

# Interactive Big Data Visualization for Child Mortality Risk Among Children Aged 5–14 in Asia

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## ABSTRACT

This project focuses on visualizing the probability of mortality among children aged 5 to 14, aiming to deliver a comprehensive understanding of geographical death rates and mortality trends from the year 2000 to 2030. Recognizing the critical importance of child survival in global health efforts, the study investigates regional disparities by reviewing existing literature, analysing global statistical data, and applying appropriate analytical methodologies. The core objective is to identify regions across Asia categorized by high, medium, and low mortality risks, thereby highlighting vulnerable populations. A data-driven dashboard was developed as the primary output of this research, enabling users to interactively explore mortality probabilities over time and across different countries. The development process followed the structured Waterfall model, progressing through five phases: preliminary study, planning, design, development and testing. Each phase achieved specific milestones: defining project goals, designing user-friendly interfaces, integrating data, conducting usability testing, and evaluating user engagement. During the evaluation phase, 41 respondents participated in assessing the dashboard's effectiveness. Findings revealed that the visualization significantly enhanced users' understanding of child mortality trends, particularly excelling in the Perceived Usefulness dimension. Through advanced data visualization techniques and robust statistical analysis, the project provides clear and actionable insights for stakeholders. The visualization tool offers valuable support to researchers, policymakers, and healthcare practitioners, empowering them to make informed, evidence-based decisions aimed at improving child health outcomes and reducing mortality risks in the targeted age group.

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## 1. INTRODUCTION

Child mortality remains one of the most critical indicators of a nation's health and socio-economic development. While global health initiatives have contributed to significant reductions in child deaths over

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recent decades, the mortality rate among children aged 5 to 14 continues to present a serious public health challenge, particularly in low- and middle-income countries. The loss of a child has profound consequences for families and communities, and understanding the patterns and causes of these deaths is essential to designing effective interventions and policies.

The probability of dying between the ages of 5 and 14 is influenced by various factors, including healthcare access, nutrition, sanitation, education, and social determinants such as income and geographical location. At the national level, mortality rates for children aged 5–9 vary significantly, ranging from as low as 0.2 to as high as 20.8 deaths per 1,000 children aged 5 years. Gender disparities also persist, with male mortality generally exceeding female mortality across this age group. In 2021, the global mortality rate for boys aged 5–14 was 7 deaths per 1,000, compared to 6 deaths per 1,000 for girls. As children grow into adolescence and early adulthood (ages 15–24), the gender gap widens further, with mortality rates of 13 per 1,000 for males and 8 per 1,000 for females.

Accurate interpretation and visualization of child mortality statistics are essential for assessing health system performance and societal commitment to protecting vulnerable populations. Although global child survival has improved, preventable factors such as infectious diseases, injuries, malnutrition, and inadequate healthcare access continue to cause avoidable deaths. In 2017, an estimated 6.3 million children and young adolescents under 15 died worldwide, including approximately 0.9 million deaths among children aged 5–14, many of which could have been prevented. Child mortality remains uneven across regions, with Asia accounting for a significant share due to urbanization, healthcare inequality, and socioeconomic disparities. Integrating big data analytics with interactive visualization tools enables clearer exploration of mortality risks, trends, and regional variations, supporting informed decision-making and effective public health interventions.

The rise of modern data science tools, including Microsoft Power BI, Apache Hive, Spark, and Hadoop, supports this endeavour by enabling large-scale data integration and real-time analysis. These technologies enhance the ability to combine demographic, health, and socio-economic data into coherent visual narratives that support strategic decision-making. Furthermore, the Internet of Things (IoT) and cloud computing platforms provide the infrastructure necessary for handling and processing massive health datasets from global sources (Mahmud et al., 2016).

This study specifically aims to visualize the probability of dying among children aged 5 to 14 over a thirty-year span, from 2000 to 2030, using statistical data and regional comparisons. By employing data visualization tools and analytics, this project seeks to create an interactive dashboard that not only illustrates current trends but also identifies high-risk regions across Asia. The visualized data offers clarity for health professionals, researchers, and policy leaders, empowering them to develop data-driven interventions that are targeted, efficient, and effective.

The adoption of data visualization in public health reporting also aligns with global efforts to achieve the United Nations Sustainable Development Goals (SDGs), particularly Goal 3, which aims to ensure healthy lives and promote well-being for all ages. A core target under this goal is to end preventable deaths of newborns and children under 5 by 2030, but progress in reducing mortality in older children must not be overlooked. Visualizing age-specific mortality data strengthens global awareness, prompts accountability, and reinforces the urgency of collective action to reduce child deaths in all age groups.

In conclusion, this project addresses a vital gap in child health data presentation by focusing on the 5–14 age group. A demographic often overshadowed by under-five mortality statistics. By combining statistical accuracy with engaging visual formats, this work contributes to a better understanding of child mortality and supports efforts to create healthier, more equitable futures for children worldwide.

## 1.1 Problem statements

The increasing use of big data in healthcare has enhanced the ability to analyze complex health trends and support better population health decisions. However, challenges related to data availability, accuracy, consistency, and overall quality continue to limit effective health analytics (Vesoulis et al., 2023). Child mortality among children aged 5–14 remains an underrepresented public health concern, often overshadowed by younger age groups. Despite facing unique health and socioeconomic risks, this group is frequently overlooked in aggregated mortality statistics. In 2016, an estimated 5.6 million child deaths were recorded globally (Fenta et al., 2020). Social epidemiology highlights the importance of examining health disparities within social contexts, underscoring the need for focused analysis using big data to better understand mortality risks among children aged 5–14 in Asia (Delpierre & Kelly-Irving, 2018).

Children aged 5 to 14 face unique and evolving challenges and including malnutrition, poor access to healthcare, unsafe environments, and educational inequalities that directly impact their health and mortality risk. For instance, in the United Kingdom, one in three children is overweight or obese by the time they leave primary school, with children from disadvantaged communities disproportionately affected due to limited access to nutritious foods (UNICEF, 2019). In developing regions, lower respiratory infections, particularly pneumonia, continue to be a leading cause of death, responsible for nearly one in seven child deaths in 2017 (Roser, 2021). Despite these critical issues, data fragmentation, inconsistent classifications, and data privacy concerns hinder effective information sharing and collaboration among healthcare institutions.

To address these challenges, a more advanced and targeted data visualization strategy is essential. Visual analytics can transform vast datasets into clear, interpretable insights that support informed decision-making. Without effective visualization, vital patterns in child mortality may remain hidden, leading to missed opportunities for intervention. This project aims to utilize big data visualization techniques to illustrate the probability of dying among children aged 5 to 14. By exposing disparities and highlighting vulnerable regions, the project seeks to drive greater awareness, inform public health strategies, and promote coordinated efforts to improve child survival through evidence-based, visually guided insights.

## 1.2 Objective

The purpose of this project is to create a data visualisation showing the probability of death for children globally. To achieve this goal, the following steps need to be completed:

- (i) To analyse appropriate methods for visualizing dying among children risk (ages 5 to 14).
- (ii) To develop suitable and interactive data visualization mortality patterns among children aged 5–14 platform.
- (iii) To evaluate usability for the outcome of interactive data visualization risk of child mortality for children aged 5–14 by using User Acceptance Test

## 1.3 Scope

This project focuses on visualizing the probability of mortality among children aged 5 to 14 across Asian regions by leveraging big data analytics. The scope encompasses the collection, integration, and analysis of diverse datasets, including child mortality rates, health indicators, and socio-economic factors. The goal is to develop a dynamic and interactive dashboard that effectively presents this data, helping to inform public understanding, academic research, and policymaking on the state of child health in Asia.

The visualization classifies regions into low, medium, and high mortality risk zones, allowing users to easily identify vulnerable areas and prioritize interventions. By highlighting these disparities, the project aims to support targeted strategies that can reduce mortality rates and improve child well-being. Drawing

on the World Health Organization's (WHO, 2023) call for improved mortality reporting and investment in sustainable health information systems, this project aligns with global efforts to enhance data accuracy and utility.

Technologically, the project utilizes Apache Spark and Python for data processing, while Power BI and Google Charts are employed for visualization and interactive data presentation. Descriptive analytics techniques are applied to interpret the data and uncover key patterns in mortality risk. Furthermore, expert evaluations and user feedback have been incorporated to assess and refine the dashboard's functionality, ensuring it meets user needs and maximizes its potential impact. Ultimately, the project aspires to serve as a practical and educational tool in the fight against child mortality through data-driven awareness and action

#### **1.4 Project significant**

This project holds significant value for public health agencies, non-profit organizations, and policymakers working toward achieving the Sustainable Development Goals (SDGs), particularly in reducing child mortality. By visualizing the probability of death among children aged 5 to 14 across Asia, this research highlights mortality hotspots and enables the identification of regions requiring urgent, targeted interventions. These insights consider the broader environmental, social, and economic determinants that influence child health and survival, guiding the development of tailored programs and support services for affected communities. Visual representations also serve as powerful tools for tracking progress over time. Through time-series visualizations, stakeholders can observe reductions in child mortality at the country level and pinpoint areas where rates remain persistently high, especially in low- and middle-income nations. This visibility supports ongoing monitoring and resource prioritization.

Furthermore, visualizations can be instrumental in advocacy, particularly in promoting policies aimed at poverty reduction, improved healthcare access, and social protection. By illustrating the link between economic conditions and child mortality, such data can influence legislation that directly supports child welfare. In addition to shaping policy, the project has implications for improving healthcare delivery including antenatal care, pediatric services, health education, and clinical management. For example, according to UNICEF (2019), while countries like Sierra Leone have mortality rates as high as 80.10 per 1,000, others report as low as 1.54. This stark contrast underscores the importance of data-driven interventions. Ultimately, this project demonstrates how big data visualization can enhance awareness, guide effective decision-making, and support life-saving initiatives to improve outcomes for children aged 5 to 14.

## **2. LITERATURE REVIEW**

This section provides a comprehensive literature review, encompassing various aspects such as issues surrounding dying children, relevant statistics, hotspot regions, contributory factors, and a detailed examination of big data processes.

### **2.1 Mortality trends and issues among children aged 5–14**

The sickness and loss of a child represent profound challenges for families and societies. Child deaths may occur suddenly due to accidents or acute health events, or gradually because of long-term illnesses such as cancer (Consolini, 2025). Despite progress in global child health, substantial inequalities in child survival persist across regions. Low-income countries continue to experience considerably higher child mortality rates compared to high-income nations, where survival into adolescence is nearly universal. While international health initiatives have significantly reduced mortality among children under five, deaths among children aged 5–14 remain a critical yet less visually represented public health issue, particularly in parts of Asia where disparities in healthcare access and socioeconomic conditions remain evident. Globally,

significant disparities exist in child survival. In the poorest nations, nearly 10% of children die before reaching their fifth birthday, while in high-income countries, survival rates approach 99.8% (Roser, 2021)

According to the World Health Organization (WHO, 2023), major causes of death among children under 15 include respiratory infections such as pneumonia, complications related to early-life conditions, diarrheal diseases, malaria, meningitis, injuries (including drowning and road traffic accidents), cardiovascular conditions, and childhood cancers. These mortality patterns are closely associated with contextual determinants such as nutrition status, geographic location, income level, and availability of healthcare services. Malnutrition, especially severe acute malnutrition, significantly increases the risk of death from otherwise preventable diseases. In this context, interactive big data visualization tools play a crucial role in integrating complex, multi-source datasets and presenting mortality risks in a clear, dynamic, and accessible manner, enabling policymakers and healthcare stakeholders to better identify high-risk populations, regional trends, and priority intervention areas among children aged 5–14 in Asia.

Children and adolescents aged 5 to 19 represent roughly a quarter of the global population, making their health and survival critical to sustainable development. Investing in this age group yields a triple benefit: it improves their current well-being, strengthens their future health outcomes, and enhances the health of the next generation. Yet, in 2019, approximately 1.48 million deaths were recorded in this group and most of them were preventable (Liu et al., 2022). Adolescents aged 5 to 24 accounted for 43% of these fatalities. Gender-based disparities in mortality are also evident. Data from 2021 indicate that the mortality rate for boys aged 5 to 14 was 7 per 1,000, compared to 6 per 1,000 for girls. Among five-year-olds specifically, the mortality rate was 20 per 1,000 for boys and 14 per 1,000 for girls, revealing a 1.4 times higher risk of death among males. The male-to-female mortality ratio was 1.1 for ages 5–9 (3.7 vs. 3.3 deaths per 1,000) and 1.2 for ages 10–14 (2.9 vs. 2.4 deaths per 1,000) (WHO, 2023).

The UN Inter-agency Group for Child Mortality Estimation reports that children from the poorest households face nearly twice the risk of dying compared to their counterparts in wealthier families. In low-income countries, the average mortality rate among 5-year-olds is 16.5 per 1,000, with one-third of these deaths occurring in the 10–14 age group. In contrast, high-income nations record an average mortality rate of just 1.1 per 1,000 in the same age group. Sub-Saharan Africa and Southern Asia are the most affected regions, accounting for 54% and nearly 25% of global child deaths respectively. A child in sub-Saharan Africa is fifteen times more likely to die between ages 5 and 14 than one in Europe (Ezbakhe & Pérez-Foguet, 2020). If current trends continue, an estimated 9.8 million children aged 5 to 14 will die by 2030 and 80% of these deaths projected to occur in Southern Asia and sub-Saharan Africa (WHO, 2023).

## 2.2 Big data and its role in child mortality analysis

Big data refers to extensive, complex datasets that are challenging to process, analyse, and visualize using traditional methods. It encompasses data characterized by high volume, variety, velocity, and veracity the "4Vs" framework (Sagiroglu & Sinanc, 2013). These characteristics underscore both the potential and complexity of using big data in healthcare settings. The vast volume signifies massive data generation; variety reflects the diversity of sources and formats (structured and unstructured); velocity represents the rapid pace at which data are produced; and veracity emphasizes the importance of data quality and reliability (Shu, 2016). In the context of child mortality, big data analytics enable the identification of patterns, causes, and social determinants that contribute to mortality risks among children aged 5 to 14. By synthesizing diverse data sources from electronic health records to socio-economic datasets and big data allows stakeholders to conduct deep, comprehensive analyses that can inform public health interventions, policy development, and resource allocation.

## 2.3 Big data visualization: Enhancing decision-making

Data visualization plays a critical role in interpreting and communicating insights derived from big data. It transforms complex datasets into interactive and easily comprehensible visual formats such as

graphs, maps, and dashboards (Ali et al., 2016). In the field of public health, especially regarding child mortality, effective visualizations can reveal trends, highlight regional disparities, and support evidence-based decision-making.

Data visualization represents the phase of the data lifecycle closest to human interpretation (Caldarola & Rinaldi, 2017). It bridges the gap between complex analytical processes and human understanding. By turning dense data into intuitive visuals, stakeholders including healthcare professionals, policymakers, and the public can comprehend and act on critical information more effectively.

## 2.4 Data visualization tools for child mortality analysis

Several tools support the visualization of child mortality data. The following platforms are particularly relevant to this project:

### 2.4.1 Tableau

Tableau is a powerful data visualization tool offering a range of customizable features. It enables the development of interactive dashboards that integrate multiple data points, such as age, cause of death, and geographic location. Its drag-and-drop interface allows users to create choropleth maps, bar charts, and trend lines that highlight high-, medium-, and low-risk areas. With its ability to integrate real-time data from diverse sources, Tableau proves valuable in tracking and responding to emerging trends in child mortality (Ali et al., 2016). However, Tableau comes with limitations. The full version is costly, which may limit accessibility for smaller organizations. Additionally, processing performance may decline when handling massive datasets, and the need for a stable internet connection for Tableau Online can limit its usability in areas with poor connectivity (Team, 2018).

### 2.4.2 Microsoft Power BI

Power BI is a robust business intelligence tool that supports the creation of dynamic and interactive visualizations. It is composed of Power BI Desktop, the Power BI Service (SaaS), and mobile-friendly apps. Power BI is particularly effective for integrating data from multiple platforms and presenting them in a unified dashboard. Visualizations such as choropleth maps and bar charts help stakeholders understand the causes and regional distribution of child mortality. Despite its strengths, Power BI has a steep learning curve for advanced use and limited customization options. Cost may also be a factor for full-feature access, and performance can suffer when working with extremely large datasets. Offline access is also limited compared to its online functionalities.

### 2.4.3 Google Charts

Google Charts is a free, web-based visualization tool known for its simplicity and wide range of chart types, including GeoCharts for regional mapping, bar charts, and line charts. It allows seamless integration into websites or apps and is particularly suitable for creating publicly accessible visualizations of child mortality data. Its interactive features enhance user engagement and allow real-time tracking of mortality trends. However, Google Charts offers fewer customization options compared to more advanced tools like Tableau or Power BI. It also requires an internet connection and lacks some of the more advanced features found in commercial platforms, making it better suited for lighter, less complex data visualization tasks.

## 2.5 Summary

The global burden of child mortality, particularly among children aged 5 to 14, remains a significant public health issue, especially in low- and middle-income regions. Despite reductions in overall child deaths, preventable causes such as infections, malnutrition, and injuries still claim millions of young lives. Big data and its visualization provide transformative potential in understanding and addressing these challenges. By leveraging platforms like Tableau, Power BI, and Google Charts, stakeholders can convert

complex mortality datasets into meaningful insights. These visualizations not only support real-time analysis and policy intervention but also foster public awareness and collaborative action to reduce child mortality rates.

### 3. METHODOLOGY

This project adopted a structured methodology grounded in the waterfall model to systematically guide the development of a dashboard that visualizes child mortality among children aged 5 to 14. The Waterfall model was selected because the research has clearly defined objectives, data sources, and system requirements from the outset. Its structured, sequential phases support thorough documentation, systematic data processing, and controlled development, which are essential for academic research, data accuracy, and validation in sensitive public health studies. The process was divided into five key phases: preliminary research, planning, design, development, and testing.

#### *Phase 1: Preliminary Research*

The initial phase focused on conducting an in-depth investigation to understand both the statistical patterns of child mortality and the best practices in data visualization. Extensive reviews of academic journals, WHO and UNICEF reports, and relevant global publications were carried out to identify common causes, geographic disparities, and age-specific trends in child mortality. Key datasets were sourced from the World Health Organization's (WHO) official database, containing variables such as death rates, health determinants, and socioeconomic indicators across Asian countries. This foundational study ensured a robust understanding of the problem and informed the visualization strategies adopted in later stages.

#### *Phase 2: Planning*

Following data collection and literature analysis, the planning phase established the roadmap for project execution. A comprehensive Gantt chart was developed to illustrate the project timeline, helping to coordinate tasks, allocate resources, and track progress effectively. The planning phase began by defining the project scope and objectives. It also included further exploration of statistical techniques, the 4Vs of big data (volume, variety, velocity, and veracity), and key data management concepts such as ELT (Extract, Load, Transform), data wrangling, and mining were all essential for the next stages.

#### *Phase 3: Design*

This phase concentrated on defining both the system structure and visual presentation. A comprehensive system architecture was developed to support efficient data organization and visualization. An Entity Relationship Diagram (ERD) was created using draw.io to model data entities and their relationships, ensuring data consistency and suitability for analytical visualization. In parallel, low-fidelity dashboard wireframes were designed using Balsamiq to illustrate the arrangement of interactive charts, geographic visualizations, filters, and user interface components. These wireframes provided a clear visual framework for presenting child mortality risk among children aged 5–14 in Asia in an intuitive, informative, and user-centered manner.

#### *Phase 4: Development*

In the development phase, the system architecture was implemented based on the approved design specifications. A centralized data warehouse was established using Apache Hive on a Hadoop framework to support scalable storage and efficient querying of child mortality datasets through HiveQL. Data ingestion, cleansing, and transformation processes were applied to ensure reliable and structured inputs. The processed data were then integrated with Power BI to develop the "Probability of Dying Among Children Aged 5–14" dashboard, enabling interactive, region-level visualization and analysis of child mortality risks across Asia using real-world datasets.

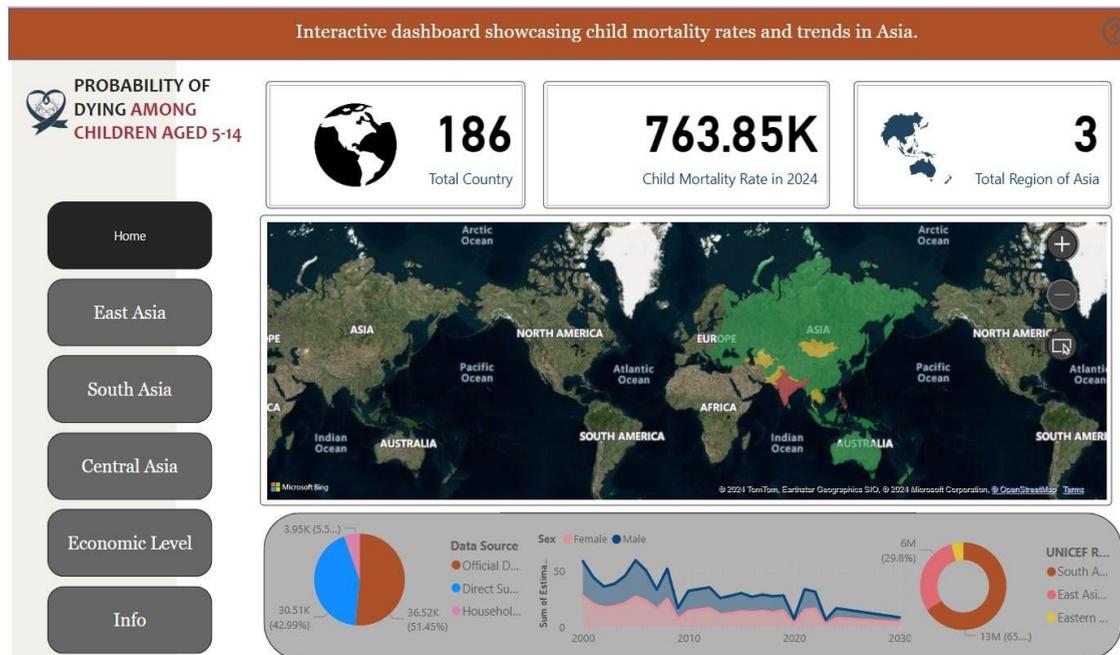


Fig. 1. Homepage Dashboard

#### Phase 5: Testing and Evaluation

The final phase focused on assessing the dashboard's effectiveness and usability. A Technology Acceptance Model (TAM)-based questionnaire was designed and approved by the university ethics committee. Distributed through Google Forms, the survey gathered user feedback from potential end-users and experts. The collected responses were used to evaluate the dashboard in terms of perceived usefulness, ease of use, and overall impact. This feedback guided improvements and validated the tool's capacity to inform decisions and raise awareness regarding child mortality.

#### 4. FINDINGS

To evaluate the dashboard developed in this project, TAM was used as the foundation for testing. The evaluation involved participants aged 16 and above from diverse backgrounds, including students, professionals, and unemployed individuals, both from public and private sectors.

The questionnaire was divided into three sections. Part 1 collected demographic information, while Part 2 was split into two subsections: 2a assessed perceived ease of use, and 2b measured perceived usefulness. A five-point Likert scale was used to gauge responses. The final section allowed participants to provide open-ended feedback and suggestions for improvement. This user-centered evaluation approach offered valuable insights to refine the dashboard and enhance its effectiveness in communicating child mortality risks.

Understanding user attitudes and perceptions is essential to the successful implementation of any new system. The Technology Acceptance Model (TAM) serves as a reliable framework for assessing how users accept and interact with technology. Developed by Fred Davis in the 1980s, TAM focuses on two primary factors that influence user adoption: Perceived Usefulness the extent to which a system enhances

performance and Perceived Ease of Use including how effortless it is to operate the system. These components help explain user behavior and guide system improvement.

Table 1. Perceived Ease of Use

The post-task questionnaire items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
The dashboard is easy to navigate	0 (0.0%)	0 (0.0%)	4 (9.8%)	16 (39%)	21 (51.2%)	4.41
I can quickly find the information I need on the dashboard	0 (0.0%)	0 (0.0%)	4 (9.8%)	15 (36.6%)	22 (53.7%)	4.44
The color-coded map helps me easily differentiate between low, medium, and high-risk areas	0 (0.0%)	0 (0.0%)	5 (12.2%)	12 (29.3%)	24 (58.5%)	4.46
The charts displaying mortality probabilities by region and year are clear and understandable	0 (0.0%)	0 (0.0%)	5 (12.2%)	17 (41.5%)	19 (46.3%)	4.34
The dashboard's interface is user-friendly	0 (0.0%)	0 (0.0%)	3 (7.3%)	14 (34.1%)	24 (58.5%)	4.51
The information about child mortality based on gender and economic status is presented clearly	0 (0.0%)	0 (0.0%)	2 (4.9%)	15 (36.6%)	24 (58.5%)	4.54
The labels and instructions on the dashboard are helpful and easy to understand	0 (0.0%)	0 (0.0%)	6 (14.6%)	15 (36.6%)	20 (48.8%)	4.34
I find it easy to switch between different page of the dashboard	0 (0.0%)	0 (0.0%)	1 (4.3%)	8 (34.8%)	14 (60.9%)	4.59
The dashboard's visual design supports ease of use and understanding of data	0 (0.0%)	0 (0.0%)	3 (7.3%)	11 (26.8%)	27 (65.9%)	4.44

Table 2. Perceived User Satisfaction

The post task questionnaire items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
I am satisfied with the overall performance of the dashboard	0 (0.0%)	0 (0.0%)	3 (7.3%)	12 (29.3%)	26 (63.4%)	4.57
The dashboard provides a clear and comprehensive overview of child mortality rates	0 (0.0%)	0 (0.0%)	3 (7.3%)	18 (43.9%)	20 (48.8%)	4.41
I find the maps useful for understanding regional differences in child mortality risks	0 (0.0%)	0 (0.0%)	2 (4.9%)	16 (39%)	23 (56.1%)	4.51

The charts showing total deaths by gender and economic status provide valuable insights	0 (0.0%)	0 (0.0%)	3 (7.3%)	16 (39%)	22 (53.7%)	4.46
The dashboard helps me understand trends in child mortality from 2000 to 2030	0 (0.0%)	0 (0.0%)	3 (7.3%)	13 (31.7%)	25 (61%)	4.54
The visual representation of data on the dashboard is effective	0 (0.0%)	0 (0.0%)	4 (9.8%)	16 (39%)	21 (51.2%)	4.41
The information provided about UNICEF and its initiatives is relevant and informative	0 (0.0%)	0 (0.0%)	2 (4.9%)	12 (29.3%)	27 (65.9%)	4.61
I would recommend this dashboard to others interested in child mortality data	0 (0.0%)	0 (0.0%)	3 (7.3%)	11 (26.8%)	27 (65.9%)	4.59
The dashboard meets my expectations in terms of functionality and information	0 (0.0%)	0 (0.0%)	2 (4.9%)	18 (43.9%)	21 (51.2%)	4.46
I am likely to use this dashboard again for information on child mortality	0 (0.0%)	0 (0.0%)	4 (9.8%)	11 (26.8%)	26 (63.4%)	4.54

The new dashboard technology was evaluated using the Technology Acceptance Model (TAM), and the results were promising, with high scores in Perceived Ease of Use (PEU) and Perceived Usefulness (PU), indicating that users find the dashboard to be both user-friendly and valuable for their academic and professional activities. The good feedback demonstrates the dashboard's usefulness in improving user performance and decision-making.

## 5. CONCLUSION

This project aimed to develop a comprehensive data visualization platform to illustrate the probability of death among children aged 5 to 14 across Asia. The work began by identifying appropriate methods for data representation, focusing on the use of Compound Annual Growth Rate (CAGR) for forecasting future trends in child mortality. By applying CAGR, the study provided a predictive foundation to better understand and potentially reduce mortality risks among this vulnerable age group. Throughout the development phase, Microsoft Power BI was utilized to design an interactive dashboard that integrates various visual elements such as charts, graphs, and geographical maps. This allowed users to engage with the data dynamically and exploring patterns by region and over time. The visual tools not only enhanced usability but also encouraged a deeper understanding of the complex factors influencing child mortality in different settings.

To evaluate the platform's effectiveness and user acceptance, the Technology Acceptance Model (TAM) was employed. Feedback was gathered through a simple web interface hosting the dashboard, with respondents assessing ease of use and perceived usefulness. The results were overwhelmingly positive, indicating that users found the platform accessible, informative, and valuable for research and policy planning. In summary, the project successfully delivered a robust and insightful data visualization tool. By combining predictive analytics with interactive visual design, it supports evidence-based decision-making

and fosters greater awareness of child mortality issues and serving as a foundation for future efforts to improve child health outcomes in Asia and beyond.

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## 7. CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interest.

## 8. AUTHORS' CONTRIBUTIONS

**Nor Arzami Othman** and **Nurul Yusra Uyop @ Ayob** conceived of the original and presented idea and developed the theory as well as the system development process. **Mohd Nizam Osman** and **Khairul Anwar Sedek** verified the analytical methods. **Nor Arzami Othman** encouraged **Nurul Yusra Uyop @ Ayob** to explore a specific aspect, supervised the findings, and conducted the experiments. **Mohd Nizam Osman** and **Khairul Anwar Sedek** contributed to the interpretation of the results. All authors discussed the results and contributed to the final version of the manuscript.

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