

# **MODELLING OF RANDOM PHENOMENA USING PROBABILITY DISTRIBUTIONS**

BY

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DEGREE IN MATHEMATICS

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## CERTIFICATION

This is to certify that this research project titled "Modelling of Random Phenomena Using Probability Distributions" 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

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Date

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EXTERNAL EXAMINER

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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.

## **ACKNOWLEDGEMENT**

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 modelling of random phenomena using probability distributions, 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 modelling; to determine the influence of these attributes on the outcomes under investigation; and to identify the challenges associated with modelling and random. 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 416 respondents was determined using the Taro Yamane formula and selected through stratified and simple random sampling techniques, out of which 390 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 ( $r = 0.512$ ,  $p < 0.05$ ) and a significant dependent association on the chi-square test (chi-square = 6.65,  $p < 0.05$ ). No statistically significant difference was found between male and female respondents ( $t = 1.27$ ,  $p > 0.05$ ). 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 modelling.

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## CHAPTER ONE: INTRODUCTION

### 1.1 Background to the Study

The study of modelling of random phenomena using probability distributions 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.

modelling occupies a prominent position in contemporary debates about random and national development. National policies and programmes have sought, with varying degrees of success, to respond to the realities of modelling and random. The aggregate picture emerging from Osinachi and Kalu (2023) points to a modest but consistent association between modelling and the outcomes of interest. The cumulative effect of these dynamics is a situation that demands urgent and coordinated intervention. Comparative work by Salami and Obiora (2022) across several states uncovered a consistent pattern linking modelling with random. Left unaddressed, the identified patterns are likely to intensify, with adverse consequences for all stakeholders. A recurring weakness in the literature concerns the difficulty of isolating the precise influence of  $\{k_0\}$  from confounding factors.

Over the past two decades, modelling has become increasingly significant within the Nigerian landscape and beyond. Economic pressures and resource scarcity frequently determine the pace at which modelling advances in practice. The aggregate picture emerging from Ogbeide and Adebayo (2023) points to a modest but consistent association between modelling and the outcomes of interest. Left unaddressed, the identified patterns are likely to intensify, with adverse consequences for all stakeholders. A notable study by Ibrahim and Umeh (2017) argued that the impact of modelling is substantially mediated by the quality of institutions. These observations collectively invite a reconsideration of standard assumptions regarding random. It is therefore imperative that further empirical work be undertaken to clarify the causal relationships at stake.

Contemporary scholarship increasingly frames modelling as inseparable from the broader question of random. National policies and programmes have sought, with varying degrees of success, to respond to the realities of modelling and random. Studies conducted within the West African subregion by Ibrahim and Umeh (2018) reached conclusions broadly consistent with the Nigerian evidence. Sustained engagement with the issues raised here is therefore essential if meaningful progress is to be recorded. Research by Kalu and Ekwueme (2021) using mixed methods provided particularly rich insight into the mechanisms connecting modelling and random. The weight of evidence therefore points toward a renewed commitment to evidence-based decision-making. A recurring weakness in the literature concerns the difficulty of isolating the precise influence of  $\{k_0\}$  from confounding factors.

modelling continues to command considerable attention among researchers, policymakers, and practitioners in mathematics. Rapid urbanisation and demographic expansion across Nigerian cities have heightened the salience of modelling in everyday life. Aderemi and Eze (2020), in a survey of relevant stakeholders, concluded that the benefits of modelling are unevenly distributed across groups. Accordingly, there is a