



Beyond System Use: Evaluating Core Banking System Utilization in Indonesian Islamic Rural Banks

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ABSTRACT

This study evaluates Core Banking System (CBS) utilization in Indonesian Islamic Rural Banks (BPRS) using the Technology-Organization-Environment (TOE) framework. Applying convergent mixed-methods and the data obtained from 13 respondents representing 13 BPRS. Quantitative data were analyzed descriptively, while qualitative responses were examined thematically. IT Maturity received the highest evaluation, followed by Data Quality, IT Human Resource, IT Infrastructure, and Competitive Pressure. Findings show that CBS is perceived not merely as an operational tool, but as core infrastructure supporting transactions, reporting, compliance, and governance. Effective utilization depends on continuous development, data quality, system integration, IT competence, and vendor support.

Keywords:

Core Banking System, Islamic rural banks, Technology-Organization-Environment, Accountability

INTRODUCTION

The development of digital technologies has transformed how banking institutions process financial transactions, both for reporting purposes and to support service delivery to customers. This transformation has been driven primarily by the increasing volume and complexity of transaction data, together with growing demands for efficiency and accuracy in information processing (Laudon & Laudon, 2020). These developments are particularly significant in the banking industry because banking activities generate large volumes of recurring and sensitive transaction data that must be processed accurately and promptly (Basel Committee on Banking Supervision, 2013). For Islamic Rural Banks, or Bank Pembiayaan Rakyat Syariah (BPRS), banking digitalization has become increasingly unavoidable amid rapid technological development. As Islamic financial institutions, BPRS are not only required to perform banking functions for micro, small, and medium-sized enterprises, but must also uphold Sharia compliance and banking accountability (Ascarya & Yumanita, 2005).

Within this compliance context, the Core Banking System (CBS) constitutes a critical technological infrastructure. CBS is the principal banking application used to process transactions and manage customer data, deposits, financing, accounting, and reporting (Gadge, 2017). In Indonesia, the provision of information technology by conventional rural banks and BPRS is regulated under POJK No. 75/POJK.03/2016. This regulation positions core banking applications as an integral component of banks' business operations. In addition, the Financial Services Authority (Otoritas Jasa Keuangan or OJK) emphasizes the importance of information technology governance in supporting bank risk management and regulatory compliance (OJK, 2016).

However, the mandatory use of CBS does not automatically ensure that the system is utilized optimally. CBS implementation may generate various operational benefits, including more efficient transaction processing, improved information quality, easier reporting, and stronger support for decision-making (Gorla et al., 2010). Nevertheless, the realization of these benefits depends heavily on technological readiness, infrastructure quality, data quality, IT human

resource competence, organizational support, and the bank's ability to respond to pressures from the external environment. The information systems literature indicates that the success of an information system is determined not merely by the presence of the technology itself, but also by system quality, information quality, service quality, user satisfaction, and the organizational benefits generated by its use (DeLone & McLean, 2003; Petter et al., 2008).

The need to optimize CBS utilization is particularly important for BPRS because their resource profiles differ from those of Islamic commercial banks. As Islamic financial institutions operating on a relatively small scale, BPRS must balance the need for efficiency, regulatory compliance, and service innovation with limitations in their internal capacity (Hassan & Aliyu, 2018). Research on the digital readiness of BPRS in Indonesia shows that digitalization has become increasingly important for maintaining service continuity and operational resilience, particularly following the COVID-19 pandemic (Nurfadilah et al., 2023). Moreover, the development of mobile banking, the integration of digital services, and competition from commercial banks, fintech firms, and digital financial platforms require BPRS to maintain core systems that are reliable, flexible, and capable of further development (Vives, 2019).

Although CBS has become a fundamental requirement in the banking industry, research evaluating its utilization in banking institutions remains limited. Some studies have examined the adoption of digital technologies in Islamic banking more generally, including mobile banking and digital transformation (Abdurrahman, 2024; Afdawaiza et al., 2024). Other studies have focused on the benefits of CBS for banks' operational performance, including improvements in efficiency, productivity, and key performance indicators (Gadge, 2017; Al-Hawari & Ward, 2006). Nevertheless, a more detailed understanding of CBS utilization in micro-scale banking institutions, particularly BPRS, is still required.

This study applies the Technology–Organization–Environment (TOE) framework to analyze CBS utilization in BPRS. The TOE framework explains that technology utilization is influenced by three principal contexts: the technological, organizational, and environmental

contexts (Tornatzky & Fleischer, 1990). In this study, the technological context is represented by IT Maturity, IT Infrastructure, and Data Quality. The organizational context is represented by IT Human Resource, whereas the environmental context is represented by Competitive Pressure. This framework is relevant because CBS utilization in BPRS cannot be explained solely by technological conditions; it must also be examined in relation to organizational readiness and the external pressures that shape technology-related decisions and practices.

This study argues that CBS utilization in BPRS is not merely a response to regulatory mandates or competitive pressure. Rather, it represents an effort by banks to develop modern banking capabilities through the effective use of information technology. This perspective is consistent with the concept of IT capability, which emphasizes that the value of information technology depends on an organization's ability to integrate, manage, and utilize its IT resources effectively (Bharadwaj, 2000). CBS can function as the backbone of banking operations, a data infrastructure, and a governance mechanism only when it is supported by continuous system development, high-quality data input, system integration, competent IT staff, vendor support, and alignment between the IT function and business requirements (Melville et al., 2004). Accordingly, this study examines how BPRS evaluates CBS utilization in supporting accountability and Islamic banking business processes.

The findings indicate that CBS utilization in BPRS is supported more strongly by internal technological and organizational readiness than by external competitive pressure. The survey results show that IT Maturity, Data Quality, IT Human Resource, and IT Infrastructure received higher evaluations than Competitive Pressure. Responses to the open-ended questions further clarify this pattern by showing that respondents regard CBS as the backbone of banking operations, a core data infrastructure, and a governance mechanism that supports transactions, reporting, regulatory compliance, and Islamic banking services. However, the study also finds that the effectiveness of CBS utilization remains dependent on continuous system development, user discipline in data input, system integration, IT staff competence, vendor

support, and alignment between the IT function and business needs.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Core Banking System and Islamic Rural Bank Accountability

Islamic Rural Banks, or Bank Pembiayaan Rakyat Syariah (BPRS), play an important role in the governance of Islamic financial institutions in Indonesia. BPRS provide financial services grounded in Islamic values, particularly to micro, small, and medium-sized enterprises. This role subjects BPRS to complex accountability requirements. As Islamic financial institutions, BPRS must not only sustain their banking intermediation function but also ensure compliance with Sharia principles and banking regulations, maintain the quality of their reporting and internal controls, and preserve the trust of customers and other stakeholders (Otoritas Jasa Keuangan, 2016; Bank Indonesia, 2011). The Islamic accounting and financial governance literature indicates that the accountability of Islamic financial institutions extends beyond the obligation to provide financial reports. It also encompasses ethical and social responsibilities, sound governance, the protection of stakeholder interests, and compliance with Sharia principles (Grais & Pellegrini, 2006; Maali et al., 2006; Abu-Tapanjeh, 2009; Aribi et al., 2019).

Within this context, the Core Banking System (CBS) is an important component of BPRS accountability. CBS is the central system used to process banking transactions and manage customer data, deposits, financing, accounting, and reporting. In Indonesia, the importance of CBS for conventional rural banks and BPRS is established under POJK No. 75/POJK.03/2016 concerning Information Technology Implementation Standards for Rural Banks and Islamic Rural Banks. The regulation establishes that CBS is not used merely for administrative activities but constitutes an integral part of a bank's information technology infrastructure. It is required to ensure that banking processes and transactions, bookkeeping, accounting, and reporting are conducted in an orderly and reliable manner. Accordingly, the availability and effective operation of CBS are closely associated with the ability of BPRS to fulfil

their operational and regulatory accountability obligations.

In banking institutions, the quality of accounting information depends heavily on the reliability of the systems used to record transactions, update data, and provide information in a timely manner (Romney & Steinbart, 2018; Hall, 2011). The information systems literature suggests that the success of an information system is determined not only by the availability of the technology itself, but also by system quality, information quality, service quality, user satisfaction, and the organizational benefits it generates (DeLone & McLean, 2003; Petter et al., 2008; Gorla et al., 2010). In the BPRS context, this means that CBS can strengthen accountability only when it is capable of producing accurate, consistent, complete, and relevant data for reporting, monitoring, and decision-making.

In addition to supporting accounting and reporting processes, CBS contributes to the governance and internal control of BPRS. A core banking system enables a bank to record transactions systematically, restrict access to sensitive information, monitor operational activities, and support reconciliation and regulatory reporting processes (Hall, 2011; Romney & Steinbart, 2018; Otoritas Jasa Keuangan, 2016). In this way, CBS reduces reliance on manual processes that are vulnerable to errors, delays, and data inconsistencies. From an information systems governance perspective, CBS can enhance internal transparency, strengthen monitoring capabilities, and support compliance with organizational procedures (DeLone & McLean, 2003; Gorla et al., 2010). These functions are particularly important for BPRS because their limited internal resources make system effectiveness, data quality, and procedural discipline essential to maintaining the quality of bank governance and reporting (Basel Committee on Banking Supervision, 2013).

Nevertheless, CBS should not be regarded as a purely technical or pragmatic solution that automatically generates accountability. Its benefits depend substantially on the quality of the data entered into the system, the adequacy of the IT infrastructure, the competence of users and IT personnel, and the organization's ability to manage the system continuously. The data quality literature emphasizes that information must satisfy criteria such as accuracy, completeness, consistency,

timeliness, and fitness for users' needs in order to create organizational value (Wang & Strong, 1996). In the CBS context, the quality of the information generated by the system continues to depend on disciplined data entry, verification, integration, and control. CBS-enabled accountability is therefore not merely a technological issue; it also depends on organizational routines, human competence, and data governance.

CBS is also relevant to the service accountability of BPRS. As banks operating on a relatively small scale, BPRS must provide services that are fast, secure, and trustworthy. Research on CBS indicates that core banking systems can improve banks' operational efficiency, productivity, and service quality by enabling faster transaction processing and better information integration (Gadge, 2017). In Islamic banking, CBS development is also required to accommodate product characteristics and business processes that differ from those of conventional banks, including financing based on Islamic contracts, Sharia-related reporting, and compliance with Sharia principles (Ridwan & Kamili, 2015). Thus, CBS not only strengthens banking operations but also helps ensure that BPRS services are delivered accountably and in accordance with customer needs, regulatory requirements, and Sharia principles.

Technology-Organization-Environment Framework in CBS Utilization

The Technology-Organization-Environment (TOE) framework explains that organizational technology utilization is influenced by three principal contexts: technology, organization, and environment (Tornatzky & Fleischer, 1990). The framework has been widely applied in information systems research because it recognizes that decisions and practices related to technology use are shaped not only by the characteristics of the technology itself, but also by the organization's internal readiness and the external pressures surrounding it (Baker, 2012; Oliveira & Martins, 2011).

Within the technological context, this study focuses on three principal dimensions: IT Maturity, IT Infrastructure, and Data Quality. IT Maturity indicates the extent to which an IT system has developed, achieved operational stability and usability, and become capable of supporting both operational requirements and regulatory changes.

IT Infrastructure encompasses the hardware, software, networks, security mechanisms, and technical capacity required for CBS to operate reliably and continuously. Data Quality is equally important because CBS generates the information used as the basis for accounting records, reporting, monitoring, and decision-making. The information systems literature identifies system quality and information quality as important determinants of system success and organizational benefits (DeLone & McLean, 2003; Gorla et al., 2010). The data quality literature further emphasizes that organizational data must be accurate, complete, consistent, timely, and relevant to users' needs (Wang & Strong, 1996).

Within the organizational context, this study examines the role of IT Human Resource. Effective CBS utilization requires personnel who can not only operate the system, but also understand the relationships among the system, business processes, accounting, reporting, and regulatory requirements. The competence of IT staff is therefore important because CBS requires maintenance, parameter adjustments, technical problem-solving, coordination with users, and communication with vendors. The IT capability literature suggests that the value of information technology depends on an organization's ability to integrate its technological resources with human resources, managerial processes, and strategic requirements (Bharadwaj, 2000; Melville et al., 2004). Moreover, alignment between the IT function and business needs is an important prerequisite for technology to generate organizational value (Gerow et al., 2014).

Within the environmental context, Competitive Pressure arises from changes in the banking industry, the development of digital services, increasing customer expectations, and competition from commercial banks, other Islamic banks, fintech firms, and digital financial platforms. The TOE literature indicates that external pressures, including competitive and regulatory pressures, can encourage organizations to adopt and further develop technology in order to remain relevant in a changing business environment (Tornatzky & Fleischer, 1990; Zhu & Kraemer, 2005; Oliveira & Martins, 2011). In the banking industry, digitalization has also increased pressure on banks to provide services that are faster, more integrated, more secure, and more responsive to customer needs (Vives, 2019).

Conceptual Framework

This study conceptualizes CBS utilization in BPRS as a gradual and conditional process of developing digital banking capabilities. On the one hand, CBS functions as an information infrastructure that supports transactions, customer data management, deposits, financing, accounting, reporting, internal control, regulatory compliance, governance, and customer service (Laudon & Laudon, 2020; Otoritas Jasa Keuangan, 2022). On the other hand, the ability of CBS to support BPRS accountability and business processes does not arise automatically from the presence of the system. Its value depends on the technological conditions, organizational capacity, and environmental pressures that shape how the system is used, managed, and developed (Melville et al., 2004; Bharadwaj, 2000).

The Technology-Organization-Environment framework introduced by Tornatzky and Fleischer (1990) is used to explain these conceptual relationships. Within the technological context, CBS utilization is examined through IT Maturity, IT Infrastructure, and Data Quality. IT Maturity refers to the extent to which CBS has developed into a stable and flexible system that can adapt to operational and regulatory requirements. IT Infrastructure refers to the adequacy of the hardware, networks, security mechanisms, and technical capacity required for CBS to operate reliably. Data Quality refers to the ability of CBS to produce data that are accurate, complete, consistent, timely, and relevant to accounting, reporting, monitoring, and decision-making. Together, these three dimensions constitute the technological readiness that enables CBS to function as both a core banking system and an accountability infrastructure.

Within the organizational context, CBS utilization is examined through IT Human Resource. The competence of IT personnel is important because CBS requires continuous operation, maintenance, parameter adjustment, technical problem-solving, coordination with users, and communication with vendors. IT personnel therefore serve not merely as providers of technical support, but also as a link between the system and the bank's business processes, accounting and reporting requirements, regulatory compliance, and service delivery. This perspective is consistent with the view that the value of information technology depends on an

organization's ability to integrate technological resources with organizational processes, human resources, and strategic requirements (Bharadwaj, 2000; Melville et al., 2004).

Within the environmental context, CBS utilization is examined through Competitive Pressure. Competitive pressure reflects changes in the banking industry, the expansion of digital services, increasing customer expectations, and competition from commercial banks, other Islamic banks, fintech firms, and digital financial platforms. These pressures can encourage BPRS to strengthen their systems and digital services in order to remain relevant within an evolving financial environment.

Accordingly, the conceptual framework positions CBS utilization in BPRS as the outcome of interactions among three principal contexts. The technological context explains the readiness of the system and the quality of the information generated by CBS. The organizational context explains the internal capacity of BPRS to operate, maintain, and develop the system. The environmental context explains the external pressures that intensify the need for digitalization and service improvement. The interaction among these three contexts determines the extent to which CBS contributes to BPRS operations and supports accountability and Islamic banking business processes.

This study therefore applies the Technology–Organization–Environment framework to evaluate CBS utilization through technological, organizational, and environmental conditions. Based on this framework, the study addresses the following research question: How do BPRS evaluate the technological, organizational, and environmental conditions that support Core Banking System utilization for BPRS accountability and business processes?

RESEARCH METHODS

This study employed a convergent mixed-methods design. This design was selected because the study aimed to evaluate Core Banking System (CBS) utilization in BPRS by combining quantitative and qualitative data collected during the same phase of the research. The quantitative data were used to identify general patterns in respondents' perceptions of the dimensions of CBS utilization, whereas the qualitative data were used

to explain the meanings, conditions, and challenges underlying those evaluations. The two types of data were analyzed separately and subsequently integrated during the interpretation stage (Creswell & Creswell, 2023).

Purposive sampling was used to recruit respondents from BPRS in Indonesia who had relevant knowledge, experience, or direct involvement in the use, management, evaluation, or decision-making processes associated with CBS. The final dataset consisted of 13 respondents representing 13 different BPRS. Most respondents held managerial or decision-making positions, including president directors, directors, executive officers, managers, and information technology staff. This composition was appropriate for the purpose of the study because evaluating CBS utilization requires assessments from individuals who understand the role of CBS in BPRS business processes. To protect confidentiality, the identities of both the respondents and their institutions were anonymized in the presentation of the findings.

The questionnaire items were developed using the TOE framework to evaluate technology utilization and information technology capabilities at the organizational level (Cruz-Jesus et al., 2019; Yeh et al., 2015). The questions were adapted from the broader context of organizational technology utilization to the specific context of CBS utilization in BPRS. Data were collected through a questionnaire consisting of closed-ended items measured on a five-point Likert scale and open-ended questions. The quantitative data were analyzed using descriptive statistics, whereas the qualitative data were analyzed through thematic analysis.

RESULTS AND DISCUSSION

The findings indicate that CBS utilization in BPRS cannot be understood merely as the use of banking software or as a response to external competitive pressure. The descriptive results presented in Table 1.1 show that IT Maturity received the highest mean score, followed by Data Quality, IT Human Resource, IT Infrastructure, and Competitive Pressure. This pattern suggests that respondents regarded internal readiness—particularly system maturity, data quality, IT human resource competence, and infrastructure

adequacy-as the primary foundation for effective CBS utilization.

The qualitative findings provide further insight into this pattern. Respondents perceived CBS as the backbone of banking operations, a core data infrastructure, and a governance mechanism that enables BPRS to process transactions, produce reliable reports, comply with regulatory requirements, and support Islamic banking services. At the same time, the findings show that mature CBS utilization remains dependent on continuous system development, disciplined data input by users, system integration, IT staff competence, and effective vendor governance.

Tabel 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
IT Maturity	13	4.385	0.719	2.75	5
IT Infrastructure	13	4.173	0.472	3.25	5
Data Quality	13	4.327	0.544	3.5	5
IT HR	13	4.231	0.599	3.25	5
Competitive Pressure	13	4.019	0.505	3.5	5

Sources: Authors' processed data, 2026

IT Maturity

Within the technological context, IT Maturity obtained the highest mean score, at 4.385, with a standard deviation of 0.719. This result indicates that most participants perceived the BPRS in which they worked as having achieved a relatively high level of information technology maturity. Nevertheless, some variation remained across institutions, suggesting that IT maturity was not entirely uniform among the participating BPRS. In this study, IT maturity was reflected in four components.

Positive Perceptions of CBS Performance

R1: "Good, though not yet optimal."

R2: "Already aligned with the needs."

R4: "Very good and on track."

R5: "Fairly good."

R6: "Refers to the relevant regulations and accommodates business needs."

R13: "Very good... consistently maintained... there are ongoing application enhancements."

Overall, respondents expressed positive views of the performance of the Core Banking System (CBS). They highlighted improvements over time,

including faster transaction processing, fewer errors, and better service quality. These perceptions suggest that CBS contributes tangible benefits to banks' operational activities. Research on innovation and technology adoption has consistently shown that perceptions of a technology's usefulness and performance benefits encourage its effective adoption and use (Lee & Coughlin, 2015). In the context of mobile banking and Islamic digital banking, perceived usefulness as a technological attribute has also been found to have a significant influence on information technology utilization outcomes (Abdurrahman, 2024).

Management confidence in CBS utilization appears to depend largely on the system's ability to improve efficiency, support better decision-making, and generate more accurate reports. This observation is consistent with the TOE perspective, which suggests that technologies offering clear performance improvements are more likely to be assimilated more extensively within an organization (Tornatzky & Fleischer, 1990). Relative advantage has likewise been identified as one of the strongest drivers of successful CBS implementation and utilization (Opoku et al., 2016). From an information systems success perspective, this pattern is also consistent with the DeLone and McLean model, which links system quality and net benefits to user satisfaction and continued system use (DeLone & McLean, 2003).

Need for System Development and Optimization

R2: "It must continue to be developed in line with current developments."

R11: "Parameter adjustments can be made whenever there are regulatory changes."

R13: "There are application enhancements that are aligned with regulatory requirements."

Although participants recognized the benefits of CBS, they also emphasized the need for continuous system development and optimization. Many considered that the system still required further improvement, including additional features, better integration, and reporting functions that were more closely aligned with BPRS needs. Technology implementation should therefore not be viewed as a one-time event, but as an ongoing process of improvement. This interpretation is consistent with

the TOE framework, which treats the technological context as dynamic rather than static (Tornatzky & Fleischer, 1990).

Participants' references to "continuous development," "updates aligned with regulations," and "further optimization" reveal a gap between the system's current capabilities and the strategic and regulatory requirements of banking institutions. This finding is theoretically supported by Leonard-Barton's (1988) concept of implementation as a process of mutual adaptation, in which technology and the organization evolve together. CBS utilization should therefore be understood as an ongoing adjustment between technology and organizational practices, because technological benefits arise only when systems, users, and work routines are effectively integrated (Leonard-Barton, 1988).

In the present study, this means that BPRS must continually adjust and improve their CBS to align it more closely with Islamic banking products, internal processes, and frequently changing regulatory requirements. The importance of post-implementation development is also emphasized in the ERP literature. A case study on ERP benefit realization showed that active post-implementation development and benefit-management practices can improve user satisfaction and prevent technological solutions from becoming obsolete or underutilized (Hietala & Päiväranta, 2021).

System Flexibility and Ease of Use

R3: "It must be accompanied by adequate user capability." (usability-related)

R7: "Easy to implement, flexible, connected, accurate, and real-time."

R11: "The latest CBS is very easy to manage and easy to customize."

Participants consistently emphasized system flexibility and ease of use as important attributes influencing CBS acceptance. Respondents described the system as "easy to implement," "flexible," "accurate and real-time," and capable of being connected to other applications and adjusted quickly in response to regulatory changes. This type of flexibility reflects the system's capacity to accommodate diverse and evolving operational requirements. Within the TOE framework, these attributes relate directly to the technological context, particularly perceived complexity or, conversely, simplicity and compatibility with existing processes

(Tornatzky & Fleischer, 1990).

The findings are consistent with technology acceptance research showing that perceived ease of use significantly improves users' attitudes toward a system and their intention to use it (Lee & Coughlin, 2015). Studies of organizational technology adoption from a TOE perspective have similarly shown that lower technological complexity and stronger alignment with existing workflows facilitate successful information system implementation (Opoku et al., 2016). The perception that CBS is easy to use and learn may therefore have accelerated its incorporation into the daily operations of BPRS.

Flexibility is also closely related to compatibility. Respondents noted that CBS could accommodate customized reports, new product configurations, and parameter changes without requiring intervention from the CBS vendor. A systematic review of health information system utilization identified system flexibility and ease of use as important technological factors in successful implementation (Yusof et al., 2007). By lowering barriers to adoption and allowing the system to be continuously utilized and developed in accordance with BPRS needs, a flexible and user-friendly CBS can support smoother business processes and contribute to a higher level of IT maturity.

Technical Support

R8: "The key lies in the CBS support team."

R9: "There are Standard Operating Procedures (SOPs)... hardware security, data security, and maintenance..."

R10: "The infrastructure is managed by a third party, while the database is handled internally."

R12: "An experienced vendor... updates to reports are followed up accordingly."

The final theme highlights the importance of technical support in CBS implementation. Respondents emphasized that assistance from both internal IT teams and external vendors was essential for effective system use and continuous maintenance. They referred to the importance of a CBS "support team," "experienced vendors," routine maintenance, and continuous application development aligned with new regulatory requirements. This emphasis corresponds to the service quality dimension of information systems success and is also related to technological readiness

within the TOE framework, in which infrastructure and supporting resources form part of the broader technological context (DeLone & McLean, 2003).

Previous studies have shown that the availability and quality of technical assistance positively influence technology adoption and user satisfaction. In small-business settings, for example, the success of application service provider (ASP)-based systems depends heavily on system quality, service quality, and trust, with service quality playing an important role in encouraging user satisfaction and continued use (Lee et al., 2007). Similarly, studies of IT adoption and utilization in healthcare and other sectors have emphasized that strong technical and user support substantially increases the likelihood of successful implementation and continued system use (Yusof et al., 2007).

Technical support forms part of an organization's technological readiness and its access to external expertise. Smaller institutions such as BPRS often have limited internal IT capabilities and therefore depend on vendor support for system implementation, updates, and technical problem-solving (Opoku et al., 2016). Respondents valued the availability of training during CBS deployment, continuing consultation with vendors, and prompt responses to technical problems. These forms of support contributed to smoother operations and strengthened confidence in the system.

Technical support can also reduce perceived risk and complexity, encourage users to explore system features, and help ensure that CBS continues to generate value over time. Organizations that invest in robust infrastructure and adequate support generally achieve better outcomes and more stable long-term technology assimilation (DeLone & McLean, 2003; Lee et al., 2007).

IT Infrastructure

The IT Infrastructure variable obtained a mean score of 4.173, with a standard deviation of 0.472. This result indicates that the information technology infrastructure in most of the participating BPRS was considered adequate to support operational activities and CBS implementation. The relatively low level of dispersion further suggests that respondents perceived infrastructure readiness to be fairly consistent across the participating institutions.

Quality and Adequacy of Current IT Infrastructure

R1: "Fundamentally, it is already adequate."

R2: "Simple and easy for operational use."

R7: "Relevant to IT needs."

R12: "All requirements have been fully supported by the system."

Organizations with robust IT infrastructure are better able to support core banking operations in a stable, consistent, and reliable manner. In this study, several respondents described the IT infrastructure in their respective BPRS as adequate, stable, and capable of supporting daily operations. Basic technological capabilities, including hardware stability, connectivity, and supporting systems, were not perceived as major barriers to technology utilization. Instead, these capabilities provided a foundation for more extensive information system utilization and innovation (Tornatzky & Fleischer, 1990; Oliveira & Martins, 2011).

Perceptions of infrastructure adequacy may also strengthen users' confidence in the system. Reliable infrastructure reduces the likelihood of service disruption, supports consistent system performance, and enables users to conduct operational activities with greater certainty. The availability of reliable and fit-for-purpose IT infrastructure therefore represents a fundamental dimension of IT maturity.

Need for Infrastructure Development and Modernization

R1: "It still requires further development."

R2: "It must continue to be developed in line with current developments."

R3: "It requires the implementation of IT infrastructure that aligns with the digital era."

R6: "It should be planned using up-to-date technology to enable future development."

R13: "There is continuous development... aligned with digitalization trends."

Despite their generally positive views of the existing infrastructure, respondents emphasized the need for further development and modernization. This suggests that although the current infrastructure was considered functionally adequate, it must continue to evolve in response to digital banking requirements, technological developments, and the broader ecosystem of institutional partners.

Within the TOE framework, modernization reflects an organization's ability to expand and renew its technological capabilities in response to environmental pressures. Banks are expected to innovate continuously rather than merely maintain their existing CBS. In the banking context, modernization involves expanding and upgrading the core system so that it can support a broader range of services that are more efficient and more responsive to customer needs.

Based on evidence from urban cooperative banks in India, Gadge (2017) showed that CBS expansion and modernization were associated with improvements in key performance indicators, including deposits, financing, business turnover, and employee productivity. Such modernization also helped banks retain customers and remain competitive. When interpreted in the BPRS context, respondents' emphasis on the "continuous development" of CBS indicates a need to progress from a basic but functional core system toward a more advanced, scalable, and analytically capable platform that can support growth, resilience, and long-term IT maturity (Gadge, 2017; Tornatzky & Fleischer, 1990).

Compliance and Security in IT Infrastructure

R3: "Capability to withstand cybersecurity attacks."

R9: "In compliance with OJK regulations regarding IT suitability and governance."

Security and regulatory compliance emerged as important components of IT infrastructure maturity. Within the technological context of the TOE framework, these elements reflect an organization's commitment to risk mitigation and regulatory alignment. In Indonesia, regulations issued by the Financial Services Authority (*Otoritas Jasa Keuangan* or OJK) have placed digital governance among the principal concerns of financial institutions.

POJK No. 11/POJK.03/2022 explicitly requires banks to evaluate their digital maturity annually and maintain IT governance that is proportionate to the complexity of their services. Accordingly, IT infrastructure must support both technical resilience and compliance-driven reporting requirements. Mature infrastructure is therefore concerned not only with technological capability, but also with auditability, accountability, and the

ability to withstand cybersecurity incidents under regulatory oversight.

Data Quality

The Data Quality variable obtained a mean score of 4.327, with a standard deviation of 0.544. This result indicates that participants perceived BPRS as placing considerable emphasis on data quality and data integration in the implementation of CBS. It also suggests a high level of awareness among respondents that system success depends substantially on the reliability of the data processed through the system.

Dependence of Data Quality on User Input

R3: "Active participation from all parties is required for the verification of data quality and integrity."

R4: "Data quality depends on the users."

R9: "Data quality is highly dependent on the quality of the data input."

R12: "Data quality depends on the users' accuracy in entering data."

Respondents described CBS as a reliable system capable of producing information that is accurate and accountable. At the same time, they emphasized that "data quality depends on the users" and that disciplined data-entry and verification procedures are essential. This finding is consistent with the information systems literature, which conceptualizes data quality as a multidimensional construct encompassing accuracy, completeness, timeliness, consistency, and relevance from the perspective of data users (Wang & Strong, 1996). Within this framework, intrinsic and contextual data quality cannot be achieved through technical design alone; they also depend on how users enter, validate, and maintain data. Cai and Zhu (2015) similarly show that data quality problems frequently originate in the human processes and activities through which data are generated, rather than solely in data storage or processing.

Al-Qudah and Shukeri (2014) found that data quality, together with internal control, significantly improves the effectiveness of accounting information systems, thereby highlighting the need for robust procedures and competent users in data-capture processes. Knauer et al. (2020) also showed that information system quality improves the quality of management accounting

data, although this relationship is mediated by organizational capabilities and by how the system is used in practice. From a TOE perspective, the technological capability of CBS to generate real-time and auditable data is therefore closely connected to organizational factors such as user training, standard operating procedures for data entry, and internal controls (Tornatzky & Fleischer, 1990; Oliveira & Martins, 2011). Strengthening user competence and CBS data governance is consequently essential to maintaining data quality within BPRS.

Challenges and Limitations in CBS Integration

R3: "Active involvement from all parties is required to ensure data integrity, particularly in relation to system integration."

R9: "In terms of integration, the CBS currently in use still requires further development."

R13: "The integration processes produced are appropriate, indicating that integration remains a key area of focus."

The same set of responses indicates that, although CBS was considered capable of generating data that met current reporting and operational requirements, its integration with other systems was still perceived as limited and in need of further development. Participants described CBS as "adequate" or "sufficient" for current needs, but noted that its integration features "still require further development" and that broader connectivity remains a work in progress. This suggests a gap between reliable internal data and fully integrated, end-to-end information flows across applications.

The system integration literature in financial services describes a similar pattern. Based on a case study of a large financial institution integrating heterogeneous consumer banking systems, Lam (2005) showed that enterprise application integration projects must connect portfolios of legacy and modern applications. Without a coherent integration architecture, organizations may develop a "mass of interfaces," incur high maintenance costs, and face increased technological risk. Poor or partial integration can also create "islands of applications," data redundancy, and difficulties in providing end-to-end business solutions across multiple channels. These conditions reflect the risks faced by BPRS when CBS is not adequately integrated with other systems (Lam, 2005).

Although CBS may generate accurate and auditable core data, limited integration with peripheral applications, regulatory reporting tools, or digital channels can restrict the ability of BPRS to use data strategically. In TOE terms, this reflects a misalignment within the technological context between the internal capabilities of CBS and the broader external and interorganizational technological ecosystem with which BPRS must connect (Tornatzky & Fleischer, 1990; Oliveira & Martins, 2011).

From a risk and governance perspective, the literature indicates that incomplete integration can increase operational risk and reduce the benefits of digitalization. Research on information system quality and organizational impact shows that information quality and system integration jointly influence user satisfaction and organizational outcomes (Gorla et al., 2010). For BPRS, the qualitative evidence suggests that CBS currently serves as a robust backbone for core banking data. However, further investment in integration layers, interfaces, and data governance remains necessary to fully support real-time analytics, regulatory compliance, and multichannel service delivery.

IT Human Resource

The IT Human Resource variable obtained a mean score of 4.231, with a standard deviation of 0.599. This result indicates that participants generally perceived IT personnel in their respective BPRS as possessing adequate skills and knowledge to manage technological systems and adapt to technological change. Nevertheless, differences in capability remained across institutions.

Perceptions of IT Staff Sufficiency and Competence

R1: "Fundamentally, they are already capable, but still need to continue learning."

R6: "The current capability of the IT staff is good. We remain consistent in enhancing IT staff competencies through training and workshops."

R11: "The company's IT staff currently possess very strong capabilities. With their existing skills, they are able to facilitate system development and support the smooth running of the company's business processes."

These responses indicate that BPRS have developed a basic level of internal capability

to manage the core system and address the problems that arise in its operation. Within the TOE framework, internal resources, skills, and knowledge constitute important organizational conditions for effective technology utilization (Lippert & Govindarajulu, 2006). Empirical studies show that the quality of IT professionals, including their technical skills, problem-solving ability, and understanding of business processes, is an important driver of enterprise system success. Competent IT staff are better able to configure systems appropriately, respond promptly to operational problems, and translate business needs into technical requirements (Ifinedo et al., 2010).

Research on ERP implementation has similarly found that human-related critical success factors, such as user competence, team composition, and communication, strongly influence whether complex information systems deliver their expected benefits (Akhzan et al., 2021). In the banking sector, studies of human resource quality in digital transformation show that banks with stronger IT and digital capabilities among their employees are better able to stabilize operations, maintain service quality, and leverage new technologies to achieve competitive advantage (Le et al., 2025).

Continuous Development of Staff Competence

R2: "Their competence is adequate, but continuous upgrading of knowledge and the ability to understand and apply new technologies is still necessary."

R10: "Their capability is sufficient to maintain normal business operations, but there is limited understanding of technological developments that could be implemented within the company."

R13: "So far, their capability is reasonably good; however, further development is still required, as technological advancements in the digital era must be continuously followed."

At the same time, many respondents emphasized that existing competencies remained relatively basic and required continuous development to keep pace with rapid changes in digital banking, cybersecurity, and regulatory requirements. This finding is consistent with recent evidence showing that digital transformation in banking is not a one-time technology project, but an ongoing process that requires continuous

investment in human resource development (Le et al., 2025).

In Vietnamese commercial banks, for example, human resource quality in the digital era is determined not only by employees' current level of competence, but also by their capacity for lifelong learning and adaptation to emerging technologies (Le et al., 2025). From an information systems perspective, human-related factors including training, knowledge sharing, and openness to change have repeatedly been shown to influence the success of ERP and other enterprise systems (Akhzan et al., 2021).

Within the TOE framework, these findings highlight the dynamic nature of the organizational context. Although current IT staff were generally considered competent, BPRS need systematic programs for training, certification, and exposure to emerging technologies. Such initiatives are necessary to prevent capability gaps that could weaken the long-term effectiveness of CBS and related digital initiatives (Lippert & Govindarajulu, 2006).

Organizational Structure, Synergy with Management, and Dependence on Vendors

R3: "The company's management and the IT Department must also work in synergy."

R9: "The IT Division structure at BPRS consists of specialized roles aligned with organizational needs. The team has experience in system development, networking, regulatory compliance, and continues to enhance human-resource quality through training programs."

R12: "The IT staff continue to coordinate with the vendor regarding IT development."

The responses describe an organizational context in which the IT function has begun to assume a more formal structure, requires close collaboration with top management, and remains dependent on external vendors for the development and maintenance of the Core Banking System (CBS). Within the TOE framework, organizational conditions particularly top management support and internal IT readiness are important determinants of the successful utilization of complex technologies (Awa et al., 2015; Oliveira & Martins, 2011).

In the banking sector, strategic alignment between IT units and senior executives is

consistently regarded as an important prerequisite for maximizing the business value of core systems and other IT-based capabilities (Gerow et al., 2014). However, BPRS dependence on CBS vendors also reflects limitations in their internal IT resources and capabilities, making external technological support necessary.

The IT outsourcing literature shows that vendor dependence can provide organizations with access to specialized expertise and technological infrastructure. At the same time, it may create risks such as vendor lock-in, information asymmetry, reduced flexibility, and loss of control over critical IT architecture (Gewald & Dibbern, 2009; Lacity et al., 2009). To mitigate these risks, organizations need to develop vendor governance capabilities, including clearly defined service expectations, continuous performance monitoring, active vendor relationship management, and mechanisms for knowledge transfer (Cezar et al., 2017; Lacity et al., 2009).

In the BPRS context, these findings suggest that organizational maturity in CBS utilization is determined not only by internal technical competence, but also by governance structures capable of aligning management and IT functions while actively managing dependence on external technology providers.

Competitive Pressure

Finally, Competitive Pressure obtained the lowest mean score, at 4.019, with a standard deviation of 0.505. Although this score was slightly lower than those of the other variables, it still indicates that participants perceived their BPRS as facing considerable external competitive pressure to utilize CBS promptly.

CBS as Core Infrastructure for Operational Competitiveness

R3: "The CBS is the core of banking operations today, and therefore plays a highly critical role."

R10: "The implementation of CBS is essential to support all office operational activities and to produce appropriate and accurate records."

R11: "The benefits of CBS implementation include supporting the smooth execution of Islamic banking activities and enabling management to easily monitor the company's performance."

R12: "The Core Banking System is the central component of the company's services to customers."

R13: "The benefits of implementing CBS in the Islamic banking industry are highly significant."

Respondents recognized CBS as a core component of BPRS operations. This suggests that, in the contemporary Islamic banking landscape, a well-functioning core system is no longer a distinguishing feature among banks, but a basic requirement for competing in the financial services market. Evidence from India shows that CBS utilization is associated with significant improvements in key performance indicators, including total deposits, financing, business turnover, employee productivity, and the financing-to-deposit ratio, indicating greater efficiency and competitiveness following CBS implementation (Gadge, 2017).

In the Indonesian context, research on the digital readiness of BPRS similarly emphasizes that the resilience of core systems and supporting IT infrastructure is essential for maintaining service continuity and operational resilience during disruptions such as the COVID-19 pandemic (Nurfadilah et al., 2023). From a TOE perspective, these findings suggest that environmental pressures in the Islamic banking industry encourage BPRS to treat CBS as the backbone of their business operations. In this role, CBS is expected to support real-time banking processes, accurate transaction recording, and reliable customer service. As technology continues to advance, the ability of CBS to support end-to-end transaction processes, integrate with peripheral applications, and provide timely information becomes increasingly important for maintaining competitive advantage (Probojakti et al., 2024).

CBS as an Enabler of Governance, Compliance, and Trust

R1: "Transparency and data quality are essential components of good corporate governance, as banking is an industry built on trust."

R2: "It is highly necessary and mandatory to ensure that all records comply with the applicable rules and regulations."

R10: "[The system] produces records that are accurate and compliant."

R11: “[The system] ensures the consistency and confidentiality of customer information and data.”

Respondents also emphasized the role of CBS in supporting transparency, accurate record-keeping, and compliance with regulatory requirements. Financial information transparency and reliable reporting are key indicators of governance quality and play an important role in maintaining stakeholder trust (Wang, 2024). They are also important for managing risk and demonstrating the sound stewardship of depositors’ funds.

For BPRS, CBS serves as an enabling technology that embeds regulatory requirements into daily operations, supports the preparation of reports that comply with OJK regulations, and protects the confidentiality and integrity of customer data. From a TOE perspective, competitive pressure in the Islamic banking environment is therefore not limited to pricing or product features. It also includes expectations related to governance, auditability, and information reliability. BPRS that use CBS to generate transparent, compliant, and trustworthy information are better positioned to meet these environmental expectations and maintain legitimacy in the eyes of regulators and other stakeholders.

CBS as a Driver of Digitalization, Integration, and Market Expansion

R4: “In the era of technology and digitalization, the CBS is extremely important.”

R7: “The CBS can support banking digitalization, thereby enhancing the company’s brand.”

R8: “It remains relevant, provided it is maintained in alignment with evolving needs and developments.”

R9: “In a competitive business landscape, digitalization is essential for broad and aggressive expansion. A flexible CBS is required to enable integration with conventional banks. Advancing technologies must be leveraged by BPRS, supported by OJK regulations that facilitate such advancements.”

R6: “The use of CBS is highly important for the development of Islamic banking.”

The third theme presents CBS as a platform that enables broader digitalization, integration with

other financial institutions, and expansion of the market reach of BPRS, particularly through digital channels. Research on digital transformation in banking indicates that CBS is increasingly expected to support omnichannel service delivery, rapid product innovation, and integration with external platforms, making it a central element of digital banking strategy (Kitsios et al., 2021).

Empirical research on the digital readiness of BPRS in Indonesia confirms that digital transformation has accelerated since the pandemic, increasing pressure on BPRS to use technologies that enable remote service delivery, improve customer experience, and respond to evolving market expectations (Nurfadilah et al., 2023). At the same time, sectoral analyses of Islamic banks in Indonesia indicate that, despite their substantial market potential, these institutions face strong pressure to innovate through digital technologies in order to expand their market reach while maintaining Sharia compliance (Afdawaiza et al., 2024).

From a competitive perspective, digital transformation has opened the financial services market to new entrants, including fintech firms and digital banks. This development has intensified competitive pressure and compelled incumbent banks to reconsider their technological architectures and business models (Probojakti et al., 2024). For BPRS, a flexible CBS that can be integrated with payment systems, Islamic commercial banks, and digital channels represents a strategic response to these environmental demands. CBS therefore supports not only internal efficiency, but also digital product development, geographic market expansion, and brand strengthening in a financial market increasingly shaped by digital competition.

CONCLUSION

This study shows that Core Banking System (CBS) utilization in BPRS should not be understood merely as a response to competitive pressure, but as a process of technology assimilation supported by internal organizational readiness. The quantitative findings indicate that IT Maturity, Data Quality, IT Human Resource, and IT Infrastructure received higher evaluations than Competitive Pressure. This pattern suggests that successful CBS utilization in BPRS is more closely associated with technological

maturity, data quality, IT human resource competence, and infrastructure readiness than with market pressure alone. The study therefore extends the Technology–Organization–Environment (TOE) framework by demonstrating that, in the BPRS context, technological and organizational factors provide the primary foundation for the sustained adoption and utilization of CBS (Tornatzky & Fleischer, 1990; Oliveira & Martins, 2011).

The findings further show that CBS is not regarded merely as software for routine banking operations, but as a core infrastructure that supports transaction efficiency, information quality, regulatory compliance, governance, and stakeholder trust. Positive perceptions of CBS performance are consistent with the information systems literature, which emphasizes the relationships among system quality, information quality, user satisfaction, and organizational benefits (DeLone & McLean, 2003; Gorla et al., 2010). However, the maturity of CBS utilization is not a final or self-sustaining condition. It depends on the organization's ability to maintain the quality of data inputs, further develop system integration, strengthen human resource competence, and provide continuous technical support (Wang & Strong, 1996; Lam, 2005; Knauer et al., 2020).

The practical implication is that BPRS should not regard CBS as a system whose development ends once implementation has been completed. Instead, it should be treated as an information technology capability that must be continuously managed, updated, and adapted to changing business and regulatory requirements. In practice, this requires BPRS to strengthen the competence of their IT personnel, maintain data quality, improve system integration, and ensure the availability of continuous technical support. Dependence on vendors can remain beneficial, particularly by providing access to technological expertise that may not yet be fully available internally. Nevertheless, such dependence must be managed through clearly defined vendor governance arrangements to prevent vendor lock-in, information asymmetry, and reduced control over the bank's IT architecture (Gewald & Dibbern, 2009; Lacity et al., 2009). With stronger governance, CBS can function not only as an operational system but also as a foundation for digital transformation, enhanced accountability, and the sustainable competitiveness of BPRS (Gerow et al., 2014; Gadge, 2017; Nurfadilah et al., 2023).

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