CHAPTER 5

5.0 SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 SUMMARY

In this chapter, a summary of the research work will be made after which a conclusion based on the analysis in the previous chapters will also be made. This chapter reveals areas that have great influence on premium rating in the insurance industry.

In the process of researching into premium rating in the insurance industry using the actuarial techniques of term insurance and annuity to calculate the benefit premium and also using the predictive analytics technique of multiple linear regression, some problem areas were realized. These problems areas were looked into and conclusion and some recommendation was made.

In chapter one, the background of the study was dealt with, it was here that it was explained that premium rating is the process or procedure in which the insurance company charge an effective and efficient premium in other to pay for claims when due and provide for administration expenses and reserves.
The chapter also looked into the purpose of the study, limitation of the study, relevance and the significance of the study, problem analysis and the statement and research question. This chapter is then rounded up with some terms definition.

Chapter two which is the literature review the experts in various fields had on the topic was looked into from the various aspect of the topic. These include the concept of premium rating, the overview, and the theories relevant to the research questions.
The field of predictive analytics was also looked into and its relationship with the insurance industry. The predictive model to be used was discussed and also the relevance of big data in the insurance industry

Chapter three is the methodology, it looks at the various ways of gathering informations, which is collecting data for the purpose of study, (which in this case is a secondary data) the selection and type of data needed for the analysis was discussed. Two dataset was used and one was analysed using he conventional actuarial formula while the other was analysed using predictive analytics technique. The chapter also looked into the population, scope and limitation of the study. The techniques to be used were analysed – term insurance premium rate formula and multiple linear regression model.

As a whole, this research will provide a detailed understanding of the actuarial and data science (or specifically predictive analytics) techniques by which actuaries collect, analyze, manipulate and revise raw data to make estimates that can be used for projection in practice. The primary purpose of the study is to determine the lowest premium that meets all required objectives including - to cover losses and expenses, and to earn some profit.

5.2 CONCLUSION DRAWN FROM THE FINDINGS HOW THE STUDY HAS ANSWERED THE RESEARCH QUESTIONS

Premium rating have been overtime used to calculate and estimate the effective premium an insured will pay for a policy in order for the insurer to fix a fair and efficient premium which will meets the required objectives including - to cover claims whenever they arise, expenses and administrative cost as they fall due, earn some profit and hold appropriate reserve.
Conclusions will be made accordingly on each techniques used:

- Actuarial technique
- Predictive analytics technique

Based on the findings of the research, the following conclusions obvious:

a) Actuarial Technique
The technique has shown the pattern of calculating premium at the moment of death and at the end of the year of death using the actuarial present value of insurance and annuities.

The Result Tables are described below:
- In Table 1, the original data was shown and calculations were based on the table.
- Table 2 shows the actuarial present value of insurance and annuities
- Table 3 shows the effective premium each policy holder will pay both at the moment of death and at the end of the year of death.

b) Predictive Analytics Technique
This technique has shown the method of calculating premium using the multiple linear regression model. This technique made use of data science packages and libraries including a computer software programming language – Python.

The Result Tables are described below:
- Table 1 shows the raw and unclean data.
- Table 2 shows our dataset after data cleaning which include converting all categorical data to numerical data. There were no missing values.
- Table 3 shows the dataset after dropping the insignificant columns or independent variables (sex and region column). Premium calculations and model evauation were based on Table 3.
- Table 4 shows the test dataset actual charges and their corresponding predicted charges. The accuracy of our model was derived from this table
- Table 5 shows the summary of the fitted model including the number of observations, r-squared value, p-values, model coefficients of each independent variables and some other statistic.

The Result Graphs are described below:
- The First Set Of Graphs show the relationship between insurance premium charge and sex, age, region, smoker, children and body mass index.
- Graph 2 shows the relationship between the actual premium charges in the Test Dataset vs their corresponding predicted values or charges.

5.3 RECOMMENDATIONS BASED ON THE CONCLUSIONS

Based on the findings and deductions of this study, certain recommendations and suggestions are made:

- Actuaries will be very useful in making policy decisions in effective premium rating and calculations.
- The use of predictive analytics to determine insurance premium charge should be adopted and well explored as the future of the insurance industry will be based on Big Data and Artificial Intelligience
- Actuaries should learn how to use data science tools including the Python programming lanuage. As actuaries learn this tool, more actuaries will become data scientist and the gap between the insurance industry and the data science industry will begin to narrow
- Actuaries will be needed to assist in building computer software tools, libraries and packages that involve complex actuarial calculations which will be used in insurance companies to provide accurate result to complex calculations and fasten the process of underwriting.

The following recommendations should be adopted in order to fix an adequate insurance premium.
- Qualified Actuaries should be employed to help calculate premium charges.
- Actuaries should learn and improve their computer programming / data science skills.
- The claims experience of both new and existing policy holder should be considered.
- The economic conditions such as inflation rate, exchange rate etc should be considered.