DIGI-ICE: DIGITAL OFFICE ADMINISTRATION FOR BUILDING MODERN OFFICE-BASED MSMES

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ABSTRACT

Phenomenon/Issue: This research addresses the gap in digital transformation in MSME administration, particularly the lack of easily accessible digital tools in rural areas such as Banyumas Regency, which hinders modernization.

Purpose: The goal is to develop Digi-Ice, an integrated application that combines archive management, correspondence, product cataloging, and social media integration to transform SMEs into technology-based offices.

Novelty: Its main innovation lies in the rural-specific design, the integration of administrative functions and digital business, and the collaboration between Jenderal Soedirman University and MSME actors. As the first Android-compatible application, Digi-Ice reaches rural users with high accessibility.

Research Methods: The research method uses the R&D model by Mckenney & Reeves (2013) through three stages: problem analysis, design, and iterative implementation. Data were collected through closed questionnaires (validated by media experts) and trials on 40 SMEs

Results: The validation results showed a feasibility score of 82.3% (experts) and 82.07% (users), confirming the application's effectiveness. The main advantages include structured archiving, social media integration, and Android compatibility, although there are limitations such as reliance on the internet and the absence of an iOS version.

Research Contributions: The research contributes to the digital transformation literacy of MSMEs with empirical evidence, and supports the mission of universities and the government in rural economic development. Digi-Ice has become a replicable model for local technology interventions, strengthening the competitiveness of national MSMEs in line with Indonesia's digitalization agenda.

INTRODUCTION

The evolution of technology and communication has led to the emergence of new types of jobs, particularly in the field of entrepreneurship. In the past, entrepreneurship was conducted conventionally, but now it is carried out with the help of digital media. Globally, digital entrepreneurship has had a significant impact on business. The use of various social media has changed the way we communicate,

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market, and create all kinds of products. For that, digital literacy skills are needed to make use of the technology that is currently available. The development of skills and competencies in the digital era requires a new way of thinking and the ability of users to continuously adapt to the new literacies demanded by new technologies. (Akbar & Noviani, 2019).

Despite the current uncertain economic situation, particularly following the COVID-19 pandemic, the government remains optimistic that economic growth will reach 1.5% and investment will increase by 6%. This confidence in economic growth depends on the entrepreneurship sector, which is becoming increasingly robust and continues to develop. Economic digitalization is a way to create massive job opportunities and inclusive growth.

However, based on the East Ventures Digital Competitiveness Index (EV-DCI) 2022 report on the national digital competitiveness score, the use of digital technology in entrepreneurship and productivity is still ranked low compared to other sectors at 23.6%. Therefore, the government continues to strive to strengthen existing entrepreneurship through digital means.
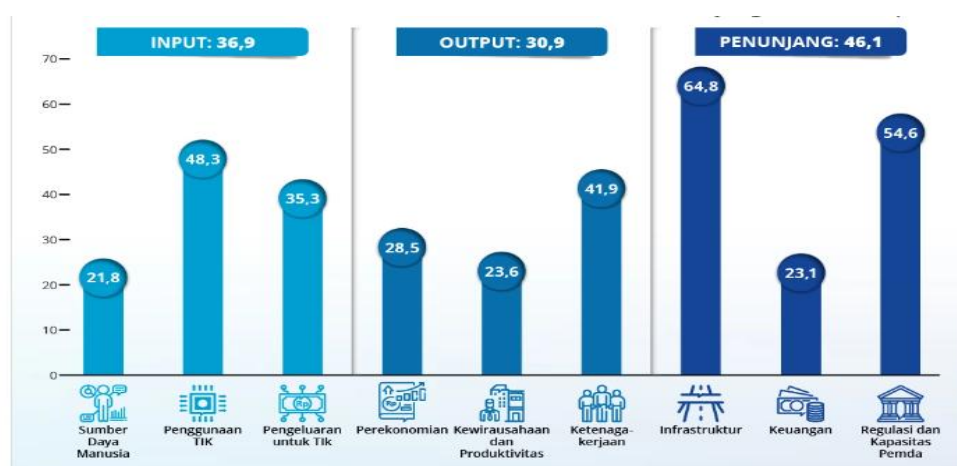
Source : Researchers, 2025
Figure 01. DIGITAL COMPETITIVENESS INDEX

In running a business, especially in the MSME sector, the administrative function plays a significant role in the success of an enterprise. Administrative activities are carried out in an effort to simplify the increasingly complex administrative processes. In current administrative management, it is critical to keep up with the times by implementing digital-based information technology to enhance a business's effectiveness and efficiency.

The basis of this research is grounded in an initial study of SMEs in Purwokerto district, where various training sessions have been conducted in the aspect of digital usage, particularly in marketing. However, in terms of administration, no training has been carried out, especially due to the absence of digital technology that can assist SMEs in administrative activities. Therefore, it is necessary to develop an application as an alternative in the effort to transform MSMEs into modern offices.To create digital-based entrepreneurs, universities serve as the primary institutions for shaping a generation capable of leveraging technology in the field of entrepreneurship to foster future competitiveness. Jenderal Soedirman University, which has the vision "to be a center for the development of rural resources and local wisdom by 2034," certainly plays a significant role in the efforts to develop MSMEs in the rural sector by promoting products based on local wisdom. This is further clarified in the mission of Jenderal Soedirman University outlined in the UNSOED 2023-2026 Strategic Plan, which aims to produce various innovations, technologies, and models for rural development and community welfare. Innovative MSME administration that can adapt to the times or be digital is needed.

Based on the issues presented above, it was found that there is currently no digital technology available to assist MSMEs in administrative management. Therefore, it is necessary to develop an application as an alternative in the effort to transform MSMEs into modern offices. For this reason, the researcher is attempting to develop digital-based administrative management so that MSMEs can transform into modern offices.

LITERATURE REVIEW

1. Modern Office

An office is a place for conducting business transactions where administrative functions are carried out to coordinate and control the activities of the organization. An office generally performs tasks such as formulating business policies, processing and communicating information, record-keeping, handling correspondence, executing orders, and managing receipts and payments. An office can also be described as a place where information on paper is gathered, documented, stored, and used for current and future business operations. Currently, modern offices are organized based on scientific principles, and their management and administration are in the hands of specialized office managers. The manager does not share the same room with the secretary but sits in a separate room. For the secretary, supervision and control are carried out with the help of a supervisor and through standard office systems, routines, office manuals, etc. (Grover, 2020)

The following factors contribute to the growth of office jobs: i) Management requires accurate and timely information across all aspects of business operations in order to make informed decisions. ii) As businesses grow, office jobs also grow proportionally. iii) Tasks related to preparing returns for the government, financial reports, employee relations, etc., increase office work. iv) With the increase in service activities such as accounting, banking, advertising, marketing, damage insurance, etc., paperwork has surged rapidly. v) The importance of the office in relation to customers is very significant. The office acts as a channel that connects the business organization with its customers. The modern office has several types, namely (1) Front Office, (2) The Middle Office, (3) The Electronic Office or E-Office, (4) The Virtual Office, (5)Back Office (Grover, 2020)

The functions of a modern office can be classified into two categories: (i) Basic Office Functions, and (ii) Administrative Management Functions. Basic Office Functions include: (i) Receiving information; (ii) Recording information; (iii) Organizing information; and (iv) Providing information. The functions of the Administration Office include: (i) Management functions such as planning, organizing, staffing, directing, communicating, controlling, coordinating, and motivating; (ii) Public Relations functions; (iii) Institutionalizing office systems and routines; (iv) Record keeping; (v) Asset security; (vi) Designing and controlling forms; (vii) Controlling stationery and supplies; (viii) Selecting and purchasing office equipment; (ix) Personnel functions; (x) Cost control. (Priyanka Gauri, 2008)

2. Digital SMEs

Digital SMEs refer to entrepreneurial activities that leverage digital transformation within businesses. The fundamental principles of entrepreneurship are applied in the form of digital entrepreneurship, which includes identifying good opportunities, understanding customers, recognizing market needs, increasing capital, and instilling an entrepreneurial mindset. What distinguishes conventional MSMEs from digital MSMEs is the change in the nature of activities and connections to customers or the community through the use of digital technology (Göcke & Meier, 2021). In digital MSMEs, there are several types of entrepreneurship:

1. Content-based MSMEs. In this type of digital entrepreneurship, various forms of digital content are offered, which contain a variety of values.
2. Community-based MSMEs. In this entrepreneurship, it offers a discussion forum and various content that is a contribution from its users.
3. Online stores, where entrepreneurs sell products and services using digital platforms. There are opportunities for entrepreneurship by reselling goods and even through subscriptions.
4. MSMEs (Micro, Small, and Medium Enterprises) provide services and seek services. An example in business or entrepreneurship is bringing together not only matches but also connecting students and mentors with parents who need expert hairdressers, makeup artists, and so on.

5. Business promotion. Entrepreneurship in this field involves products that have already been selected and the desire to find new customers. With the advent of the digital world, promotion can be carried out online, allowing entrepreneurs to acquire new customers. (Allen, 2019)

3. E-Office

The term electronic office or e-office was created to cover the increasing use of information technology-based computers for office work, especially in the 1980s when it was a marketing buzzword. However, it is not used as much now because all modern offices are electronic offices. The term emerged much earlier in the name of the computer LEO (Lyons Electronic Office), which first ran business applications in 1951 in England.

The introduction of e-office increases the accuracy and efficiency of organizations, thereby enhancing their service levels, while theoretically reducing costs and drastically decreasing paper consumption. Many documents are still being printed and distributed on paper, especially for those who need signatures (Diskominfo Bekasi, 2019). A system related to administration virtually centralizes the components of an institution, where data, information, and communication are created through telecommunications media based on intranet and internet, connected automatically and integrated. The e-Office application consolidates information, making it a primary tool in decision-making that helps officials avoid limitations in information sources. (Busra, 2013)

The implementation of Electronic Office in companies greatly assists employees in completing their tasks, such as managing files, drafting letters, and other duties, allowing them to finish their work more quickly and on time. With the adoption of Electronic Office, office work can be optimized to provide convenience for employees, thereby helping to enhance efficiency and time management, as well as potentially increasing employee productivity. The improvement in employee work efficiency can be observed through the increasingly better performance of employees who can complete tasks within the designated time. (Narsen & Sugiarto, 2022)

METHOD

A. Research Design
The research method used in this study is the R&D method (Mckenney & Reeves, 2013). The following is an overview of the R&D approach used:
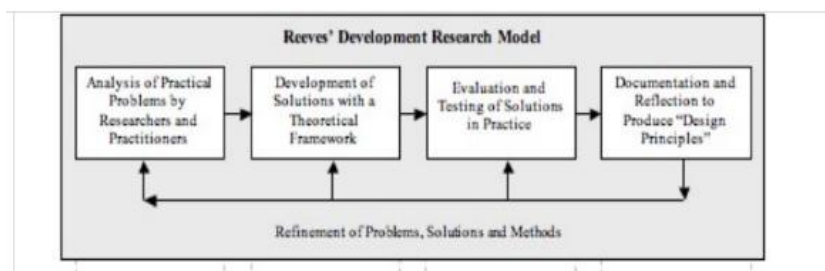
Source : Researchers, 2025
Figure 02. REEVES DEVELOPMENT RESEARCH MODEL

B. Research Procedure
The development of the model uses the Reeves design (Mckenney & Reeves, 2013), with the following stages of development:
a. Analysis of the problem: Consultations with the practitioners
    In phase 1, the focus is on identifying, understanding, and evaluating the issues faced in teaching students.
b. Formulation of the design principles and development of the learning solution
    In phase 2, a targeted and in-depth literature review is conducted, focusing on the frameworks and guidelines identified in phase 1 to formulate a set of design principles.
c. Iterative implementation and refinement of the learning solution

At this stage, it is about testing the effectiveness of the design and its implementation. After the data is collected, it is then analyzed to identify areas that need improvement.

C. Population and Sample
The research population includes all research subjects, namely MSMEs in Banyumas Regency. This research uses purposive sampling techniques. The researcher employs purposive sampling with the hope of obtaining sample criteria that truly align with the research to be conducted.

D. Research Instruments
a. Questionnaire
This research uses an instrument in the form of a closed questionnaire. This questionnaire is given to the experts. The purpose of administering the questionnaire is to determine the validity and reliability of the DIGI-ICE Application.

E. Data Analysis Techniques
The data analysis technique used to analyze quantitative data from validation is the calculation of the average value. A calculation function to determine the ranking of the final score of the relevant item. The formula for calculating the average value is as follows:

$$P = \frac{\sum x}{\sum xi} \times 100\%$$

Explanation:
P = Feasibility
$\sum x$ = Total assessment answers
$\sum xi$ = Total highest answers

Table 01.
QUALIFICATION LEVELS OF ELIGIBILITY BASED ON PERCENTAGE

Percentage (%)	Eligibility Criteria	Remarks
84 – 100	Very valid	No revision
68 – 84	Valid	No revision
52 – 74	Fairly valid	Some revision
36 – 52	Less valid	Revision
20 – 36	Very less valid	Revision

Source : Researchers, 2025

RESULTS AND DISCUSSIONS

4.1 Digi-Ice Application Development
Results The development of the Digi-Ice application uses a development design based on Reeves' design (Mckenney & Reeves, 2013), as for the development stages, namely analysis of problems, namely identifying, understanding and evaluating the problems faced by students, then Formulation of design principles and development of the learning solution, namely developing products to solve the problems faced by designing the products made. and the last is Iterative implementation and refinement of the learning solution, at this stage testing the effectiveness of the product that has been made so that the effectiveness is known after its implementation, as for the detailed stages of product development are as follows: a. Analysis of the problem At this analysis stage, researchers focus on knowing the problems faced by MSMEs in the field and try to analyze and explore as a preliminary study before formulating problem solving for the problems faced by MSME partners. Based on the results of observations and literature studies conducted, it is known that currently MSMEs have not carried out administrative activities properly. Especially with the current developing technology, of course this should make it easier for MSMEs to carry out administrative activities that can facilitate the course of entrepreneurial

activities that are being carried out. for this reason, it is necessary to develop an application that is able to assist MSMEs in administrative activities. So for this reason, it is necessary to develop an application as an alternative in an effort to transform MSMEs into modern offices.

This aligns with the goals of Jenderal Soedirman University, which has the vision "to be a center for the development of rural resources and local wisdom by 2034." It certainly plays a significant role in the efforts to develop MSMEs in the rural sector by promoting products based on local wisdom. This is further clarified in the mission of Jenderal Soedirman University outlined in the UNSOED Strategic Plan 2023-2026, which aims to produce various innovations, technologies, and models for rural development and community welfare. For that reason, there is a need for innovation in the field of MSME administration that can adapt to the demands of the times or be digital-based. To create digital-based entrepreneurs, universities serve as the primary institutions for shaping a generation capable of leveraging technology in the field of entrepreneurship to foster future competitiveness. Based on the issues raised above, it has been found that there is currently no digital technology available to assist MSMEs in managing their administration. Therefore, it is necessary to develop an application as an alternative in the effort to transform MSMEs into modern offices.

b. Formulation of the design principles and development
Based on the preliminary study conducted, problems were identified, followed by problem-solving for those issues, which involves designing a modern Office-based application to assist MSMEs in managing their business administration effectively. The proposed application aims to facilitate administrative activities by including a profile of the business, as well as files or data related to the business, making it easy to locate these files again and organize them properly. Furthermore, it will help MSMEs manage their correspondence efficiently, ensuring everything is neatly arranged. In addition, this application also offers a catalog of products available in MSMEs, making it easy to find and search when asked about what products have been made and what will be sold.

This application is also directly connected to the social media of SMEs, making it easier to check for orders through social media or direct social media connections. And lastly, this application also contains updated information regarding the overall development of MSMEs. With the recent update, it is hoped that SMEs can develop their businesses more effectively and adapt to the current conditions.

c.   Iterative implementation and refinement of the learning solution
At this stage, the implementation of the product that has been designed is carried out to be tested, then after that the effectiveness of the product that has been made is known. the activity is analyzed to determine the effectiveness of the product both from media experts and from MSME actors who use the product. based on the results of the analysis, later it is used as material for improvement for the improvement of the product. the following are the results of the validation of media experts and the results of implementation on MSME actors.
 1. Media Expert Validation
   At this stage of the analysis, researchers try to validate the products that have been made to determine the performance of the product as well as expert suggestions and comments on the products that have been made, in this assessment there are two criteria used in validating the product, namely in the first aspect is the software aspect and in the second aspect, namely the visual communication aspect.
   In the software aspect, the indicators are known in the form of effectiveness and efficient use, reliability, and finally usability. In the visual communication aspect, at least there are indicators used, namely creativity, visuals and navigation icons. based on the assessment of media experts, the following are the results of the assessment.
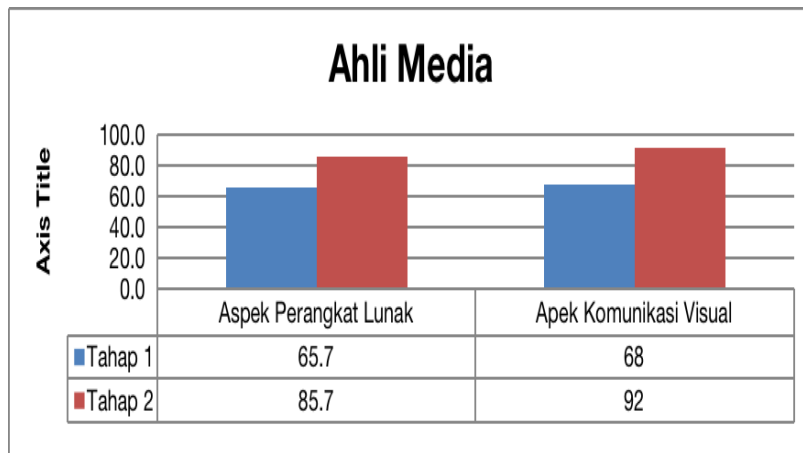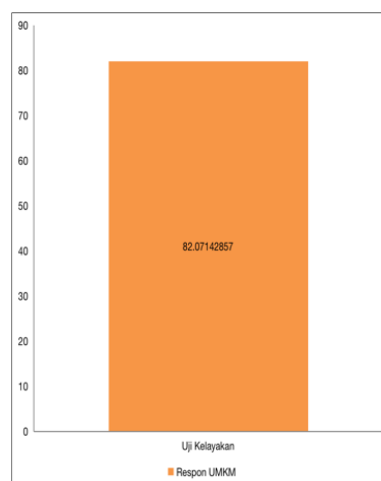
Source : Researchers, 2025
Figure 03. DIAGRAM OF THE ASSESSMENT RESULTS BY STAGE I AND II MEDIA EXPERTS

Based on the results of the final assessment of the media summarized in the form of a bar chart above, the assessment was carried out at two stages, namely stage 1 and stage 2. based on the data above, it is known that there is a difference between stage 1 and stage 2, which means that there are differences in assessment at the beginning and after improvement. The details of the results of the media expert assessment are as follows.

1. In the aspect of software at the initial stage, a score of 65.7% was obtained, but after improvements were made, the score rose to 85.7%.
2. In the visual communication aspect at the initial stage, a score of 68% was obtained, but after improvement the score increased to 92%.

2. Feasibility of user or user applications A

After the validation test is carried out by experts, then trials are carried out on application users, namely MSME actors. The trial was conducted to determine the feasibility and effectiveness of the product that had been developed and also to determine the effectiveness of the product to obtain suggestions and input for product improvement towards perfection before being revised into a final stage product.

The trial was carried out by giving a questionnaire to 40 MSME actors who were randomly selected by distributing the questionnaire to MSME actors to determine the effectiveness and feasibility of the DIGI-ICE application that had been used.

Source : Researchers, 2025
Figure 04. DIAGRAM OF PRODUCT TRIAL RESULTS

Based on the diagram above, the results of product trials were obtained by obtaining a feasibility and effectiveness test of 82, 07% in the feasible category. After the researchers conducted two trials and after the trial to evaluate and reflect on the use of the product by MSME actors, an evaluation was also carried out to determine the effectiveness of the media in assisting the administrative activities of MSME actors so that it made it easier for MSME actors to record all kinds of products and correspondence activities carried out. after trials and discussions involving MSME actors so that from a practical point of view, the products created are suitable for use. In addition, from a theoretical point of view, the products developed can reinforce the theoretical understanding of these products that support product feasibility. Further strengthening the theory in this study gained an understanding that applications are very important in the process of administrative activities, the effectiveness of the application greatly affects the needs in the field involving users.

4.2 Discussion of the Digi-Ice Application

This research aims to develop the Dji application, this application was developed based on the needs of MSMEs which experience many obstacles in the field of administrative activities in their MSME activities so that the hope is that this application can make MSMEs a modern office.

Based on an initial study of MSMEs in Purwokerto district, various trainings have been carried out in the aspect of digital use, especially in the field of marketing, but in the administrative aspect, it has not been done, especially in the absence of digital technology that is able to assist MSMEs in administrative activities. So for that it is necessary to develop an application as an alternative in an effort to transform MSMEs into modern offices. The application provides a menu in order to make it easier for users to manage their business administration, starting with a business profile display, then Udrive to store various business files, then the application also provides updated information related to MSMEs, the application is also equipped with a menu for businesses to obtain business licenses, then there is e mail which can be used to view various incoming letters and outgoing letters. On the e product menu, business people can add items for sale so that it becomes a catalog of products, besides that there is an e social media menu that directly connects the application with umkm social media accounts so that it can easily monitor umkm social media and finally the service complaint menu to provide feedback if the application has errors and improvements.

The development stage is analysis of problems, namely identifying, understanding and evaluating the problems faced by students, then Formulation of design principles and development of the learning solution, namely developing products to solve the problems faced by designing the products made. and the last is Iterative implementation and refinement of the learning solution, at this stage a trial is carried out on the effectiveness of the product that has been made so that the effectiveness is known after its implementation, Based on the results of the feasibility test and the effectiveness of the application product, some data are obtained as follows

Table 02.
RESULTS OF THE FEASIBILITY TEST AND THE EFFECTIVENESS

No.	Assessment	Score
1	Media Expert	88,5%
2	UMKM actors	82, 07%

Source : Researchers, 2025

Based on the table above, the feasibility and effectiveness scores were obtained by various experts and students. In the media expert assessment, it scored 82, 3% in the feasible category. and 82.2 students are in the feasible category. The results in the table can be described in the bar chart.
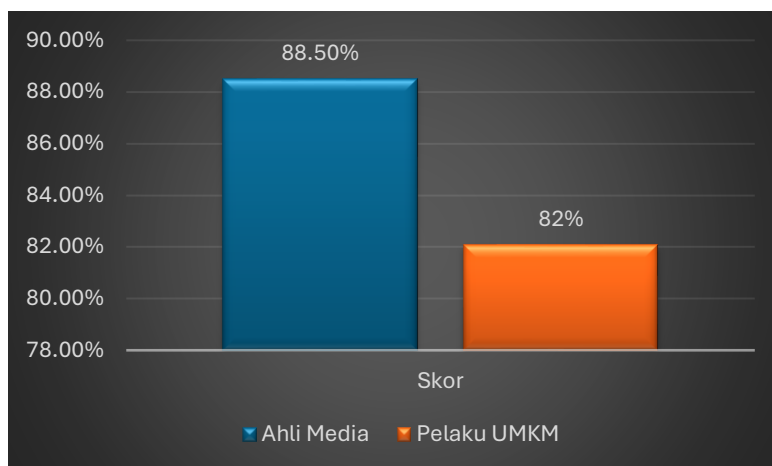
Source : Researchers, 2025
Figure 05. THE FEASIBILITY AND EFFECTIVENESS SCORES

In addition to the product feasibility test. Researchers also asked for suggestions and input on the advantages and disadvantages of the products that had been made. Based on this, the following results were obtained:

Table 03.
ADVANTAGES AND DISADVANTAGES OF THE PRODUCTS

No.	Advantages	Disadvantages
1	The application can be used easily,	the system is still android and cannot be accessed via IOS
2	Making it easier to organize archives more neatly in organizing archives in the business	The use of the internet in using the application so that internet availability is needed
3	Facilitate the correspondence process in the process of business activities	
4	Can easily monitor umkm social media with direct access through the application	
5	Can help store various business files, then the application also provides updated information related to MSMEs	
6	Helps entrepreneurs compile a product catalog that can add items for sale so that it becomes a catalog of products	
7	Easy access anywhere and anytime	

Source : Researchers, 2025

These results are in accordance with the opinion The results of the study concluded that information technology capabilities and dynamic capabilities have an influence on company performance through digital transformation. (Dessy Hershanty, 2021), the nature of the struggle for the survival of small and medium enterprises, maintaining business survival by reducing costs by utilizing digital transformation is a strategy often used by companies. (Chiang, Kao, & Lin, 2022) Referring to its impact on SMEs, the analyzed data illustrates that digital transformation has a great impact in building customer relationships and ensuring easy business accessibility (Ikhwan & Himawati, 2024).

CONCLUSION

Based on the results of the research and the discussion above, it can be concluded that this study:

1. Researchers have designed and tested the feasibility of Digi-Ice: Digital Office Administration in an Effort to Build Modern Office-Based SMEs. From the results of the research and discussion above, a feasibility and effectiveness score was obtained from various experts and actors in MSMEs. In the assessment, media experts received a score of 82.3% in the feasible category, while MSME actors scored 82.2, also in the feasible category.

2. MSME actors need to carry out administrative activities and business archiving regularly for their enterprises so that the business activities can run smoothly and make the management effective and efficient.

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