

**Application of Game theory on Financial benefits  
and Employee satisfaction:**

**“Case study on State banks of Sri Lanka”**

Deekirikewage Don GamunuTrevince Jayasekara

(178111U)

Thesis submitted in partial fulfillment of the requirements for the degree Master of  
Science/ Financial Mathematics

Department of Mathematics

University of Moratuwa

Sri Lanka

November 2020

## **DECLARATION**

The following declaration should be made by the candidate following the signature and the date. A candidate, after a discussion with the supervisor/s can request an embargo for a particular thesis/dissertation for a given work for a given time or indefinitely. Such an embargo may override the statement made in the thesis/dissertation itself.

“I declare that this is my own work and this thesis/dissertation 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.

Also, I hereby grant to University of Moratuwa the non-exclusive right to reproduce and distribute my thesis/dissertation, in whole or in part in print, electronic or other medium. I retain the right to use this content in whole or part in future works (such as articles or books).

Signature:

Date:

The supervisor/s should certify the thesis/dissertation with the following declaration.

The above candidate has carried out research for the Masters/MPhil/PhD thesis/Dissertation under my supervision.

Name of the supervisor:

Signature of the supervisor:

Date :

## **ABSTRACT**

In any business organization, there are two parties inside. The company and the employees, the company always tries to maximize their profit as well as employees try to demand their gains or benefits. This is not a linear relationship, because the profit and employee earnings have disproportionate equilibrium. To maximize the profit the management always focuses on the performance of the employees and to reduce the cost. As per the motivational theories, it is clearly indicated that the employees have different types of needs. Therefore, the management should focus on a wide range of factors to satisfy the employees to absorb the maximum strength they are holding. In this research, we focus on both employees and the management of a state bank. Management of the state bank is always eager to minimize the cost and maximize the profit. However, the employees make every endeavor to elevate their earnings, which will be a cost to the company. The conflict begins at this point. The author observed that the problem of the institutions and introduced the Game Theory which provides a mathematical framework for understanding the optimal outcome and what the tradeoffs are to achieve that outcome. Therefore, it has to found the main financial benefits and their effectiveness on employee satisfaction to maximize the profit. To fulfill that objective it has to be observed the benefits given to employees, the effectiveness of those benefits on employees and finally recommend an effective benefits allocation mix to the organization, which will address both employee and the top management.

In this game, the top management can be denoted as player and there is using Maximin strategy to maximize their profit. The employees play the game as opponent and they always try to use Minimax strategy to minimize their maximum lost. This is a cooperative game consisting of two parties, which are presenting various strategies to overcome their common issues. Therefore, this game consists of mixed strategies. Management introduced various benefits. The employees' perspective, their answers are varying according to their needs. Therefore, the accuracy and reliability depend accordingly on the selection of the sample units. The sampling technique is uniquely done by considering various parameters. During the data analysis, it is proven that this game is not having any pure solution. The results are based on the probabilities after using the values in linear programming techniques. According to the results the most suitable allowance is medical allowance to allocate more funds because the probability of that is 0.96. According to the test results, it is clearly state that there are some benefits which are totally useless to provide such as Key Holding, Disturbance and Cash loading and there are some benefits that the management should allocate more to motivate the employees as well as to gain profit.

## **ACKNOWLEDGEMENT**

I truly indebted and thankful to Dr. (Mrs). AnnistaN.Wijayanayake, Senior Lecturer, Department of Industrial Management, Faculty of Science, University of Kelaniya as the Main Supervisor for her valuable guidance to make my research much more professional. I extend my gratitude to Mr. A.R.Dissanayake, Senior Lecturer, Department of Mathematics, Faculty of Engineering, University of Moratuwa as the Core Supervisor and all the lectures.

I am very grateful to the panel of lecturers in the University of Moratuwa, for the assistance provided in various issues came up during the research period. Also, providing the best panel of lectures for each and every subject to upgrade our knowledge and learn some new things. I am also thankful to the colleagues in this batch for their support.

Finally, I would like to dedicate this study to parents who provided the opportunity to achieve career objectives and supported throughout this research.

## **Table of Contents**

|   |      |
|---|------|
| DECLARATION.....  | ii   |
| ABSTRACT .....  | iii  |
| ACKNOWLEDGEMENT .....   | iv   |
| LIST OF TABLES.....   | viii |
| LIST OF FIGURES .....   | ix   |
| CHAPTER 01.....   | 1    |
| INTRODUCTION.....   | 1    |
| 1.1 Introduction .....  | 1    |
| 1.2 Background to the Organization.....                                   | 1    |
| 1.3 Justification of the study .....                                      | 2    |
| 1.4 Problem Identification.....   | 4    |
| 1.5 Problem Justification.....  | 5    |
| 1.6 Research question.....  | 7    |
| 1.7 Objectives of the study .....   | 7    |
| 1.8 Chapter outline.....  | 7    |
| CHAPTER 02.....   | 8    |
| LITERATURE REVIEW .....   | 8    |
| 2.1 Introduction to Chapter 02.....                                       | 8    |
| 2.2 Effect on Employee and customer satisfaction to maximize profit. .... | 8    |
| 2.3 Game Theory applied for similar research .....                        | 9    |
| CHAPTER 03.....   | 13   |
| RESEARCH METHODOLOGY .....  | 13   |
| 3.1 Introduction to Chapter 03.....                                       | 13   |
| 3.2 Research Methodology.....   | 13   |

|  |    |
|--|----|
| 3.3 Conceptual framework .....                             | 15 |
| 3.4 Role of the researcher .....                           | 18 |
| 3.5 Research Design.....                                   | 18 |
| 3.6 Population.....  | 19 |
| 3.7 Sample and sample technique.....                       | 19 |
| 3.8.1 Collection of primary data .....                     | 20 |
| 3.9 The procedure of data collection.....                  | 22 |
| 3.11 Presenting of Data .....                              | 22 |
| 3.13 Chapter outline.....                                  | 24 |
| CHAPTER 04.....  | 25 |
| DATA ANALYSIS AND PRESENTATION.....                        | 25 |
| 4.1 Introduction of Chapter 04 .....                       | 25 |
| 4.2 Analyzing the data .....                               | 25 |
| 4.2.1 Findings through Research .....                      | 25 |
| 4.2.1.1 Presenting the Employee's Identification Data..... | 25 |
| 4.2.1.2 Analyzing the gender of the respondents.....       | 26 |
| 4.2.1.3 Age distribution of the employees.....             | 26 |
| 4.2.1.4 Designation of the respondents .....               | 27 |
| 4.2.1.5 Educational background of the respondents .....    | 28 |
| 4.2.2 Data analyzing : section B .....                     | 29 |
| 4.2.3 Summary of the responses for section B .....         | 29 |
| 4.2.3.1 Medical Allowance.....                             | 29 |
| 4.2.3.2 Difficult Station.....                             | 30 |
| 4.2.3.3 Key Holding.....                                   | 31 |
| 4.2.3.4 Disturbance .....                                  | 31 |

|   |    |
|---|----|
| 4.2.3.5 Cash loading.....                             | 32 |
| 4.2.3.5 Summery of the responds .....                 | 33 |
| 4.2.4 Values according to Likert scale .....          | 34 |
| 4.3 Game Theory application .....                     | 35 |
| 4.3.1 Method of finding the strategy.....             | 35 |
| CHAPTER 05.....                                       | 41 |
| CONCLUSION AND RECCOMENDATION .....                   | 41 |
| 5.1 Introduction to Chapter 05.....                   | 41 |
| 5.2 Conclusion .....                                  | 41 |
| 5.2.1 Medical Allowance.....                          | 42 |
| 5.2.2 Difficult Station.....                          | 42 |
| 5.2.3 Key Holding Allowance .....                     | 42 |
| 5.2.4 Disturbance Allowance.....                      | 43 |
| 5.2.5 Cash loading Allowance .....                    | 43 |
| 5.3Recommendations .....                              | 43 |
| 5.3.1 Recommendation for Medical Allowance .....      | 43 |
| 5.3.2 Recommendation for Difficult Station .....      | 44 |
| 5.3.3 Recommendation for Key Holding Allowance.....   | 45 |
| 5.3.4 Recommendation for Disturbance Allowance .....  | 45 |
| 5.3.5 Recommendation for Cash loading Allowance ..... | 46 |
| 5.4 Suggestions for Further Research .....            | 47 |
| 5.5 Outline of Chapter 05.....                        | 47 |
| REFERENCE .....                                       | 48 |

## LIST OF TABLES

|   |    |
|---|----|
| Table 1.1 : Top 100 most valuable Sri Lankan Brands .....   | 3  |
| Table 2.1 : Perception of risks by private investors of transport infrastructure<br>investments in Latin America..... | 11 |
| Table 2.2 : Operating Profit/loss per club.....   | 12 |
| Table 3.1 : Payoff values indicator .....   | 14 |
| Table 3.2 : Questions asked from the employees .....  | 17 |
| Table 3.3 : collection of data .....  | 21 |
| Table 4.1: Gender Distribution .....  | 26 |
| Table 4.2 : Age Distribution .....  | 26 |
| Table 4.3 : Designation Distribution.....   | 27 |
| Table 4.4 : Educational background Distribution.....  | 28 |
| Table 4.5 : Employee desirable limits for medical allowance.....  | 29 |
| Table 4.6 : Employee desirable limits for Difficult station Allowance .....   | 30 |
| Table 4.7 : Employee desirable limits for Key Holding Allowance .....   | 31 |
| Table 4.8 : Employee desirable limits for Disturbance Allowance .....   | 31 |
| Table 4.9 : Employee desirable limits for Cash loading Allowance .....  | 32 |
| Table 4.10 :Summery of the responds.....  | 33 |
| Table 4.11: Summery of the responses with given weights/Likert Scale values.....                                      | 34 |
| Table 4.12: Values obtained to check the strategy which is going to be used.....                                      | 36 |



## LIST OF FIGURES

|  |    |
|--|----|
| Figure 3.1 – Conceptual frame work .....                                 | 16 |
| Figure 3.2 – Sample Calculator .....                                     | 20 |
| Figure 4.1 - Gender Distribution.....                                    | 26 |
| Figure 4.2 - Age Distribution.....                                       | 26 |
| Figure 4.3 - Designation Distribution.....                               | 27 |
| Figure 4.4 – Educational Background Distribution.....                    | 28 |
| Figure 4.5: Summery of the responds.....                                 | 33 |
| Figure 4.6: Summery of the graph after applying the LS responses.....    | 35 |
| Figure4.7: Values entered in to the Excel Solver.....                    | 38 |
| Figure4.8: Values obtained from the Excel Solver.....                    | 38 |
| Figure4.9: Sensitivity output sheet from the Excel Solver.....           | 39 |
| Figure4.10: Detailed sensitivity output sheet from the Excel Solver..... | 39 |