**Problem Description:**

There is a big problem of plastics waste ending up in the unintended places or environment. The idea of this project is to explore and understand the locations of some key touch points, facilities and stakeholders in the plastic supply-chain (like plastic manufacturers, supermarkets, plastic recyclers) who can influence and help tackle the issue. The project will compare these clusters within a developed city like London and compare to those in a rapidly developing city like Lagos, Nigeria. The results will present locations of facilities and resources that stakeholders (like consumers, entrepreneurs, product designers and waste management policy makers) will find helpful when they are trying to dispose plastic waste, source recycled materials to design products and where to establish new waste handling facilities.

**Background:**

Densely populated cities like London and Lagos are big generators of waste in general and waste management is a key issue to keep atop of. Time poor urban dwellers are heavily reliant on convenient groceries and products that are mostly packaged in single-use plastics to ensure the products reach the consumer safely and last till the desired expiration. This dependence on single-use plastics has led to decades of piling plastic wastes that are not recycled. Fortunately, there have been increasing awareness of the damages that plastic wastes in particular cause to our environment and wildlife, especially when they are not recycled and end up in unintended/undesirable locations like water bodies and landfills. This is thanks to documentaries like Blue Planet II by Sir David Attenborough in 2017 and organisations like The Ellen MacArthur Foundation who highlight the dangerous impacts of unmanaged plastic waste that will eventually enter the human food chain.. For instance, it is estimated that one in three sea birds have at least one component of plastic in their guts. Also, by 2050 it is estimated that there will be more plastics in the ocean than fish if we continue to use and dispose plastics indiscriminately, as unrecycled plastic litter float adrift in streams and water bodies into oceans. (<https://www.nationalgeographic.com/news/2017/07/plastic-produced-recycling-waste-ocean-trash-debris-environment/>, <https://cleanstreets.westminster.gov.uk/plastic-waste-complete-guide/#2>)

There is a challenging balance to strike because our modern global lifestyles currently rely a lot on plastics in many industries from automotive, construction to food packaging to name a few. Solving such a big problems requires the involvement of many stakeholders in the supply-chain of plastics packaging ranging from resin manufacturers, packaging manufacturers, brand manufacturers, professional packaging consultants, distributors, supermarkets and consumers to waste management bodies. Packaging professionals help brands design and select the right/sustainable materials and are key to determining if a packaging will be recyclable or not. Supermarkets are major points at which plastic-packaged food/other items are collated before being purchased by end-users. Consumers need to know how and where to dispose their plastics and plastic recyclers are the final 'gate' locations that help prevent plastics waste escaping/ending in undesired locations. This project will aim to find and overlay the locations of supermarkets, plastic packaging manufacturers and plastic recycling points over a map of a developed city where there is some 'perceived' good level of waste management, and compare to a developing city like Lagos with challenging waste management issues. This comparison may bring about insights that can influence consumer disposal behaviour and other policy/decision makers to decide if, how and where to invest resources that can help to substantially reduce the leakage of plastic packaging into undesired environments.

**Data Description:**

The sets of data to be used in the project are:

1. Location coordinates of supermarkets and hyper-markets within 30km radius of a central neighbourhood/point in London and Lagos. (Tower of London, and Lagos state Polytechnic, Isolo Campus). (Data source: Foursquare API).

2. Location coordinates of plastics packaging manufacturers within 30km radius of a central neighbourhood/point in London and Lagos. (Tower of London, and Lagos state Polytechnic, Isolo Campus). (Data source: Foursquare API).

3. Location coordinates of plastic recyling points/recyclers within 30km radius of Tower of London and Lagos Polytechnic.   
(Data source: Foursquare API).

4. Location coordinates of packaging professional consultancies within 30km radius of Tower of London and Lagos Polytechnic. (Data source: Foursquare API).

5. The population of London. (Data source: <https://populationstat.com/united-kingdom/london>)

6. The population of Lagos. (Data source: <https://worldpopulationreview.com/world-cities/lagos-population>)

7. Tonnage of plastic wastes generated and recycled proportions in London and Lagos (Latest historical of 2018). <https://www.circularonline.co.uk/news/londoners-plastic-recycling-could-build-the-shard-5-times/>

<https://businessday.ng/businessday-investigation/article/plastic-waste-chokes-lagos-despite-potential-billion-naira-recycling-industry/#:~:text=In%20essence%2C%20about%202%2C250%20tons,a%20USD%20250%20million%20industry.>

<https://ourworldindata.org/plastic-pollution#mismanaged-plastic-waste>

**How the data will be used:**

Foursquare API will be used to explore the businesses around a 30km radius of a 'central' city location in London and Lagos. The businesses will be explored and their categories will be used to identify the type of business - whether supermarket, packaging manufacturer or plastic recycler. A k-means cluster analysis will be conducted to see how the businesses are grouped. The results of clusters will be overlaid on a map of the cities. Then a comparison of the clusters in London and Lagos will be made, (whilst taking into account the city population and per capita plastic waste generation) to identify any similarities or differences that can provide useful insights to stakeholders towards reducing the escape of plastic waste into unintended environment.