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# APPROACHES AND METHODS FOR ORGANIZATIONAL BUSINESS PROCESS REENGINEERING

**Jiang Yun*[1], Koshkina O.[1], Moldabekova A.[1]**

*[1]Al-Farabi Business School, Al-Farabi Kazakh National University, Almaty, Kazakhstan*

**ABSTRACT**. This monographic article presents an in-depth exploration of the methodological foundations of Business Process Reengineering (BPR), tracing its conceptual development from the classical paradigms of the 1990s to its modern-day applications aligned with digital transformation. The study thoroughly examines the traditional five-phase BPR methodology, delving into the objectives, tools, and techniques applied at each stage. It highlights how integrating BPR with technologies such as Process Mining, Artificial Intelligence (AI), Robotic Process Automation (RPA), and Low-Code platforms enhances both efficiency and innovation.

Special emphasis is placed on the emergence of adaptive paradigms—Agile BPR, human-centric reengineering, and sustainable ("green") models—as strategic responses to the dynamic and complex realities of today's business environment. The theoretical framework is supported by a detailed, hypothetical case study of redesigning the end-to-end "Order-to-Cash" process, demonstrating the practical application of the concepts discussed.

This article serves as a valuable resource for researchers, graduate students, practitioners, and decision-makers involved in business process optimization and strategic transformation. It provides critical insights into both the challenges and opportunities inherent in BPR initiatives in the digital age, while also underscoring the importance of change management, stakeholder alignment, and technological integration for achieving long-term organizational success.

**KEYWORDS**: Business Process Reengineering, BPR, methodology, digital transformation, Process Mining, artificial intelligence, Agile BPR, change management, sustainable development, process orientation, operational efficiency

# Подходы и методы реинжиниринга бизнес-процессов организации

**Jiang Yun*[1], Кошкина О.[1], Молдабекова А.[1]**

*[1]Бизнес-школа «Аль-Фараби», Казахский национальный университет имени аль-Фараби, Алматы, Казахстан*

**АННОТАЦИЯ**. В этой монографической статье подробно рассматриваются методологические основы реинжиниринга бизнес-процессов (BPR), прослеживается его концептуальное развитие от классических парадигм 1990-х годов до современных приложений, связанных с цифровой трансформацией. В исследовании подробно рассматривается традиционная пятиэтапная методология BPR, в которой рассматриваются цели, инструменты и методы, применяемые на каждом этапе. В нем рассказывается о том, как интеграция BPR с такими технологиями, как интеллектуальный анализ процессов, искусственный интеллект (ИИ), роботизированная автоматизация процессов (RPA) и платформы с низким уровнем кодирования, повышает эффективность и инновационность.

Особое внимание уделяется появлению адаптивных парадигм — Agile BPR, ориентированного на человека реинжиниринга и устойчивых ("зеленых") моделей - в качестве стратегического ответа на динамичные и сложные реалии современной бизнес—среды. Теоретическая основа подкрепляется подробным, гипотетическим примером изменения структуры сквозного процесса "От заказа до получения наличных", демонстрирующим практическое применение обсуждаемых концепций.

Эта статья служит ценным источником информации для исследователей, аспирантов, практиков и лиц, принимающих решения, занимающихся оптимизацией бизнес-процессов и стратегическими преобразованиями. В нем дается критическое представление как о проблемах, так и о возможностях, присущих инициативам BPR в эпоху цифровых технологий, а также подчеркивается важность управления изменениями, согласования интересов заинтересованных сторон и технологической интеграции для достижения долгосрочного успеха организации.

**КЛЮЧЕВЫЕ СЛОВА**: Реинжиниринг бизнес-процессов, BPR, методология, цифровая трансформация, анализ процессов, искусственный интеллект, Agile BPR, управление изменениями, устойчивое развитие, ориентация на процессы, операционная эффективность.

# Ұйымның бизнес-процестерін қайта құру тәсілдері мен әдістері

**Jiang Yun*[1], Кошкина О.[1], Молдабекова А.[1]**

*[1]Әл-Фараби бизнес-мектебі, Әл-Фараби атындағы Қазақ ұлттық университеті, Алматы, Қазақстан*

**АҢДАТПА**. Бұл монографиялық мақалада бизнес-процестерді қайта құрудың (BPR) әдіснамалық негіздері егжей-тегжейлі қарастырылады, оның 1990-шы жылдардағы классикалық парадигмалардан бастап цифрлық трансформацияға қатысты заманауи қосымшаларға дейінгі тұжырымдамалық дамуын қадағалайды. Зерттеу әр кезеңде қолданылатын мақсаттарды, құралдарды және әдістерді қарастыратын дәстүрлі бес сатылы BPR әдістемесін егжей-тегжейлі қарастырады. Онда BPR-ді технологиялық интеллект, жасанды интеллект (AI), роботты процестерді автоматтандыру (RPA) және кодтау деңгейі төмен платформалар сияқты технологиялармен біріктіру тиімділік пен инновацияны қалай арттыратыны туралы айтылады.

Адаптивті парадигмалардың пайда болуына ерекше назар аударылады - Agile BPR, адамға бағытталған реинжиниринг және тұрақты ("жасыл") модельдер—қазіргі бизнес ортасының динамикалық және күрделі шындықтарына стратегиялық жауап ретінде. Теориялық негіз талқыланатын тұжырымдамалардың практикалық қолданылуын көрсететін "тапсырыстан қолма-қол ақша алуға" дейінгі процестің құрылымын өзгертудің егжей-тегжейлі, гипотетикалық мысалымен расталады.

Бұл мақала зерттеушілерге, аспиранттарға, практиктерге және шешім қабылдаушыларға бизнес-процестерді оңтайландыруға және стратегиялық қайта құруға арналған құнды ақпарат көзі ретінде қызмет етеді. Ол цифрлық дәуірдегі BPR бастамаларына тән мәселелер мен мүмкіндіктер туралы сыни түсінік береді және ұйымның ұзақ мерзімді табысына жету үшін өзгерістерді басқарудың, мүдделі тараптардың мүдделерін үйлестірудің және технологиялық интеграцияның маңыздылығын көрсетеді.

**ТҮЙІН СӨЗДЕР**: бизнес-процестерді қайта құру, BPR, әдістеме, цифрлық трансформация, процесті талдау, жасанды интеллект, Agile BPR, өзгерістерді басқару, тұрақты даму, процестерге бағдарлау, операциялық тиімділік.

**INTRODUCTION.** In the context of an increasingly complex global economic landscape—shaped by the profound disruptions of the COVID-19 pandemic, rapid digitalization, and intensifying geopolitical rivalry—the capacity of organizations to initiate fundamental transformation is no longer a mere competitive advantage, but a prerequisite for survival. Traditional managerial paradigms, characterized by hierarchical structures and functional specialization inherited from the industrial age, have proven inadequate when confronted with the volatility, uncertainty, complexity, and ambiguity of the contemporary VUCA world. Under such conditions, incremental improvements aimed at localized optimization are insufficient. Organizations are compelled to pursue transforma-

tive, systemic change that reconfigures the very architecture of their operations.

Within this framework, Business Process Reengineering (BPR) has regained prominence. Originally formulated in the early 1990s by Michael Hammer and James Champy, BPR introduced a radical imperative: "Do not automate — obliterate." Defined as a "fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical performance measures such as cost, quality, service, and speed" [1], BPR challenged longstanding organizational conventions.

Despite initial enthusiasm and notable early successes, the first wave of BPR was accompanied by a high rate of failure—reportedly as high as 70%. These shortcomings stemmed primarily from overly technocratic implementations that neglected the human dimension, resulting in workforce demoralization, widespread redundancies, and resistance to change. Today, however, BPR is experiencing a resurgence—recast in a more sophisticated, technologically integrated form. Modern reengineering emphasizes not wholesale demolition, but rather the intelligent reconstruction of organizational frameworks through advanced digital tools and methods.

**MATERIAL AND METHODS OF RESEARCH.**

Objective of the Study

The present research aims to conduct a comprehensive analysis and systematic consolidation of the methodological foundations of business process reengineering, contextualized within the opportunities and challenges of the 21st century. The specific objectives include:

- To trace the evolution of the BPR concept from its classical formulation to contemporary interpretations;
- To delineate BPR from related frameworks, including Business Process Management (BPM), Total Quality Management (TQM), and Continuous Improvement (CI);
- To examine the traditional five-phase BPR methodology, supplemented by contemporary instruments and practices;
- To explore emerging paradigms in reengineering, such as Agile, human-centered, and environmentally sustainable ("green") models;
- To illustrate the practical application of the BPR methodology through an integrated case example;
- To identify key success factors and potential risks associated with BPR initiatives in a digital context.

Before delving into methodological specifics, it is essential to distinguish BPR from conceptually adjacent approaches. BPM treats business processes as strategic organizational assets requiring ongoing governance. In this context, BPR serves as a tool for radical change, employed when incremental adjustments are insufficient. Once a process is reengineered, BPM mechanisms assume responsibility for its continual monitoring and enhancement.

CI—exemplified by the Kaizen philosophy—advocates gradual, incremental improvements rather than wholesale transformation. BPR and CI are not mutually exclusive; following a radical redesign through BPR, an organization may adopt CI principles to maintain momentum. Similarly, TQM emphasizes customer-centric quality enhancement at all organizational levels. BPR may serve as a strategic vehicle for realizing TQM objectives when existing processes are structurally incapable of delivering requisite quality standards.

As such, BPR constitutes a high-risk, high-reward strategic initiative necessitating methodological precision and rigorous execution. The subsequent sections offer a detailed exposition of its conceptual foundations and practical integration within modern organizational frameworks.

**RESULTS AND THEIR DISCUSSION.** Understanding contemporary Business Process Reengineering (BPR) necessitates an examination of its foundational origins, historical successes and failures, and its subsequent evolution. The conceptual development of BPR may be segmented into three distinct phases: its initial emergence and widespread acceptance, a period marked by critical reassessment and decline, and finally, its revitalization within the context of digital transformation.

The early 1990s witnessed the publication of "Reengineering the Corporation", a groundbreaking work by Michael Hammer and James Champy that catalyzed a global shift in organizational thinking. The authors contended that the competitive decline of American businesses stemmed not from managerial inefficiencies or workforce shortcomings, but from reliance on antiquated and fragmented processes rooted in the economic models of the 18th century. The extreme specialization of functions—popularized by thinkers like Adam Smith and operationalized by Henry Ford—had produced siloed organizational structures, leading to inefficiencies, delays, and diminished customer orientation.

BPR advocated a radical departure from this legacy by promoting cross-functional, end-to-end process design focused on delivering customer value. Key principles included structuring work around outcomes rather than discrete tasks, empowering frontline employees, integrating data with execution, and leveraging technology to eliminate barriers. These ideas, underpinned by high-profile case studies (e.g., Ford, IBM Credit Corp.), inspired organizations worldwide to reengineer core processes such as Order-to-Cash and new product development.

Nevertheless, the momentum of the BPR movement diminished by the late 1990s, hindered by widespread implementation failures. Critics attributed this to several core issues: a technocratic orientation that marginalized human and cultural dimensions; severe social ramifications, including workforce reductions; underappreciation of change management complexities; and an often naïve "blank slate" mentality that dismissed institutional knowledge.

The Emergence of BPM as a Balanced Framework

Lessons drawn from BPR's shortcomings precipitated the rise of Business Process Management (BPM)—a more holistic and iterative approach to managing organizational processes. Unlike BPR, which often entailed one-time radical redesigns, BPM treats processes as dynamic assets requiring continuous oversight. The BPM lifecycle—encompassing modeling, analysis, execution, monitoring, and optimization—enables both evolutionary improvements and, where necessary, revolutionary redesigns.

Within this paradigm, BPR occupies a strategic niche: it is deployed when a process is fundamentally deficient and incapable of incremental repair. After reengineering, the renewed process is reintegrated into the BPM structure for ongoing refinement, thus tempering BPR's disruptiveness with long-term sustainability.

The contemporary renaissance of BPR is intricately linked with the proliferation of advanced digital technologies. Unlike its earlier iteration—where IT played a supporting role—today's digital tools are central to BPR's execution and success [2]. Technologies such as artificial intelligence (AI), robotic process automation (RPA), cloud computing, the Internet of Things (IoT), and particularly Process Mining have introduced capabilities once inconceivable to early BPR theorists.

Process Mining uncovers actual operational behavior by analyzing digital footprints within enterprise systems, exposing inefficiencies that deviate from documented procedures. AI and RPA enable not only automation

of repetitive tasks but also the intelligent delegation of decision-making and analytical functions to machines. Low-Code/No-Code platforms democratize process innovation, empowering non-technical users to participate in solution development with unprecedented agility [3].

Thus, the current phase may be best described as "Digital BPR"—a sophisticated, data-driven, and human-centered evolution of the original framework. While it retains the foundational ethos of transformative process thinking, it is now deeply rooted in technological integration and adaptive design, themes that are explored in subsequent chapters. Table 1 about evolution of BPR concept.

**Table – 1. Evolution of the BPR Concept: From Classical Paradigm to Digital Reengineering**

| Development Stage | Characteristics | Key Technologies | Main Challenges and Criticism | Methodological Focus |
|---|---|---|---|---|
| **1. Classical BPR** (1990s) | Radical redesign of core business processes from scratch; focus on end-to-end value-creating activities | ERP systems, IT as a supporting tool | - Ignoring organizational culture and human factors- Mass layoffs and social resistance- Underestimating change management complexity- Loss of valuable corporate knowledge | "Clean slate" approach; one-time transformation project |
| **2. Integration with BPM** (2000s) | Transition to continuous process management; BPR becomes part of a broader lifecycle approach | BPMS, modeling and monitoring tools | - Difficulty in integrating BPR into stable management systems- Inflexibility of traditional approaches | BPM lifecycle: modeling, execution, monitoring, optimization |
| **3. Digital BPR** (2010s–present) | BPR revived through digital technologies; emphasis on data-driven decision-making, agility, and human-centric design | AI, RPA, IoT, Process Mining, Low-Code/No-Code platforms, Cloud computing | - Integration complexity- Need for new competencies- Cybersecurity and data governance risks | Digital reengineering: automation, intelligence, and transformation |

Despite evolving methodologies, the core structure of Business Process Reengineering (BPR) remains largely consistent, typically encompassing five sequential and logically interconnected phases. The success of a reengineering initiative is directly contingent upon the rigor and discipline applied at each stage. Below is a detailed examination of the first three phases, now enhanced with modern tools and practices.

Phase 1: Strategic Vision and Preparation ("Envision")

This phase lays the groundwork for the entire BPR effort. Missteps here are often irreversible. The aim is not only to initiate the project but to ensure its strategic alignment, secure required resources, and assemble a capable cross-functional team. BPR should never be a standalone objective—it must address a specific strategic imperative. For instance:

- Strategy: "Achieve market leadership in customer service." BPR Goal: Streamline order fulfillment and enhance delivery accuracy.

- Strategy: "Reduce operational costs by 30%." BPR Goal: Redesign procurement to eliminate inefficiencies.

Tools such as the Balanced Scorecard (BSC) help formalize this alignment, linking BPR goals to internal process improvements and to financial and customer objectives. Given finite resources, it is impractical to reengineer all processes simultaneously. Prioritization should be guided by:

- Pain/Gain Matrix: Evaluates processes based on current pain points versus potential benefits. Priority goes to those in the "high pain, high gain" quadrant.

- Value Chain Analysis: Based on Porter's framework, distinguishes between core (value-generating) and support processes. BPR often targets core processes due to their strategic impact.

- Davenport Criteria: Assesses processes by strategic relevance, current condition, and feasibility of reengineering. BPR is inherently collaborative. Key roles include:

- Executive Sponsor: A senior leader (e.g., CEO, COO) who provides authority, resources, and political backing. Projects without visible sponsorship often fail.

- Process Owner: A manager accountable for the long-term success of the reengineered process and team lead.

- Project Team: A cross-functional group composed of:

- Insiders: Employees with deep, hands-on process knowledge.

- Outsiders: Staff from other departments or external consultants who offer fresh perspectives.

- IT Experts: Technologists who introduce innovative digital solutions.

- Change Managers: Specialists in communication, training, and stakeholder engagement.

Phase 2: Diagnostic Assessment of the "As-Is" State ("Analyze")

This phase aims to thoroughly and objectively map current workflows, measure performance, and uncover root causes of inefficiency—while avoiding "analysis paralysis."

- Process Mapping: BPMN 2.0 remains the industry standard for depicting flows, roles, logic, and data pathways [4].

- Value Stream Mapping (VSM): A lean manufacturing tool that visualizes time, wait periods, and non-value activities.

- SIPOC Analysis: A high-level framework that identifies suppliers, inputs, outputs, and customers.

- Metrics Collection: Quantitative indicators like cycle time, cost per transaction, error rates, service levels (SLAs), and customer satisfaction (CSI).

Traditional methods—interviews, workshops—often yield idealized representations. Process Mining, however, offers a data-driven alternative by reconstructing actual processes from digital event logs (e.g., ERP, CRM systems).

- Discovery: Algorithms generate unbiased process maps, including deviations and "spaghetti diagrams," often exposing gaps between documented procedures and real-life operations.

- Conformance Checking: Compares actual process behavior with defined standards, quantifying violations and pinpointing causes [5].

- Enhancement: Adds performance data to highlight bottlenecks, delays, and inefficiencies. Root Cause Analysis (RCA) algorithms help trace systemic issues, such as supplier-related delays or approval bottlenecks.

Process Mining transforms As-Is diagnostics from a subjective art to an empirical science, significantly im-

proving insight quality.

Phase 3: Designing the "To-Be" process ("Design")

Arguably the most creative yet complex phase, this is where the team conceptualizes a radically improved process by applying BPR principles alongside modern technologies.

- Clean Slate: Disregards the existing process entirely in favor of an idealized design. Highly creative but prone to reinventing the wheel.

- Reference Models: Leverages industry best practices (e.g., SCOR for logistics, ITIL for IT services, eTOM for telecom). While efficient, this may produce generic rather than competitive designs. A hybrid model is often used. Creative methods to stimulate innovative thinking:

- Design Thinking: Focuses on empathy for end users and rapid prototyping.

- SCAMPER: A structured brainstorming method (Substitute, Combine, Adapt, Modify, Put to other use, Eliminate, Reverse).

- Lateral Thinking: Techniques for breaking conventional thought patterns.

Artificial Intelligence enables the creation of processes with advanced capabilities:

- Predictiveness: Embeds ML models to forecast outcomes like late deliveries or customer churn and triggers proactive mitigation [6].

- Cognitive Automation: Uses AI to handle unstructured data (emails, documents), automating previously manual tasks.

- AI Assistants: Decision-support systems that guide employees in real time using big data analytics [7].

Before launching in production, the To-Be model should be tested virtually.

- Simulation Modeling: Enables thousands of test iterations to measure potential outcomes (e.g., cycle times, costs, capacity utilization).

- Digital Twins of Organizations (DTOs): More advanced models simulating interdependent processes and overall organizational dynamics [8].

Phase 4: Implementation and organizational transformation ("Implementation")

At this stage, the project moves from theory to practice. This is the phase of the greatest resistance and the highest risks. Success here depends on technology for 20% and on working with people for 80%.

Setting up or developing IT systems that support the new process (ERP, CRM, BPM systems).

The role of Low-Code/No-Code platforms: These platforms allow you to create business applications with minimal programmer involvement using visual constructors. This dramatically speeds up and reduces the cost of technical implementation and allows business analysts to participate in the creation of solutions themselves [9].

Implementation strategies:

"Big Bang": The simultaneous launch of a new process throughout the organization. A high-risk, but fast approach.

Phased Roll-out: Implementation of the process in parts — by geography (first one branch), by products (first one line) or by functionality. It's less risky and allows you to learn from mistakes.

This is a critical success factor. Special models are used to structure this work, for example, ADKAR® from Prosci [10]:

Awareness: To convey to each employee the need for changes.

Desire: To form people's personal motivation to support change (to answer the question "What's in it for me?" — "What will it give me personally?").

Knowledge: To train employees how to work in a new process and use new tools.

Ability (Skill): To give people the opportunity to practice and develop the necessary skills to the required level.

Reinforcement: Create a system of motivation, recognition, and control that will support new behaviors and prevent you from returning to old habits.

An effective communication strategy (constant, honest and two-way communication) and active work with agents of change and opinion leaders at all levels are the key to success.

Phase 5: Monitoring, Control and transition to continuous Improvement ("Sustain & Improve")

The BPR project does not end on the day the new process is launched. You need to make sure that it works as intended and delivers the expected results.

KPI system development: A balanced system of key performance indicators is being created for the new process, which tracks its speed, cost, quality and impact on customer satisfaction.

Control tools: Dashboards are being created that display KPI values in real time. Statistical process control (SPC) methods can be used to track process stability.

Creation of a "Process Competence Center" (Process Center of Excellence): In order for the achievements of BPR not to be lost, and the organization to switch to a continuous improvement mode, a special unit is often created. Its tasks are to support the process management methodology, train employees, audit processes, and initiate new projects to improve them. Table 2 shows key phases of BPR methodology.

The classical BPR methodology, as previously outlined, is now being enriched by contemporary approaches that render it more adaptive, human-centered, and socially responsible.

Traditional BPR typically follows a linear, waterfall-like structure, where extensive analysis and design phases precede large-scale implementation. In today's fast-paced business environment, this approach is fraught with risk, as final deliverables may become obsolete by the time they are realized. Agile BPR addresses this challenge by incorporating principles of Agile software development—particularly iterative delivery and continuous user feedback [11].

- Iterative Execution: Rather than deploying a singular, large-scale project, BPR is decomposed into short, manageable cycles (sprints), each targeting a discrete component of the overall process.

- Incremental Outcomes: Each sprint culminates in a Minimum Viable Process (MVP)—a functional improvement that immediately delivers value.

- Continuous Feedback Loops: Close collaboration with business stakeholders enables real-time testing of hypotheses and data-driven course correction.

One of the key insights from the 1990s was that processes are inseparable from people. Human-centered BPR focuses not only on customers but equally on the well-being and engagement of employees [12]. The aim is to design processes that are not only operationally efficient but also intuitive, user-friendly, and fulfilling for those who carry them out.

- Design Thinking Integration: During analysis and design, methodologies such as empathy mapping and employee journey mapping are employed to identify pain points and latent needs.

- Employee Experience (EX) Focus: Process evaluation includes not just performance metrics, but also the impact on employee engagement, stress levels, and job satisfaction.

- Co-creation Principle: Employees are treated as co-designers of the new process rather than passive recipients

of top-down change.

In light of growing attention to environmental stewardship and ESG (Environmental, Social, Governance) commitments, organizations are increasingly embedding sustainability into their strategic agendas. Green BPR introduces ecological considerations into process redesign efforts [13].

- Expanded KPIs: In addition to traditional performance indicators (time, cost, quality), environmental metrics are incorporated, such as carbon emissions, energy and water usage, waste generation, and recycling rates.

- Practical Applications:

- Redesigning logistics to optimize routing and minimize emissions;

- Reengineering manufacturing operations to reduce waste and enable circular economy practices;

- Transforming procurement processes to prioritize environmentally responsible suppliers.

**Table - 2. Key Phases of BPR Methodology and Modern Implementation Tools.**

| Phase | Objective | Key Activities | Modern Tools and Practices |
|---|---|---|---|
| **1. Strategic Vision and Preparation (Envision)** | Ensure strategic alignment, select high-impact processes, build leadership and teams | - Link BPR to corporate strategy- Prioritize processes- Form cross-functional project teams and executive sponsorship | - Balanced Scorecard (BSC)- Pain/Gain Matrix- Value Chain Analysis (M. Porter)- Davenport's criteria- Cross-functional collaboration |
| **2. Current State Analysis (Analyze)** | Understand how the process operates in reality, identify inefficiencies and root causes | - Process mapping (e.g., BPMN 2.0)- Metrics collection- Interviews and workshops | - Process Mining: Discovery, Conformance, Enhancement- SIPOC diagrams- Value Stream Mapping (VSM)- Root Cause Analysis (RCA) |
| **3. Future State Design (Design)** | Redesign the process based on BPR principles, innovation, and available technologies | - Clean Slate or Reference Model approach- Idea generation and ideation- Integration of AI and digital simulation | - Design Thinking, SCAMPER, Lateral Thinking- Predictive models (ML), Cognitive Automation- Digital Twins (DTO)- Simulation modeling |
| **4. Implementation and Transformation (Implement)** | Deploy the new process and manage organizational resistance | - Configure or build supporting IT systems- Choose rollout strategy- Apply structured change management | - Low-Code/No-Code platforms- Robotic Process Automation (RPA)- Big Bang vs Phased Rollout- ADKAR Model: Awareness, Desire, Knowledge, Ability, Reinforcement |
| **5. Monitoring and Continuous Improvement (Sustain & Improve)** | Ensure long-term performance and move toward ongoing improvement | - Define and track KPIs- Build process governance structures- Enable adaptive control | - Real-time dashboards- Key Performance Indicators (KPIs)- Statistical Process Control (SPC)- Process Center of Excellence (PCoE) |

**Table – 3. Comparative Analysis of Traditional vs. Agile BPR**

| Criterion | **Traditional BPR (Waterfall)** | **Agile BPR (Iterative)** |
|---|---|---|
| **Scope** | Large-scale, end-to-end process redesign | Small process segments, incremental iterations |
| **Planning** | Detailed, long-term planning at the start of the project | High-level planning with detailed short-term sprint planning |
| **Approach** | Radical redesign from a "clean slate" | Gradual improvement through experiments and MVPs |
| **Value Delivery Speed** | Value is delivered only at the end of the project | Value is delivered incrementally at the end of each sprint |
| **Feedback** | Collected after full implementation | Continuous feedback throughout the cycle |
| **Risks** | High risk of total project failure | Risk is localized within each sprint, enabling quick adaptation |

**Case Study: Reengineering the "Order-to-Cash" Process at GlobalTech Manufacturing**

To illustrate the application of a modern BPR methodology, we present a hypothetical yet realistic case study.

**Phase 1:** Context and Problem Statement

Company: GlobalTech Manufacturing — a large B2B industrial equipment producer.

Strategic Challenge:

Facing rising competition from more agile Asian manufacturers, GlobalTech experienced a decline in customer loyalty. A new 3-year strategic goal was announced:

"Turn customer service into a core competitive advantage."

Process Selection:

Analysis identified the Order-to-Cash (O2C) process as the most problematic and customer-impacting.

Key Issues (from BSC metrics and customer surveys):

Average order fulfillment time: 45 days

Order/invoice error rate: 15%

Customer Satisfaction Index (CSI): 6.5/10

Numerous manual tasks, constant fire-fighting

Team Composition:

A steering committee was formed, led by the COO (sponsor), with a cross-functional project team headed by the Sales Director (process owner). The team included representatives from Sales, Finance, Logistics, Production, and IT.

**Phase 2:** As-Is Process Analysis Using Process Mining

The team used a Process Mining platform (e.g., Celonis or UiPath Process Mining), loading one year of data from the ERP and CRM systems.

Key Findings:

Discovery: Over 50 process variants were uncovered, contradicting the official process map — forming a complex "spaghetti diagram" with repeated loops and shadow operations (e.g., email approvals).

Conformance Analysis: Only 30% of orders followed the "happy path". The rest had significant deviations.

Root Cause Analysis (RCA) identified 3 main bottlenecks:

Manual credit checks: Took 3 days and required CFO involvement.

Non-standard discount approvals: Unstructured process lasting up to 7 days.

Manual reconciliation: Invoice vs. delivery documents matched manually, causing delays and errors.

**Phase 3:** To-Be Process Design

Based on the findings, the team designed an intelligent, streamlined O2C process.

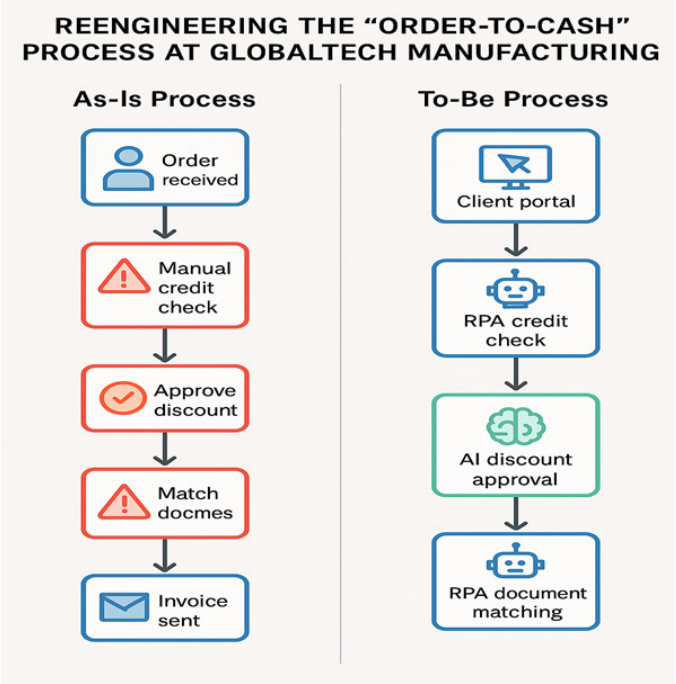


**Figure 1: As-Is vs. To-Be**

As-Is: Long, complex chains with red markers at bottlenecks (credit check, approval, reconciliation)

To-Be: Clean, linear flow with RPA (robot icons), AI (brain icons), and a Client Portal introduced

Key Improvements in the "To-Be" Process:

Client Self-Service Portal (built with Low-Code):

Clients can place orders, track status, and download documents in real time.

Automated Credit Check:

ERP integrated with external scoring system via API; decisions made in seconds, with edge cases escalated.

AI-Driven Discounting:

Machine learning recommends optimal discounts based on client history, order size, and margin. Within-threshold discounts auto-approved.

RPA-Powered Document Matching:

A bot reads delivery and invoice data, reconciles them, and posts invoices automatically if matched.

Simulated Outcomes:

Cycle time: ↓ to < 5 days

Error rate: ↓ to < 1%

Manual labor reduction: −70%

Phase 4: Implementation and Change Management

Rollout Strategy: Phased deployment

Step 1 (Pilot): New process and portal launched for key client segment (3-month test).

Change Management via ADKAR:

Awareness / Desire: Company-wide meetings and workshops led by the COO emphasized benefits ("Less paperwork, more client interaction").

Knowledge / Ability: Sales trained on AI-assisted discounting; accounting trained to manage exceptions and supervise bots.

Step 2 (Scaling): After a successful pilot and adjustments, rollout expanded to all customer segments over 6 months.

Phase 5: Monitoring and Continuous Improvement

A real-time BI dashboard was launched to track core O2C KPIs:

Cycle time per stage

Automation rate

First-time order success rate

CSI score (via portal feedback)

The dashboard was accessible to all stakeholders, ensuring transparency and enabling rapid response. A continuous A/B testing plan was launched to improve portal UX and customer satisfaction.

The analysis and case study show that BPR, enriched with modern technologies and methodologies, has transformed from a shock therapy tool into a powerful strategic competence. It allows not only to increase efficiency, but also to fundamentally restructure the business model of the organization, making it more flexible, intelligent and customer-oriented.

However, it is important to understand the limitations/risks of modern approaches: The "Black box" of AI: Complex machine learning models can be opaque, which makes it difficult to understand the reasons for their decisions and creates new risks.

Digital vulnerability: A high degree of automation and integration increases the risks of cyber attacks and technical failures.

Ethical dilemmas: Automation of cognitive tasks raises new questions about the future of the labor market and the role of humans in the organization.

Promising areas of future research lie at the intersection of BPR and advanced management concepts and technologies:

BPR for business ecosystems and Decentralized autonomous organizations (DAOs): How to design end-to-end processes that run across the borders of several independent companies or are managed by smart contracts in the blockchain?

Quantum computing for process simulation: The potential use of quantum computers for modeling and optimizing highly complex systems (for example, global supply chains) opens up new horizons for BPR [14].

Behavioral Economics Integration: A deep understanding of cognitive biases and irrational behaviors of people (both customers and employees) can be used to design processes that "push" for more effective and correct actions.

CONCLUSION. Business Process Reengineering (BPR) has evolved significantly—from a revolutionary manifesto to a sophisticated managerial discipline. If traditional BPR of the 1990s resembled a surgical intervention, often performed without anesthetic, its modern incarnation is a precision-driven, intelligent transformation—grounded in data, agile methodologies, and a nuanced understanding of the human element.

While the methodological core of BPR—its five fundamental phases—remains intact, the content and execution of each phase have undergone radical transformation. Intuition has given way to empirical insights via Process Mining; process design is now informed by artificial intelligence and advanced simulations rather than drawn manually on whiteboards. Low-code platforms have accelerated implementation, and the focus has shifted from purely technical execution to holistic change management. New paradigms—Agility, human-centricity, and sustainability—have made BPR more adaptive, ethical,

and future-ready.

Success in 21st-century reengineering does not hinge on choosing between "revolution" and "evolution," but rather on synthesizing both. Organizations must undertake bold, tech-enabled transformations of core processes (BPR), followed by embedding a culture of continuous, flexible improvement (BPM, CI, Agile). Ultimately, BPR has transcended its origins as a cost-reduction initiative—it has become a blueprint for building resilient, forward-thinking organizations capable not only of responding to change, but of shaping it.

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## AUTHOR INFORMATION:


**Jiang Yun** - докторант 2-го года обучения, DBA, бизнес-школа «Аль-Фараби», Казахский национальный университет имени аль-Фараби, Алматы, Казахстан. E-mail: jiang.yun.02@mail.ru

**Кошкина Ольга** – доктор финансовых наук, доцент, Кафедра финансов и бухгалтерского учета, Университет Международного бизнеса, Алматы, Казахстан. E-mail: o.koshkina@mail.ru. ORCID: 0000-0002-0847-3537

**Молдабекова Айсулу** - PhD в области логистики, Бизнес-школа имени аль-Фараби, Казахский национальный университет имени аль-Фараби, Алматы, Казахстан. E-mail: kazsocium01@gmail.com. ORCID: 0000-0003-4330-5595

**Jiang Yun** - 2 курс докторанты, DBA, Әл-Фараби атындағы Қазақ ұлттық университеті, Әл-Фараби бизнес мектебі, Алматы, Қазақстан. E-mail: jiang.yun.02@mail.ru

**Ольга Кошкина** – Қаржы ғылымдарының докторы, доцент, Қаржы және бухгалтерлік есеп кафедрасы, Халықаралық бизнес университеті, Алматы, Қазақстан. E-mail: o.koshkina@mail.ru. ORCID: 0000-0002-0847-3537

**Молдабекова Айсұлу** - Логистика саласындағы PhD, әл-Фараби атындағы Бизнес-мектеп, әл-Фараби атындағы Қазақ ұлттық университеті, Алматы, Қазақстан. E-mail: kazsocium01@gmail.com. ORCID: 0000-0003-4330-5595

**Jiang Yun** – 2nd year Doctoral Student, DBA, Al-Farabi business school, Al-Farabi Kazakh National University, Almaty, Kazakhstan. E-mail: jiang.yun.02@mail.ru. Koshkina Olga - PhD in Finance, Associate Professor, Department of Finance and Accounting, University of International Business, Almaty, Kazakhstan. E-mail: o.koshkina@mail.ru. ORCID: 0000-0002-0847-3537

**Moldabekova Aisulu** - PhD of Logistics, Al-Farabi business school, Al-Farabi Kazakh National University, Almaty, Kazakhstan. E-mail: kazsocium01@gmail.com. ORCID: 0000-0003-4330-5595



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# ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ АГРОӨНЕРКӘСІПТІК КЕШЕНІН ДАМЫТУДА ЖАСАНДЫ ИНТЕЛЛЕКТ МҮМКІНДІКТЕРІ


**Жамбылова Г.Ж.[1], Андронова И.В.[2], Бекбусинова Г.К.[3], Мүсіров Ғ.М.[4]**

*[1]Х. Досмұхамедов атындағы Атырау университеті, Атырау, Қазақстан; [2]Ресей халықтар достығы университеті, Мәскеу, Ресей; [3]Қ. Құлажанов атындағы Қазақ технология және бизнес университеті, Астана, Қазақстан; [4]Қ. Жұбанов атындағы Ақтөбе өңірлік университеті, Ақтөбе, Қазақстан*



**АҢДАТПА**. Ғылыми мақаланың мақсаты - экономиканың цифрлық трансформациясы жағдайында саланың өнімділігін, орнықтылығын және бәсекеге қабілеттілігін арттыру мақсатында Қазақстан Республикасының агроөнеркәсіптік кешенінде жасанды интеллектті (ЖИ) қолдану мүмкіндіктері мен бағыттарын зерделеу. Әдіснамасы - зерттеу барысында мақаладағы жұмыста бастапқы деректерді талдау, жинау және өңдеу, статистикалық бақылау және салыстыру, синтез сияқты әдістер сияқты ғылыми әдістер басшылыққа алынды. Ауыл шаруашылығы ұлттық экономиканың тұрақты дамуының негізі болып табылады. Жасанды интеллектті ауыл шаруашылығында қолданудың негізгі тұжырымдамасы оның икемділігіне, жоғары өнімділігіне, дәлдігіне және экономикалық тиімділігіне негізделген. Ауыл шаруашылығындағы жасанды интеллект бүгінгі таңда үш перспективалық бағытта дамыған: машиналық оқыту, компьютерлік көру, болжамды аналитика. Жасанды интеллектті пайдаланудың шетелдік тәжірибесі өндірісті оңтайландыруға, өнімділікті арттыруға, ресурстардың шығындарын азайтуға және экологиялық зиянды азайтуға мүмкіндік беретін агроөнеркәсіптік кешенді трансформациялаудың жоғары әлеуетін көрсетеді. Зерттеу нәтижелері - жасанды интеллектті енгізудің шетелдік тәжірибесі зерделенді, негізгі кедергілері анықталды: білікті кадрлардың жетіспеушілігі, цифрлық инфрақұрылымның әлсіздігі, фермерлердің хабардарлығының