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Priority Areas for Life Insurance Marketing Campaign

1 Introduction

Life insurance is a product in which an insurer pays contracted money to a beneficiary in the event of the insured's death. The start-up company that sells life insurance policies plans to launch a marketing campaign and seek advice for its effective execution.

2 Project Overview

This project aims to provide bespoke insights to the company on identifying the most suitable areas in London for a life insurance marketing campaign. The campaign is designed to target those who are retiring in some years or have retired recently, have middle to high disposable income, and do not own life insurance yet. This project uses the geodemographic dataset originally from the UK Census 2011 and other relevant data from the Consumer Data Research Centre (CDRC) and Office for National Statistics (ONS), such as average annual income, housing price and number of births. The study area is the 2011 Middle layer Super Output Areas (MSOAs) in London, UK (Figure 1). Table 1 summarises the project overview.

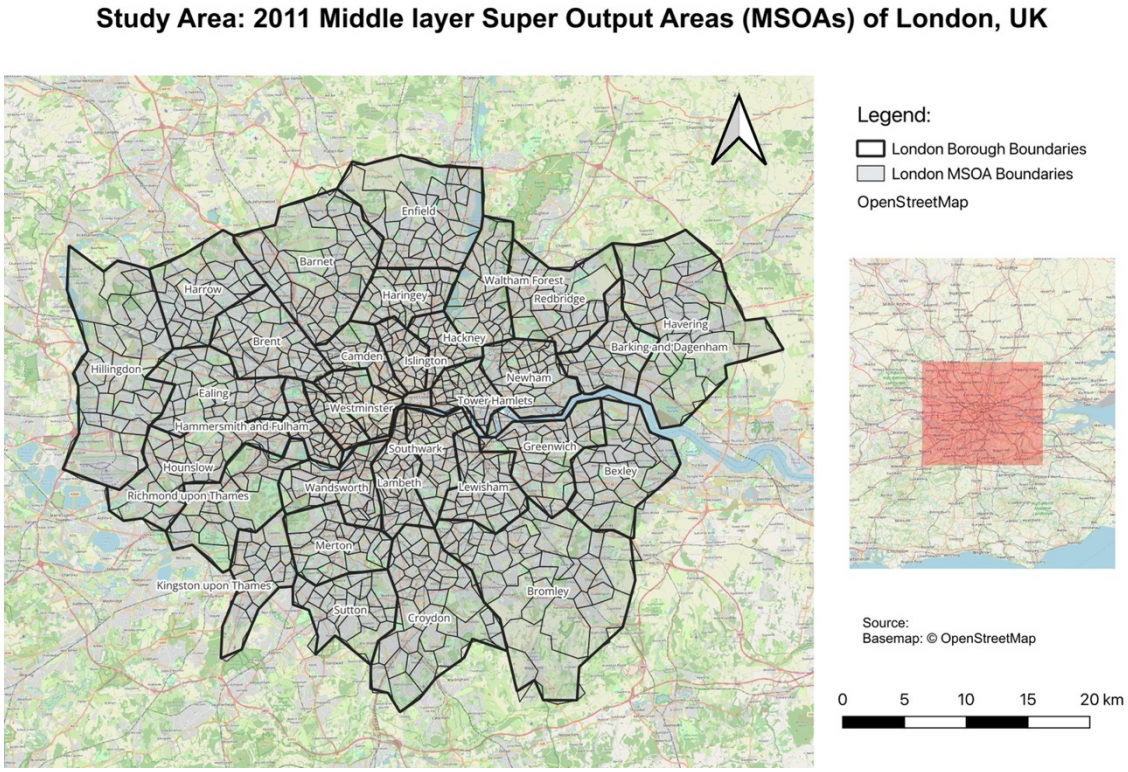

Figure 1 Map of Study Area

Table 1 Project Overview

Item	Description
Project aim	To identify the optimal areas in London for life insurance marketing campaign.
Target consumer profile	Individuals who are retiring in some years or have retired recently, have middle to high disposable income, and do not own life insurance yet.
Study area	2011 MSOAs within London, UK
Data to be used	Dataset provided by the University of Leeds - UK Census 2011 - Consumer Data Research Centre (CDRC) - London data store, Office for National Statistics (ONS)

3 Literature Review

Geodemographic approaches are commonly employed in marketing, especially for customer profiling. A geodemographic approach categorises demographic features such as age, sex, employment status, and income by geographic areas. Leventhal (2016) emphasises the effectiveness of launching a marketing campaign targeting specific geographical areas where potential demographic groups exist. Various geodemographic methods are available, such as neighbourhood classification and spatial indexing.

Various previous works discuss the characteristics of life insurance and influential factors on its purchases. Yaari (1965) asserts that taking out life insurance is equivalent to eliminating uncertainty from insured individuals' allocation decisions. Wang (2019) supports this assertion and insists that life insurance ensures the life standard of family dependents by providing financial protection in the event of the death of an insured wage earner. Due to the nature of life insurance, individuals who are concerned about financial vulnerability in the future and seek protection for their dependents tend to take out life insurance. Burnett and Palmer (1984) analysed demographic factors affecting life insurance ownership and concluded that individuals with higher incomes, higher educations and more children are more likely to own life insurance, which does not conflict with the role of life insurance. Furthermore, Dragos et al. (2017) insist that those with higher educational levels are more likely to understand complex life insurance products and their benefits and have a higher risk aversion.

4 Methodology

This project creates a priority index for life insurance marketing to identify potential areas effectively. The priority index is calculated for each MSOA in London by summing up some variables from the provided dataset to consider multiple factors influencing insurance policy purchases.

This approach is advantageous in that the calculation is easier to understand for every end-user, which also brings better accountability for the result. Furthermore, the priority index gives scores to each MSOA, which is helpful for determining priorities for the target to allocate the company's resources. On the other hand, the shortcoming of this methodology is that the contributions from each variable

to the priority index can be missed in the final output. In order to supplement this, this project provides the distributions of all the selected variables across London as well as the final result of priority index distribution.

This project employs the analysis steps in Table 2. As a first step, suitable demographic variables are selected from the dataset according to the literature review, which identifies the influential variables on consumer behaviours. In the second step, the descriptive statistics of the selected variables, such as distributions and correlations of variables, are explored. This step includes standardising variables by z-score transformation to make them comparable, which is necessary if the units of the variables greatly vary. The third step is to develop the priority index for all the MSOAs in London using the standardised variables. Lastly, the optimal MSOAs to target the first marketing campaign are identified.

Table 2 Steps of Analysis

Step	Item	Description
1	Variable selection	Select most suitable variables for constructing the priority index based on the literature review.
2	Descriptive statistics of the variables	Understand the statistical information of the variables. - Distributions of variables and correlation matrix to examine relations between the variables. - Standardisation of the variables.
3	Developing priority index	Calculate the priority index for each MSOA in London using the standardised variables (z-scores).
4	Identifying MSOAs with higher priority	Identify the optimal MSOAs within London to target the first marketing campaign.

5 Analysis and Result

5.1 Step 1: Variable Selection

5.1.1 Selected Variables

The variables in Table 3 were selected based on the literature review. As this project develops a priority index, which is an additive index, the variables that contribute to targeting the areas with high potential were selected. In other words, the conditions of these variables provide consumers with a positive motivation to take out a life insurance policy.

Table 3 Selected Variables and Definitions

No.	Variable Name	Definition
1	Average annual income	The average annual income in the MSOA.
2	% Population aged 60 to 64	The percentage of population aged 60 to 64 against the total population in the MSOA.
3	% Level 4 qualification	The percentage of population aged 16 to74 of which the highest qualification is level 4 and above against the total population aged 16 to 74 in the MSOA.
4	Average schoolchildren and students	The average number of schoolchildren and full-time students aged 16 and over per household in the MSOA.

No.	Variable Name	Definition
5	Population	The total population in the MSOA.

(1) Average annual income

The "average annual income" variable helps to discover areas with individuals whose income level is middle to high, in accordance with the campaign target. As supported by Burnett and Palmer (1984), individuals with higher incomes are more likely to take out life insurance.

(2) % Population aged 60 to 64

The "% Population aged 60 to 64" variable was selected as the campaign targets those who are going to end their working lives soon or have recently retired. According to GOV.UK. (2024), the default retirement age (a forced retirement age of 65) has been abolished, and employees may work for as many years as they wish, regardless of age. The state pension age in the UK is set at 66 years old as of 2022; however, it is planned to gradually increase to 68 by 2038 in several phases due to the ageing population (Boado-Penas et al., 2023). As the most common retirement age is expected to be close to the state pension age, it is reasonable to set the age group 60 to 64 for the target consumers. Furthermore, as life insurance is required by those who are concerned about their dependents and the campaign targets those who are not covered with life insurance yet, the older age group than 60 to 64 is considered not suitable.

(3) % Level 4 qualification

The variable "% level 4 qualification" helps to identify areas where a higher proportion of individuals with higher education reside. This "level 4 and above" group represents the highest qualification category. As Dragos et al. (2017) support, those who have a high level of qualifications are more prone to be keen on life insurance.

(4) Average schoolchildren and students

The variable "average schoolchildren and students" indicates the average number of dependent children per household. This variable is calculated by dividing the number of schoolchildren and students by the number of households in the MSOA. As Wang (2019) asserts, those have more children to support are more likely to purchase life insurance.

(5) Population

The variable "population was selected as it indicates the size of the market, as a larger population means a higher probability of potential consumers. Thus, allocating more marketing budget toward areas with larger populations enables efficient and effective marketing.

5.1.2 Polarity of Variables

The polarity of variables, which indicates whether each variable has a positive or negative effect on the priority index to be developed, should be examined while taking into account the index's purpose. All the selected variables have the same polarity this time, meaning that positive values have positive contributions to the priority index.

5.2 Step 2: Descriptive Statistics of Variables

Table 4 describes the correlations between the variables. While the correlation between "Average annual income" and "% Level 4 qualification" is high at 0.762, the correlations between other variables are not considered high. These low correlations suggest that these variables have different distribution patterns. As the priority index aims to comprehensively assess the MSOAs from multiple independent perspectives, the low correlations support this purpose.

Table 4 Correlations between Variables

	Population	Average Annual Income	% Population aged 60 to 64	% Level 4 qualification	Average schoolchildren and students
Population	1	-.119**	-.226**	-.060	.109**
Average Annual Income	-.119**	1	.375**	.762**	-.323**
% Population aged 60 to 64	-.226**	.375**	1	-.004	-.452**
% Level 4 qualification	-.060	.762**	-.004	1	-.223**
Average schoolchildren and students	.109**	-.323**	-.452**	-.223**	1

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5 describes the variables' descriptive statistics, and Figure 2 illustrates box plots of variable distributions. As shown in Table 5, the distributions of the five variables greatly vary, as some are percentages, while the others are in different units. It suggests that standardising variables is necessary to transform them into comparable ones. For the standardisation process, this project employs the z-score. A Coefficient of Variation (COV) enables the comparison of the variability of variables with different units or scales. The COV is the largest in the "Average schoolchildren and students" variable, which suggests that the variable varies the most across MSOAs in London compared to the others. On the other hand, the COV of the "population" variable is the smallest, suggesting that the population of each MSOA does not vary as much as other variables.

Table 5 Descriptive Statistics of Variables

	Population	Average annual income	%_Population aged 60 to 64	%_Level 4 qualification	Average schoolchildren and students
count	983.000000	983.000000	983.000000	983.000000	983.000000
mean	8315.301119	51379.959308	4.242757	39.987813	0.219797
std	1448.361564	10766.540120	1.309062	13.974056	0.112664
min	5184.000000	32000.000000	1.360000	12.380000	0.070000
25%	7337.500000	43700.000000	3.250000	28.980000	0.150000
50%	8156.000000	49400.000000	4.080000	37.960000	0.190000
75%	9110.000000	57200.000000	5.065000	50.245000	0.260000
max	14719.000000	105700.000000	9.100000	75.960000	1.130000

	Population	Average annual income	%_Population aged 60 to 64	%_Level 4 qualification	Average schoolchildren and students
COV	0.1741	0.2094	0.3084	0.3493	0.5123

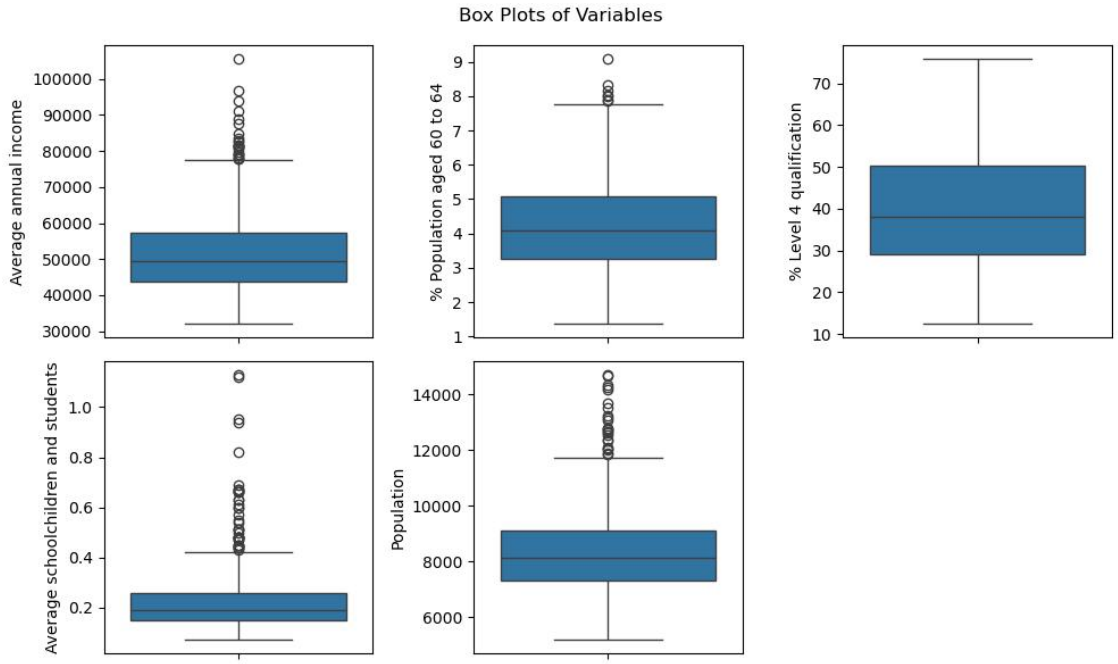

Figure 2 Box Plots of Variables

Table 6 describes the standardised variables' descriptive statistics, and Figure 3 illustrates box plots of standardised variable distributions. It should be noted that many outliers are observed in the variable "Average schoolchildren and students," which has the smallest interquartile range, while the variable "Level 4 qualification" has the largest interquartile range.

Table 6 Descriptive Statistics of Standardised Variables (z-score)

	Z_Population	Z_Average annual income	Z_% Population aged 60 to 64	Z_% Level 4 qualification	Z_Average schoolchildren and students
count	9.830000e+02	9.830000e+02	9.830000e+02	9.830000e+02	9.830000e+02
mean	3.051882e-08	3.051882e-08	-1.525941e-07	-1.017294e-08	8.138352e-08
std	1.000000e+00	1.000000e+00	1.000000e+00	1.000000e+00	9.999999e-01
min	-2.161960e+00	-1.800020e+00	-2.198380e+00	-1.975950e+00	-1.365400e+00
25%	-6.751050e-01	-7.133200e-01	-7.578900e-01	-7.879800e-01	-6.472550e-01
50%	-1.099900e-01	-1.839000e-01	-1.265200e-01	-1.449800e-01	-2.282300e-01
75%	5.486900e-01	5.405700e-01	6.288400e-01	7.340600e-01	3.609100e-01
max	4.421340e+00	5.045260e+00	3.711020e+00	2.573920e+00	8.107240e+00

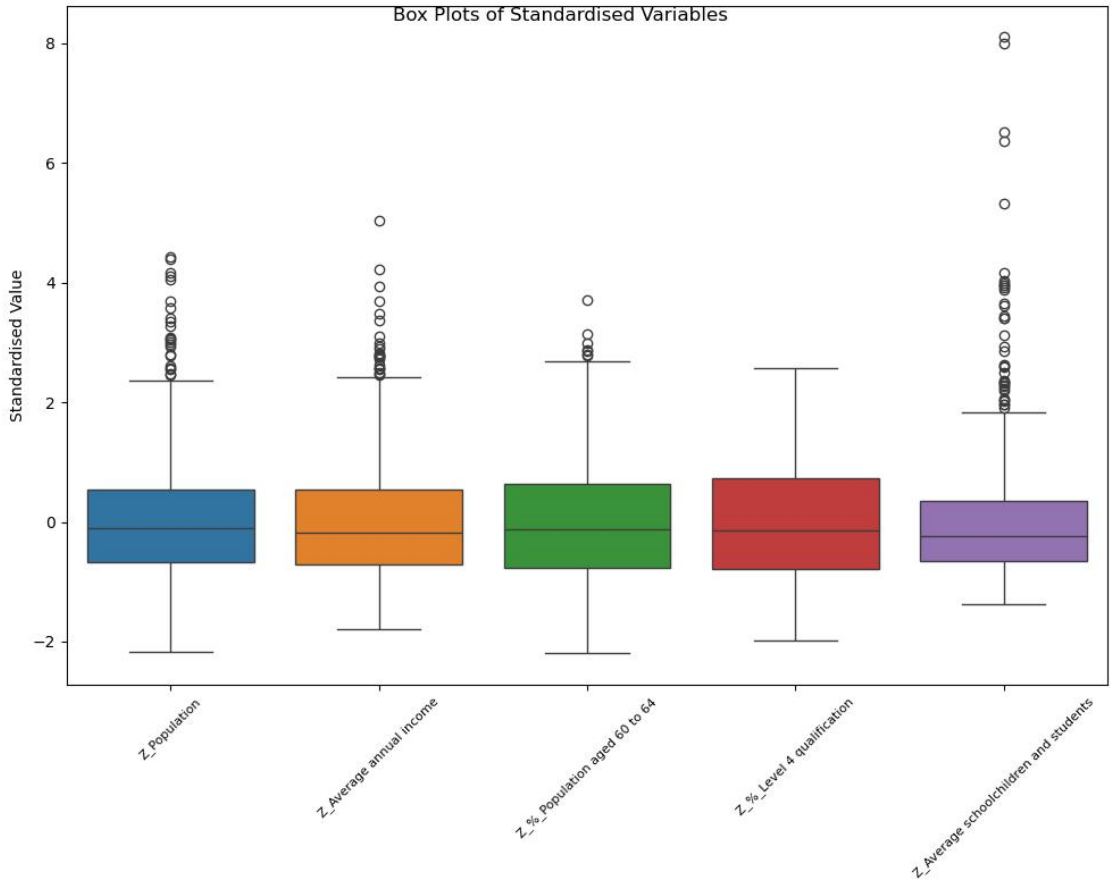

Figure 3 Box Plots of Standardised Variables (z-score)

5.3 Step 3: Developing Priority Index

The priority index was calculated by summing the standardised variables of each MSOA within London without weightage to assess all the variables equally, considering the result's transparency. The simple method of constructing an additive index contributes to higher accountability for the result as well.

5.3.1 Population

As Figure 4 illustrates, MSOAs with large populations are evenly distributed and do not exhibit unique patterns. This can be attributed to the fact that MSOAs are composed of a group of Output Areas (OAs), which are designed to include similar populations.

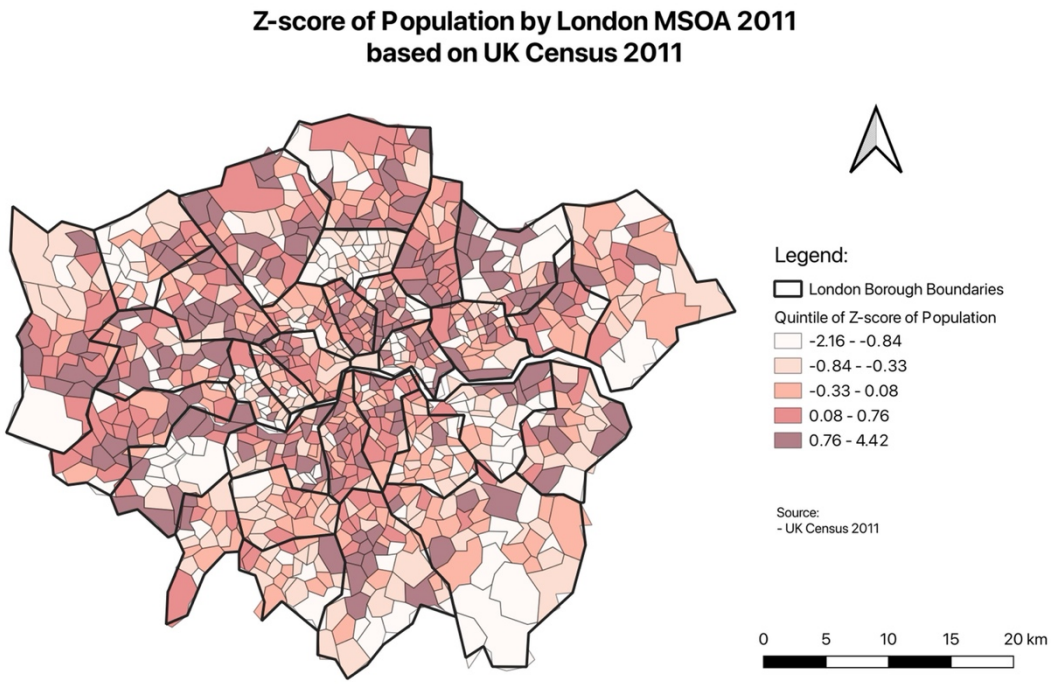

Figure 4 Distribution of Population (Z-score)

5.3.2 Average Annual Income

As Figure 5 illustrates, the MSOAs with affluent residents are distributed in Inner London and western London along the River Thames. The MSOAs in the southern fringe of London are also inhabited by prosperous individuals. The result is attributed to the fact that central London has a high concentration of offices and industries, which brings about high-paying job opportunities. The high average annual income in Richmond upon Thames borough, located on the southwestern fringe of Outer London, is considered to be brought by one of the highest rates of self-employed individuals and highly educated residents (London Borough of Richmond upon Thames, 2018).

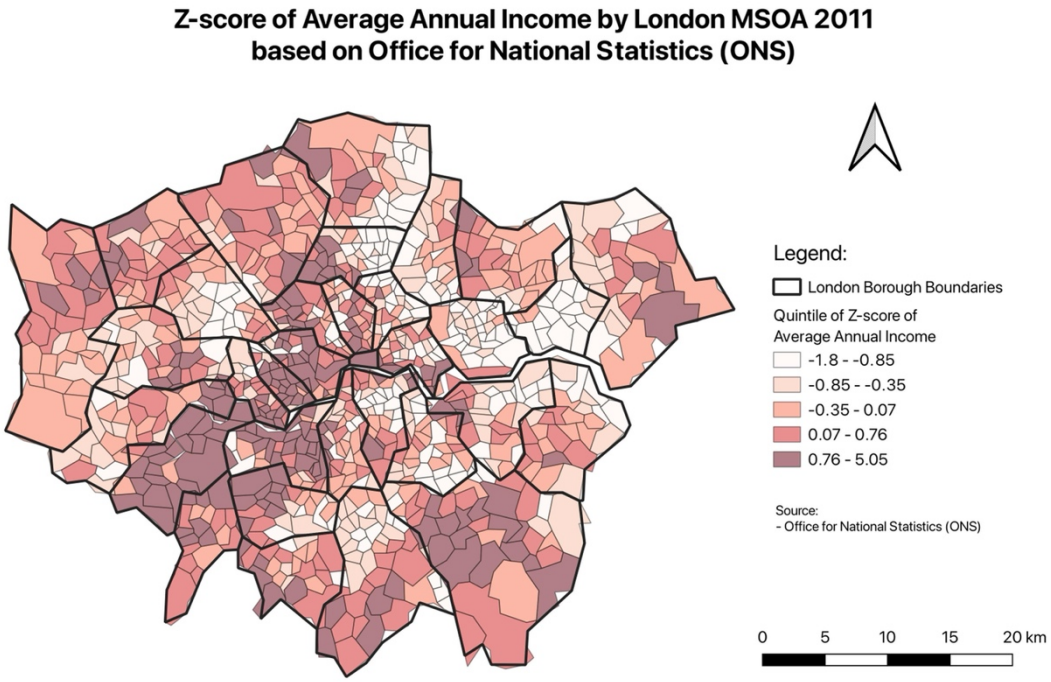

Figure 5 Distribution of Average Annual Income (Z-score)

5.3.3 % Population Aged 60-64

As Figure 6 illustrates, the MSOAs, with a high proportion of the population aged 60 to 64, are distributed on the fringe of London. These outskirts provide affordable housing with greener surroundings supported by London's Green Belt, suitable for larger families. Those in this age group tend to remain in such outskirts even after retirement, and even those who used to live in central London before retirement may wish to move to suburban areas to avoid unaffordable housing and a busy environment. However, it should be noted that recent years witnessed an increasing number of retired dwellers in central London because of its convenient accessibility and amenities for elderly people (Cottel and Harding, 2022).

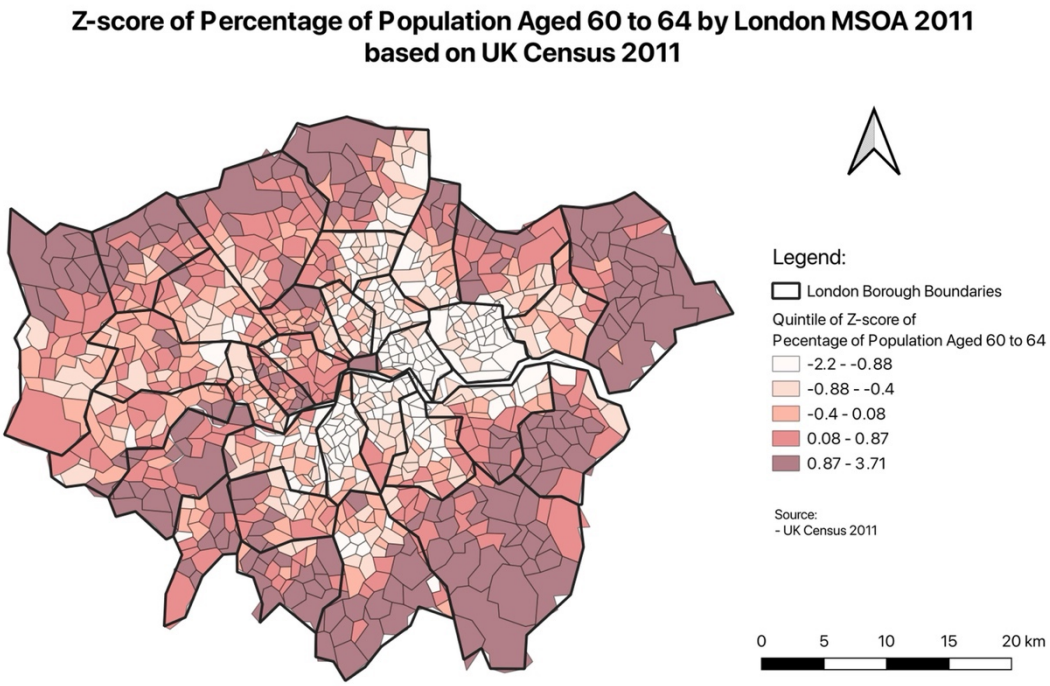

Figure 6 Distribution of Percentage of Population Aged 60 to 64 (Z-score)

5.3.4 % Level 4 Qualification

As Figure 7 illustrates, a large percentage of high qualifications are observed in the MSOAs in Inner London and surrounding areas. The distribution pattern resembles the "average annual income" variable, underpinned by the high correlations between them. The distribution pattern in central London is due to the high concentration of employment opportunities that require high qualifications and an abundance of educational institutions.

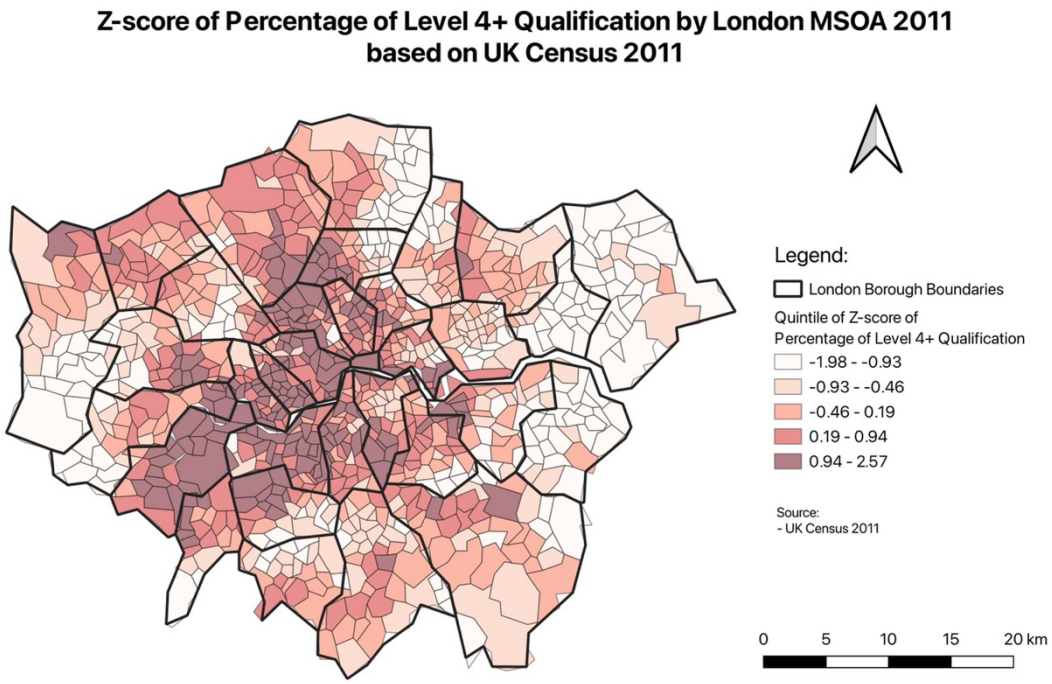

Figure 7 Distribution of Percentage of Level 4 and above Qualification (Z-score)

5.3.5 Average schoolchildren and students

As Figure 8 illustrates, the MSOAs with larger numbers of schoolchildren and students per household are mainly distributed in Inner and north London. The distribution pattern can be attributed to relatively affordable housing prices in north London, which are preferable for households with schoolchildren. It should be noted that boroughs in East London have experienced a large increase in the population of schoolchildren in the past decade (Hennig and Dorling. (no date)).

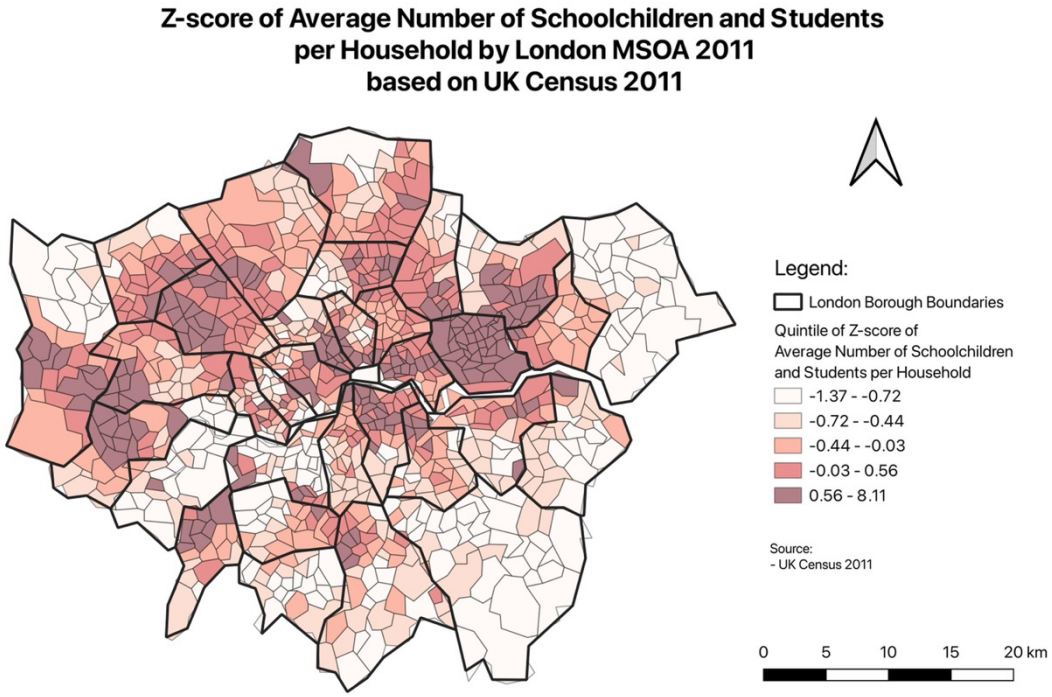

Figure 8 Distribution of Average Number of Schoolchildren and Students per Household (Z-score)

5.4 Step 4: Identifying MSOAs with Higher Priority

Lastly, Figure 9 illustrates the distribution of the priority index. Overall, the higher priority is observed in MSOAs in Inner London, such as Westminster and Kensington and Chelsea boroughs, and some south-western outskirts, such as Richmond upon Thames borough. The high average annual income and a high percentage of ownership in level 4 and over qualification contribute to the high priority in Inner and western London. On the other hand, the high priority in some MSOAs in northern and southern boroughs is attributed to a high number of schoolchildren and students per household and a larger proportion of populations aged 60 to 64. In contrast, MSOAs in eastern London exhibited the lowest priority, as none of the variables showed distinctively high values in these areas, except for the proportion of individuals aged 60 to 64.

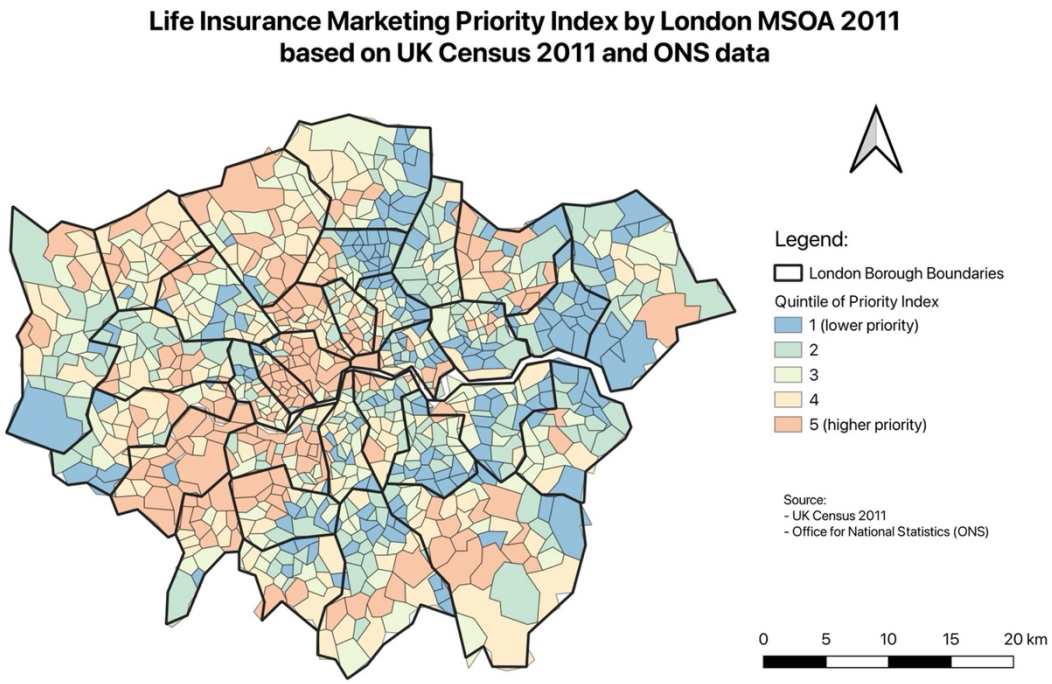

Figure 9 Life Insurance Marketing Priority Index

6 Conclusion and Discussion

This project explored the most suitable areas within London for the life insurance marketing campaign by the company, which targets consumers with specific profiles. In order to effectively uncover geographical hotspots, the project employed the geodemographic approach, which categorises geographical areas according to demographic features. Through the analysis, the priority index, a spatial additive index, was constructed after the influential factors for life insurance purchase were examined and selected referring to pieces of literature. The priority index calculated with five different variables showed that the MSOAs in Inner London, such as Westminster and Kensington and Chelsea boroughs and some south-western outskirts, such as Richmond upon Thames borough, have the highest priority. It is advised that the company allocate the marketing resources primarily to the MSOAs with the highest priority index (the orange-coloured MSOAs in Figure 9). In addition, the distribution maps of the individual variables can be used as a reference in decision-making if the company prioritises any specific perspectives, such as income level, over the others.

The priority index was calculated by summing the standardised variables without weightage as no actual data were available that demonstrate the association of each variable with purchases of the life insurance product that the company plans to sell. Future work may extend to causality analysis using the actual customer profile data accumulated over some years, as Burnett and Palmer (1984) analysed

data obtained from the actual consumer panel. The tailored analysis will enable the priority index to be constructed with meaningful weightage and output more precise results.

Lastly, it should be noted that this project was carried out using the UK Census 2011, which is outdated. In recent years, dramatic demographic changes have occurred in London; for instance, some boroughs have experienced an increase in the proportion of children or the older population. Analysis using the latest UK Census 2021 data is also recommended to reflect these trends.

7 References

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