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SiAnggar: An AI-Assisted Business Budgeting Website to Enhance the Financial Literacy of Rural MSMEs

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Abstract: *Rural MSME actors demonstrate persistent weaknesses in business budgeting. Manual financial records are the norm, personal and business finances are not separated and traditional training methods have not produced sustainable practical skills. This community service program is intended to improve the financial literacy of MSME actors in Malang Regency by developing a website for business budgeting with an artificial intelligence (AI) assistant named SiAnggar. SiAnggar has two main features. The first is an AI assistant that answers budgeting questions in a clear and contextual way. The second is an interactive learning module which includes a pre-test and a post-test. The system employs the System Development Life Cycle (SDLC) methodology. SiAnggar combines operational and education aspects. The modules range from Business Budgeting Basics to Basic Financial Ratios. There are six modules in all. The modules are sequential in nature and are practiced in the app itself. SiAnggar's innovation is the combination of a literacy curriculum with practical tools, AI-driven prescriptive insights, a companion persona and sector-specific personalization*

INTRODUCTION

Micro, Small and Medium Enterprises (MSMEs) play a big role in Indonesia's economy. MSME industry creates job opportunities, distributes the wealth equitably to the people in different parts of the country, and hence leads to economic development in different parts of the country (Hidayat et al., 2022). MSMEs have a big role in the economic system of the country. But their financial management practices have been insufficient. The owners of MSMEs often mix personal and business finances, find it difficult to control the flow of money into and out of their business and do not have a long term financial planning strategy (Sudarma & Wulandari, 2025).Therefore MSMEs are vulnerable to the negative impacts of unforeseen events and are not able to grow sustainably.

The challenge is essentially about financial literacy, which can be understood as the knowledge, skills and self-confidence needed to make informed choices regarding one's finances. Data from the 2022 National Financial Literacy and Financial Inclusion Survey (SNLIK) show that the National Financial Literacy Index is 49.68%, far below the Financial Inclusion Index of 85.10% (Finance, 2023). "So, while access to financial services has

improved, knowledge about how to access them has not." There is evidence that financial literacy is related to financing decisions and capital structure of small businesses (Basha et al., 2023). Financial literacy also influences the efficient use of formal financial services (Ansar et al., 2023). The systematic review of MSME financial literacy also supports that financial competence of business owners is a key determinant of business performance and sustainability (Is et al., 2025).

One of the dimensions of financial literacy that is least mastered by MSME actors is business budgeting. A budget is a planning, control and co-ordination tool. With a budget business actors can plan revenue, budget costs and measure performance. Budgeting affects the profitability of micro, small and medium enterprises (MSMEs) as well (Harahap et al., 2024). The record is straightforward, and the level of financial literacy in MSME groups in rural East Java is distinct (Widodo & Mukhlis, 2023).

Based on observations in several villages in Malang Regency, there are several problems faced by MSMEs, namely: not yet preparing written budgets, financial recording still manual and not continuous, not separating personal finances and business finances, and limited understanding of the concept of costs, cost of goods and cash projections . If these problems are not handled, they risk reducing the competitiveness of businesses, making it difficult to access formal financing and making the actors of MSMEs vulnerable to risky financing.

Community service programs were mainly done through face-to-face training and engagement in the past. It provides a good basis for basic understanding but lacks sufficient practical skills and long-term sustainability after the activities. According to Sudarma and Wulandari (2025) the business budgeting training in Malang has enhanced the participants understanding. The lowest score was on the practical skills portion that required mentoring after. This shows the need for educational resources that are available at any time and can help entrepreneurs on their own after the activity. The interactive modules have shown the ability to improve the competence of managers and improve the practical accounting skills of MSMEs (Afriani et al., 2025). Tiana and Fanther (2023) assert that the digitalisation of financial management leads to a heightened frequency of business financial management activities.

Generative artificial intelligence (AI) offers innovative opportunities to improve the financial management skills of small, resource-scarce enterprises. Metzger et al. (2025) suggests that generative artificial intelligence assists small and medium-sized enterprises to develop their financial management practices through the availability of real-time analysis. But it works best when the organization is ready for it and the user can understand the information. In the educational field, LLMs could serve as personal tutors providing personalized explanations according to the learner's needs but their use should be balanced with precision and ethical considerations (Dwivedi et al., 2015; Kasneci et al., 2023). At the same time, the readiness of micro, small and medium enterprises (MSMEs) in developing countries for artificial intelligence (AI) technology is very low (Kulkarni et al., 2024). The perceived ease of use and perceived benefits are determinants that influence the adoption of fintech among Indonesian MSMEs (Nugraha et al., 2022). Consequently, AI-driven solutions for rural MSMEs must be uncomplicated, relevant, and accompanied by guidance.

Based on the above description, the community service team developed SiAnggar, a website that functions as a business budgeting module for MSME actors. The uniqueness of

SiAnggar compared to conventional training and typical financial recording applications lies in two integrated features, namely an AI Assistant and an interactive learning module. The AI Assistant will answer user questions about budgeting concepts and preparation in simple and contextual language. The interactive learning module is equipped with pre-tests and post-tests, so that improvements in user understanding can be measured quantitatively.

IMPLEMENTATION METHOD

SiAnggar was developed using the waterfall SDLC model supplemented with feedback from partners at each stage. SDLC is a systematic framework for software development that includes communication and planning, modeling, construction, and delivery of the system to users. The SDLC stages are integrated with the community service stages (socialization, training, mentoring, and evaluation) so that system development proceeds in tandem with partner empowerment.

Table 1. Integration of SDLC stages and community service activities

SDLC Stage	Activity	Output
Planning & needs analysis	Observation, interviews, and FGDs with MSME actors and village officials; mapping of budgeting problems; pre-assessment of financial literacy	User requirements document (functional & non-functional)
System design	Design of system flow, database, interface, learning module materials, and AI assistant scenarios	System design & module content
Implementation (coding)	Development of the SiAnggar website: budget preparation module, AI assistant, interactive learning module (pre-test/post-test), dashboard	SiAnggar prototype
Testing	Functional testing using black-box testing; content validity testing by experts; limited trial by partners	Validated system
Deployment to users	Socialization & training on using SiAnggar; practice in preparing each business's own budget	Users are able to operate the system
Maintenance & evaluation	Periodic mentoring, improvements based on feedback, measurement of learning effectiveness and usability	Evaluation report & sustainability plan

RESULTS AND DISCUSSION

Today, financial literacy is seen as a basic skill that influences the quality of economic decisions made by individuals and organizations (Lusardi & Mitchell, 2023). In today's digital world, financial literacy is no longer sufficient if measured only by conventional knowledge because business actors also need digital financial literacy to be able to use financial applications and technology (Zaimovic et al., 2025). In this context, SiAnggar was developed as an AI-based business budgeting platform that integrates financial work tools with budget literacy learning. SiAnggar is provided with access features as business owner, manager and finance staff that can be selected by the users. SiAnggar also has beginner, intermediate, and

advanced level features.

The platform consists of two complementary parts: an operational part (called "Module 1 — Basic Budgeting") and an educational part (called "Learning & Help"). The functional part includes Dashboard, Budget Preparation, Realization Recording, Expenditure Categories, Budget Reminders and Reports & Analysis. The educational part includes Learning Modules, Literacy Quizzes and a question and answer service called "What Would You Like to Ask?". This two-layer design enables users not only to operate the tool, but also understand the concept behind each figure, thus forming practice-based learning (learning through doing).

The SiAnggar interface is characterized by the persona of a companion, “Angga & Anggi – SiAnggar’s Young Accountant Team” that greets users in a simple, communicative language. Users are segmented by sector and role e.g. culinary sector with the role of business owner which allows content to be contextualized to specific business. Dashboard Shows key indicators like daily income, daily expenses, month to date profit vs target and cash balance. It also delivers AI-powered insights such as cash forecasts, savings recommendations and a Financial Health Score. Hence, the Dashboard is not only a visual representation of data but also a decision support system.

The SiAnggar learning space consists of 6 short modules with 5 steps in sequence thus the learning steps are 30. The modules have been sequenced gradually from basic concepts to complex ratio analysis. This follows the scaffolding principle to support learning in increments, depending on the current ability of the learner. At the end of all the modules, participants are asked to take a Budget Literacy Quiz of 10 questions to assess their knowledge level.

Module 1: Business Budget Basics

Module 1 – A budget is: A financial plan. Why does this matter for MSMEs? The material describes a budget as a quantitative financial plan for one period, and explains the role of the budget in planning, coordination, and control. It also emphasizes the benefits of budgets in preventing waste. This module is directly related to the Budget Preparation feature. Here the users enter the estimated amounts per category in an editable table where rows can be added or deleted.

Module 1’s strength is that it makes it easy to understand things micro business owners find complicated. The budget preparation feature includes a term-help icon that pops up when the cursor hovers over a category name so users don’t need an accounting background. Profit calculations are automatic as soon as amounts are entered, so users see immediately the consequences of each allocation decision. This immediate response accelerates the learning of cause and effect in financial planning and fosters a habit of planning before spending.

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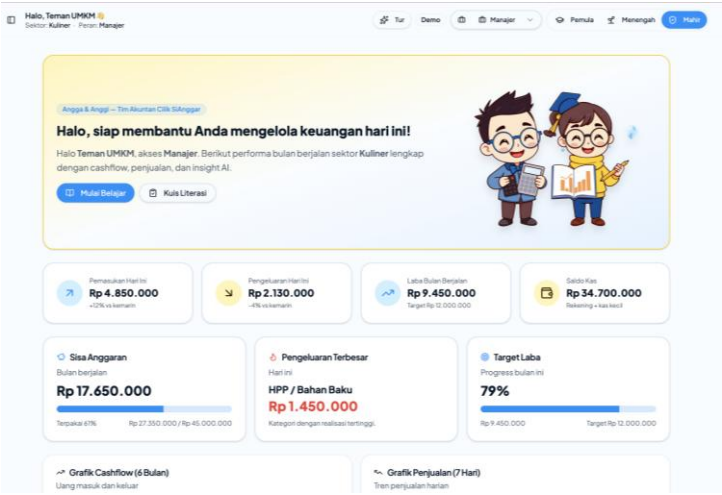


Figure 1. Basic Budgeting-Home Screen

Module 2: Income vs Expenditure

Module 2 looks at recording and classifying transactions as income or expenses. The material covers: Identifying income sources. Separation of cost of goods sold (COGS/raw materials) from operating expenses, salaries, marketing costs and other expenses. The importance of separating personal and business finances. This module is supported by the Actual Transactions Recording and Expenditure Categories features within the operational component.

Module 2's strength lies in building disciplined transaction classification, which underpins all financial reporting. Consistent categorization helps users see exactly where their money is going and which categories place the greatest financial burden on the business. The notification feature complements this module, for example, by issuing an "Operating category over budget" warning when actual expenditure is 12% above budget. Classification knowledge is combined with automated alerts, turning learning into tangible cost-control measures.

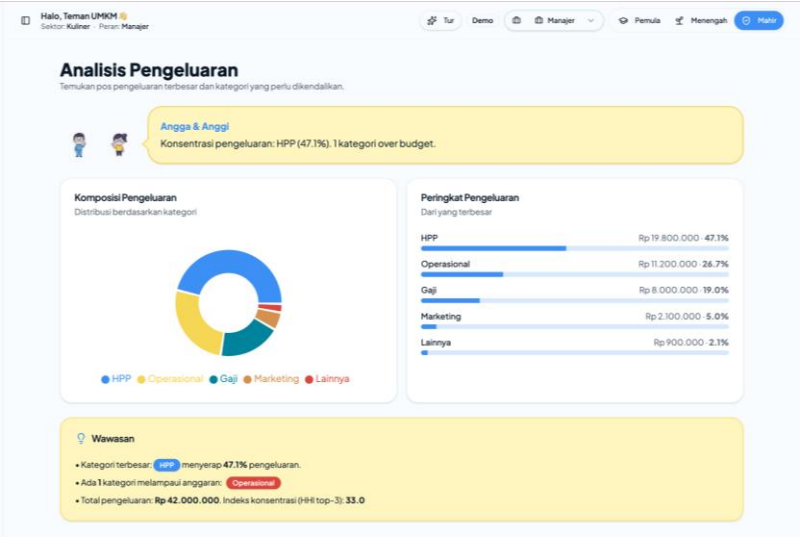


Figure 2. Expenditure Analysis of SiAnggar

Module 3: Understanding Cash Flow

In Module 3 cash flow is referred to as the 'lifeblood of a business' and the difference between making a profit and having cash is explained. The material covers cash inflows and outflows, the impact of receivables and payables on the cash position, and the risk of not having sufficient liquidity even if the business is profitable on paper. The module contains a Six Month Cash Flow Chart and a Payment Calendar showing schedules of receivables and payables due.

One of the advantages of Module 3 is the integration with an AI-powered cash forecasting capability. AI Insights cash forecasts include a risk status, so users can anticipate liquidity conditions before they occur. The use of predictive models for the prediction of the financial performance of micro, small and medium enterprises (MSMEs) is a new research direction in the applied artificial intelligence literature. The module helps MSME owners to think ahead, not just record what happened in the past.

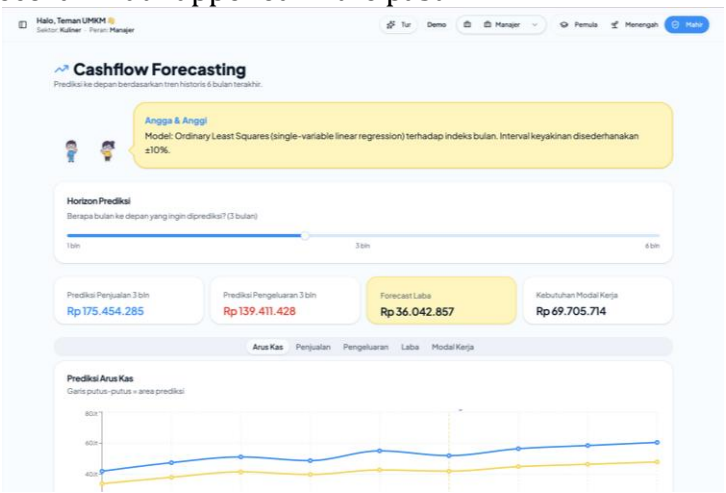


Figure 3. Cashflow Forecasting

Module 4: Simplified Profit and Loss

In Module 4, you will learn how to calculate the monthly profit or loss for a business using a simplified profit and loss statement. The material explains how to calculate gross profit by subtracting COGS from revenue, and then net profit by subtracting operating expenses. Users are also helped to understand the meaning of margins and to analyze profits variations between periods.

Module 4's strength is its link to setting measurable profit targets that can be directly tracked. Users not only learn how to calculate profit, but can also regularly track their progress toward their goals with the help of visual cues. This is consistent with the principles of management by objectives, where the definition of clear objectives leads to more disciplined management practices. For MSMEs used to judging business success by the notes in the cash drawer, this module gives a more accurate, objective view.

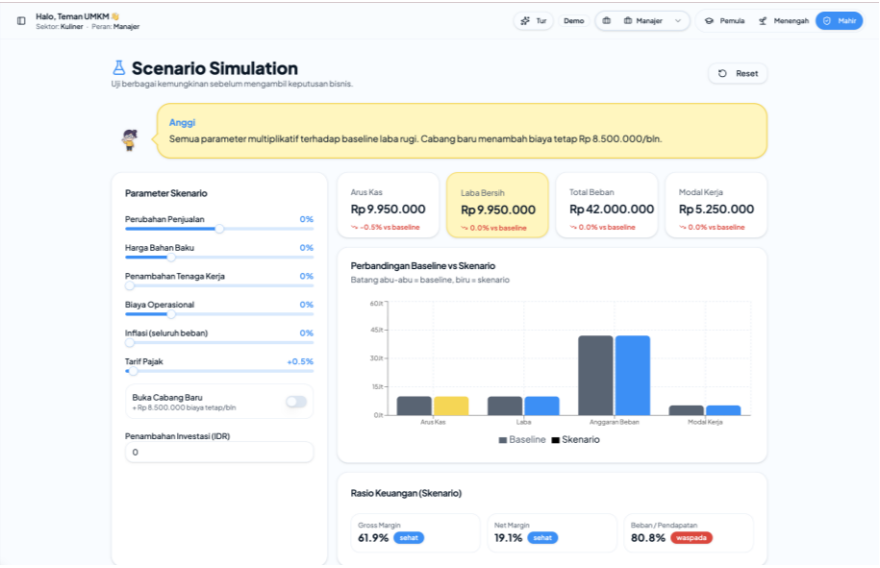


Figure 4. Simulation of a Simple Profit and Loss Scenario

Module 5: Budget vs Actual

In module 5 you will learn how to perform variance analysis (comparing budget figures with actual figures). This material explains how to calculate the variance between budget and actual figures, how to distinguish between favorable and unfavorable variance and how to determine corrective actions. This module is assisted by the Budget Reminder feature, which warns users when actual figures are approaching or exceeding set limits.

The strength of Module 5 is that it links planning (Module 1) and recording (Module 2) and thus completes the budgeting cycle. If the budget were not compared to the actual figures, there would be no effect on behavior; the budget would be a formal document. The module is enhanced with AI insights such as suggesting a 15% cut in marketing budgets after conversion rates dropped in the last fortnight. This data driven recommendations is one example of how artificial intelligence can act as a virtual financial advisor in facilitating corrective decision making.

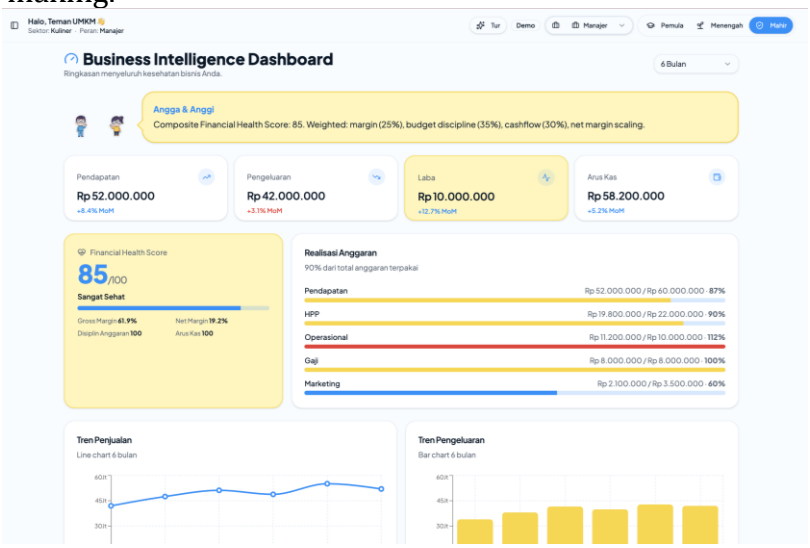


Figure 5. Business Intelligence Dashboard

Module 6: Basic Financial Ratios

Module 6 is a higher level module that deals with indicators of business health using basic financial ratios. These may include liquidity ratios, profitability ratios such as profit margins, and cost-to-revenue efficiency ratios. This module closely parallels the Financial Health Score on the dashboard, which combines a range of indicators into a composite score. As it is the final module in the sequence, ratio analysis requires an understanding based on previous modules five.

The strength of Module 6 is that it helps SME owners move from the recording stage of data to the stage of analyzing and evaluating the data. Understanding financial ratios is important for SMEs that want to get financing from banks or investors as financial institutions use such indicators to judge the viability of a business. To meet this need there is the Report Center feature. There are seven types of reports available that can be exported to PDF, Excel or CSV for use in meetings or when dealing with banks. Thus Module 6 directly contributes to enhancing SMEs' readiness to access finance.

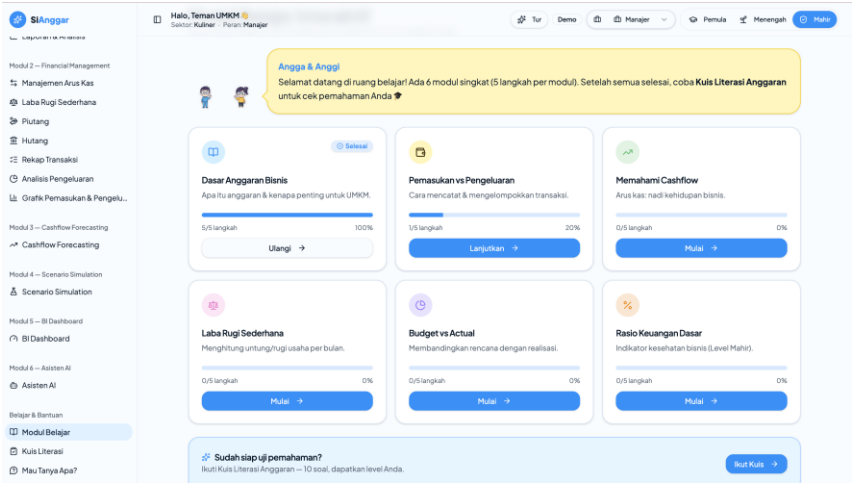


Figure 6. Learning Module

Besides the six modules, SiAnggar also provides a Budget Literacy Quiz containing 10 questions to measure and classify the users' level of understanding. This quiz is a formative assessment and pre- and post test tool in community service programmes and research. The 'Got a Question?' service has a Q&A channel where users can ask contextual questions without waiting for a mentor. The modules, quizzes and Q&A service work together to create a self-directed learning ecosystem that continues to function after face-to-face training has ended.

By category, budget reports are available at the Reporting Centre. Data can be exported in a variety of formats for further processing in spreadsheet applications or for import into accounting and business intelligence systems. This kind of interoperability is important as growing SMEs tend to graduate to more complex accounting systems. Therefore, SiAnggar is an entry point to the digitalisation of SME finances, not a closed system.

SiAnggar innovates by integrating budgeting tools with structured financial literacy curriculum in one single platform. The current SME financial record keeping applications are focused on transactional functions. Financial literacy programmes are mostly in the form of face to face training and they are separate from practical tools. SiAnggar has both. The

concepts in every module can be directly applied to the relevant operational features. The integration responds to the need for digital financial literacy, which includes knowledge, skills and confidence in the use of digital resources (Zaimovic et al., 2025).

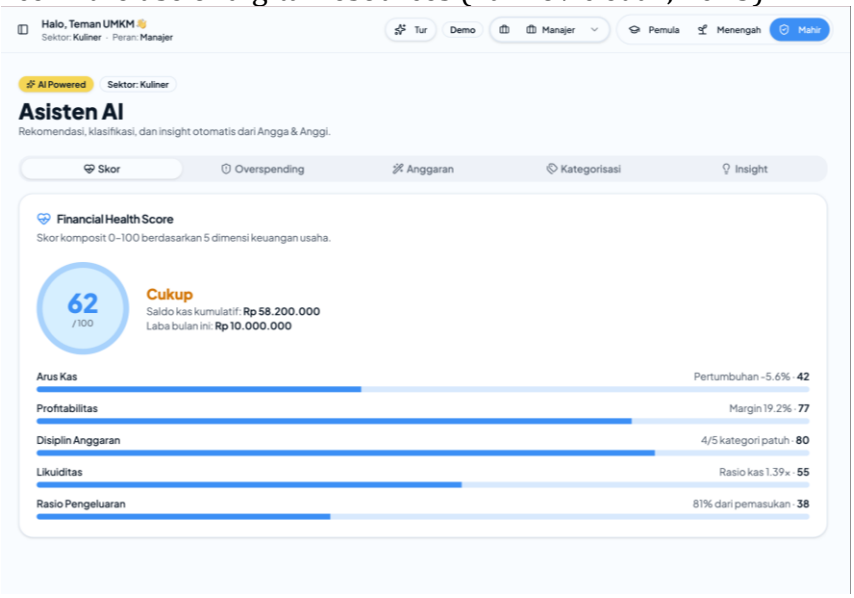


Figure 7. AI Assistant

The second innovation is the use of artificial intelligence to generate prescriptive insights that are easy for micro-entrepreneurs to digest, such as cashflow forecasts, cost-saving recommendations and financial health scores. The research on generative artificial intelligence in financial management of MSME reveals that the technology has the potential to improve the analytical capacity of small businesses that have always been limited by resources. The third innovation is the anthropomorphic approach through the persona of Angga & Anggi that decreases the psychological barriers for users who have low digital literacy levels. Fourth, there's personalization by sector and user role, meaning the content and analysis are relevant to the business context, for example the catering sector.

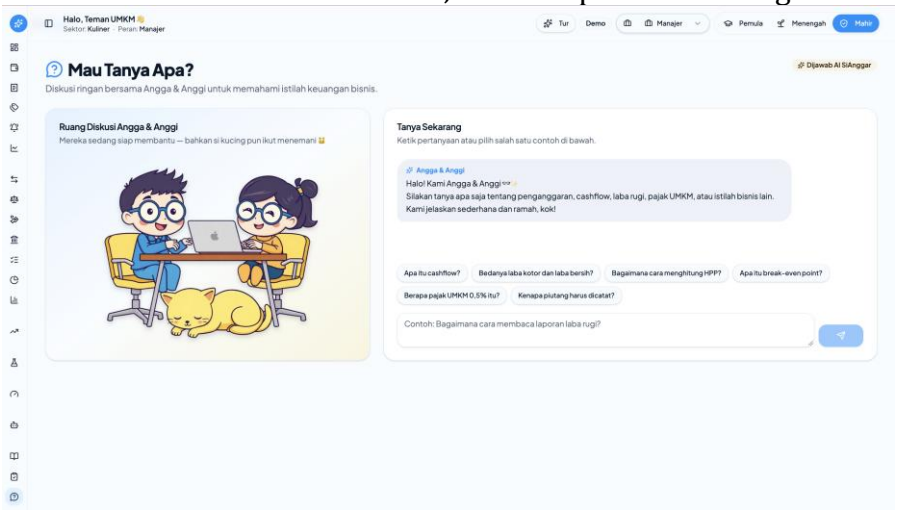


Figure 8. Menu for the Angga and Anggi Discussion Forum

Previous studies have mainly examined the relationship between financial literacy, financial technology and MSME financial management through quantitative, survey-based

methods. These studies provide empirical evidence for the importance of financial literacy, but generally stop short at measurement and do not result in interventions in the form of technological artifacts that can be used immediately. SME financial literacy is also identified as an emerging research field with a significant demand for model development and intervention studies in bibliometric reviews (Molina-García et al., 2023). SiAnggar provides an answer to this gap with concrete intervention that can be measured with financial literacy quizzes before and after the intervention.

CONCLUSION

SiAnggar is an innovative business budgeting platform with artificial intelligence that integrates operational and educational functions. The six modules – Basics of Business Budgeting, Income vs Expenditure, Understanding Cash Flow, Simple Profit and Loss, Budget vs Actual and Basic Financial Ratios – are designed as a step-by-step learning path and map directly to the features of the app. The new part is it pairs a financial literacy curriculum with practical tools, AI-generated prescriptive insights, a personalized guide and industry-specific customization. The platform also fills a gap in research, as there are few technological interventions for rural micro-enterprises with varying degrees of financial and technological literacy.

Practically SiAnggar has the potential to enhance the financial capabilities of MSMEs through an integrated cycle of planning, record-keeping, control and evaluation. The platform could be a topic for further research, theoretically, for instance, by testing the acceptance and effectiveness of the platform using the Technology Acceptance Model or Design Science Research. However, there are still limitations such as dependency on internet access, quality of data entered by users and accuracy of AI predictions which need to be validated against real world data. Hence, regular field evaluations are necessary to make sure that the recommendations generated are in accordance with the actual conditions of the businesses.

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