Design and Implementation of An Efficient Information System for Broiler Chicken Rearing: A Case Analysis VR Broiler Farm

Marhani Wiji Ayu Kusumawati
Informatics Study Program, Faculty of Science and Technology, Universitas Teknologi Yogyakarta, Yogyakarta Special Region, Indonesia.
E-mail: marhaniwij@gmail.com

Muhammad Fachrie *
Informatics Study Program, Faculty of Science and Technology, Universitas Teknologi Yogyakarta, Yogyakarta Special Region, Indonesia.
E-mail: muhammad.fachrie@staff.uty.ac.id

Abstract: With the rapid advancements in information technology, there is a corresponding increase in the competitiveness of business enterprises. In this context, the utilization of computerized business management administration is recommended to streamline business operations, thereby enhancing efficiency and effectiveness, ultimately leading to increased profitability. VR Broiler Farm, a specialized broiler chicken farming business, currently records its broiler chicken maintenance data manually. This practice, stemming from a lack of utilization of contemporary technology, leads to longer data recording processes and potential data inconsistencies. Given this scenario, there is a clear need for an information system tailored for poultry farmers to facilitate faster and more efficient data recording. This system would cover various aspects including scheduling identification, chicken feed requirements, mortality rates, total chicken count, and other data relevant to broiler chicken farming. Therefore, the implementation of an information system for managing broiler chicken farming can provide valuable insights into the developmental trends of broiler chicken production.

1. Introduction

VR Broiler Farm is among the numerous enterprises operating in the broiler chicken farming industry. Known for their rapid growth, broiler chickens are a significant source of meat, offering a quick turnaround from rearing to harvest. Consequently, broiler chicken farming has emerged as a new opportunity to enhance community economies. This business, suitable for those with the necessary resources and expertise, shows promising prospects due to high market demand. Additionally, the development of chicken farming ventures could become a cornerstone for affordable and accessible animal-based food sources in the future. However, a thorough analysis is crucial to determine the viability and success of such enterprises. Historically, VR Broiler Farm has relied on manual recording for broiler chicken maintenance, a practice attributed to the limited use of modern technology among broiler chicken farmers. This is a significant oversight, considering the rapid advancements in information technology that have accelerated various business sectors. A lack of technological know-how is evident in the manual data recording processes, leading to data inconsistencies and inaccuracies due to illegible handwriting and data loss. Consequently, VR Broiler Farm faces challenges with inaccurate data, which can lead to various operational problems, including physical and material losses – a critical issue that needs addressing for business continuity.

Therefore, there is an urgent need for technology that can support and mitigate these risks. To this end, a mobile-based application for chicken farm management has been developed. This application aims to facilitate the input and real-time display of daily livestock data. It is anticipated that the application will provide essential daily data for the company, which is crucial for the owner and company leadership. The resulting data is expected to be more effective and efficient, reducing the risk of data loss and damage, ultimately benefiting the farming operation.

Previous studies in the field of agricultural technology have significantly contributed to enhancing farm management and operations. Subowo and Saputra (2019) developed a mobile application that features articles on broiler chicken farming, accessible to registered extension workers and farmers. This application also facilitates discussions among these groups, thereby emerging as a vital information source for aspiring broiler chicken farmers [1]. Novrian et al. (2021) furthered this development by creating a mobile app with comprehensive features, including user and partner registration, investment facilitation, financial transactions, and report generation [2]. Similarly, Sudianto and Sadali (2021) focused on layer chicken farming, introducing an Android application designed to ease communication between investors and farmers, simplifying the investment process [3]. Huriati et al. (2020) contributed by designing a system for monitoring layer chicken development, improving the efficiency of tracking various farming aspects such as chick growth, productivity, and health management [4]. Mukmin et al. (2019) took a broader approach by creating a livestock commodity information system, which streamlined data entry and reporting, making livestock data more accessible to the agricultural sector and the public [5]. In the realm of sales and transaction management, Fauzi and Murti (2022) developed a system for Suyadi Broiler Farm, which not only managed sales data but also incorporated online ordering capabilities, enhancing operational efficiency [6]. Ardian and Rahayu (2022) emphasized the importance of detailed maintenance data in the cattle farming sector, proposing a system usable by owners, farmers, and administrators for comprehensive data management [7]. Fadlurrahman et al. (2021) developed a system for daily livestock and harvest data recording in poultry farms, addressing the need for accurate and efficient data management [8]. Addressing data issues in veterinary clinics, Fitriana and Kristania (2021) created a computerized system to streamline patient, staff, and doctor interactions, thus preventing data duplication and confusion [9]. Alfionita and Putri (2021) identified data recording challenges in chicken farming and developed a real-time maintenance data application for broiler chickens [10]. Setiawan and Eko (2022) focused on chicken cultivation, creating an application that provided essential information and cost estimation for poultry farming, making it more accessible to the public [11]. Izzul and Al (2023) tackled the limitations of manual chicken sales by developing an online sales system to broaden market reach and simplify transactions [12]. Wulandari et al. (2022) addressed the time-consuming nature of manual data recording in free-range chicken farming with an application that streamlined various data aspects including costs and profit-loss reports [13]. Melisa et al. (2023) observed the issues of data loss and inaccuracy in manual poultry farm recording systems, leading to the development of an application for efficient and accurate recording of sales, purchases, and mortality data [14]. Lastly, Werdiningsih et al. (2023) contributed by developing an application for recording and graphically reporting chicken egg data, enhancing data visualization and management [15].

2. Research Method

In conducting the research titled Design and Development of a Broiler Chicken Farm Management Information System, several stages were employed to gather and analyze information. The methodology encompassed observation, interviews, and literature review. Observations and interviews were conducted at VR Broiler Farm, involving direct on-site examinations and interactions with the farm owner. This approach provided firsthand insights into the operational challenges and practices of the farm. For the literature review, the research involved extensive examination of existing literature and studies relating to similar cases in poultry farm management. This process enabled the identification of prevailing issues within the field and exploration of potential solutions.
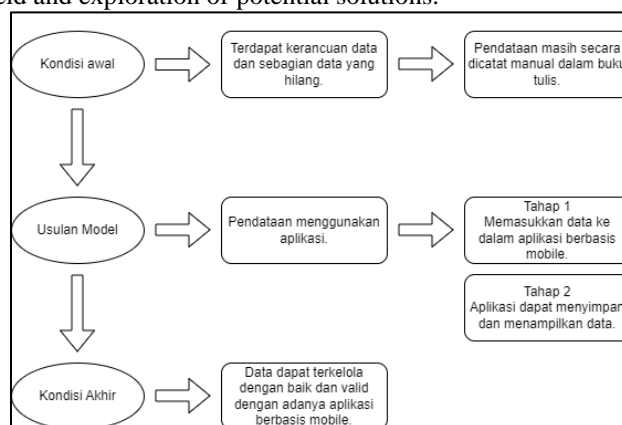

Figure 1. Research Framework

The research framework, as illustrated in Figure 1, consists of three primary components: the initial condition, the proposed model, and the final condition. The initial condition highlighted issues such as data inaccuracies and losses due to manual record-keeping practices. To address these challenges, the proposed model involved the development of a comprehensive information system application for broiler chicken farm management. This application is designed to store,

edit, and display data efficiently. The anticipated final condition is the achievement of well-managed, accurate, and reliable data using this system.

3. Result and Discussion

3.1 Results

The primary outcome of this research was the design and development of a mobile-based information system for broiler chicken farm management.

3.1.1. Program Implementation

The application is equipped with functionalities for viewing, adding, deleting, and modifying data. Additionally, it features a graphical comparison tool for clearer result visualization. User access to the application is differentiated based on roles, with specific interfaces for admin and owner roles. The login process tailors the data display and functionalities according to the user type. The application's interface includes:

(a) Login Page

(b) Admin Login Page

(c) Owner Login Page

(d) View Livestock Data Page (Owner)

(e) View Livestock Data Page (Admin)

(f) Delete and Edit Livestock Data Page (Admin)

(g) Enter Livestock Data Page (Admin)

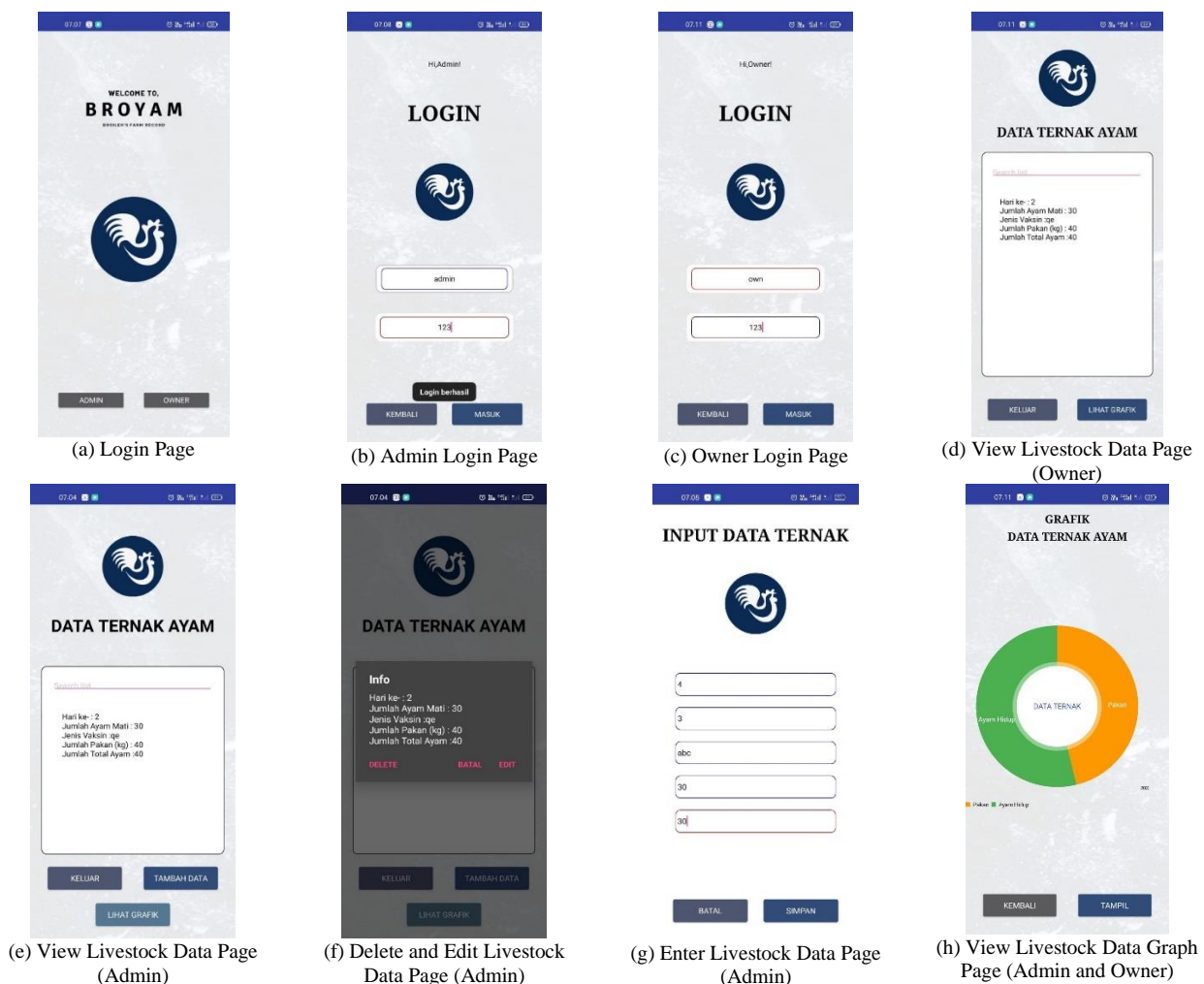(h) View Livestock Data Graph Page (Admin and Owner)

Figure 2. Application Interface

The login page (Figure 2.a) offers role selection between admin and owner. Selecting the admin role leads to the interface shown in Figure 2.b, where admins can view, edit, add, or delete livestock data as depicted in Figures 2.c to 2.g. For owners, the login directs to an interface as shown in Figure 2.c and 2.d. Both admins and owners have access to the graphical data representation page, as shown in Figure 2.h.

3.1.2. Testing

The application underwent functional testing, encompassing various aspects such as login processes, data viewing, adding, editing, and deletion. Tests were conducted across multiple mobile devices to ensure compatibility and functionality, as detailed in the tables below:

Table 1. Application Function Testing

Page	Expectation	Observation	Remarks
Admin Login	Input email & password	Successful login	Passed
Owner Login	Input email & password	Successful login	Passed
View Data (Owner)	Read database data	Data displayed	Passed
View Data (Admin)	Read database data	Data displayed	Passed
Add Data (Admin)	Input data to database	Data added	Passed
Edit Data (Admin)	Modify data in database	Data modified	Passed
Delete Data (Admin)	Remove data from database	Data deleted	Passed
View Graph (Admin & Owner)	Read database data	Graph displayed	Passed

Table 2. Application Testing on Various Smartphones

Smartphone	Specifications	Remarks
OPPO Reno 5f	RAM 8GB, Android 11, Mediatek Helio P95	Passed
OPPO Reno 5	RAM 8GB, Android 11, Snapdragon 720G	Passed
REALME 5	RAM 4GB, Android 9, Snapdragon 665	Passed

3.2. Discussion

In the discussion section, the implications, challenges, and potential for implementing the newly developed mobile-based information system for broiler chicken farm management are discussed. The application of mobile applications is a significant advance in the field of agricultural technology, especially in the management of poultry farms. By switching from manual to digital recording, this system overcomes critical problems of inaccuracy and data loss. This shift not only simplifies farm management but also improves the decision-making process through real-time data access and analysis. The graphical representation of data in the application provides an intuitive understanding of farming operations, assisting owners and administrators in effective monitoring. During system development and implementation, several challenges were faced. This includes ensuring a user-friendly interface for a wide range of users, maintaining data security and privacy, and achieving seamless integration with existing farm management practices. Overcoming these challenges is critical to system acceptance and effectiveness. Comparing the developed system with existing solutions highlights its unique features and advantages. Unlike many conventional systems, this application offers customized access and functionality for different user roles, namely admin and owner. This role-based access control improves operational efficiency and data security. This study paves the way for further research, particularly in exploring the scalability of the system to larger livestock operations and its adaptability to other types of livestock. Additionally, integrating advanced features such as predictive analytics and automatic alerts based on data trends can significantly increase the utility of the system. The development of a mobile-based broiler chicken farming management system marks an important step forward in agricultural technology. By addressing key issues in data management and providing user-specific functionality, this system promises to revolutionize poultry farming management practices. Continued development and research in this area is essential to realizing the full potential of technological solutions in agriculture.

4. Related Work

The evolution of digital solutions in poultry farm management is evident in a series of pivotal studies, reflecting a trend towards more efficient, precise, and accessible agricultural technologies. This trend aligns closely with the current research focusing on broiler chicken farm management systems. Subowo and Saputra (2019) laid the groundwork in this domain by developing a mobile application that encompassed articles about broiler chicken farming. This app, serving as a collaborative platform, allowed extension workers and farmers to upload content and engage in discussions, thereby becoming a vital resource for the community, particularly for those new to broiler chicken farming [1]. Building on this foundation, Novrian et al. (2021) expanded the capabilities of mobile applications in poultry farming. Their work introduced a suite of features for user registration, partnerships, and financial transactions, significantly broadening the scope and functionality of digital tools in this sector [2]. Similarly, Sudianto and Sadali (2021) focused their research on an Android application specifically for layer chicken farming. Their application streamlined the communication process between investors and potential farmers, simplifying the intricacies of capital allocation and farm management, particularly in the layer chicken sector [3]. Huriati et al. (2020) took a specialized approach by developing an application for monitoring the development of layer chickens. This tool provided farmers with crucial capabilities for tracking various aspects of farm operations, such as chick growth, productivity, and health management, thereby ensuring a structured and efficient farming process [4]. Mukmin et al. (2019) approached the sector from a broader perspective by designing a comprehensive livestock commodity information system. Their application, facilitating easier data entry and improved accuracy, enabled agricultural departments to produce detailed livestock reports, thus enhancing community awareness and farm management practices [5]. Fauzi and Murti (2022) ventured into sales management with the development of a specialized system for broiler farms. Incorporating online ordering features, this system streamlined the sales transaction

process, showcasing the potential of digital solutions in operational efficiency [6]. Ardian and Rahayu (2022) highlighted the importance of maintenance data recording in cattle farming, proposing a versatile system for comprehensive data management. This system, adaptable for owners, farmers, and administrators, emphasized the multifaceted nature of farm management [7]. These studies collectively showcase a clear shift towards digital solutions in poultry farming, aiming to enhance efficiency, accuracy, and accessibility. Each study contributes unique insights and tools, culminating in a comprehensive digital approach to poultry farm management, which is central to the current research in broiler chicken farm systems. The convergence of these digital advancements presents a compelling case for the continued evolution and integration of technology in poultry farming, underlining the significance of this research in the broader context of agricultural technology advancements.

5. Conclusion

The research conducted on the VR Broiler Farm has culminated in significant insights and practical solutions addressing the challenges faced in poultry farm management. This study was initiated in response to specific operational issues encountered at the VR Broiler Farm, which provided a valuable opportunity to develop a targeted and effective technological solution. The primary outcome of this research is the development of a comprehensive data management application tailored for livestock management. This application is designed to streamline various farm management processes, including data entry, storage, and retrieval. Key functionalities of the application encompass Create, Read, Update, and Delete (CRUD) operations, essential for maintaining accurate and up-to-date farm records. A significant achievement of this study is the application's compatibility across a range of Android mobile devices with varying specifications. This versatility ensures that the application can be widely adopted and utilized in diverse farming environments, thereby increasing its practical utility. Moreover, the application supports data summarization and report generation, features that significantly enhance the efficiency of data management and decision-making processes in farm operations. The ability to generate comprehensive reports and data summaries is particularly beneficial for farm owners and managers, as it facilitates informed decision-making and efficient farm oversight. In conclusion, the application developed through this research effectively addresses the initial challenges identified at the VR Broiler Farm. It stands as a testament to the potential of technology in transforming the landscape of poultry farm management. The success of this application underscores the importance of technological innovation in agricultural practices, offering a promising direction for future developments in farm management solutions.

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