

Budget Transparency and Accountability Platform

Anagha Naik¹; Mauli Nagargoje²; Vishwaraj Patil³; Pranav Raikar⁴

Under the guidance Of
Prof. Sulakshana Malwade

In partial fulfillment of
Integrated B.Tech. Computer Science and Engineering (Third Year)
[2023-2024]
At



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SCHOOL OF POLYTECHNIC AND SKILL DEVELOPMENT
PUNE-411038

Abstract:- India allocates substantial budgets for various schemes and development projects at the central, state, and local levels. However, there is often a lack of transparency in how these funds are allocated and spent, leading to inefficiencies and potential corruption. The proposed project seeks to address this issue by creating a comprehensive platform that provides citizens with easy access to information on budget allocation, utilization, and the progress of projects in their respective areas.

➤ Objectives:

- **Enhance Transparency:** Provide citizens with a user-friendly platform to access information on budget allocations and expenditures at the central, state, district, and village levels. **Promote Accountability:** Facilitate tracking of projects to ensure that allocated funds are utilized effectively and that work is progressing as planned. **Reduce Corruption and Empower Citizens.**
- **Project Features:** **Data Integration:** Collaborate with organizations like RTI India to collect and update data on budget allocations and expenditures from various government departments. **User-Friendly Interface:** Develop an intuitive web and mobile application that allows users to search for budget-related information by state, district, village, or specific area. **Project Tracking,**
- **Data Visualization:** Easily understandable and insightful manner, including charts, graphs, and

Maps.

- **Feedback Mechanism:** Citizens can report issues, submit suggestions, and engage in discussions related to budget allocation and project implementation.
- **Implementation:** The project will require collaboration with government agencies, NGOs, and RTI India to collect and verify budget-related data. It will also involve the development of a secure and scalable platform, which will require a team of software developers, data analysts, and user interface designers. The system's front end involves HTML, CSS, and JavaScript and the back end involves MySQL, JAVA/PYTHON.

I. INTRODUCTION

Introducing a transformative initiative: Our project addresses transparency issues in India's budget allocation and expenditure. By creating a user-friendly platform, citizens can easily access information on budgets at central, state, and local levels. With features like project tracking and data visualization, accountability is promoted, reducing corruption and empowering citizens. Collaborating with organizations like RTI India, we ensure accurate data collection. This initiative requires collaboration with government agencies and NGOs, utilizing a skilled team to develop a secure and scalable platform. Together, we pave the way for a more transparent and accountable governance system.

➤ *The Paper is Structured as Follows:*

• *Section 2: Literature Review:*

Review existing research on budget transparency in India and globally. Discuss relevant theoretical frameworks and methodologies used in previous studies. Identify critical debates and gaps in the literature that your research aims to address.

• *Section 3: Methodology:*

Describe the research methods you will use (e.g., quantitative analysis of budget data, qualitative interviews with stakeholders, case studies of specific initiatives). Explain the rationale behind your chosen methods and how they address your research question. Discuss data collection procedures, sample selection, and ethical considerations.

• *Section 4: Findings:*

Present your research findings in a clear and organized manner. Use data, quotes, and other evidence to support your claims. Discuss the strengths and limitations of your methodology and how they may affect your findings.

• *Section 5: Discussion:*

Analyze the implications of your findings for understanding budget transparency in India. Discuss your findings concerning the existing literature and theoretical frameworks. Identify important policy implications and recommendations for improvement.

• *Section 6: Conclusion:*

Summarize your key findings and their significance. Restate your research question and offer concise answers or conclusions based on your analysis. Suggest areas for further research or action related to budget transparency in India.

II. LITERATURE SURVEY

A. *Paper Title: A Brief Survey of Watermarks in Generative AI*

- **Abstract:** This paper examines the current landscape of watermark adoption in generative AI, particularly in response to challenges such as misuse of AI-generated content. It explores the growing discussions on response strategies, including recommendations and regulations, with a focus on watermark technology. The paper analyzes the status of watermark adoption across different countries and companies, offering insights into its integration into generative AI services. Additionally, it highlights potential research areas for improving watermark technology in this context.

➤ *Advantages of Watermarks in Generative AI:*

- **Mitigating Misuse:** Watermarks provide a means to track and identify the origin of AI-generated content, helping to deter unauthorized use or manipulation.

- **Copyright Protection:** By embedding watermarks, creators can assert ownership over their generative AI creations, facilitating legal recourse in cases of infringement.
- **Trust and Accountability:** Watermarks enhance transparency and accountability by clearly attributing content to its creators, fostering trust in AI-generated materials.
- **Compliance and Regulation:** Watermark adoption aligns with emerging regulations and recommendations aimed at addressing challenges associated with AI-generated content, ensuring compliance with legal frameworks.

➤ *Disadvantages of Watermarks in Generative AI:*

- **Alteration Vulnerability:** Watermarks can be removed or altered through various means, potentially undermining their effectiveness in protecting content.
- **Intrusiveness:** Depending on the design and placement, watermarks may disrupt the aesthetic or usability of AI-generated content, impacting its appeal.
- **Resource Intensive:** Implementing robust watermarking solutions in generative AI systems may require significant computational resources, potentially affecting performance or scalability.
- **Standardization Challenges:** Lack of standardized approaches to watermarking in generative AI could result in interoperability issues and inconsistent implementation across platforms or jurisdictions.

B. *Paper Title: Brief Overview of Edge AI Accelerators for Energy-Constrained Edge*

- **Abstract:** This paper addresses the challenge of executing computationally expensive deep learning models in real-time within environments constrained by computational and energetic resources, particularly at the network's edge. To overcome these limitations, specialized hardware known as AI Accelerators is employed. The paper surveys the market and presents an overview of various AI accelerators designed for energy-constrained edge environments.

➤ *Advantages of Edge AI Accelerators for Energy-Constrained Edge:*

- **Improved Efficiency:** Edge AI accelerators optimize the execution of deep learning models, enhancing computational efficiency within energy-constrained environments.
- **Real-time Processing:** By offloading computational tasks to dedicated hardware, edge AI accelerators enable real-time inference and decision-making, crucial for applications requiring low latency.
- **Energy Conservation:** AI accelerators are designed to operate efficiently within energy-constrained environments, reducing power consumption compared to traditional computing solutions.

- Customization: Many edge AI accelerators offer customization options, allowing developers to tailor hardware configurations to specific edge computing requirements, optimizing performance and energy efficiency.

➤ *Disadvantages of Edge AI Accelerators for Energy-Constrained Edge:*

- Cost: Specialized hardware for edge AI acceleration may involve higher initial costs compared to traditional computing solutions, impacting deployment feasibility for some applications.
- Compatibility: Integration of edge AI accelerators with existing edge computing infrastructure may require additional effort and compatibility testing, potentially leading to deployment delays or complications.
- Scalability: The scalability of edge AI accelerators in terms of accommodating increasing computational demands at the network's edge may pose challenges, especially for rapidly evolving AI applications.
- Development Complexity: Leveraging edge AI accelerators may introduce complexity in software development and optimization, requiring specialized skills and resources for efficient utilization.

C. *Paper Title: A Brief History of Artificial Intelligence: On the Past, Present, and Future of Artificial Intelligence*

- Abstract: This special issue introduces artificial intelligence (AI) by defining it as a system's capacity to interpret external data accurately, learn from such data, and utilize these learnings to accomplish specific goals through adaptive means. The abstract summarizes seven articles included in the special issue, authored by prominent experts and specialists in AI, presenting diverse perspectives on the subject. It concludes by offering a comprehensive outlook on the future of AI from micro, meso, and macro perspectives.

➤ *Advantages of the Paper:*

- Comprehensive Overview: The paper provides a concise yet comprehensive introduction to artificial intelligence, covering its past, present, and future outlook.
- Multidisciplinary Insights: By summarizing articles authored by leading experts from diverse backgrounds, the paper offers a range of perspectives on AI, enriching the understanding of readers.
- Future Outlook: The inclusion of micro, meso, and macro perspectives in discussing the future of AI offers a holistic view, considering various scales of impact and implications.

➤ *Disadvantages of the Paper:*

- Lack of Depth: Given the breadth of topics covered in the special issue, the paper may provide a superficial overview of each aspect of AI, potentially lacking in-depth analysis.

- Limited Focus: While the paper introduces various perspectives on AI, it may not delve deeply into specific subfields or emerging trends within artificial intelligence.
- Reliance on Author Perspectives: The paper heavily relies on the viewpoints presented by the contributing authors, potentially limiting the diversity of perspectives or overlooking alternative viewpoints.

D. *Paper Title: A Review of AI Teaching and Learning from 2000 to 2020*

- Abstract: This systematic literature review examines the evolution of AI teaching and learning (AITL) research over the past two decades to provide insights for AI literacy education. Through thematic and content analysis of 49 publications from 2000 to 2020, the review identifies pedagogical models, teaching tools, and challenges in AITL, paving the way for contemporary AI literacy education. The findings reveal a historical focus on computer science education at the university level, with limited adoption in K-12 classrooms due to a lack of age-appropriate teaching tools. However, recent years have witnessed a shift towards interdisciplinary design and the inclusion of AI literacy in educational standards and initiatives. The review underscores the importance of developing pedagogical strategies and curricula to prepare students for the AI-driven economy.

➤ *Advantages of the Paper:*

- Comprehensive Scope: The review provides a comprehensive analysis of AITL research spanning two decades, offering insights into the evolution of AI literacy education.
- Thematic Analysis: By conducting thematic and content analysis of a diverse range of publications, the review identifies key pedagogical models, teaching tools, and challenges in AITL.
- Practical Implications: The findings inform educators and researchers about the growth of AI literacy education, facilitating the development of pedagogical strategies and curricula to prepare students for the AI-driven economy.
- Inclusion of References: The paper includes references to relevant literature and initiatives, enriching the discussion and providing readers with additional resources for further exploration.

➤ *Disadvantages of the Paper:*

- Limited Sample Size: The review analyzes 49 publications, which may not fully capture the breadth and depth of AITL research conducted during the specified timeframe.
- Temporal Scope: The review covers AITL research from 2000 to 2020, potentially overlooking recent developments and emerging trends in AI literacy education.
- Potential Bias: The selection of publications for analysis may introduce bias, as certain studies or perspectives may be overrepresented or underrepresented in the review.

E. Paper Title: Graph-Based Conversational AI: Towards a Distributed and Collaborative Multi-Chatbot Approach for Museums

- **Abstract:** This paper addresses the development of chatbots in museums to enhance visitor experiences, noting that existing chatbots often lack human-like conversation abilities and struggle to provide comprehensive knowledge to visitors. While many museum chatbots are stand-alone systems with predefined dialog routes, recent advancements in chatbot platforms and AI technologies have led to the emergence of more intelligent chatbots trained using machine learning techniques or connected to knowledge graphs. The paper surveys existing museum chatbots and platforms, presents a systematic evaluation approach for both chatbots and platforms, and introduces a novel approach for developing intelligent chatbots in museums. This approach emphasizes graph-based, distributed, and collaborative multi-chatbot conversational AI systems, utilizing knowledge graphs to provide rich, machine-understandable content. The proposed architecture enables efficient deployment by distributing knowledge through distributed knowledge graphs and facilitating collaboration among different chatbots.

➤ *Advantages of the Paper:*

- **Comprehensive Survey:** The paper provides a comprehensive survey of existing museum chatbots and platforms, offering insights into current developments in conversational AI for museums.
- **Systematic Evaluation Approach:** The paper introduces a systematic evaluation approach for both chatbots and platforms, contributing to the methodological rigor in assessing conversational AI systems.
- **Novel Approach:** The proposed graph-based, distributed, and collaborative multi-chatbot approach presents a novel solution for developing intelligent chatbots in museums, leveraging knowledge graphs to provide unlimited knowledge to users.
- **Emphasis on Collaboration:** By emphasizing collaboration among chatbots and distributing knowledge through distributed knowledge graphs, the proposed architecture promotes efficient deployment and enhanced visitor experiences in museums.

➤ *Disadvantages of the Paper:*

- **Limited Implementation Details:** While the paper introduces a novel approach for developing intelligent chatbots in museums, it may lack detailed implementation guidelines or case studies demonstrating the practical application of the proposed architecture.
- **Complexity:** Implementing a distributed and collaborative multi-chatbot approach may introduce complexity in system design, deployment, and maintenance, potentially requiring significant resources and expertise.
- **Scalability Challenges:** The scalability of the proposed architecture, particularly in terms of managing distributed

knowledge graphs and coordinating collaboration among multiple chatbots, may pose challenges as the system grows in complexity and user demand.

F. Paper Title: A Graph-Based Machine Learning Approach for Bot Detection

- **Abstract:** This paper addresses the challenge of bot detection using machine learning (ML) approaches with network flow-level features. While existing flow-based methods often suffer from high computational overhead and incomplete capture of network communication patterns, the paper proposes a graph-based approach leveraging communication graph analysis with ML. The proposed two-phased system utilizes both unsupervised and supervised ML techniques to prune presumably benign hosts in the first phase and achieve high-precision bot detection in the second phase. The system is designed to detect multiple types of bots, including those involved in zero-day attacks, and is adaptable to different network topologies, making it suitable for large-scale data analysis.

➤ *Advantages of the Research Paper:*

- **Innovative Approach:** The paper introduces a novel graph-based approach for bot detection, leveraging communication graph analysis with ML, which provides a more intuitive representation of network communications.
- **Two-Phased System:** The proposed system employs a two-phased approach, combining unsupervised and supervised ML techniques, to enhance bot detection accuracy while reducing computational overhead.
- **Robustness:** The system is robust to zero-day attacks, enabling detection of previously unseen bot behaviors, which enhances its effectiveness in detecting emerging threats.
- **Scalability:** The system is designed to accommodate different network topologies and is suitable for large-scale data analysis, making it applicable in various network environments.

➤ *Disadvantages of the Research Paper:*

- **Implementation Complexity:** Implementing a graph-based bot detection system may introduce complexity in data preprocessing, feature extraction, and model training, requiring specialized expertise in ML and network analysis.
- **Evaluation Metrics:** The paper does not provide detailed insights into the evaluation metrics used to assess the performance of the proposed system, potentially limiting the reproducibility and comparability of results.
- **Practical Deployment:** While the paper presents promising results, practical deployment of the proposed system in real-world network environments may face challenges related to integration with existing infrastructure and operational considerations.

G. Paper Title: KBot: A Knowledge Graph Based ChatBot for Natural Language Understanding Over Linked Data

- **Abstract:** This paper addresses the challenge of making structured data available on the web, particularly in the form of knowledge bases (KBs), accessible and useful for end-users through chatbots over linked data. The paper presents the design and development of an architecture for an interactive user interface and proposes a machine learning approach based on intent classification and natural language understanding to interpret user intents and generate SPARQL queries. Additionally, the paper extends the chatbot's capabilities by processing a new social network dataset (myPersonality) and integrating it into existing knowledge bases. The system is designed to be flexible, supporting multiple knowledge bases and languages, and allowing the intuitive creation and execution of tasks across various topics. Evaluation and application cases demonstrate how the chatbot facilitates interactive semantic data for different real-world scenarios, showcasing the effectiveness of the proposed approach for a knowledge graph and data-driven chatbot.

➤ *Advantages of the Research Paper:*

- **Innovative Approach:** The paper presents an innovative approach to leveraging knowledge graphs and linked data for natural language understanding in chatbots, addressing challenges related to user query understanding and multilingual support.
- **Flexibility and Extensibility:** The proposed system is flexible and extensible, supporting multiple knowledge bases, languages, and domains, allowing for the creation and execution of tasks across diverse topics.
- **Real-world Application:** The paper provides evaluation and application cases demonstrating the effectiveness of the chatbot in facilitating interactive semantic data for various real-world scenarios, showcasing its practical utility.
- **Integration of New Data:** The integration of a new social network dataset (myPersonality) into existing knowledge bases extends the chatbot's capabilities, enhancing its ability to understand analytical queries.

➤ *Disadvantages of the Research Paper:*

- **Limited Technical Details:** The paper may lack detailed technical descriptions of the architecture and machine learning approach, potentially hindering the reproducibility of the proposed system.
- **Evaluation Metrics:** The paper may benefit from providing more comprehensive evaluation metrics to assess the performance and effectiveness of the chatbot across different tasks and scenarios.
- **Complexity of Integration:** Integrating new datasets and knowledge bases into the chatbot may introduce complexity, requiring careful consideration of data preprocessing, integration methods, and maintenance processes.

H. Paper Title: Budget Transparency in Local Governments: An Empirical Analysis

- **Abstract:** This paper aims to explore the determinants of budget transparency in local governments, focusing on small municipalities in Galicia. The study utilizes a Likert-type survey questionnaire based on the IMF's revised Code of Good Practices on Fiscal Transparency (2007) to measure budget transparency. Data from 33 Galician municipalities are analyzed to assess internal consistency and test hypotheses regarding the factors influencing budget transparency. The paper confirms several findings from existing literature while also uncovering new insights.

➤ *Advantages of the Research Paper:*

- **Empirical Analysis:** The paper provides empirical evidence on budget transparency in local governments, utilizing data from 33 municipalities to assess the determinants of transparency.
- **Methodological Rigor:** The study employs a Likert-type survey questionnaire based on an established framework (IMF's Code of Good Practices on Fiscal Transparency) to measure budget transparency, enhancing methodological rigor.
- **Contribution to Literature:** By confirming existing findings and uncovering new results, the paper contributes to the body of literature on budget transparency in local governments, advancing understanding in this area.
- **Practical Implications:** The findings have practical implications for policymakers and practitioners involved in local government finance, providing insights into factors influencing budget transparency.

➤ *Disadvantages of the Research Paper:*

- **Limited Generalizability:** The study focuses specifically on small municipalities in Galicia, which may limit the generalizability of findings to other regions or types of local governments.
- **Sample Size:** The analysis is based on data from 33 municipalities, which may be considered a relatively small sample size, potentially impacting the robustness and generalizability of results.
- **Scope of Analysis:** The paper focuses on determinants of budget transparency but may not comprehensively address other factors or dimensions of fiscal transparency in local governments.

I. Paper Title: Budget Transparency and Legislative Budgetary Oversight: An International Approach

- **Abstract:** This article aims to assess the role of legislative budgetary oversight in promoting budget transparency, a relationship that has not been empirically tested previously. Using data from a sample of 93 countries surveyed by the International Budget Partnership in 2010, the study demonstrates a positive influence of legislative budgetary oversight on budget transparency.

Additionally, the paper identifies other factors such as the legal system, political competition, and economic level that also impact budget transparency. Furthermore, the study examines determinants of legislative budgetary oversight throughout the budgetary process, including factors such as the type of legislature, legal system, Supreme Audit Institutions budgetary oversight, economic level, and democratic level.

➤ *Advantages of the Research Paper:*

- **Empirical Analysis:** The paper provides empirical evidence on the relationship between legislative budgetary oversight and budget transparency using data from a large sample of countries, contributing to the understanding of this relationship.
- **International Approach:** By analyzing data from 93 countries, the study offers insights into budget transparency and legislative oversight practices on an international scale, enhancing the generalizability of findings.
- **Policy Implications:** The findings have implications for policymakers and practitioners involved in budgetary oversight and transparency, highlighting the importance of legislative involvement in promoting transparency.
- **Comprehensive Analysis:** The study examines various factors influencing budget transparency, including legislative oversight, legal systems, political competition, and economic factors, providing a comprehensive analysis of the determinants of transparency.

➤ *Disadvantages of the Research Paper:*

- **Limited Scope of Analysis:** The study focuses primarily on the relationship between legislative budgetary oversight and budget transparency, potentially overlooking other factors or dimensions of fiscal transparency.
- **Data Limitations:** The analysis relies on data from a single survey conducted by the International Budget Partnership in 2010, which may not fully capture the dynamic nature of budgetary processes and oversight practices.
- **Causality Issues:** While the study identifies associations between legislative oversight and budget transparency, it may not establish causality due to potential confounding variables or omitted variable bias.

J. *Paper Title: The Relevance of Budget Transparency for Development*

- **Abstract:** This study aims to emphasize the importance of budget transparency in enhancing human development, expanding beyond traditional economic considerations of development to include aspects such as knowledge levels, longevity, and standard of living. The research focuses on assessing the impact of budget transparency on human development outcomes, using data from 110 countries across multiple years (2008, 2010, 2012, 2015, and 2017). Empirical results indicate a positive relationship between the open budget index and the human development index,

suggesting that budget transparency can contribute to improving levels of human development. The findings have implications for both academic discourse and practical policymaking, highlighting budget transparency as a valuable tool for advancing human development goals.

➤ *Advantages of the Research Paper:*

- **Holistic Perspective:** The paper takes a holistic approach to development by considering not only economic factors but also broader dimensions such as knowledge, health, and standard of living, reflecting a comprehensive understanding of human development.
- **Empirical Evidence:** The study provides empirical evidence demonstrating the positive impact of budget transparency on human development outcomes, contributing to the empirical literature on this topic.
- **Policy Relevance:** The findings have practical implications for policymakers, suggesting that improving budget transparency can be an effective strategy for promoting human development, thereby informing policy decisions and interventions.
- **Timely Relevance:** Given the growing emphasis on transparency and accountability in governance, the study's focus on budget transparency aligns with current policy trends and priorities.

➤ *Disadvantages of the Research Paper:*

- **Data Limitations:** The analysis relies on data from a pool of 110 countries over a limited time period, potentially limiting the generalizability of findings and overlooking variations across different contexts or regions.
- **Causality Issues:** While the study identifies a positive correlation between budget transparency and human development, it may not establish causality due to potential confounding variables or omitted variable bias.
- **Measurement Challenges:** Assessing budget transparency and its impact on human development is inherently complex, and the paper may not fully address methodological challenges associated with measuring these constructs accurately.

K. *Paper Title: The National Budget Transparency Initiative at the Ministry of Finance in Open Government Data*

- **Abstract:** This paper aims to depict the efforts of the Ministry of Finance in Indonesia to promote national budget transparency through the adoption of technology. The study focuses on how government agencies and ICT suppliers/users/developers collaborate to implement a national budget transparency system. The methodology involves examining the technology adoption process and its implications for budget transparency, including the design of transparency mechanisms within the ICT platform. The research results highlight the connections and configurations between suppliers/users and the impact on transparency and social accountability practices. However, the study also identifies a

disconnection phenomenon between suppliers/users and stakeholders due to differences in conception and adoption processes.

➤ *Advantages of the Paper:*

- **Practical Relevance:** The paper addresses a practical issue of promoting national budget transparency, highlighting efforts by the Ministry of Finance and ICT stakeholders in Indonesia.
- **Technology Adoption Perspective:** By focusing on technology adoption processes, the study offers insights into how ICT platforms are utilized to enhance budget transparency, providing practical implications for other governments and organizations.
- **Impact Assessment:** The research examines the impact of technology adoption on transparency and social accountability practices, contributing to a better understanding of the outcomes of such initiatives.
- **Empirical Basis:** The study is based on empirical data from the implementation of budget transparency initiatives, enhancing the credibility and relevance of findings.

➤ *Disadvantages of the Paper:*

- **Limited Generalizability:** The study focuses specifically on the context of Indonesia, which may limit the generalizability of findings to other countries or regions with different institutional contexts and ICT infrastructures.
- **Lack of Methodological Detail:** The paper may lack detailed descriptions of the methodology used to examine the technology adoption process and its impact on transparency, potentially limiting the reproducibility of the study.
- **Scope of Analysis:** While the paper addresses the adoption of technology for budget transparency, it may not comprehensively analyze other factors influencing transparency, such as legal frameworks or institutional capacity.

L. Paper Title: Budget Analysis and Policy Advocacy: The Role of Non-Governmental Public Action

- **Abstract:** This paper examines the impact and importance of independent budget analysis and advocacy initiatives aimed at enhancing budget transparency and directing government expenditure towards poverty alleviation priorities. The study draws on case studies from six countries - Brazil, Croatia, India, Mexico, South Africa, and Uganda - involving non-governmental organizations, research institutions, and social movements. The findings indicate that civil society budget initiatives contribute to enhancing the transparency of budgetary decisions and processes, raising awareness and literacy about budgets, and fostering deeper engagement in the budget process among legislators, media, and civil society organizations. While structural constraints in the budget process may limit significant changes in expenditure priorities, these

initiatives directly influence budget allocations and improve implementation, thereby enhancing decision-makers' accountability. Furthermore, tracking budgetary expenditures effectively ensures the efficient utilization of funds allocated for education and healthcare, ultimately promoting greater equity in budget priorities and advancing social justice objectives. The activities of budget groups also contribute to strengthening democracy by fostering accountability, transparency, and inclusive participation.

➤ *Advantages of the Paper:*

- **Comprehensive Scope:** The paper addresses the role of civil society budget initiatives across diverse countries, providing a comprehensive understanding of their impact on budget transparency and poverty-focused expenditure priorities.
- **Empirical Evidence:** Drawing on case studies from six countries, the paper offers empirical evidence to support its findings, enhancing the credibility and relevance of the research.
- **Policy Implications:** The findings have significant policy implications, highlighting the importance of civil society engagement in budget analysis and advocacy for promoting transparency, accountability, and social justice objectives.
- **Focus on Social Justice:** The paper emphasizes the importance of budget initiatives in promoting greater equity in budget priorities and advancing social justice objectives, contributing to broader debates on development and governance.

➤ *Disadvantages of the Paper:*

- **Limited Generalizability:** The study focuses on case studies from six countries, which may limit the generalizability of findings to other contexts with different institutional and socio-political dynamics.
- **Potential Bias:** As the paper focuses on the positive impacts of civil society budget initiatives, there may be a risk of bias towards highlighting successes and overlooking challenges or limitations.
- **Methodological Limitations:** The paper may lack detailed descriptions of the methodology used in the case study research, potentially limiting the transparency and reproducibility of the study.

M. Paper Title: Measuring and Promoting Budget Transparency: The Open Budget Index as a Research and Advocacy Tool

- **Abstract:** This article introduces the Open Budget Index (OBI) as a tool for measuring budget transparency, based on surveys conducted by independent researchers comparing key budget information published by governments worldwide. The latest survey, published in 2010 and covering 94 countries, reveals that overall, budget transparency globally is poor. Countries with lower incomes, weaker democratic institutions, and

higher reliance on foreign aid and hydrocarbon sales tend to exhibit lower levels of transparency. However, the study also identifies instances of improvement in the quantity and coverage of budget information published by certain countries, often in response to civil society pressure informed by OBI findings. Additionally, the OBI data facilitate the identification of practical steps that governments and other stakeholders can take to enhance budget transparency.

➤ *Advantages of the Paper:*

- **Introduction of a New Tool:** The paper introduces the Open Budget Index (OBI) as a novel tool for assessing budget transparency, providing a standardized methodology for comparison across countries.
- **Empirical Evidence:** Based on data from a survey covering 94 countries, the study offers empirical evidence on the state of budget transparency globally, enhancing understanding in this area.
- **Policy Relevance:** The findings have significant policy implications, highlighting the importance of budget transparency and providing actionable insights for governments and stakeholders to improve transparency.
- **Civil Society Engagement:** The study underscores the role of civil society pressure, informed by OBI findings, in prompting governments to enhance the quantity and coverage of budget information published..

➤ *Disadvantages of the Paper:*

- **Data Limitations:** The study relies on data from a single survey conducted in 2010, which may not capture recent developments or changes in budget transparency practices.
- **Generalizability:** The findings may not be fully generalizable to all countries or regions, as budget transparency dynamics can vary significantly depending on contextual factors.
- **Potential Bias:** As the paper focuses on the positive impact of the OBI in promoting budget transparency, there may be a risk of overlooking challenges or limitations associated with the index.

N. *Paper Title: Budget Transparency, Fiscal Performance, and Political Turnout: An International Approach*

- **Abstract:** This paper investigates the relationships between budget transparency, fiscal performance, and political turnout using a comparative international approach. The authors construct a comprehensive index of budget transparency comprising 40 budget features based on international standards for a sample of 41 countries. The study finds a positive correlation between national government fiscal balance and budget transparency, indicating that increased transparency limits politicians' ability to utilize fiscal deficits for opportunistic purposes. Univariate analysis suggests a positive association between political turnout and transparency, implying that higher transparency levels in

budget reports may incentivize voter participation. The paper identifies three clusters of countries based on transparency, government fiscal balance, and electoral turnout: low transparency with fiscal imbalance, low transparency with small fiscal imbalance, and high transparency with fiscal surplus.

➤ *Advantages of the Paper:*

- **Novel Approach:** The paper explores the interplay between budget transparency, fiscal performance, and political turnout using a comparative international perspective, offering insights into previously unexamined relationships.
- **Comprehensive Index:** The authors develop a comprehensive index of budget transparency, encompassing 40 budget features based on international standards, providing a robust framework for analysis.
- **Empirical Evidence:** The study utilizes data from a sample of 41 countries, offering empirical evidence to support its findings and enhancing the credibility of results.
- **Policy Implications:** The findings have significant policy implications, highlighting the importance of budget transparency in promoting fiscal responsibility and political engagement.

➤ *Disadvantages of the Paper:*

- **Limited Sample Size:** The study is based on a sample of 41 countries, which may limit the generalizability of findings to a broader range of countries and contexts.
- **Potential Methodological Limitations:** The construction of the budget transparency index and the analysis of relationships may be subject to methodological limitations or biases, which could affect the validity of results.
- **Complexity of Relationships:** The interplay between budget transparency, fiscal performance, and political turnout is complex and multifaceted, and the paper may not fully capture all relevant factors or dynamics.

O. *Paper Title: Budget Transparency and Legislative Budgetary Oversight: An International Approach*

- **Abstract:** This article aims to assess the role of legislative budgetary oversight in enhancing budget transparency, an aspect that has not been empirically tested extensively. Using data from a sample of 93 countries surveyed by the International Budget Partnership in 2010, the study demonstrates that legislative budgetary oversight has a positive influence on budget transparency. Additionally, the study examines other factors such as the legal system, political competition, and economic level that also affect budget transparency. Through additional analysis, the paper investigates the determinants of legislative budgetary oversight across the budgetary process, including factors like the type of legislature, legal system, Supreme Audit Institutions budgetary oversight, economic level, and democratic level.

➤ *Advantages of the Paper:*

- **Empirical Evidence:** The study provides empirical evidence on the positive influence of legislative budgetary oversight on budget transparency, contributing to a better understanding of this relationship.
- **Comprehensive Analysis:** The paper examines various factors affecting budget transparency, including legislative oversight and other institutional, political, and economic factors, offering a comprehensive analysis.
- **Policy Relevance:** The findings have significant policy implications for enhancing budget transparency through legislative oversight, highlighting the importance of institutional mechanisms in promoting transparency and accountability.
- **International Perspective:** By analyzing data from a sample of 93 countries, the study offers insights into budget transparency and legislative oversight practices across different regions and contexts, enhancing the generalizability of findings.

➤ *Disadvantages of the Paper:*

- **Potential Methodological Limitations:** The study may face methodological limitations related to data collection and analysis, which could affect the robustness and validity of results.
- **Limited Scope:** While the study examines various factors influencing budget transparency, it may not capture all relevant variables or dynamics, potentially limiting the comprehensiveness of analysis.
- **Time Sensitivity:** The data used in the study are from 2010, and budget transparency and legislative oversight practices may have evolved since then, raising questions about the current relevance of findings.

P. Paper Title: Budget Transparency and Budget Efficiency: Evidence from South Korea's Online Open Budget System

- **Abstract:** This article investigates the impact of budget transparency on budget efficiency, using the introduction of the online open budget system in South Korea in 2017 as a case study. Through a difference-in-difference examination, the study finds that budget transparency, facilitated by the online open budget system, leads to a reduction in the size of the unused budget, indicating improved budget efficiency. The paper conducts a battery of robustness tests to support this result. Additionally, the study highlights that enhancing budget efficiency has a more pronounced effect when budget projects are at risk of agency problems. The findings suggest that budget transparency, facilitated by the online open budget system, can enhance budget efficiency by promoting public participation and mitigating principal-agent problems.

➤ *Advantages of the Paper:*

- **Timely Relevance:** The study focuses on the recent introduction of the online open budget system in South Korea in 2017, providing timely insights into the impact of budget transparency measures.
- **Empirical Evidence:** Using a difference-in-difference approach and robustness tests, the study offers empirical evidence supporting the positive relationship between budget transparency and budget efficiency.
- **Policy Implications:** The findings have significant policy implications for governments aiming to improve budget efficiency through transparency measures, providing actionable insights based on real-world implementation.
- **Theoretical Contribution:** The study contributes to the literature by highlighting the role of budget transparency in mitigating agency problems and improving budget efficiency, advancing theoretical understanding in this area.

➤ *Disadvantages of the Paper:*

- **Limited Generalizability:** The study focuses on the specific context of South Korea's online open budget system, which may limit the generalizability of findings to other countries or regions with different institutional settings.
- **Methodological Constraints:** While the study employs robustness tests, there may still be methodological limitations inherent in the difference-in-difference approach and data analysis, which could affect the validity of results.
- **Potential Biases:** The study may face biases related to the selection of variables or control groups in the difference-in-difference analysis, potentially influencing the interpretation of results.

Q. Paper Title: AI-KG: An Automatically Generated Knowledge Graph of Artificial Intelligence

- **Abstract:** The paper presents the Artificial Intelligence Knowledge Graph (AI-KG), a large-scale knowledge graph automatically generated to describe research entities in the field of artificial intelligence (AI). AI-KG encompasses approximately 820,000 research entities, including tasks, methods, metrics, materials, and others, extracted from 333,000 research publications. It contains about 14 million RDF triples and 1.2 million reified statements, interconnected by 27 relations. The AI-KG aims to support various intelligent services for analyzing research dynamics, assisting researchers, and informing decision-making in funding bodies and research policymakers. The knowledge graph is generated using an automatic pipeline that extracts entities and relationships from research publications using DyGIE++, Stanford CoreNLP, and the CSO Classifier, and integrates and filters the resulting triples using deep learning and semantic technologies to ensure quality.

➤ *Advantages of the Paper:*

- **Novel Contribution:** The paper introduces AI-KG, a large-scale knowledge graph specifically designed to represent research entities in the field of artificial intelligence, contributing to the advancement of scholarly data representation.
- **Comprehensive Coverage:** AI-KG encompasses a vast number of research entities extracted from a large corpus of research publications, providing a comprehensive overview of the AI research landscape.
- **Practical Applications:** The AI-KG is designed to support various intelligent services, including research analysis, researcher support, and decision-making in funding bodies and research policymakers, demonstrating practical utility.
- **Evaluation:** The paper evaluates the automatic pipeline used to generate AI-KG against a manually crafted gold standard, ensuring the quality and reliability of the knowledge graph.

➤ *Disadvantages of the Paper:*

- **Dependency on Automatic Pipeline:** The quality of AI-KG heavily relies on the accuracy and effectiveness of the automatic pipeline used for entity and relationship extraction, which may introduce errors or biases.
- **Limited Scope:** While AI-KG focuses on the field of artificial intelligence, it may not capture the entirety of research dynamics or entities relevant to AI research, potentially limiting its scope and applicability.
- **Data Availability:** The availability of AI-KG under CC BY 4.0 is advantageous for research purposes but may also raise concerns regarding data privacy and intellectual property rights.

R. *Paper Title: Generative Artificial Intelligence: More of the Same or Off the Control Chart?*

- **Journal:** Clinical Chemistry
- **Authors:** Christopher Snyder, Mark A Zaydman, Thomas Chong, Jason Baron, Jonathan H Chen, Brian Jackson
- **Abstract:** The paper explores the application of generative artificial intelligence (AI), specifically ChatGPT, in clinical chemistry and medicine. It discusses recent advancements in generative AI, particularly the development of generative pre-trained transformers (GPTs), which are large language models capable of producing novel content like text, speech, or pictures. ChatGPT, a service provided by OpenAI, is highlighted for its ability to engage in human-like conversation and generate sophisticated responses across various content domains. The paper presents a panel discussion conducted by experts, focusing on the benefits and challenges of integrating ChatGPT into the medical field. Ethical considerations related to privacy and data security are also addressed, offering insights into the future implications of using ChatGPT in healthcare.

➤ *Advantages of the Paper:*

- **Timely and Relevant Topic:** The paper addresses the application of generative AI, specifically ChatGPT, in healthcare, a timely and relevant topic given the increasing adoption of AI technologies in the medical field.
- **Expert Panel Discussion:** The inclusion of perspectives from a panel of experts provides a comprehensive overview of the potential benefits and challenges associated with integrating ChatGPT into clinical chemistry and medicine.
- **Ethical Considerations:** The paper acknowledges and discusses ethical concerns related to privacy and data security, highlighting the importance of addressing these issues when implementing AI technologies in healthcare settings.
- **Future Implications:** The paper offers insights into the potential future implications of using ChatGPT in healthcare, providing valuable perspectives for patients, healthcare providers, and policymakers.

➤ *Disadvantages of the Paper:*

- **Limited Scope:** The paper focuses specifically on the application of ChatGPT in clinical chemistry and medicine, potentially overlooking other relevant aspects or applications of generative AI in healthcare.
- **Lack of Empirical Data:** While the paper presents expert opinions and discussions, it may lack empirical data or case studies to support the claims or perspectives presented, limiting the depth of analysis.
- **Bias or Subjectivity:** The panel discussion may be subject to bias or subjectivity based on the perspectives of the participating experts, potentially influencing the interpretation of findings or recommendations.

S. *Paper Title: Designing AI Learning Experiences for K-12: Emerging Works, Future Opportunities and a Design Framework*

- **Authors:** Xiaofei Zhou, Jessica Van Brummelen, Phoebe Lin
- **Abstract:** The paper addresses the importance of artificial intelligence (AI) literacy in K-12 education and the limited support available for designing tools and curriculum to teach AI literacy in this context. Through an analysis of existing K-12 AI and education literature, the authors identify core competencies of AI literacy and examine how they are currently implemented in learning experiences. They organize these findings into an educator-friendly chart to facilitate the selection of appropriate resources for K-12 classrooms. Additionally, the paper identifies future opportunities and proposes K-12 specific design guidelines, which are synthesized into a conceptual framework aimed at supporting researchers, designers, and educators in creating AI learning experiences for K-12 students.

➤ *Advantages of the Paper:*

- **Timely Topic:** The paper addresses the emerging need for AI literacy in K-12 education, reflecting the growing importance of AI in society and the workforce.
- **Comprehensive Analysis:** By analyzing existing literature, the paper provides insights into how core competencies of AI literacy are currently implemented in K-12 learning experiences, offering valuable guidance for educators and curriculum developers.
- **Educator-Friendly Chart:** The organization of findings into an educator-friendly chart facilitates the efficient selection of resources for K-12 classrooms, enhancing accessibility and usability for educators.
- **Conceptual Framework:** The proposed conceptual framework synthesizes future opportunities and K-12 specific design guidelines, providing a structured approach for researchers, designers, and educators to create effective AI learning experiences.

➤ *Disadvantages of the Paper:*

- **Limited Empirical Evidence:** While the paper analyzes existing literature, it may lack empirical evidence or case studies demonstrating the effectiveness of specific AI learning experiences in K-12 settings, potentially limiting the depth of analysis.
- **Generalizability:** The findings and recommendations may be limited in their generalizability to diverse K-12 educational contexts, as the analysis primarily focuses on existing literature rather than empirical studies across various educational settings.
- **Lack of Implementation Guidance:** While the paper provides a conceptual framework, it may lack practical guidance or examples for implementing AI learning experiences in K-12 classrooms, potentially limiting its immediate applicability for educators.

T. Paper Title: Data Formulator: AI-Powered Concept-Driven Visualization Authoring

- **Abstract:** The paper introduces Data Formulator, an interactive visualization authoring tool that leverages AI to address the challenge of data transformation in visualization authoring. It presents a new visualization paradigm called "concept binding," which separates high-level visualization intents from low-level data transformation steps. Authors define data concepts using natural language or examples, which are then bound to visual channels. Data Formulator dispatches an AI agent to automatically transform the input data and generate desired visualizations. The tool provides feedback to help authors inspect and understand the results. A user study with 10 participants demonstrates that users can effectively use Data Formulator for creating visualizations involving complex data transformations, and suggests future research directions.

➤ *Advantages of the Paper:*

- **Innovative Approach:** The paper introduces a novel visualization paradigm, concept binding, which separates visualization intents from data transformation steps, offering a unique solution to the challenge of data transformation in visualization authoring.
- **AI-Powered Tool:** Data Formulator leverages AI to automate the data transformation process, reducing the barrier for authors who lack programming or data processing skills, and enabling them to create visualizations more efficiently.
- **User Study:** The paper includes a user study that evaluates the effectiveness of Data Formulator, demonstrating its usability and effectiveness in creating visualizations involving complex data transformations.
- **Future Research Directions:** The paper discusses interesting future research directions, suggesting opportunities for further development and enhancement of Data Formulator and similar tools.

➤ *Disadvantages of the Paper:*

- **Small Sample Size:** The user study conducted with only 10 participants may limit the generalizability of the findings and insights regarding the usability and effectiveness of Data Formulator.
- **Limited Evaluation Metrics:** The paper primarily focuses on the usability and user experience aspects of Data Formulator, but may lack comprehensive evaluation metrics to assess its performance and effectiveness in comparison to existing visualization authoring tools.
- **Implementation Details:** The paper provides an overview of Data Formulator and its capabilities, but may lack detailed information on the implementation of the tool, such as the underlying AI algorithms and technical considerations.

U. Paper Title: An Effective Budget Management Framework for Real-Time Bidding in Online Advertising

- **Abstract:** The paper addresses the optimization of budget efficiency in real-time bidding (RTB) for online advertising. Traditional bidding strategies often result in either overly aggressive or conservative budget spending due to a lack of optimal budget management. The paper proposes a multi-constrained budget allocation optimization model and a heuristic algorithm to approximate optimal budget allocation under the constraint of smooth delivery for display advertising. A piecewise bidding strategy is introduced to filter out low-quality impressions based on predicted click-through rates (pCTRs) thresholds for each time slot. The paper tackles the challenge of determining pCTR thresholds by modeling the distributions of pCTRs and market prices in each time slot, and derives optimal bidding functions to adapt bid prices to available budgets. Experimental results on a real-world dataset demonstrate the effectiveness of the proposed method in terms of various standard metrics compared to state-of-the-art baselines.

➤ *Advantages:*

- **Practical Application:** The paper addresses a practical problem in online advertising by proposing an effective budget management framework for real-time bidding, which has significant implications for advertisers seeking to optimize their budget spending.
- **Novel Approach:** The proposed multi-constrained budget allocation optimization model and piecewise bidding strategy offer a novel approach to addressing the challenge of budget efficiency in RTB, contributing to advancements in the field of online advertising.
- **Empirical Evaluation:** The paper conducts experiments on a real-world dataset to evaluate the proposed method, providing empirical evidence of its effectiveness compared to existing baselines and demonstrating its practical applicability.

➤ *Disadvantages:*

- **Simplified Assumptions:** The paper may make simplified assumptions or abstractions in modeling the problem, which could limit the generalizability or applicability of the proposed framework in more complex real-world scenarios.
- **Lack of Theoretical Analysis:** The paper may lack in-depth theoretical analysis or formal proofs of the proposed heuristic algorithm and optimization model, which could raise questions about the robustness and reliability of the proposed approach.
- **Limited Scope:** The paper focuses specifically on budget management in RTB for display advertising, which may limit its applicability to other forms of online advertising or broader contexts within the field of digital marketing.

Table 1: Title

SR NO.	TITLE	DATA SET USED	KEY FINDINGS
1.	<u>Meldi Rendra and Ilham Cendekia , "The national budget transparency initiative at ministry of finance in open government data" Year: 2015 Conference Paper Publisher: IEEE</u>	Information and Communication Technology	<u>Finance, Technological innovation, Government.</u>
2.	<u>Navaporn Surasvadi, Chalermopol Saiprasert and Suttipong Thajchayapong , "Budget and procurement analytics using open government data in Thailand", 2017, pp.1-6, 2017.</u>	Computing and Workshops (Ubi-Media)	<u>transparency, technology adoption, ICT pattern, disconnection</u>
3.	<u>Dani Gunawan and Amalia Amalia , "The Implementation of open data in Indonesia", International Conference on Data and Software Engineering , 2016.</u>	Data and Software Engineering	<u>national budget transparency initiative.</u>
4.	<u>Mentor Geci and Csaba CsAki , "BOLD in national budget planning – a comparison of international cases", The 22nd Annual International Conference on Digital Government Research, pp.189, 2021 DG.O2021:</u>	Digital Government Research	<u>Ministry of Finance, open government data, ICT supplier-user-developer</u>
5.	<u>Takahiro Kinouchi and Norihide Kitaoka, "A response generation method of chat-bot system using input formatting and reference resolution", Year: 2022 Conference Paper Publisher: IEEE</u>	Advanced Informatics: Concepts, Theory and Applications	<u>Reference resolution, Centering Theory, Chat bot, response generation method, chat-bot system, input formattingAdaptation models.Data preprocessing, Oral communication, Transformers</u>
6.	<u>Shashi Kant Singh , Shubham Kumar and Pawan Singh Mehra, " Chat GPT & Google Bard AI: A Review", 2023 International Conference on IoT, Communication and Automation Technology (ICICAT), Year: 2023 Conference Paper Publisher: IEEE</u>	LLMs, Chatgpt own Dataset	<u>Artificial Intelligence, Chatbots, Chat GPT, Google Bard A. Surveys, Technological innovation, Automation,Storms, Prototypes</u>

III. METHODOLOGIES

A. Quantitative Analysis:

- **Open Budget Survey (OBS):** This annual survey by the International Budget Project assesses budget transparency based on eight key documents and 109 indicators. It offers a standardized way to compare India's transparency with other countries.
- **Analysis of Budget Documents:** Analyze published budget documents at national and state levels, assessing completeness, timeliness, accessibility, and citizen-friendliness. You can track trends over time and compare different administrations.
- **Budget Expenditure Tracking Surveys (PETS):** These surveys analyze government spending allocations and actual utilization at grassroots levels, uncovering potential leakages and inefficiencies.
- **Interviews with Stakeholders:** Conduct interviews with government officials, civil society organizations, and citizens to understand their perspectives on budget transparency, its limitations, and areas for improvement.
- **Case Studies:** Select specific initiatives or programs aimed at enhancing budget transparency and conduct in-depth case studies to assess their effectiveness, challenges, and lessons learned.
- **Analysis of Media Coverage:** Analyze media coverage of budget-related issues to understand public discourse on transparency and its impact on accountability.

B. Combined Methodologies:

Triangulate quantitative and qualitative approaches: Combine data analysis with stakeholder perspectives for a more nuanced understanding of the complex issue of budget transparency.

Use mixed methods: Employ surveys, interviews, and document analysis within a single study design to gather comprehensive data and cross- validate findings.

C. Additional Considerations:

- **Focus on specific aspects:** Instead of covering all facets of transparency, focus on a specific area like citizen participation, public procurement, or performance reporting.

Choose appropriate research questions: Formulate clear and measurable research questions that guide your chosen methodology and data collection.

- **Ensure ethical practices:** Maintain ethical research standards in data collection, analysis, and reporting, especially when dealing with sensitive information.

IV. FINDINGS

A. Data Collection and Analysis:

Implement robust data collection mechanisms to gather information from government budget documents, open government initiatives, and through crowdsourcing.

Develop algorithms for data parsing, extraction, and cleaning to ensure accuracy and consistency.

Utilize advanced data analysis techniques including data visualization tools, statistical analysis, and machine learning algorithms to derive meaningful insights from the collected data.

Explore Natural Language Processing (NLP) techniques for analyzing textual data such as budget documents and news articles.

- **Sources:** Apps can acquire data from various sources like government websites, open data initiatives, and user-generated submissions. Data quality checks and cleaning are crucial before analysis.
- **Standardization:** Data from different sources may have varying formats and structures. Standardization ensures consistency for processing and analysis.
- **Textual Data:** Some apps analyze textual data (e.g., budget documents, news articles) using Natural Language Processing (NLP) techniques like named entity recognition (NER) and sentiment analysis to extract relevant information.

B. User Engagement and Participation:

Design user interfaces that prioritize accessibility and simplicity, catering to users with varying levels of technical expertise.

Create interactive features such as budget calculators, simulations, and feedback mechanisms to encourage active user engagement.

Implement gamification elements to incentivize participation and knowledge sharing.

Foster a sense of community by providing forums, chat rooms, or social media integration for users to discuss budget-related issues and collaborate on advocacy efforts.

C. Technology and Architecture:

Develop a mobile-first approach, ensuring compatibility and optimal performance across different devices and screen sizes.

Leverage open-source technologies for development, data management, and deployment to promote transparency and collaboration.

Utilize cloud infrastructure for scalability, reliability, and data security, allowing the app to accommodate a large user base and handle fluctuations in traffic seamlessly.

D. Evaluation and Impact:

Implement comprehensive feedback mechanisms to gather user input and assess the app's effectiveness in promoting budget transparency and citizen engagement.

Conduct regular evaluations and performance assessments, leveraging both quantitative metrics (e.g., user engagement metrics, and app usage statistics) and qualitative feedback (e.g., user surveys, and focus groups).

Collaborate with research organizations and advocacy groups to conduct independent studies evaluating the app's impact on government accountability, budget allocations, and citizen participation.

E. AI-powered Charts and Data Summarization:

Develop AI algorithms to analyze and visualize budget data, recommending the most suitable chart types based on data characteristics and user preferences.

Implement dynamic updating features for charts to reflect real-time changes as users filter or drill down into the data.

Utilize AI-powered summarization techniques to extract key insights from budget data, customizing summaries based on user preferences and demographics.

Ensure multilingual support for both data visualization and summarization features to cater to a diverse user base.

F. AI-powered Charts and Data Summarization:

- **Visualization Techniques:** Interactive charts and graphs using libraries like D3.js or Tableau help users explore and understand complex budget data visually. AI can assist in:
- **Chart Selection:** Recommending the most suitable chart type based on data characteristics and user intent.
- **Dynamic Updates:** Generating charts that update automatically as users filter or drill down into the data.
- **Accessibility:** Creating charts with features like color contrast and alternative text descriptions for users with disabilities.
- **Automated Summarization:** AI algorithms can be used to:
- **Extract key insights:** Generate summaries highlighting crucial aspects of the budget data, like spending trends or sectoral allocations.
- **Customize summaries:** Tailor summaries based on user preferences, interests, or demographics.
- **Multilingual support:** Enable summaries in different Indian languages for wider accessibility.

V. DISCUSSIONS*A. Challenges and Considerations:*

Address challenges related to data reliability by implementing robust data quality checks and validation mechanisms.

Mitigate algorithmic bias through careful selection and training of AI models, as well as regular audits and evaluations of algorithmic performance.

Prioritize user-friendliness in app design and navigation, conducting user testing and iteration to optimize user experience.

Provide clear explanations for AI-generated content to enhance transparency and user trust, ensuring users understand how the app's AI features work and how they contribute to data analysis and visualization.

- **Data Reliability:** Ensure accuracy and consistency of data sources, especially when using user-generated content.
- **Algorithmic Bias:** Be mindful of potential biases in AI algorithms and their impact on data visualization and summarization.
- **User-friendliness:** Design interfaces that are intuitive and easy to navigate for users with varying technical expertise.
- **Explainability:** Provide explanations for AI-generated visualizations and summaries to build user trust and understanding

B. Examples and Resources:

Study existing apps like Open Budgets India and Janaagraha I Paid Bribe for inspiration and insights into best practices in budget transparency and citizen engagement.

Explore resources and case studies on AI for social good, leveraging insights and methodologies from similar initiatives to inform the development of AI-powered features in your app.

VI. RESEARCH GAP*A. User-Centric Design and Usability:*

Existing research often lacks a focus on user-centric design principles for platforms aimed at citizens. Research should explore optimal user interface designs, accessibility features, and user engagement strategies to ensure that the platform is intuitive and accessible to a diverse population.

B. Limited Research Papers:

There are very few papers which are matching our problem statement.

C. Effectiveness of Data Visualization Techniques:

Limited research evaluates the effectiveness of specific data visualization techniques in conveying budgetary information to citizens. Investigating the impact of various visualization methods (charts, graphs, maps) on users, comprehension, and decision-making can provide insights into optimizing data presentation.

D. Challenges in Data Integration from Government Sources:

Research should delve into the challenges and solutions associated with integrating data from diverse government sources. Issues such as data standardization, accuracy, and

real-time updates pose potential gaps that need to be addressed to ensure the reliability of the platform's information.

E. Citizen Engagement and Participation:

While the project aims to empower citizens, there is a research gap in understanding the factors influencing citizen engagement and participation in such platforms. Investigating the motivations, barriers, and impact of citizen involvement can guide the development of features that encourage active participation.

F. Security and Privacy Concerns:

Limited research explores the security and privacy concerns associated with providing citizens access to detailed budgetary information.

Investigating potential vulnerabilities, implementing robust encryption methods, and understanding user perceptions of data Security are critical aspects that need thorough exploration.

G. Scalability of the Platform:

Research should address the scalability challenges associated with a platform intended to serve a diverse and potentially large user base. Understanding the potential bottlenecks in data processing, server load, and concurrent user access can inform strategies for ensuring the platform's scalability.

H. Impact on Government Decision-Making:

While the project emphasizes citizen empowerment, there is a research gap in understanding the actual impact of such platforms on government decision-making processes. Research should investigate whether increased transparency leads to improved decision-making and resource allocation at various levels of governance.

I. Long-Term Sustainability and Maintenance:

Research often overlooks the long-term sustainability and maintenance challenges of similar platforms. Investigating models for sustainable funding, ongoing data updates, and adaptability to evolving technological landscapes is essential for ensuring the continued success and relevance of the platform.

J. Effectiveness of Generative AI Integration:

Evaluate the impact of incorporating generative AI, such as the ChatGPT API, in enhancing the interpretability and accessibility of budgetary information derived from RTI government datasets. There is no such platform that incorporates AI in budget transparency.

These identified research gaps provide a foundation for further investigation, offering opportunities for scholars and practitioners to contribute valuable insights to the development and improvement of Budget Transparency and Accountability Platforms.

VII. SYSTEM ARCHITECTURE

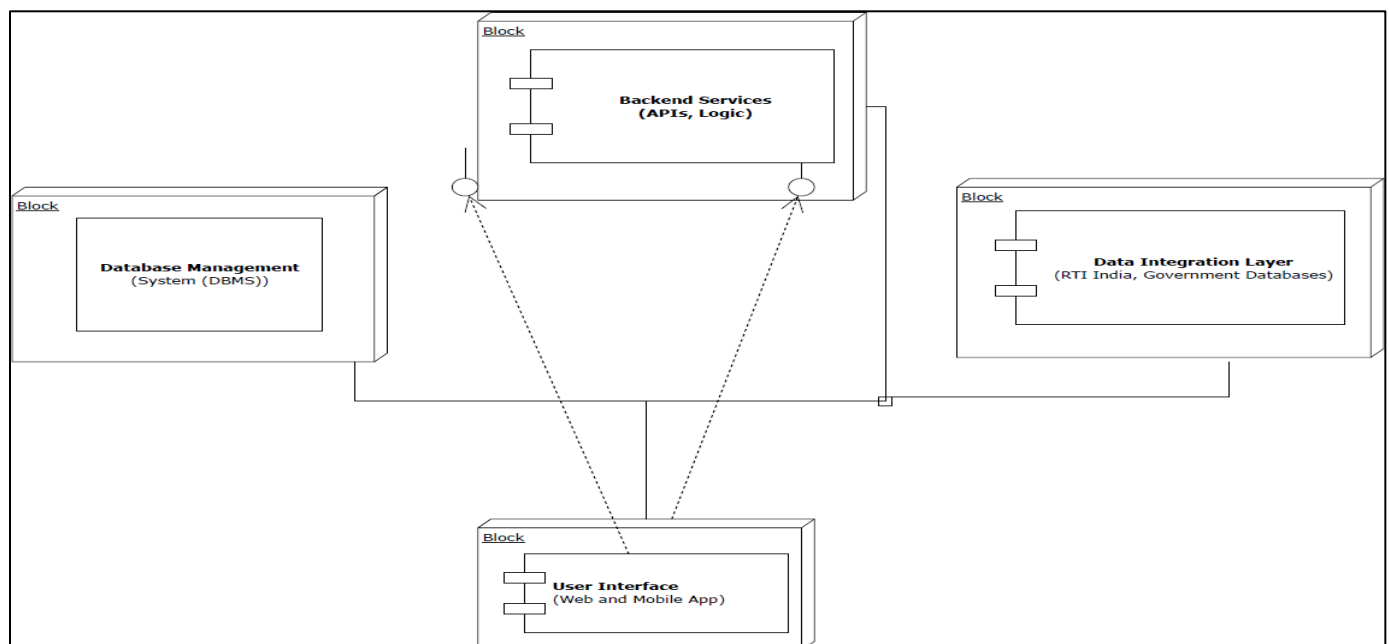


Fig 1: Block Diagram

This block diagram represents the flow of information from the Data Integration Layer to the database Management System, with the Backend Services acting as the intermediary that processes and serves data to the User Interface. The security layer ensures the integrity and confidentiality of the data throughout the system. Keep in mind that this is a high-

level overview, and each component can be further detailed based on specific functionalities and technologies chosen for implementation. Additionally, scalability, performance optimization, and regular updates are essential considerations throughout the development and maintenance phases of the project.

A. System Architecture Explanation:

The architecture of the Budget Transparency and Accountability Platform is designed to ensure efficient data collection, processing, and user interaction. The key components include:

➤ Data Integration Layer:

Collaborate with RTI India and other relevant organizations to collect budget-related data. Implement data integration processes to gather information from central, state, and local government databases.

➤ Database Management System (DBMS):

Utilize a robust DBMS to store and manage the collected data. Ensure data integrity, security, and scalability to accommodate the growing volume of budget-related information.

➤ Backend Services:

Develop backend services responsible for processing and serving data to the front end. Implement APIs (Application Programming Interfaces) for seamless communication between different components.

➤ Web and Mobile Application:

Create a user-friendly web and mobile application for citizens to access budget-related information. The application should allow users to search for data based on parameters such as state, district, village, or specific areas.

➤ User Authentication and Authorization:

Implement secure user authentication mechanisms to ensure that only authorized users can access sensitive information. Define user roles and permissions to control access to various features of the platform.

➤ Project Tracking Module:

Integrate a project tracking module that allows citizens to monitor the progress of specific projects. Implement features such as milestones, updates, and a reporting system for citizens to provide feedback.

➤ Data Visualization Component:

Utilize data visualization techniques to present budget information in an easily understandable format. Implement charts, graphs, and maps to visually represent budget allocations, expenditures, and project progress.

➤ Feedback Mechanism:

Integrate a feedback mechanism to allow users to report issues, submit suggestions, and engage in discussions related to budget allocation and project implementation.

➤ Security Layer:

Implement robust security measures to protect sensitive data and ensure the privacy of users. Use encryption, secure communication protocols, and regular security audits to identify and address vulnerabilities.

VIII. UML DIAGRAMS

A. Use-Case-

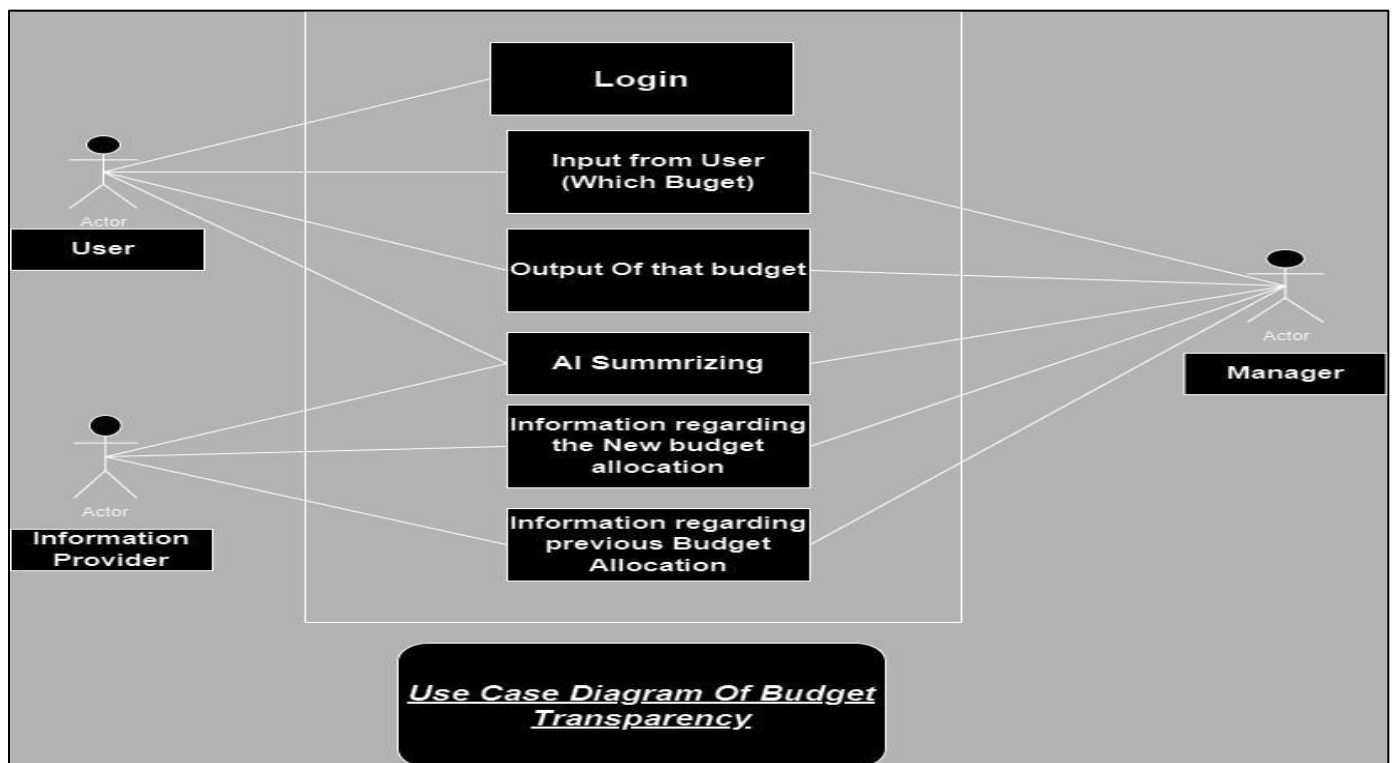


Fig 2: Use Case

B. Flowchart

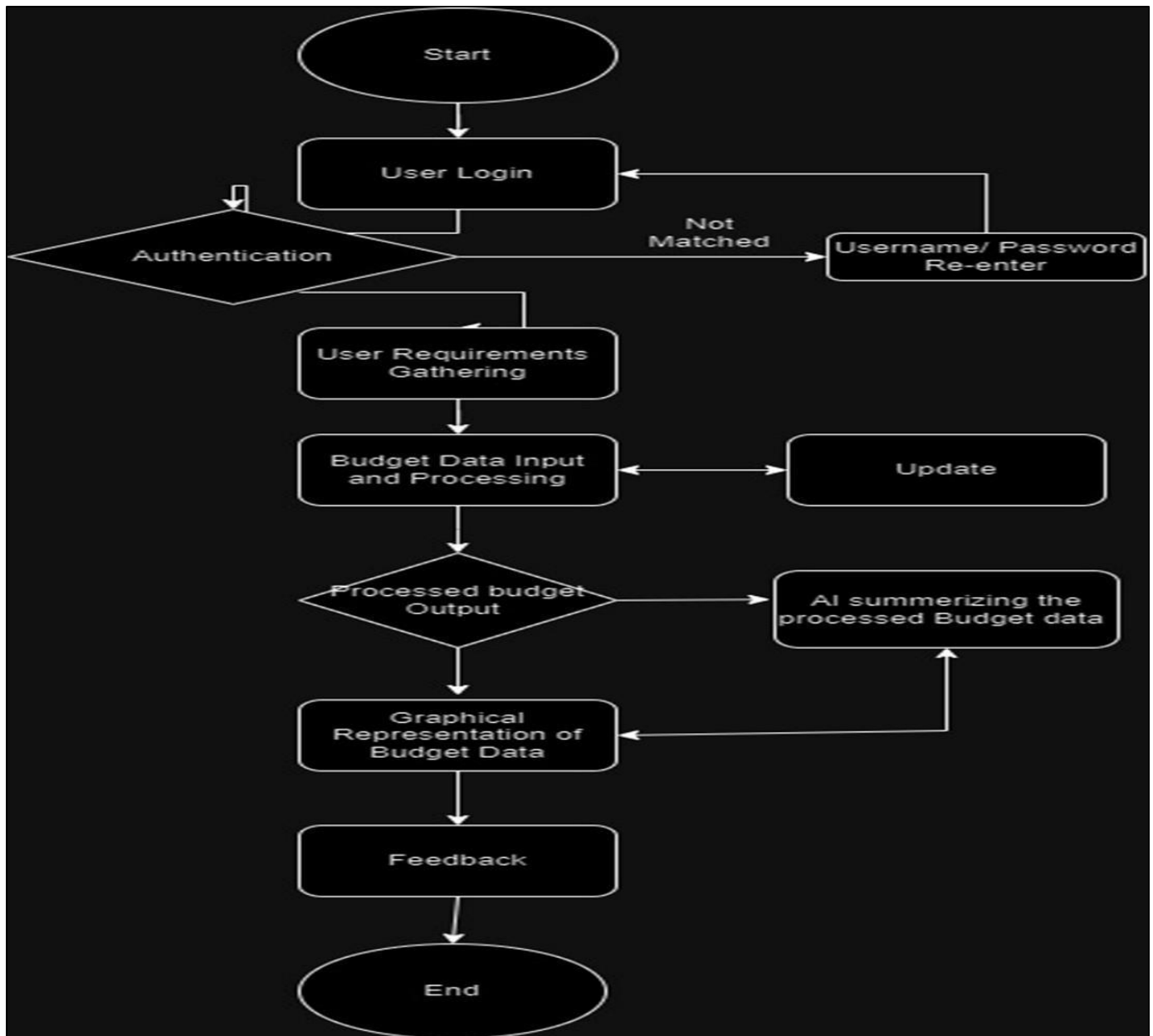


Fig 3: Flowchart

IX. RESOURCES REQUIRED

A. Software and Hardware Requirement:

➤ Hardware Requirement

- Processor: Multicore processor (e.g., Intel Core i5 or equivalent)
- RAM: 16GB or higher
- Storage: 256GB SSD or higher
- Network Interface Card: Gigabit Ethernet
- Key Board: Standard Windows Keyboard
- Mouse: Two or Three Button Mouse
- Monitor: LCD/LED with a resolution of 1920x1080 or higher
- Hard Disk

➤ Software Requirement

- Operating System: Windows 10
- Development Platform: Android Studio
- Database Management System: PostgreSQL or MySQL
- Backend Framework: Django (Python)
- Programming Languages: Java (for Android), Python (for backend)
- Version Control: Git
- Web Server: Apache or Nginx
- Data Visualization: D3.js or Chart.js
- Security: SSL/TLS for secure communication
- Integrated Development Environment (IDE) for backend development: PyCharm or Visual Studio Code
- GitHub

B. Technology Stack Frontend:

- Android (Java/Kotlin)
- HTML, CSS, JavaScript (for web-based components)
- React js library
- Node js library

➤ Backend:

- Django (Python) / (node js)
- RESTful API for communication between frontend and backend
- Chatbot API

➤ Database:

- PostgreSQL or MySQL for data storage

➤ Data Visualization:

- D3.js or Chart.js for graphical representation of budget data
- Chat got Plus Api (graphical representation charts, histogram, bubble charts, pie charts, etc.)

➤ Datasets

- The dataset will be obtained from RTI India and other government sources.
- It should include information on budget allocations, expenditures, and project details at various administrative levels (central, state, district, village).

X. CONCLUSION

The Budget Transparency and Accountability Platform for India is a transformative project that aligns with the principles of transparency, accountability, and citizen empowerment. It has the potential to revolutionize the way government budgets are managed and contribute significantly to the development and progress of our nation. With the use of AI, understanding through smart charts and graphs we citizens can contribute by giving feedback through this platform. In a country as vast and diverse as India, this project is a vital step towards building a more transparent, efficient, and accountable government.

REFERENCES

- [1]. Meldi Rendra and Ilham Cendekia, "The national budget transparency initiative at the ministry of finance in open government data" Year: 2015 | Conference Paper Publisher: IEEE
- [2]. Navaporn Surasvadi, Chalermopol Saiprasert, and Suttipong Thajchayapong, "Budget and procurement analytics using open government data in Thailand", 2017, pp.1-6, 2017.
- [3]. Dani Gunawan and Amalia Amalia, "The Implementation of open data in Indonesia", *International Conference on Data and Software Engineering*, 2016.
- [4]. Mentor Geci and Csaba CsAki, "BOLD in national budget planning – a comparison of international cases", *The 22nd Annual International Conference on Digital Government Research*, pp.189, 2021 DG.O'2021:
- [5]. Takahiro Kinouchi and Norihide Kitaoka, "A response generation method of chat-bot system using input formatting and reference resolution", Year: 2022 | Conference Paper | Publisher: IEEE
- [6]. Shashi Kant Singh, Shubham Kumar, and Pawan Singh Mehra, " Chat GPT & Google Bard AI: A Review", 2023 International Conference on IoT, Communication and Automation Technology (ICICAT), Year: 2023 | Conference Paper | Publisher: IEEE
- [7]. Ana-María Ríos, Bernardino Benito and Francisco Bastida "Determinants of Central Government Budget Disclosure: An International Comparative Analysis" | Published online: 08 Jun 2013
- [8]. Paula Maddigan and Teo Susnjak, Chat2VIS: Generating Data Visualizations via Natural Language Using ChatGPT, Codex, and GPT- 3 Large Language Models, 08 May 2023, Publisher: IEEE: 2169-3536: 23119043DOI: 10.1109: .2023.3274199.
- [9]. AIK12. (2019). *Five Big Ideas about AI*. Retrieved from <https://ai4k12.org/big-idea-1-overview/>.
- [10]. Albu, A. B. (2012). Learning artificial intelligence clip by clip. In *IEEE Frontiers in Education Conference* (pp. 789–794). IEEE.
- [11]. Ali, S., Payne, B. H., Williams, R., Park, H. W. & Breazeal, C. (2019). Constructionism, ethics, and creativity: Developing primary and middle school artificial intelligence education. In *International workshop on education in artificial intelligence K-12*. MIT Press.
- [12]. Allen, B., McGough, A. S., & Devlin, M. (2021). Toward a framework for teaching artificial intelligence to a higher education audience. *ACM Transactions on Computing Education (TOCE)*, 22(2), 1–29.
- [13]. <https://link.springer.com/article/10.1007/s10639-022-11491-w>
- [14]. Alesina A., Perotti R. (1996). Fiscal discipline and the budget process. *American Economic Review*, 86, 401-407.
- [15]. Alt J. E., Lassen D. (2006). Fiscal transparency, political parties, and debt in OECD countries. *European Economic Review*, 50, 1403-1439.
- [16]. Alt J. E., Lassen D., Rose S. (2006). The causes of fiscal transparency: Evidence from the U.S. states. *IMF Staff Papers*, 53, 30-57.
- [17]. Al-Hilani H (2012) HDI As a measure of human development: A better index than the income approach. *IOSR Journal of Business and Management* 2(5): 24–28.

- [18]. Alt JE, Lassen DD (2005) The political budget cycle is where you can't see it: Transparency and fiscal manipulation. EPRU Working Paper 2005-03, University of Copenhagen.
- [19]. Alkire S (2002) Dimensions of human development. *World Development* 30(2): 181–205.
- [20]. 2015 3rd International Conference on Information and Communication Technology (ICoIC)
- [21]. Alt, James E., and David D. Lassen. 2006. "Transparency, Political Polarization, and Political Budget Cycles in OECD Countries. *American Journal of Political Science* 50 (3): 530–550.
- [22]. Bellver, Ana, and Daniel Kaufmann. 2005. *Transparenting Transparency: Initial Empirics and Policy Implications*. Policy Research Working Paper, World Bank, Washington, DC.
- [23]. Alesina, Alberto F., and Roberto Perotti. 1996. Budget Deficits and Budget Institutions. Working Paper no. 5556, National Bureau for Economic Research.
- [24]. Alesina, Alberto F., Ricardo Hausmann, Rudolf Hommes, and Ernesto Stein. 1999. Budget Institutions and Fiscal Performance in Latin America. *Journal of Development Economics* 59(2): 253–73.
- [25]. Alesina A., Perotti R. (1996). Fiscal discipline and the budget process. *American Economic Review*, 86, 401-407.
- [26]. Alt J. E., Lassen D. (2006). Fiscal transparency, political parties, and debt in OECD countries. *European Economic Review*, 50, 1403-1439.