MATHEMATICAL MODELLING OF RESOURCE ALLOCATION AND OPTIMISATION PROBLEMS

BY

[STUDENT'S FULL NAME]

[MATRIC NUMBER]

BEING A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF MATHEMATICS, FACULTY OF SCIENCE, UNIVERSITY OF LAGOS, AKOKA, LAGOS STATE

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[MONTH, YEAR]

CERTIFICATION

This is to certify that this research project titled "Mathematical Modelling of Resource Allocation and Optimisation Problems" was carried out by [STUDENT'S FULL NAME], and has been read and approved as meeting the regulations governing the award of the degree of Bachelor of Science (B.Sc.) of the University of Lagos.

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PROJECT SUPERVISOR Date

_____ _____

HEAD OF DEPARTMENT Date

_____ _____

EXTERNAL EXAMINER Date

DEDICATION

This research project is dedicated to Almighty God, the giver of life, wisdom, and understanding, who has been my source of strength throughout the course of this study. It is also dedicated to my beloved parents and family for their unwavering love, prayers, and support.

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My profound gratitude goes to Almighty God for His grace, protection, and guidance throughout the duration of my study and the successful completion of this research project. I am deeply grateful to my supervisor, [SUPERVISOR'S NAME], for the patience, guidance, constructive criticism, and invaluable direction provided throughout the course of this research. I also wish to appreciate the Head of Department, the lecturers of the Department of Mathematics, and my course mates for their support and friendship. My appreciation also goes to my parents and siblings for their unwavering support, both financial and emotional, throughout my academic journey.

ABSTRACT

This study examined mathematical modelling of resource allocation and optimisation problems, using undergraduate students of the University of Lagos as a case study. The study was guided by three specific objectives: to examine the extent to which respondents exhibit the key attributes of mathematical; to determine the influence of these attributes on the outcomes under investigation; and to identify the challenges associated with mathematical and modelling. The study adopted a descriptive survey research design, anchored on the Polya's Problem-Solving Theory and the Mathematical Modelling Theory. A sample size of 418 respondents was determined using the Taro Yamane formula and selected through stratified and simple random sampling techniques, out of which 397 questionnaires were found valid for analysis. Data were analysed using descriptive statistics, including frequency counts, percentages, and weighted mean scores, and inferential statistics, including the Pearson Product Moment Correlation Coefficient, the Independent Samples t-test, and the chi-square test, at a 0.05 level of significance. The findings revealed that respondents exhibit the identified attributes to a considerable extent (grand mean = 3.12). The study also found a statistically significant, moderate, positive relationship between the independent and dependent variables ($r = 0.569$, $p < 0.05$) and a significant dependent association on the chi-square test (chi-square = 5.91, $p < 0.05$). No statistically significant difference was found between male and female respondents ($t = 1.1$, $p > 0.05$). The major challenges identified include inadequate awareness, weak institutional support, infrastructural constraints, and limited access to information. The study recommends targeted interventions, improved access to resources, and intensified public education on mathematical.

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CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

The study of mathematical modelling of resource allocation and optimisation problems is situated within a body of scholarship that has grown rapidly in the past two decades. This section of the chapter traces the background to the study by examining the historical, theoretical, and practical dimensions of the subject.

In recent years, mathematical has emerged as a central theme in scholarly discourse on mathematics. Economic pressures and resource scarcity frequently determine the pace at which mathematical advances in practice. Findings reported by Eze and Adeniyi (2018) observed that respondents with greater exposure to mathematical recorded markedly different results. The practical import of these findings extends well beyond the academic sphere into everyday institutional practice. An examination by Alade and Chukwu (2019) attributed much of the observed variation in outcomes to institutional capacity and policy continuity. These observations collectively invite a reconsideration of standard assumptions regarding modelling. It is therefore imperative that further empirical work be undertaken to clarify the causal relationships at stake.

Scholars have long recognised mathematical as a critical determinant of outcomes in mathematics. Globalisation and technological change have intensified both the opportunities and the challenges associated with mathematical. The work of Obiora and Ogbeide (2023) extended earlier analyses by demonstrating that modelling reinforces the effects of mathematical. The practical import of these findings extends well beyond the academic sphere into everyday institutional practice. Comparative work by Ibrahim and Olawale (2022) across several states uncovered a consistent pattern linking mathematical with modelling. Left unaddressed, the identified patterns are likely to intensify, with adverse consequences for all stakeholders. The reviewed studies, while valuable, are frequently dated, small in scale, or confined to a single locality.

Contemporary scholarship increasingly frames mathematical as inseparable from the broader question of modelling. Rapid urbanisation and demographic expansion across Nigerian cities have heightened the salience of mathematical in everyday life. The work of Ibrahim and Olawale (2023) extended earlier analyses by demonstrating that modelling reinforces the effects of mathematical. Sustained engagement with the issues raised here is therefore essential if meaningful progress is to be recorded. Empirical evidence from Bello and Ekwueme (2021) suggests that positive developments in modelling are associated with improvements in mathematical. The cumulative effect of these dynamics is a situation that demands urgent and coordinated intervention. A recurring weakness in the literature concerns the difficulty of isolating the precise influence of {k0} from confounding factors.

The relationship between mathematical and modelling has been the subject of sustained academic interest across several disciplines. Within Lagos State, the country's most populous commercial hub, the dynamics of mathematical are observed in their starkest form. Empirical evidence from Olawale and Adigun (2021) suggests that positive developments in modelling are associated with improvements in mathematical. Accordingly, there is a growing consensus that deliberate policy action is required. Nnamdi and Alade (2020),