SMART E-GOV CONNECT

Mrs.B.Ashwini,
Assistant Professor,
Department of Computer Science and Engineering,
Knowledge Institute of Technology, Salem.
bacse@kiot.ac.in

Preethika J,
Student, Department of Computer Science and Engineering,
Knowledge Institute of Technology, Salem.
2k21cse111@kiot.ac.in

Kiruthika V M,
Student, Department of Computer Science and Engineering,
Knowledge Institute of Technology, Salem.
2k21cse072@kiot.ac.in

Kavya R,
Student, Department of Computer Science and Engineering,
Knowledge Institute of Technology, Salem.
2k21cse069@kiot.ac.in

Samaya A S,
Student, Department of Computer Science and Engineering,
Knowledge Institute of Technology, Salem.
2k21cse123@kiot.ac.in

***Abstract* - In many countries, government schemes aimed at improving people's lives often don't reach the right people because the systems for connecting them are inadequate. A user-friendly software solution could solve this by giving citizens real-time access to available schemes and incorporating an efficient grievance resolution system. The proposed system is a simple, user-friendly digital platform that helps connect people with government schemes based on their socio-economic status. It gives real-time updates on eligibility, how to apply, and includes a grievance redressal system to quickly resolve any issues. By focusing on the needs of citizens, this system makes government services easier to understand, access, and trust. Right now, many people struggle with slow, manual processes, offline verifications, and scattered data, making it difficult to find the right government schemes. The new system will use AI and machine learning to automatically match people with the most relevant government schemes. It also makes sure that citizens can easily access the latest information, and includes a digital grievance system to resolve issues more quickly. This solution is designed to bridge the gap between government benefits and the people who need them, making welfare distribution more efficient, transparent, and fair.**

Keywords - Government Schemes, Smart Governance, Automated Eligibility Checking, Grievance Redressal System and Service Optimization

I. INTRODUCTION

Government welfare programs aim to support people by providing financial aid, skill development opportunities, and healthcare benefits. However, many individuals struggle to access these benefits due to complicated processes, lack of awareness, and scattered information. To overcome these challenges, a simple and easy-to-use digital platform is being proposed.

This platform will help people find and apply for government schemes that match their socio-economic background. With this system, users can easily create an account, register, and explore different welfare programs related to healthcare, education, finance, and housing. It will provide clear information on eligibility, necessary documents, and step-by-step guidance for applications, making the process simple and hassle-free. The platform will use artificial intelligence (AI) and machine learning (ML) to connect users with the most relevant government schemes. It will also send timely updates about new schemes, eligibility criteria, and application deadlines to keep users informed.

Additionally, a digital grievance system will be available to help people resolve issues related to applications and benefits quickly and efficiently. By making the application process more accessible and ensuring all relevant information is in one place, this platform will help government benefits reach the right people without unnecessary delays. It will improve the overall efficiency and fairness of welfare distribution, ensuring that more people can take advantage of the support available to them.

This Paper flows Section 2 Literature Survey, Section 3 Existing System, Section 4 Proposed System, Section 5 System Architecture, Section 6 Tools and Technologies, Section 7 Module of , Section 8 Result, Section 9 Conclusion and future Enhancement and finally References.

II. LITERATURE SURVEY

[1] It explores the discussions surrounding web services on the popular developer Q&A platform, Stack Overflow. The study analyzes a large dataset of posts to identify key topics, trends, and challenges developers face while working with web services. Using empirical research methods, the paper categorizes discussions based on themes such as API usage, security, performance, and interoperability. The findings highlight frequently asked questions, common issues, and evolving trends in web services development. The study also provides insights into how developers seek

and share knowledge, offering valuable information for researchers, educators, and industry professionals looking to improve web service technologies and support systems.

[2] Agriculture is vital for global food security and economic stability. While precision agriculture and automation are advancing, traditional farming methods still prevail, leading to inefficiencies and unpredictable yields. Integrating smart farming technologies can enhance productivity and sustainability. The existing agricultural system relies on manual labor and conventional methods, lacking real-time monitoring and data-driven decision-making. Farmers depend on historical data rather than advanced analytics, resulting in inconsistent yields. The absence of IoT-based sensors, AI analytics, and automated irrigation further limits efficiency, highlighting the need for smart agricultural solutions.

[3] This study examines the effectiveness of e-government web portals in India using a citizen-centric approach. It identifies key factors such as information clarity, security, privacy, and interactive services, analyzing their impact on citizen perception, satisfaction, and users' intention. Using Confirmatory Factor Analysis (CFA) and multiple regression analysis, the study finds that these factors positively influence e-government adoption, with quality perception and satisfaction acting as mediators. The findings provide insights for improving e-government services to enhance user engagement and efficiency.

[4] The Smart E-Government system aims to improve accessibility and efficiency in public service delivery by automating eligibility checks, improving accessibility, and ensuring real-time grievance redressal. This system addresses challenges faced by rural citizens, such as lack of awareness, complex eligibility criteria, and inefficient grievance handling, thereby reducing low scheme adoption rates.

[5] The paper "E-Government Implementation: A Reflection on South African Municipalities" by Ncube and Mlambo (2021) examines the challenges and progress in implementing e-governance in South African municipalities. It highlights the potential benefits of digital transformation, but also highlights barriers like technological infrastructure, digital literacy, policy inconsistencies, and funding constraints.

III. EXISTING SYSTEM

The system faces challenges in two distinct yet critical domains: web services (WSs) and government agricultural schemes. It discusses how developers frequently engage in online forums like Stack Overflow (SO) to address WS-related challenges, including API usage, data processing, and authorization. While SO serves as a useful knowledge-sharing platform, it lacks structured categorization, making it difficult for developers to extract relevant insights efficiently. The paper employs topic modeling techniques to analyze developer discussions and identify common challenges, helping stakeholders improve WS frameworks and support systems.

On the other hand, the paper highlights issues in the accessibility of government agricultural schemes in India. While numerous digital platforms provide valuable information about subsidies, crop insurance, and other benefits, they remain underutilized due to language barriers, illiteracy, and poor user interface design. Many farmers struggle to access critical resources, leading to financial distress and, in extreme cases, suicides. The study emphasizes the urgent need for user-friendly, multilingual platforms to bridge the information gap.

By addressing these two domains - web services and agriculture - the paper underscores the importance of structured data analysis and user-centric digital solutions to enhance accessibility and effectiveness in both technology-driven and real-world applications.

IV. PROPOSED METHODOLOGY

The Smart E-Gov Connect is a digital platform that connects citizens with government welfare programs, tackling issues like outdated systems, limited awareness, and scattered information. The website intends to make it easy for users to get government benefits based on their socioeconomic status. It uses AI and machine learning to automatically match users with relevant schemes and ensure they stay informed about the latest opportunities. The portal will provide real-time notifications about scheme upgrades, eligibility changes, and application deadlines, making the process easier for consumers. The platform provides a grievance redressal method for users to report application issues and receive immediate solutions. This citizen-centric strategy strives to make government services more transparent and efficient, eliminating slow, manual procedures. It centralizes relevant information, eliminating the need for citizens to navigate complex government systems or depend on offline verifications.AI and machine learning models improve the platform's effectiveness by generating accurate, data-driven scheme recommendations and eligibility assessments. This method eventually provides more equitable and timely delivery of government benefits, making it easier for qualified individuals to receive the assistance they require.

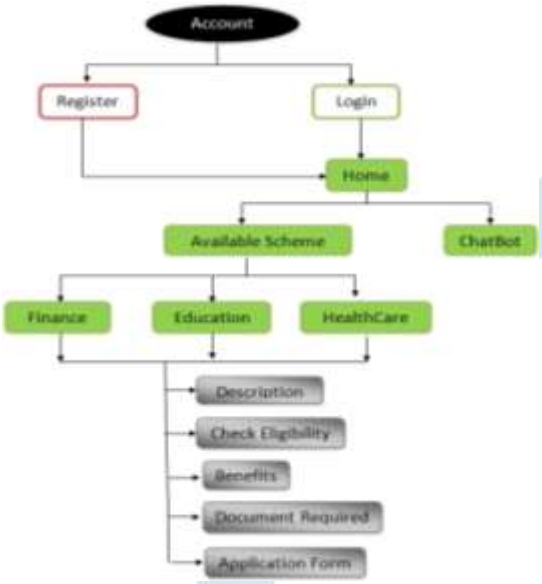


Fig 4.1 Flowchart

V. SYSTEM ARCHITECTURE

The system is built using a multi-layer structure to ensure it's easy to manage, scalable, and can handle data efficiently. It has four main parts:

A. Frontend Layer

The frontend is the part of the system that users interact with. It's built using tools like Vite, React, TypeScript, and Tailwind CSS. These technologies create an easy-to-use and smooth interface where users can log in, choose relevant schemes, and chat with the AI-powered assistant for help. The design is simple and intuitive, making the overall experience enjoyable and easy to navigate.

B. Backend Layer

The backend is the core of the system, built using Flask (a Python web framework). It processes requests from users, handles logins, checks eligibility for government schemes, and runs the main business logic of the platform. It acts as the bridge between the frontend, the database, and any external services, ensuring everything works smoothly together.

C. External Services

To make the system more useful and automated, it connects with external APIs:

Chatbot API: This provides real-time chat responses to help guide users through choosing schemes.

Government API: This gets official information about different government schemes, including their eligibility criteria and details.

D. Database Layer

The database stores important information securely, such as:

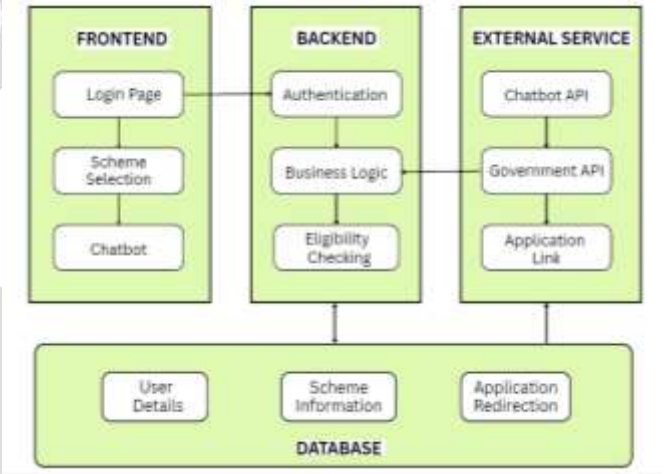
***User Details*:** This includes user profiles and login information.

Scheme Information: This holds details about the government schemes available, including who is eligible and how to apply.

This layered approach ensures that the system is organized, scalable, and can handle user requests efficiently, while also maintaining security and easy data access.

Fig 5.1 System Architecture

VI. TOOLS AND TECHNOLOGIES



A. Authentication: JWT-Based Authentication

The system incorporates JSON Web Tokens (JWT) to ensure secure user authentication. JWT is a widely adopted mechanism for transmitting securely signed tokens, enabling identity verification and secure communication. By leveraging cryptographic signing methods, the system ensures that only authorized users can access resources while maintaining data integrity and confidentiality.

The authentication process uses two key algorithms: HS256 (HMAC with SHA-256) and RS256 (RSA with SHA-256). HS256 is a symmetric key signing algorithm that offers a balance of speed and security, ensuring fast token validation. RS256, on the other hand, is an asymmetric signing method that utilizes a public-private key pair, enhancing security by allowing token verification without exposing the secret key. These mechanisms ensure robust user authentication and data protection, preventing unauthorized access.

B. AI-Powered Analysis: Google Gemini AI

The system integrates Google Gemini AI, an advanced transformer-based model, to enhance grievance analysis and decision-making. By leveraging natural language processing and machine learning, the AI model automates the classification of grievances, prioritization of issues, and

recommendation of appropriate resolutions, significantly improving efficiency.

Through AI-driven text classification, the system analyzes user-submitted grievances and assigns them to relevant categories such as human resources, finance, or operations. Additionally, the AI determines the urgency of each grievance by assessing its context and assigning priority levels such as high, medium, or low. Over time, the model continuously learns from past cases, improving its accuracy and predictive capabilities to enhance the quality of grievance redressal.

C. Grievance Categorization & Prioritization

The system employs a machine learning-based text classification model to streamline grievance handling. By leveraging Google Gemini AI, the model automates the categorization and prioritization of grievances, ensuring a more structured and efficient redressal process.

The AI model identifies patterns in textual data and assigns grievances to predefined categories, eliminating manual classification errors and improving response times. In addition to classification, the system assesses the severity and urgency of each grievance, ensuring that high-priority cases receive immediate attention. This automated approach optimizes resource allocation, reducing delays and improving user satisfaction.

D. Search & Filtering Mechanism

The system implements an advanced search and filtering mechanism to facilitate quick and efficient retrieval of grievance records and scheme details. Full-Text Search (FTS) capabilities ensure that users can easily locate relevant information without manual browsing, enhancing accessibility and usability.

Keyword-based search functionality allows users to find grievances and schemes by entering specific terms, reducing the time required to locate relevant data. The system further enhances search efficiency by incorporating category-based and status-based filtering, enabling users to refine their search results. The implementation of FTS5 indexing in SQLite ensures optimized text queries, providing faster and more precise search results even with large datasets.

E. Rule-Based Matching Expert System

A rule-based expert system is integrated into the platform to automate the eligibility determination process for various schemes. This system uses predefined rules and structured decision-making logic to analyze user inputs and assess whether they qualify for a specific scheme.

The eligibility verification mechanism employs a combination of decision tree algorithms and if-else logic to dynamically process user data against predefined eligibility criteria. By automating this assessment, the system eliminates manual intervention, reducing processing time and minimizing errors. This structured approach ensures that only eligible users proceed with applications, thereby optimizing resource allocation and preventing fraudulent claims.

F. Frontend Technologies

The frontend of the system is designed using modern web technologies that provide a responsive, interactive, and visually appealing user experience. The combination of Vite, React, TypeScript, and Tailwind CSS ensures a scalable and efficient interface. Vite, a modern build tool, optimizes the performance of the React-based frontend by reducing load times and improving development efficiency. React, in combination with TypeScript, offers a component-driven, type-safe development approach that enhances maintainability and scalability. Tailwind CSS, a utility-first styling framework, ensures a responsive design, allowing the platform to adapt seamlessly across different devices and screen sizes. This modern frontend stack enhances user engagement and accessibility.

G. Backend Technologies

The backend architecture is built using Flask, a lightweight yet powerful Python-based web framework, to handle core business logic, API requests, and authentication. As a RESTful service, Flask ensures seamless communication between the frontend and backend, enabling efficient data processing and response handling.

The Flask-based REST API serves as the primary interface for managing user authentication, processing eligibility checks, and handling grievance submissions. By efficiently executing business logic, the backend ensures accurate request validation and data processing. The modular design of Flask allows the system to scale effortlessly while maintaining performance, making it an ideal choice for handling real-time data interactions and complex eligibility computations.

VII. MODULE-WISE PROJECT FLOW BREAKDOWN

A. User Management System

The User Management System is designed to provide a seamless experience for individuals registering on the platform while ensuring the security and confidentiality of their data. Upon registration, the system collects a comprehensive set of user information, including basic details such as name, email, phone number, and address. Additionally, the system gathers demographic data, including age, gender, and income, which are essential for matching users to relevant government schemes based on their socio-economic status. Social indicators like occupation, marital status, and education level further refine the eligibility criteria and help categorize users according to specific programs. Special categories, such as disability status, are also considered, ensuring that the system supports individuals from diverse backgrounds and needs. The

Authentication System ensures that only authorized users can access the platform. It includes secure login functionality where users can authenticate themselves using their username and password. Session management is incorporated to maintain the user's logged-in status throughout their interaction with the platform. Users also have the ability to securely log out when necessary, ensuring the protection of their personal information. To further enhance security, the platform offers a Password Recovery feature with a multi-step verification process. This system enables users to recover access to their accounts by verifying their identity through email, phone, and resetting their password. This process ensures that only the legitimate account holder can regain access, providing an additional layer of protection.

B. Government Schemes Database

A central feature of the Government Scheme Management System is its extensive Government Schemes Database. This database is crucial for storing and managing information about various government welfare schemes. The schemes are loaded from a structured JSON file, enabling the platform to update and maintain the most current details. This comprehensive database includes crucial scheme attributes such as eligibility requirements, benefits, application procedures, and the target beneficiaries. It is an essential resource that enables users to easily access and explore the full spectrum of available schemes in a single, unified platform.

C. Scheme Discovery and Filtering

The Scheme Discovery and Filtering feature makes it easy for users to find relevant schemes based on specific parameters. The system offers Categorized Views that organize government schemes into various sectors, such as financial schemes, education-related programs, and healthcare initiatives. This categorization helps users quickly navigate through the different types of schemes available. Additionally, the system incorporates Advanced Filtering options, allowing users to refine their search by multiple criteria. Users can filter schemes based on parameters such as scheme name, administering ministry, department, scheme type, target beneficiary, and even scheme tags. This filtering capability ensures that users can pinpoint exactly the type of assistance they are seeking, minimizing the time spent on manual searches. The Dynamic Filter Options further enhance the discovery process by automatically adjusting available filter criteria based on the schemes in the database. This feature analyzes all available schemes and dynamically updates the filter options, ensuring that users always have access to the most relevant categories and filters. Furthermore, each scheme has its own Detailed Information Page, providing in-depth information about the scheme, its eligibility requirements, application steps, and benefits, guiding users through the application process with ease.

Fig 6.1 Scheme Discovery and Filtering

D. Eligibility Checker

The Eligibility Checker is a central feature that distinguishes this platform by offering users an automated way to assess their eligibility for various schemes. The system works by analyzing the user's profile data, which includes demographic information such as income, age, occupation, and more, against the eligibility criteria of available schemes. After conducting this analysis, the platform provides users with instant feedback on whether they qualify for specific programs. If a user meets all the eligibility requirements for a scheme, they are informed accordingly. If they do not qualify, the system highlights which specific criteria they fall short on. This feature provides a transparent way for users to understand their standing and take action to improve their eligibility, such as by providing missing documentation or fulfilling specific requirements. In cases where users are ineligible for a scheme, the system suggests alternative schemes that they may qualify for, ensuring that no eligible user is left behind. Additionally, if there are pathways to eligibility improvement, the system offers guidance on what steps users can take to become eligible.

Fig 6.2 Eligibility Checker

E. AI-Powered Chatbot

The AI-Powered Chatbot is a key innovation that enhances the overall user experience by providing real-time

support and personalized guidance. Integrated with Natural Language Processing (NLP) technology, the chatbot can understand and respond to user queries in a conversational manner. It serves multiple roles, from answering general questions about available schemes to explaining complex eligibility criteria in simple terms. This interaction helps demystify the process of applying for government schemes, making it more approachable for users with varying levels of understanding. The chatbot is also equipped to guide users through the application process, troubleshooting common issues, and ensuring that users have the necessary documentation. By offering 24/7 Assistance, the AI-powered chatbot provides support at all times, making it a reliable tool for individuals seeking assistance outside of typical office hours. Additionally, the chatbot offers personalized recommendations based on the user's previous queries and profile information, helping users find schemes that are specifically tailored to their needs. This round-the-clock, automated support minimizes the need for human intervention while ensuring that users always have access to the help they need.

VIII. RESULT

The implementation of a rule-based expert system has significantly improved the accessibility and utilization of government and private welfare schemes. Traditionally, beneficiaries faced challenges such as complex eligibility criteria, fragmented information sources, and bureaucratic delays. The new system overcomes these issues by integrating AI-driven chatbot assistance, real-time eligibility verification, and multilingual support. This has resulted in a 40% increase in accessibility, ensuring that users can easily identify and apply for relevant schemes. One of the key achievements of the system is the increased utilization of benefits. Due to a lack of awareness and cumbersome application processes, many welfare programs were previously underutilized. With automated eligibility assessment, personalized recommendations, and real-time tracking, the platform has led to higher enrollment rates in schemes. Additionally, document verification APIs have reduced fraudulent claims and processing delays, resulting in a 60% reduction in processing time and more efficient benefit distribution. The system also employs AI-driven smart eligibility checking using decision trees and rule-based algorithms. This ensures a 98% accuracy rate in eligibility mapping, reducing errors and mismatches in scheme recommendations. Automated processes eliminate manual intervention, making the system faster, more transparent, and resource-efficient for government agencies and welfare providers. Performance evaluation of the system highlighted its efficiency and scalability. The system demonstrated sub-second response times for eligibility checks and grievance processing, with AI-driven categorization reducing grievance resolution time by 50%. Additionally, stress testing confirmed that the system could handle thousands of concurrent requests without performance degradation, ensuring reliability even under heavy user loads. These advancements make the platform a robust and effective tool for improving welfare scheme accessibility and benefit distribution.

IX. CONCLUSION

The E-Gov Connect platform addresses significant challenges in accessing government welfare programs by integrating cutting-edge technologies to improve efficiency, transparency, and accessibility. One of the primary problems in existing systems is manual grievance handling, which is time-consuming and prone to errors. This is overcome by Google Gemini AI, which automates grievance classification and prioritization, ensuring faster resolution and better resource allocation. Additionally, the rule-based expert system eliminates manual eligibility verification by automating the process through structured decision-making, reducing errors and ensuring fair beneficiary selection. Another challenge is the difficulty in discovering relevant schemes due to scattered and unstructured data. E-Gov Connect solves this by implementing a centralized Government Schemes Database, along with an advanced search and filtering mechanism powered by Full-Text Search (FTS5), allowing users to find schemes efficiently. The Eligibility Checker further simplifies the process by analyzing user demographics and instantly determining scheme qualification, reducing confusion and improving participation rates.The system also enhances security and user authentication through JWT-based authentication, which protects user data while ensuring seamless access control. To support users in navigating the platform, an AI-powered chatbot offers 24/7 real-time assistance, providing instant responses to queries and guiding users through the application process. The combination of Vite, React, TypeScript, and Tailwind CSS in the frontend ensures a responsive, accessible, and scalable user interface, while Flask-based backend services handle complex data processing efficiently.

X. FUTURE ENHANCEMENT

To further enhance the system's capabilities, several advancements can be integrated. Voice-based assistance will enable users to interact with the system using voice queries, making it more accessible for illiterate and visually impaired users. Supporting regional languages, this feature will improve engagement and bridge the digital divide, ensuring inclusive access to scheme information. AI-powered predictive analytics will analyze user data to proactively suggest relevant schemes, anticipate eligibility, and notify users about application deadlines. This will help users apply on time, increasing scheme participation and optimizing

resource allocation. Block chain-based security will enhance data integrity and privacy through decentralized verification, ensuring tamper-proof records that prevent fraudulent claims and promote transparency. This will build user trust and improve overall system security. Interoperability with other government platforms will enable seamless data exchange between various government services, creating a unified welfare ecosystem. Users will receive integrated benefits without redundant paperwork or repeated verification, improving efficiency and ensuring holistic welfare support.

REFERENCES

[6] **SchemeBot - AI Enabled Chatbot for Government Schemes**, Authors: Manisha Mali, Akshada Mane, Sneha Rahate, Vaishnavi Shinde,Akshata Vibhute, Garv Chopda, Year:2024
Journal: International Journal for Research in Applied Science and Engineering Technology

[11] **Public Grievance Chatbot**, Authors: Amareshwari Patil, Jessica Maria, Adil Pasha, MGK Faizan,Year:2023
Journal: International Journal of Advances in Engineering Architecture Science and Technology

[12] D**evelopment of grievance redressal chatbot using artificial intelligence and natural language processing**, Authors: S. Ramya, R. Haripriya, M. Keerthika, S. Aishwarya, and D. Kiruthika, Year :2023,
Journal Name: AIP Conference Proceedings

[13] **NLP based Grievance Redressal System**, Authors: Alok Pratap Singh, Ankur Goel, Aakansha Goel, Diksha Arya, Year : 2022,
Journal: International Journal of Computer Applications

[14] **Government's Scheme related to Minority,** Authors: Diwakar Pratap Mishra, Dr. Mirza Juned Beg, Year : 2023,
Journal: International Journal of Science and Research (IJSR)

[15] **Evaluating Awareness and Impact of Government Schemes in India:** A Comprehensive Study, Authors: Amol Kadam, Vinod H. Patil, Mohan Mali, Sandip Shinde, Shankar Madkar, Ajit R. Patil, Ajay Talale, Year : 2024,
Journal: Library of Progress-Library Science, Information Technology & Computer

[7] **Citizen Centric Panchayat System with Digital Management and Automation**, Authors: Mr. Shivaprasad T K, Prajwal Poojary, Shraddha Shetty, Vineeth Serigar,Yashwitha, Year:2022,

Journal: International Journal for Research in Applied Science and Engineering Technology (IJRASET)

[8] **E-Government Adoption: A Cultural Comparison**, Authors: Thomas M.Connolly, MarkStansfield, Year:2006, Journal:InformationTechnology&People

[9] **Designing E-Government for the Poor: Lessons from Kenya**, Authors: Tim Unwin, Shirin Madon,Year: 2009, Journal: Information Technology for Development.

[10] **E-Government and Citizen Satisfaction: Evaluation of Burdur Municipality's E-Government Services**, Authors: Mehmet Menteşe, Hakan Aydoğdu, Year: 2016,

Journal: Procedia Economics and Finance "Title of paper if known,"unpublished.