International Journal of Business and Quality Research

https://e-journal.citakonsultindo.or.id/index.php/IJBQR
E-ISSN: 2985-9468

From Digitalization to Process Transformation: A Conceptual Synthesis of Business Process Reengineering in the Transformation of Digital Management Information Systems to Improve Organizational Performance

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Abstract

Information technology investment does not always improve performance when organizations retain business processes that are long, fragmented, and non-value-adding. This article analyzes the role of Business Process Reengineering (BPR) in the transformation of digital management information systems (MIS). The study uses a descriptive-analytical literature review of five scientific journal articles published in 2021–2024, complemented by a case study at Telkom University, which are then critically synthesized. The findings show that BPR supports digital transformation through process redesign, information integration, activity automation, and changes in decision-making patterns. Its success is determined not by technology alone, but also by management commitment, organizational readiness, human resource competence, data quality, and change governance. The Telkom University case study shows that redesigning the official travel procedure produced a fully online process, more decentralized decision-making, more transparent monitoring, and improvements in effectiveness and efficiency as reported by the researchers. This article proposes a six-stage conceptual synthesis model that integrates BPR with business process management (Business Process Management/BPM) and multidimensional performance measurement. The model has not been empirically tested and requires validation in future research.

Keywords: Business Process Reengineering, Digital Management Information Systems, Digital Transformation, Organizational Performance, Business Process Management

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INTRODUCTION

Digital technology is changing the competitive environment and the way organizations run their operations. Organizations are required to manage information quickly, make data-driven decisions, improve service quality, and adapt to changing stakeholder needs. In this context, digital management information systems (MIS) play a strategic role because it integrates data, coordinates activities across units, monitors performance, and supports managerial decisions; its function goes beyond record-keeping. Even so, many organizations that already use electronic applications or administrative systems still retain lengthy procedures, repeated approvals, duplicate record-keeping, and coordination that is siloed across units. A systematic review of 279 articles by Hanelt et al. (2021) shows that digital transformation is associated with organizational change and the need for continuous adaptation, so it cannot be treated as a technology project that is finished once the system is launched. Verhoef et al. (2021) distinguish three stages, namely digitization, digitalization, and digital transformation, and emphasize that digital transformation demands particular organizational structures and has implications for the metrics used to assess performance. A review of the strategic management literature also concludes that research on the relationship between digital transformation and strategic management is still at an early stage (Rêgo et al., 2022).

Business process reengineering (BPR), namely the fundamental rethinking and redesign of business processes to achieve significant performance improvements, is a relevant approach to this problem. However, prior studies place different emphases. Fetais et al. (2022) position human, technological, and organizational factors as elements of BPR success. Shahul Hameed et al. (2021) report a significant positive relationship between top management commitment, readiness for change, information technology capability, and human resource management with organizational performance among 103 respondents from electronic manufacturing companies in Malaysia. Milani et al. (2024), through a review of 40 case studies, identify the digital technology capabilities that enable process redesign, while Putra and Mahendrawathi (2024), through a synthesis of 34 articles, emphasize the links among BPM, digital innovation, and digital transformation. Pasaribu et al. (2021) present evidence of BPR implementation in the official travel procedure at Telkom University. These five studies differ in design and context, so the strength of their evidence is not equal, and their findings have not been integrated into a single framework that links process design, digital capability, organizational readiness, and performance measurement. The tensions between technology-centric and socio-technical views, between radical redesign and continuous improvement, and between efficiency and multidimensional performance also remain unresolved. More recent empirical evidence reinforces the need to

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pay attention to process design. Zhou et al. (2025), taking a BPR perspective and using data on companies listed on the Shanghai and Shenzhen exchanges for 2010–2023, report that digital transformation increases labor productivity through optimization of production management processes, reduction of excess human resources, and improvement of internal control.

This gap is important to address because digital MIS investment decisions require a basis that explains when, how, and under what prerequisites process redesign leads to performance improvement. This article aims to analyze the role of BPR in the transformation of digital MIS through a review of five scientific journal articles and a case study at Telkom University. Specifically, this article (1) critically compares the approaches and findings of the five articles, (2) analyzes the implementation of BPR at Telkom University, and (3) formulates a conceptual synthesis model and managerial implications for measurable and sustainable performance improvement.

METHOD

Research Design and Article Selection

This study uses a literature review with a descriptive-analytical approach and critical synthesis. Five scientific journal articles were selected based on their relevance to BPR, digital transformation, business process management, and organizational performance, prioritizing publications from 2021–2024 (Table 1). Hanelt et al. (2021) is used as a supporting reference for the digital transformation context and is not included among the five articles analyzed. Ten additional articles published in 2021–2025 (Badakhshan et al., 2022; Beerepoot et al., 2023; Cosa & Torelli, 2024; Graafmans et al., 2021; Masoud & Basahel, 2023; Reijers, 2021; Rêgo et al., 2022; Verhoef et al., 2021; Zhao et al., 2024; Zhou et al., 2025) are used as supporting references to strengthen the discussion and are not included among the five articles analyzed.

Analysis Procedure

The analysis was carried out in three steps: (1) identifying the objectives, approach, and findings of each article; (2) comparing approaches, contexts, and limitations, bearing in mind that types of evidence (literature reviews, surveys, and case studies) have different evidentiary strength; and (3) developing a critical synthesis to produce a conceptual model and recommendations. The Telkom University case study is based on the scientific publication by Pasaribu et al. (2021) and not on the authors' direct observation. Therefore, no primary data were collected and no impact was recalculated.

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RESULTS

Characteristics and Findings of the Five Articles

Table 1 summarizes the focus, design, findings, and limitations of the five articles. The main difference lies in the type of evidence: literature reviews describe general patterns of research, surveys test relationships among variables, and case studies show how change is carried out in a particular context. Statistical relationships from surveys do not automatically prove causality, whereas case studies provide contextual depth at the cost of limited generalizability.

Table 1: Summary of the Five Articles Reviewed

Article	Focus and design	Main findings	Limitations
Fetais et al. (2022)	Success factors in BPR implementation; literature review	BPR success is not explained by technology alone; attention is needed to human resources, organizational support, and the fit of technology with the objectives of change (human–technology–organization framework)	Synthesizes prior research and therefore does not establish the magnitude of each factor's influence across all types of organizations
Pasaribu et al. (2021)	Official travel procedure at Telkom University; mixed methods (before–after measurement, interviews, focus group discussions)	Fully online process; more decentralized decision-making; more transparent monitoring; improved effectiveness and efficiency, paper and cost savings, and optimized employee assignment	One university and one type of procedure

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Article	Focus and design	Main findings	Limitations
Shahul Hameed et al. (2021)	BPR and organizational performance; survey of 103 respondents in electronic manufacturing in Malaysia during the COVID-19 pandemic; PLS-SEM	Top management commitment, readiness for change, information technology capability, and human resource management are significantly and positively related to performance	Survey data and a specific industry context do not prove a cause-and-effect relationship that applies universally
Putra & Mahendrawathi (2024)	BPM, digital innovation, and digital transformation; systematic review of 34 articles	The three are interrelated; BPM helps manage processes more systematically and flexibly	Shows patterns in the literature, not a single measure of impact
Milani et al. (2024)	Digital technology in process redesign; systematic review of 40 case studies	Five enabling capabilities: digitization, communication, analytics, digital representation, and connectivity	Technology is only an enabler; benefits depend on data quality, organizational readiness, and the accuracy of process design

Source: authors' compilation based on the articles reviewed.

Case Study: BPR Implementation at Telkom University

Telkom University is a private university in Indonesia that was the object of study in Pasaribu et al. (2021). The official travel procedure involves submission, review, approval, execution, and accountability reporting, so it is prone to delays and administrative burden when it relies on manual documents or separate coordination. That study evaluated the existing process, designed a new process, and implemented the BPR results with the support of digitalization and cross-unit integration, using mixed methods. Table 2 summarizes the

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reported changes. This table is not the result of a recalculation because detailed quantitative figures are not available in the sources used.

Table 2: Conditions Before and After BPR in the Official Travel Procedure

Aspect	Before BPR	After BPR
Process medium	A combination of manual and online	Fully online process
Decision-making	Highly centralized	More decentralized
Monitoring	Limited process transparency	More transparent monitoring system
Resource use	Administration requires time and materials	Paper and cost savings reported
Process performance	Barriers to effectiveness and efficiency	Improvements in effectiveness and efficiency reported

Source: Pasaribu et al. (2021), summarized by the authors.

Four managerial implications can be drawn from this case. First, meaningful change is not merely a shift of medium from manual to online but a change in decision flow and monitoring mechanisms; moving forms into an application without changing an inefficient procedure will preserve the old bottlenecks. Decentralizing routine decisions can speed up the process if accompanied by clear limits of authority, standard operating procedures, and internal controls. Zhou et al. (2025) provide empirical support for this path: improved internal control mechanisms are one of the channels that increase decision-making efficiency and productivity. Second, cross-unit integration is effective only if every unit uses consistent data standards and follows the agreed workflow. Third, transparency and traceability clarify responsibilities, but must be balanced with access rights management so that restricted information is not accessed by unauthorized parties. Fourth, paper and cost savings need to be compared with development, maintenance, training, technical support, and information security costs so that the net benefit can be determined.

DISCUSSION

Technology as an Enabler, Not the Sole Determinant

The technology-centric approach assumes that automation, system integration, and digital infrastructure improve efficiency, and this assumption has a basis because technology reduces manual work and speeds up information exchange. Milani et al. (2024) extend this

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view by showing that technology does not merely replace manual activities but also enables new processes to be designed on the basis of more integrated information: analytics helps identify process bottlenecks, while connectivity enables information exchange across units. However, Fetais et al. (2022) and Shahul Hameed et al. (2021) both show that human and organizational factors, namely management commitment, readiness for change, and human resource management, must be analyzed together with technology. Thus, an organization can have modern applications and still be slow if approval authority is unclear, data are inconsistent, or employees do not understand the new process. The findings of Zhou et al. (2025) are consistent with this: scenario innovation in applying digital technology, which touches processes and business models, has a greater effect on labor productivity than the adoption of technology alone, and the effect of digital transformation is weaker in state-owned enterprises with more rigid structures. Zhao et al. (2024) also report that digital transformation is related to firm performance through total factor productivity and innovation output, with the magnitude of the effect differing by firm size and ownership. Verhoef et al. (2021) add that the success of digital transformation depends on the necessary assets and capabilities, not on technology alone. Of the three approaches compared (technology-centric, process-centric, and socio-technical), the socio-technical approach offers the most comprehensive perspective although it demands more complex coordination. Digital investment decisions therefore need to answer three questions: what problem is to be solved, how the process will change, and what indicators will prove success.

Radical Redesign and Continuous Improvement

BPR emphasizes fundamental change, whereas BPM, as reviewed by Putra and Mahendrawathi (2024), emphasizes continuous process management. The radical approach is appropriate when the old process is no longer relevant, too costly, too long, or fails to meet user needs, but it risks service disruption, confusion over the allocation of responsibilities, and reduced productivity during the transition if applied without testing. Incremental improvement allows small-scale testing but is less effective when the problem is structural. The two approaches are better viewed as complementary: BPR redesigns structurally problematic processes, while BPM ensures that the new process is continually evaluated and refined. The degree of change is determined by urgency, process complexity, tolerance for disruption, and the organization's capacity to manage change. BPM itself is understood as a management philosophy supported by various methods, techniques, and tools, with themes that include process design and process mining (Reijers, 2021); therefore the relationship between BPR and BPM is better read as a continuum than as an opposition. The discipline is also still evolving: Beerepoot et al. (2023) formulate nine major unresolved BPM research

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problems, so an integrated model such as the one proposed in this article should be treated as a working hypothesis.

Organizational Performance as a Multidimensional Construct

Evaluations of digital transformation tend to use cost savings and time acceleration as the main measures. Both indicators are important but inadequate: a faster process does not necessarily produce more accurate decisions, and reducing steps can lower accountability if the checks that are removed were in fact necessary. Badakhshan et al. (2022), through a multiple case study of eight international companies, show that the value of process analytics takes the form of process efficiency, monetary gains, and non-monetary gains such as customer satisfaction, so measurement that focuses only on cost and time will miss part of the value. Masoud and Basahel (2023) likewise test the effect of digital transformation on firm performance by taking customer experience and information technology innovation into account, not merely efficiency. Pasaribu et al. (2021) report improvements in effectiveness, efficiency, and transparency, but applying these findings to other organizations still requires evaluation of service quality, user satisfaction, process errors, and control risks. Table 3 proposes eight performance dimensions that need to be agreed upon before implementation so that comparison of baseline and end conditions can be carried out objectively. The adaptability dimension is consistent with the review of 47 studies by Cosa and Torelli (2024), which found that digital transformation drives dynamism and adaptability in performance measurement systems.

Table 3: Organizational Performance Dimensions and Example Indicators

Dimension	Example indicators
Efficiency	Cost per transaction and cycle time
Effectiveness	Percentage of targets achieved
Quality	Error rate and rework
Service	User satisfaction and response time
Transparency	Traceability of status and decisions
Productivity	Output per employee and administrative burden
Risk control	Security incidents and procedural compliance
Adaptability	Ability to adjust processes to changing needs

Source: authors' compilation. Indicators need to be adapted to the characteristics of the organization.

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A Conceptual Synthesis Model for Integrating BPR and Digital MIS

Based on the comparison above, this article proposes a six-stage model that combines process design, digital capability, organizational readiness, and performance measurement (Table 4). The diagnosis stage can make use of process mining, which uses digital data traces to visualize and measure process performance (Badakhshan et al., 2022). Graafmans et al. (2021) developed the Process Mining for Six Sigma guideline, which aligns process mining techniques with the DMAIC cycle; this guideline can serve as a methodological reference for the diagnosis, evaluation, and continuous improvement stages, provided that the organization has adequate process log data. The novelty of this contribution lies in unifying these four elements in a single managerial framework. This model is the authors' conceptual synthesis based on the five articles and is not a standard model that has been empirically tested as a whole.

Table 4: Six-Stage Conceptual Synthesis Model

No.	Stage	Main activities
1	Process diagnosis	Identify bottlenecks, user needs, costs, cycle time, error rates, and non-value-adding activities
2	Redesign	Define the target process, simplify steps, clarify responsibilities, and retain the necessary controls
3	Technology alignment	Select or develop information systems according to the needs of the new process, including data integration, automation, analytics, and audit trails
4	Organizational readiness	Involve employees, build competence, strengthen change communication, and establish the authority of each unit
5	Implementation and evaluation	Test and apply the new process in a controlled manner, then compare its performance with the baseline
6	Continuous improvement	Use implementation data to identify new problems and adjust the process (BPM function)

Source: authors' conceptual synthesis.

CONCLUSION

BPR is a strategic approach to transforming digital MIS because it changes process design rather than merely speeding up administrative work. Its success is determined by a combination of human, technological, and organizational factors: technology provides integration, automation, connectivity, and analytics capabilities, while process design,

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leadership commitment, employee readiness, and governance determine whether those capabilities produce real benefits. The Telkom University case study shows that BPR in the official travel procedure turned the process fully online, encouraged decentralization of decisions, increased transparency, and improved effectiveness and efficiency as reported by the researchers, with the caveat that these results are context-bound. BPR and BPM are complementary, and performance improvement must be demonstrated through comparison of multidimensional indicators before and after implementation.

Recommendations

The model leads to six recommendations.

First, set priorities based on strategic value. Processes with long completion times, high error rates, frequent rework, or user complaints are the initial candidates, taking into account technical feasibility, investment requirements, and organizational capacity.

Second, map processes before choosing technology. The current process (*as-is*) is documented and the target process (*to-be*) is designed, so that each activity can be eliminated, merged, simplified, or automated in line with the findings of Milani et al. (2024).

Third, make change management a priority. Leaders explain the reasons for and benefits of the change, users are involved from the needs-mapping stage, and training focuses on real tasks, in line with Fetais et al. (2022) and Shahul Hameed et al. (2021).

Fourth, strengthen data integration and governance through data standards, data quality owners, role-based access rights, activity logging, backups, and recovery procedures.

Fifth, measure performance before and after implementation by distinguishing implementation indicators (for example, the number of employees trained) from outcome indicators (for example, reductions in completion time and error rate). Indicator design needs to be flexible to changing needs, as shown by studies of performance measurement systems in the era of digital transformation (Cosa & Torelli, 2024).

Sixth, integrate BPR with BPM by appointing process owners, reviewing indicators periodically, and taking data-based corrective action, so that processes do not become inefficient again after the initial change. Periodic monitoring of process indicators can be aided by process mining in the control phase of the improvement cycle (Graafmans et al., 2021).

Transformation through BPR requires cross-functional governance and cannot be left to the information technology unit alone.

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Limitations and Suggestions for Further Study

First, this article is a literature review of five articles and therefore does not produce impact estimates. Second, the five articles differ in context (university administration, electronic manufacturing, and cross-sector reviews), so the findings are better used as a basis for principles and implementation hypotheses than as a guarantee of the same results in every organization. Additional evidence from Zhou et al. (2025) and Zhao et al. (2024) comes from listed companies in China with digital transformation indicators based on annual reports, so its relevance to public organizations or universities in Indonesia still needs to be tested. Third, the Telkom University case study covers only the official travel procedure and does not include detailed quantitative figures, so it cannot be used to draw conclusions about the impact on academic, financial, or human resource processes. Fourth, the six-stage model has not been empirically tested.

Future research is advised to test the relationships among BPR, digital capability, organizational readiness, and performance in different sectors, using before-and-after implementation data, user surveys, or mixed methods, and to empirically validate the six-stage model.

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