UNDERSTANDING TRAVELLERS' CHOICES USING DATA ANALYTICS

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Degree of Master of Business Administration in Information Technology

Department of Computer Science and Engineering

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DECLARATION

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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ABSTRACT

Travel and tourism industry is one of the largest and growing industries in the world that depends on choices and demands of travellers. The identification of these choices and demands will provide benefits to both service providers in the industry and travellers. The use of data analytics to achieve this has been discussed briefly over the years using different types of data. The findings of these studies were inconclusive due to limitations in the selected data types, features and analysis techniques. This research aims to overcome these limitations by identifying the factors that impact the choices of travellers, establishing a feature framework to identify those choices, finding the feasibility of using time series forecasting to predict travellers' demand and proposing the use of data analytics in travel insurance. The limitations in previous studies and the unavailability of necessary data for research have increased the importance of using data analytics in travel insurance, an industry within travel and tourism industry. This research achieves its objectives by conducting a study with data from the UK, one of the best performing outbound markets in the world. The data was analysed using data analytics techniques to find the destination and travel mode choices of travellers and two other subgroups, travellers with medical conditions and cruise travellers. The number of outbound trips and the visitors for destinations were forecasted for a year to find the feasibility of using time series forecasting to predict travellers' demands. The results of the analysis confirm that a traveller's age, group type they choose to travel under, and their health have an impact on their destination and travel mode choices, and the two choices have an impact on each other. The study finds that time series forecasting is a reliable demand forecasting technique when a large data set is available.

Keywords: Outbound Markets, Travel Demand, Travel Patterns, United Kingdom

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LIST OF ABBREVIATIONS

Abbreviation	Description
GDP	Gross Domestic Product
UK	United Kingdom
CLV	Customer Lifetime Value
BI	Business Intelligence
BA	Business Analytics
DSS	Decision Support System
EU	European Union
MAE	Mean Absolute Error
RMSE	Root Mean Squared Error
MAPE	Mean Absolute Percentage Error
MASE	Mean Absolute Scaled Error
PII	Personally Identifiable Information

LIST OF APPENDICES

1. INTRODUCTION

1.1. Background

The travel, tourism and travel insurance industries are some of the biggest industries in the world. All three industries are part of a bigger industry known as travel and tourism. The value creation and revenue generation in travel and tourism depends on the understanding of customers' needs and demands.

1.1.1. Travel & Tourism Industry

World Travel & Tourism Council (2017) estimated that direct economic impact of the travel and tourism industry, including accommodation, transportation, entertainment and attractions, accounts for more than 3% of world's Gross Domestic Product (GDP) and employment, and predicted to exceed 3.5% mark by 2027. The investment in travel and tourism is expected to account for 5% of total national investment in 2027. Figure 1.1 shows the economic impact and the number of employment opportunities in the travel and tourism industry.

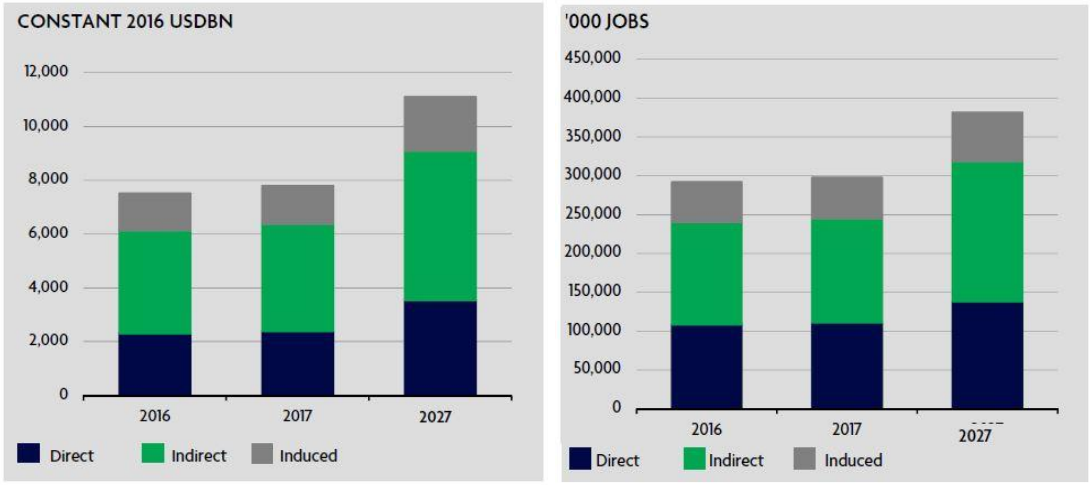

Figure 1.1: Economic impact and employment opportunities in travel and tourism industry

(Source: World Travel & Tourism Council, 2017)

1.1.2. Outbound Markets and Growth

Worldwide outbound trips grew by 3.9% during the first eight months of 2017 (ITB Berlin, 2017) despite terror attacks (Abbit, 2017; "Brussels bombings leave many dead," 2016; Burgen, 2017; Eddy, 2017; "Police arrest 12 after London terror attack," 2017; Samuel, 2016) and political unrest (Guéhenno, 2017) in 2016 and 2017. It is evident that worldwide travel will maintain its growth trajectory despite these incidents. The sharing-platforms like Airbnb and Google's Google Trips, Book on Google and trusted blogs along with millennial culture are the great enablers for this outbound market growth (ITB Berlin, 2017).

Seven European countries along with the United Kingdom (UK) are included in the ten best performing outbound markets in 2016 despite China's dominance in outbound travel. The UK is the third best performing market among European countries accounting for 6% growth rate in 2016. The market growth is a clear indication that the UK remains to be a force to reckon with and considered when making decisions in the travel, tourism and travel insurance industries. The decisions in these industries must be data-driven decisions due to the changing nature of travellers' demands. Figure 1.2 presents the growth rates of the best performing outbound markets in 2016.

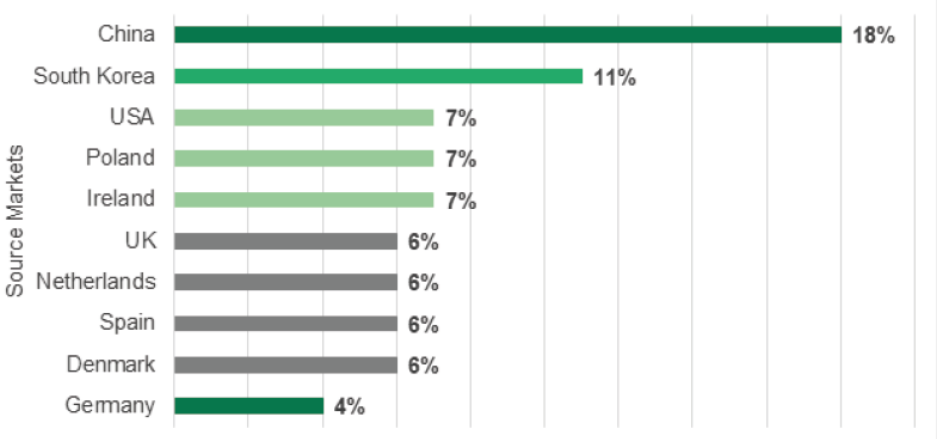

Figure 1.2: Growth rates of best performing outbound markets in 2016
(Source: ITB Berlin, 2017)

1.1.3. Demand and Customer Centric Approach in Travel and Tourism

The accurate estimation of travellers' demands helps to avoid economic consequences and use perishable products effectively. A clear picture of the travellers' demands will

help authorities and decision makers in the travel and tourism industry to make better strategic decisions to avoid economic meltdowns (Pai, Hung, & Lin, 2014). The demand alone will not be enough for anyone to make better decisions and strategic plans. The need for the identification of the customer and the needs also come along with the demand. The failure to identify and satisfy the needs of the customer will result in customer turnover that hurts both businesses and countries. Understanding the type of customers in tourism, their origin, spending capacity and behaviours will help a travel and tourism company to formulate better marketing strategies to maximize profit (Juwattanasamran, Supattranuwong, & Sinthupinyo, 2013). Amadeus (2015) identified that there are five different traveller types based on their type of travel, need for travel and other factors related to their trip. They emphasised that it is critical for anyone to understand these travellers' behaviours to personalise services and delight each traveller.

1.1.4. Benefits of Using Big Data, Business Intelligence (BI) and Business Analytics (BA) in Travel, Tourism and Travel Insurance

Governments and organisations around the world rely highly on demand forecasting in travel and tourism to predict infrastructure development needs (Claveria, Monte, & Torra, 2013). Business analytics can help to achieve it along with seven other benefits (Akerkar, R., 2012).

- Accurate demand/sales forecasting
- Efficient and effective inventory management
- Multi-channel campaign optimization
- Maximizing revenue and profit
- Minimizing order(booking) cancelations
- Customer Lifetime Value (CLV) and trustworthiness creation
- Negotiation of better rates with suppliers
- Maximizing the management capabilities

Akerkar, R. (2012) expressed the technical difficulties associated with the use of big data in travel and tourism. He said a substantial investment is needed to overcome these obstacles, but the outcome will be more rewarding in terms of the investment.

His analysis of the situation is limited since there are affordable Business Intelligence (BI) solutions based on Raspberry Pi clusters to analyse data (d'Amore, Baggio, & Valdani, 2015).

A deeper analysis was required to find the awareness of big data, BI and BA in the travel and tourism industry, and to identify the benefits that organisations would reap by implementing big data or BI techniques.

1.2. Problem Statement

Travel and tourism industry is one of the largest and growing industries in the world that depends on choices (needs/patterns) and demands of its customers, the travellers. The identification of these choices and demands will provide benefits to both service providers in the industry and travellers alike. The travel insurance policy records can be used as one of the most accurate data sources to understand travel choices and demands in travel and tourism. The lack of significant research with consideration on all three aspects, data, features and analysis techniques, and the unavailability of necessary data for research increase the importance of finding the feasibility of using travel insurance policy records as data, data analytics as the means, and establishing a feature framework to identify the choices and demands of travellers.

Therefore, it is imperative to understand the following:

How can travel, tourism and travel insurance industries identify choices and demands of travellers?

1.3. Research Objectives

- To identify the factors that impact the choices of travellers.
- To create a feature framework to identify the travellers' choices.
- To find the feasibility of using time series forecasting to predict travellers' demands.
- To emphasise on the potential in using data analytics in travel insurance.

1.4. Research Design

The research serves as an exploratory data analysis research that investigates the potential in the use of data analytics in travel insurance policy records. The objectives

of the research were achieved through an analysis of a subset of travel insurance policy records in the UK from 2014 to 2017. An extensive literature review was conducted before the analysis to compare different data types, to find demand prediction techniques and accuracy measures, and to find the features that influence the destination and travel mode choices of the travellers to structure the analysis. Multiple descriptive data analytics techniques were selected to confirm the relationship among features and choices of the travellers. Time series forecasting was selected to find the viability of using travel insurance policy records to predict traveller demand.

1.5. Outline

The thesis follows a five-chapter structure. Chapter two reviews literature available on travel demand and choices to find the best technique to predict traveller demand and the features that influence a traveller's destination and travel mode choices. The next chapter, chapter three presents the methodology formation for the research. The data analysis and the findings are discussed in the fourth chapter. Chapter five presents the conclusions, recommendations, limitations and future work.

1.6. Summary

The understanding of travellers' choices and demands is vital for the survival of organisations in travel, tourism and travel insurance industries due to the customer-centric nature of these industries. The use of data analytics to achieve this has been discussed briefly over the years, and there is a need for more research to find the potential and the practicality of it. This research achieves this by conducting a study with data from UK, one of the best performing outbound markets in the world. The research helps to identify the factors that impact the destination and travel mode choices and demands of travellers and provide recommendations to organisations dedicated towards the catering to them.

2. LITERATURE REVIEW

The formulation of the methodology and conducting of analysis require the identification of data types, features that influence a traveller's destination and travel mode choices, prediction techniques and accuracy measures used in previous studies. The literature review has served as an important step in confirming the use of travel insurance policies as the data in the research. It also acted as a great enabler to find the factors that influences the destination and travel mode choices of the travellers. The identification of influencing factors from past studies helped to narrow down the features in the sample that should consider. The studying of past research work helped to compare the findings of the research with results from previous studies. The results from the past studies also helped to select the technique for demand prediction.

2.1.1. Business Intelligence (BI)

Business Intelligence (BI) brings together applications, infrastructure and tools, and best practices for the purpose of enabling access and analysis of data to generate valuable information and knowledge to improve the decisions and performance ("Business Intelligence - BI - Gartner IT Glossary," n.d.). It is responsible for the gathering of data, storing of data and management of information and knowledge (Negash & Gray, 2008). The best way to understand it would be to look at it as Decision Support System (DSS) that relies only on data. It analyses past and present data in the forms of structured and semi-structured to provide actionable information and knowledge.

2.1.2. Business Analytics (BA)

Business Analytics (BA) helps people and process to make the optimal decisions at the correct time (Laursen & Thorlund, 2016). It deals with creating scenarios, understanding realities and predicting future using analysis models and simulations ("Business Analytics - Gartner IT Glossary," n.d.). BA applications comes with pre-built industry content aimed at business users. Any of these analytics solutions will use to some or multiple analytics techniques, data mining, predictive analytics, applied analytics and statistics.

2.1.3. Big Data

Big data is a form of advanced data warehousing and BA (Minelli, Chambers, & Dhiraj, 2012). It deals with high-volume, high-velocity and high-variety of data unlike traditional analytics (McAfee & Brynjolfsson, n.d.). These data are considered as information assets that demand cost effective and innovative forms of information processing to provide insights, enhance decision making and automate processes ("What Is Big Data? - Gartner IT Glossary - Big Data," n.d.).

2.1.4. Big Data & BI Awareness in Travel & Tourism

A review of literature found that studies conducted to find the use of data analytics and the availability of data for research in travel and tourism were inadequate (Baggio, 2016). The review looked at recent literature available on big data and BI in the fields of travel, tourism, hospitality and leisure. The main sources for the analysed papers were IFITT digital library and Scopus database that contains twenty thousand papers from five thousand international publishers. The study reviewed the research work conducted over the past fifteen years and discovered that only five hundred and twenty-one papers were related to travel and tourism out of sixteen thousand four hundred and ninety-six BI research papers. Only hundred and twenty-seven papers out of fourteen thousand fifty-one big data papers were related to travel and tourism. The papers were initially identified by searching titles, abstracts and keywords for "travel, tourism, tourist, hospitality or leisure" words and by selecting papers published in tourism and hospitality journals. A manual inspection of titles and abstracts was conducted to select the most relevant work associated with big data and BI. Some of the selected papers presented only a general overview of big data and its usage to improve and extended present research activities. Only a limited number of papers attempted to find solutions to problems in travel and tourism using big data and BI. There was limited regard for using advanced approaches like artificial intelligence and machine learning methods in the selected papers. The analysis of papers from only two sources to find awareness in a vast field was the biggest limitation of the study. An extensive analysis should be conducted to confirm these findings and to study real-world applications of big data and BI in travel and tourism domain.

2.2. Real-world Applications

The studies in the travel and tourism were conducted using different data types and frameworks over the years. These studies had limitations due to type of data, features and analysis techniques used by them.

2.2.1. Data

Fuchs et al. (2013) proposed a knowledge destination framework that collected data, and created and disseminated knowledge, aimed at enabling knowledge exchange and learning processes among stakeholders. They discovered that BI methods can be used to enhance the travel destinations. The proposed framework aimed at achieving these objectives had two layers, knowledge application and generation. The knowledge creation layer was responsible for extracting and accessing the knowledge sources, and the knowledge application layer provided information about destination resources, supply elements and customers' activities in an intelligent manner. The Destination Management Information System (DMIS) in this framework architecture was responsible of visualising the tourists' demographic and psychographic characteristics ranging from buying motives to product consumption patterns as shown in Figure 2.1.

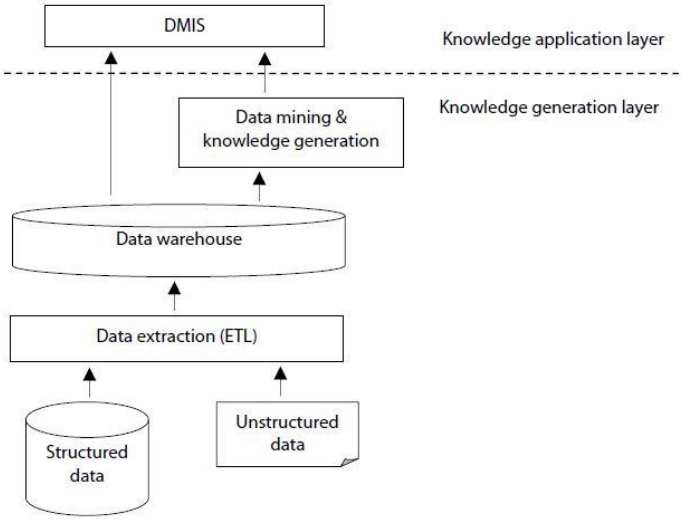

Figure 2.1: Knowledge destination framework architecture

(Source: Fuchs et al., 2013)

The main limitation of the study was the lack of integration of the measurement indicators and the DMIS. This may had caused by the traditional nature of the

measurement indicators, and a study with a different set of measurements should be carried out to re-validate the framework.

A framework is closely associated with the type of data available, and there are different types of data available in travel and tourism related to travellers and their behaviours. These data can be both structured and unstructured, and qualitative and quantitative. The selection of the correct data type is equally important as selecting the correct analysis technique.

Passport & Visa Data

The passport data was recognised as a data type that can be used to find the destination choices of travellers (Rani, 2014). The research used association rule mining to discover and validate travel patterns found in a previous research using clustering. The main limitation of the research was that it used data in a simulated database and not real data. The use of real passport and visa data is a challenge since the departing country only records the departure, and arrival data is only recorded at the arrival destination. The collection of visa data would require the cooperation of governments and use of passport data would require the consent of travellers.

Global Positioning System (GPS) Data

A widely viewed method of understanding travel behaviours is the use of surveys based on GPS. It has been used since it presents benefits like fewer conditions imposed on the participants, higher accuracy in space-time and cost friendly implementation nature (Vij & Shankari, 2015). The use of GPS-based surveys had inaccuracies and limitations despite the benefits. These were caused by inadequate information in collected data since these surveys cannot capture vital information like purpose of travel, travel mode, etc. The travel demand analysis solely depended on the size of the sample, inference algorithm's accuracy and the level of intricacy in the demand model. The level of accuracy would be questionable in any inference model since the most best inference algorithm would be prone to errors. This was proven in their Montel Carlo experiment when they found that for a travel mode choice behaviour model to be reliable it required at least hundred high-quality observations selected from ten

thousand observations. The number of observations required to obtain hundred high-quality observations depended solely on the accuracy of the inference algorithm.

van Dijk & Krygsman (2015) had also studied the reliability and feasibility of understanding travel behaviours using smartphone tracking. They found different problems associated with the study that fell under three different categories, user, technology and methodology. The proposed solution required study group to install an Android application, TrackLog to collect GPS data. Every twenty-four hours TrackLog collected two thousand eight hundred and eighty records with location measurement frequency of thirty seconds. The spatiotemporal measurements for everyone were created, imported and projected in ArcGIS 10.2 to visualise the location information based on the data. The smartphone requirement and the installation of the application were limitations of the approach. These conditions captured the attention of a specific user group that had smartphones and a reasonable level of technology literacy. The randomness of the data set and results of the travel behaviour analysis were questionable due to these reasons. This was one of the main problems of using smartphone tracking. The practical implementation of smartphone tracking was also questionable since it had the tendency to violate privacy of the participants by capturing data of all their movements. The smartphone tracking also consumed the battery life of the participant's smartphone and put an extra burden on the participant.

Search Trends Data

li, Pan, Law, & Huang (2017) proposed a framework to forecast tourism demand using the Generalized Dynamic Factor Model (GDFM) with search engine data. Figure 2.2 presents the forecasting framework that they empirically tested using data obtained from Chinese search engine Baidu. They tested the model against two other models to measure the accuracy of their model and found that their model outperformed other two models. The study found that search engine data can provide valuable insights about tourists' behaviours despite the challenges presented in modelling the data. The main purpose of the study was to identify the most suitable selection method for variables in tourism demand forecasting with search data. The method was intended to handle large amounts of data and ability to obtain a representation that reflect all the data. The main challenges in the study were selection of keywords and data

aggregation. They overcame the keywords selection challenge by choosing index aggregation as their keyword selection method due to its direct insertion of keywords to models. The extraction of index was performed with the help of index aggregation and Principal Component Analysis (PCA). It helped to overcome the data aggregation challenge. The model was further evaluated through static and dynamic observations and dynamic rolling window forecasts. Their correlation analysis revealed that most of the trends are positively correlated while only a few were poorly correlated. The method used in the correlation analysis allowed them to keep poor correlations that prevented information loss. The research still failed to find whether the proposed methodology can predict other indicators like hotel sales, flight bookings, etc. and use in nonlinear models.

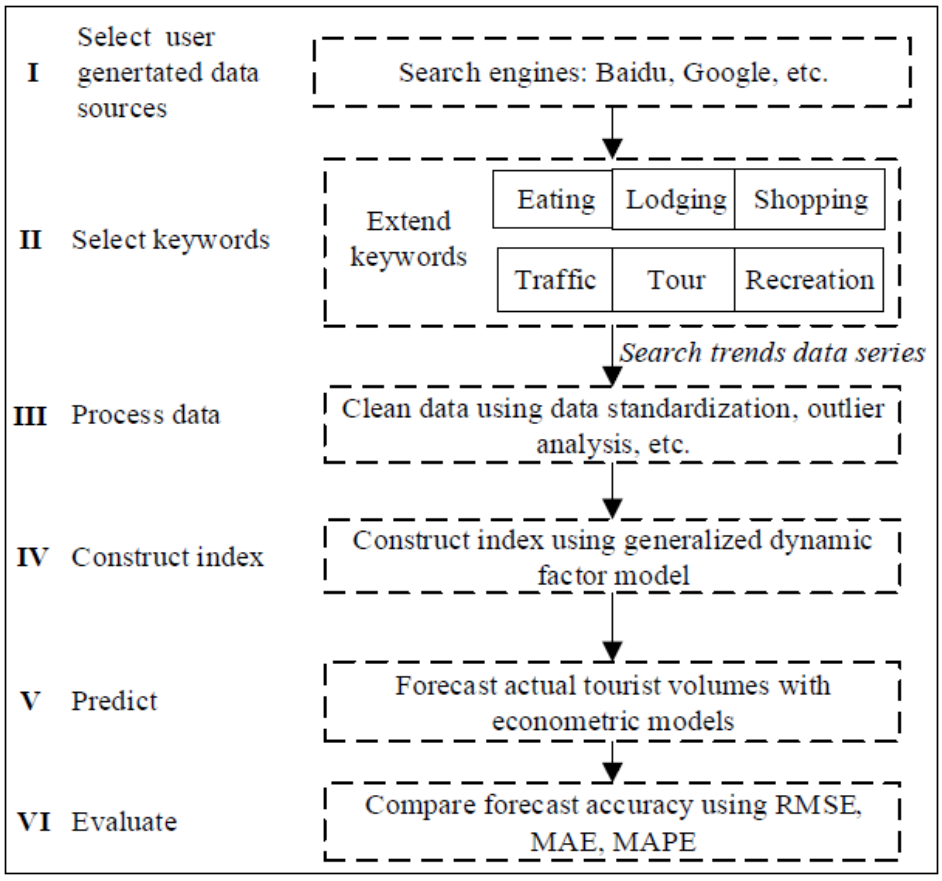

Figure 2.2: Forecasting framework for search trend data

(Source: li, Pan, Law, & Huang, 2017)

The use of a Chinese search engine's data was the main limitation of the research. Baidu is considered one of the largest or maybe the largest web services company in an internet activity highly regulated country. The same research should be carried out in a different market where more lenient regulations are imposed, or perfect competition is encouraged to validate the findings. The fact that 'not every search is a definite tourist visit' questions the accuracy of using search engine data for forecasting tourism demand.

Vaccination Data

Boubaker et al. (2016) used medical and vaccination data to find the travel profiles and patterns of Swiss people by conducting a descriptive analysis. They analysed a Swiss travel clinic's counselling and vaccination records collected over the past ten years through DIAMM/G version 6 program. The data contained answers to questions related to demographic characteristics, travel patterns, prescriptions of vaccines, and actions proposed for prevention of malaria. Microsoft Office Excel 2007 was used for data processing. The analysis was conducted using a software designed for epidemiology. They found that actual travel behaviour of Swiss population was different from the study's findings and most of the attendees come to seek advice before they visit a tropical or subtropical country.

The study's findings indicate that the use of medical and vaccination data, for finding of travellers' profile and travel patterns, is highly questionable since only a certain sample of the population go for medical consultation and vaccination before travelling abroad. Even the contrast between the actual demography of Swiss travellers and the findings is a clear indication of poor accuracy in the data.

2.2.2. Features

The choice of travel mode and destination are important vacation choices and the outcome of these choices governs the entire vacation choice structure. (Hedlund, 2013). He found that the outcome of the destination choice had the most influence on other vacation choices including the choice of travel mode. The personal determinants of these vacation choices were categorised into four groups, circumstances, knowledge, psychological and experiences. He included health, disposable income

available and leisure time under circumstances, knowledge regarding destinations, availability of tourism products and price differences among competitors under knowledge, values, attitudes and intentions under psychological, and experience of vacation types, destination and products under experiences. The research collected data in two stages from charter travellers and other travellers, and the sizes of the groups were seven hundred and thirty-two, and six hundred and eighty-one respectively. There were multiple limitations in the research. The frequency of travellers with higher education was more than the population's frequency, and it made a biased sample. The data collected was of intention and not actual behaviour.

Slak Valek, Shaw, & Bednarik (2014) found that gender, age, income and level of education have an impact on the destination choice in sports tourism. The research analysed survey data accounting for 353,783 sports trips taken by Slovenian sports tourists. The research found that destination choice in return had an impact on the accommodation choice and the trip expenditure of these tourists. The tourists that chose a destination abroad were willing to spend more on high-quality accommodation than the tourists that chose destinations within Slovenia.

Beerli & Martín (2004) also looked at the impact of sociodemographic factors have on the destination image. They found socio-demographic factors along with origin country, and social and economic status have an impact on the destination image. They considered the relationship among these factors except for origin country as casual relationships since the relations were not strong enough. The research aimed to find the factors that influence the image of a destination. The study collected data from six hundred and sixteen tourists that visited Lanzarote to find the cognitive and affective elements of a destination image. The data was collected using a structured questionnaire at the Lanzarote airport by interviewing them after their vacation in Lanzarote. The measurement of pre-visit image could not be conducted due to research method of the study. They also caution the interpretation of casual relationship revealed in the research and generalisation of the findings since the research was conducted in Lanzarote.

Kattiyapornpong (2006) looked at both sociodemographic and trip characteristics impact on the destination choice. He found age, income, life stage, trip length and trip distance have an impact on travel behaviour. The researchers also expressed that younger and older people travel more than middle age people, and travellers that travel alone and with their significant other travel more than people travelling with their children. The researchers were only able to consider to behaviours under travel behaviour, destination choice and trip length since the twenty-one dependent variables were created using those. These depended variables were measured by categorising to four categories. The research used binomial logit regression to find the relationship between the independent and dependent variables. It was also used to find the relative main of those variables. The data gathered from a cross-sectional self-completed survey by Australians from 2003 to 2004 was used in the analysis. These responses were analysed under thirty-four sociodemographic groups created using three socio-demographic characteristics. The main shortcoming of this research is the failure to justify the sociodemographic groups used by them.

Guillet, Lee, Law, & Leung (2011) pushed the boundaries of destination choice researches by looking at the influence of sociodemographic, travel motivation factors and trip characteristics on the choice of destination. They found that trip characteristics highly effect the destination choice compared to sociodemographic and travel motivation factors. The length of stay (duration of trip) had the most influence on the trip destination along with trip expenditure, group size, income, age, urge to discover, and urge to escape from troubles, routine, stress, role, and obligations. The research used data collected from nine thousand one hundred and seventy-five Hong Kong residents through a large-scale survey conducted from 2005 to 2010 over the phone. Two thousand four hundred and sixty-nine of them travelled to overseas destinations. The sixteen independent variables used in the research were categorised into three different categories, trip characteristics, sociodemographic and travel motivation factors. The trip's travel mode, expenditure, group size and duration of trip were categorized into trip characteristics. The gender of the travellers, level of education, income level and size of household were sociodemographic factors while spending time with family and friends, meeting new people, need to relax, urge to discover, and

urge to escape from roubles, routine, stress, role, and obligations were categorised into motivation factors. The distance travelled from Hong Kong was the dependent variable of the study. The main limitation of the study was the bias introduced into the findings by travellers travelling to more than one destination on a trip. The researchers also emphasised that more research should be conducted to confirm the findings since this was the first time a research analysed the impact on the destination choice by all three factors, trip characteristics, sociodemographic and travel motivation factors.

Hsieh, O'Leary, & Morrison (1993) found that age, travel party size, trip type and being and seeing have an impact on the travel mode choice. The being and seeing was one of the four attributes they discovered as psychographic attributes. They categorised thirty benefits sought by travellers into six attributes, being and seeing, adventure getaway, show and tell, heritage, physical activity and social escape, and called these psychographic attributes. They analysed the impact on the choice of travel mode by these attributes along with socioeconomic and demographic, and travel characteristics. Level of income, education, gender, age, stage in life, occupation and origin were the socioeconomic and demographic variables they used, and party size, type of trip, duration of trip, travel season and whom they travel with were the travel characteristics. Logistic regression analysis was used to find the relationship between the selected socioeconomic and demographic factors, travel characteristics and psychographic attributes. They also found that the impact of other variables was insignificant compared to age, travel party size, trip type and being and seeing.

2.2.3. Analysis Techniques for Demand Prediction

The data along with effective analysis types and techniques are required to conduct highly accurate predictions. Over the years the viability of these different techniques, from simple clustering techniques to time series forecasting and neural networks were discussed in length.

Juwattanasamran, Supattranuwong, & Sinthupinyo (2013) established a framework that used travellers search data along with association rule technique to find travellers interests when searching for travel destination choices like tourist attractions, things to do, accommodation and restaurants. They wanted to provide travellers with an

application that suggested the best travel destination choices to them based on association rules since travellers avoid vacation planning due to experience of unknowingness and flexibility of action. They used a questionnaire that covered the initially mentioned travel destination choices as the first step of their research to collect data from 2000 Thai travellers age between 18 to 24 lived in Bangkok. Figure 2.3 depicts the framework they used to discover knowledge from the collected data and the process that they came up with their application solution. The Rapipminer program with association rule technique was used to generate relationship rules of traveller behaviour.

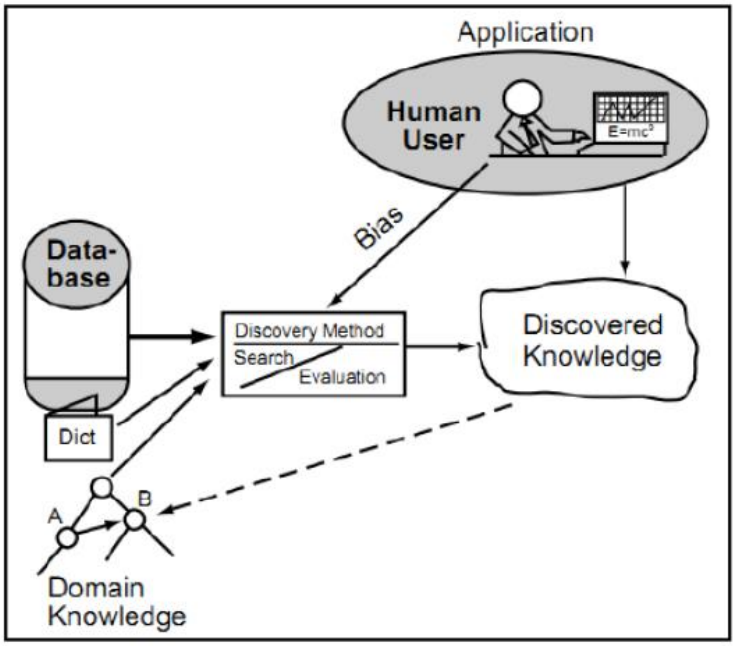

Figure 2.3: Framework for knowledge discovery

(Source: Juwattanasamran, Supattranuwong, & Sinthupinyo, 2013)

Figure 2.4 depicts the framework for traveller behaviour collecting and travel recommender innovative system that was the final product of the research based on the relationship rules discovered.

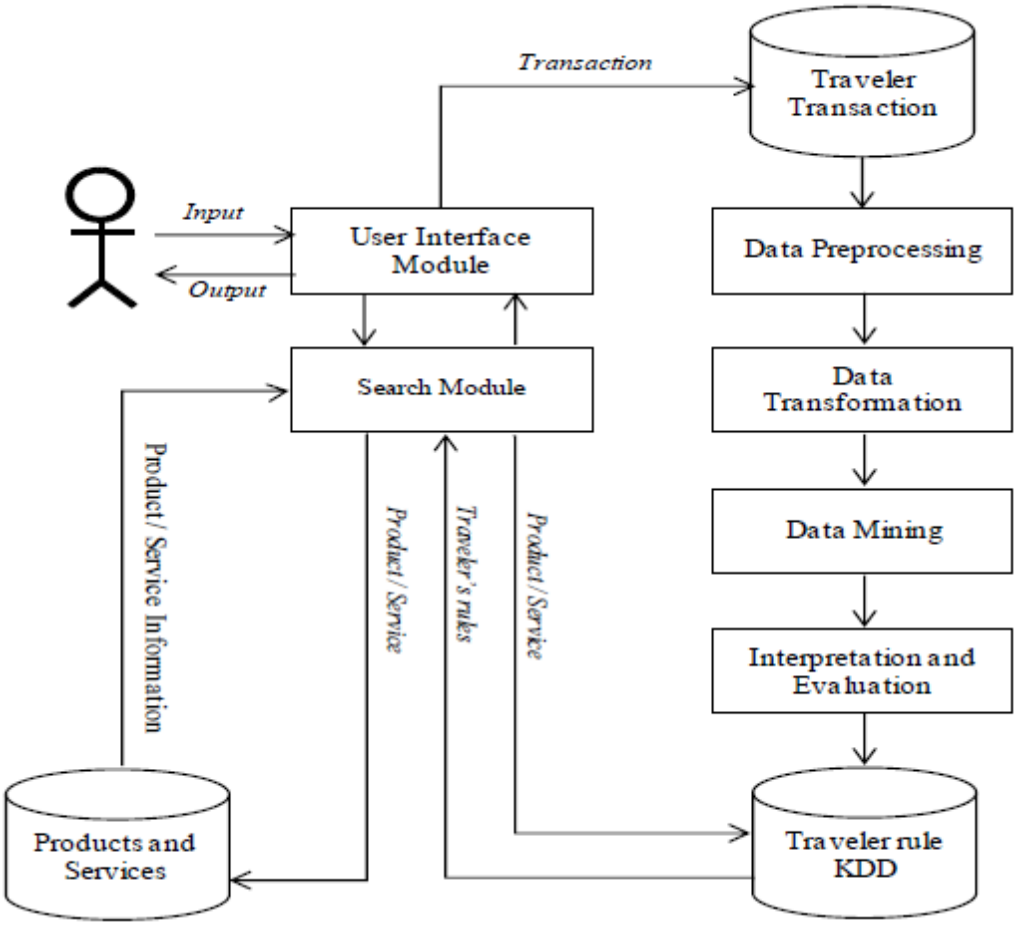

Figure 2.4: Framework for Traveller Behaviour Collecting and Travel Recommender Innovative System

(Source: Juwattanasamran, Supattranuwong, & Sinthupinyo, 2013)

The final mobile application they developed was of web-based that connected to a database server that analysed the collected data using seventy-eight association rules. The biggest limitation of the research was that they used a small sample of data to find these rules. They should have used transaction data instead of a questionnaire as the data for the research since transactions reveal more real data than answers in a questionnaire. The biggest limitation of the research was the type of data that they used where they could have used transaction data instead of questionnaire data to obtain a more accurate picture of the real world. Although they found seventy-eight rules from their sample, the size of it was not reasonable enough. A research with a better sample of data is needed to validate the findings of the research.

Clustering

Clustering techniques have been used in many fields engineering, geology, medicine, etc. It was identified as an analysis technique that discovers the data structure and partitions it into sub-sets with correlated data (Pai, Hung, & Lin, 2014).

Claveria & Poluzzi (2017) compared the performance of multidimensional scaling (MDS) and categorical principal component analysis (CATPCA) and proposed a way of clustering and positioning destinations. They measured the tourism demand at a destination by the four tourism indicators, number of arrivals, total expenditure, occupancy rate, number of rooms, GDP, the amount of money spent in inbound per GDP and ratio of spending per tourist, and Human Development Index (HDI). The countries were then ranked based on these variables and the correlation coefficients were measured for the variables. The countries were then grouped into categories by reducing the correlated initial variables to newer set of variables that are not correlated using CATPCA and MDS. A numerical value has been assigned to each destination to show the destinations on a scree plot. It was also used to find the last component that influences the dimensions and variance in data. They found that only two dimensions were needed, where one dimension associated with the amount of money spent in inbound per GDP and captured the destination's dependence on tourism. The other dimension helped to order the indicators and HDI and helped to capture tourism activity's profitability. Finally, countries were positioned (clustered) into groups to identify competing destinations, and their weaknesses and strengths that could assist to compete better against the opponent.

Although the study managed to find correlations in the data, only a few correlations had proved to be significant and the sample size used in the study was small. Also, the study's findings were not generalised since they had conducted only a descriptive analysis. A better study should be carried out with a larger sample that contains more destinations along with a wider range of indicators to confirm the findings. The research should be compared with other researches where they used different clustering techniques to obtain an accurate comparison of the use of multivariate clustering.

Fussy Clustering

Pai, Hung, & Lin (2014) used fussy clustering technique fuzzy c-means (FCM) with logarithm least-squares support vector regression (LLS-SVR) to present a tourism demand forecasting model. They used FCM in the first stage to find the centre points of clusters that provided a rough approach. Although there were many fuzzy clustering techniques to choose ranging from hard c-means (k-means) to artificial neural networks, they selected FCM. The main reason for the selection was its ability to optimise the objective function until the optimisation is below the optimum level. This was done through the continuous update of membership function and clusters' centres. Figure 2.5 presents the model that they came up with to predict the tourism demand. The second stage of the model used the data pre-processed in the first stage by FCM to make predictions by using LLS-SVR that further tuned the approach. The LLS-SVR model used Genetic Algorithms (GA) and Least-Square Support Vector Regression (LS-SVR) together where GA acted as a method to find the parameters for LS-SVR that helped to improve the effectiveness of the model. They also used Mean Absolute Percentage Error (MAPE) and Root Mean Squared Error (RMSE) to find the prediction model's accuracy. They compared their model with six other traditional forecasting models using tourist arrival data related to Hong Kong and found that their model was more effective, and that their proposed combining mechanism improves the performance of traditional prediction models. There were not many limitations in the study except for their training set data being hundred and six, and twenty-four tests.

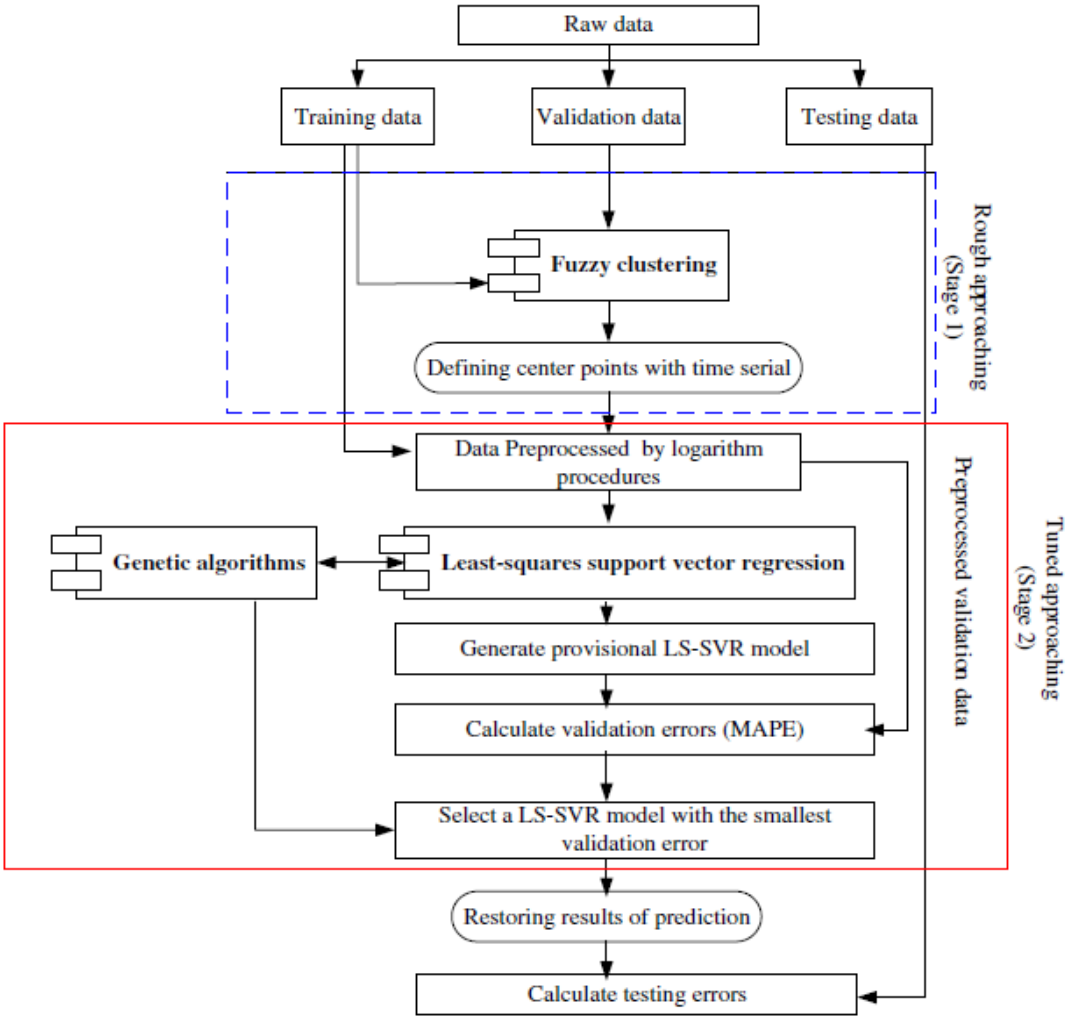

Figure 2.5: Demand forecasting model

(Source: Pai, Hung, & Lin, 2014)

Bora, Gupta, & Kumar (2014) found that even at a performance level K-Means clustering technique's performance was better than FCM. There are numerous combinations to be researched since the selection of clustering techniques depends on data type and clustering application.

Gaussian Process Regression

Wu, Law, & Xu (2012) proposed a model for forecasting of tourism demand using sparse Gaussian Process Regression (GPR). Its accuracy was higher compared to kernel-based models and ARMA. The main reasons for their selection of the model

were to predict the tourism demand distribution and eliminate any fitting issue. The Gaussian Process's (GP) non-parametric regression capability in high dimensional spaces, its capability to provide estimations that are difficult to generate, and its capability to understand noise and find smoothness parameters with the use of training data have also contributed to the construction of the model.

They used data of inbound tourists to Hong Kong from thirteen countries over the period of 1985 and 2008 for their study that resulted in a nonstationary time series. Although GPR was not designed to model nonstationary time series, its flexibility in moving active inputs helped to overcome the difficulties arose when creating non-stationary covariance functions.

Artificial Neural Networks

Claveria, Monte, & Torra (2013) compared the performances of Artificial Neural Network (ANN) models in demand forecasting of tourists. The models were selected from based on the architecture. Radial Basis Function (RBF), Multi-Layer Perceptron (MLP) and Elman Network were selected where the same experiment was repeated with different number of lags to find the effects of the memory. The demand forecasting in tourism has been divided into two categories, non-causal time series and econometric models. ANN picked up interest due to the limitations in linear methods when modelling seasonal and trend components. Most widely used ANN has been MLP and it consists of different layers of neurons with a layered connectivity. Each model was compared with another in pairs with the use of different accuracy measures and Diebold Mariano test in three different time periods. They divided their hundred and thirty-nine months of data into three sets where first sixty months as training, next thirty-six months as validation and the remaining twenty percent as the test set to find the performance on unseen data. They used the validation set to determine the topology of the network, number of epocs for training in MLP, hidden layer's neurons for RBF and spread's value. They found that MLP and radial basis function neural networks were more accurate than Elman Neural Networks and concurred that it may be due to the issues that comes from using dynamic networks. RBF outperformed MLP networks when there were not any additional lags in the network and has past context. They also found that increasing dimensionality of the input returns better results when

conducting long term forecasting. The researchers did not find whether the performance can be improved by taking connections between the tourist arrivals and visitor country into account.

Back-propagation Neural Network (BPN)

Chen, Lai, & Yeh (2012) proposed a tourism demand forecasting model by integrating Back-propagation Neural Network (BPN) and Empirical Mode Decomposition (EMD). The researchers used data related to international arrivals of visitors to Taiwan. 79.98% of the data was used as the training data, and the remaining 20.01% was used as the test data. As the first step in the model, EMD decomposed tourism data into more stationary and regular components that they identified as Intrinsic Mode Functions (IMFs) and residue. These components were then modelled and forecasted using BPN, and as the final step, the results obtained by forecasting were integrated to obtain the final forecasting value. They compared the proposed model against BPN model non-EMD forecasting variables and ARIMA model and found that their model outperforms other models based on the values they received for Mean Absolute Difference (MAD), MAPE and RMSE.

Time Series Modelling

Wu, Law, & Xu (2012) acknowledged that tourism demand forecasting using time series forecasting would be complicated due to the reason that, it is being affected by various factors with random, seasonal and uncertainty characteristics. Despite that claim, in a new research, Clavería González & Torra Porras (2014) found that time series models outperformed neural networks when used in forecasting of tourism demand. They evaluated ANN against two time series models, Self-Exciting Threshold Autoregressions (SETAR) and Autoregressive Integrated Moving Average (ARIMA) models by forecasting tourism arrivals and overnight stays. Despite the general belief that nonlinear methods outperform linear methods, SETAR and ANN performed poorly against ARIMA models for relatively small time periods. The research used monthly arrival and length of stay data for Catalonia for nine years, and Augmented Dickey-Fuller (ADF), Kwiatkowski-Philips-Schmidt-Shin (KPSS) and Philips-Perron were used to test the unit root hypothesis. These tests proved that removal of effects of seasonality and detrending are required before modelling and

forecasting. The Root Mean Squared Forecast Error (RMSFE) was used to order the methods while Diebold-Mariano test for predictive accuracy measured the significance in the RMSFE reduction. Although the research proved that ANN models' performance was low in forecasting tourism demand, they suggested that the ANN models' tourism demand forecasting performance can be improved through structural optimisation and incorporation of additional memory values. The comparison of non-linear ANN models against the linear time series models can be considered one of the limitations of the research. The only reason for ANN models' low accuracy was due to its information loss caused by the filtering process. ANN is better suited to handle non-linear behaviours than linear behaviours. They should have also compared ANN against non-linear autoregressive (AR) models like Nonlinear Autoregressive Exogenous Model (NARX) to confirm their findings.

2.2.4. Accuracy Measures

The accuracy measures to find the accuracy of forecasts have been discussed over the years. The search of the best accuracy measure for forecasting is a pointless search and use of any accuracy measures depends on the judgement of the forecaster ("Naughty APEs and the quest for the holy grail | Modern Forecasting," 2017). The selection of the most feasible accuracy measure depends on data and the type of forecasting.

Mean Absolute Error (MAE)

MAE is concerned with the absolute error of a forecast (JJ, 2016). A large error in the forecast will have the same weight as any other error since MAE assign equal weight to all the errors in the forecast. MAE is easy to understand and describes the average error compared to RMSE. This has been recommended as an accuracy measure for forecasts that are on the same scale (Hyndman, 2014).

$$MAE = \frac{1}{n}\sum_{t=1}^{n}|A_t - F_t|$$

where,

MAE = Mean Absolute Error
A_t = Real value in t time
F_t = Forecast value in t time
n = Amount of forecast points

Root Mean Squared Error (RMSE)

RMSE has been identified as an accuracy measure that should be used when the forecasts are on the same scale (Hyndman, 2014). It penalises large errors and avoids taking the absolute values that can be considered as an advantage over the MAE (JJ, 2016). This was considered by them as a disadvantage over MAE, and it has the tendency to increase more than MAE with the increase in sample size.

$$RMSE = \sqrt{\frac{1}{n}\sum_{t=1}^{n}(A_t - F_t)^2}$$

where,

RMSE = Root Mean Squared Error
A_t = Real value in t time
F_t = Forecast value in t time
n = Amount of forecast points

Mean Absolute Percentage Error (MAPE)

MAPE has been considered one of the widely used accuracy measures (Kim & Kim, 2016) due to its ability to present the error relative to the time series value as a percentage regardless of the unit of measurement (Hanke & Wichern, 2009). It has been discovered that it is a good choice of measurement to find the accuracies on different scales except for in temperature (Hyndman, 2014). MAPE leads to extreme or undefined values when the actual value is zero or closer to zero.

$$MAPE = \frac{100\%}{n}\sum_{t=1}^{n}\frac{|A_t - F_t|}{A_t}$$

where,

MAPE = Mean Absolute Percentage Error
A_t = Real value in t time
F_t = Forecast value in t time
n = Amount of forecast points

2.3. Summary

Over the years different researches have studied the use of different data and analysis techniques to find the patterns and demands of travellers in different outbound markets. The viability in the use of passport and visa data, GPS data, search trend data, and vaccination data to find travel patterns and predict demands is questionable due to low accuracies and impracticality. The few studies that used passport and visa data were conducted on simulation data instead of real data. The use of passports and visa data would require the cooperation of governments and the consent of the travellers. The use of GPS data is questionable due to its inaccuracy, privacy concerns, unwillingness of the travellers, etc. The search trend data is also inaccurate since a search on the internet does not guarantee an outbound trip. The use of vaccination data is also questionable since a visit to a medical clinic before and after the trip depends on the type of traveller and the destination.

The destination and travel mode choices of travellers dictate the travel patterns and demands of an outbound market. A traveller's choice of destination and travel mode depend on trip characteristics, sociodemographic, socioeconomic, trip motivation and psychographic factors. The choices also have an impact on each other. These choices create demand for destinations, travel modes, etc. among travellers. Time series forecasting is one of the best demand prediction techniques with great accuracy to predict this demand in advance. There are multiple accuracy measures to find the accuracy of a forecast and searching for the best accuracy measure for forecasting is pointless. The selection of an accuracy measure to find the accuracy of a forecast depends on the forecaster.

3. RESEARCH METHODOLOGY

The research was conducted in Epistemology research method associated with Positivism research philosophy. The inductive approach was used to discover the patterns and relationships from the data to achieve the research objectives.

3.1. Exploratory Data Analysis

The research was conducted as a quantitative data analysis research in the form of an exploratory data analysis. An exploratory data analysis helps to detect mistakes, check assumptions, select appropriate models, determine the relationships among variables, and assess the direction and rough size of relationship among variables (Seltman, 2018). The analysis was aimed at discovering the travel patterns of UK residents and the factors that influence the destination and travel mode choices of a traveller. A literature review was conducted before the analysis to select the analysis techniques for traveller demand prediction and establish the relationship between the influencing factors and features available in the sample. The literature was also used to compare and justify the proposed feature framework.

3.2. Methodology Framework

The methodology framework illustrated in Figure 3.1 was used to conduct the research. The analysis of related work helped to identify the optimal analysis technique for prediction of traveller demand and establish a set of features for the analysis of traveller patterns. The selected features were also used to identify the conditions that needed to be considered during data pre-processing. The data pre-processing was a combination of four different steps. Different data pre-processing steps were revisited multiple times during the data analysis stage to prepare data for different types of analysis despite the data pre-processing conducted based on the selected techniques at the beginning. Basic statistical analysis techniques were used during the data analysis stage along with the prediction technique selected after the review of literature.

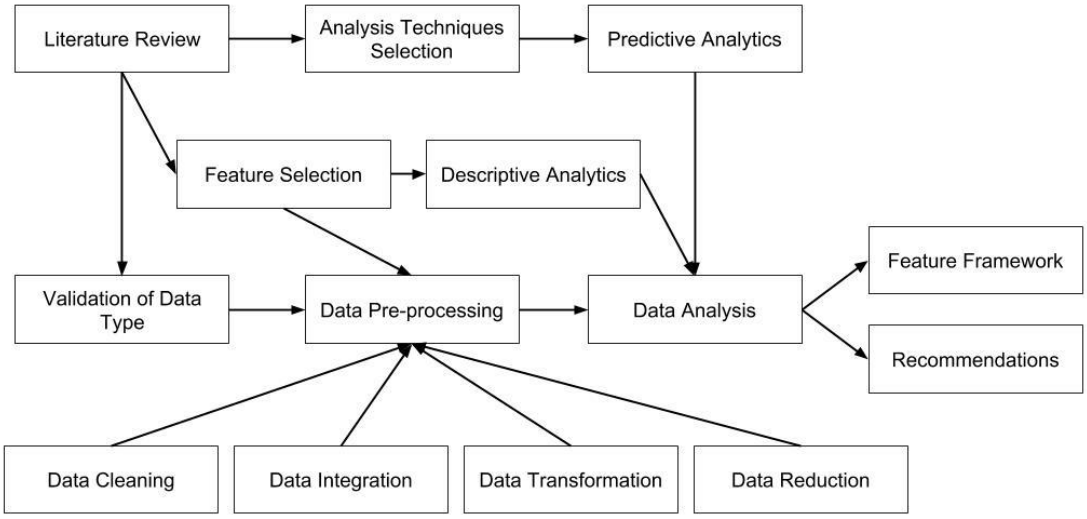

Figure 3.1: Methodology Framework

3.3. Conceptual Framework

An extensive review of the literature was conducted to find the factors influencing travellers' destination and travel mode choices as shown in APPENDIX A. Based on the review of the literature a feature table was created for the research as shown in Table 3.1. The features available in the sample were mapped against the influencing factors found from literature. The group type feature was mapped against two influencing factors listed in APPENDIX A, size of travel party and life stage since the group type captures both size of the travel party and the relationship to the travellers in the party. The reason behind the mapping of relationship to life stage is that relationships cannot exist without being in a certain life stage. As an example, a traveller must be divorced or widowed to travel as a single parent family. The traveller's health has been mapped against the existence of a medical condition. The reason behind this mapping is that a medical condition includes diseases, lesions, disorders, or nonpathological conditions that requires medical treatment ("Disease," 2019). The absence of a medical condition implies that the traveller is healthy.

Table 3.1: Feature Selection

Influencing Factors from Literature	**Names of the corresponding features in the sample**	**Names used to refer features in the research**	**Traveller's Choices**
Age	Age	Age	Choice of destination
Size of travel party	Group type	Group type	

Life stage			
Health	Existence of a medical condition	Health	
Choice of travel mode	Cruise traveller/not a cruise traveller	Choice of travel mode	
Age	Age	Age	Choice of travel mode
Size of travel party	Group type	Group type	
Life stage			
Health	Existence of a medical condition	Health	
Choice of destination	Choice of destination	Choice of destination	

3.3.1. Age Groups

The travellers should be grouped into generations to provide recommendations to travel, tourism and travel insurance companies on how to cater to travellers. There is not a clear age breakdown for generations since there has been different definitions for generations as shown in APPENDIX B.

The research uses its own definition for generations based on other definitions as shown in Table 3.2. The main changes in the generation definition is the categorisation of everyone over seventy-two years old into Silent Generation and everyone under twenty-two years old into Generation Z.

Table 3.2: Definition of generations used in the research

Age Group	**Age Range**
Generation Z	Under 22 years (0 to 21)
Millennials	22 to 37 years
Generation X	38 to 53 years
Baby Boomers	54 to 72 years
Silent Generation	Over 72 years (73 and above)

(Based on APPENDIX B)

3.4. Population and Sample

A total of 209,307,000 trips originated from UK from January 2014 to December 2017 ("Travel trends - Office for National Statistics," 2018) as shown in Table 3.3.

Table 3.3: Number of outbound trips originated from UK over the years

From	2014	2015	2016	2017
United Kingdom	60,082,000	65,720,000	70,815,000	72,772,000

(Source: Travel trends - Office for National Statistics, 2018)

The sample of the research for the same time period contained travel insurance policy records that accounted for 1,104,758 trips. Another set of records that accounted for 308,924 trips (from January 2018 to December 2018) was used to validate the predictions generated based on the main sample.

3.5. Data Pre-processing

The data pre-processing of the research was mainly performed using SQL queries and R. Firstly, SQL queries were performed on the MySQL database to identify the tables that needed for the analysis. A single data frame was created in R by combining multiple tables in the database through a database connection established using the DBI library in R. This presented a data frame with over two million records. A manual search was conducted on the created data frame to find any unwanted columns in the data frame. The rows with any empty values were identified by a command in R after the elimination of unwanted columns. Another command in R was used to delete the entire records with any missing values. It reduced the data set closer to the sample's size. A further manual search was conducted on each column to find any other hidden anomalies in the data. A few records with negative values for age was observed and these were removed using R commands that are being used for row deletion in a data frame. The sample of the analysis, a single data frame with 1,104,758 records was obtained as the final output of the data pre-processing.

Throughout the analysis different data frames were created from the main data frame according to the type of analysis. As an example, for analysis of travellers with medical conditions, a separate data frame from the main data frame was created. Any date field had to be defined in a separate data frame before performing any analysis.

3.6. Data Analysis

The data were analysed using different data analytics techniques to find insights in the forms of trends and metrics. These data analytics techniques are being used in different industries to analyse customer trends and satisfaction that lead to better business decisions and innovation (“Data Analytics Definition | Investopedia,” n.d.).

3.6.1. Descriptive Analytics

Descriptive Analytics is concerned with the examination of data or content to answer the question “What happened?” (or "What is happening?") through the means of BI and visualisation methods like charts, graphs, tables or other narratives (“Descriptive Analytics - Gartner IT Glossary,” n.d.).

A set of questions was identified before the analysis that should be answered using descriptive analytics techniques.

1. How many travellers travelled over the last few years?
2. Where do travellers travel mostly to (Europe, Asia, Africa or America)?
3. How many travellers visited the most visited destinations over the years?
4. With whom do travellers tend to travel?
5. How many travellers travelled under different group types over the years?
6. Where do different group types travel mostly to?
7. How many travellers belonged to different group types were received by most visited destinations over the years?
8. What is the average age of a traveller?
9. Where do each generation travel mostly to?
10. Where do Generation Z travellers travel mostly to?
11. How many travellers from each generation travelled over the years?
12. Where do each generation travel mostly to?
13. How many travellers from each generation were received by most visited destinations over the years?
14. How many travellers travel to more than one destination on a trip?
15. What are the generations that tend to travel to more than one destination on a trip?

16. What are the group types that tend to travel to more than one destination on a trip?
17. How many travellers with medical conditions travelled over the years?
18. Where do travellers with medical conditions travel mostly to?
19. How many travellers with medical condition received by the most visited destinations over the years?
20. Do travellers with medical conditions tend to travel with their family members?
21. How many travellers with medial conditions from different group types travelled over the years?
22. What are the most visited destinations by travellers with medical conditions travelled under each group type?
23. Do younger generations with medical conditions travel more than older generations with medical conditions?
24. How many travellers with medial conditions from different generations travelled over the years?
25. What are the most visited destinations by travellers with medical conditions that belonged to different generations?
26. How many travellers with medical conditions travelled on a cruise during their trip?
27. How many travellers with medical conditions travelled on a cruise during their trip over the years?
28. What are the most visited destinations by travellers with medical conditions that travelled on a cruise during their trip?
29. How many travellers choose cruise as a travel mode?
30. How many travellers travelled on a cruise during their trip over the years?
31. What are the most visited destinations by cruise travellers?
32. How many cruise travellers were received by the most visited destination over the years?
33. What types of groups tend to travel in cruise (couples/families/single parent family)?

34. What are the most visited destinations by cruise travellers that travelled under each group type?
35. What generations tend to travel in cruise (Generation Z, Millennials, Generation X, Baby Boomers/Silent Generation)?
36. What are the most visited destinations by cruise travellers belonged to different generations?
37. How many cruise travellers had medical conditions?
38. How many cruise travellers that had medical conditions travelled over the years?
39. What are the most visited destinations by cruise travellers that had medical conditions?

3.6.2. Predictive Analytics

Predictive Analytics is considered as a form of advance analytics that analyses data or content using sophisticated techniques and tools to the answer the question "What is going to happen?" ("Predictive Analytics (2) - Gartner IT Glossary," n.d.).

Time Series Forecasting

The number of arrivals is an accepted measurement of determining traveller demand (Claveria & Poluzzi, 2017). The research uses time series forecasting to predict the traveller demand by forecasting number of arrivals. Time series forecasting is used by different industries that work with quantifiable data to forecast sales, costs, reserves, production, demand, prices, new customers, etc. It is being used when a sequence of measurements is recorded over time that acts as an influencing factor that needs to be treated differently (Shmueli, Bruce, Yahav, Patel, & Jr, 2017). Also, time series models like ARIMA outperforms neural networks in forecasting of tourism demand (Clavería González & Torra Porras, 2014). Exponential smoothing models are powerful forecasting models that can be used as alternatives to ARIMA models (Brownlee, 2018). These models are used to forecast univariate data, and the only difference between the two types is the decrease in weights for past observations in exponential smoothing models. It has been found that exponential smoothing models are slightly more accurate than ARIMA models based on the RMSE, MAPE and Mean Absolute Scaled Error (MASE) values for a test set in a study that used quarterly

cement production data (Etienne, 2019). It is an indication that exponential smoothing models performs better than ARIMA models when the data has seasonality component. The triple exponential smoothing is the most advance exponential smoothing model and known as Holt-Winters Exponential Smoothing (Brownlee, 2018). It considers three smoothing factors, level (alpha), trend (beta) and seasonal (gamma). The trend type, dampen type and seasonality type in Holt-Winters Exponential Smoothing can be either additive or multiplicative depending on the type of change in the seasonality.

All the time series forecasting in the research were performed in R version 3.5.1 using forecast library in forecast package. These forecasts were conducted using Holt-Winters Filtering with triple exponential smoothing due to the presence of strong seasonality component. The default model in R, additive model was used in the forecasting of travellers.

A set of questions was identified that should be answered using time series forecasting before the analysis.

1. How many travellers will travel in 2018?
2. How many travellers will visit most visited destinations in 2018?
3. How many travellers will travel under each group type in 2018?
4. How many travellers belonged to each group type will visit their most visited destinations in 2018?
5. How many travellers belonged to each generation will travel in 2018?
6. How many travellers belonged to each generation will visit their most visited destinations in 2018?
7. How many travellers will travel to more than one destination in 2018?
8. How many travellers belonged to each group type will travel to more than one destination in 2018?
9. How many travellers belonged to each generation will travel to more than one destination in 2018?
10. How many travellers with medical conditions will travel in 2018?

11. How many travellers with medical conditions will visit their most visited destinations in 2018?
12. How many travellers with medical conditions will travel under each group type in 2018?
13. How many travellers with medical conditions belonged to each generation will travel in 2018?
14. How many travellers with medical conditions will travel on a cruise during their trip in 2018?
15. How many travellers will travel on a cruise during their trip in 2018?
16. How many travellers that travel on a cruise during their trip will visit their most visited destinations in 2018?
17. How many travellers that travel on a cruise during their trip will travel under each group type in 2018?
18. How many travellers that travel on a cruise during their trip belonged to each generation will travel in 2018?
19. How many travellers that travel on a cruise and have medical conditions will travel in 2018?

3.7. Accuracy Measures

MAPE has been selected as the accuracy measurement for the research with the consideration on practical usability in the industry. The wide usage of the measurement (Kim & Kim, 2016) and its ability to present the error relative to the time series value as a percentage regardless of the unit of measurement (Hanke & Wichern, 2009) makes it suitable for all three industries in forecasting traveller demand.

$$MAPE = \frac{1}{n}\sum_{t=1}^{n}\frac{|A_t - F_t|}{A_t}$$

where,

MAPE = Mean Absolute Percentage Error
A_t = Real value in t time
F_t = Forecast value in t time
n = Amount of forecast points

3.8. Summary

The design of the research was based on the Epistemology research method associated with Positivism research philosophy. The research used inductive research approach along with quantitative analysis to analyse travel insurance policy records from 2014 to 2017 in the form of an exploratory data analysis. The achievement of the objectives depended on the feature selection, prediction technique selection and formation of questions that could be answered from the sample. The feature and prediction technique selection were influenced by an extensive review of literature. The questions were formed based on the selected features. The accuracy measure for the prediction was also selected based on the literature available on accuracy measures.

4. DATA ANALYSIS

The research analysed travel insurance policy records cleaned of any anomalies from January 2014 to December 2017 that accounted for 1,104,758 outbound trips originated from UK. The quantitative data analysis of these outbound trips looked at insights generated through descriptive and predictive data analytics techniques. An additional set of travel insurance policy records from January 2018 to March 2018 that accounted for 308,924 outbound trips originated from UK were used to find the accuracy of the forecasts conducted using time series forecasting.

Firstly, a complete copy of the data related to travellers' trips without the Personally Identifiable Information (PII) was taken from the database that recorded travel insurance policy data. The PII was removed to protect the privacy of the travellers. A high-performance computer was used to access the data in this database by establishing a database connection using RStudio. MySQL Workbench 8.0 CE was used to find the suitable SQL queries to combine the data in different tables. After conducting preliminary study of data in MySQL Workbench 8.0 CE, RStudio was used to analyse the data in R version 3.5.1 by creating two different data frames using the SQL queries identified that combined all the relevant travel information related to trips. Any records with missing data were identified and removed completely by using missing value identification and records deletion commands available in R. A thorough search was conducted by ordering each column in the cleaned data set to find any other hidden anomalies in the data (e.g. age in negative numbers) and to eliminate them. Basic statistical techniques along with time series analysis were used to find travel patterns hidden within the data. These analytics techniques were used to find travel patterns of UK travellers and two sub groups within UK travellers, travellers with medical conditions and cruise travellers.

During the use of different techniques, suitable data frames were created from the main data frames and cleaned of missing values to obtain highly accurate travel patterns. Time series forecasting has been used to predict the next twelve months of travel demands. A verification of the predicted travellers' demand was conducted using the outbound trips data obtained from the twelve months of 2018.

4.1. Travellers

UK's outbound travel decreased by 0.12% in 2017 after 25.64% and 4.82% increases in 2015 and 2016 respectively. The decrease in 2017 was due to a 1.44% decrease in number of travellers during the year's main travel season from August to October. The other travel season for the year was from April to June. A time series forecasting conducted on these data revealed that the number of UK residents engaged in travelling would decrease by 0.33% in 2018 compared to the previous year but it increased by 3.93% despite the prediction. The predicted pattern was compared against real data and found that the MAPE was only 5.72% for the forecast. Figure 4.1 shows the number of UK residents travelled over time.

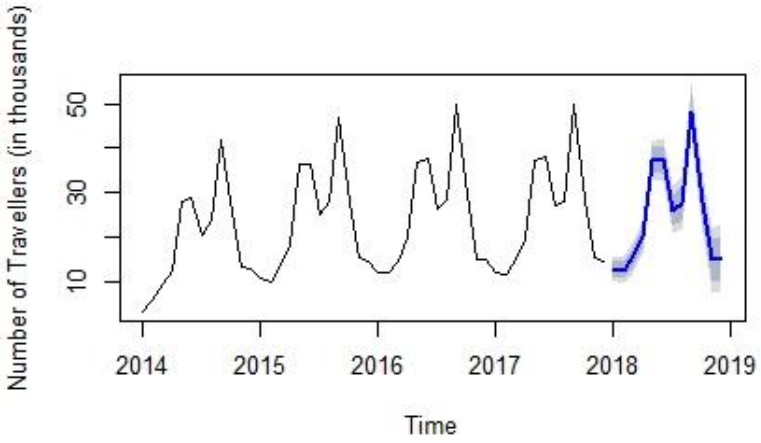

Figure 4.1: Number of UK travellers over time

The sample showed that 1,566,175 UK travellers were received by all the destinations. It is bigger than the total number of UK travellers in the sample since some of the travellers travelled to more than one destination on a trip. Spain was the first choice of destination for 25.96% of destination visits from 2014 to 2017 as shown in Table 4.1. Spain managed to surpass the number of UK travellers received by the next four destinations, France, Portugal, Italy and Greece combined. The only middle east country that ranked among the top twenty destination choices of UK travellers was Turkey. A single South American, African or Asian country did not manage to be included in the list.

Table 4.1: Most visited destinations by travellers from 2014 to 2017

No.	Country	Number of Travellers	Percentage of Travellers
01.	Spain	406,606	25.96%
02.	France	96,225	6.14%
03.	Portugal	92,227	5.89%
04.	Italy	91,969	5.87%
05.	Greece	74,860	4.78%
06.	United States	70,528	4.50%
07.	Great Britain (UK)	44,531	2.84%
08.	Turkey	40,094	2.56%
09.	Cyprus	32,156	2.05%
10.	Germany	30,372	1.94%
11.	Malta	24,609	1.57%
12.	Gibraltar	24,320	1.55%
13.	Australia	23,416	1.50%
14.	Belgium	22,082	1.41%
15.	Croatia	21,658	1.38%
16.	Norway	20,158	1.29%
17.	Netherlands	19,117	1.22%
18.	Ireland	17,546	1.12%
19.	Canada	17,043	1.09%
20.	Barbados	14,651	0.94%

Figure 4.2 depicts the number of UK travellers that visited each of the ten most visited destinations from 2014 to 2017. Four out of ten destinations, France, Great Britain, Cyprus and Germany managed to maintain 10.67%, 20.27%, 9.98% and 14.28% average annual growths in number of visitors from the UK throughout all four years respectively. It indicates that these countries are favourite destinations among UK travellers. Spain, Portugal, Italy and United States had 33.23%, 62.80%, 52.78% and 58.43% increases in number of visitors from 2014 to 2016 but suffered 3.49%, 2.25%, 1.79% and 11.51% decreases in 2017 compared to 2016 respectively. Portugal and Italy are becoming two of the most favourite destinations among UK travellers despite the decrease in 2017. Greece had a 23.24% increase in number of visitors during 2015

but suffered an average of 0.42% decrease in visitors during the next two years. Turkey, the only middle east country among the ten most visited destinations suffered an average decrease of 18.81% in number of visitors annually. The biggest decreases in number of visitors were recorded for Turkey and United States. The increased security risk level of the country was one of the main reasons behind the Turkey's decrease in visitors. It was the only destination that categorised as a medium level security risk country ("Security | Map | Planner | Travel Risk Map," n.d.). These patterns in the most visited destinations indicate that UK travellers' favour toward travelling to destinations with low security risks closer to home.

All these destinations would adhere to the same patterns shown from 2014 to 2017 in 2018 according to a time series prediction. The highest increase of 22.67% in UK visitors would be recorded for Germany in 2018. Italy, France, Greece, Cyprus, Great Britain, Portugal and Spain would receive 21.79%, 20.16%, 12.16%, 7.44%, 6.58%, 3.29% and 0.26% more visitors in 2018 compared to 2017. Turkey and United States would be the only destinations to suffer decreases of 23.10% and 5.62% in UK travellers. An accuracy test conducted on the forecasts with real data recorded for 2018 revealed that MAPE for Spain, France, Portugal, Italy, Greece, United States, Great Britain, Turkey, Cyprus and Germany were 3.25%, 29.85%, 11.52%, 64.17%, 207.65%, 7.89%, 23.18%, 108.85%, 17.19% and 38.15% respectively.

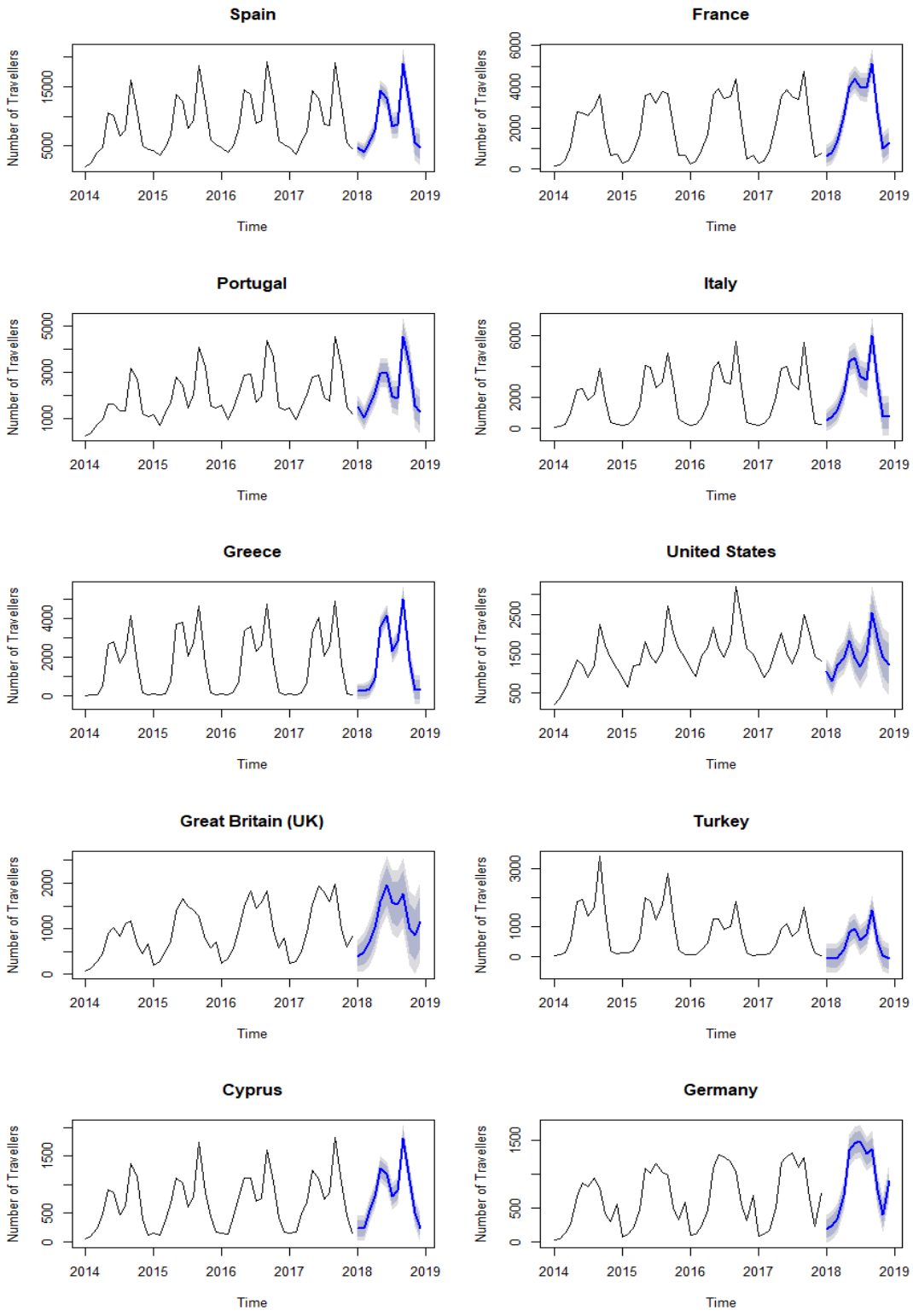

Figure 4.2: Number of UK travellers received by the ten most visited destinations over time

4.1.1. Group Type

UK travellers prefer to travel with at least one other person than travelling alone, and they choose people who are close to them. 56.84% of the travellers travel as couples while only a 32.03% travel alone as shown in Table 4.2. 60.05% of the travellers travel either with their significant other or with a close relative.

Table 4.2: Number of travellers that travelled in each group type as a percentage of total number of travellers from 2014 to 2017

No.	Group Type	Percentage of Travellers
01.	Couple	56.84%
02.	Individual	32.03%
03.	Group	7.92%
04.	Family	2.63%
05.	Single Parent Family	0.58%

Only travellers that travelled as couples and single parent families decreased by 1.87% and 3.48% in 2017 respectively compared to 2016 as shown in Figure 4.3. UK travellers that travelled as individuals, groups and families increased by 1.36%, 3.83% and 9.04% in 2017 respectively. This indicates that UK travellers' travel habits are slowly changing, and they are starting to travel more in groups and with their families. The peak in travellers is toward the middle of the year and between the two travel seasons for groups, families and single parent families.

A forecasting was conducted to find the number of travellers that would travel as each group type in 2018. It revealed travellers that travel as couples and individuals would further decrease by 1.29% and 6.75% respectively. The number of travellers that travel as individuals, groups and families would increase by 8.74%, 10.95% and 8.49% respectively. The accuracy test conducted on these predicted values using real data recorded for 2018 revealed that MAPE for couples, individuals, groups, families and single parent families were 3.05%, 5.34%, 13.72%, 15.14% and 27.78% respectively.

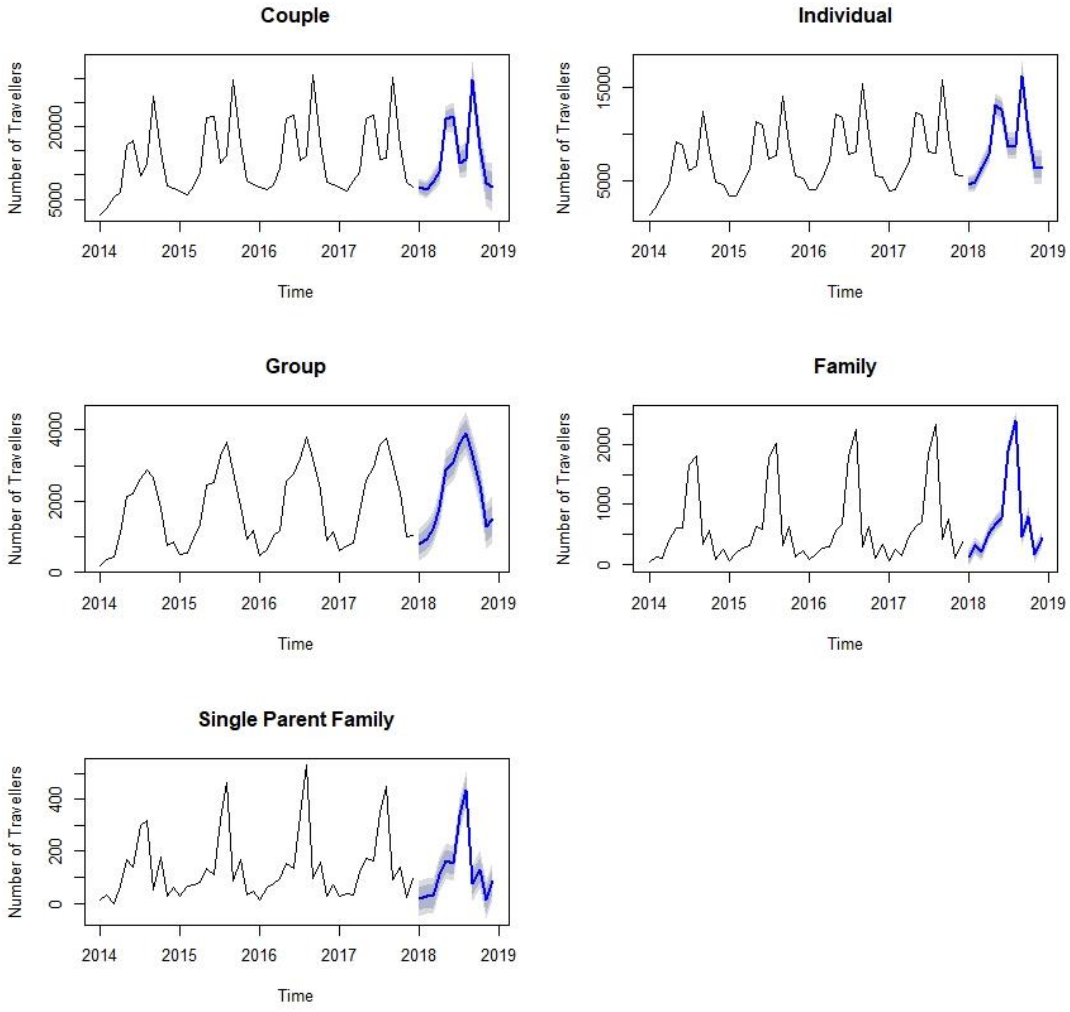

Figure 4.3: Number of UK travellers that travelled in different group types over time

Couples travel mostly to destinations within Europe compared to all other group types. The only two countries couples travelled that fell outside of Europe were United States and Turkey ranked at sixth and eighth respectively as shown in Table 4.3. A comparison between couples and other group types showed that all other group types prefer to travel to United States more than couples. Only 3.69% of couples chose United States as a destination and was the sixth most visited destination, while more than 5% of the travellers within every other group type chose United States as a destination and was ranked within second to fourth places in every other group type. Tables 4.3, 4.4, 4.5, 4.6 and 4.7 show the most visited destinations by each group type from 2014 to 2017.

The only middle east country that managed to be a destination choice for all group types was Turkey. It was the fourth and fifth most visited country by families and single parent families respectively. Turkey's ranking within these groups is significant due to its three decades long struggle to obtain European Union (EU) membership (Phinnemore & İçener, 2016) and its categorisation as a medium level security risk country ("Security | Map | Planner | Travel Risk Map," n.d.). United Arab Emirates was the only other middle east country that managed to be included in the lists of ten most visited destinations by families and single parent families. Great Britain was not a most visited destination by families and single parent families though it was one of the ten most visited destinations by all other group types. Italy was not a favourite destination for families and single parent families compared to other group types. It was only the seventh most visited destination for both group types. All these destination preferences, and that four out of ten most visited destinations by these group types are located outside of Europe indicate families and single parent families prefer to travel to destinations outside of Europe.

UK travellers that travel as individuals do not limit themselves to few continents or destinations preferred by other group types. Their travel patterns were different from all other group types. Australia was also one of the most visited destinations by them and they were the only other group type that had Germany as one of their ten most visited destination except for travellers that travelled as couples. Cyprus, one of the ten most visited destinations by all the other groups was not favoured by them.

These differences in the most visited destinations among different group types is a clear indication that the group type has an impact on the destination choice of a traveller.

Table 4.3: Most visited destinations by couples as a percentage of total number of travellers that travelled as couples received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	25.91%
02.	Portugal	6.31%
03.	Italy	6.13%

04.	France	5.94%
05.	Greece	5.03%
06.	United States	3.57%
07.	Great Britain (UK)	2.84%
08.	Turkey	2.25%
09.	Cyprus	2.05%
10.	Germany	1.95%

Table 4.4: Most visited destinations by individuals as a percentage of total number of travellers that travelled as individuals received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	24.31%
02.	France	6.26%
03.	Italy	5.72%
04.	United States	5.57%
05.	Portugal	5.37%
06.	Greece	4.14%
07.	Great Britain (UK)	2.97%
08.	Turkey	2.48%
09.	Germany	2.17%
10.	Australia	2.09%

Table 4.5: Most visited destinations by groups as a percentage of total number of travellers that travelled as groups received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	30.24%
02.	France	6.41%
03.	United States	6.35%
04.	Italy	5.24%
05.	Portugal	5.08%
06.	Greece	5.03%
07.	Turkey	4.06%
08.	Great Britain (UK)	3.10%

09.	Cyprus	2.36%
10.	Gibraltar	1.58%

Table 4.6: Most visited destinations by families as a percentage of total number of travellers that travelled as families received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	34.47%
02.	France	8.97%
03.	United States	8.57%
04.	Turkey	6.54%
05.	Greece	5.62%
06.	Portugal	4.67%
07.	Italy	3.34%
08.	Cyprus	2.52%
09.	Egypt	1.87%
10.	United Arab Emirates	1.05%

Table 4.7: Most visited destinations by single parent families as a percentage of total number of travellers that travelled as single parent families received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	35.59%
02.	United States	8.12%
03.	France	8.00%
04.	Greece	6.31%
05.	Turkey	5.78%
06.	Portugal	3.94%
07.	Italy	3.25%
08.	Cyprus	2.84%
09.	Egypt	1.52%
10.	United Arab Emirates	1.24%

Only four out of the ten destinations, France, Great Britain, Cyprus and Germany had shown consistent increase in number of travellers from 2014 to 2017 as shown in

Figure 4.4. This confirm that these destinations are favourites among couples. The peak travel season for all the destinations except for Great Britain was the second travel season during a year from August to October. Great Britain's peak travel season was the first season during a year that starts from April and ends in June. Cyprus had an increase of 4.19% more visitors that travelled as couple in 2016 compared to the previous year despite the 11.87% decrease in its peak travel season. Great Britain and Germany had only 0.50% and 0.67% visitor growth in 2017 compared to 2016.

France and Cyprus received 5.31% and 3.87% more UK resident couples during 2017 compared to 2016 respectively despite the inconsistent growth over the past years. United States had a 66.71% increase in UK travellers that travelled as couples from 2014 to 2016 but suffered a 14.25% decrease in 2017 compared to previous year. The popularity of Turkey as a destination among couples decreased over the four years by 51.81%. Turkey's decrease in popularity as a destination was not unique among UK travellers that travelled as couples. It was recorded across all other group types. The number of UK travellers travelled as individuals, groups, families and single parent families that visited Turkey decreased by 45.51%, 39.21%, 51.16% and 31.20% from 2014 to 2017 respectively.

All the destinations that are popular among couples except for Germany receive the highest number of travellers during UK's two travel seasons from April to June and from August to October. Germany receive its highest number of UK resident couples between the two seasons from May to July.

Germany's visitor pattern shown by couples can be seen again in UK travellers that travelled as individuals, the only other group type that has Germany in the ten most visited destinations. Figure 4.5 shows the number of UK travellers that travelled as individuals received by the ten most UK travellers visited destinations as individuals from 2014 to 2017. Great Britain had an 89.90% significant increase in the number of UK residents that travelled as individuals from 2014 to 2017. The destination managed to maintain an annual average increase of 24.71% in UK travellers that travelled as individuals during the four years.

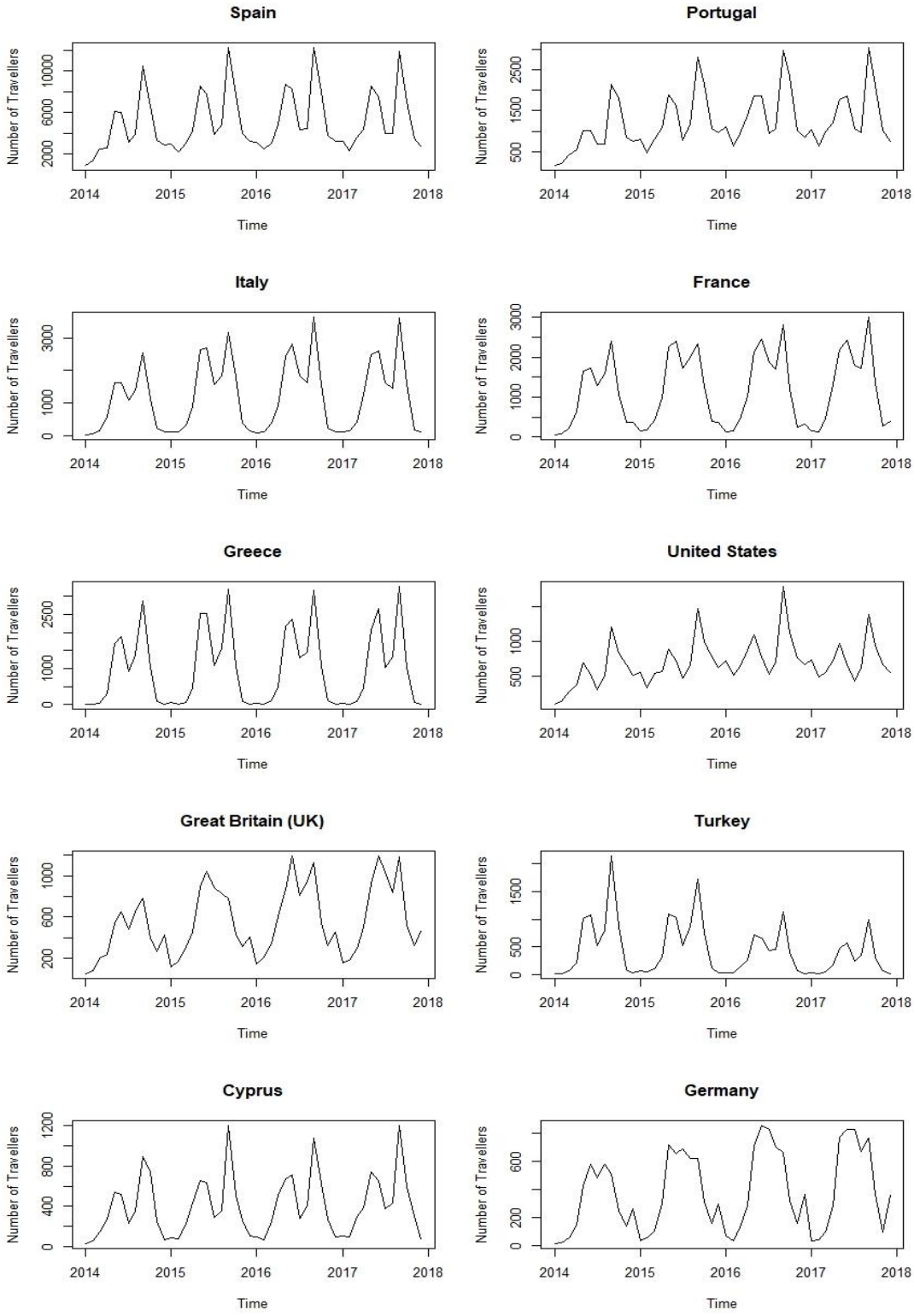

Figure 4.4: Number of UK travellers that travelled as couples received by the ten most visited destinations by such travellers from 2014 to 2017

Spain, Portugal, Italy and United States had 33.36%, 63.06%, 56.15% and 49.10% increases in number of UK travellers that travelled as individuals from 2014 to 2016 but suffered 0.99%, 1.38%, 4.33% and 9.75% decreases in number of travellers in 2017 compared to the previous year. The remaining five destinations managed to maintain a consistent increase in number of UK travellers that visited as individuals throughout all four years. These destinations, France, Greece, Great Britain, Cyprus and Germany had 3.32%, 4.65%, 8.95%, 2.47% and 6.40% increases visitors that travelled as individuals in 2017 compared to 2016 respectively. Germany is one of the most favourite destinations among UK travellers that travelled as individuals compared to couples since the growth rate of individual travellers to Germany was almost ten times of the growth rate for couples in 2017.

Australia is one of the most sought out destinations during the end of a year and beginning of a year. This is mainly due to UK's winter that spans from December to March ("When does winter start?," n.d.). The number of UK residents that travelled as individuals visited Australia during this time in past years was more than the UK residents that travelled as individuals received by France, Italy, Portugal, Greece, Great Britain, Turkey and Germany during the same time period.

All the destinations visited by UK residents that travel in groups do not have two distinctive travel seasons compared to couples and individuals group types as shown in Figure 4.6. Even Spain, the country that was the most visited destination by all group types did not have two distinctive travel seasons. The same pattern can be seen with both families and single parents group types.

United States showed an increase and decrease pattern for UK travellers that travelled in groups. A 59.55% of increase in the number of travellers took place from 2014 to 2016 followed by a 9.59% decrease in 2017.

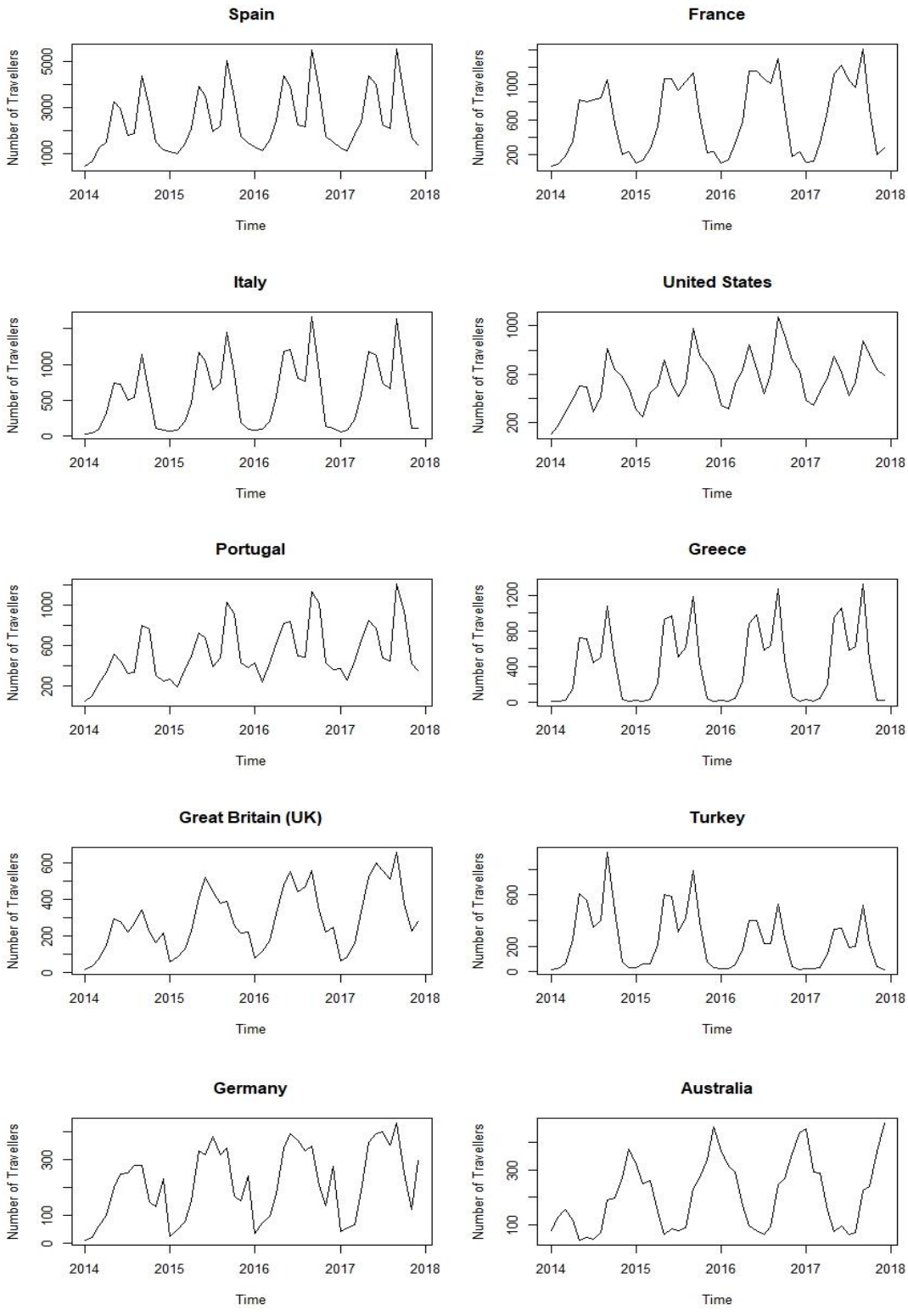

Figure 4.5: Number of UK travellers that travelled as individuals received by the ten most visited destinations by such travellers from 2014 to 2017

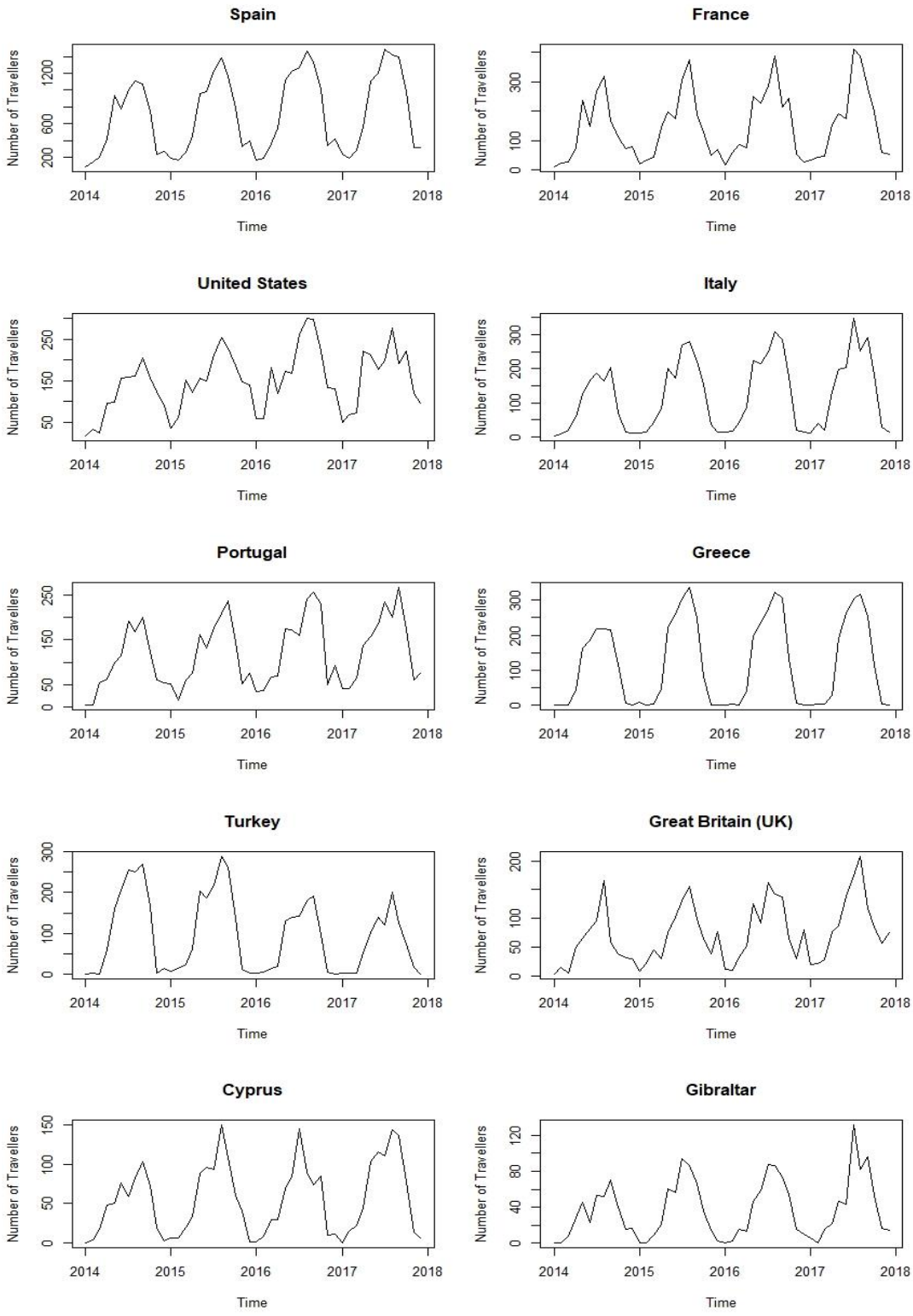

Figure 4.6: Number of UK travellers that travelled as groups received by the ten most visited destinations by such travellers from 2014 to 2017

UK travellers that travelled with families show the same pattern for United States, but it was only a 0.12% decrease in 2017 after a 45.80% increase from 2014 to 2016 as shown in Figure 4.7. This same increase and decrease pattern for United States can be found across all other group types.

Egypt is one of the ten most visited destinations by families, but it lost its popularity after 2015. Egypt saw an increase of 13.36% in UK travellers that travelled as families from 2014 to 2015 followed by a significant 39.45% decrease in the number of travellers during 2016. A 176.92% increase in the number of travellers took place from 2016 to 2017 followed by a 74.29% decrease in the two years following 2015. A similar travel pattern like this for Egypt was shown again by single parent families as shown in Figure 4.8. A 50% increase of UK travellers that travelled as single parent families took place from 2014 to 2015 but decreased by 82.35% towards the end of 2016. It again increased by a 66.67% from 2016 to 2017. A total of 70.59% decrease in number of travellers had taken place from 2015 to 2017.

The other middle east country, United Arab Emirates had a 325% increase in number of travellers that travelled as single parent families from 2014 to 2015 but suffered a 17.65% decrease in 2017. Families that travelled to the country has increased by 72.73% in 2017 despite the decrease in UK travellers that travelled as single parent in 2017. There was not a clear seasonal pattern to the way Egypt and United Arab Emirates received travellers from both group types during the four years. This makes it difficult to predict demand for these destinations.

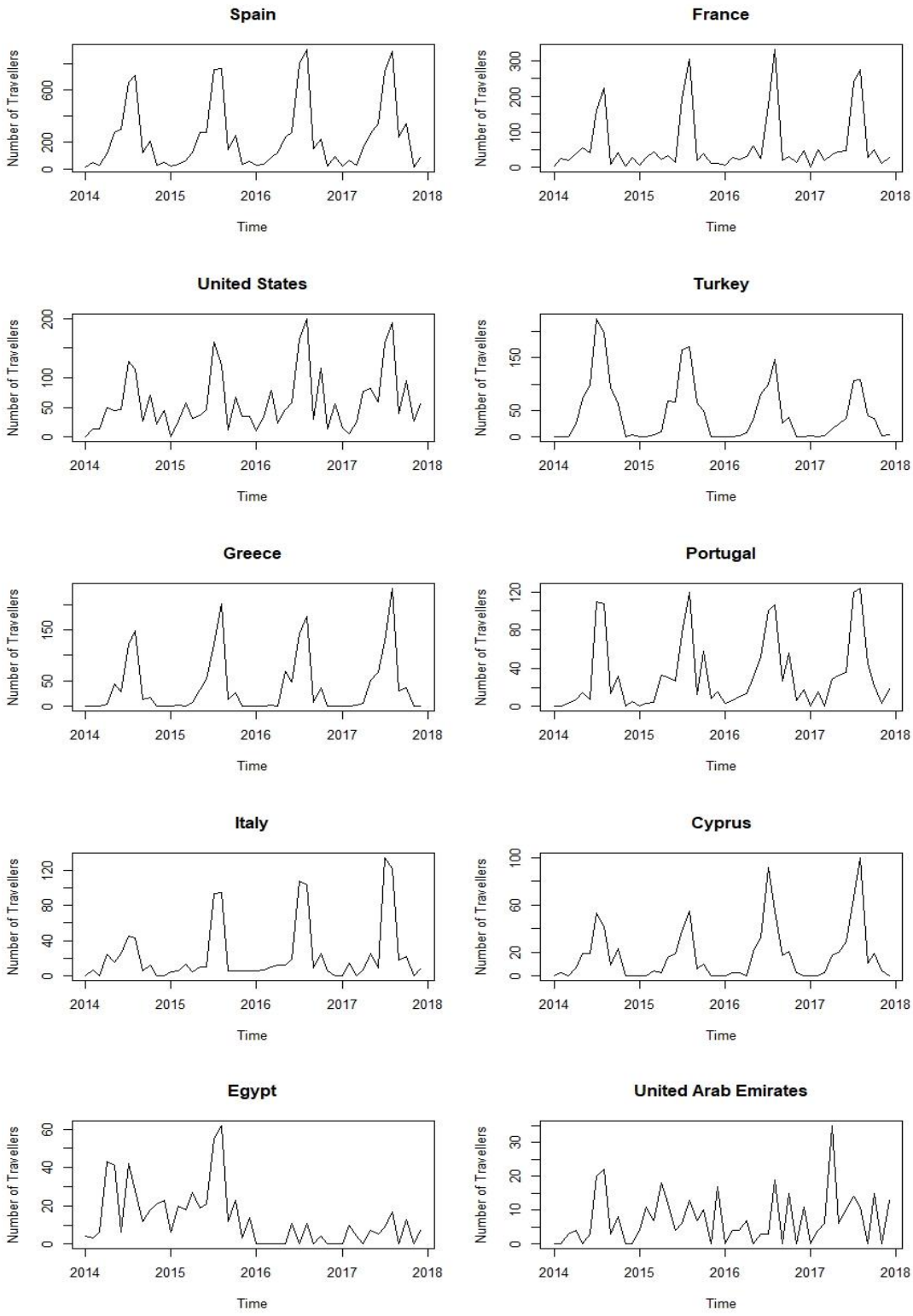

Figure 4.7: Number of UK travellers that travelled as families received by the ten most visited destinations by such travellers from 2014 to 2017

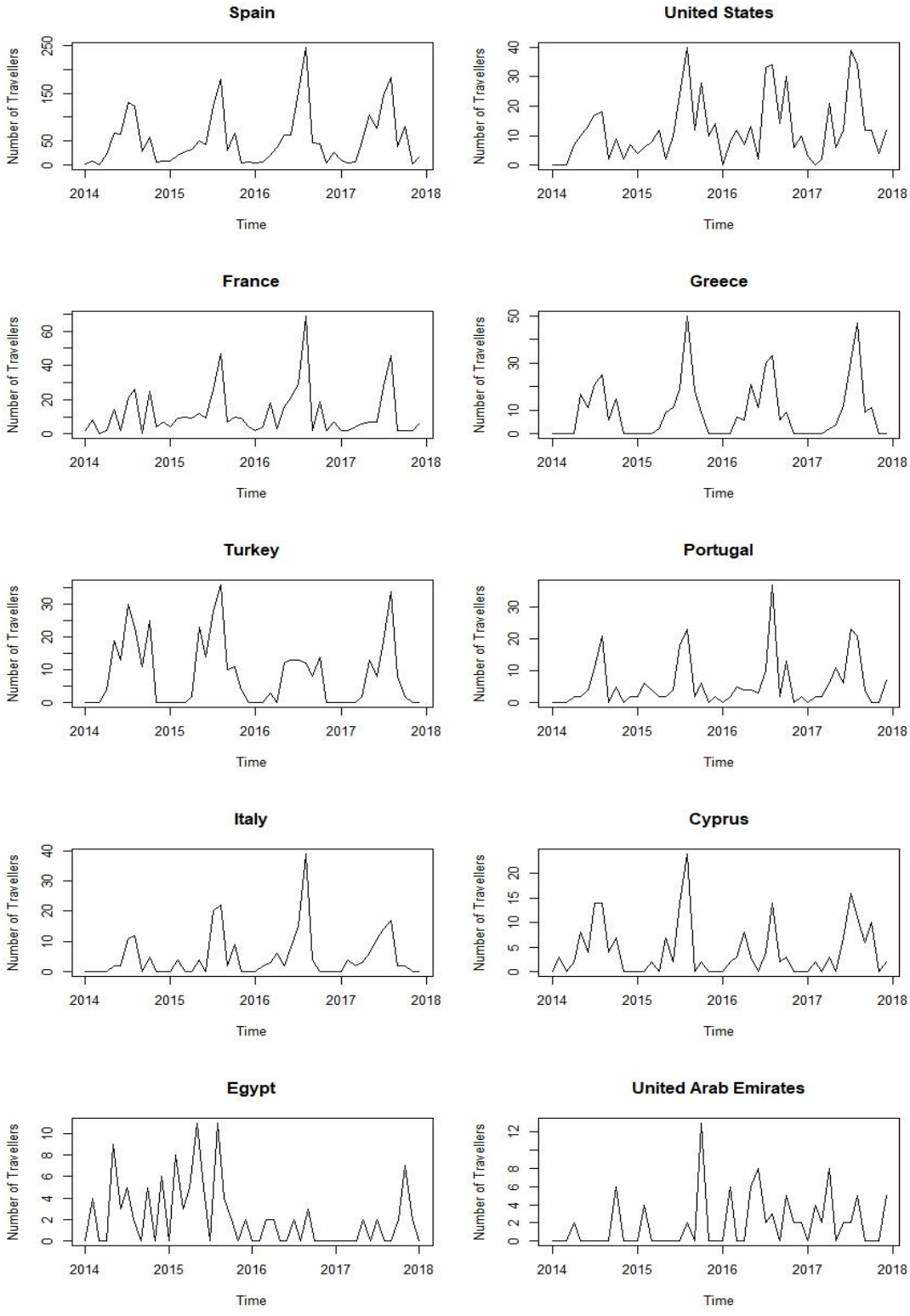

Figure 4.8: Number of UK travellers that travelled as single parent families received by the ten most visited destinations by such travellers from 2014 to 2017

4.1.2. Age

The average age of a UK resident traveller is sixty-six years, and Baby Boomers are the most travelled age group. They accounted for 51.60% of all outbound trips from 2014 to 2017 and the rest was divided among the other four age groups as shown in Table 4.8. A clear indication is that UK travellers over fifty-three years travel more than other age groups.

Table 4.8: Number of travellers belonging to each age group as a percentage of total number of travellers from 2014 to 2017

No.	Age Group	Percentage of Travellers
01.	Generation Z (under 22 years old)	3.76%
02.	Millennials (22 to 37 years old)	2.11%
03.	Generation X (38 to 53 years old)	6.44%
04.	Baby Boomers (54 to 72 years old)	51.60%
05.	Silent Generation (over 72 years old)	36.08%

A steady increase in the number of travellers for almost all age groups was recorded during all four years except for Baby Boomers in 2017 as shown in Figure 4.9. The number of Baby Boomers that travelled in 2017 decreased by 1.93% compared to the previous year.

A time series prediction revealed that number of travellers from Generation Z, Millennials and Silent Generation would increase by 17.34%, 9.86% and 13.87% respectively in 2018. The number of UK travellers engaged in travelling from Generation X and Baby Boomers would decline by 1% and 4.27% respectively. The prediction had MAPE of 23.77%, 8.58%, 4.83%, 4.74% and 9.62% for Generation Z, Millennials, Generation X, Baby Boomers and Silent Generation respectively.

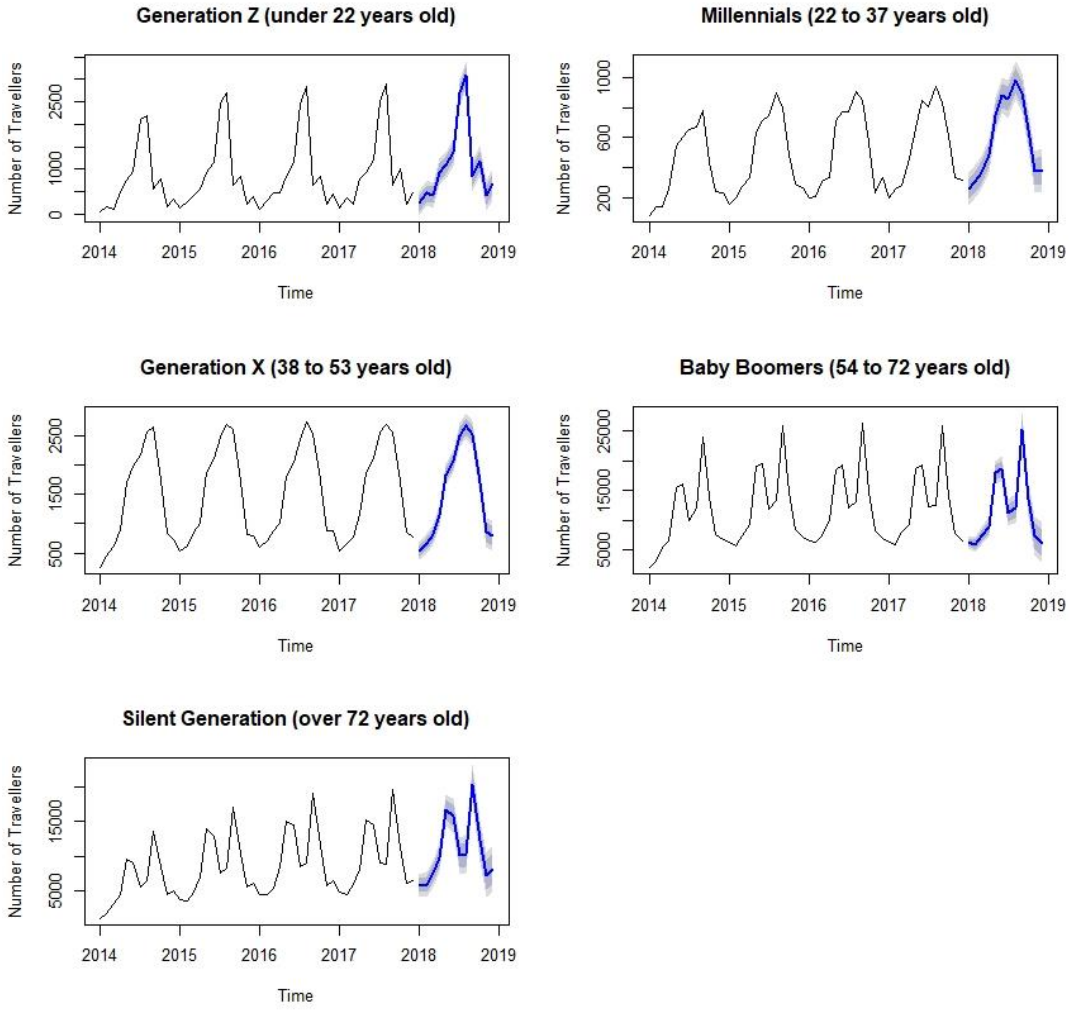

Figure 4.9: Number of travellers that belonged to different age groups over time

The differences in the most visited destinations among age groups are clear indications that the age of a traveller has an impact on the destination choice of a traveller. Tables 4.9, 4.10, 4.11, 4.12 and 4.13 show the most visited destinations by each age group from 2014 to 2017. Only travellers from Silent Generation prefer to travel to Gibraltar, and Germany is a most visited destination by Baby Boomers and Silent Generation. Great Britain is a popular destination among older travellers than younger travellers. Only Silent Generation, Baby Boomers and Generation X has it as one of the most visited destinations. The percentage of the travellers within each group that visited Great Britain decreased from Silent Generation to Generation X. Italy is another destination favoured by Baby Boomers and Silent Generation. Only Silent Generation do not have Turkey included in their ten most visited destinations. The ten most visited

destinations by Baby Boomers and Silent Generation are considered low health risk destinations ("Medical | Map | Planner | Travel Risk Map," n.d.). These findings show that these two generations prefer travelling to destinations that have low health risks and are close to UK and within EU region.

Younger generation like Generation Z, Millennials and Generation X are far more adventurous with their destination choices compared to older generations. United States is either the second or third most visited destination for these age groups accounting for more than 6% of travellers within each generation. They also prefer to travel to Greece compared to other two generations. Greece is among the third or fourth most visited destinations for these three generations. Egypt and Netherlands are two of the ten most visited destinations by Generation Z and Millennials.

Table 4.9: Most visited destinations by Generation Z as a percentage of total number of Generation Z travellers received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	33.34%
02.	France	8.24%
03.	United States	7.89%
04.	Greece	5.92%
05.	Turkey	5.86%
06.	Portugal	4.06%
07.	Italy	3.85%
08.	Cyprus	2.58%
09.	Egypt	1.53%
10.	Netherlands	1.35%

Table 4.10: Most visited destinations by Millennials as a percentage of total number of Millennials received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	28.34%
02.	United States	8.81%
03.	France	6.14%

04.	Greece	4.82%
05.	Turkey	4.53%
06.	Portugal	4.19%
07.	Italy	3.97%
08.	Cyprus	2.18%
09.	Netherlands	1.55%
10.	Egypt	1.47%

Table 4.11: Most visited destinations by Generation X as a percentage of total number of Generation X travellers received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	28.43%
02.	United States	6.57%
03.	Greece	5.63%
04.	France	5.62%
05.	Portugal	5.04%
06.	Italy	4.86%
07.	Turkey	4.79%
08.	Cyprus	2.21%
09.	Egypt	1.58%
10.	Great Britain (UK)	1.35%

Table 4.12: Most visited destinations by Baby Boomers as a percentage of total number of Baby Boomers received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	25.83%
02.	Italy	5.82%
03.	Portugal	5.65%
04.	France	5.60%
05.	Greece	5.19%
06.	United States	4.63%
07.	Turkey	2.59%
08.	Great Britain (UK)	2.22%

09.	Cyprus	2.11%
10.	Germany	1.74%

Table 4.13: Most visited destinations by Silent Generation as a percentage of total number of Silent Generation travellers received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	25.04%
02.	France	6.81%
03.	Portugal	6.59%
04.	Italy	6.36%
05.	Great Britain (UK)	4.15%
06.	Greece	3.99%
07.	United States	3.53%
08.	Germany	2.42%
09.	Gibraltar	1.95%
10.	Cyprus	1.90%

Generation Z, Millennials and Generation X travel mostly during one travel season of a year unlike Baby Boomers and Silent Generation that travel mostly during two distinctive travel seasons. Figures 4.10, 4.11, 4.12, 4.13 and 4.14 show the number of travellers from each group that visited their most visited destinations from 2014 to 2017.

The only middle east country visited by Generation Z and Millennials, Egypt did not show any seasonal pattern in visitors. The country lost its popularity among Generation Z and Millennials in 2016 by 85.20% and 82.46% respectively compared to 2015. These two destinations have started to gain attraction again in 2017 with 57.14% and 70% increases in visitors from Generation Z and Millennials respectively compared to 2016. The only other destination preferred by Generation Z and Millennials, Netherlands had 47.66% and 76.92% increases in travellers from these age groups respectively in 2017 compared to 2014.

United States had suffered a decrease in travellers across all age groups in 2017. Travellers from Generation Z, Millennials, Generation X, Baby Boomers and Silent Generation that visited the country decreased by 10.36%, 0.40%, 14%, 13.6% and 8.66% respectively compared to 2016.

The most popular destination among all the age groups, Spain had an increase in visitors only across two age groups during all four years. Travellers from Generation Z and Millennials that visited the country had increased by 6.05% and 0.27% respectively in 2017 compared to 2016. Generation X, Baby Boomers and Silent Generation that visited Spain had reduced by 1.61%, 5.11% and 2.81% respectively in 2017 compared to 2016.

France and Cyprus were the only two destinations that had increase in visitors across all age groups during all four years. The number of travellers from Generation Z, Millennials, Generation X, Baby Boomers and Silent Generation that visited France increased by 2.94%, 15.86%, 2.23%, 1.44% and 7.38% respectively in 2017 compared to the previous year. Cyprus also had an increase in travellers from Generation Z, Millennials, Generation X, Baby Boomers and Silent Generation by 3.14%, 5.63%, 12.90%, 7.89% and 0.67% respectively in 2017 compared to 2016. This indicate Cyprus that ranked among the bottom three destinations of most visited destinations across all age groups is gaining popularity among all UK resident travellers.

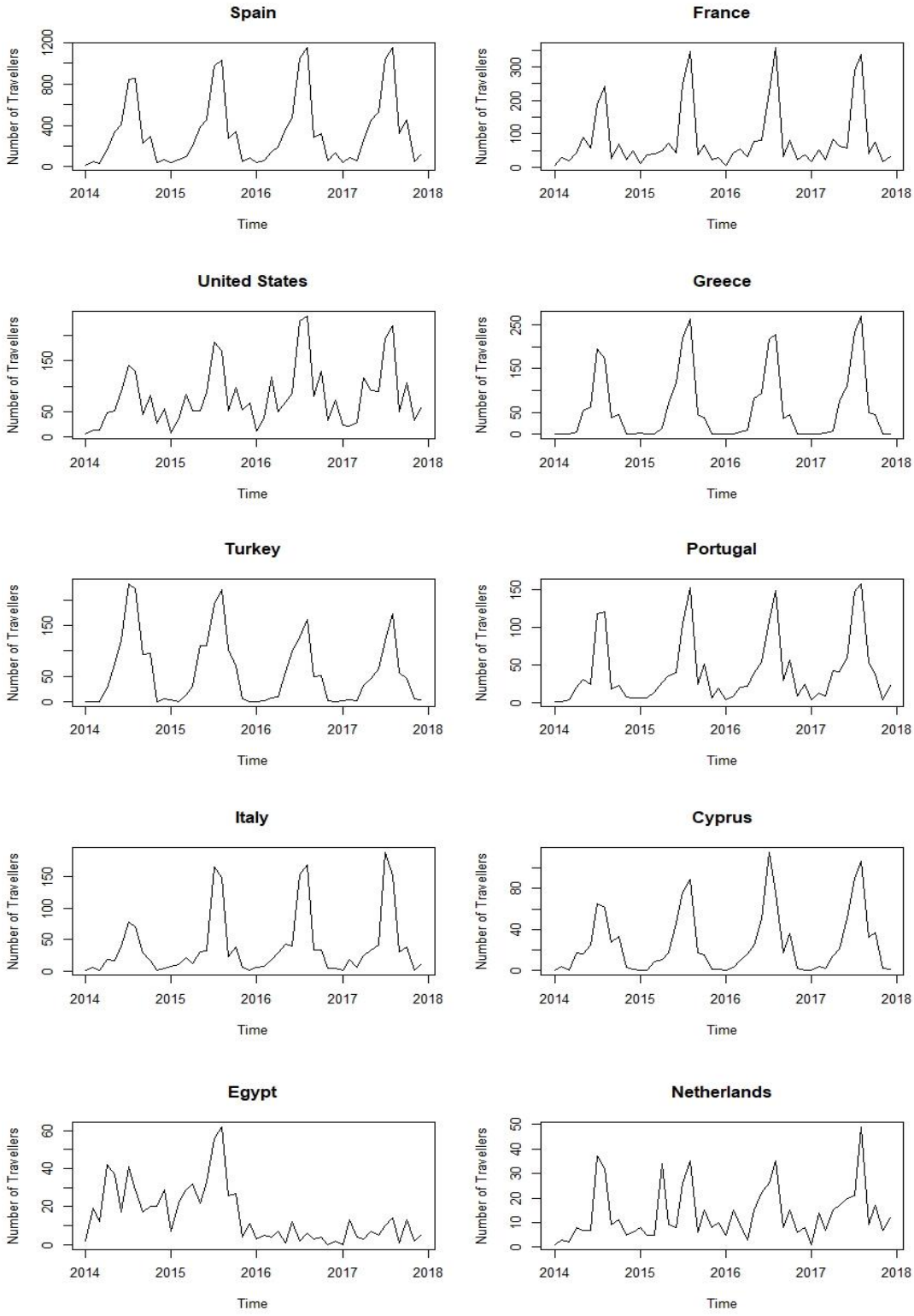

Figure 4.10: Number of Generation Z travellers received by the ten most visited destinations by Generation Z travellers from 2014 to 2017

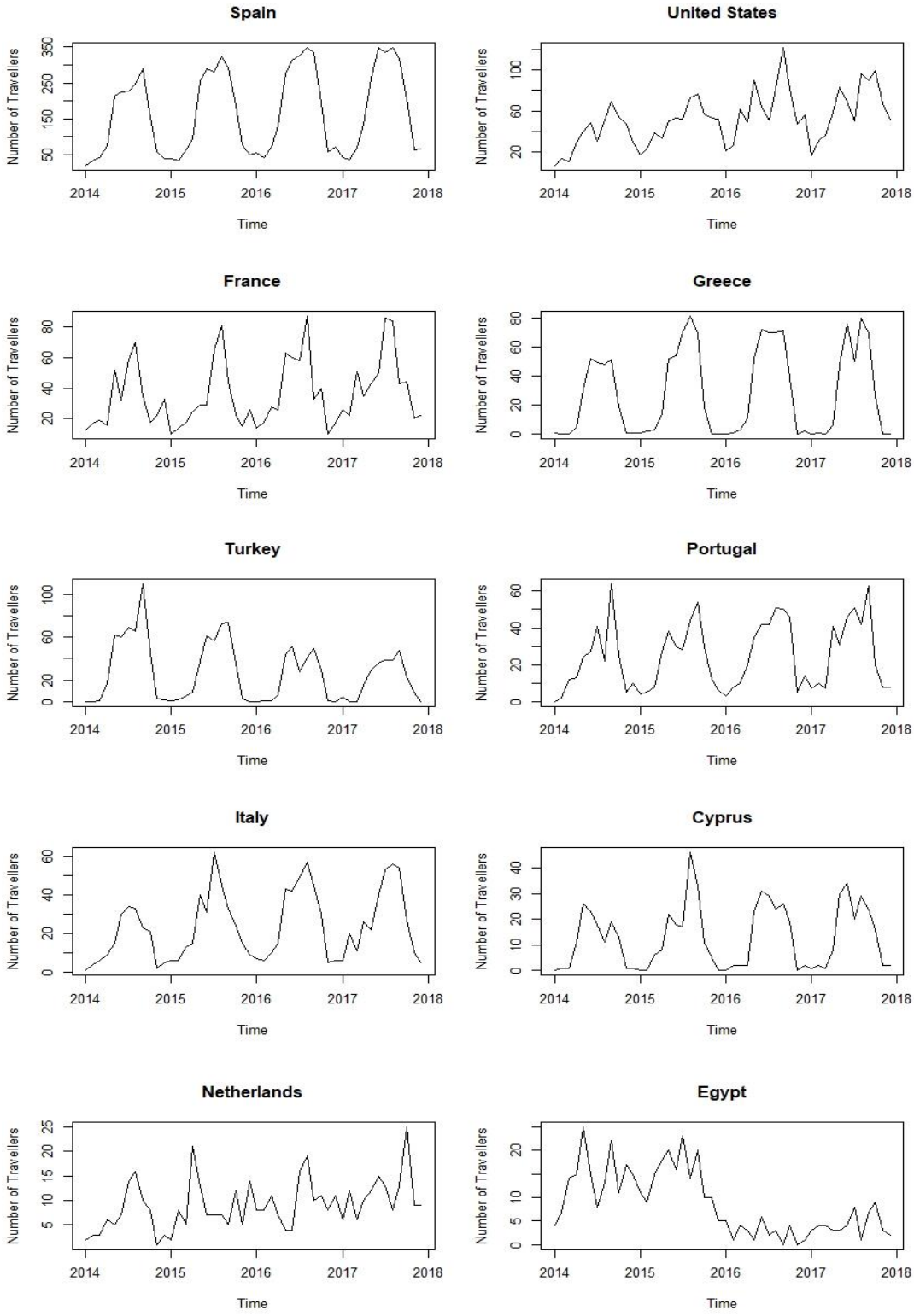

Figure 4.11: Number of Millennials received by the ten most visited destinations by Millennials from 2014 to 2017

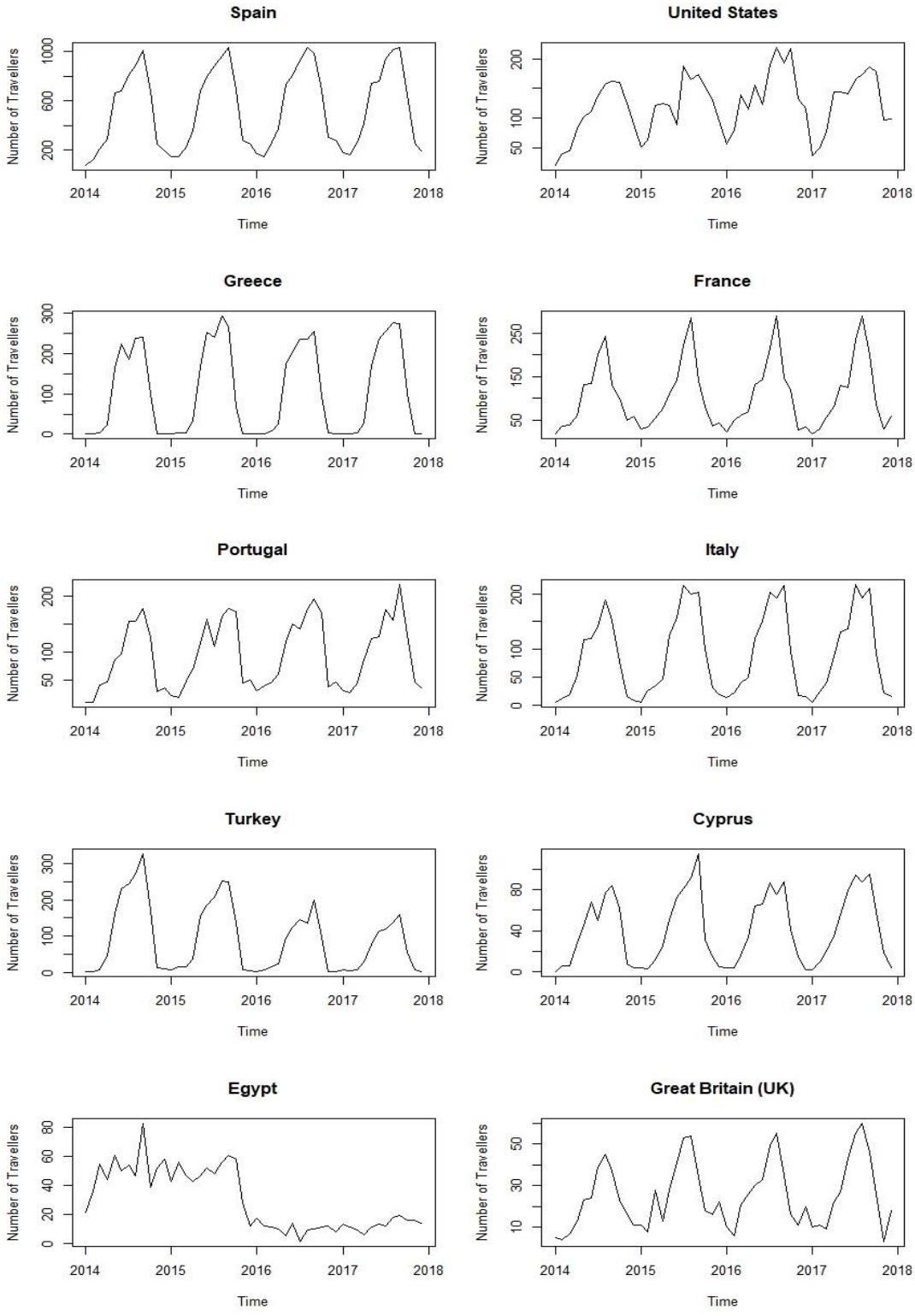

Figure 4.12: Number of Generation X travellers received by the ten most visited destinations by Generation X travellers from 2014 to 2017

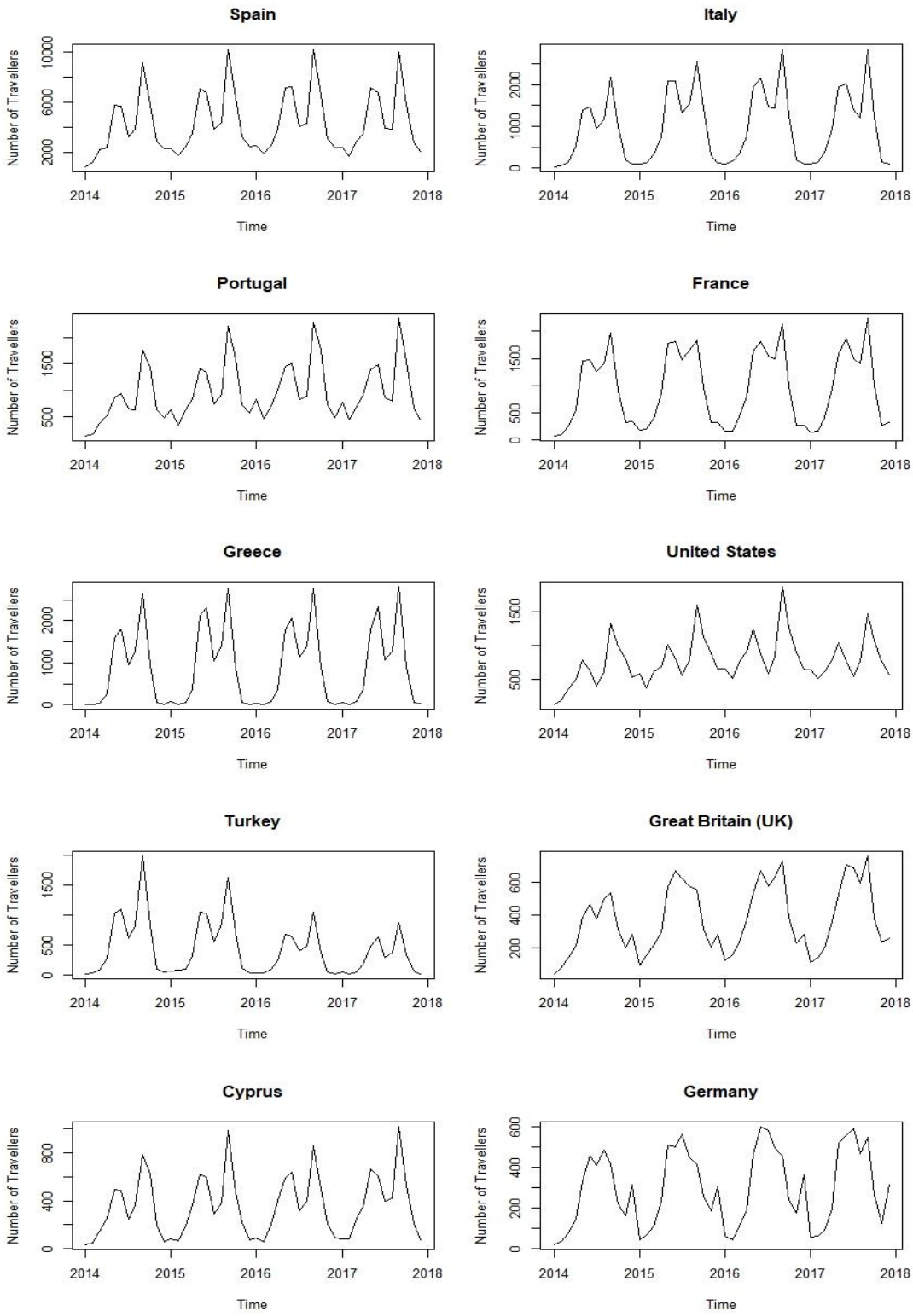

Figure 4.13: Number of Baby Boomers received by the ten most visited destinations by Baby Boomers from 2014 to 2017

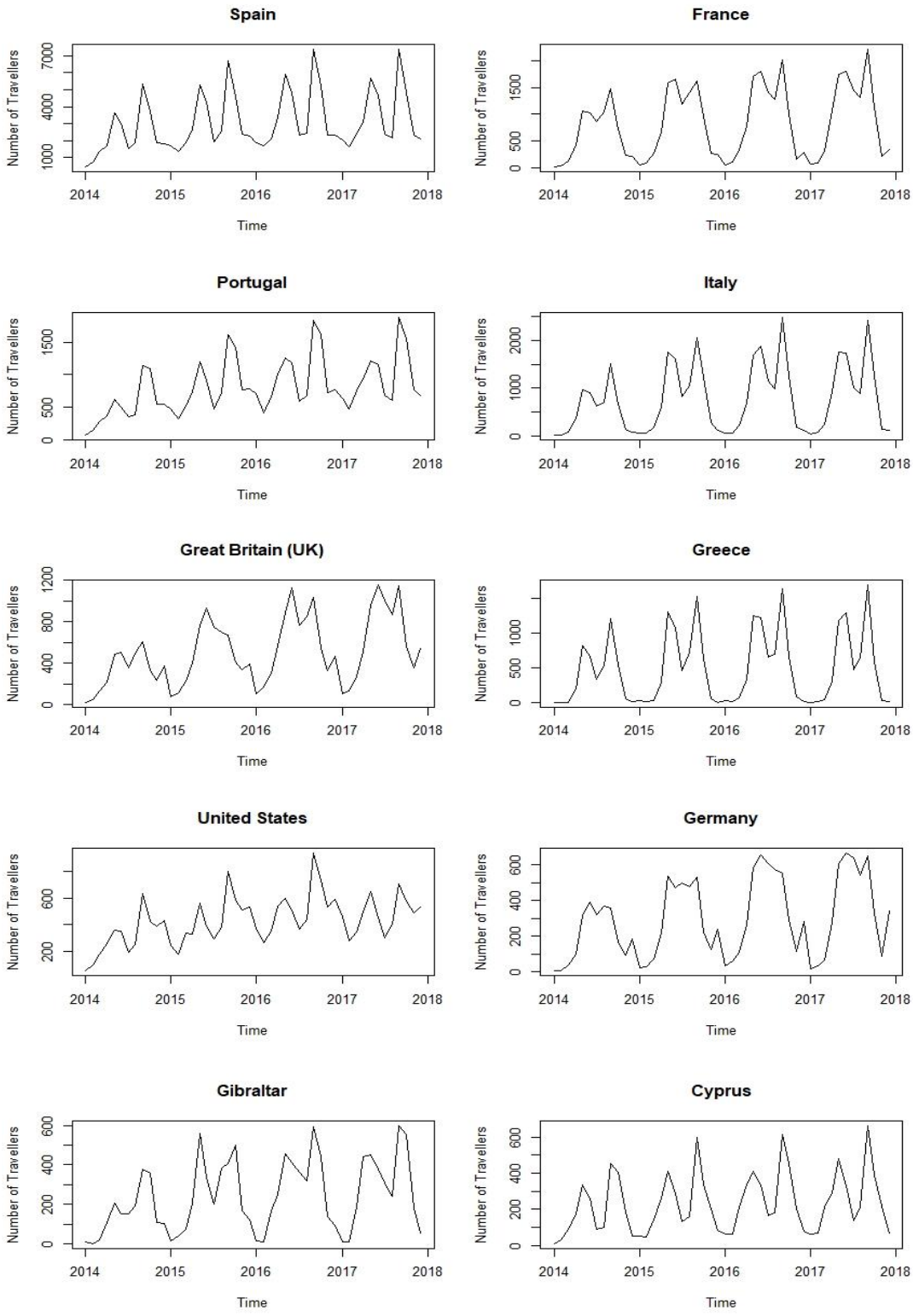

Figure 4.14: Number of Silent Generation travellers received by the ten most visited destinations by Silent Generation travellers from 2014 to 2017

4.1.3. More than one Destination

Only 15.86%, 175,174 out of 1,104,758 UK travellers visited more than one destination during a trip in the sample and 72.05% of them travelled with at least another person as shown in Table 4.14. An average age of a UK traveller that travel to more than one destination is sixty-two years and 92.60% of them are over 53 years old as shown in Table 4.15.

Table 4.14: Number of travellers in each group type that travelled to more than one destination on a trip as a percentage of total number of travellers that travelled to more than one destination on a trip from 2014 to 2017

No.	Group Type	Percentage of Travellers
01.	Couple	64.63%
02.	Individual	27.95%
03.	Group	6.02%
04.	Family	1.17%
05.	Single Parent Family	0.23%

Table 4.15: Number of travellers belonging to each age group that travelled to more than one destination on a trip as a percentage of total number of travellers that travelled to more than one destination on a trip from 2014 to 2017

No.	Age Group	Percentage of Travellers
01.	Generation Z (under 22 years old)	1.80%
02.	Millennials (22 to 37 years old)	1.24%
03.	Generation X (38 to 53 years old)	4.36%
04.	Baby Boomers (54 to 72 years old)	50.51%
05.	Silent Generation (over 72 years old)	42.09%

The number of travellers that travelled to more than one destination during a trip increased by 72.89% from 2014 to 2016 but it reduced by 3.42% in 2017. A significant 5.87% decrease in the number of travellers happened during the last five months of the year including the peak travel season from August to October in 2017 was the main cause for the overall decrease as shown in Figure 4.15.

A time series forecasting revealed the number of UK travellers that travel to more than one destination during a trip would increase by 7% in 2018 compared to 2017. The prediction's MAPE was 9% and the real data showed it only increased by 0.39% in 2018.

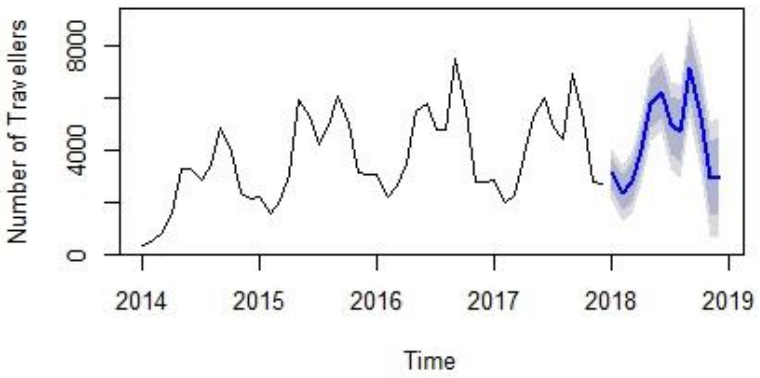

Figure 4.15: Number of UK travellers that travelled to more than one destination during a trip over time

The overall reduction in number of travellers that travelled to more than one destination in 2017 compared to 2016 was caused by four out of five group types, couples, individuals, families and single parent families. 4.39%, 0.87%, 6.45% and 25.18% decreases in number of travellers from group types couples, individuals, groups and single parent families respectively made more impact on the overall number of travellers than the 11.66% increase shown by travellers that travelled as families. Figure 4.16 shows the number of UK travellers from different group types that travelled to more than one destination during a trip over time. This indicate that families tend to travel to more than one destination on a trip than other group types.

A time series forecasting showed the number of travellers that travel as individuals, groups, families and single parent families would increase by 6.56%, 29.33%, 23% and 11.54% in 2018 compared to 2017. Only travellers that travel as couples would decrease by 5.43% following the trend set in 2017. The predicted values were compared against the real values collected for 2018 and found that MAPE for couples, individuals, groups, families and single parent families were 13.30%, 7.71%, 16.18%, 93.44% and 155% respectively.

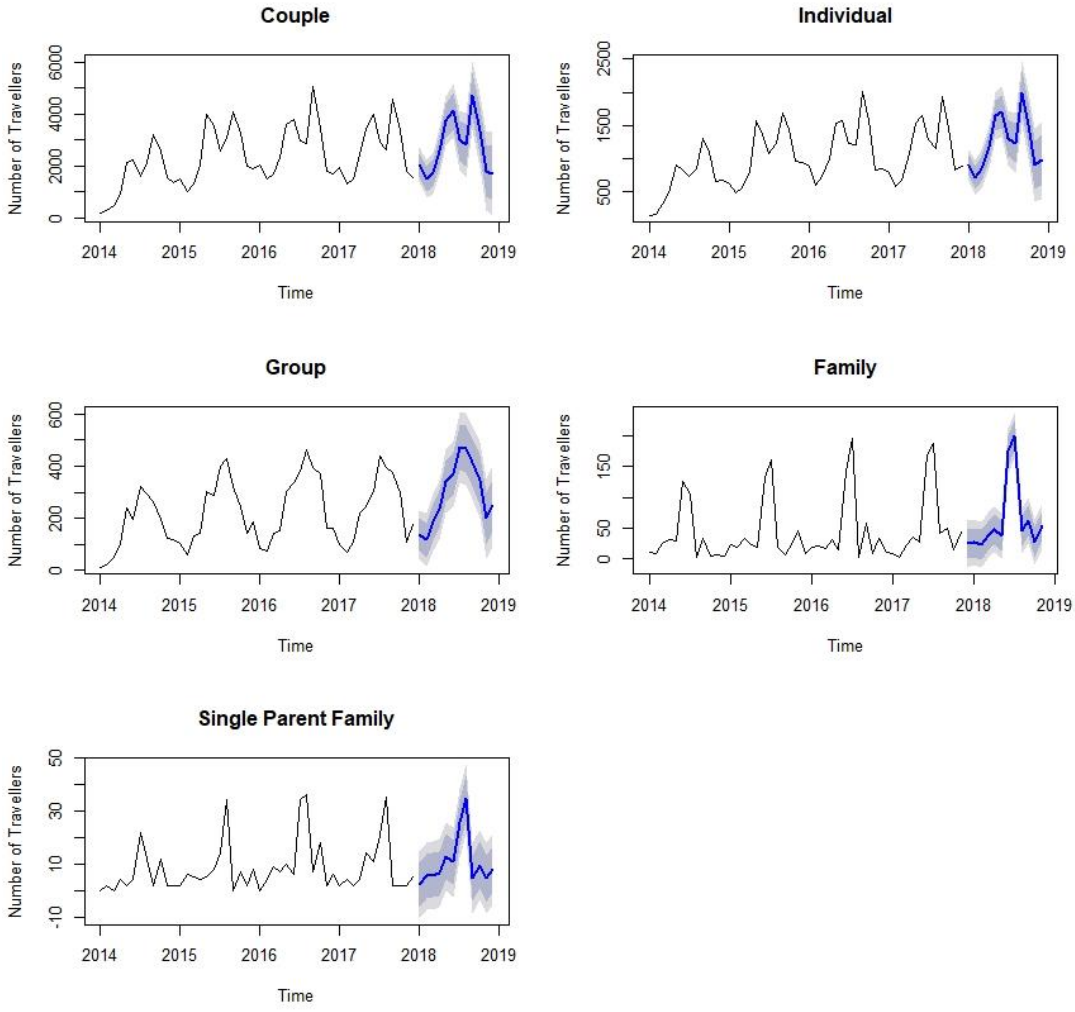

Figure 4.16: Number of UK travellers from different group types that travelled to more than one destination during a trip over time

Generation Z and Millennials that travelled to more than one destination during a trip has increased consistently over the years as shown in Figure 4.17. The only inconsistency in increase was reported for only three age groups. The travellers belonging to Generation X, Baby Boomers and Silent Generation that travelled to more than one destination decreased by 5.99%, 5.49% and 1.33% in 2017 compared to 2016.

A prediction revealed the travellers from Generation Z, Millennials, Generation X, Baby Boomers and Silent Generation that travel to more than one destination would increase by 17.37%, 21.08%, 1.73%, 1.15% and 15.05% in 2018. The MAPE of the

forecasts conducted for Generation Z, Millennials, Generation X, Baby Boomers and Silent Generation were 25.36%, 16.51%, 12.25%, 9.36% and 12.37% respectively.

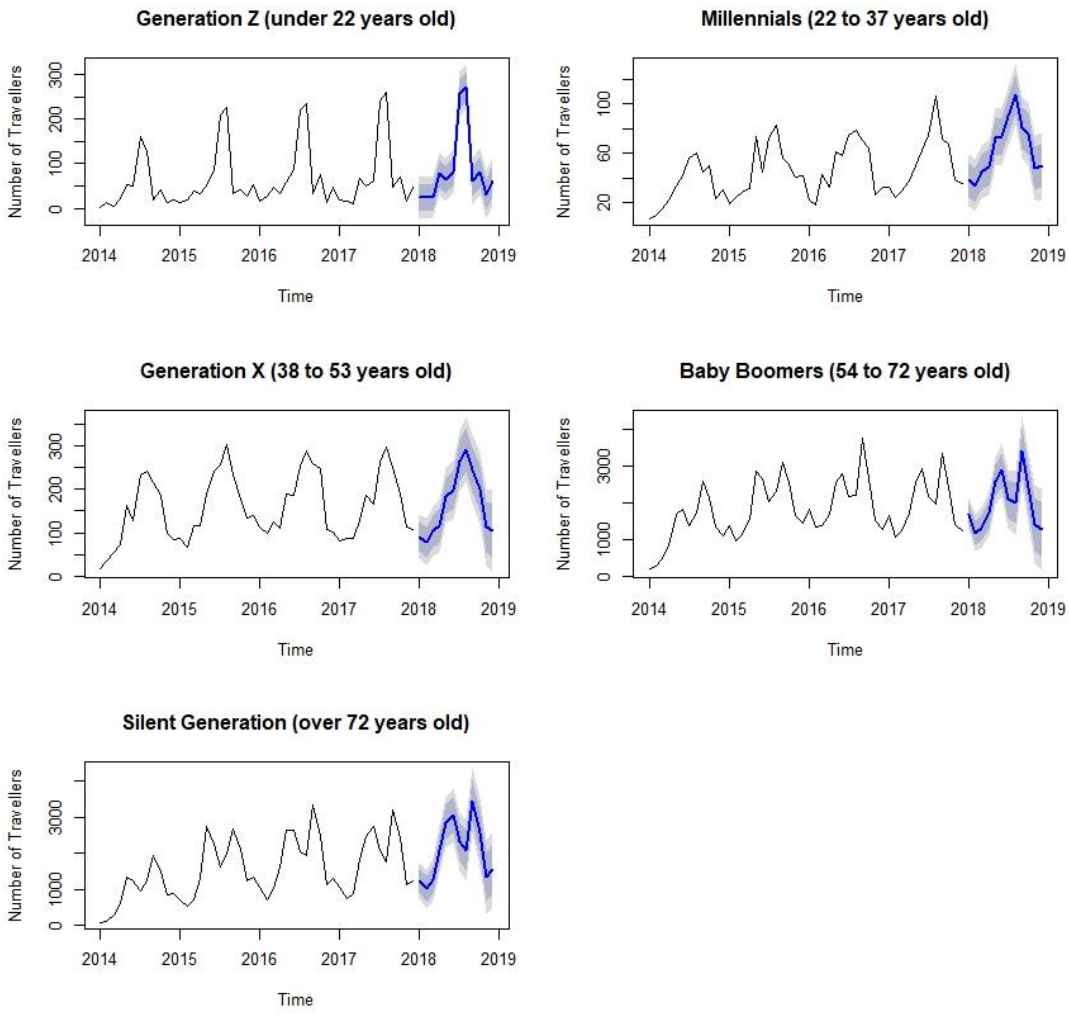

Figure 4.17: Number of UK travellers from different age groups that travelled to more than one destination during a trip over time

4.2. Travellers with Medical Conditions

67.85%, 749,539 out of 1,104,758 UK travellers in the sample have some medical condition. Figure 4.17 shows the number of UK travellers with medical conditions that travelled over time. A 541.21% significant increase in the number of UK resident travellers with medical conditions was recorded from 2014 to 2017 despite the 0.79% decrease in 2017 compared to the previous year.

A time series forecasting revealed that the number of travellers with medical conditions engaged in travelling will increase by 25.23% in 2018 compared to 2017. The comparison of the predicted values against real data collected for 2018 showed that the prediction's MAPE was 30.74%.

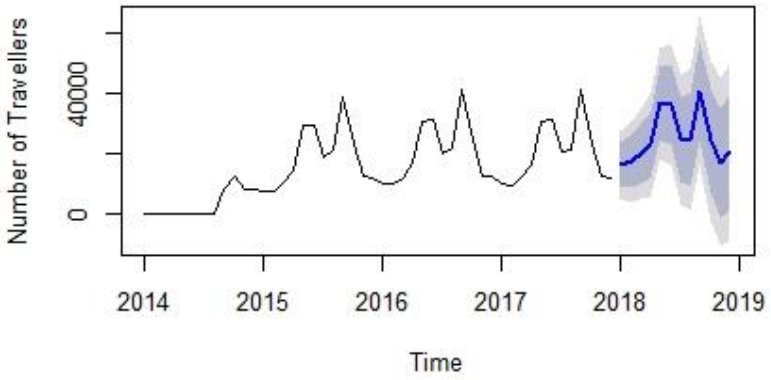

Figure 4.18: Number of UK travellers with medical conditions travelled over time

The sample showed that 1,082,305 travellers with medical conditions were received by all the destinations. It is bigger than the total number of travellers with medical conditions in the sample since some of the them travelled to more than one destination on a trip. The health of a traveller has an impact on the traveller's choice of destination. The most visited destination by UK travellers with medical conditions is Spain accounting for 25.34% of the total number of visitors to all destinations as shown in Table 4.16. Egypt is not one of the twenty most visited destinations by travellers with medical conditions despite it being included as twelfth most visited destination by travellers without any medical conditions. Barbados is one of the twenty most visited destinations by travellers with medical conditions, but it is not a favourite destination among travellers without any medical conditions. Australia is slightly more preferred destination among travellers with medical conditions compared to travellers without

any medical conditions. Table 4.17 shows the most visited destinations by UK travellers without any medical conditions. These differences of most visited destinations indicate that travellers with medical conditions destination have different destination preferences compared to others.

Table 4.16: Most visited destinations by UK travellers with medical conditions from 2014 to 2017

No.	Country	Number of Travellers	Percentage of Travellers
01.	Spain	274,291	25.34%
02.	Portugal	66,398	6.13%
03.	France	65,682	6.07%
04.	Italy	64,697	5.98%
05.	Greece	48,869	4.52%
06.	United States	48,113	4.45%
07.	Great Britain (UK)	32,143	2.97%
08.	Germany	21,936	2.03%
09.	Turkey	21,823	2.02%
10.	Cyprus	21,684	2.00%
11.	Gibraltar	17,797	1.64%
12.	Australia	17,372	1.61%
13.	Malta	16,973	1.57%
14.	Belgium	15,698	1.45%
15.	Croatia	15,207	1.41%
16.	Norway	14,131	1.31%
17.	Netherlands	13,572	1.25%
18.	Ireland	12,721	1.18%
19.	Canada	12,046	1.11%
20.	Barbados	10,990	1.02%

Table 4.17: Most visited destinations by UK travellers without any medical conditions from 2014 to 2017

No.	Country	Number of Travellers	Percentage of Travellers
01.	Spain	132,315	27.35%
02.	France	30,543	6.31%

03.	Italy	27,272	5.64%
04.	Greece	25,991	5.37%
05.	Portugal	25,829	5.34%
06.	United States	22,415	4.63%
07.	Turkey	18,271	3.78%
08.	Great Britain (UK)	12,388	2.56%
09.	Cyprus	10,472	2.16%
10.	Germany	8,436	1.74%
11.	Malta	7,636	1.58%
12.	Gibraltar	6,523	1.35%
13.	Croatia	6,451	1.33%
14.	Belgium	6,384	1.32%
15.	Australia	6,044	1.25%
16.	Norway	6,027	1.25%
17.	Netherlands	5,545	1.15%
18.	Egypt	5,186	1.07%
19.	Canada	4,997	1.03%
20.	Ireland	4,825	1.00%

The overall reduction in travellers with medical conditions during 2017 was mainly due to the decrease in visitors to Spain, Greece, Italy, Portugal, United States and Turkey by 4.06%, 1.75%, 2.61%, 2.78%, 11.98% and 20.63% respectively. Turkey's decrease in travellers with medical condition was not limited to 2017. The country suffered a 33.25% decrease in 2016 compared to 2015. France was the only country amongst the seven most visited destinations that managed an increase in travellers with medical conditions at least by 4.30%. Great Britain, Cyprus and Germany had 3.44%, 3.31% and 2.85% increases respectively in 2017. This indicates a shift in destination preference amongst travellers with medical conditions. France, Great Britain, Cyprus and Germany are becoming favourite destination choices among UK travellers with medical conditions. Figure 4.18 shows the number of UK resident travellers with medical conditions received by the ten most UK travellers with medical conditions visited destinations from 2014 to 2017.

A time series forecasting showed that the number of travellers with medical conditions received by Spain, Portugal, Italy, Greece, United States, Great Britain, Germany, Turkey and Cyprus would increase by 32.31%, 42.47%, 69.56%, 78.48%, 32%, 10.18%, 14.81%, 51.57% and 48.93% respectively in 2018 compared to 2017. France was the only destination that would suffer a 0.18% decrease in travellers with medical conditions. An accuracy test conducted on the predicted values using real data for 2018 found that the MAPE for Spain, Portugal, France, Italy, Greece, United States, Great Britain, Germany, Turkey and Cyprus were 42.04%, 55.62%, 61.52%, 230.69%, 1387.13%, 43.92%, 45.31%, 80.33%, 161.76% and 91.05% respectively.

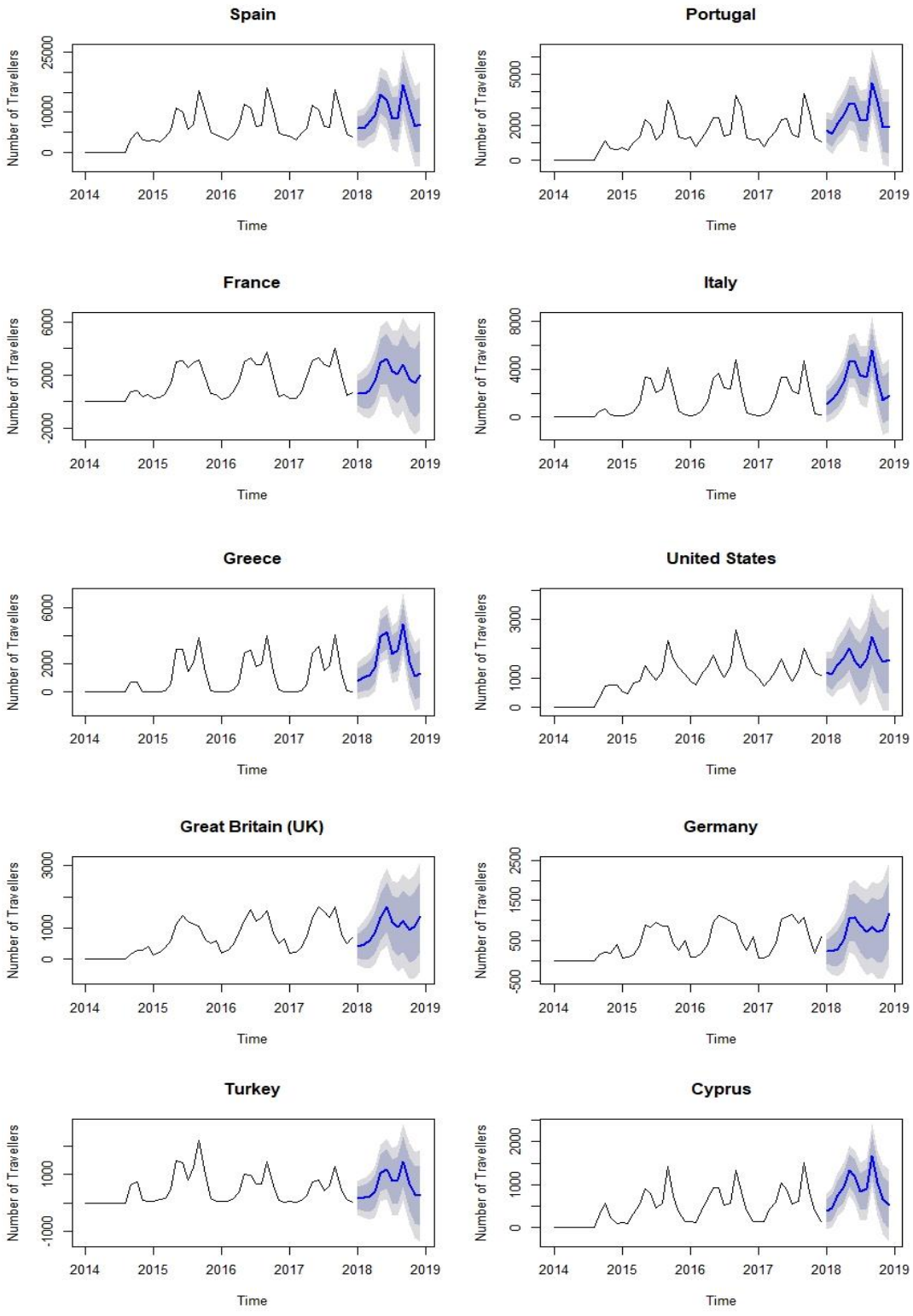

Figure 4.19: Number of travellers with medical conditions received by the ten most visited destinations by such travellers from 2014 to 2017

4.2.1. Group Type

92.98% of the travellers with medical conditions travel either with their significant other or alone as shown in Table 4.17. The travellers with medical conditions are less likely to travel in groups or with their families compared to travellers without any medical conditions. Only 1.59% of the travellers with medical conditions travelled with their family members while 6.63% of the travellers without any medical conditions travelled with their family members as shown in Table 4.18.

Table 4.18: Number of travellers with medical conditions that travelled in each group type as a percentage of total number of travellers with medical conditions from 2014 to 2017

No.	Group Type	Percentage of Travellers
01.	Couple	57.37%
02.	Individual	35.61%
03.	Group	5.43%
04.	Family	1.29%
05.	Single Parent Family	0.30%

Table 4.19: Number of travellers without any medical conditions that travelled in each group type as a percentage of total number of travellers without any medical conditions from 2014 to 2017

No.	Group Type	Percentage of Travellers
01.	Couple	55.73%
02.	Individual	24.48%
03.	Group	13.17%
04.	Family	5.46%
05.	Single Parent Family	1.17%

The travellers with medical conditions are slowly starting to change with whom they travel. They are starting to travel more with their families and in groups. The number of travellers with medical conditions that travelled as couples and single parent families decreased by 2.59% and 2.77% respectively in 2017 compared to the previous year as shown in Figure 4.20. The travellers with medical conditions that travelled

with their families and in groups increased by 7.67% and 4.18% respectively in 2017 compared to 2016.

A time series forecasting found that the number of travellers with medical conditions travelling under the group types of couples, individuals, families and single parent families would increase by 34.28%, 18.44%, 86.91% and 77.61% respectively in 2018 compared to 2017. The forecasting also found that the number of travellers with medical conditions that travel as groups will decrease by 4.34% in 2018. An accuracy test conducted on the predicted values revealed that the MAPE for couples, individuals, groups, families and single parent families were 43.52%, 20.82%, 41.68%, 102.57% and 86.06% respectively.

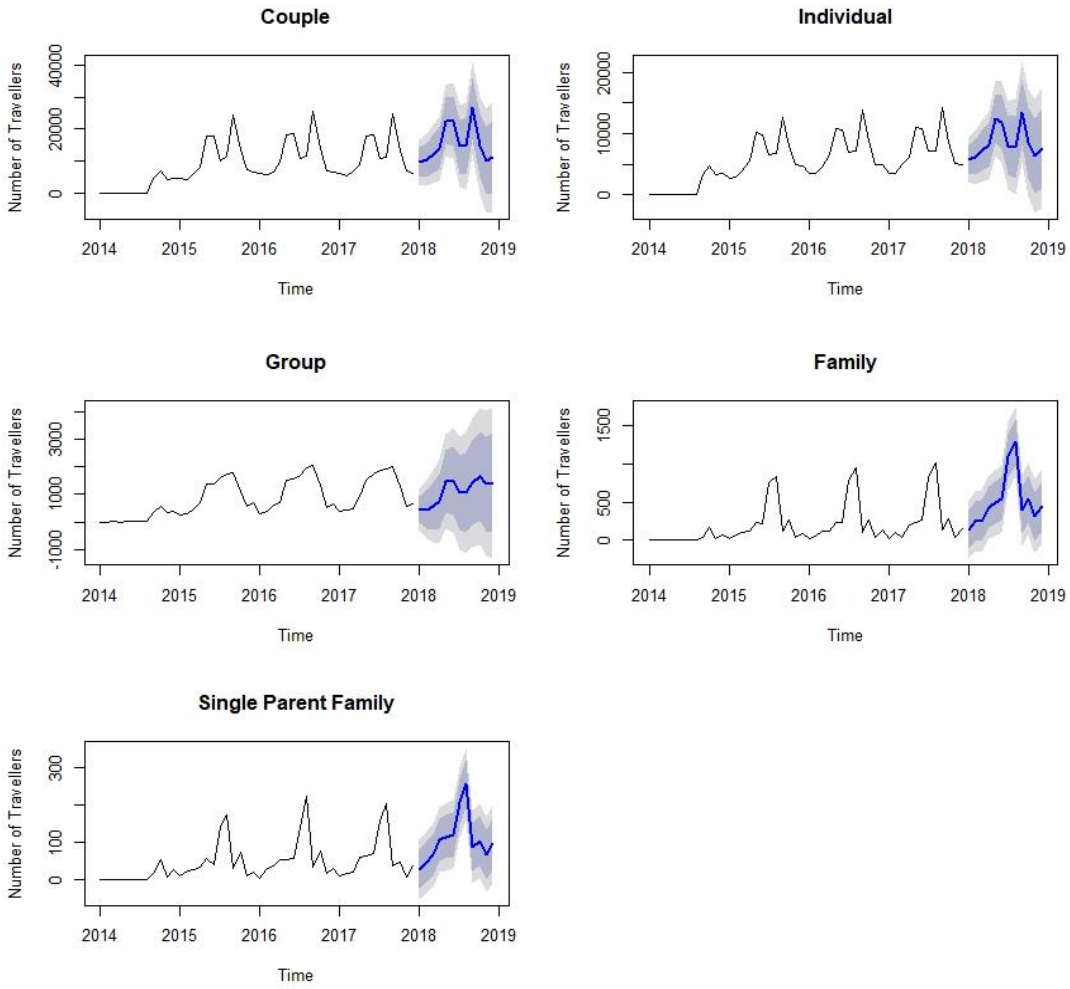

Figure 4.20: Number of travellers with medical conditions that travelled in different group types over time

Travellers with medical conditions that travelled as couples do not prefer to travel to middle east countries. Even Turkey, one of the most visited destinations by other group types was not among the ten most visited destinations by couples. The only destination that they prefer to travel outside of Europe is United States as shown in Table 4.19. The travellers with medical conditions that travel as individuals are more open toward travelling to destinations outside of Europe, but United States, Australia and Turkey are the only destinations outside of Europe that they visit as shown in Table 2.20. The travellers with medical conditions that travel as groups are more comfortable with their destination choices compared to couples and individuals. They favoured toward travelling to United States and Turkey compared to families and individuals as shown in Table 2.21. Travellers with medical conditions more comfortable in choosing destinations outside of Europe when they are travelling with their family members. Turkey, one of the middle east countries visited by every group except for couples, is favoured among families and single parent families compared to other group types. United Arab Emirates is a favourite only amongst families and single parent families, and Egypt was one of the most visited destinations by families. Tables 4.22 and 4.23 show the most visited destinations by travellers with medical conditions that travelled as families and single parent families. The patterns shown by couples, individuals, groups, families and single parent families indicate that group type has an impact on the destination choice of a traveller with medical conditions.

Table 4.20: Most visited destinations by travellers with medical conditions that travelled as couples as a percentage of total number of travellers with medical conditions that travelled as couples received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	25.63%
02.	Portugal	6.55%
03.	Italy	6.15%
04.	France	5.91%
05.	Greece	4.76%
06.	United States	3.54%
07.	Great Britain (UK)	2.91%

08.	Cyprus	2.01%
09.	Germany	1.99%
10.	Gibraltar	1.90%

Table 4.21: Most visited destinations by travellers with medical conditions that travelled as individuals as a percentage of total number of travellers with medical conditions that travelled as individuals received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	23.99%
02.	France	6.21%
03.	Italy	5.75%
04.	United States	5.61%
05.	Portugal	5.52%
06.	Greece	3.97%
07.	Great Britain (UK)	3.09%
08.	Germany	2.21%
09.	Australia	2.19%
10.	Turkey	2.09%

Table 4.22: Most visited destinations by travellers with medical conditions that travelled as groups as a percentage of total number of travellers with medical conditions that travelled as groups received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	28.99%
02.	United States	6.28%
03.	France	6.20%
04.	Italy	5.87%
05.	Portugal	5.45%
06.	Greece	4.85%
07.	Great Britain (UK)	3.38%
08.	Turkey	3.04%
09.	Cyprus	2.28%
10.	Gibraltar	1.84%

Table 4.23: Most visited destinations by travellers with medical conditions that travelled as families as a percentage of total number of travellers with medical conditions that travelled as families received by all the destinations from 2014 to 2017

No.	Country	Percentage of Travellers
01.	Spain	33.13%
02.	United States	9.60%
03.	France	9.39%
04.	Greece	5.90%
05.	Portugal	4.92%
06.	Turkey	4.77%
07.	Italy	3.93%
08.	Cyprus	2.54%
09.	Egypt	1.20%
10.	United Arab Emirates	1.13%

Table 4.24: Most visited destinations by travellers with medical conditions that travelled as single parent families as a percentage of total number of travellers with medical conditions that travelled as single parent families received by all the destinations from 2014 to 2017

No.	Country	Percentage of Travellers
01.	Spain	32.43%
02.	United States	9.62%
03.	France	8.88%
04.	Greece	5.35%
05.	Portugal	4.93%
06.	Turkey	4.77%
07.	Italy	3.61%
08.	Cyprus	2.33%
09.	United Arab Emirates	1.71%
10.	Germany	1.28%

4.2.2. Age Group

The average age of a traveller with a medical condition is sixty-nine years and 92.86% of them are over fifty-three years old. It is more than 15.1% compared to travellers without any medical conditions as shown in Table 4.25 and Table 4.26. This is not a surprise since elderly travellers are more likely to have medical conditions than younger travellers.

Table 4.25: Number of travellers with medical conditions from each age group as a percentage of total number of travellers with medical conditions from 2014 to 2017

No.	Age Group	Percentage of Travellers
01.	Generation Z (under 22 years old)	1.28%
02.	Millennials (22 to 37 years old)	1.09%
03.	Generation X (38 to 53 years old)	4.76%
04.	Baby Boomers (54 to 72 years old)	51.78%
05.	Silent Generation (over 72 years old)	41.08%

Table 4.26: Number of travellers without any medical conditions from each age group as a percentage of total number of travellers with medical conditions from 2014 to 2017

No.	Age Group	Percentage of Travellers
01.	Generation Z (under 22 years old)	9.01%
02.	Millennials (22 to 37 years old)	4.26%
03.	Generation X (38 to 53 years old)	9.97%
04.	Baby Boomers (54 to 72 years old)	51.22%
05.	Silent Generation (over 72 years old)	25.54%

The travel patterns shown by different age groups indicate that the travellers with medical conditions from Baby Boomers and Silent Generation travel mostly during the UK's two travel seasons from April to June and August to October. All the other age groups do not have a clear separation of the two seasons, and they travel mostly between the two seasons.

A time series forecasting was conducted to find the number of UK travellers with medical conditions from different age groups that would travel in 2018. It revealed

that the number of travellers with medical conditions from Generation Z, Millennials, Generation X, Baby Boomers and Silent Generation would increase by 87.15%, 45.75%, 17.87%. 22.23% and 40.71% respectively compared to 2017. An accuracy test conducted with real data recorded for the same time period revealed that MAPE for Generation Z, Millennials, Generation X, Baby Boomers and Silent Generation were 92.05%, 43.64%, 36.12%, 31.95% and 38.56% respectively.

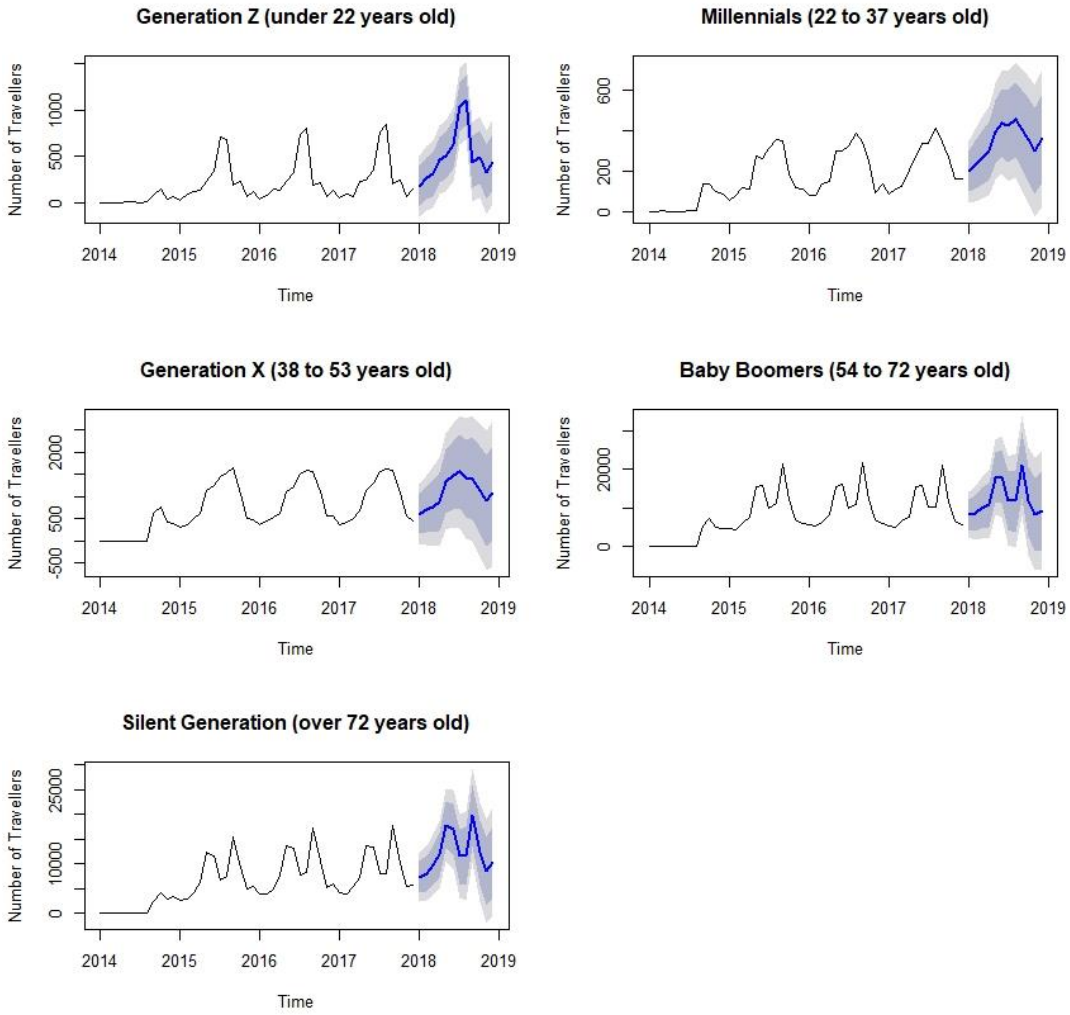

Figure 4.21: Number of travellers with medical conditions that belonged to different age groups from 2014 to 2017

The differences between the ten most visited destinations by travellers with medical conditions belonging to different age groups are clear indications that age has an impact on the destination choice of a traveller with medical conditions. Tables 4.27,

4.28, 4.29, 4.30 and 4.31 shows ten most visited destinations by travellers with medical conditions belonging to different age groups. The two middle east countries, Turkey and United Arab Emirates are most visited destinations by Millennials. Generation Z and them are the only age groups that favoured towards travelling to Netherlands. Both Generation Z and Millennials did not prefer travelling to Great Britain compared to others. The two age groups along with Generation X are the only age groups that had United States as one of their top three destination choices. Baby Boomers is the only age group that has Australia among their ten most visited destinations list and Gibraltar is preferred only by Silent Generation travellers. Only Generation Z, Millennials and Silent Generation travellers have Germany as one their ten most visited destinations. Turkey is among the ten most visited destinations by almost all age groups except for Silent Generation. They are also the only age group that prefer to travel to Gibraltar. These differences among the ten most visited destinations by travellers with medical conditions belonging to different age groups indicate that younger travellers with medical conditions are more open to travel to destinations located far from home compared to older travellers.

Table 4.27: Most visited destinations by Generation Z travellers with medical conditions as a percentage of Generation Z travellers with medical conditions received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	30.96%
02.	United States	9.12%
03.	France	8.66%
04.	Greece	5.73%
05.	Portugal	4.40%
06.	Italy	4.37%
07.	Turkey	4.22%
08.	Cyprus	2.50%
09.	Netherlands	1.73%
10.	Germany	1.35%

Table 4.28: Most visited destinations by Millennials with medical conditions as a percentage of Millennials with medical conditions received by all the destinations from 2014 to 2017

No.	Country	Percentage of Travellers
01.	Spain	26.00%
02.	United States	9.90%
03.	France	6.08%
04.	Greece	4.78%
05.	Italy	4.43%
06.	Portugal	4.26%
07.	Turkey	3.28%
08.	Cyprus	1.91%
09.	Netherlands	1.66%
10.	United Arab Emirates	1.52%

Table 4.29: Most visited destinations by Generation X travellers with medical conditions as a percentage of Generation X travellers with medical conditions received by all the destinations from 2014 to 2017

No.	Country	Percentage of Travellers
01.	Spain	27.72%
02.	United States	7.21%
03.	Greece	5.62%
04.	France	5.45%
05.	Portugal	5.21%
06.	Italy	5.00%
07.	Turkey	3.94%
08.	Cyprus	2.15%
09.	Germany	1.33%
10.	Great Britain (UK)	1.25%

Table 4.30: Most visited destinations by Baby Boomers with medical conditions as a percentage of Baby Boomers with medical conditions received by all the destinations from 2014 to 2017

No.	Country	Percentage of Travellers
01.	Spain	25.51%
02.	Italy	5.81%
03.	Portugal	5.79%
04.	France	5.51%
05.	Greece	4.93%
06.	United States	4.75%
07.	Great Britain (UK)	2.19%
08.	Turkey	2.18%
09.	Cyprus	2.09%
10.	Australia	1.80%

Table 4.31: Most visited destinations by Silent Generation travellers with medical conditions as a percentage of Silent Generation travellers with medical conditions received by all the destinations from 2014 to 2017

No.	Country	Percentage of Travellers
01.	Spain	24.75%
02.	France	6.75%
03.	Portugal	6.74%
04.	Italy	6.35%
05.	Great Britain (UK)	4.19%
06.	Greece	3.87%
07.	United States	3.56%
08.	Germany	2.45%
09.	Gibraltar	2.00%
10.	Cyprus	1.87%

4.2.3. Cruise

15.74% of the travellers with medical conditions that travel on a cruise during their trip and more than 75% of them are over sixty years old. The number of travellers with medical conditions that travel on a cruise during their trip increased consistently from 2014 to 2017 as shown in Figure 4.22. A prediction with an MAPE of 35.25% has revealed that it would increase by 16.29% in 2018 compared to 2017. Another prediction with an MAPE of 30.15% revealed the number of travellers with medical conditions that do not travel on a cruise during their trips would increase by 27.21% in 2018 despite the 0.99% decrease in 2017 as shown in Figure 4.23. This indicate that more travellers with medical conditions are choosing to travel in cruise.

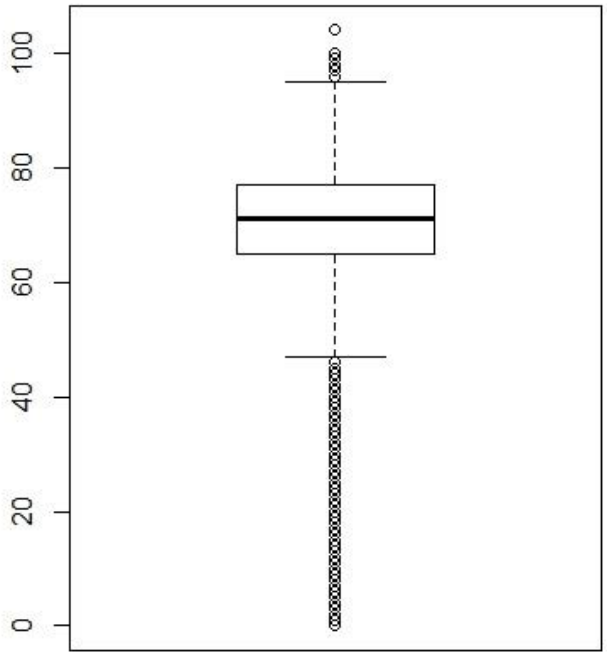

Figure 4.22: Age distribution of travellers with medical conditions that travelled on a cruise during their trip

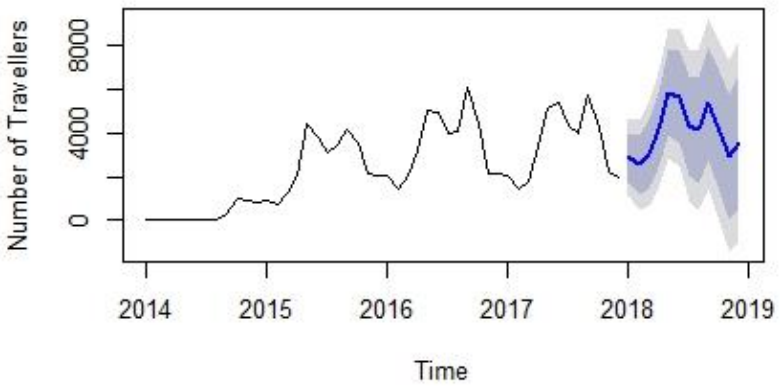

Figure 4.23: Number of UK travellers with medical conditions that travelled on a cruise during their trips over time

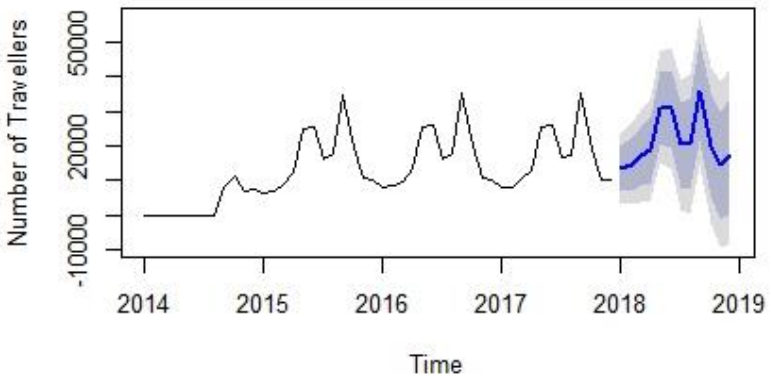

Figure 4.24: Number of UK travellers with medical conditions that did not travel on a cruise during their trips over time

The number of UK travellers without any medical conditions that travelled on a cruise during a trip has decreased by 64.65% in 2015 and 6.22% in 2016 but increased by 2.20% in 2017 as shown in Figure 4.24. A time series forecasting with an MAPE of 90.01% has found that it would increase by 54.09% in 2018 compared to the previous year. Another prediction conducted with an MAPE of 181.72% found the past decreases in the number of travellers without any medical conditions that did not prefer to travel on a cruise during their trips would hold for 2018 as shown in Figure 4.25.

It is evident that the travellers with medical conditions prefer to travel in cruises more than the travellers without any medical conditions. The existence of a medical condition played a decisive role in a traveller's travel mode.

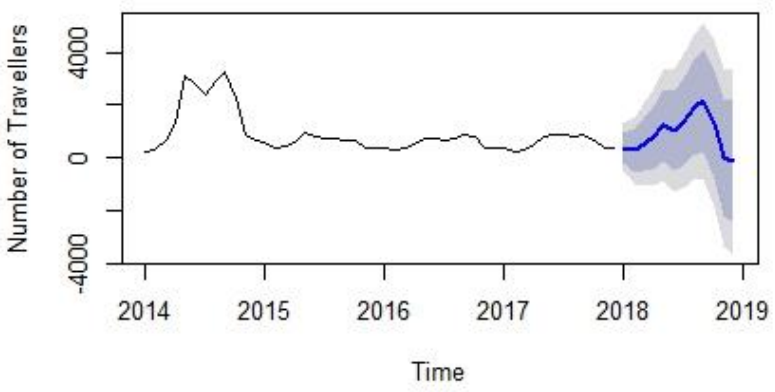

Figure 4.25: Number of UK travellers without any medical conditions that travelled on a cruise during their trips over time

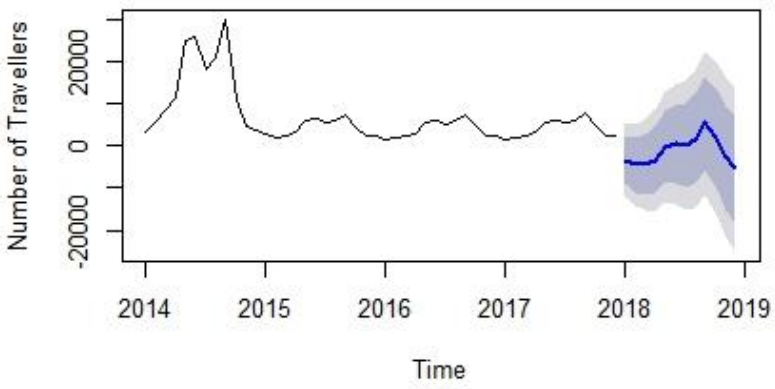

Figure 4.26: Number of UK travellers without any medical conditions that did not travel on a cruise during their trips over time

There is a clear difference between the destination choices among the travellers with medical conditions that travel on a cruise and the travellers that do not travel on a cruise during their trip. Nine out of the twenty most visited destinations by travellers with medical conditions that travel on a cruise during their trip, Gibraltar, Norway, Barbados, Saint Lucia, Saint Martin, Antigua and Barbuda, Denmark, Saint Kitts and Nevis, and Russia are only preferred by them as destinations as shown in Table 4.32. Another nine destinations, Cyprus, Turkey, Australia, Malta, Canada, Ireland, United Arab Emirates, Austria and India, are favoured only by travellers with medical conditions that do not travel on a cruise during their trips as shown in Table 4.33. It is evident that the travel mode has an impact on the choice of destination among travellers with medical conditions.

Table 4.32: Most visited destinations by UK travellers with medical conditions that travelled on a cruise during their trips as a percentage of total number of travellers with medical conditions that travelled on a cruise during their trips received by all the destinations from 2014 to 2017

No.	Country	Percentage of Travellers
01.	Spain	12.65%
02.	Portugal	7.41%
03.	Italy	7.18%
04.	France	6.42%
05.	Gibraltar	4.11%
06.	Greece	3.40%
07.	Norway	3.19%
08.	Germany	2.44%
09.	Croatia	2.35%
10.	Barbados	2.14%
11.	United States	2.02%
12.	Belgium	1.90%
13.	Great Britain (UK)	1.84%
14.	Saint Lucia	1.69%
15.	Saint Martin	1.63%
16.	Netherlands	1.59%
17.	Antigua and Barbuda	1.56%
18.	Denmark	1.38%
19.	Saint Kitts and Nevis	1.33%
20.	Russian Federation (Russia)	1.25%

Table 4.33: Most visited destinations by UK travellers with medical conditions that did not travel on a cruise as a percentage of total number of travellers with medical conditions that did not travel on a cruise received by all the destinations from 2014 to 2017

No.	Country	Percentage of Travellers
01.	Spain	32.40%
02.	France	5.87%

03.	United States	5.80%
04.	Portugal	5.42%
05.	Italy	5.31%
06.	Greece	5.13%
07.	Great Britain (UK)	3.60%
08.	Cyprus	2.99%
09.	Turkey	2.55%
10.	Australia	2.25%
11.	Malta	1.87%
12.	Germany	1.80%
13.	Canada	1.45%
14.	Ireland	1.38%
15.	Belgium	1.20%
16.	Netherlands	1.07%
17.	United Arab Emirates	0.99%
18.	Austria	0.98%
19.	India	0.90%
20.	Croatia	0.88%

A comparison between the travellers without any medical conditions that travelled on a cruise during their trips and the travellers without any medical conditions that did not travel on a cruise during their trips confirmed again the impact of travel mode on the destination choices. Seven out of twenty destinations, Gibraltar, Norway, Barbados, Russian Federation, Denmark, Saint Martin, Saint Lucia, and Antigua and Barbuda are favoured by travellers without any medical conditions that travel on a cruise compared to others as shown in Table 3.34. Travellers without any medical conditions that do not travel on a cruise during their trips also favour seven destinations, Cyprus, Malta, Australia, Egypt, Canada, Austria and Tunisia as shown in Table 4.35.

Table 4.34: Most visited destinations by UK travellers without any medical conditions that travelled on a cruise during their trips as a percentage of total number of travellers

without any medical conditions that travelled on a cruise during their trips received by all the destinations from 2014 to 2017

No.	Country	Percentage of Travellers
01.	Spain	12.94%
02.	Italy	7.82%
03.	France	6.96%
04.	Portugal	6.72%
05.	Greece	4.16%
06.	Gibraltar	3.93%
07.	Norway	3.42%
08.	Croatia	2.57%
09.	United States	2.23%
10.	Germany	2.20%
11.	Barbados	1.81%
12.	Great Britain (UK)	1.77%
13.	Belgium	1.68%
14.	Turkey	1.64%
15.	Russian Federation (Russia)	1.51%
16.	Denmark	1.47%
17.	Saint Martin	1.46%
18.	Saint Lucia	1.44%
19.	Netherlands	1.39%
20.	Antigua and Barbuda	1.29%

Table 4.35: Most visited destinations by UK travellers without any medical conditions that did not travel on a cruise as a percentage of total number of travellers without any medical conditions that did not travel on a cruise received by all the destinations from 2014 to 2017

No.	Country	Percentage of Travellers
01.	Spain	32.87%
02.	France	6.06%
03.	Greece	5.84%
04.	United States	5.55%

05.	Portugal	4.81%
06.	Italy	4.80%
07.	Turkey	4.60%
08.	Cyprus	2.87%
09.	Great Britain	2.86%
10.	Malta	1.72%
11.	Germany	1.57%
12.	Australia	1.54%
13.	Egypt	1.35%
14.	Canada	1.23%
15.	Belgium	1.18%
16.	Ireland	1.15%
17.	Netherlands	1.05%
18.	Austria	0.90%
19.	Tunisia	0.90%
20.	Croatia	0.86%

4.3. Cruise Travellers

14.48%, 159,934 out of 1,104,758 UK travellers in the sample travelled on a cruise during their trip. The number of cruise travellers grew by 104.55% during the four years compared to 2014. The growth rate was five times compared to the 22.95% growth rate of travellers that did not travel on a cruise during their trip. Figure 4.26 shows the number of UK travellers that travelled on a cruise during their trip over time.

A forecast conducted found that the number of cruise travellers would increase by 19.04% in 2018 but it decreased during that year by 5.61% despite the prediction. An accuracy test conducted on the prediction revealed that the prediction's MAPE was 33.06%. This indicate that the number of cruise travellers are expected to grow in future.

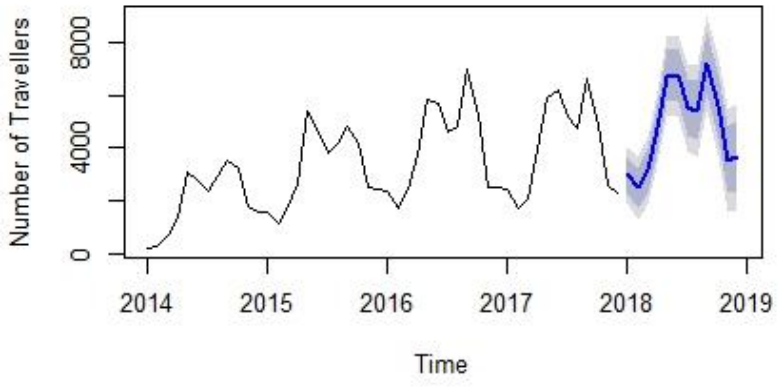

Figure 4.27: Number of UK travellers that travelled on a cruise during their trip over time

A comparison of the travel demand patterns between the cruise travellers and other travellers revealed that seasonal patterns are strong among the latter. The second travel season from August to October is not always the dominant season for cruise travellers. First travel season of the year from April to June is the dominant season for them in 2015 and the difference between the number of cruise travellers of the two seasons in 2017 was only 1.7%. Figure 4.27 shows the number of UK travellers that did not travel on a cruise during their trips over time. A forecast conducted with a MAPE of 6.01% revealed the number of travellers that do not travel in a cruise during their trip would decrease by 0.68% in 2018. The real data for 2018 revealed that it increased by 5.8% despite the prediction.

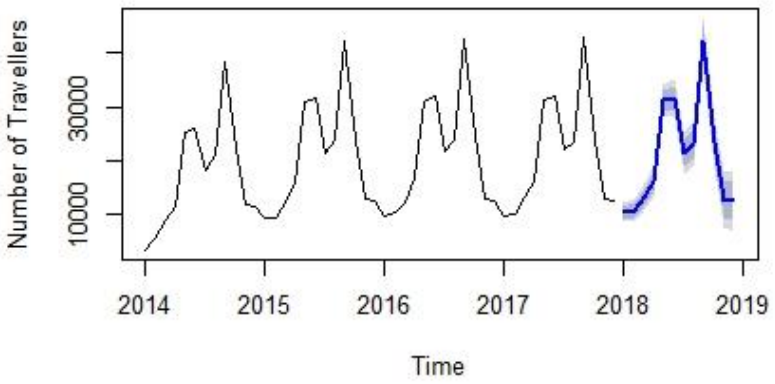

Figure 4.28: Number of UK travellers that did not travel on a cruise during their trip over time

The sample showed that 520,934 travellers with medical conditions were received by all the destinations. It is bigger than the total number of cruise travellers in the sample since some of the them travelled to more than one destination on a trip. The travel mode is a deciding factor for destination choices amongst these cruise travellers. Nine out of twenty destinations visited by cruise travellers shown in Table 4.36, Gibraltar, Norway, Barbados, Saint Lucia, Saint Martin, Antigua and Barbuda, Denmark, Russia, and Saint Kitts and Nevis are not among the twenty most visited destinations by other travellers, shown in Table 4.37. Turkey, Cyprus, Australia, Malta, Canada, Ireland, Austria, United Arab Emirates and Egypt are only included in the twenty most visited destinations by UK travellers that did not travel on a cruise during their trip. Italy and Croatia are highly favoured among cruise travellers, and United States and Great Britain are not favoured by them compared to other travellers.

More than 73% of UK travellers that visit Barbados, Saint Lucia, Saint Martin, Antigua and Barbuda, and Saint Kitts and Nevis are cruise travellers unlike other destinations as shown in APPENDIX C. All these destinations are Caribbean islands ("List of Caribbean islands," 2019), and a traveller that wants to travel to these islands would be more tempted to select cruise as the travel mode since these destinations are recognised as Caribbean cruise destinations ("The 17 Best Places to Visit in the Caribbean," n.d.). This indicates that destination choice also has an impact on the choice of travel mode.

Table 4.36: Most visited destinations by UK travellers that travelled on a cruise during their trip from 2014 to 2017

No.	Country	Number of Travellers	Percentage of Travellers
01.	Spain	66,286	12.72%
02.	Italy	38,249	7.34%
03.	Portugal	37,698	7.24%
04.	France	34,174	6.56%
05.	Gibraltar	21,155	4.06%
06.	Greece	18,735	3.60%
07.	Norway	16,913	3.25%
08.	Croatia	12,525	2.40%
09.	Germany	12,388	2.38%
10.	United States	10,791	2.07%
11.	Barbados	10,696	2.05%
12.	Belgium	9,595	1.84%
13.	Great Britain (UK)	9,499	1.82%
14.	Saint Lucia	8,471	1.63%
15.	Saint Martin	8,253	1.58%
16.	Netherlands	8,015	1.54%
17.	Antigua and Barbuda	7,764	1.49%
18.	Denmark	7,320	1.41%
19.	Russian Federation (Russia)	6,864	1.32%
20.	Saint Kitts and Nevis	6,708	1.29%

Table 4.37: Most visited destinations by UK travellers that did not travel on a cruise during their trips from 2014 to 2017

No.	Country	Number of Travellers	Percentage of Travellers
01.	Spain	340,320	32.56%
02.	France	62,051	5.94%
03.	United States	59,737	5.72%
04.	Greece	56,125	5.37%
05.	Portugal	54,529	5.22%
06.	Italy	53,720	5.14%

07.	Great Britain (UK)	35,032	3.35%
08.	Turkey	33,802	3.23%
09.	Cyprus	30,870	2.95%
10.	Australia	21,074	2.02%
11.	Malta	19,013	1.82%
12.	Germany	17,984	1.72%
13.	Canada	14,399	1.38%
14.	Ireland	13,635	1.30%
15.	Belgium	12,487	1.19%
16.	Netherlands	11,102	1.06%
17.	Austria	9,963	0.95%
18.	United Arab Emirates	9,709	0.93%
19.	Egypt	9,264	0.89%
20.	Croatia	9,133	0.87%

Four out of ten most visited destinations by cruise travellers had consistent increase from 2014 to 2017 as shown in Figure 4.28. These four destination, France, Gibraltar, Norway and Germany had average annual increases of 29.71%, 30.33%, 27.97% and 36.31% during the four years. Norway was becoming one of the favourite destinations among the cruise travellers compared to other three countries. It had 31.49% increase in number of cruise travellers in 2017 alone compared to the previous year when other three destinations managed less than 15% increases. This was a clear shift of interest in the destination choices of cruise travellers since all these destinations were not among the three most visited destinations by cruise travellers. The three most visited destinations along with three other destinations suffered decreases in cruise travellers in 2017. Greece had the highest decrease in cruise travellers in 2017, 22.56%. Spain, Italy, Portugal, Croatia and United States had 6.26%, 2.65%, 6.02%, 15.76% and 14.23% decreases in 2017 despite 97.73%, 86.45%, 124.20%, 60.97% and 78.78% increases from 2014 to 2016 respectively.

A time series forecast was conducted to find the number of cruise travellers that would visit these ten destinations in 2018. It revealed the number of cruise travellers for Spain, Italy, France, Gibraltar, Greece, Norway, Croatia and Germany would increase

by 26.81%, 40.70%, 27.32%, 32.56%, 28.27%, 16.55%, 45.99% and 25.90% respectively. Only Portugal and United States would suffer 6.19% and 49.38% decreases respectively. An accuracy test conducted found that MAPE for Spain, Italy, Portugal, France, Gibraltar, Greece, Norway, Croatia, Germany and United States were 48.12%, 316.23%, 19.96%, 178.99%, 161.02%, 355.96%, 86.84%, 995.91%, 188.91% and 55.14% respectively.

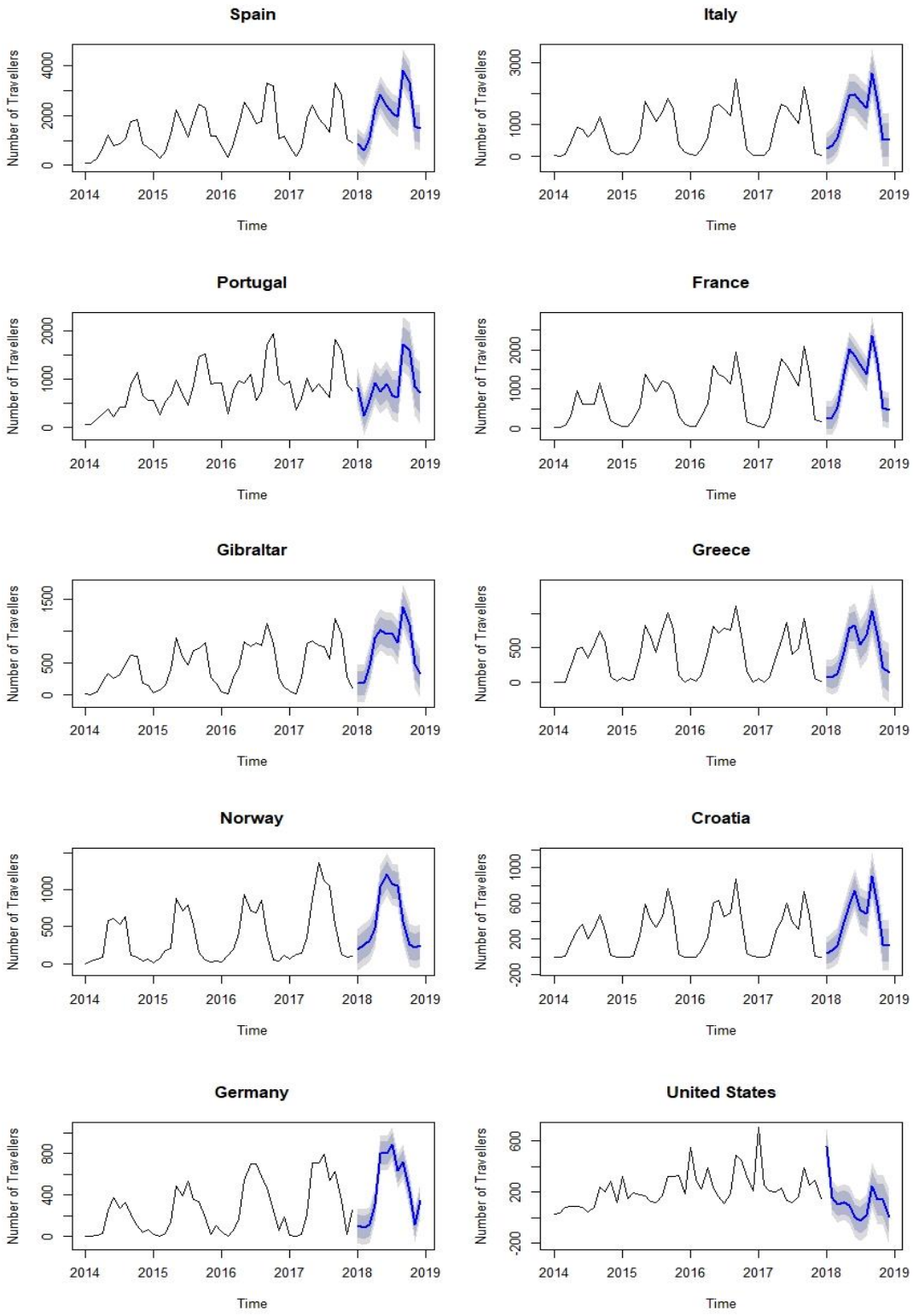

Figure 4.29: Number of cruise travellers received by the ten most visited destinations by cruise travellers from 2014 to 2017

4.3.1. Group Type

Cruise travellers preferred to travel with their significant other than with anyone else as shown in Table 4.38. A fewer cruise travellers travelled either as families or single parent families compared to travellers that did not travel on a cruise during a trip as shown in Table 4.39. This indicates that group type has an impact on the traveller's choice of travel mode.

Table 4.38: Number of cruise travellers that travelled in each group type as a percentage of total number of cruise travellers from 2014 to 2017

No.	Group Type	Percentage of Travellers
01.	Couple	66.12%
02.	Individual	26.79%
03.	Group	6.05%
04.	Family	0.85%
05.	Single Parent Family	0.19%

Table 4.39: Number of travellers that did not travel on a cruise during their trips in each group type as a percentage of total number of travellers that did not travel on a cruise during their trips from 2014 to 2017

No.	Group Type	Percentage of Travellers
01.	Couple	55.27%
02.	Individual	32.92%
03.	Group	8.23%
04.	Family	2.93%
05.	Single Parent Family	0.64%

Cruise travellers that travelled as couples or alone travelled mostly during the two UK travel seasons from April to June and August to October, but cruise travellers that travelled as families and single parent families travelled between the two travel seasons. Groups travelled in cruise during both seasons and more towards the middle of the year. Figure 4.29 shows the number of cruise travellers that travelled in different group types over time.

A time series forecasting revealed that all group types would hold the same travel patterns shown in past years for 2018. The number of cruise travellers that travel as couples, individuals, groups, families and single parent families would increase by 13.80%, 23.14%, 15.33%, 23.04% and 23.08% respectively in 2018. An accuracy test with real data was conducted for all the group types to find the accuracy of the time series forecast. MAPE for couples, individuals, groups, families and single parent families were 32.69%, 27.43%, 21.79%, 51.60% and 208.30% respectively.

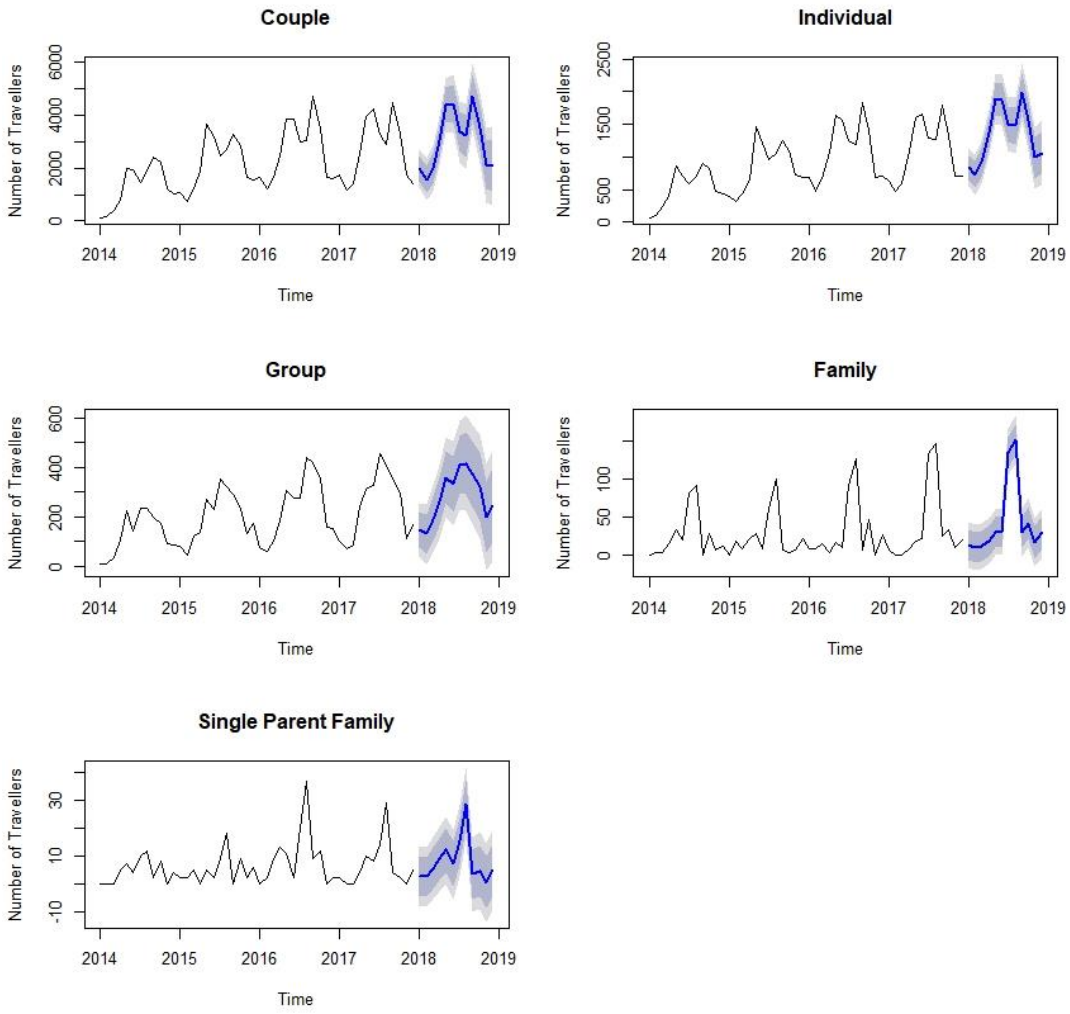

Figure 4.30: Number of cruise travellers that travelled in different group types over time

The group type has an impact on the destination choice of cruise travellers. Spain, France, Portugal and Italy were the four most visited destinations by all group types. Tables 4.40, 4.41, 4.42, 4.43 and 4.44 show the most visited destinations by cruise

travellers that travelled in each group type. Norway was a favourite destination amongst cruise travellers that travelled as couples, individuals and groups compared to families and single parent families. Everyone except for couples preferred to travel to United States and only couples had Barbados. Only families favoured travelling to Guernsey, a famous cruise destination that attracts 100,000 day-trip travellers a year ("Guernsey," 2019).

It was evident that travelling on a cruise was only one part of every cruise travellers' trip since some of the most visited destinations by cruise travellers did not fall under cruise destinations.

Table 4.40: Most visited destinations by travellers that travelled on a cruise during their trips as couples as a percentage of total number of travellers that travelled on a cruise during their trips as couples received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	12.59%
02.	Portugal	7.29%
03.	Italy	7.24%
04.	France	6.34%
05.	Gibraltar	4.20%
06.	Greece	3.58%
07.	Norway	3.14%
08.	Croatia	2.43%
09.	Germany	2.42%
10.	Barbados	2.06%

Table 4.41: Most visited destinations by travellers that travelled on a cruise during their trips as individuals as a percentage of total number of travellers that travelled on a cruise during their trips as individuals received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	12.25%
02.	Italy	7.15%
03.	Portugal	6.97%

04.	France	6.51%
05.	Greece	3.63%
06.	Norway	3.46%
07.	Gibraltar	3.44%
08.	Germany	2.50%
09.	Croatia	2.40%
10.	United States	2.22%

Table 4.42: Most visited destinations by travellers that travelled on a cruise during their trips as groups as a percentage of total number of travellers that travelled on a cruise during their trips as groups received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	15.65%
02.	Italy	9.09%
03.	France	8.63%
04.	Portugal	7.80%
05.	Gibraltar	5.19%
06.	Norway	3.63%
07.	Greece	3.55%
08.	Belgium	2.58%
09.	Croatia	2.18%
10.	United States	2.07%

Table 4.43: Most visited destinations by travellers that travelled on a cruise during their trips as families as a percentage of total number of travellers that travelled on a cruise during their trips as families received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	17.50%
02.	France	10.80%
03.	Italy	9.48%
04.	Portugal	7.08%
05.	Gibraltar	4.67%
06.	Greece	4.34%
07.	United States	3.01%

08.	Norway	2.86%
09.	Guernsey	2.32%
10.	Belgium	2.22%

Table 4.44: Most visited destinations by travellers that travelled on a cruise during their trips as single parent families as a percentage of total number of travellers that travelled on a cruise during their trips as single parent families received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	20.00%
02.	France	14.88%
03.	Italy	10.75%
04.	Portugal	7.38%
05.	Belgium	4.63%
06.	Gibraltar	3.25%
07.	United States	2.75%
08.	Greece	2.25%
09.	Turkey	2.25%
10.	Norway	2.00%

4.3.2. Age

The average age of a cruise traveller was seventy years and 46.14% of cruise travellers were above seventy-two years of age as shown in Table 4.45. It was more than 11.76% compared to travellers that did not travel on a cruise during their trips as shown in Table 4.46. It indicates that travellers of old age favour toward travelling on a cruise during their trip compared to younger travellers. The age has an impact on the choice of travel mode.

Table 4.45: Number of cruise travellers belonged to each generation as a percentage of total number of cruise travellers from 2014 to 2017

No.	**Age Group**	**Percentage of Travellers**
01.	Generation Z (under 22 years old)	1.42%
02.	Millennials (22 to 37 years old)	0.90%

03.	Generation X (38 to 53 years old)	3.96%
04.	Baby Boomers (54 to 72 years old)	47.58%
05.	Silent Generation (over 72 years old)	46.14%

Table 4.46: Number of travellers that did not travel on a cruise during their trip belonged to each generation as a percentage of total number of traveller that did not travel on a cruise during their trip from 2014 to 2017

No.	**Age Group**	**Percentage of Travellers**
01.	Generation Z (under 22 years old)	4.16%
02.	Millennials (22 to 37 years old)	2.32%
03.	Generation X (38 to 53 years old)	6.86%
04.	Baby Boomers (54 to 72 years old)	52.28%
05.	Silent Generation (over 72 years old)	34.38%

All the age groups except for Generation X and Baby Boomers had consistent growths in number of cruise travellers from 2014 to 2017 as shown in Figure 4.30. The number of cruise travellers belonged to Generation X and Baby Boomers decreased by 5.18% and 0.21% respectively in 2017. This decrease of Baby Boomers in 2017 and the decrease of growth rate to 19.30% in the previous year made Silent Generation the largest contributor to the overall growth in cruise travellers.

A time series forecasting found that the number of cruise travellers belonging to Generation Z, Millennials, Generation X, Baby Boomers and Silent Generation would increase by 22.87%, 20.64%, 17.67%, 13.59% and 21.65% respectively in 2018 compared to the previous year. The forecasting had MAPE of 54.79%, 49.44%, 33.64%, 33.03% and 30.67% for Generation Z, Millennials, Generation X, Baby Boomers and Silent Generation respectively.

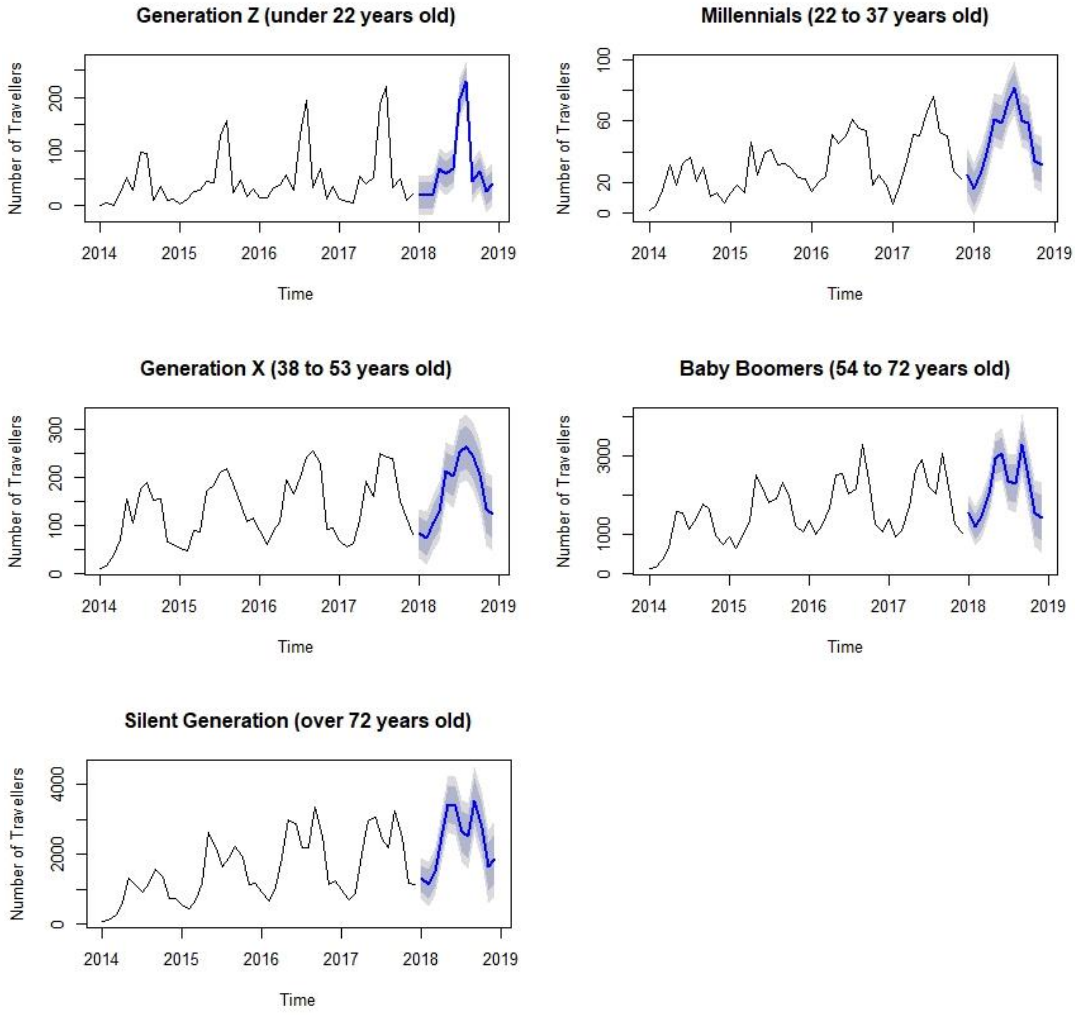

Figure 4.31: Number of cruise travellers that belonged to different age groups from 2014 to 2017

The differences in the most visited destinations by cruise travellers belonging to different groups indicate that the age has an impact on the destination choice of a cruise traveller. Netherlands was favoured among cruise travellers belonging to Generation Z and Belgium was favoured by both Generation Z and Millennials. Barbados was a popular destination among both Millennials and Generation X. Croatia was one of the most visited destination by Baby Boomers and Silent Generation. United States was favoured among all the age groups except for Silent Generation, and Germany and Great Britain were most visited destinations by them. Tables 4.47, 4.48, 4.49, 4.50 and

4.51 show the most visited destinations by cruise travellers belonging to different generations.

Table 4.47: Most visited destinations by Generation Z cruise travellers as a percentage of total number of Generation Z cruise travellers that visited all the destinations from 2014 to 2017

No.	Country	Percentage of Travellers
01.	Spain	18.02%
02.	France	11.71%
03.	Italy	10.82%
04.	Portugal	6.69%
05.	Gibraltar	5.14%
06.	Greece	4.14%
07.	Belgium	2.98%
08.	Norway	2.85%
09.	United States	2.72%
10.	Croatia	2.29%

Table 4.48: Most visited destinations by Millennial cruise travellers as a percentage of total number of Millennial cruise travellers that visited all the destinations from 2014 to 2017

No.	Country	Percentage of Travellers
01.	Spain	14.73%
02.	France	8.36%
03.	Italy	8.12%
04.	Portugal	7.33%
05.	Gibraltar	4.54%
06.	Greece	3.27%
07.	United States	3.24%
08.	Belgium	3.15%
09.	Norway	3.10%
10.	Netherlands	2.11%

Table 4.49: Most visited destinations by Generation X cruise travellers as a percentage of total number of Generation X cruise travellers that visited all the destinations from 2014 to 2017

No.	Country	Percentage of Travellers
01.	Spain	13.84%
02.	Italy	8.58%
03.	France	7.77%
04.	Portugal	7.04%
05.	Gibraltar	3.94%
06.	Greece	3.68%
07.	Norway	2.95%
08.	United States	2.62%
09.	Barbados	2.39%
10.	Belgium	2.31%

Table 4.50: Most visited destinations by cruise travellers who are Baby Boomers as a percentage of total number of cruise travellers who are Baby Boomers that visited all the destinations from 2014 to 2017

No.	Country	Percentage of Travellers
01.	Spain	11.70%
02.	Italy	7.16%
03.	Portugal	6.51%
04.	France	5.98%
05.	Gibraltar	3.70%
06.	Greece	3.59%
07.	Norway	2.99%
08.	United States	2.40%
09.	Croatia	2.34%
10.	Barbados	2.31%

Table 4.51: Most visited destinations by Silent Generation cruise travellers as a percentage of total number of Silent Generation cruise travellers that visited all the destinations from 2014 to 2017

No.	Country	Percentage of Travellers
01.	Spain	13.61%
02.	Portugal	8.09%
03.	Italy	7.34%
04.	France	6.94%
05.	Gibraltar	4.45%
06.	Greece	3.59%
07.	Norway	3.58%
08.	Germany	2.98%
09.	Croatia	2.52%
10.	Great Britain (UK)	2.30%

4.3.3. Medical Condition

73.78% of the cruise travellers have medical conditions and more than 50% of them are above 70 years old. Figure 4.32 shows the age distribution of cruise travellers with medical conditions.

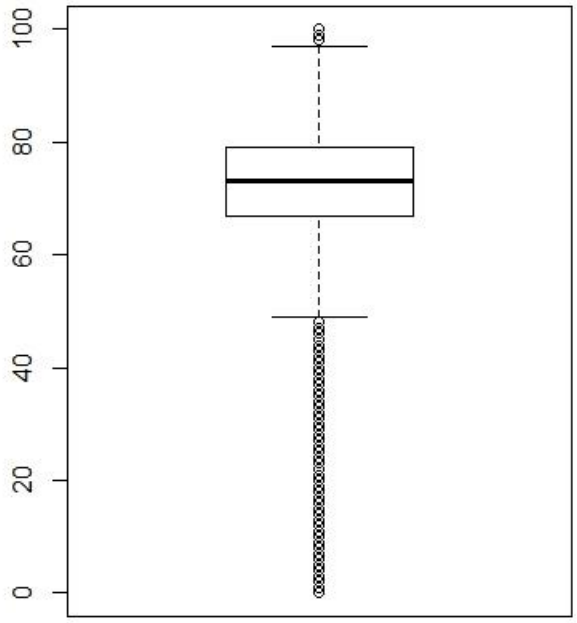

Figure 4.32: Age distribution of cruise travellers that had medical conditions

The number of cruise travellers with medical conditions consistently increased from 2014 to 2017 as shown in Figure 4.33. A forecasting conducted from the past four years of data revealed that it would increase by 35.80% in 2018. The prediction's MAPE was 89.47%.

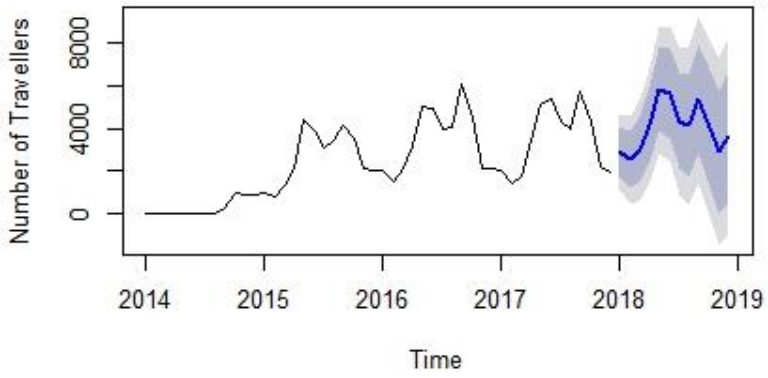

Figure 4.33: Number of cruise travellers with medical conditions over time

The health of a cruise traveller has an impact on the destination choice of a cruise traveller as shown in Table 4.52 and Table 4.53. The cruise travellers with medical conditions favour travelling to Saint Lucia, Netherlands, and Antigua and Barbuda compared to cruise travellers without any medical conditions. They are less favourable toward travelling to Russia compared to cruise travellers without any medical conditions. They travel to one destination that does not belong in most visited destinations by travellers without any medical conditions, Saint Kitts and Nevis. The cruise travellers without any medical conditions also travel to a destination that cruise travellers with medical conditions do not favour, Turkey.

Table 4.52: Most visited destinations by cruise travellers with medical conditions as a percentage of total number of cruise travellers with medical conditions received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	12.65%
02.	Portugal	7.41%
03.	Italy	7.18%
04.	France	6.42%

05.	Gibraltar	4.11%
06.	Greece	3.40%
07.	Norway	3.19%
08.	Germany	2.44%
09.	Croatia	2.35%
10.	Barbados	2.14%
11.	United States	2.02%
12.	Belgium	1.90%
13.	Great Britain (UK)	1.84%
14.	Saint Lucia	1.69%
15.	Saint Martin	1.63%
16.	Netherlands	1.59%
17.	Antigua and Barbuda	1.56%
18.	Denmark	1.38%
19.	Saint Kitts and Nevis	1.33%
20.	Russian Federation (Russia)	1.25%

Table 4.53: Most visited destinations by cruise travellers without any medical conditions as a percentage of total number of cruise travellers without any medical conditions received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	12.94%
02.	Italy	7.82%
03.	France	6.96%
04.	Portugal	6.72%
05.	Greece	4.16%
06.	Gibraltar	3.93%
07.	Norway	3.42%
08.	Croatia	2.57%
09.	United States	2.23%
10.	Germany	2.20%
11.	Barbados	1.81%
12.	Great Britain (UK)	1.77%

13.	Belgium	1.68%
14.	Turkey	1.64%
15.	Russian Federation (Russia)	1.51%
16.	Denmark	1.47%
17.	Saint Martin	1.46%
18.	Saint Lucia	1.44%
19.	Netherlands	1.39%
20.	Antigua and Barbuda	1.29%

The existence of a medical condition impacts the destination choice of a traveller that did not travel on a cruise during their trip as shown in Table 4.54 and Table 4.56. The travellers that do not travel on a cruise during their trip and with medical conditions favour travelling to United Arab Emirates and India, but they are less favourable toward travelling to Greece compared to travellers that do not travel on a cruise during their trip and without any medical conditions. Egypt and Tunisia are favourite destinations among travellers that travel on a cruise during their trip and without any medical conditions.

Table 4.54: Most visited destinations by travellers that did not travel on a cruise and had medical conditions as a percentage of total number of travellers that did not travel on a cruise and had medical conditions received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	32.40%
02.	France	5.87%
03.	United States	5.80%
04.	Portugal	5.42%
05.	Italy	5.31%
06.	Greece	5.13%
07.	Great Britain (UK)	3.60%
08.	Cyprus	2.99%
09.	Turkey	2.55%
10.	Australia	2.25%

11.	Malta	1.87%
12.	Germany	1.80%
13.	Canada	1.45%
14.	Ireland	1.38%
15.	Belgium	1.20%
16.	Netherlands	1.07%
17.	United Arab Emirates	0.99%
18.	Austria	0.98%
19.	India	0.90%
20.	Croatia	0.88%

Table 4.55: Most visited destinations by travellers that did not travel on a cruise and without any medical conditions as a percentage of total number of travellers that did not travel on a cruise and without any medical conditions received by all the destinations from 2014 to 2017

No.	**Country**	**Percentage of Travellers**
01.	Spain	32.87%
02.	France	6.06%
03.	Greece	5.84%
04.	United States	5.55%
05.	Portugal	4.81%
06.	Italy	4.80%
07.	Turkey	4.60%
08.	Cyprus	2.87%
09.	Great Britain (UK)	2.86%
10.	Malta	1.72%
11.	Germany	1.57%
12.	Australia	1.54%
13.	Egypt	1.35%
14.	Canada	1.23%
15.	Belgium	1.18%
16.	Ireland	1.15%
17.	Netherlands	1.05%

18.	Austria	0.90%
19.	Tunisia	0.90%
20.	Croatia	0.86%

4.4. Summary of Findings

UK travellers' favour towards travelling to destinations closer to home with low security risks. Spain, France, Great Britain, Cyprus and Germany are their most favourite destinations, and Portugal and Italy have gained popularity among them over the past few years. Their travel patterns indicate that they travel mostly during two travel seasons, from April to June and August to October.

They tend to travel with at least one other person and majority of the time it is with their significant other or a family member. A new trend amongst them indicate that they are starting to travel more with their family members and in groups. The type of group they choose to travel has an impact on their destination choices. They are more confident in travelling to destinations with higher security risks when they travel with their families and alone. France, Greece, Great Britain, Cyprus and Germany are favourite destinations among UK travellers that travel as individuals. Same destinations except for Greece are also couples' favourite destinations. They travel mostly during the first travel season of the year from April to June when they travel to Great Britain. Germany is more popular among individuals than couples, and it receives travellers from both groups mostly between the two travel seasons from May to July. Australia is a favourite destination among UK travellers that travel as individuals. They travel to the Australia during UK's winter season from the end of a year to the beginning of the following next year. United States was popular among all travel groups until 2016 but suffered a decline in popularity among all group type in 2017. Turkey lost its popularity among all the group types, and Egypt lost its popularity among the only group types favoured it as a destination, families and single parent families. The popularity of United Arab Emirates among families and single parent families has fluctuated from 2014 to 2017. Both United Arab Emirates and Egypt do not follow any seasonal patterns in receiving visitors from UK. This makes it harder to predict demand for these countries. Groups, families and single parent families visit

all their most visited destinations mostly during one time of the year and mostly between the two travel seasons in UK.

Baby Boomers and Silent Generation are the most active UK resident travellers, and they travel mostly during the two travel seasons in UK. Generation Z, Millennials and Generation X travel mostly during one time of the year. Younger generations are more adventurous with their destination choices compared to older generations. France and Cyprus are popular destinations among all the generations. Egypt is gaining popularity again among Generation Z and Millennials. The age of a traveller has an impact on the choice of destination.

15.86% of the UK resident travellers travel to more than one destination during a trip and 72.05% of them travel with at least another person. 92.60% of the UK resident travellers that travel to more than one destination are over fifty-three years old. Most of these travellers prefer to travel with their significant other. The interest to travel to more than one destination on a trip is increasing among travellers that travel with their family members.

67.85% of UK resident travellers have at least some medical condition and this number is expected to increase in future. The traveller's health has an impact on the destination choice of a traveller. France, Great Britain, Cyprus and Germany are becoming favourite destinations among travellers with medical conditions.

Travellers with medical conditions prefer to travel alone or with their significant other compared to travelling with anyone else, but this is starting to change. More travellers have started travelling with their family members. They are also more comfortable with choosing destinations outside of Europe when they travel with their family members, and both families and single parent families have United Arab Emirates as one of their favourite destinations. Travellers with medical conditions are hesitant to travel to destinations outside of Europe only when they travel with their significant other. The destination choices these travellers make are impacted by the group type they choose to travel.

92.86% of the travellers with medical conditions are over fifty-three years old. All of them are belonged to Baby Boomers and Silent Generation and travel mostly during

the UK's two travel seasons. All the other generations travel mostly during one time of the year. The younger travellers among these travellers with medical conditions are more open to travel to destinations far from UK compared to older travellers. These are indications that age has an impact on the destination choice of a traveller with a medical condition.

The travellers with medical conditions prefer to travel on a cruise during their trip than the travellers without any medical conditions. 15.74% of the travellers with medical conditions travelled on a cruise during their trip. This is an indication that traveller's health has an impact on the selection of the travel mode. The travel mode in turn has an impact on the destination choice of both travellers with medical conditions and travellers without medical conditions.

The travel mode has an impact on the destination choice of a UK resident traveller. 14.48% of UK resident travellers travel on a cruise during their trip. Cruise travellers' favourite destinations are France, Gibraltar, Norway and Germany. The seasonal pattern for these travellers changes frequently and makes it harder to identify the dominant travel season from the two travel seasons. The trend in the number of travellers that travelled on a cruise during a trip over the years shows that this number will increase in future. Most of the contribution to the growth of cruise travellers comes from Silent Generation. The number of cruise travellers from other generations has increased consistently over the years. The differences among these generations show that age has a significant impact on the choice of travel mode among UK travellers. The group type they choose to travel with also has an impact on the selection of travel mode. Cruise travellers prefer to travel with their significant other during the two travel seasons, from April to June and August to October. The same pattern is being shown by cruise travellers that travel alone. The destination choices of different generations show that age has an impact on the destination choice of a cruise traveller. Barbados, Saint Lucia, Saint Martin, Antigua and Barbuda, and Saint Kitts and Nevis are famous cruise destinations visited by UK resident cruise travellers. The travelling to these destinations would require a traveller to travel on a cruise. This indicates that destination choice also has an impact on the travel mode. More than 73% of UK travellers that visit Barbados, Saint Lucia, Saint Martin, Antigua and Barbuda, and

Saint Kitts and Nevis are cruise travellers, a lot more than the number of cruise travellers received by other destinations as shown in APPENDIX C. The fame surrounding these destinations as cruise destinations ("The 17 Best Places to Visit in the Caribbean," n.d.) tempt any traveller that wants to visit these destinations to choose cruise as the travel mode.

73.78% of the cruise travellers have medical conditions and 50% of them are over seventy years old. The number of cruise travellers with medical conditions have consistently increased over the years and expect to increase in future. The health of a cruise traveller has an impact on their destination choice. The cruise travellers with medical conditions favour travelling to Saint Kitts and Nevis, Saint Lucia, Netherlands, and Antigua and Barbuda, but they do favour travelling to Russia compared to cruise travellers without any medical conditions. Turkey is a favourite destination among cruise travellers without any medical conditions. The traveller's health has an impact on the destination choice of a traveller that does not travel on a cruise during their trip. These travellers with medical conditions prefer United Arab Emirates and India compared to travellers that do not travel on a cruise and without any medical conditions. Egypt, Tunisia and Greece are favourite destinations among travellers that do not travel on a cruise and without any medical conditions compared to travellers that do not travel on a cruise and without any medical conditions.

Prediction Accuracy

The accuracy of time series forecasting was higher for the forecasts conducted on the main sample due to its size, 1,104,758 outbound trips. The accuracy decreased for the forecasts conducted on two travellers' subgroups, travellers with medical conditions and cruise travellers since both used only 749,539 and 159,934 trips to conduct the forecasts for each group respectively. The accuracies shown in APPENDIX D indicates that with a large sample of data, time series forecasting is a significantly viable option to predict demand of travellers.

4.5. Summary

The analysis was conducted to find the travel patterns of UK travellers, and the features that impact on the destination and travel mode choices of a UK traveller. The travellers' patterns were analysed as overall, by group type, by generation (age groups), by existence of medical condition, by existence of medical condition and group type, by existence of medical condition and generation, by existence of medical condition and travel mode, by travel mode, by travel mode and group type, by travel mode and generation, and by travel mode and existence of medical condition. Statistical data analytics techniques and time series modelling were used to find the travel patterns. The data of the main sample from January 2014 to December 2017 was used in time series forecasting to find the demand for 2018. The predictions were compared against travel policy data recorded for 2018 to find the accuracy of the predictions.

5. CONCLUSIONS AND RECOMMENDATIONS

A feature framework for a traveller's choice of destination and travel mode is established based on the findings of the analysis. The framework along with the recommendations derived from travel patterns discovered in the analysis and the ability to forecast highly accurate travel demand show the potential in using data analytics in travel insurance.

5.1. Conclusions

The findings of the research helped to confirm the reliability of time series forecasting, and the relationship between the features and the traveller's destination and travel mode choices.

5.1.1. Feature Framework

The feature framework based on the findings of the analysis shown in Figure 5.1 expresses the factors related to the traveller and trip, that dictate their choice of destination and travel mode. The framework was further validated by the director of research for Sri Lanka Tourism Development Authority as shown in APPENDIX E.

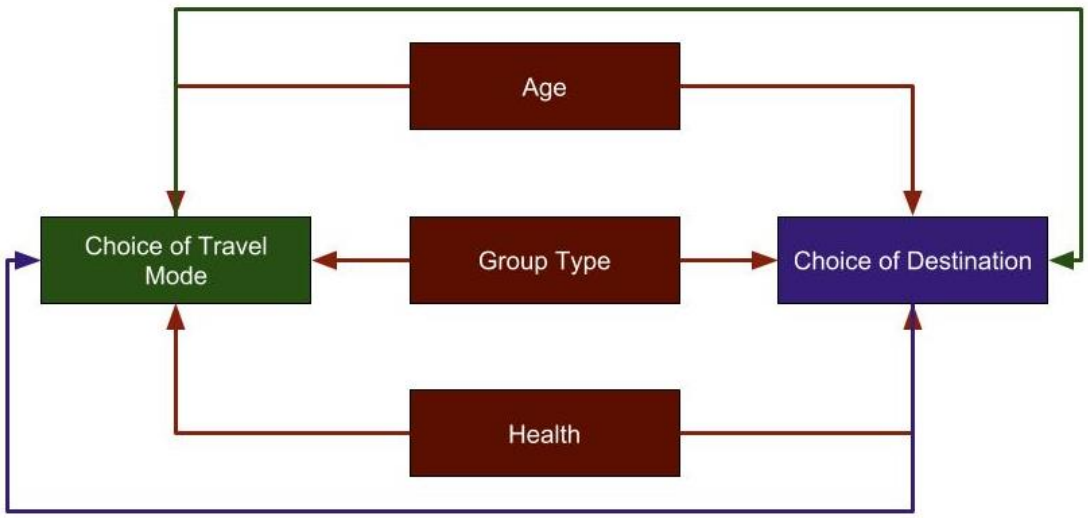

Figure 5.1: Feature Framework

The relationships among the features found in previous studies shown in APPENDIX A are confirmed and strengthened further by the established feature framework based on the analysis.

Choice of Destination

The destination choice is the most important vacation choice (Hedlund, 2013). The choice of destination depends on the traveller's age, group type, existence of a medical condition and travel mode. The same impact was discovered by different studies over the years as shown in APPENDIX A. The destination choice has an impact on the travel mode according to findings of the analysis in section 4.3.

Choice of Travel Mode

The travel mode choice is an important vacation choice after the destination choice in a standard trip, but it is the most important vacation choice in a charter trip (Hedlund, 2013). Their research found the same two-way relationship between the choice of destination and choice of travel mode discovered in analysis. The research findings in 4.2.3 and 4.3 sections indicate that a cruise traveller makes different destination choices compared to other travellers and some of the destination choices require travellers to travel on a cruise.

Age

The findings of the analysis in 4.1.2, 4.2.2 and 4.3.2 sections indicate that the age of a traveller has an impact on the destination choice among different travellers' groups. Slak Valek, Shaw, & Bednarik (2014), Kattiyapornpong (2006), Beerli & Martín (2004), and Guillet, Lee, Law, & Leung (2011) found the same connection between the age of a traveller and their destination. The age also has an impact on the choice of travel mode among travellers. The analysis findings show that older generations are more favourable toward travelling on cruise compared to younger generations.

Group Type

Kattiyapornpong (2006), Beerli & Martín (2004) found life stage of a traveller has an impact on the choice of destination, and Guillet, Lee, Law, & Leung (2011) found the size of travel party has an impact on the choice of destination. The findings of the analysis in 4.1.1, 4.2.1 and 4.3.1 sections show that a combination of both factors,

group type has an impact on the destination choice. The life stage decides the type of related people they have in their lives and size of travel party indicates the size of the group. A traveller that travels with a group of related and unrelated travellers make different destination choices in both instances even if the group size is the same, as found by the destination choice differences between families and groups in the analysis. Hence, the group type is a better feature choice as it captures elements of both influencing factors. The analysis also found that group type, with whom a traveller chooses to travel has an impact on the travel mode choice among travellers, travellers with medical conditions and cruise travellers.

Health

The traveller's health, the existence of a medical condition has an impact on the destination choice of a traveller according to the findings in 4.2 and 4.3.3 sections. It also has an impact on the choice of travel mode according to the findings of the analysis. Hedlund (2013) also discussed the impact of traveller's health on vacation choices.

5.1.2. Time series Forecasting

The accuracy results of the time series forecasting shown in APPENDIX D reveal that time series is a reliable method to predict traveller demand when a large training data set (sample) is available. The analysis also confirms that the accuracy of a forecasting can be improved by increasing the size of the sample.

5.2. Recommendations

Travel, tourism and travel insurance companies that cater to UK resident travellers should understand their customers' needs if they want to increase revenue generation and customer value creation. The main part of revenue generation and value creation is catering to the patterns of the travellers.

The service offerings of travel, tourism and travel insurance companies must include the UK travellers' favourite destinations, Spain, France, Great Britain, Cyprus, Germany, Portugal and Italy. The companies should align their marketing efforts to take advantage of the two travel seasons from April to June and August to October along with the focused offerings. The marketing and sales campaigns of these

companies should focus more on the dominant travel season from the two travel seasons. All the favourite destinations except for Great Britain should be focused more in the second season of the year and Great Britain in the first season of the year. The companies that cater to UK resident travellers should mainly focus on UK travellers that travel as couples. The destination suggestions for couples by a travel and tourism company should be of low health and security risks and located within Europe. The travel insurance companies focused on providing travel insurance to UK travellers should conduct risk assessments for destinations or refer to widely accepted risk indexes for destinations and adjust their travel insurance policies to provide better insurance covers to travellers. UK travellers that travel as groups, families and single parent families should be focused from the beginning of the first season to the end of second season during the time they are mostly active. The holiday offers and promotions conducted during the winter season to UK travellers that travel alone should include Australia as a destination. The packages and offerings for middle east countries should focus Generation Z and Millennials since these generations show more interest toward middle east destinations.

The service offerings should have customisation ability to cater for travellers with medical conditions since the number of UK resident that travel abroad is expected to increase in future. Different travel, tourism and insurance packages should be provided for travellers with medical conditions belonged to different generations. The destination choices that travel and tourism companies offer to Baby Boomers and Silent Generation should be close to UK with low health risks. The younger generations with medical conditions should be provided with destination choices outside of Europe with low health risks since they are more open to travel outside of Europe compared to older generations. United States should be specially included for them as one of the destination choices since most of the younger travellers with medical conditions favour travelling to United States. An option should be provided for customers to purchase a medical coverage along with their travel, tourism and insurance packages to provide better services and earn generate more revenue.

The service offerings for cruise travellers should be focused on the UK's two travel seasons. The travel and tourism packages should include cruise experience with other

travel options and experiences since travelling on a cruise is only a part of the trip for UK travellers. The travel insurance products should also provide customisation options to include different travel modes in a single travel policy. The service offerings of all the organisations should mainly target Baby Boomers and Silent Generation and focus at catering to all the destination choices favoured by cruise travellers, France, Gibraltar, Norway, Germany, Spain, Portugal and Italy. The companies should investigate cross selling of health packages along with their service offerings to these customers since most of the cruise travellers have medical conditions. A customisable service offering considering these recommendations would increase revenue and customer satisfaction.

Anyone that cater to travellers' needs and demands in any outbound market should study the proposed feature framework and recommendations provided for UK outbound market and cater to their markets based on travellers' destination choices, travel mode choices, group type, age and health condition. The use of data analytics in travel insurance allows travel, tourism and travel insurance industries to do this and create value for them. The director of research for Sri Lanka Tourism Development Authority has also confirmed that the findings of the research are highly valuable in target marketing, and travel and tourism infrastructure development as shown in APPENDIX E. It is evident from these benefits that the use of data analytics in travel insurance has great potential.

5.3. Limitations and Future Work

The research only looked at the existence of the connections between the features to establish the feature framework. A future study should measure the strengths of these connections. The sample of the research accounted only for 0.53% of the total number of outbound trips originated from the UK. A bigger sample should be used to confirm the findings and to increase the accuracy of the predictions conducted for traveller subgroups, traveller with a medical condition and cruise traveller. A further study should be carried out with more data sources to confirm the findings since the research was conducted using travel insurance policy records from a single source. The proposed framework should be tested with different types of data and in a different

outbound market to find the adaptability of the framework since the research only used travel insurance policy records related to UK outbound market.

5.4. Summary

The impacts of features on a traveller's destination and travel mode decisions found in the analysis forms a framework that helps to find a traveller's destination and travel mode choices. The findings of the analysis also helped to provide recommendations to companies in travel, tourism and travel insurance industries on how to fine tune their service offerings and conduct effective marketing. The accuracy readings of the predictions indicate that time series forecasting is a reliable traveller demand prediction method to use in these industries. A further study is required to address the limitations, confirm the findings and test the framework in different settings.

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APPENDIX A - Factors Influencing Destination and Travel Mode Choices

	Influencing Factors																		
	Gender	**Age**	**Income**	**Level of education**	**Life stage**	**Social class**	**Country of origin**	**Size of travel party**	**Length of stay**	**Trip expenditure**	**Health**	**Trip distance**	**Urge to discover**	**Urge to escape from routine, role, obligation, stress and troubles**	**Trip type**	**Being & seeing**	**Choice of Destination**	**Choice of Travel Mode**	**Impacted Choices**
Slak Valek, Shaw, & Bednarik (2014)	✓	✓	✓	✓															Choice of Destination
Kattiyapornpong (2006)		✓	✓		✓				✓			✓							
Beerli & Martín (2004)	✓	✓		✓	✓	✓	✓												
Guillet, Lee, Law, & Leung (2011)		✓			✓			✓	✓	✓			✓	✓					
Hedlund (2013)			✓								✓							✓	
Hsieh, O'Leary, & Morrison (1993)		✓						✓							✓	✓			Choice of Travel Mode
Hedlund (2013)			✓								✓						✓		

APPENDIX B - Definitions of Generations

Age Group	Age Range
Generation Z	Born from mid-1990s to mid-2000s Approximate minimum age is 18. Approximate maximum age is 28. (“Generation,” 2019)
	Just before start of the Millennium. Approximate maximum age is 19. (Wallop, 2014)
	Born from 1995 to 2012 Approximate minimum age is 6. Approximate maximum age is 23. (“Generations X,Y, Z and the Others - WJSchroer,” n.d.)
	Born from 1997 to 2012. Approximate minimum age is 6. Approximate maximum age is 21. (Dimock, n.d.)
Millennials or Generation Y	Born from early 1980s to mid-1990/mid-2000 Approximate minimum age is 18. Approximate maximum age is 38. (“Generation,” 2019)
	Born from 1980 to 2000 Approximate minimum age is 18. Approximate maximum age is 38. (Wallop, 2014)
	Born from 1977 to 1994 Approximate minimum age is 24. Approximate maximum age is 41. (“Generations X,Y, Z and the Others - WJSchroer,” n.d.)
	Born from 1980 to 2000 Approximate minimum age is 18. Approximate maximum age is 38. (Stein, n.d.)
	Born from 1981 to 1996 Approximate minimum age is 22. Approximate maximum age is 37. (Dimock, n.d.)
Generation X	Born from early-to-mid 1960s to early 1980s Approximate minimum age is 38. Approximate maximum age is 58. (“Generation,” 2019)
	Born from early 1960s to early 1980s Approximate minimum age is 38. Approximate maximum age is 58. (Wallop, 2014)
	Born from 1966 to 1976

	Approximate minimum age is 42. Approximate maximum age is 52. ("Generations X,Y, Z and the Others - WJSchroer," n.d.)
	Born from 1965 to 1980 Approximate minimum age is 38. Approximate maximum age is 53. (Dimock, n.d.)
Baby Boomers	Early-to-mid 1940 and end from 1960 to 1964 Approximate minimum age is 54. Approximate maximum age is 78. ("Generation," 2019)
	1945 to early 1960s Approximate minimum age is 58. Approximate maximum age is 73. (Wallop, 2014)
	Baby Boomers I: Born from 1946 to 1954 Baby Boomers II: Born from 1955 to 1965 Approximate minimum age is 53. Approximate maximum age is 72. ("Generations X,Y, Z and the Others - WJSchroer," n.d.)
	Born from 1946 to 1964 Approximate minimum age is 54. Approximate maximum age is 72. (Dimock, n.d.)
	Born from mid-1946 to mid-1964 Approximate minimum age is 54. Approximate maximum age is 72. ("The Baby Boom Cohort in the United States: 2012 to 2060," n.d.)
Silent Generation or Post-War Cohort	Born from 1925 to 1942 Approximate minimum age is 76. Approximate maximum age is 93. ("Generation," 2019)
	Born from 1928 to 1945 Approximate minimum age is 73. Approximate maximum age is 90. ("Generations X,Y, Z and the Others - WJSchroer," n.d.)
	Approximate minimum age is 73. Approximate maximum age is 91. (Dimock, n.d.)

APPENDIX C - Cruise Travellers & Total Visitors to Destinations

No.	Country	Number of Cruise Travellers (as a percentage of all the visitors from UK)
01.	Spain	16.30%
02.	Italy	41.59%
03.	Portugal	40.88%
04.	France	35.51%
05.	Gibraltar	86.99%
06.	Greece	25.03%
07.	Norway	83.90%
08.	Croatia	57.83%
09.	Germany	40.79%
10.	United States	15.30%
11.	Barbados	73.01%
12.	Belgium	43.45%
13.	Great Britain (UK)	21.33%
14.	Saint Lucia	83.14%
15.	Saint Martin	91.05%
16.	Netherlands	41.93%
17.	Antigua and Barbuda	80.88%
18.	Denmark	75.57%
19.	Russian Federation (Russia)	83.26%
20.	Saint Kitts and Nevis	89.56%

APPENDIX D - Accuracy of Time Series Forecasting

No.	Prediction	Mean Absolute Percentage Error (MAPE)
01.	Number of UK travellers that would travel in 2018	5.72
02.	Number of UK travellers that would travel to Spain in 2018	3.25
03.	Number of UK travellers that would travel to France in 2018	29.85
04.	Number of UK travellers that would travel to Portugal in 2018	11.52
05.	Number of UK travellers that would travel to Italy in 2018	64.17
06.	Number of UK travellers that would travel to Greece in 2018	207.65
07.	Number of UK travellers that would travel to United States in 2018	7.89
08.	Number of UK travellers that would travel to Great Britain in 2018	23.18
09.	Number of UK travellers that would travel to Turkey in 2018	108.85
10.	Number of UK travellers that would travel to Cyprus in 2018	17.19
11.	Number of UK travellers that would travel to Germany in 2018	38.15
12.	Number of UK travellers that would travel as couples in 2018	3.05
13.	Number of UK travellers that would travel as individuals in 2018	5.34
14.	Number of UK travellers that would travel as groups in 2018	13.72
15.	Number of UK travellers that would travel as families in 2018	15.14

16.	Number of UK travellers that would travel as single parent families in 2018	27.78
17.	Number of UK travellers belong to Generation Z that would travel in 2018	23.77
18.	Number of UK resident Millennials that would travel in 2018	8.58
19.	Number of UK travellers belong to Generation X that would travel in 2018	4.83
20.	Number of UK resident Baby Boomers that would travel in 2018	4.74
21.	Number of UK travellers belong to Silent Generation that would travel in 2018	9.62
22.	Number of UK travellers that would travel to more than one destination on a trip in 2018	9.00
23.	Number of UK travellers that would travel as couples to more than one destination on a trip in 2018	13.30
24.	Number of UK travellers that would travel as individuals to more than one destination on a trip in 2018	7.71
25.	Number of UK travellers that would travel as groups to more than one destination on a trip in 2018	16.18
26.	Number of UK travellers that would travel as families to more than one destination on a trip in 2018	93.44
27.	Number of UK travellers that would travel as single parent families to more than one destination on a trip in 2018	155.00
28.	Number of UK travellers belong to Generation Z that would travel to more than one destination on a trip in 2018	25.36
29.	Number of UK resident Millennials that would travel to more than one destination on a trip in 2018	16.51
30.	Number of UK travellers belong to Generation X that would travel to more than one destination on a trip in 2018	12.25
31.	Number of UK resident Baby Boomers that would travel to more than one destination on a trip in 2018	9.36
32.	Number of UK travellers belong to Silent Generation that would travel to more than one destination on a trip in 2018	12.37

33.	Number of UK travellers with medical conditions that would travel in 2018	30.74
34.	Number of UK travellers with medical conditions that would travel to Spain in 2018	42.04
35.	Number of UK travellers with medical conditions that would travel to Portugal in 2018	55.62
36.	Number of UK travellers with medical conditions that would travel to France in 2018	61.52
37.	Number of UK travellers with medical conditions that would travel to Italy in 2018	230.69
38.	Number of UK travellers with medical conditions that would travel to Greece in 2018	1387.13
39.	Number of UK travellers with medical conditions that would travel to United States in 2018	43.92
40.	Number of UK travellers with medical conditions that would travel to Great Britain in 2018	45.31
41.	Number of UK travellers with medical conditions that would travel to Germany in 2018	80.33
42.	Number of UK travellers with medical conditions that would travel to Turkey in 2018	161.76
43.	Number of UK travellers with medical conditions that would travel to Cyprus in 2018	91.05
44.	Number of UK travellers with medical conditions that would travel as couples in 2018	43.52
45.	Number of UK travellers with medical conditions that would travel as individuals in 2018	20.82
46.	Number of UK travellers with medical conditions that would travel as groups in 2018	41.68
47.	Number of UK travellers with medical conditions that would travel as families in 2018	102.57
48.	Number of UK travellers with medical conditions that would travel as single parent families in 2018	86.06
49.	Number of UK travellers with medical conditions belong to Generation Z that would travel in 2018	92.05

50.	Number of UK resident Millennials with medical conditions that would travel in 2018	43.64
51.	Number of UK travellers with medical conditions belong to Generation X that would travel in 2018	36.12
52.	Number of UK resident Baby Boomers with medical conditions that would travel in 2018	31.95
53.	Number of UK travellers with medical conditions belong to Silent Generation that would travel in 2018	38.56
54.	Number of UK travellers with medical conditions that would travel on a cruise during their trip in 2018	35.25
55.	Number of UK travellers with medical conditions that would not travel on a cruise during their trip in 2018	30.10
56.	Number of UK travellers without any medical conditions that would travel on a cruise during their trip in 2018	90.01
57.	Number of UK travellers without any medical conditions that would not travel on a cruise during their trip in 2018	181.72
60.	Number of UK travellers that would travel in a cruise during their trip in 2018	33.06
61.	Number of UK travellers that would not travel in a cruise during their trip in 2018	6.01
62.	Number of UK resident cruise travellers that would travel to Spain in 2018	48.12
63.	Number of UK resident cruise travellers that would travel to Italy in 2018	316.23
64.	Number of UK resident cruise travellers that would travel to Portugal in 2018	19.96
65.	Number of UK resident cruise travellers that would travel to France in 2018	178.99
66.	Number of UK resident cruise travellers that would travel to Gibraltar in 2018	161.02
67.	Number of UK resident cruise travellers that would travel to Greece in 2018	355.96
68.	Number of UK resident cruise travellers that would travel to Norway in 2018	86.84

69.	Number of UK resident cruise travellers that would travel to Croatia in 2018	995.91
70.	Number of UK resident cruise travellers that would travel to Germany in 2018	188.91
71.	Number of UK resident cruise travellers that would travel to United States in 2018	55.14
72.	Number of UK resident cruise travellers that would travel as couples in 2018	32.69
73.	Number of UK resident cruise travellers that would travel as individuals in 2018	27.43
74.	Number of UK resident cruise travellers that would travel as groups in 2018	21.79
75.	Number of UK resident cruise travellers that would travel as families in 2018	51.60
76.	Number of UK resident cruise travellers that would travel as single parent families in 2018	208.30
77.	Number of UK resident cruise travellers belong to Generation Z that would travel in 2018	54.79
78.	Number of UK resident cruise travellers belonged to Millennials generation that would travel in 2018	49.44
79.	Number of UK resident cruise travellers belong to Generation X that would travel in 2018	33.64
80.	Number of UK resident cruise travellers belonged to Baby Boomers generation that would travel in 2018	33.03
81.	Number of UK resident cruise travellers belong to Silent Generation that would travel in 2018	30.67
82.	Number of UK resident cruise travellers with medical conditions that would travel in 2018	89.47

APPENDIX E - Interview with the Industry Expert

Date: 11th of March 2019

Location: Sri Lanka Tourism Development Authority

Interviewee: Ms. Dinushka Peiris, Director, Research, Sri Lanka Tourism Development Authority

Question 1: Do you conduct similar studies to find travel patterns and demands like these?

Answer: Yes, we conduct similar studies. Every year we conduct a survey-based study at Bandaranaike International Airport to collect information about both inbound and outbound trips. A special team is deployed to the airport to collect data from time to time. There are also multiple tablets placed at the airport to collect feedback from the travellers. The survey results along with data we obtain from Department of Immigration and Emigration are used to profile the travellers and predict the demand for the next year.

Question 2: How important is travel demand forecasting?

Answer: The government of Sri Lanka relies highly on the forecasting of travellers for their destination marketing and tourism infrastructure development. For that reason, it is one of the main objectives of our studies.

Question 3: What do you do with the findings of your studies?

Answer: We publish an annual travel and tourism report showing the details about types of travellers that visited the country during the year and predictions for the next year. The report is being used by government to market Sri Lanka as a destination and build tourism infrastructure in the country. The companies that are interested in travel and tourism use the findings in the report for target marketing and to optimise their service offerings.

Question 4: Have you seen the features discovered by this research influencing destination and travel mode choices of travellers.

Answer: Yes, we have witnessed the impact of age, group type and travel mode on the destination choices of a traveller. The cruise travellers would visit locations in short distance from the port like Pinnawala and Kandy. We do not have enough data to find the impact of traveller's health on destination choices, and the impact of age, group type, travel mode and destination choice on choice of travel mode.

Question 5: Are the findings of the research important?
Question 5.1: How are these important (practical use)?

Answer: Yes, the findings are important to any government and organisation interested in travel and tourism. Understanding the types of travellers that visit a country and their needs help conduct target marketing. These findings help a government to understand the needs of the travellers that they receive and to market their country as a travel destination according to those data. The same data will be used to develop the infrastructure for travel and tourism of outbound market and destinations. As an example, the development of a destination with high demand will be prioritised over other destinations. An organisation dedicated to catering to travellers would use the same data to conduct target marketing, and to create value for their customers and the organisation by optimising their service offerings.