SUPPLEMENTARY MATERIAL

1.1. Analysis of mode shift with different types of social networks

Figure 2 illustrates the first step of the simulation for a preferential attachment network. It connects unsatisfied people with high uncertainty, who compare their own satisfaction to that of their peers to shift the transport mode if the expected satisfaction with the others' modes is higher.

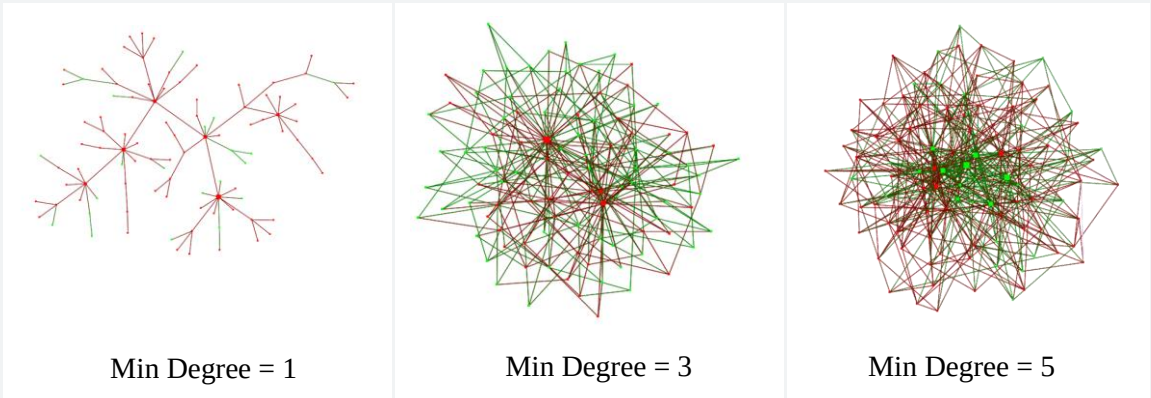


Figure 2. Illustration of preferential attachment network with different degrees. The nodes are sized by their total degree and colored by the number of accumulated changes, from green (less changes) to red (more changes).

For each type of social network in both groups, imitators and inquirers, we generate the graphs over the 10-time steps to analyze how node size (total degree centrality) and node color (accumulated number of changes) are related at each tick. ORA software was used to calculate network metrics and generate network graphs (Netanomics, 2023).

In Figure 3 we present the average accumulated changes over the ten years for each type of network for inquisitive people. Most changes occur in denser networks and people connected through preferential attachment structures change more than those in random networks.

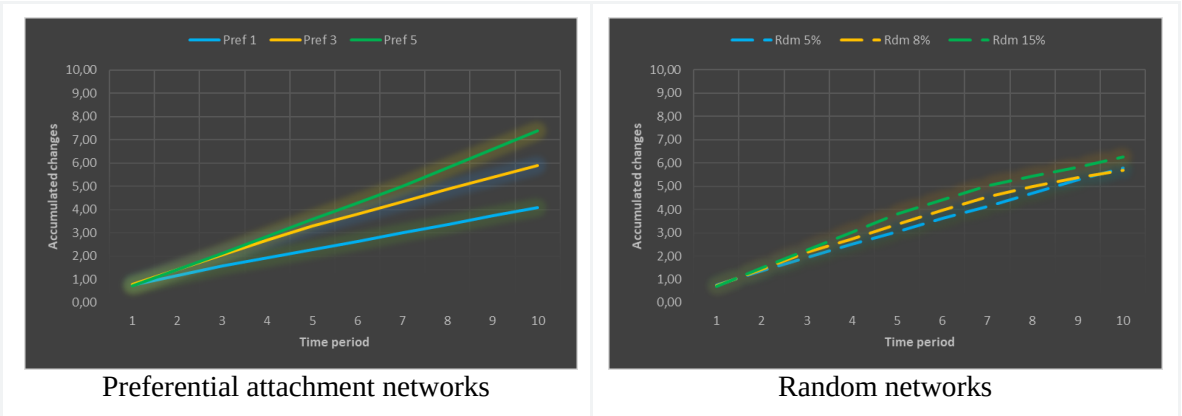
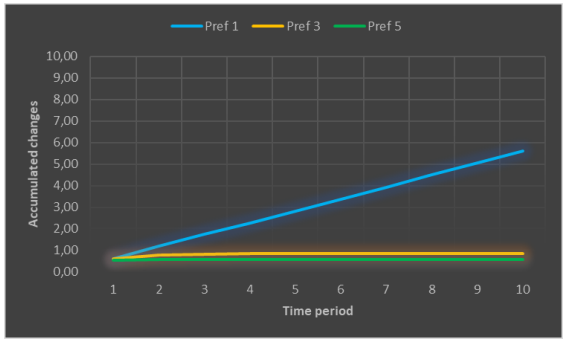
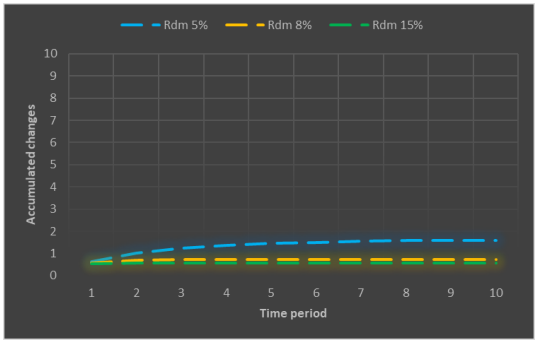


Figure 3. Average changes for inquirers across time for random networks varying by low, medium and high probability of connection

Figure 4. shows how imitative people rapidly converge to use the same transport mode in medium and high degree networks. Thus, the total amount of changes is considerably lower compared to inquisitive people. However, the highest number of changes occur in the low connected networks for these group of people where there is little coordination. It is also noticeable that agents in random networks converges faster than agents in preferential attachment structures.



Preferential attachment networks



Random networks

Figure 4. Average changes for imitators across time for preferential attachment networks varying by low, medium and high degree

Table 1 describes the parameters used to run the simulation using the setup of the Colombian city taken as a reference for a developing country.

Table 1. Setup used to run simulations with empirical data from Cali city.

Parameters	**Value**	**Sources**
Probability accident rate motorcycle	0.2	Data base. City Security Observatory
Motorcycles registries	233875	Data base. City Transit Authorities
Insecurity incident rates	0.2 %	(Alcaldia de Bogota, 2023)
Average speed motorcycle	60 km/h*	*Máx speed allowed in the urban area in the city
Average speed car	35 km/h	(Alcaldia de Bogota, 2023)
Average transport speed public	20 km/h	(Alcaldia de Cali, 2023)
Relative costs motorcycles	0.7	(AKT, 2023; Auteco, 2023; Incolmotos Yamaha, 2023)
Relative costs cars	0.5	(Chevreolet, 2023; Kia, 2023; Nissan, 2023; Renault, 2023)
Emissions motorcycle	126 CO2(g/km)	(Ghaffarpasand et al., 2020)
Emissions car	204 CO2(g/km)	(Cherry, 2009)
Efficiency motorcycle	120 mpg	(AKT, 2023; Auteco, 2023; Incolmotos Yamaha, 2023)
Efficiency car	50 mpg	(Chevreolet, 2023; Kia, 2023; Nissan, 2023; Renault, 2023)

Operating costs for cars and motorcycles include fixed components such as insurance and annual taxes, and the variable portion refers to fuel consumption costs. Acquisition cost is an average of market prices for the

most representative brands in the country. These values are scaled from 0 to 1 to obtain a relative cost between cars and motorcycles which is used as a input for the satisfaction function.

REFERENCES

AKT. 2023. ‘Motos’, 2023.https://www.aktmotos.com/motos, accessed 25 March 2023.

Alcaldia de Bogota. 2023‘Traffic. Movilidata’. 2023 <https://transport.opendatasoft.com/pages/trafico, accessed 20 April 2023.

Alcaldia de Cali. 2023 ‘Velocidad Comercial Ejecutada Por La Flota Del Sistema Integrado de Transporte Masivo – SITM-MIO’, https://www.cali.gov.co/observatorios/publicaciones/140985/observatorio-movis-velocidad-comercial-ejecutada-por-la-flota-del-sistema-integrado-de--transporte-masivo--sitm-mio, accessed 20 April 2023.

Auteco.2023.‘TVS’. https://www.auteco.com.co/motos-tvs, accessed 18 April 2023.

Cherry, Christopher R.., Weinert, Jonathan X.. & Xinmiao, Y. 2009. “Comparative environmental impacts of electric bikes in China”. Research Part D: Transport and Environment, 14(5), 281-290. https://doi.org/10.1016/j.trd.2008.11.003

Chevreolet. 2023 ‘Vehiculos’.https://www.chevrolet.com.co/carros, accesed 20 April 2023.

Ghaffarpasand, O., Talaie, M., Ahmadikia, H., Khozani, A., Shalamzari, M. & Majidi, S. 2021. “Real-world evaluation of driving behaviour and emission performance of motorcycle transportation in developing countries: A case study of Isfahan, Iran”. Urban Climate, 39. https://doi.org/10.1016/j.uclim.2021.100923

Incolmotos Yamaha. 2023.‘Vehiculos’. https://www.incolmotos-yamaha.com.co/vehiculos, accessed 18 April 2023.

Kia. 2023. ‘Automoviles’. https://www.kia.com.co/nuestros-vehiculos, accessed 18 April 2023.

Netanomics. 2023.‘Products. ORA’.https://netanomics.com/products-2, accessed 18 April 2023.

Nissan.2023. ‘Vehiculos Nuevos’, 2023 <https://www.nissan.com.co/vehiculos/nuevos.html, accessed 20 April 2023.

Renault.2023. ‘Vehiculos Personales’, 2023 <https://www.renault.com.co/vehiculos.html, accessed 20 April 2023.