

**A
Project Report
On**

**Development of On Demand Service App for
Management of Household Generated Degradable and
Non-degradable Waste**
submitted to

**Sant Gadge Baba Amravati University,
Amravati (M.S.) 444 602**

in partial fulfillment of the requirement

for the degree of

**BACHELOR OF ENGINEERING
in
MECHANICAL ENGINEERING**

**Priya Asolkar
Vilas Thigale
Nikita Pargharmol**

by

**Gauri Kale
Pawan Gawande
Sakshi Ratnaparkhi**

under the guidance of

**Prof. K. D. Gadgil
Mr.D.V.Lawankar**



**Department of Mechanical Engineering
Shri Sant Gajanan Maharaj College of Engineering
Shegaon-444203 (M.S.)**

(Recognised by AICTE, accredited by NBA, New Delhi, NAAC, Bangalore & ISO 9001:2000)

www.ssgmce.ac.in

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Certificate

This is to certify that the project report entitled **“Development of on Demand Service App for Management of Household Generated Degradable and Non-degradable Waste”** is hereby approved as a creditable study carried out and presented by

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– **Projectees**

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Abstract

This abstract outline the development of an innovative on-demand service platform leveraging Salesforce Customer Relationship Management (CRM) software for the effective management of waste by municipal corporations. The primary objective of this platform is to streamline and optimize the data management and reporting processes associated with daily waste management operations, without utilizing any Internet of Things (IoT) systems or directly engaging in waste collection.

The on-demand service platform utilizes Salesforce CRM, a powerful cloud-based software solution, to facilitate seamless coordination and communication among various stakeholders involved in waste management. Municipal corporations can leverage the platform to efficiently manage and track the progress of waste management tasks, generate comprehensive reports, and make data-driven decisions.

Key features of the platform include:

Task Assignment and Tracking: The platform allows municipal corporations to assign waste management tasks to their workforce, ensuring efficient allocation of resources and timely completion of assignments. Supervisors can track the status of each task in real-time, enabling better coordination and management.

Data Management: The platform provides a centralized repository for storing and managing data related to waste management, including information about waste collection points, schedules, and workforce details. This data can be easily accessed, updated, and analyzed, facilitating informed decision-making.

Reporting and Analytics: Comprehensive reports and analytics are generated based on the data collected and managed by the platform. These reports provide valuable insights into the efficiency of waste management operations, helping municipal corporations identify areas for improvement and optimize resource allocation.

Communication and Notifications: The platform enables seamless communication between municipal corporations, supervisors, and field personnel. Real-time notifications and alerts keep stakeholders informed about task updates, urgent requirements, or changes in schedules, ensuring smooth workflow management.

By implementing this on-demand service platform, municipal corporations can enhance their waste management capabilities, improve operational efficiency, and make informed decisions based on accurate data analysis.

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CHAPTER 01

INTRODUCTION

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INTRODUCTION

India's municipal waste management system is a complex and challenging issue. According to the Central Pollution Control Board (CPCB), India generates around 62 million tonnes of municipal solid waste (MSW) annually, of which only 43 million tonnes are collected, and just 12 million tonnes are treated. This means that around 70% of the waste generated is left untreated, leading to health hazards, environmental pollution, and a loss of resources. India's current municipal waste management system is primarily based on the collection and transportation of waste to landfills. However, due to a lack of infrastructure, financial resources, and public awareness, most municipalities struggle to handle the waste generated in their areas. To tackle this issue, the Indian government has launched various initiatives and policies such as Swachh Bharat Abhiyan, the Solid Waste Management Rules 2016, and the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) to improve the situation. These initiatives aim to encourage segregation at source, promote recycling and composting, and increase public participation in waste management. Several cities in India have also implemented innovative waste management practices such as decentralized waste management systems, waste-to-energy plants, and bioreactor landfills to reduce their dependence on conventional landfilling. However, the implementation of these practices remains limited to a few cities due to financial and technical constraints. Overall, India's municipal waste management system is still in the developmental stage and requires significant improvements in infrastructure, policy implementation, and public awareness to achieve sustainable waste management practices

1.1 Necessity of project

Municipal corporations are responsible for managing the waste generated by households in their jurisdiction. Waste management is a complex and challenging task that requires a comprehensive approach to collection, transportation, processing, and disposal of waste. A service platform for municipal corporation and household waste

management using CRM software can help address these challenges and provide an efficient and effective solution for waste management.

- **Customization:** The platform can be customized to suit the specific needs of different service providers. Service providers can add their branding, customize their pricing plans, and offer additional services as required.
- **Efficient Communication:** The CRM software can also enable efficient communication between the municipal corporation and households. The software can provide a platform for households to report any issues related to waste management, such as missed pickups or overflowing bins. The software can also enable the municipal corporation to communicate important updates or changes to waste management policies to households.
- **Data Management:** The CRM software can help manage the vast amounts of data generated by waste management operations. The software can provide a centralized platform for storing and analyzing data related to waste collection, transportation, processing, and disposal. This can help the municipal corporation make informed decisions regarding waste management policies and operations.
- **Improved Customer Service:** The CRM software can help improve customer service by providing households with easy access to information related to waste management. For example, the software can provide households with information on the collection schedule, recycling guidelines, and disposal options. This can help reduce confusion and frustration among households and improve their overall satisfaction with waste management services.
- **Cost Savings:** The CRM software can also help reduce the overall costs of waste management operations for the municipal corporation. By streamlining operations, improving communication, and managing data more efficiently, the software can help reduce the time and resources required for waste management. This can result in significant cost savings for the municipal corporation.
- **Real-Time Monitoring:** The CRM software can provide real-time monitoring of waste management operations. The software can help track the location and status of waste collection vehicles, monitor the amount of waste collected, and

identify any issues or delays in the waste management process. This can help the municipal corporation make timely and informed decisions to address any problems that may arise.

- **Predictive Analytics:** The CRM software can also enable predictive analytics for waste management operations. By analyzing historical data on waste collection and disposal, the software can help predict future trends and identify areas where waste management operations can be improved. This can help the municipal corporation optimize its operations, reduce costs, and improve overall efficiency.
- **Mobile Access:** The CRM software can provide mobile access to waste management operations. Waste collectors can use mobile devices to access information on their routes, report issues, and receive updates in real-time. Households can also use mobile devices to report issues, access information on waste management, and receive updates from the municipal corporation.
- **Integration with Other Systems:** The CRM software can be integrated with other systems used by the municipal corporation for waste management operations. For example, the software can be integrated with GPS tracking systems, fleet management systems, and billing systems. This can help create a seamless and integrated system for waste management operations.
- **Sustainability:** The CRM software can also help promote sustainability in waste management operations. The software can help track the amount of waste generated, recycled, and disposed of, and provide insights on ways to reduce waste and improve recycling rates. This can help the municipal corporation meet its sustainability goals and contribute to a cleaner and healthier environment.

Overall, a service platform for municipal corporation and household waste management using CRM software can provide numerous benefits, including streamlined operations, improved communication, data management, customer service, cost savings, real-time monitoring, predictive analytics, mobile access, integration with other systems, and sustainability. By implementing such a platform, municipal corporations can enhance their waste management operations and provide better services to households while promoting sustainability and reducing costs.

In conclusion, a service platform for municipal corporation and household waste management using CRM software can provide a comprehensive and efficient solution for waste management. The software can help streamline operations, improve communication, manage data more efficiently, improve customer service, and reduce costs.

1.2 Present system of waste management (UNNAT BHARAT)

India generates approximately 62 million tons of municipal solid waste (MSW) per year, with this amount expected to increase to 165 million tons by 2030. However, according to the Central Pollution Control Board, only about 43 million tons of this waste is collected, and only 12 million tons is treated or processed. One of the biggest challenges in India's waste management system is the lack of adequate waste segregation at the source. The majority of households in India mix their waste together, making it difficult to separate and recycle different types of waste. This leads to a high proportion of waste ending up in landfills or being burned, contributing to air pollution and climate change. Another challenge is the inadequate waste collection and transportation infrastructure in many parts of the country. There is often a shortage of waste collection vehicles and staff, leading to irregular collection schedules and overflowing garbage bins. This results in waste being dumped in open spaces, rivers, and other water bodies, causing environmental damage and health hazards. To address these challenges, the government and non-governmental organizations are implementing various initiatives, such as setting up waste-to-energy plants, promoting composting and vermicomposting, and engaging in public awareness campaigns to encourage citizens to segregate their waste at the source. The present system of waste management in India is largely inadequate and inefficient, leading to significant environmental and health problems. The government, NGOs, and private sector organizations are working towards improving waste management through various initiatives. The Swachh Bharat Abhiyan, launched in 2014, is one such initiative aimed at making India clean and free of open defecation. The campaign includes various activities such as the construction of toilets, waste segregation at source, and the creation of awareness about cleanliness

and hygiene. Under this campaign, the government has also launched the Swachh Bharat Mission (Urban), which aims to achieve 100% collection and scientific management of municipal solid waste in all urban areas. The mission includes the development of waste processing plants, composting and recycling facilities, and the promotion of decentralized waste management systems. The Unnat Bharat Abhiyan is another initiative launched by the government in 2014 with the aim of promoting sustainable development in rural areas. The program involves the identification of key development challenges in rural areas and the implementation of solutions through active involvement of local communities and stakeholders.

In terms of waste management, Unnat Bharat Abhiyan focuses on promoting sustainable waste management practices, such as composting, recycling, and the creation of biogas from organic waste. The initiative also aims to create awareness about waste segregation and the importance of reducing, reusing, and recycling waste, the Swachh Bharat Abhiyan and Unnat Bharat Abhiyan are important initiatives aimed at promoting sustainable waste management practices and creating a cleaner and healthier environment in India. However, their success will depend on the effective implementation of these initiatives at the ground level and the active participation of all stakeholders. The present system of waste management in India faces various challenges, such as inadequate infrastructure, lack of public awareness and participation, and the absence of effective regulations and policies. As a result, a significant proportion of waste generated in India ends up in landfills, causing environmental pollution and health hazards. To address these challenges, the government has introduced various policy measures, such as the Solid Waste Management Rules, 2016, which provide a framework for the effective management of solid waste in the country. The rules emphasize the importance of waste segregation at source, setting up waste processing and treatment facilities, and promoting the use of recycled products. Under the Unnat Bharat Abhiyan, various institutions, including educational institutions, are actively involved in identifying and addressing development challenges in rural areas. The program involves collaboration between academic institutions and local communities to find sustainable solutions to development challenges, including waste management. In addition to waste management, the Unnat Bharat Abhiyan also focuses on promoting sustainable

practices in other areas such as agriculture, energy, and water management. The program aims to bridge the gap between rural communities and academic institutions and promote the exchange of knowledge and expertise for sustainable development. Overall, the present system of waste management in India is facing various challenges, but initiatives such as the Swachh Bharat Abhiyan and Unnat Bharat Abhiyan are providing a framework for the effective management of waste and promoting sustainable development in the country.

1.3 CRM used for waste management (Problem Statement)

The World's population is constantly growing, and every year people create more and more waste, which affects both the life quality and the environmental situation around the world. In order to preserve and improve the environment and quality of life, governments and humanity as a whole began to actively develop the field of waste management. In this regard, governments are increasing their requirements for waste management in the daily processes of various organizations. Both public and private organizations will have to solve new, more complicated tasks, meet the growing needs and challenges in the field of waste management, and develop their tools and capabilities on sustainability and waste related reporting matters. To solve these tasks, complex information systems are needed that support decision-making and monitor the waste management process. New digitalization-based solutions will also be needed by various organizations related to housing and apartment rentals to improve waste separation by their tenants. Digitalization can transform waste management, facilitate its implementation, and strengthen control by applying IoT and sensor technologies to monitor resources so that they are not wasted.

CRM (Customer Relationship Management) is a strategy that businesses use to manage their interactions with customers and improve overall customer satisfaction. The waste management industry is no exception, and implementing a CRM system can help waste management companies better understand their customers' needs and preferences, as well as streamline their operations. One way to introduce CRM in waste management is to gather data about customer interactions and use that data to improve service delivery. This could involve using technology such as sensors and

mobile devices to track waste pickup and disposal, and collecting data on customer feedback and complaints. With this information, waste management companies can make more informed decisions about service routes, pricing, and other factors that affect customer satisfaction.

Another way to introduce CRM in waste management is to use customer data to tailor services to individual needs. This could involve developing personalized waste management plans for commercial customers, or offering customized recycling programs for residential customers. By tailoring services to specific customer needs, waste management companies can improve customer satisfaction and loyalty.

We all have heard a lot about customer relationship management (CRM) software, but probably not every one of us knows what the system is actually capable of doing for your waste management business. Like every other system, CRM solutions keep track of business information and generate reports, but what sets them apart lies in their ability to drive real business growth.

A successful waste management business needs adapt CRM software to control human resources, finances, inventory and other operations through a centralized platform and support industry's best practices. These business solutions offer deep data-driven insights to help you spot opportunities and issues much ahead of time. But, before we find out more about the benefits that an CRM system brings to your waste management company, let's take a look at the actual challenges faced by organizations like yours.

1.3.1 Waste Management Challenges

There are two major problematic areas in waste management – collection and disposal. Issues in managing these arise due to unregularized and slow processes, inefficient tracking mechanisms, communication barriers, not having enough resources and scattered settlements. Whether it's a liquid and a solid waste produced by the food industry or construction sites or urbanization, well-equipped CRM systems offer solutions to all the challenges that impacting waste management.

1.3.2 Major Benefits of Waste Management CRM System

Benefits of advanced CRM software are boundless. Essentially, its tools are employed for effective planning and management of different aspects of your business and help it become as competitive as possible.

- Improve Information Management

Waste management involves documenting information for different collection and dumping sites. This gathered data ought to be stored securely for future undertakings. A smart waste management system helps in this. It stores data on the cloud and additionally allows you to continuously add or modify the information as and when needed, without distorting the existing ones.

- Better Task Scheduling

Your waste management company might require dealing with multiple projects, simultaneously. Keeping track of their progress is tricky. A modular crm system offers clear and easy-to-follow dashboards, helping you remain constantly updated about every change. The software also allows you to implement instructions in an accessible way, letting your staff have a clear idea about their individual tasks.

- Effective Resource Allocation

An integrated crm system ensures that your employees are working on the right tasks at the right time, especially when they work on bigger waste management projects that incorporate multiple locations. Managers are allowed to directly delegate tasks to the team members using the system while the employees are provided access to check what they require doing. This is an easier way to make your workforce perform tasks in accordance with the priorities and effectively save time.

- Allow Feedback Sharing

Your clients' feedbacks regarding waste dumping helps you improve your services. Gathering this valuable information from multiple sources could be

tedious and time-consuming until it is done without the aid of crm software. The business management solution allows your clients to share their feedback. The system gathers and analyses the information, helping you make informed decisions while framing future business strategies

- Enable Safer Disposals

Safety disposal of waste is always of top concern in maintaining cleanliness and sustainability drive for health and resource conservation. CRM system eases the process.

1.4 Objectives of project

- To study and examine waste disposal management system available in india.
- To develop on demand service platform.
- To test this online platform for waste management in Indian context.
- To publish one research paper in reputed journal on testing of platform.

CHAPTER 02

LITERATURE REVIEW

CHAPTER 02

LITERATURE REVIEW

S.No.	Title of Paper	Publisher	Journal	findings
01	Municipal Solid Waste Management, a Major Impacted Sector of Urban Environment due to Residential Land Use Activities	K.Chitra, Naseer M A	Sciencedirect (2016)	Municipal solid waste management and its related infrastructure.
02	Municipal Solid Waste Management in Asia	Wim Slomons	Springer-Singapore(2020)	Enviromental issues on global scale due to waste.
03	Solid Waste Management in India: A Brief Review: Proceedings of 6th IconSWM	Priyabrata Banerjee, Pritam Ghosh	Researchgate(2016)	Review is focused on generation of different SWs and corresponding techniques of SWM.
04	Municipal solid waste management in india: a review and some new Results	Srinivasarao Meka	International Journal of Civil Engineering and Technology(2021)	Waste management system in tier I,tier II,tier III cities.
05	Swachha Bharat manual	Govt. Of India	Published by govt.of India(2016)	Hirarchy in waste management system
06	Waste Management Systems & Software Solutions	Alexander Nedashkovskiy	Researchgate(2018)	The report contain background information about the field of waste management
07	Understanding CRM Implementation in SMEs	Vanessa Gaffar ¹ , Arief Budiman,	5th Global Conference on Business, Management and Entrepreneurship (GCBME 2020)	Implementation of Customer Relationship Management (CRM) by Small medium-sized enterprises (SMEs)
08	The Best Practice of CRM Implementation for Small- and Medium-Sized Enterprises	Michal Pohludka and Hana Štverková	Department of Business Administration, Faculty of Economics, VSB—Technical University of Ostrava(2015)	Advantages of CRM implementation in waste management system

This chapter presents detailed Literature survey about waste management method and use of CRM software. In today's fast-paced world, waste management has become an increasingly pressing issue. With the growth of urbanization and population, the efficient handling and disposal of waste have become crucial for maintaining a clean and sustainable environment. On-demand service platforms have emerged as a viable solution, leveraging technology to streamline waste management processes and provide convenient and reliable services to individuals and businesses. This project aims to develop an on-demand service platform for waste management, utilizing cutting-edge technology to connect service providers with customers in need of waste collection, recycling, and disposal services. In this document, we will outline the key components of the project and present a comprehensive analysis of the literature review conducted to identify the relevant factors and challenges involved in the development of such a CRM platform.

The manual published by the government of India in 2016 on municipal solid waste management Presented the fact that waste management methods followed by municipal authorities. This manual on Municipal Solid Waste Management provides guidance to urban local bodies on the planning, design, implementation and monitoring of municipal solid waste management systems. Issues of environmental and financial sustainability of these systems are a critical consideration. The manual clearly defines the planning process to be adopted by urban local bodies for preparing, revising and implementing Municipal Solid Waste Management Plans (MSWM Plans). The long term planning horizon of 25 years is further divided into short term plans to be prepared once every five years, with a mid-term review once every 2-3 years within this 5 year period, as per requirement. 'A seven step approach for MSWM Planning' is defined, with special emphasis on community or stakeholder contribution and inter-departmental coordination at the local authority level to ensure implementation success.

Ar. K Chithra, Naseer M A (2016)[1] Municipal solid waste management and its related infrastructure provision have become a major concern to many of the urban local self-governments in India. Major objective of this paper, which is based on a doctoral research work on the residential land use impact on urban environment is to

examine the relative position of municipal solid waste management sector among the other identified sectors of urban environment and also to evolve a waste management index that can be used to compare urban areas in terms of its waste generation and management perspective. An AHP based expert questionnaire survey of 93 experts across India was conducted to identify the significance of municipal solid waste management sector along with the identified impacted sectors of urban environment due to residential land use activities. A household survey was conducted in 51 wards of Kozhikode Corporation to check the performance of the waste management index generated out of the expert survey. The results of the survey show that the municipal solid waste management sector is the most impacted sector among the urban environment sectors. Waste management index of the surveyed wards revealed that the index is aligning very well with the residential density as well as the residential land-use characteristics of the area under consideration. This index has immense potential to identify the urban areas that require intervention possibly by providing infrastructure for municipal solid waste management.

Wim Salomons (2020)[2] These paper focus on environmental issues on a global scale must be resolved by initiatives taken on a global scale. There are three major environmental crises facing mankind: the global warming crisis, resource crisis and ecosystem crisis. These crises are all closely related to waste and waste management. Regardless of how desirable an alternative may appear to be, it is no more than a pie in the sky if it costs too much money to build the necessary facilities or the alternative is not possible. Some local governments, unable to dispose of waste by landfilling or incineration due to lack of appropriate landfill sites or incineration plants, are left with no choice but to collect stained plastics separately for recycling. There is a need to choose feasible alternatives. If it is physically impossible to build treatment facilities due to a shortage of funds or lack of consensus among residents, we will be left with no choice, no matter how unreasonable it may appear. However, providing explanations based on LCA results may help us achieve a consensus among related parties about an alternative that had appeared infeasible due to a lack of understanding, and put it into practice.

Priyabrata Banerjee, Pritam Ghosh(2017)[3] This paper major emphasis on levied on environmental safety and concern regarding human health. In this relevance, solid waste Management need major attention. Awareness in society is profusely obligatory for minimization of solid waste generation. Careful study reveals that municipal solid Waste (MSW) provides a major contribution to the total amount of solid waste. But e-wastes are the most frequently growing waste which is also an efficient source of various toxic elements. Globally, upsurge in the demand of nuclear energy enhances the generation of radioactive solid waste (RSW) that may be responsible for harmful effect of radiation. On the other hand, hospital solid wastes (HSWs) have great impact on environment and public health as it is the carrier of infectious diseases and other toxic elements. Biodegradable organics are the major content of agriculture solid waste (ASW) along with some pesticides and heavy metals. The total amount of solid waste (SW) is enhancing day by day, and as a consequence proper solid waste management (SWM) methods are necessary which could minimize the total amount of SW as well as its hazardous effect on environment. This review is focused on generation of different SWs and corresponding techniques of SWM starting from conventional tools to modern technique like refuse-derived fuel (RDF), pyrolysis, incineration together with their advantages and limitations. In search of better facilities and lifestyle, people day by day are moving towards the Cities . Population boom and ongoing industrialization are also influencing Factor for these migration which causes large amount of MSW generation Including Biodegradable waste, Recyclable materials, Inert waste, Composite Wastes, Hazardous waste, Toxic waste, construction and demolishing waste etc. On viewing the elements Weight, MSW contains major fraction of organic than ash and fine earth as well as paper and plastics, where glass and metals are present in very little amount.

Srinivasarao Meka (2021)[4] In this paper information about waste management system in tire 123 cities have provided which says solid waste management for metro/large cities is different from that of small-scale towns and village surrounding them. In metro/large cities waste collection and segregation can be done at different

places as per zoning according to socio-economic, commercial-residential area, industrial area etc. waste cumulatively collected can be segregated and disposed as required which will give economical option as it requires less manpower and other amenities (United Nations Environment Program, 2009). Integrated municipal solid waste management must be done to ensure the safe and environmentally sound disposal of waste. In developing country like India where 71% of population resides in small scale towns and villages (census, 2011) interface between small scale towns and their surrounding villages should be done for better MSWM. Villages generate very small quantity of waste, which becomes difficult as well as financially not viable to manage at individual villages. Moreover, major portion of waste generated from villages is biodegradable in nature. Hence, quantity of disposable waste reduces further. Hence, it is advisable to explore the integrated MSWM strategy that is exclusively developed for such scenario.

Overall, the deficiencies in MSWM are primarily caused by apathy of municipal authorities, lack of community involvement, lack of technical knowhow, and inadequate financial resources. Kumar and Pandit, also observed that the above factors constitute the main challenges that authorities must tackle to improve the system of waste management in India.

Priyabrata Banerjee(2019)[5] This represents the solid waste management in india in the twenty-first century, major emphasis should be levied on environmental safety and concern regarding human health. In this relevance, solid waste management need major attention. Awareness in society is profusely obligatory for minimization of solid waste generation. Careful study reveals that municipal solid waste (MSW) provides a major contribution to the total amount of solid waste. But e-wastes are the most frequently growing waste which is also an efficient source of various toxic elements. Globally, upsurge in the demand of nuclear energy enhances the generation of radioactive solid waste (RSW) that may be responsible for harmful effect of radiation. On the other hand, hospital solid wastes (HSWs) have great impact on environment and public health as it is the carrier of infectious diseases and other toxic elements. Biodegradable organics are the major content of agriculture solid waste (ASW) along

with some pesticides and heavy metals. The total amount of solid waste (SW) is enhancing day by day, and as a consequence proper solid waste management (SWM) methods are necessary which could minimize the total amount of SW as well as its hazardous effect on environment. This review is focused on generation of different SWs and corresponding techniques of SWM starting from conventional tools to modern technique like refuse-derived fuel (RDF), pyrolysis, incineration together with their advantages and limitations. Globally, solid waste generation is growing day by day with the increasing population. Only in India, it is ranging around 0.2–0.6 kg/capita in cities which is generating 42 million tonnes of total solid every year, and these figures will cross 260 million tonnes in 2047. Therefore, for healthy environment proper integrated solid waste management (ISWM) is essential rather than conventional SWM which only involves waste collection, treatment and disposal. But ISWM focused on the reduction of waste at source, reuse of recovered resource and recycle of residue. With economic efficacy, reduction on environmental impact and ensuring multi-stakeholders participation the ISWM are more advantageous to the conventional waste management. The complete cycle of SWM contains waste collection, separation, storage, transportation, treatment and disposal.

Alexander Nedashkovskiy(2018)[6] This report examines the field of waste management in general and the solutions that are used in it. The report contains background information about the field of waste management, waste management systems case studies, as well as data on the development and prospects of the waste management market. The main goal of this work is to understand how much digitalization affects the field of waste management, as well as what solutions should be in order to meet the modern needs of waste processing and what prospects are waiting for waste market in the future. from pathological laboratories can be considered as pathological waste. Human the main goal of the current report is to understand how digitalization affects the field of waste management (WM), whether digital systems are able to meet the changing needs of a fast-growing market, as well as to discuss where the market is moving, and what future prospects waste management has. In order to achieve this goal, the following things will be

considered: what the WM concept is, what it consists of, what digital age offers to waste management and top 3 waste management systems, their functionality and limitations. The information about the market and the current results will be also presented, and then future prospects will be touched on.

Delimitations: in the research, the focus will be at waste management systems and case studies in commercial and mostly industrial organizations, caused according to statistics, these organizations produce the biggest amount of waste (more than 50% of waste). Also, in order to track global development trends, data on waste management will be considered from a regional perspective.

Vanessa Gaffar¹, Arief Budiman, Benny Tjahjono (2021)[7] This study aims to analyze the implementation of Customer Relationship Management (CRM) by Small medium-sized enterprises (SMEs) in West Java Province, Indonesia. This research is qualitative research using in-depth interviews for the data collection. Five small enterprises participated in this study. They cover different fields of business, namely fashion, travel, food, sneakers, and photography. Interview guidelines were set up to observe customer relationship management programs in every company. This was categorized into three programs: continuity marketing, one-to-one marketing, and partnering program. The study shows that participants basically have implemented CRM in their businesses. They have known the fundamental function of CRM, although they are not fully aware of CRM terminology.

It is crucial for those enterprises to know and understand more of what CRM is and the benefit of its implementation to perform well and create customer loyalty. CRM programs for each company are not necessarily the same. It really depends on the type, the scope, and the characteristics of the business. The customers are also not necessarily the same in terms of their characteristics, needs, and desires. Which CRM program is best will significantly depend on each company's consideration and assessment, especially in terms of costs and benefits provided.

SMEs need to know and understand more about CRM since one of its aims is to create a long-term relationship with customers and thus could create customer loyalty.

Michal Pohludka and Hana Štverková (2015)[8] The biggest key aspect to the success of a business is a satisfied customer. For this reason, it is possible to state that the growing trend of focusing on the customer and his/her needs has prevailed in recent years. The aim of this article is to analyze the use of CRM (Customer Relationship Management) systems in small- and medium-sized enterprises (SMEs) in the Czech republic and to find the determinants for CRM system implementation. The best practice for CRM implementation

suitable for SMEs is clarified using a specific case of a global enterprise. A fully functional CRM system can be considered a competitive advantage, and this is not only the case for global companies, but also for small and medium enterprises. Using a functional CRM interconnected with an ERP system, enterprises are able to manage business and direct marketing activities, as well as the company's overall profits. These functional systems lead to an integrated system called funnel management, which improves customer relationship management and leads to a sustainable business. All of the company's operations have been interconnected in terms of software. Nowadays, the ERP system is interconnected with the CRM system in the company. These two core business systems were linked to all other ones related to the financial, marketing, and business agenda. This fact enables easy and straightforward tracking of sales statistics, current sales numbers, and sales forecasting.

The homogeneity of the system also allows the central administration of ISO documentation and documentation for financial audits. Last but not least, these systems are automatically connected to the approval system of prices falling under discounts or transactions with the investment component of the company. From the point of view of feedback, it is necessary to have an established system for evaluating the functioning of the systems. It is clear that not many companies on the market are nowadays able to avoid customer relationship management if they want to increase or generate higher profits. It does not matter how large their market share is. With the use of information technology, the world market becomes more accessible, so companies need to be more competitive. Customers are well-aware of a wide range of products and their alternatives, so their main concern is often not only the price/quality ratio. Instead, relationships and product-related services are increasingly important.

Companies are aware that if they understand the needs of their customers, it will mean returning customers for them and therefore relatively easily attainable recurring profit. It is necessary to distinguish between CRM as a strategy and CRM as a software

Francis Arthur Buttle(2005)[8] Customer relationship management is focused on the creation and maintenance of long-term, mutually beneficial relationships with strategically important markets. It is based on the premise that customers with the highest life-time value potential are those in whom the company should invest their retention resources. Other customers might be fired. For others, it may be possible to re-engineer or nurture the relationship to create new sources of value.

Creating, communicating and delivering value to selected customers can only be achieved if the company aligns and co-ordinates its relationships with four other major constituencies: suppliers, owners/investors, employees and partners. Together, these five constituencies form the S.C.O.P.E. of customer relationship management. Another fundamental of customer relationship management is that the value proposition or offer should be customised to meet or exceed customer expectations.

Traditionally, customisation has centred on the product component of the value proposition. Equally, it is possible to customise service, process, people, distribution, price and communication.

Customer relationship management is not philanthropic. It is a means to an end. Customer relationship management impacts both sides of the profit equation.

CHAPTER 03

PROBLEM ANALYSIS

CHAPTER 03

PROBLEM ANALYSIS

3.1 Problem Statement

Our mass production and mass disposal model is linear, meaning that waste is mainly lost and not reused. This is an environmental issue as it increases pollution but also an economic loss as waste materials is not reused. Waste which are not reused generally result in getting dumped and cause pollution in various different ways. These wastes can be picked up and reused to avoid the reduction of resources during mass production. There is a difference in understanding the mass production and mass disposal of materials where the mass produced materials have a track of how much they produce but when it comes to disposal then we lose track of the quantity we dispose. Hence instead of disposing it can be reused in various methods. We would like to develop the circular economy and find a solution to ensure our production models are in a closed loop based on Reuse, Upcycle, Recycle, Repair and the Reduction of Resources rather than their disposal. Please submit your idea, digital or technological solution to help in creating our vision of a zero waste society. Some issues which could be tackled under this category include, but are not restricted to, the following: Waste reduction, Conversion of waste materials into valuable resources (e.g. upcycling of Waste etc), use of industrial waste, ensuring the longevity of equipment (repair and reuse).

3.2 Objectives

1. To study and examine waste disposal management system available in India.
2. To develop on demand service platform.
3. To test this online platform for waste management requirements in Indian context.
4. To publish one research paper.

3.3 Procedure

3.3.1 Objects

Object is a data storage architecture for storing unstructured data, which section data into units objects and stores them into a structurally flat data environment. Each object includes the data, metadata, and a unique identifier that applications can use for easy access and retrieval.

This are the objects we can use in our on demand service app for storing data-

1. Contacts
2. Leave Application
3. Vehicle Information
4. Dump yards or Landfills
5. Account
6. Reports
7. Dashboard
8. Feedback

3.3.2 Field Information

Exactly what type of information store in this object as follows-

1. Contacts

First Name

Last Name

DOB

Address 1 2 3 / pin code

Mobile No.

Type of user- Municipal Corporation Employee, Household, Contractor

E-mail Address viii. SMS ix. Pan / Aadhar no.

2. Leave Application

Name

Contact No

Type of Post

E-mail Address

Reason of leave

Duration of leave

CL Available

ML Available

3. Vehicle Information

Vehicle Information

Type of vehicle Government / Private

If Private- Owner of vehicle, contact no.

Insured

Maintenance

Allotted Routes

Travel Distance

Driver Information

4. Dump yards or Landfills

Information of dump yard

Workers details

Current Capacity

Next Maintenance date

Type of waste dry / wet

Locations or area

Daily reporting

Vehicle details

5. Account

Government fund
Maintenance cost
Expenses
Workers Payment
Employee Account Details
Handling Cost

6. Feedback

Name
Mobile No.
E-mail Address
Type of Complaint
Feedback
Problem Statement
Add problem photo/screenshot if any

3.3.3 User Flow Diagram

Flow chart or flow diagram is a diagram that visually displays interrelated information such as events, steps in a process, functions, etc., in an organized fashion, such as sequentially or chronologically. A data-flow is a path for data to move from one part of the information system to another. A data-flow may represent a single data element such the Customer ID or it can represent a set of data element (or a data structure). A data flow diagram is a way of representing a flow of data through a process or a system (usually an information system). The DFD also provides information about the outputs and inputs of each entity and the process itself. A data-flow diagram has no control flow there are no decision rules and no loops.

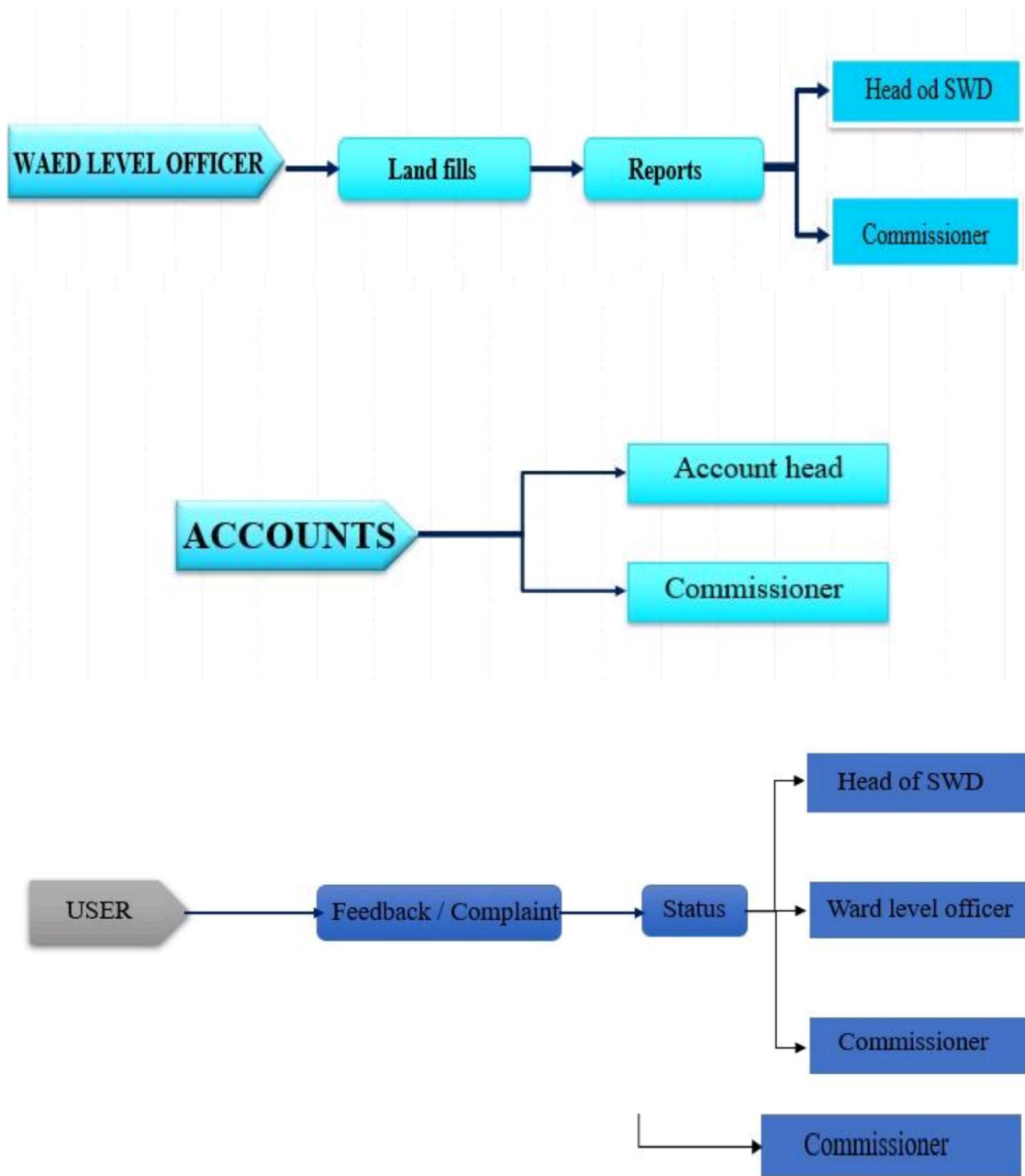


Figure- 3.1 User Flow Diagrams

3.3.4 Process Mapping or Schema Diagram

Process mapping is a management tool used to visually depict the flow of work and the steps and people involved in a business process. These maps are also commonly referred to as flowcharts or workflow diagrams. Organizations use this tool to gain a

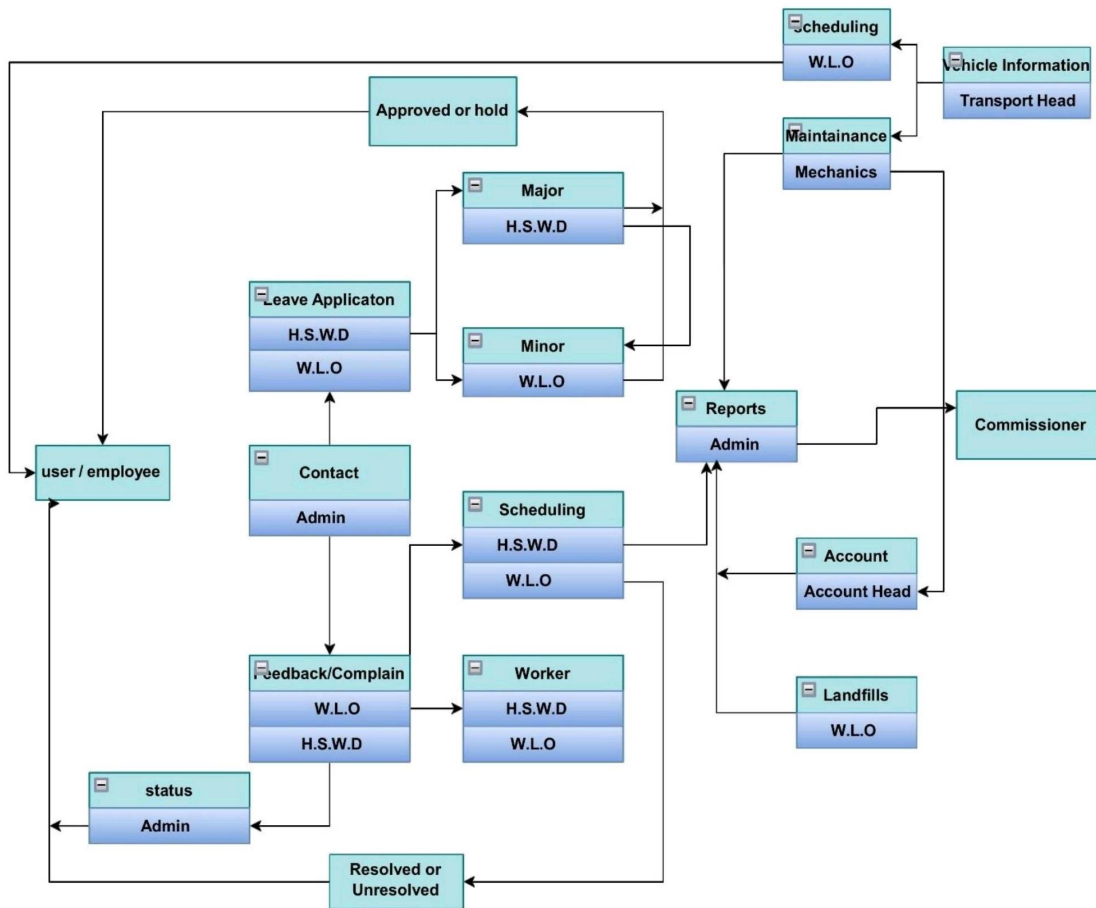


Figure-3.2 Process Mapping or Schema Diagram

better understanding of a process and to improve its efficiency. Example- A process map is a visual diagram that explains who is responsible for executing a single work activity. Ordering new stock, handling a customer complaint, sending a late payment notice, or hiring a new department head are all examples of jobs you can create process maps for. A schema diagram is a diagram which contains entities and the attributes that will define that schema. A schema diagram only shows us the database design. It does not show the actual data of the database. Schema can be a single table or it can have more than one table which is related.

There are 5 levels of process mapping- It takes five areas: your suppliers, your inputs, your process, your outputs and your customers. Value Stream-a specific map that helps to visualize and understand the metrics for the performance of major steps.

CHAPTER 04

PROJECT IMPLEMENTATION

CHAPTER 04

PROJECT IMPLEMENTATION

4.1 Design

4.1.1 User Interface:

The user interface (UI) of an app refers to the graphical layout, controls, and interactions through which users interact with the application. It encompasses the visual design, presentation, and usability aspects of the app. The UI plays a crucial role in providing a seamless and intuitive user experience. Here are some key elements and characteristics of a user interface in an app.

Visual Design: The UI includes the overall aesthetics, colors, typography, and visual elements that make up the app's appearance. It should be visually appealing, consistent with the app's branding, and convey the desired user experience.

Layout and Navigation: The app's UI organizes content and features in a logical and easy-to-understand manner. It includes menus, navigation bars, tabs, and other elements that help users navigate through different sections and screens of the app.

Interaction Design: The UI defines how users interact with the app. It includes gestures, touch interactions, swipe actions, drag-and-drop functionality, and other intuitive ways for users to interact with content and perform tasks.

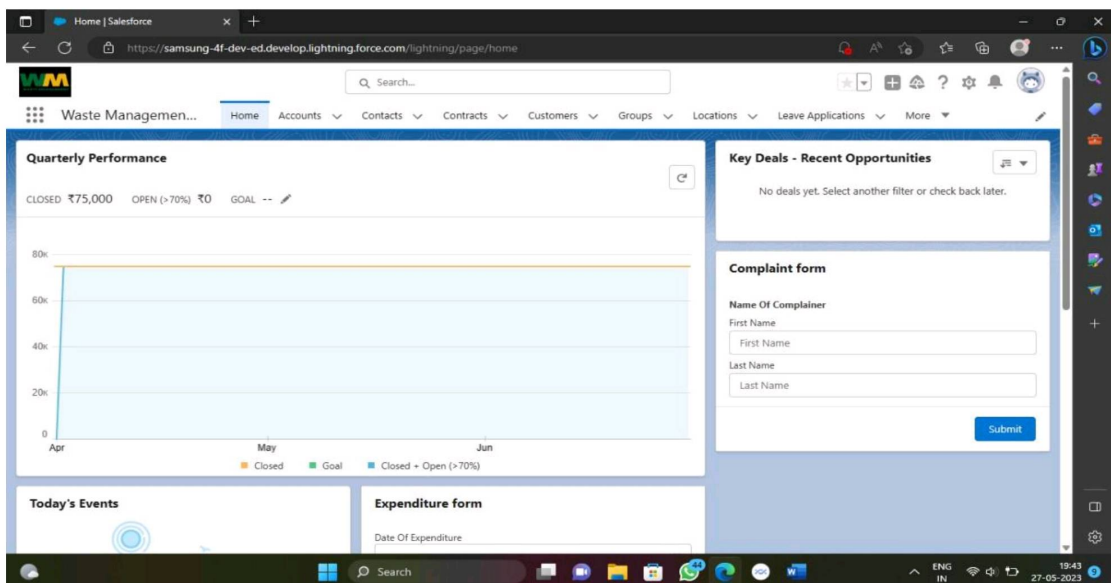


Fig. 4.1 User Interface

4.1.2 Object Design

We can see how to create objects in salesforce step by step:

1. Contact Object

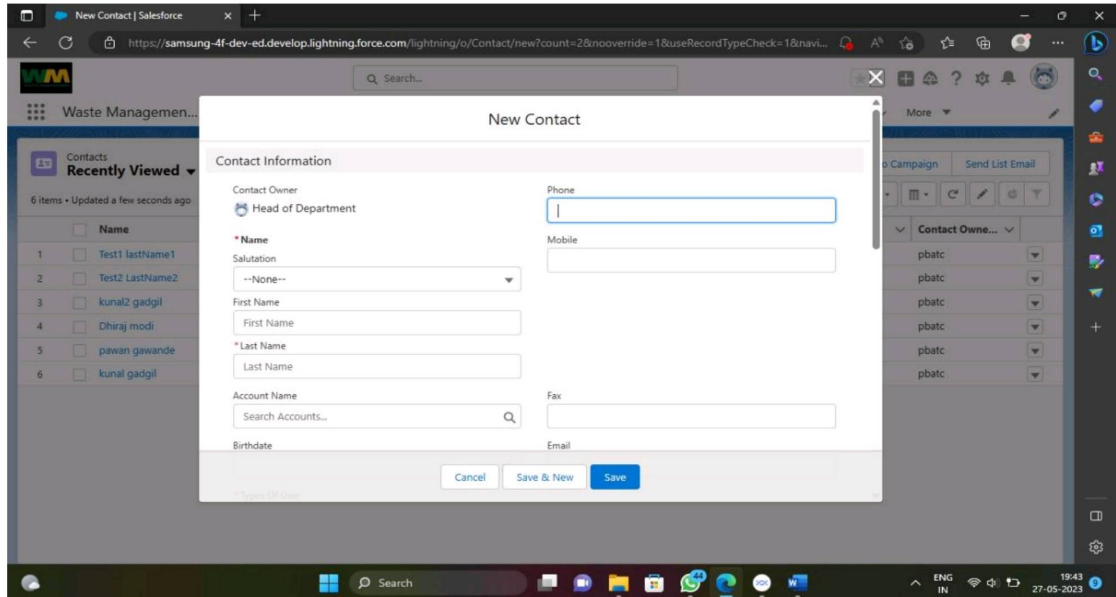


Fig. 4.2 Contact Object

Step 1: Log in to Salesforce

Go to the Salesforce login page and enter your credentials to access your Salesforce account.

Step 2: Access the Object Manager

Once you're logged in, click on the App Launcher icon (grid-like icon in the upper-left corner) and search for "Object Manager." Click on the "Object Manager" option that appears in the search results.

Step 3: Create a New Object

In the Object Manager, click on the "Create" button and select "Custom Object" from the dropdown menu.

Step 4: Define Object Properties

On the "New Custom Object" page, provide the following details to define the Contact object:

Label: Enter the label for the Contact object (e.g., "Contact").

Plural Label: Enter the plural label for the Contact object (e.g., "Contacts").

Object Name: Salesforce will auto-generate an object name based on the label, but you can modify it if needed.

Record Name: Choose a field that will be used as the record name for Contact objects (e.g., "Name").

Data Type: Select the appropriate data type for the record name field.

Deployment Status: Choose "Deployed" to make the object available for immediate use.

Sharing Setting: Choose the appropriate sharing setting for the object.

Step 5: Customize Related List and Page Layouts (optional)

On the "New Custom Object" page, you can customize the related lists and page layouts if desired. This step is optional but can be useful for controlling the display of Contact records.

Step 6: Save the Object

Once you have provided all the necessary details, click the "Save" button to create the Contact object in Salesforce.

2. Leave Application Object

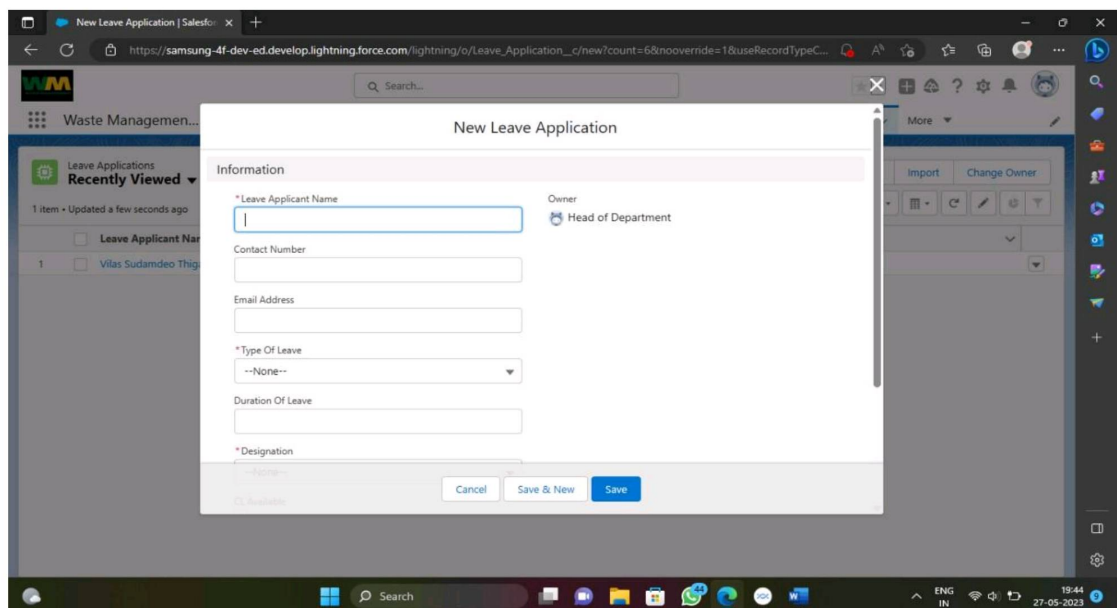


Fig. 4.3 Leave Application Object

Step 1: Log in to Salesforce

Go to the Salesforce login page and enter your credentials to access your Salesforce account.

Step 2: Access the Object Manager

Once you're logged in, click on the App Launcher icon (grid-like icon in the upper-left corner) and search for "Object Manager." Click on the "Object Manager" option that appears in the search results.

Step 3: Create a New Object

In the Object Manager, click on the "Create" button and select "Custom Object" from the dropdown menu.

Step 4: Define Object Properties

On the "New Custom Object" page, provide the following details to define the Leave Application object:

Label: Enter the label for the Leave Application object (e.g., "Leave Application").

Plural Label: Enter the plural label for the Leave Application object (e.g., "Leave Applications").

Object Name: Salesforce will auto-generate an object name based on the label, but you can modify it if needed.

Record Name: Choose a field that will be used as the record name for Leave Application objects (e.g., "Employee Name").

Data Type: Select the appropriate data type for the record name field.

Deployment Status: Choose "Deployed" to make the object available for immediate use. Sharing Setting: Choose the appropriate sharing setting for the object.

Step 5: Add Custom Fields

Click on the "New Custom Field" button to add custom fields to the Leave Application object. Define fields such as "Start Date," "End Date," "Reason," "Status," etc., as per your requirements. Set the data type, field labels, and any validation rules or picklist values needed for each field.

Step 6: Save the Object Once you have provided all the necessary details and added custom fields, click the "Save" button to create the Leave Application object in Salesforce.

3. Vehicle Information Object

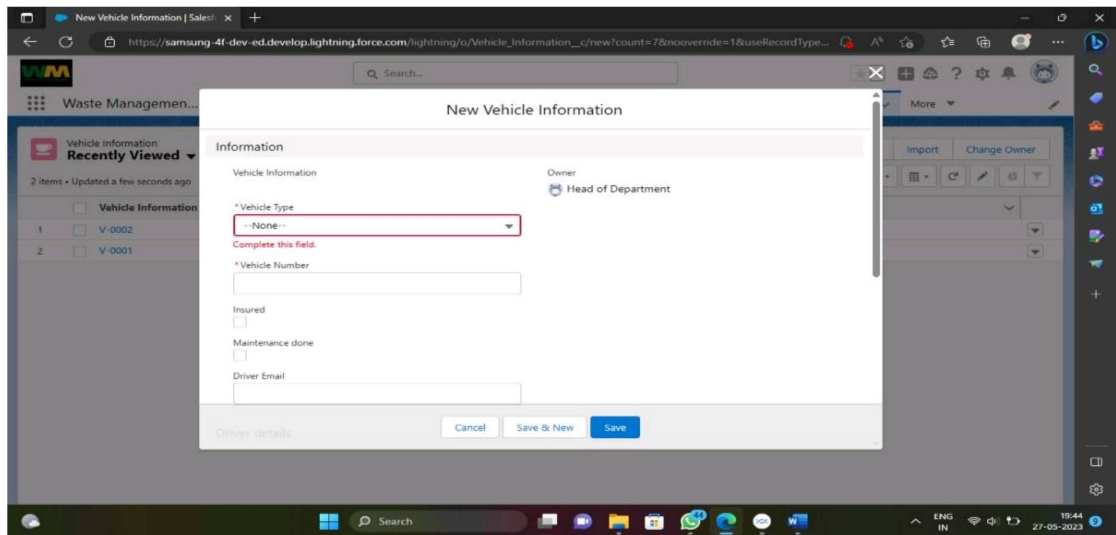


Fig. 4.4 Vehicle Information Object

Step 1: Log in to Salesforce

Go to the Salesforce login page and enter your credentials to access your Salesforce account.

Step 2: Access the Object Manager

Once you're logged in, click on the App Launcher icon (grid-like icon in the upper-left corner) and search for "Object Manager." Click on the "Object Manager" option that appears in the search results.

Step 3: Create a New Object

In the Object Manager, click on the "Create" button and select "Custom Object" from the dropdown menu.

Step 4: Define Object Properties

On the "New Custom Object" page, provide the following details to define the Vehicle Information object:

Label: Enter the label for the Vehicle Information object (e.g., "Vehicle Information").

Plural Label: Enter the plural label for the Vehicle Information object (e.g., "Vehicle Informations").

Object Name: Salesforce will auto-generate an object name based on the label, but you can modify it if needed.

Record Name: Choose a field that will be used as the record name for Vehicle Information objects (e.g., "License Plate Number").

Data Type: Select the appropriate data type for the record name field.

Deployment Status: Choose "Deployed" to make the object available for immediate use.

Sharing Setting: Choose the appropriate sharing setting for the object.

Step 5: Add Custom Fields

Click on the "New Custom Field" button to add custom fields to the Vehicle Information object. Define fields such as "Make," "Model," "Year," "Color," "Mileage," etc., as per your requirements. Set the data type, field labels, and any validation rules or picklist values needed for each field.

Step 6: Save the Object

Once you have provided all the necessary details and added custom fields, click the "Save" button to create the Vehicle Information object in Salesforce.

4. Landfill Object

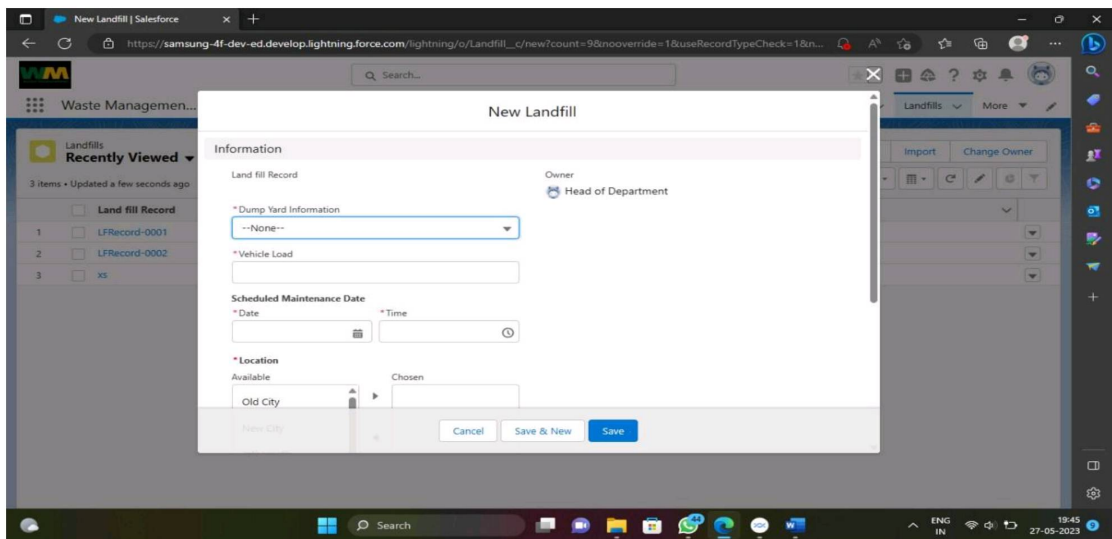


Fig. 4.5 Landfill Object

Step 1: Log in to Salesforce

Go to the Salesforce login page and enter your credentials to access your Salesforce account.

Step 2: Access the Object Manager

Once you're logged in, click on the App Launcher icon (grid-like icon in the upper-left corner) and search for "Object Manager." Click on the "Object Manager" option that appears in the search results.

Step 3: Create a New Object

In the Object Manager, click on the "Create" button and select "Custom Object" from the dropdown menu.

Step 4: Define Object Properties

On the "New Custom Object" page, provide the following details to define the Landfill object:

Label: Enter the label for the Landfill object (e.g., "Landfill").

Plural Label: Enter the plural label for the Landfill object (e.g., "Landfills").

Object Name: Salesforce will auto-generate an object name based on the label, but you can modify it if needed.

Record Name: Choose a field that will be used as the record name for Landfill objects (e.g., "Landfill Name").

Data Type: Select the appropriate data type for the record name field.

Deployment Status: Choose "Deployed" to make the object available for immediate use.

Sharing Setting: Choose the appropriate sharing setting for the object.

Step 5: Add Custom Fields

Click on the "New Custom Field" button to add custom fields to the Landfill object. Define fields such as "Location," "Capacity," "Permit Number," "Operating Hours," etc., as per your requirements. Set the data type, field labels, and any validation rules or picklist values needed for each field.

Step 6: Save the Object

Once you have provided all the necessary details and added custom fields, click the "Save" button to create the Landfill object in Salesforce.

5. Account Object

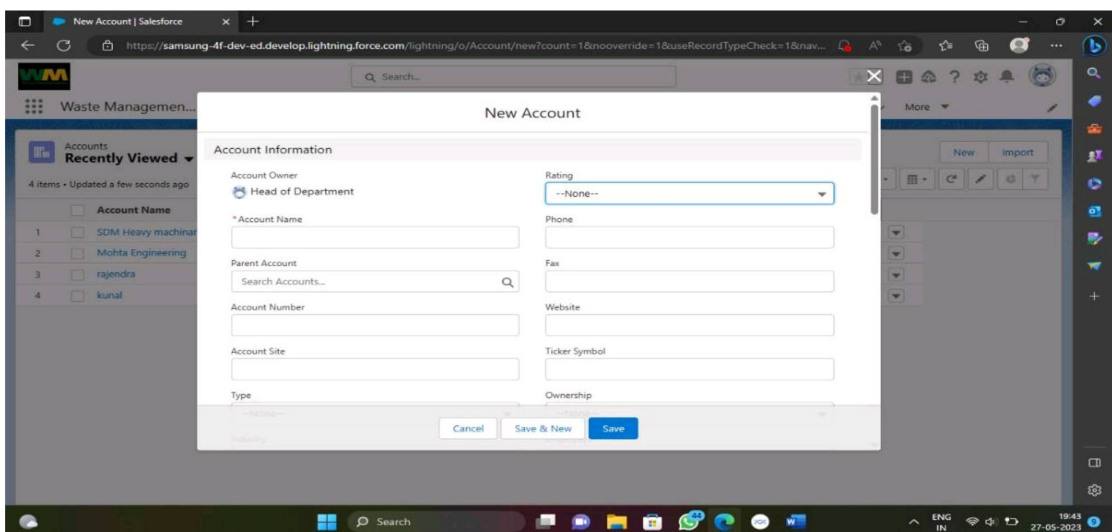


Fig. 4.6 Account Object

Step 1: Log in to Salesforce

Go to the Salesforce login page and enter your credentials to access your Salesforce account.

Step 2: Access the Object Manager

Once you're logged in, click on the App Launcher icon (grid-like icon in the upper-left corner) and search for "Object Manager." Click on the "Object Manager" option that appears in the search results.

Step 3: Create a New Object

In the Object Manager, click on the "Create" button and select "Custom Object" from the dropdown menu.

Step 4: Define Object Properties

On the "New Custom Object" page, provide the following details to define the Account object:

Label: Enter the label for the Account object (e.g., "Account").

Plural Label: Enter the plural label for the Account object (e.g., "Accounts").

Object Name: Salesforce will auto-generate an object name based on the label, but you can modify it if needed.

Record Name: Choose a field that will be used as the record name for Account objects (e.g., "Account Name").

Data Type: Select the appropriate data type for the record name field.

Deployment Status: Choose "Deployed" to make the object available for immediate use.

Sharing Setting: Choose the appropriate sharing setting for the object.

Step 5: Add Custom Fields

Click on the "New Custom Field" button to add custom fields to the Account object. Define fields such as "Phone," "Website," "Industry," "Billing Address," etc., as per your requirements. Set the data type, field labels, and any validation rules or picklist values needed for each field.

Step 6: Save the Object Once you have provided all the necessary details and added custom fields, click the

"Save" button to create the Account object in Salesforce

6. Feedback Object

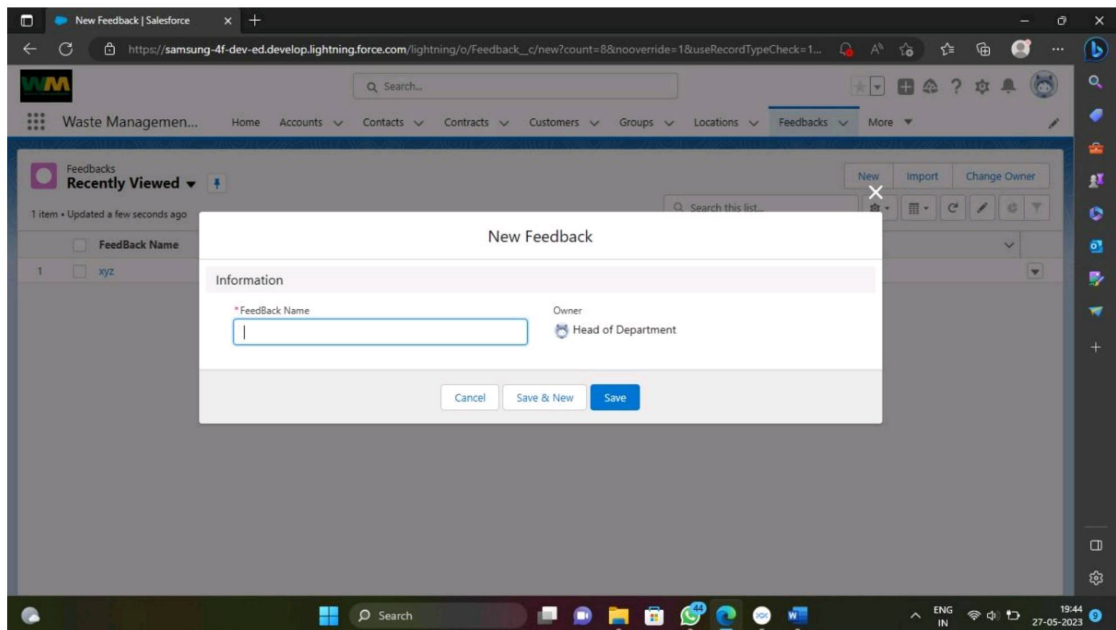


Fig. 4.6 Feedback Object

Step 1: Log in to Salesforce

Go to the Salesforce login page and enter your credentials to access your Salesforce account.

Step 2: Access the Object Manager

Once you're logged in, click on the App Launcher icon (grid-like icon in the upper-left corner) and search for "Object Manager." Click on the "Object Manager" option that appears in the search results.

Step 3: Create a New Object

In the Object Manager, click on the "Create" button and select "Custom Object" from the dropdown menu.

Step 4: Define Object Properties

On the "New Custom Object" page, provide the following details to define the Feedback object:

Label: Enter the label for the Feedback object (e.g., "Feedback").

Plural Label: Enter the plural label for the Feedback object (e.g., "Feedbacks").

Object Name: Salesforce will auto-generate an object name based on the label, but you can modify it if needed.

Record Name: Choose a field that will be used as the record name for Feedback objects (e.g., "Feedback Title").

Data Type: Select the appropriate data type for the record name field.

Deployment Status: Choose "Deployed" to make the object available for immediate use.

Sharing Setting: Choose the appropriate sharing setting for the object.

Step 5: Add Custom Fields

Click on the "New Custom Field" button to add custom fields to the Feedback object. Define fields such as "Feedback Description," "Feedback Category," "Feedback Date," etc., as per your requirements. Set the data type, field labels, and any validation rules or picklist values needed for each field.

Step 6: Save the Object Once you have provided all the necessary details and added custom fields, click the "Save" button to create the Feedback object in Salesforce.

CHAPTER 05

SOFTWARE TESTING

CHAPTER 05

SOFTWARE TESTING

5.1 Testing

While user stories are commonly used in Agile software development to capture user requirements, they may not be the most suitable approach for software testing. User stories typically focus on the functionality and value delivered to end users, whereas software testing involves ensuring the quality and correctness of the software. User stories provide a valuable means to understand and visualize the flow of information within an object. By using user stories, we can gain insights into how information moves and interacts with the object throughout its lifecycle.

5.1.1 Leave Application

1) User Story: As a Higher Officer, I want to be able to approve or reject leave applications.

- Positive Scenario:

Given that a leave application is submitted by an employee. When the Higher Officer reviews the leave application. Then the Higher Officer should be able to approve the leave application and the employee should receive a notification of leave approval

- Negative Scenario - Rejection:

Given that a leave application is submitted by an employee. When the Higher Officer reviews the leave application. Then the Higher Officer should be able to reject the leave application. And the employee should receive a notification of leave rejection

2) User Story: As an Employee, I want to receive notifications about the status of my leave application

- Positive Scenario - Approval Notification:

Given that I have submitted a leave application. When the Higher Officer approves my leave application. Then I should receive a notification informing me

- about the approval status and the notification should include the leave application details, such as dates and type of leave approved

Positive Scenario - Rejection Notification:

Given that I have submitted a leave application. When the Higher Officer rejects my leave application. Then I should receive a notification informing me about the rejection status. And the notification should include the reason for rejection, if provided by the Higher Officer

- Negative Scenario - Invalid Application:

Given that I have submitted an invalid or incomplete leave application. When the Higher Officer reviews my leave application. Then I should not receive any notification regarding the status of my leave application. And an error message or notification should be displayed to me indicating the need for valid information or completion of the application. These scenarios cover the main aspects of testing the notifications for leave application status.

5.1.2 Accounts

1) User Story: As an Accounts Head, I want to be able to approve or allocate funds

- Positive Scenario - Approval:

Given that a funding request is submitted by a department. When the Accounts Head reviews the funding request. Then the Accounts Head should be able to approve the request. And the department should receive a notification of the approved funds.

- Negative Scenario - Rejection:

Given that a funding request is submitted by a department. When the Accounts Head reviews the funding request. Then the Accounts Head should be able to reject the request. And the department should receive a notification of the rejection

- Positive Scenario - Fund Allocation: Given that the Accounts Head receives a request for fund allocation. When the Accounts Head reviews the request

- and determines the allocation amount. Then the Accounts Head should be able to allocate the funds accordingly. And the relevant department or project should receive a notification of the allocated funds
- 2) User Story: As an Accounts Head, I want to be able to Generate Reports on the costs associated with the garbage collection

Positive Scenario - Cost Report Generation:

Given that garbage collection cost data is available in Salesforce CRM. When the Accounts Head generates a cost report for garbage collection. Then the report should include relevant cost information, such as total expenses, breakdown by category (labour, equipment, disposal, etc.), and date range. And the report should be accurate and reflect the latest data available in the system

- Positive Scenario - Customization:

Given that the Accounts Head generates a cost report for garbage collection. When customizing the report parameters, such as selecting specific cost categories, filtering by a particular date range, or grouping the costs by location. Then the report should reflect the chosen customization options and provide the desired level of detail and granularity

- Negative Scenario - No Data Available:

Given that there is no garbage collection cost data available in Salesforce CRM When the Accounts Head tries to generate a cost report. Then the system should display an appropriate message or notification indicating the unavailability of data. And the report generation process should not proceed

5.1.3 Vehicle Information

- 1) User Story: As a Municipal Corporation employee, I want to be able to access real-time location and status updates of garbage trucks in Salesforce CRM, so that I can optimize their routes and schedules.

- Positive Scenario - Real-time Location:

Given that the garbage trucks are equipped with GPS tracking devices When a Municipal Corporation employee accesses the garbage truck tracking feature in Salesforce CRM. Then the employee should be able to view the realtime

- location of each garbage truck on a map interface. And the location should be accurate and continuously updated
- Negative Scenario - Insufficient Privileges:
Given that a regular employee tries to access the real-time location and status updates of garbage trucks. Then the regular employee should not have access or permission to view this information. And an error message or notification should be displayed indicating insufficient privileges

- Positive Scenario - Route Optimization:

Given access to real-time location and status updates of garbage trucks. When a Municipal Corporation employee analyzes the data in Salesforce CRM. Then the employee should be able to identify opportunities for optimizing the routes and schedules of garbage trucks, based on factors like proximity to collection points, current fill levels, and traffic conditions.

2) User Story: As a user, I want to receive push notifications when garbage trucks are scheduled to arrive on my street in Salesforce CRM, so that I can ensure that garbage is ready for pickup.

- Positive Scenario - Scheduled Arrival Notification:

Given that the garbage pickup schedule is available in Salesforce CRM. When the scheduled arrival time for the garbage truck on the user's street is approaching. Then the user should receive a push notification on their device. And the notification should include the estimated arrival time and a reminder to have the garbage ready for pickup.

- Negative Scenario - No Scheduled Arrival:

Given that there is no scheduled garbage truck arrival on the user's street. When the garbage pickup schedule does not include the user's street or there are no upcoming pickups. Then the user should not receive any push notifications regarding garbage truck arrivals. And the absence of notifications should accurately reflect the lack of scheduled pickups.

5.1.4 Landfills

1) User Story: As the Head of SWD, I want to be able to generate monthly reports on the waste collection and disposal data from the landfills.

-
- Positive Scenario - Report Generation:

Given that the waste collection and disposal data is available in Salesforce CRM. When the Head of SWD generates a monthly report for waste collection and disposal. Then the report should include relevant data, such as the quantity of waste collected, types of waste, disposal methods, and any relevant metrics or trends. And the report should accurately reflect the data for the specified month.

Positive Scenario - Customization:

Given that the Head of SWD generates a monthly report for waste collection and disposal. When customizing the report parameters, such as selecting specific landfill sites, filtering by waste types or disposal methods, or specifying a date range. Then the report should reflect the chosen customization options and provide the desired level of detail and granularity

2) User Story: As the Head of SWD, I want to be able to easily track the usage and capacity of landfills in Salesforce CRM.

- Positive Scenario - Usage Tracking:

Given that landfill data is available in Salesforce CRM. When the Head of SWD accesses the landfill tracking feature. Then the Head of SWD should be able to easily view and track the current usage of each landfill, such as the percentage filled or the amount of waste disposed. And the usage information should be accurate and up-to-date, reflecting the latest data available in the system.

- Positive Scenario - Capacity Tracking:

Given that the landfill capacity data is available in Salesforce CRM. When the Head of SWD accesses the landfill tracking feature. Then the Head of SWD should be able to easily view and track the capacity of each landfill, such as the total volume or weight it can hold.

CHAPTER 06
CONCLUSION

CHAPTER 06

CONCLUSION

The chapter presents the conclusions drawn from the observations and the future scope of this research work.

The development of an on-demand platform for waste management, where data is segregated and focused on waste management, brings numerous benefits for both users and workers involved in the process. This platform serves as a centralized hub, streamlining waste management operations and fostering a more sustainable and efficient environment. For users, the platform offers convenience and accessibility. They can easily request waste management services, such as garbage collection, recycling, or hazardous waste disposal, with just a few clicks on their mobile devices or computers. The platform provides real-time updates on service availability, pickup schedules, and estimated arrival times, enhancing user experience and reducing uncertainty. For workers involved in waste management, the platform optimizes operational efficiency. Through data segregation, it enables effective route planning, ensuring that workers can navigate through neighborhoods and collect waste in the most time and fuel-efficient manner. The platform also provides workers with clear instructions and real-time notifications, improving coordination and minimizing delays. Overall, the development of an on-demand platform for waste management with segregated data has the potential to revolutionize the industry. It empowers users with convenience, knowledge, and sustainable practices while enhancing operational efficiency for workers and enabling data-driven decision-making for waste management officers. By fostering collaboration and leveraging technology, this platform paves the way for a cleaner, more sustainable future.

CHAPTER 07

FUTURE SCOPE

CHAPTER 07

FUTURE SCOPE

The future scope for developing an on-demand waste management platform is promising. By implementing advanced data segregation techniques, such as machine learning algorithms and IoT devices, waste can be classified and sorted more efficiently. This enables optimized waste collection routes and schedules based on realtime fill level data. Streamlining worker management through task assignment, route optimization, and performance monitoring tools enhances productivity. Intuitive interfaces for users and workers facilitate easy waste collection requests, progress tracking, feedback submission, and communication with waste management personnel. Features like leave application and scheduling modules automate workforce management. Analytics and reporting capabilities provide valuable insights for decision-making and resource allocation. Integration with recycling and waste disposal systems ensures proper waste management practices and optimizes recycling efforts. Overall, the future development of an on-demand waste management platform holds great potential for improving data segregation, worker efficiency, and user satisfaction. The future scope for the development of an on-demand platform for waste management is vast, with several possibilities for improving data segregation, enhancing the efficiency of workers, and providing valuable features for users. Here are some potential areas of development:

- **Advanced Data Segregation:** Implementing robust data segregation techniques can help classify and categorize waste more effectively. This can involve using machine learning algorithms to automatically identify and sort different types of waste based on images or descriptions provided by users. Additionally, integrating sensors and Internet of Things (IoT) devices in waste containers can provide real-time data on fill levels, allowing for optimized waste collection routes and schedules.
- **Worker Management and Optimization:** Developing features to streamline worker management can enhance efficiency and productivity. This may

include tools for assigning and tracking tasks, optimizing routes, and monitoring worker performance. Advanced algorithms can be employed to allocate tasks based on worker skills, proximity to waste collection points, and real-time demands. This ensures that workers are effectively utilized, leading to improved waste collection efficiency.

- **User-Friendly Interfaces:** Creating intuitive and user-friendly interfaces for both users and workers is crucial for the success of the platform. Users should be able to easily request waste collection, track progress, and provide feedback. Workers should have access to a user-friendly mobile application that guides them through their assigned tasks, provides navigation assistance, and enables them to report any issues or complications they encounter during waste collection.
- **Leave Application and Scheduling:** Implementing features for workers to apply for leave, manage their schedules, and receive notifications can greatly streamline workforce management. A leave application module can allow workers to request time off, which can then be automatically factored into task assignments and route optimization algorithms.
- **Contact Generation and Feedback:** Integrating features for users to contact waste management personnel directly through the platform can improve communication and issue resolution. Additionally, enabling users to provide feedback on the quality of waste collection services can help identify areas for improvement and ensure continuous enhancement of the platform.
- **Analytics and Reporting:** Incorporating analytical tools and reporting capabilities can provide valuable insights for waste management companies. Data collected from the platform can be analyzed to identify patterns, optimize waste collection routes, measure performance metrics, and generate reports on waste management efficiency. These insights can drive decision-making, resource allocation, and future improvements.
- **Integration with Recycling and Waste Disposal Systems:** Building connections with recycling facilities and waste disposal centers can facilitate the seamless flow of waste from collection to appropriate processing locations.

CHAPTER 08

REFERENCES

CHAPTER 08

REFERENCES

1. Solid Waste Management in India: A Brief Review Priyabrata Banerjee, Abhijit Hazra, Pritam Ghosh, Amit Ganguly, Naresh Chandra Murmu and Pradip K. Chatterjee
2. MUNICIPAL SOLID WASTE MANAGEMENT IN INDIA: A REVIEW AND SOME NEW RESULTS Arti Pamnani, Meka Srinivasarao* Faculty of Technology: Dharmsinh Desai University; Nadiad; Gujarat; India- 387 001
3. Ramendra Thakur a, *, Letty Workman “Customer portfolio management (CPM) for improved customer relationship management (CRM): Are your customers platinum, gold, silver, or bronze?”
4. Francis Buttle, PhD FCIM Principal, Francis Buttle & Associates, Macquarie Graduate School of Management North Ryde, The S.C.O.P.E. of Customer Relationship Management Sydney, NSW 2109, Australia
5. Himabindu, P., Udayashankara, T. H., & Madhukar, M. A. (2015). Critical review on biomedical waste and effect of mismanagement. *International Journal of Engineering Research & Technology*, 4(03), 0181–2278.
6. Giusti, L. (2009). A review of waste management practices and their impact on human health. *Waste Management*, 29, 2227–2239.
7. Guerrero, L. A., Maas, G., & Hogland, W. (2013). Solid waste management challenges for cities in developing countries. *Waste Management*, 33(1), 220–232.
8. Singh, H., Rehman, R., & Bumb, S. S. (2014). Management of biomedical waste: A review. *Journal of Dental and Medical Research*, 1(1), 14–20.
9. Shanghai manual—A guide for sustainable urban development in the 21st century (Chapter 5). (2010).
10. Gowda, M. C., Raghavan, G. S. V., Ranganna, B., & Barrington, S. (1995). Rural waste management in a South Indian Village a case study. *Bioresource Technology*, 53, 157–164.

11. Sims, J. T., & Wolf, D. C. (1990). Poultry waste management: Agricultural and environmental issues. Academic Press.
12. Sharholly, M., Ahmad, K., Mahmood, G., & Trivedi, R. C. (2008). Municipal solid waste management in Indian cities—A review. *Waste Management*, 28, 459–467.
13. Marshall, R. E., & Farahbakhsh, K. (2013). Systems approaches to integrated solid waste management in developing countries. *Waste Management*, 33, 988–1003.
14. Chartier, Y., Emmanuel, J., Pieper, U., Prüss, A., Rushbrook, P., & Stringer, R., et al. (2014). Safe management of wastes from health-care activities. Appia, Geneva, Switzerland: WHO Press, World Health Organization. ISBN 978-92-4-154856-4.
15. Khan, S., Syed, A. T., Ahmad, R., Rather, T. A., Ajaz, M., & Jan, F. A. (2010). Radioactive waste management in a hospital. *International Journal of Health Sciences*, 4(1), 39–46.
16. Mathur, P., Patan, S., & Shobhawat, A. S. (2012). Need of biomedical waste management system in hospitals—An emerging issue—A review. *Current World Environment*, 7(1), 117–124.
17. Altin, S., Altin, A., Elevli, B., & Cerit, O. (2003). Determination of hospital waste composition and disposal methods: A case study. *Polish Journal of Environmental Studies*, 12 (2), 251–255.
18. Kilgroe, J. D. (1996). Control of dioxin, furan, and mercury emissions from municipal waste combustors. *Journal of Hazardous Material* 47, 163–194.
19. Baldé, C. P., Wang, F., Kuehr, R., Huisman, J. (2015). The global e-waste monitor—2014, United Nations University, IAS—SCYCLE, Bonn, Germany. ISBN: 978-92-808-4555-6.
20. Gaidajis, G., Angelakoglou, K., & Aktsoğlu, D. (2010). E-waste: Environmental problems and current management. *Journal of Engineering Science and Technology Review* 3(1), 193–199.
21. Brealey, R. (1983). Risk and return on common stocks. Cambridge, MA: MIT Press. Brennan, R., Canning, L., & McDowell, R. (2010). Business-to-business marketing (2nd ed.). London: Sage Publications.
22. Capon, N., & Glazer, R. (1987). Marketing and technology” a strategic alignment. *Journal of Marketing*, 51(July), 1–14.

23. Cui, A. S. (2013). Portfolio dynamics and alliance termination: The contingent role of resource dissimilarity. *Journal of Marketing*, 77, 15–32.
24. Day, G. (1977). Diagnosing the product portfolio. *Journal of Marketing*, 41(April), 29–38.
25. De Reyck, B., Grushka-Cockayne, Y., Lockett, M., Calderini, S. R., Moura, M., & Sloper, A. (2005). The impact of project portfolio management on information technology projects. *International Journal of Project Management*, 23(7), 524–537.
26. Fournier, S., & Avery, J. (2011). Putting the relationship back into CRM. *Sloan Management Review*, 52(3), 63–72.
27. Frei, Frances X. (2008, April 1–14). The four things a services business must get right. *Harvard Business Review* (Prod. #: R0804D-PDF-ENG).
28. Friend, S. B., & Johnson, J. S. (2014). Key account relationships: An exploratory inquiry of customer-based evaluations. *Industrial Marketing Management*, 43, 642–658.
29. Gabas-Varini, E. (2003). Project portfolio management: Get more value from IT investments.

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