educated groups.	F b le
Resource accessibility	Deprivation	Material deprivation is linked to lower smartphone ownership and prepaid data strategies; users may disable background location to save data/battery, reducing trace density.	F h d
	Car ownership	Households without cars are more transit- or walking-oriented, which can have gaps (e.g., underground) and shorter trips; car ownership also proxies resources for devices/data.	F v
	Home ownership	Owner-occupation signals residential stability and higher digital access, improving home inference and persistence of traces; private renting can increase churn and misclassification.	F tl
	Central heating	Absence of central heating proxies housing deprivation; lower resources can limit device quality and data plans, decreasing continuous location capture.	F v
Mobility	Non-UK born	Migrant populations may use foreign SIMs, multiple devices, or app ecosystems with different location defaults, and cross-border operator issues can reduce representativeness.	F a
	Recent migrant	High residential and job churn plus pay-as-you-go usage increase ID instability and under-capture of routine trips, biasing origin–destination estimates.	F r tl
	Commuting	Work-from-home and irregular or multi-site work patterns violate standard home–work heuristics; mode-specific coverage (e.g., tunnels) further skews detectable commuting.	F v
Geographic	Population density	Dense urban areas have better app adoption but suffer GPS multipath and tower contention; sparse areas have coverage gaps—both distort measured trip rates and distances.	N s
	Rural	Rural settings have weaker network coverage and older age structures with lower smartphone penetration, leading to fewer, noisier traces and undercounted mobility.	F li