A FIQH MUAMALAH PERSPECTIVE ON THE USE OF CLOUD COMPUTING IN MSME FINANCIAL MANAGEMENT IN SRAGEN REGENCY

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Abstract
Research Aims: This study aims to examine the adoption of cloud computing technology in MSME financial management in Sragen Regency from the perspective of fiqh muamalah and assess its compatibility with Islamic sharia principles.

Design/Methodology/Approach: This research adopts a qualitative case study approach. Data were collected through in-depth interviews with MSME practitioners, direct observations, and literature studies on Islamic financial jurisprudence. The analysis examines Islamic contract principles including ijarah (leasing), wakalah (agency), and syirkah (partnership), alongside aspects of data ownership, security, and sharia compliance.

Research Findings: The findings indicate that cloud computing significantly enhances operational efficiency and financial transparency in MSME management. However, implementation must adhere to Islamic principles of fairness, transparency, and avoidance of riba (usury) and gharar (excessive uncertainty). Cloud computing services can be legitimately adopted by MSMEs when structured according to sharia-compliant frameworks.

Theoretical Contribution/Originality: This study contributes to Islamic business literature by integrating contemporary digital technology with classical fiqh muamalah principles. It provides novel insights into reconciling cloud computing with sharia values, offering a theoretical framework for technology adoption in Islamic-oriented business environments.

Practitioners/Policy Implications: The results recommend that MSMEs select cloud service providers offering sharia-compliant contracts. Policymakers should develop regulatory frameworks supporting Islamic-compliant cloud computing models. Technology providers are encouraged to design solutions tailored to Islamic principles, facilitating wider adoption among Muslim entrepreneurs.

Research Limitations/Implications: The qualitative case study approach and geographic focus on Sragen Regency may limit generalizability. Future research should employ mixed-methods designs across diverse regions, explore additional variables such as digital literacy and cost-benefit analysis, and develop standardized sharia-compliant cloud computing models for MSME financial management.

Keywords: Fiqh Muamalah, Cloud Computing, MSME, Digitalization, Islamic Economics

A Fiqh Muamalah Perspective on the Use of CLOUD Computing in MSME
Financial Management in Sragen Regency

Introduction

Cloud computing has emerged as a transformative technology that enables users to store, manage, and access data and applications online without the need for physical infrastructure. According to Aditya (2023), cloud computing facilitates resource sharing and application use without requiring local installations, simplifying business operations. Ahmad (2017) explains that cloud computing separates applications, operating systems, and hardware, allowing independent management and scalability. This paradigm has revolutionized information technology and become essential in managing data efficiently. In the context of MSMEs, cloud computing offers efficiency in financial management, inventory control, and business transactions. However, many MSME owners in Sragen Regency remain hesitant to adopt this technology due to limited understanding of its sharia compliance. This study explores the compatibility of cloud computing services with Islamic principles, particularly within the framework of fiqh muamalah (Wong & Amri, 2024).

Cloud computing as an information technology paradigm will not develop well until its basic concepts are fully identified and understood. Madhavaiah et al. (2012) state that this development will not occur until all the basic elements that form the concept are recognized and understood collectively. The application of cloud computing in financial information processing has become a major trend in the financial industry. With rapid data growth, financial institutions face enormous data challenges. According to Wang et al. (2024), manual data processing reduces efficiency and risks missing business opportunities, making the adoption of smart technology essential to improve efficiency and accuracy. Advances in information technology have driven the need for efficient data management solutions. This is in line with Marwi (2021), who states that cloud computing provides services that are accessible at any time, saves infrastructure costs, and improves operational scalability. Mobile Cloud Computing (MCC) is a paradigm that has transformed mobile devices with the power of cloud computing to perform various tasks flexibly.

Samarawickrama states that the transfer of computing, storage, and processing processes to remote servers, fog, or the cloud has significantly increased efficiency in the digital era, making the use of technology in business a necessity, including for Micro, Small, and Medium Enterprises (MSMEs) (Aulia et al., 2025; Hasanah et al., 2025). One of the rapidly developing technologies is cloud computing, which enables online data storage and processing. This technology offers efficiency in financial management, inventory management, and business transactions. However,

Ilham Rosyid Miftahul Farid, Krismono, Syahmirwan

many MSME players, especially in Sragen, are still hesitant to use this technology due to a lack of understanding of the sharia aspects of cloud services. Advances in information technology have driven the need for efficient data management solutions. Ria & Susilo (2023) state that cloud computing provides services that can be accessed at any time, saving infrastructure costs and improving operational scalability. In line with Karvela et al., (2023), cloud computing is a computing infrastructure enabling resource management and offering supply chain capabilities such as accessibility, efficiency, and scalability.

However, according to Alfarizi & Ikasari (2023), data security and privacy challenges remain, so organizations need to manage risks and implement appropriate security measures. Cloud Computing changes the way we manage and access information, offering flexibility and efficiency. This study aims to explain the suitability of cloud service agreements with Islamic principles as well as the security of customer and business owner data in cloud systems from an Islamic perspective. This study aims to understand the application of cloud computing in SME financial management, particularly in improving efficiency, transparency, and accessibility of financial data. This study also examines the compatibility of cloud computing with the principles of fiqh muamalah, including aspects of freedom from usury, gharar, and maysir.

In addition, this study identifies challenges and opportunities for MSMEs in Sragen in adopting this technology, as well as providing recommendations so that MSMEs can utilize it in accordance with sharia principles (Sarianti et al., 2024). The purpose of this study is to identify the role of cloud computing in SME financial management, particularly in improving operational efficiency and transparency. In addition, this study also aims to analyze cloud computing services from the perspective of fiqh muamalah in order to understand the extent to which this technology is in accordance with the principles of transactions in Islam. Furthermore, this study will assess the suitability of using cloud computing technology with Islamic financial principles, including aspects of fairness, transparency, and freedom from usury, gharar, and maysir. Based on the findings, this study will provide recommendations for MSMEs to adopt this technology while complying with sharia provisions, so that they can provide optimal benefits without violating Islamic principles.

A Fiqh Muamalah Perspective on the Use of CLOUD Computing in MSME
Financial Management in Sragen Regency

Table 1
Mapping of Cloud Service Models with Fiqh Contracts

Cloud Service Type	Example Service	Relevant Fiqh Contract	Explanation
IaaS (Infrastructure as a Service)	Google Cloud, AWS	Ijarah (Lease)	Users rent infrastructure such as servers and storage for a fee; permissible if terms and costs are clear.
PaaS (Platform as a Service)	Microsoft Azure, Heroku	Wakalah (Agency)	The provider acts as an agent managing system operations transparently on behalf of users.
SaaS (Software as a Service)	Jurnal.id, Canva, Moka POS	Ijarah / Syirkah	Users subscribe to software; categorized as ijarah if rental-based or syirkah if involving shared benefit.

Research Methodology

This study employed a qualitative case study design to explore the implementation of cloud computing among Micro, Small, and Medium Enterprises (MSMEs) in Sragen Regency. The qualitative approach was chosen to obtain an in-depth understanding of the phenomena through real experiences of business owners and managers. Data were collected through semi-structured interviews, direct observations, and literature studies. The instruments used included interview guides, observation checklists, and document analysis forms. Data were analyzed through three main stages data reduction, data presentation, and conclusion drawing to ensure systematic analysis and accuracy. This research design allows a comprehensive exploration of how cloud computing is implemented in

Ilham Rosyid Miftahul Farid, Krismono, Syahmirwan

MSMEs and how such practices align with Islamic legal principles (fiqh muamalah).

This study was conducted on Wednesday–Thursday, February 5–6, 2025, in Sragen Regency, Central Java. The research locations included several MSMEs that had adopted cloud computing in their operational activities, such as grocery stores, food stalls, clothing manufacturers, and service-based enterprises. These locations were selected to represent different business sectors utilizing cloud-based technology in their daily operations.

A total of five informants participated in this study. They were selected through a purposive sampling technique, which allows the researcher to intentionally choose participants who best meet the study objectives.

The selected informants were owners or managers of MSMEs that have used cloud computing applications in their business processes. They also represented various business sectors, including grocery stores, food stalls, clothing manufacturing, printing services, and online retail shops. All informants operated within Sragen Regency and were willing to take part in interviews and direct observations.

The instruments used in this research consisted of: 1) Interview Guidelines to explore the informants' experiences, perceptions, and challenges in implementing cloud computing within their businesses. 2) Observation Checklists to record how cloud-based technologies (such as online accounting, inventory management, and data storage systems) were applied in day-to-day operations. 3) Document Analysis Forms to review supporting data such as transaction records, digital platforms used, and literature related to cloud computing and Islamic economic principles.

The research was conducted in several stages: 1) Identification of Research Subjects selecting MSMEs that met the inclusion criteria as research participants. 2) Data Collection conducting interviews, direct observations, and literature reviews. 3) Documentation compiling and organizing interview transcripts, observation notes, and supporting documents. 4) Data Verification and Validation ensuring the credibility of the collected data through triangulation and member checking.

Triangulation was carried out by comparing information from multiple data sources (interviews, observations, and documentation) to ensure consistency and accuracy. Meanwhile, member checking was conducted by sharing key findings and summaries with the informants to confirm that the interpretations accurately reflected their perspectives and experiences.

Data were analyzed using the Miles and Huberman (1994) model, consisting of three main stages: 1) Data Reduction selecting, simplifying,

and focusing on relevant data aligned with the research objectives. 2) Data Presentation organizing the reduced data into narrative descriptions to facilitate analysis and interpretation. 3) Conclusion Drawing and Verification deriving insights from the data and validating them through triangulation and informant feedback. The data validation process ensured credibility, dependability, and confirmability, strengthening the reliability of the research findings. Through this systematic process, the study provides comprehensive insights into the benefits and challenges of cloud computing adoption among MSMEs and examines its alignment with Islamic legal and ethical principles.

Results and Discussions
Definition of Cloud Computing

The study found that several MSMEs in Sragen utilize cloud-based platforms such as Moka POS, Google Drive, and Shopee to enhance operational efficiency. For instance, 'Barokah Mart' and 'Sari Rasa' use Moka POS for sales and inventory management, while 'Mulya Jaya' employs Google Drive for storing financial records. These practices increase efficiency by up to 40% and reduce errors in financial reporting. From a fiqh muamalah perspective, such usage aligns with the ijarah contract, as MSMEs rent digital services for agreed fees and durations. The transparency of terms and the clarity of data ownership ensure that no gharar or riba elements exist in the transaction.

Nevertheless, potential challenges remain regarding data ownership and privacy. Users must ensure that their contracts clearly state data ownership rights to avoid gharar. Cloud providers hold the moral and legal responsibility (*amanah*) to protect user data, consistent with the Islamic principle of trust. If providers fail to safeguard data, it constitutes a violation of the contract and ethical breach in Islam. Thus, Islamic law allows the use of cloud computing as long as it adheres to transparency, fairness, and data protection standards.

Cloud Computing is a technology that allows users to store, manage, and access data and applications via the internet without the need to store data on local devices (Rumetna et al. 2017, 2017). Cloud Computing is ITaaS (IT as a service) that provides computing services, data storage, and applications that can be accessed via the internet from a centralized data center. (Kurniawan, 2015). According to Arsa & Mustofa, (2014a). Private Cloud is a cloud computing model that is operated for a specific organization, managed by the organization or a third party, and can be located on-site or off-site. In fiqh muamalah, transactions must meet the

requirements of a valid contract, including agreement, clarity of the object, and freedom from gharar and usury. In line with this, Christiani (2018) states that subscription cloud computing services are included in the Ijarah contract, with the requirement of transparency in data storage and security. These services consist of several types, namely: a) *IaaS (Infrastructure as a Service):* Provides cloud- based IT infrastructure, such as servers and networks. b) *PaaS (Platform as a Service):* Provides a platform for developing cloud-based applications. c) *SaaS (Software as a Service):* Provides cloud-based software, such as accounting and business management applications.

Benefits of Using *Cloud Computing* in the Business World

IT adoption in MSMEs remains low despite the importance of technology for business growth. Ghozali et al. (2019) revealed that the high cost of hardware, software, and experts is an obstacle, with many MSMEs concerned about limited resources to purchase, maintain, and secure information systems. The banking industry is heavily influenced by the ever-evolving needs of customers and transactions, making banks dependent on information technology. This is in line with Rumetna's (2018) opinion, which states that cloud computing helps banks deal with global economic and financial uncertainty. The use of cloud computing is an efficient solution for Indonesian MSMEs, with services such as IaaS, SaaS, and PaaS to improve business performance. Akmal & Irawan (2023) state that this technology enables virtual implementation without the need for large investments, suitable for MSMEs with limited human resources and IT infrastructure.

The Impact of Using *Cloud Computing* in the Business World

Cloud computing enables small businesses to compete with large companies by reducing infrastructure costs. Cloud services include private, public, community, and hybrid clouds, as well as IaaS, PaaS, and SaaS. Riana (2020) states that cloud implementation follows the agile development cycle, beginning with an analysis of the company's needs in order to tailor the appropriate cloud services.

IT adoption in SMEs is still low despite its importance for business growth. According to Imam Purwanto (2013), high costs for hardware, software, and experts are obstacles, as well as SMEs' concerns about limited resources to manage and secure information systems. Arsa & Mustofa (2014b) state that cloud computing implementation facilitates virtual server management, where users can order and configure servers directly, while administrators can approve requests and create server machines automatically without additional manual processes. Cloud

accounting technology improves efficiency, reduces costs, and facilitates access to information for MSMEs. However, research in Indonesia is still limited, so further research with complete data and advanced methods is needed to improve MSME financial management (Kuningan, 2025). SMEs need to adapt to increase competitiveness, with IT playing an important role in financial management, planning, reporting, and evaluation. Although beneficial, IT adoption is often difficult for SMEs (Monika, Sinar; Rakhman, 2017).

How to Apply *Cloud computing* in MSMEs Sragen

In Sragen Regency, several MSMEs utilize cloud computing for operational efficiency, such as cloud-based accounting applications for real-time transaction recording and inventory management systems for inventory management. Data storage in cloud services such as Google Drive facilitates access and information sharing, reduces IT costs, and increases operational flexibility, including:

a) Barokah Mart"Grocery Store: Uses Moka POS for financial management and cashier operations

b) "Sari Rasa"Food Stall Using Moka POS for management stock and cashier.

c) Konveksi"Mulya Jaya Sragen": Utilizing Google Drive for keep report finance.

d) Diyanis Store: Using Shopee to marketing product.

e) Printing of Billboards: Using Corel Draw, a design platform graphics.

f) "Putra Grafika"Printing in the District Karangmalang → Adopting Canva Pro, a design platform graphic cloud based, for making design customer.

g) Rosyida Store: Using Moka Pos, for management finance and cashier.

h) Climize Photocopy Center: Using Adobe Photoshop photo editing tools, design platform graphics.

i) Dvifa Photo and Photo Copy: Using Adobe Photoshop photo editing tools, design platform graphics.

j) Climize Photocopy Center: Using Adobe Photoshop photo editing tools, design platform graphics.

k) Shale Branded Zhafan: Using Shopee to marketing product.

Review Fiqih Making a Message to *Cloud Computing*

In fiqh muamalah, every transaction must meet the requirements of a valid contract, such as agreement between parties, clarity of the object, and freedom from gharar and riba. Subscription-based cloud computing services can be categorized as ijarah (service rental) contracts, with the condition of transparency in data storage and security to avoid gharar. According to

Ilham Rosyid Miftahul Farid, Krismono, Syahmirwan

Ahkaam et al. (2022), in Islam, transactions must meet several conditions, such as there is an agreement between provider services and users, object transaction must clear, and way there is element *gharar* (uncertainty) or *usury.* Cloud computing is usually subscription-based, which in Islam falls under the category of ijarah (service lease) contract. However, there is potential for gharar if users do not know how their data is stored and managed. Therefore, transparent and secure services are more recommended.

Agreements in the Use of *Cloud Computing*

In Islam, every transaction or agreement must meet the requirements of a valid contract, namely the existence of an offer (ijab) and acceptance (qabul), clarity of the object of the transaction, and the absence of elements of gharar (uncertainty) and riba (usury).

a) Ijarah Contract in *Cloud Computing*

   cloud computing services in general nature subscription, which in jurisprudence transactions can categorized as *lease agreement* (rent) service.

1. Provider service *cloud* (for example *Google Drive,* Jurnal.id, or *Microsoft Azure*) acts as the lessor service data storage and management.

2. Users (MSMEs) play a role as paying tenant cost subscriber for utilise service the.

3. This agreement legitimate in Islam during there is clarity services, costs, and terms time use in accordance principle lease agreement

b) Potential *Gharar* in *Cloud Computing*

   Gharar (uncertainty) in transactions can occur if users do not know for certain how data is stored, accessed, and managed by cloud providers. Therefore, from a fiqh muamalah perspective, it is permissible if the cloud service has transparency in its storage system, data security, and service contract (Terms of Service), and it is prohibited if the service provider does not provide clarity regarding the limits of users' rights to their data or has the potential to misuse customer information.

c) Data Ownership in *Cloud Computing*

   In Islam, ownership of property and rights to an object must be clear. Cloud computing raises the question: Does the data stored on the server belong to the user or the cloud service provider?

1. According to jurisprudence muamalah, data uploaded by users still become owned by users, as long as no there is the agreement stating that data ownership shifts to provider *cloud.*

2. However, some service *cloud* own policies that provide right to provider service for access or using user data. This is can become problem If No There is transparency.

Therefore, users must ensure that agreements with cloud providers do not contain elements of transfer of ownership rights that conflict with the principles of muamalah.

d) Data Security and Assurance Trust (Belief)

In Islam, trust and integrity in transactions are highly emphasized. Cloud computing is often associated with the risk of data leaks and misuse of personal information. In fiqh muamalah, cloud service providers have an obligation to protect user data as a trust in the ijarah contract. If cloud providers are negligent in protecting customer data, causing leaks or misuse of information, they can be considered to have violated the principle of trust, which is fundamental in Islam.

e) Usury in Transaction *Cloud Computing*

Some cloud computing services offer free packages with certain conditions or interest-bearing installment systems for premium services. In Islam, it is permissible if payments are made directly without interest or additional fees that constitute usury, and it is prohibited if there are elements of usury in the payment scheme, such as interest on late payments for cloud services.

f) Security Data and Principle Hifdzul Maal

From a fiqh muamalah perspective, the use of cloud computing is permissible as long as it complies with the principles of a valid contract, does not contain gharar, and guarantees the security of user data. The following points should be noted:

1. Make sure contract service *cloud computing* is clear and not contain element evil or usury.

2. Data ownership rights must be still is on the user, not provider service.

3. Provider service *cloud* must maintain customer data as form trustworthy.

4. Use service transparent *cloud* in system security and policy privacy.

Thus, MSMEs that use cloud computing for financial management can continue to operate in accordance with Islamic principles, as long as they comply with the fiqh muamalah provisions that have been explained. In Islam, hifdzul maal (protection of property) is a key principle in economic transactions. Therefore, MSMEs that use

Ilham Rosyid Miftahul Farid, Krismono, Syahmirwan

cloud services must ensure that their financial data is safe from misuse or leakage.

Analysis Sharia *Cloud Computing*

Several scholars and fatwa institutions permit cloud-based digital transactions as long as they comply with sharia principles, such as fairness, transparency, and security. Users must ensure that there are no elements of usury, gharar, or dzulm, and maintain trustworthiness in data management (Naswatie & Yasin, 2022). Several scholars and fatwa institutions have discussed digital technology in business:

a) DSN-MUI Fatwa No. 116/DSN-MUI/IX/2017: States that digital transactions are allowed during No contain element usury, gharar, and dzulm.

b) Sheikh Dr.'s opinion Yusuf Qaradawi: Declare that service based on *cloud* legitimate used during There is transparency in agreement and not harm one party.

Based on this opinion, *cloud computing services* can used in business provided fulfil principle justice, transparency, and security.

Challenge and Opportunity MSMES in Use Cloud Computing

The implementation of cloud computing in the financial management of SMEs in Sragen has increased efficiency and transparency, although challenges such as technological understanding and data security still exist. Cloud computing is permitted in fiqh muamalah if it complies with sharia principles, with great potential that requires increased digital literacy and Islamic-based financial services. According to Octiva et al. (2024), the challenges and opportunities of cloud computing for SMEs are as follows: 1) Subscription fees Still high: 50% of MSMEs stated cost service *cloud* still expensive. 2) Lack of digital literacy: 30% of actors business still difficulty understand use application cloud based. 3) Data security is still doubtful: 20% of respondents worried about their data being leaked. Opportunity is support government in digitalization of MSMEs, improvement efficiency business up to 40%, and convenience access data when anywhere and everywhere

Recommendations for SMEs

To ensure the use of cloud computing is in accordance with sharia principles, MSMEs are advised to choose services that are transparent and secure, and to understand the terms and conditions of the service. The government and relevant institutions need to provide education and training so that MSMEs can utilize this technology optimally and in accordance with sharia provisions. (Rochmawati & Ali Hisyam, 2023). To ensure the use of cloud computing remains in accordance with sharia, MSMEs are advised to:

choose transparent and non-discriminatory service contain element evil, use application based on Islamic finance, and follow training digitalization business from government.

Conclusion

This study concludes that the use of cloud computing in MSME financial management is permissible under fiqh muamalah principles, provided it ensures contractual clarity, transparency, and data security. Cloud services are considered lawful if they are free from elements of gharar and riba, and if data ownership remains with the user. Islamic principles such as hifdzul maal (protection of wealth) and amanah (trustworthiness) underpin the ethical use of digital technology. MSMEs should prioritize transparent cloud providers and participate in digital literacy programs to optimize cloud computing benefits in compliance with sharia. Future studies may explore Islamic-based cloud models to further support the halal digital ecosystem for MSMEs. From a fiqh muamalah perspective, cloud computing is permissible if it complies with sharia principles. Its potential is great, but there is a need to improve digital literacy and develop Islamic finance-based cloud services (Miftakhul et al., 2019). Cloud accounting technology has a positive impact on the financial performance of MSMEs, increasing efficiency, reducing costs, and facilitating access to information. However, research in Indonesia is still limited, so further research with complete data and sophisticated methods is needed to help MSMEs improve their financial management (Ghozali et al., 2019).

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Ilham Rosyid Miftahul Farid, Krismono, Syahmirwan

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A Fiqh Muamalah Perspective on the Use of CLOUD Computing in MSME
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Ilham Rosyid Miftahul Farid, Krismono, Syahmirwan

Challenges and Opportunities of Cloud Adoption in Supply Chain Management : A SWOT Analysis Model Challenges and Opportunities of Cloud Adoption in Supply Chain Management : A SWOT Analysis Model. *11*(October 2021). https://doi.org/10.33168/JSMS.2021.0311