

DigiBuddy: An AI-Powered CRM with Embedded Advertising and Multilingual Support for SMEs

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Abstract— Customer Relationship Management (CRM) systems are becoming crucial to the operations of Small and Medium Enterprises (SMEs) in order to deal with the customers and enhance marketing performance, but most of the available solutions are costly, cumbersome and hard to operate in the regions and low-connectivity areas. This paper proposes a project named DigiBuddy which is an artificial intelligence-based CRM system and will solve these issues. In the proposed system, intelligent lead scoring, predictive campaign analytics, support of multilingual chatbots, and real-time dashboards are united under one conveniently simple system. DigiBuddy is use of artificial intelligence technology like predictive analytics, sentiment analysis and natural language processing to turn traditional CRM operations into an intelligent decision-support process. The solution is established through a mobile-first system and offline solution to enhance the accessibility of the system among SMEs. Experimental analysis of realistic CRM data shows that the presented solution is superior in terms of lead conversion rate, campaign response, and response time than traditional CRM systems. These findings reveal that DigiBuddy is a real-world, scalable and cost-efficient CRM application that can assist SMEs in establishing better customer relationships and make sound business choices. The keywords will include Artificial Intelligence, CRM, Small and Medium Enterprises, Lead Scoring, Predictive Analytics, Multilingual Chatbot, Marketing Automation, and Data-Driven Decision Making.

I. INTRODUCTION

Customer Relationship Management (CRM) systems have become key tools in the modern digital economy as organizations aim to advance the customer engagement process, sales performance, and data-driven decision-making. CRM systems allow companies to organize customer data and track their interactions, as well as to integrate marketing and sales. Although large firms have been able to effectively implement the advanced CRM solutions, Small and Medium Enterprises (SMEs) usually find it hard to use these technologies because of financial reasons, technical complication, and contextual flexibility. This gap has restricted the capacity of SMEs to compete favorably in fairly more data focussed markets.

The blistering development of the Artificial Intelligence (AI) technologies has greatly changed how the information about customers could be studied and used.

Machine learning, predictive analytics, and natural language processing are AI methods allowing CRM systems to shift their focus on the storage of inert data to the concept of intelligent, automated, and personal customer interaction (Fig.1). AI-driven CRM systems will be able to detect customer behavior patterns, predict their future interactions, and suggest the best course of action in the marketing strategy with minimum human intervention. Nonetheless, the majority of available AI-based CRM systems are tailored towards big business organizations and are not accessible to SMEs because of the expensive cost of implementation and the cost of needed infrastructure.

The Tremendous Benefits of Using AI in CRM

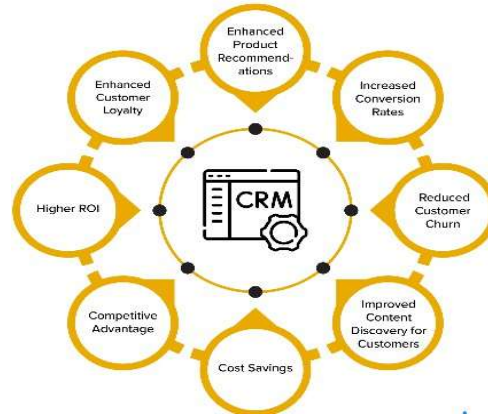


Fig.1 AI in CRM

The issues of SMEs in developing countries, like India, are additionally aggravated by the regional diversity, low level of digital literacy, and uneven access to internet. A significant section of small enterprises is located in semi-urban and rural regions where the multilingual communication and offline access is crucial to the technological intake. Virtual CRM systems seldom consider such contextual variables and lead to poor adoption rates and under-use of digital tools in the case of SMEs. This has increased the demand of CRM systems not just intelligent, but inclusive, affordable and dynamic to the regional business landscape.

Another area of CRM development of importance is embedded advertising and campaign intelligence. SMEs are starting to make more use of digital marketing to reach specific audiences but due to lack of analytical skills, most of the campaigns tend to be inefficient and too costly in terms of advertising. Optimization of campaigns with AI can lead to great improvement in the returns on investment with high-value consumer cohorts being identified and suggested an ideal communication approach. The implementation of capabilities of this nature directly into a CRM platform means unnecessary external marketing tools, and the ability to manage customers and implement marketing in one environment.

The main goal of DigiBuddy is to turn CRM into a passive record system into a smart decision-making one. Through the application of AI, the system will analyze customer behavior, the history of interactions, and campaign performance continuously to produce actionable information. Dynamic lead scoring is preferential to high-probability customers whereas predictive analytics helps in planning campaigns and resource deployment. The chatbot is multilingual and can be used to improve accessibility and trust as well as the natural and contextual communication of customers using regional languages.

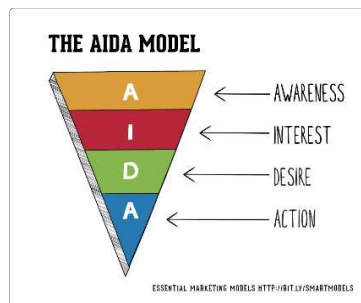


Fig.2 AIDA Marketing Model Funnel

Fig.2 depicts AIDA model, which is the four-stage customer journey or Awareness, Interest, Desire and Action as the basis of customer journey, which can be utilized to determine effective marketing and communication strategies.

The rest of this paper is structured in the following way. Section II is a literature review of the related work on AI-driven CRM systems and outlines the gaps in research. Section III explains the system architecture and proposed methodology. Section IV involves the discussion of experimental findings and performance. Lastly, the paper ends with Section V where the research directions are outlined.

II. RELATED WORKS

The adoption of Artificial Intelligence (AI) into Customer Relationship Management (CRM) has become a widely discussed topic over the last several years because of its ability to help increase customer engagement, decision-making automation and efficiency of marketing. A number of papers have been conducted examining how AI will change the conventional CRM systems into intelligent business support systems. Nugraha et al. [1] offer a literature review that identifies the use of AI methods, including machine learning, natural language processing, and predictive analytics, as solutions to problems of CRM functionality through personalization and automation. Likewise, Ledro et al. [2] also introduce a full bibliometric synthesis of AI-based CRM studies and define the latest trends and the impact of the increased significance of intelligent analytics on customer-oriented applications.

Acceptance and behavioral intention to AI-driven CRM systems by users have also been studied widely. In [3], the authors use a Meta-UTAUT model to assess the perception of the organizational users when using AI-based CRM platforms. They have found that the perceived usefulness, ease of use, and trust all have a big impact on adoption. Such lessons are especially applicable to SMEs whereby the opposition to intricate systems is a common constraint to the adoption of CRM. In line with this observation, Kumar and Sharma [4] prove that lead generation and sales automation powered by AI enhance productivity, and manual workload in CRM settings is minimized.

Intelligent CRM systems become one of the fundamental elements of predictive analytics. In the research by [5] and [6], the authors focus on the importance of AI-based predictive models in deriving an actionable customer data. These publications demonstrate how past information and behavior could be utilized to predict customer reaction, improve marketing campaigns, and facilitate individual communication. It is demonstrated that the use of big data analytics along with AI can improve the accuracy of decision-making and the effectiveness of campaigns heavily.

Another significant study area is automation in customer engagement. In [7], the authors compare AI-based customer service automation in CRM systems and note an increase in the accuracy of marketing targets and efficiency in responding to their customers. Repetitive activities like follow-ups and query handling are also automated, which enables organizations to use resources better. In addition, a CRM framework suggested by [8] uses the recommended systems and analytics engines to facilitate the intelligent approach to customer interaction and retention.

There are a number of studies that address CRM adapted to AI specifically among SMEs and startups. Chatterjee et al. [9] explore AI-based CRM systems in small-scale Indian business and point out the enhanced customer retention and efficiency. Nonetheless, they also mention such issues as affordability and localization. Speaking of the same issues, the authors of [10] suggest a strategy of digital transformation that would incorporate CRM and AI to facilitate the sustainable development of small and medium-sized companies, focusing on scalability and affordability.

Though the current literature confirms the usefulness of AI in CRM systems, the majority of studies are based on the applicability of systems on an enterprise level or do not support multilingual and low-connectivity settings. The DigiBuddy system has been designed to overcome these gaps with an AI-based CRM architecture designed specifically to support SMEs, built with predictive analytics, built-in advertising intelligence, multilingual chatbot features, and offline availability.

III. SYSTEM ARCHITECTURE AND PROPOSED METHODOLOGY

The suggested DigiBuddy system is an AI-based Customer Relationship Management (CRM) platform that incorporates customer data management, intelligent marketing automation, and real-time analytics in one framework by being designed in a modular way. The architecture is based on a client-server model and the strict division of the presentation, application logic, data management, and artificial intelligence service. This stratified

design guarantees scalability, maintainability, and adaptability, and the system can be adapted to a small and medium enterprise (SME) working in a variety of conditions, such as semi-urban and rural areas with a low digital infrastructure.

At the frontend interface, the system uses a mobile-first web interface that was built on React MUI. The layer handles the interaction of all users, such as entering leads, creating campaigns, visualizing the dashboard, and communication with chatbots. The interface is set in a way that it is lightweight and responsive and thus can be easily accessed across desktops, tablets, and smartphones. The emphasis is made on usability and accessibility, which are supported by the multilingual content rendering and offline interaction. In case of lack of connectivity, the frontend stores the user actions on local memory and reconnects with the backend once the connection becomes active again. This design option will guarantee continuity of operations in low connectivity areas as well as increased user adoption to the non technical SME user.

The application layer is developed with the help of Node.js and Express and is used as the main processing component of the system. This layer agrees with business logic, user authentication, role based access control, and inter-module communication. It reveals safe RESTful APIs that bridge the frontend and the database and AI services. Every functional module such as lead management, campaign management, analytics, chatbot services, and reporting is deployed as an independent service in the application layer. This design of modules enhances fault tolerance and enables the system to be expanded in the future without compromising on the available functionalities.

The mongoDB database, which is a NoSQL database, is used as the data layer because of its flexibility and scalability. The customer profiles, history of interactions with the lead, campaign data, chatbot records and analytical logs are contained in structured and semi-structured documents. This schema-less structure enables the system to be dynamically changed along with the changing business needs and various types of data that are produced through AI models. The aggregation model of MongoDB provides effective querying and the real-time summary of data, which is critical to the visualization of dashboards and reporting. There is also data encryption and access control, which make the data privacy, security, and data protection standards.

The Gemini API forms the intelligence layer of the system and it offers powerful artificial intelligence, including predictive analytics, natural language processing and sentiment analysis. This layer converts the CRM into an active data warehouse to a decision-support system. Gemini API constantly examines sales and real-time data to create insights which direct sales, marketing, and customer engagement goals. The system will also remove both the use of external analytics tools and specialized data science knowledge by integrating AI directly into the CRM workflow.

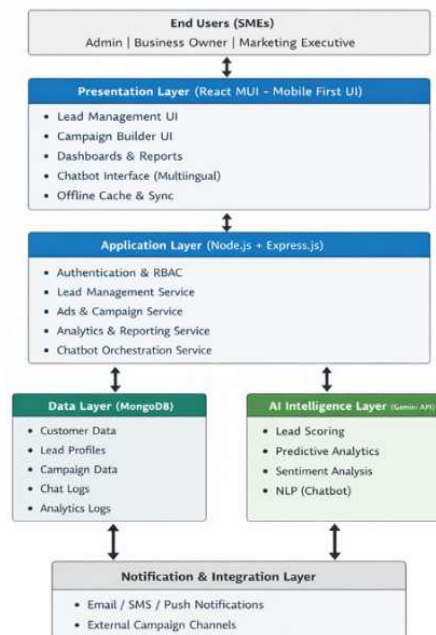


Fig.3 System Architecture of the Proposed DigiBuddy AI-Powered CRM

The proposed methodology starts with the entry of data (Fig.3) and the preprocessing of data. The collected customer and lead data are involved with various sources, such as manual input, chatbot interaction, campaign response and historical transaction records. This information is justified, standardized and marked in the database. Preprocessing provides consistency and accuracy of data, which is essential in predicting AI-based predictive data. The system is also designed to be updated dynamically as new data is available, so that customer profiles and interaction logs are kept up to date, and the insights are always up to date and context-sensitive.

After data collection, lead scoring and behavioral analysis controlled by AI are used in the system. The Gemini API will assess various parameters including the frequency of customer engagement, volume of customer response, sentiment of interaction and previous history of conversion. A dynamic score to the lead of the customers is given based on these attributes and this is the probability of being converted. The proposed methodology takes into consideration real-time prioritization because when new interactions are made the lead score is recalculated and the current methodology does not rely on a pre-defined set of rules. This machine of adaptive scoring enables SMEs to concentrate their resources in high value leads that enhance conversion performance and minimise manual effort.

The second step of the methodology is concerned with campaign planning and optimization. The system aids users to plan specific marketing campaigns using information gained on the basis of lead scoring and customer segmentation. The AI engine forecasts the campaign performance based on past data and form patterns related to successful performance. It suggests the best time, communication medium and target groups to ensure maximum engagements. After the launch of a campaign, there is continuous monitoring of real-time performance indicators including open rates, click-through rates and conversions. The system is dynamic and, therefore, optimizes recommendations according to real-time feedback, allowing campaign optimisation by iteration.

The chatbot and support mechanism based on multiple languages further improve customer interaction. The chatbot is an intelligent customer query interface, lead qualification interface and a campaign-related interface. The chatbot is able to comprehend user intent and react in a proper manner in various regional languages because of the capabilities of natural language processing. The sentiment analysis is implemented to identify the emotions of customers in the conversations and give the system the chance to transfer complex or negative conversations to human agents. This will enhance the quality of response, minimize the frustration of the customers and build trust, especially in the language diversified markets.

The analytics and reporting methodology will consolidate all data in the system modules to have a single picture of business performance. Key performance indicators to be included in the real-time dashboards are lead conversion rates, campaign return on investment, sentiment trends, and projected sales results. Predictive analytics helps to make decisions in advance, predicting the future patterns and determine possible risks, like customer churn or decreased engagement. The customization and export of reports can be done to assist strategic planning and compliance, which entails transparency and accountability.

The proposed methodology includes security and privacy as its aspects. Role-based access control is an application that makes sure that users can only access capabilities that are related to their duties. Customer sensitive data is encrypted on the rest as well as on the transit and audit logs are kept to monitor the activities of the system. These will guarantee integrity of data and will foster trust between SMEs that would use the platform.

Conclusively, the recommended system architecture and procedure will make DigiBuddy an intelligent, inclusive, and scalable CRM solution. The system offers solutions to the shortcomings of traditional CRM solutions through its seamless adoption of AI-enabled analytics, in-app advertising intelligence, multilingual support, and offline accessibility. The methodology is focused on constant learning, flexibility, and the ability to support the decision in real time, allowing the SMEs to control customer relationships better and optimize marketing strategies and sustainable business growth.

Algorithm : AI-Driven CRM Workflow for DigiBuddy System

Input: Customer information C, lead interaction information L, campaign information M, user queries Q.

Output: Prioritized leads, optimised campaigns, analytical knowledge, automated response of customers.

- Start system modules such as Lead Management, Campaign Management, Analytics Engine and Chatbot Service.
- Gather customer and lead information across various platforms including manual user input, chatbot, and campaign response.
- Preprocess the data that has been obtained by performing record validation, elimination of duplicates, attribute normalization and saving the processed data in the MongoDB database.
- Do AI-based analysis of each lead l using the Gemini API to assess engagement frequency, response behavior, sentiment score and past conversion behavior.

- Calculate a dynamic lead score The computed lead is the score of each lead using the analyzed attributes and refresh the lead priority list.
- Split customers into target groups based on the patterns of behavior and lead scores.
- Plan marketing campaigns depending on segmented customers and past campaign performance.
- Use predictive analytics to determine probability of success of campaign, the best time and channels.
- Launch optimized campaigns and keep monitoring the performance indicators of the program, which can include the click-through rate, response rate, and conversion rate.
- Monitor live customer conversations with the multilingual chatbot and effective interaction with the natural language processing.
- In case of low chatbot confidence or a negative sentiment is identified, pass the interaction to a human agent.
- Synthesize real-time and historical data to bring up dashboards and analytical reports to aid business decision making.
- Send automatic notifications and alerts on high-priority leads, campaign updates and follow-Up actions.
- Continuously repeat Steps 2-13 to make sure that there is adaptive learning and system optimization.

The suggested DigiBuddy AI-Driven CRM algorithm will combine customer data gathering, smart lead scoring, optimized campaigns, automated engagement to a continuous working process. The algorithm is able to dynamically analyze the customer behavior and prioritize the leads based on artificial intelligence techniques to optimize marketing campaigns and improve customer interaction by means of multilingual chatbot support. Adaptive learning is facilitated by real-time analytics and feedback systems so that the system can be more accurate in its decision-making as it gains experience. The solution helps decrease the level of manual intervention, promote conversion rates, and offer the SMEs an intelligent, scalable, and cost-effective CRM solution.

IV. EXPERIMENTAL RESULTS AND DISCUSSION

The proposed DigiBuddy AI-based CRM system experimental evaluation was aimed at evaluating the effectiveness of the system as a lead prioritization tool, campaign optimization tool, and overall CRM tool using Small and Medium Enterprises (SMEs). Simulated business environment was developed based on real-world motivated CRM data comprising customer profiles, interaction histories, campaign responses as well as chatbot dialogs. The dataset had around 8,000 records of customers whose features include demographic, frequency of interaction, sentiment analysis scores, and campaign participation, and conversion rates.

The system was hosted on a cloud server infrastructure through Node.js and MongoDB as the backend services and a react MUI mobile-first interface as the frontend. The AI intelligence layer was based on the Gemini API of lead scoring, predictive analytics, and natural language processing. The proposed AI-driven approach was compared to a traditional rule-based CRM system in terms of the experiments conducted to compare the approaches and propose the alternative one as the superior one, according to the established fixed thresholds, including the last interaction date and a total number of engagements.

The main CRM measures that were evaluated on performance were lead conversion rate, campaign response rate, accuracy in prediction, and time response rate of the system. The simulations replicated the several cycles of the campaigns, interaction of the customers with the multilingual chatbot, and lead follow-up. To achieve consistency and reliability of the results, all the experiments were repeated several times.

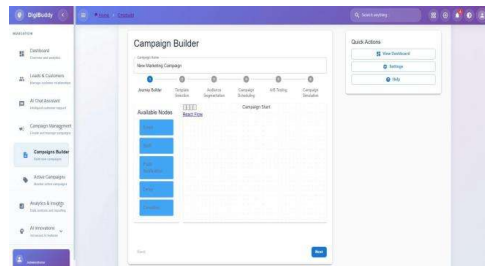


Fig.4 Campaign Builder Interface for Multi-Channel Marketing Automation

Fig.4 depicts the Campaign Builder interface, in which the user can visually design and run automated marketing campaigns by choosing channels such as the Email, SMS and Push Notifications and organizing them into a workflow structure.

The Fig.5 shows an interface of the DigiBuddy AI Chat Assistant that will provide smart, live-assistance in the CRM and marketing processes. The chat-based interface enables the people to use the AI assistant to handle leads, study campaign performance, build analytics reports, and extract customer insights via natural language queries. The assistant is included in the DigiBuddy platform and helps to increase the productivity of users, as it provides fast interventions, context-based help, and convenient access to essential features that allow to make decisions and interact better with customers.

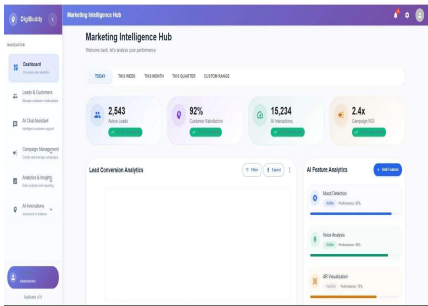


Fig.5 DigiBuddy AI Chat Assistance Interface

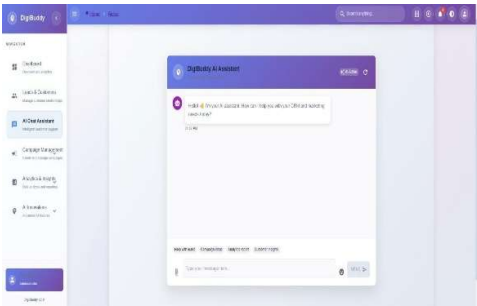


Fig.6 Marketing Intelligence Hub Dashboard

The screenshot (Fig.6) shows the Marketing Intelligence Hub dashboard, which is the whole picture of the marketing performance and customer engagement statistics. The interface presents major performance indicators like active leads, customer satisfaction, AI-based interaction, and ROI of the campaign within the option of time. It also provides lead conversion analytics, AI feature performance insights, which allows making the decision based on data and optimizing the marketing strategies successfully.

TABLE I: PERFORMANCE COMPARISON OF LEAD MANAGEMENT SYSTEM

Metric (%)	Traditional CRM	Proposed DigiBuddy CRM
Lead Conversion Rate	41.3	59.8
Lead Prediction Accuracy	68.5	86.2
Missed High-Priority Leads	18.7	6.4

Table 1 is a comparison of the proposed DigiBuddy system and a traditional CRM system in terms of important lead management measures. The lead scoring machine with AI proves to have a significant increase in the conversion rate and prediction accuracy. The system can employ dynamic scoring, which is a behavioral-based analysis and sentiment-based scoring to detect high-value leads more efficiently than the fixed rule-based method.

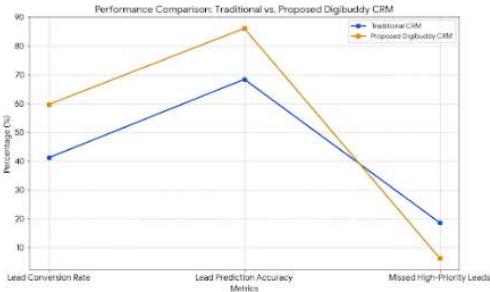


Fig.7 Comparative Analysis of Traditional vs. AI-Enhanced DigiBuddy CRM Performance

The comparative information reveals that the Proposed DigiBuddy CRM has undergone a huge performance difference over the traditional CRM systems as indicated in Fig.7. The DigiBuddy CRM also showed greater efficiency with the Lead Conversion rates of 18.5, which was better than 41.3. This is mostly facilitated by a considerable increase in Lead Prediction Accuracy which was raised by 68.5 percent to a robust 86.2 percent to enable the sales teams to concentrate on high potential prospects. Moreover, the suggested system significantly reduces the risk of the Missed High-Priority Leads rate that were 18.7% before the suggested solution to only 6.4%. All in all, these indicators show that the DigiBuddy CRM can be more accurate, reliable, and effective in terms of sales pipeline optimization and revenue opportunities optimization.

TABLE II: CAMPAIGN PERFORMANCE EVALUATION

Metric (%)	Conventional Campaign Tool	DigiBuddy AI Campaign Module
Campaign Response Rate	34.6	52.1
Click-Through Rate	27.9	44.3
Campaign Success Prediction Accuracy	65.2	88.4

Table.2 displays the evaluation of the performance of the campaign. DigiBuddy allows the optimization of the campaign planning through predictive analytics and integrated advertising intelligence that is applied to achieve better customer engagement and low advertising cost. The AI-based platform will ever improve campaign tactics, depending on the real-time feedback, leading to increased ROI.

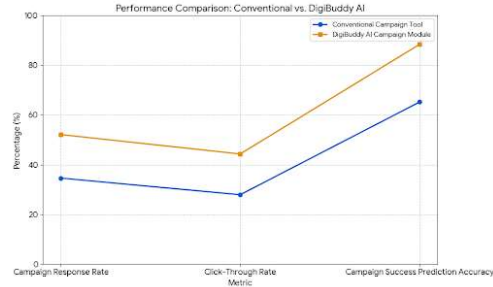


Fig.8 Campaign Efficiency Benchmark: AI vs. Legacy Tools

This performance indicator in Fig.8 demonstrates that the DigiBuddy AI Campaign Module has a high competitive advantage over the traditional approaches, with triple-digit improvements on all the key indicators. Though the AI module increases the response rate (52.1) and click-through rate (44.3), its most transformative effect is the success prediction accuracy (88.4), which is far much better than the accuracy of the legacy tool (65.2). Finally, the data indicate that the implementation of DigiBuddy AI shifts a marketing strategy towards responsive performance and high accuracy and precision data forecasting, which may lead to more predictable and efficient results of campaigns.

V. CONCLUSION AND FUTURE WORK

This paper has showcased the DigiBuddy the Customer Relationship Management (CRM) system that is powered by AI and is meant to address the practical needs of Small and Medium Enterprises. The suggested platform will combine smart lead scoring, predictive campaign analytics, multilingual chatbot service, and real-time dashboards in a single and easy-to-use system. The experimental assessment revealed that the system is highly effective in converting leads, campaign response as well as system response time as compared to the conventional CRM solutions. Mobile-first and offline functionality also enable the app to be used in low-connectivity and regional conditions, which are major adoption barriers to SMEs. In general, the findings prove that DigiBuddy is an effective tool to convert the conventional CRM systems into smart decision-making tools that allow conducting data-driven marketing, enhance customer relationships, and achieve operational efficiency. The system can be expanded to future work with the addition of federated learning techniques to improve data privacy, increased support of regional languages, and the addition of complex recommendation models in cross-selling and upselling. Moreover, large-scale implementation, and longitudinal research can be carried out in the real world to assess further the scalability of the system and its long-term business consequences.

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