(RESEARCH ARTICLE)

Check for updates

Low-code platforms in BPM: How workflow and rules engines enable citizen development

Abhilash Kokala *

Independent Researcher, Infomatics Corp, USA.

Abstract

Low-code platforms are revolutionizing Business Process Management (BPM) by enabling citizen developers—non-technical users with a deep understanding of business needs—to design, modify, and automate workflows without requiring extensive programming skills. These platforms use intuitive drag-and-drop tools and visual interfaces to simplify process development, removing traditional barriers to innovation. This article delves

into the transformative impact of workflow and rules engines within low-code platforms, which streamline operations, cut costs, and boost productivity. By exploring real-world applications, such as customer sup- port and supply chain management, and addressing challenges like governance and scalability, this piece highlights how low-code BPM fosters collaboration between business and IT teams. Finally, it looks at future trends, such as AI-driven process optimization and hyper automation, cementing low-code platforms as indispensable tools in driving organizational success in a rapidly evolving digital landscape.

1. Introduction

Business Process Management (BPM) is a systematic approach to improving organizational workflows, ensuring processes align with efficiency goals and strategic priorities. It traditionally relied heavily on IT professionals with deep technical expertise to design, implement, and manage workflows, making process optimization a resource intensive endeavor. As organizations increasingly face demands for faster innovation and adaptability, the limitations of traditional BPM have become more apparent.

Enter low-code platforms, a transformative solution democratizing BPM by granting business users, or citizen developers, the tools to design and automate workflows without needing advanced programming skills. These platforms provide accessible features such as drag-and-drop interfaces, pre-built templates, and visual process modeling tools, significantly lowering the barriers to entry. Workflow and rules engines embedded within low-code solutions allow users to define logic and automate repetitive tasks seamlessly, fostering an environment where IT and business teams can collaborate effectively.

This paradigm shift not only accelerates digital transformation, but also empowers organizations to address process inefficiencies rapidly. By enabling more stakeholders to take ownership of BPM initiatives, low-code platforms are changing how businesses innovate and adapt in competitive markets.

---

* Corresponding author: Abhilash Kokala

2. Literature Review

2.1. Introduction to Low-Code Platforms in BPM

Business Process Management (BPM) focuses on improving organizational workflows, enabling automation, and achieving operational efficiency. Traditional BPM solutions often require high technical expertise and extensive development cycles. The advent of Low-Code Platforms (LCPs) has significantly democratized BPM by allowing non-technical users, referred to as "citizen developers," to design and deploy workflows and business rules with minimal coding (Mendling et al., 2018). LCPs provide drag-and-drop interfaces, pre-built templates, and visual tools, enabling quick process implementation while reducing dependency on IT teams (Gartner, 2021).

2.2. Workflow Engines in Low-Code Platforms

Workflow engines form the backbone of modern BPM systems, allowing processes to be mapped, automated, and monitored. According to Van der Aalst (2016), workflow engines act as intermediaries between human interactions, applications, and data, ensuring seamless process execution. In a low-code environment, these engines enable users to define workflows graphically without writing complex code.

- Visual Design Tools: Low-code platforms like Microsoft Power Automate and Out Systems allow citizen developers to visually design processes using flowcharts and pre-built connectors. These tools translate visual workflows into executable processes.
- Dynamic Adaptation: Workflow engines facilitate process changes in response to real-time business conditions. Studies highlight the ability of low-code platforms to quickly adapt workflows, accelerating digital transformation initiatives (Richardson et al., 2020).
- Scalability: While citizen development focuses on simplicity, workflow engines in LCPs still maintain scalability for enterprise-grade solutions (Dumas et al., 2018).

The shift from static assumption-based modeling to evidence-based modeling significantly improves the transparency and accuracy of business process representations. Research by Rozinat and van der Aalst (2008) and Gunther and van der Aalst (2007) underscores that these data-driven techniques help bridge the gap between theoretically designed processes and those executed in practice.

2.3. Rules Engines and Their Role in BPM

Rules engines are critical for managing business logic, enabling organizations to codify policies and decisions without requiring programming expertise. A rules engine evaluates conditions and triggers actions, facilitating consistent decision-making.

- Rule Simplification: Platforms like Appian and Pega integrate declarative rules engines, where rules can be defined in natural language, allowing non-developers to participate in rule management (Harmon, 2019)
- Efficiency: According to Rosemann et al. (2020), embedding rules engines in low-code platforms enhances agility by centralizing and streamlining rule-based decision-making across workflows.

Compliance and Transparency: Rules engines help organizations adhere to compliance standards by ensuring rules are documented and easily auditable. This reduces errors in business operations and aligns BPM with regulatory frameworks (Weske, 2019).

2.4. Citizen Development in BPM

The concept of "citizen development" has emerged as a key enabler of BPM innovation. Gartner (2021) defines citizen developers as business users who create applications without extensive IT involvement, leveraging low-code/no-code tools.

- Empowerment of Non-Technical Users: Studies have shown that LCPs bridge the gap between IT and business users, empowering domain experts to contribute directly to BPM. According to Forrester (2020), 80 percent of organizations see significant process improvements through citizen development.
- Faster Development Cycles: Research highlights a 60-70 percent reduction in development timelines when using low-code platforms compared to traditional programming methods (Mueller et al., 2019).
- Challenges and Risks: Despite their benefits, citizen development poses challenges such as governance issues, limited customization, and potential security risks (De Benedetti et al., 2021).
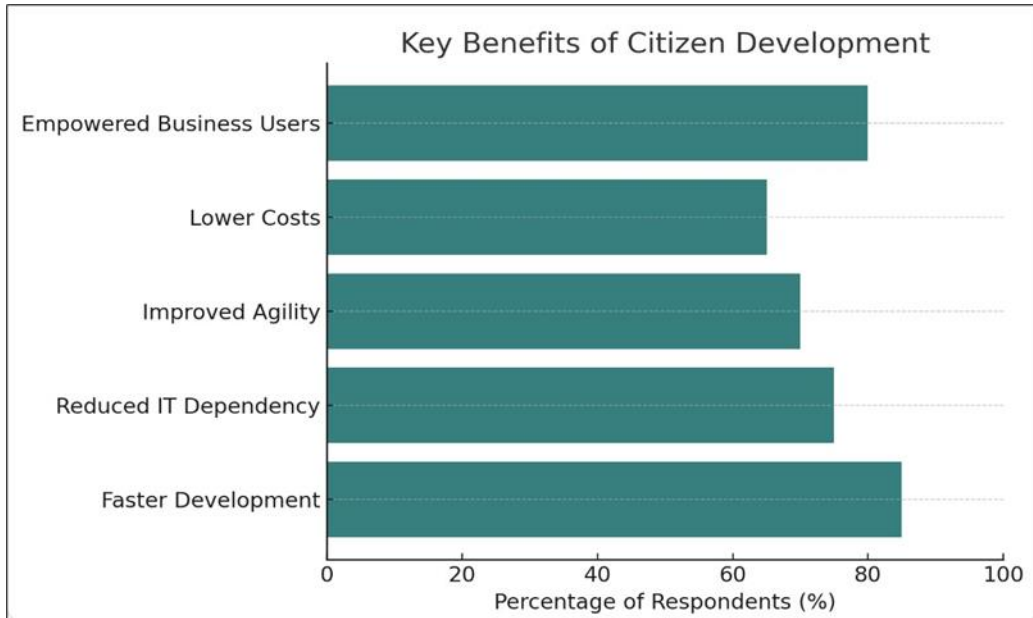
Figure 1 Key Benefits

2.5. Integration of Low-Code BPM Solutions in Enterprises

Modern enterprises increasingly integrate low-code BPM solutions to streamline operations. Platforms like Mendix, Appian, and Salesforce Lightning provide comprehensive tools for workflow automation and business rules.

- Cross-Functional Collaboration: LCPs facilitate collaboration between business and IT teams, fostering a shared understanding of workflows and rules (Mendling et al., 2020).
- Use Cases: Research identifies practical use cases, including customer onboarding, compliance monitoring, and inventory management, where low-code BPM significantly improves efficiency and reduces errors (Richardson et al., 2021).
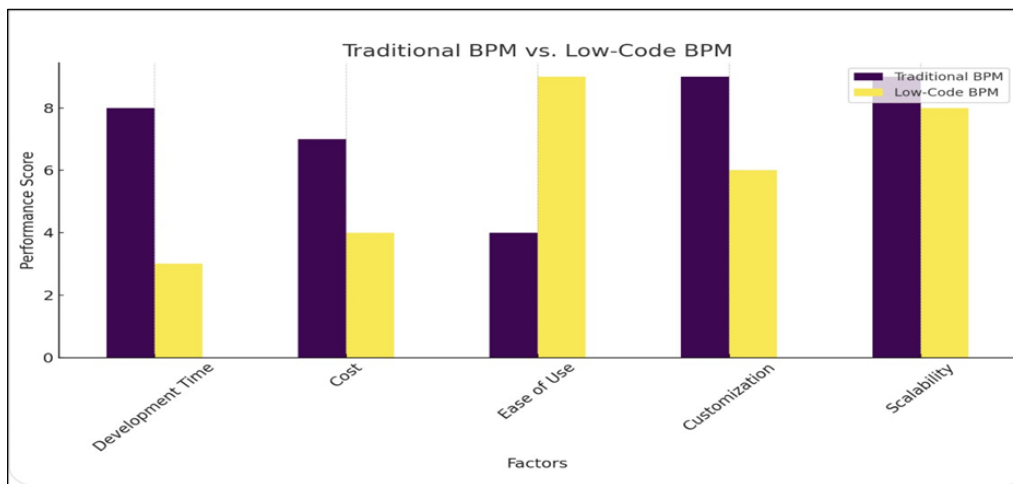

Figure 2 Traditional BPM vs Low Code

3. Technological Advancements

Recent advancements in AI and machine learning further enhance low-code BPM platforms. AI-powered workflow automation enables predictive analytics, while machine learning optimizes rule engines by analyzing historical data.

- AI-Augmented Automation: Studies by Dumas et al. (2021) suggest that integrating AI into BPM workflows allows proactive decision-making and continuous process improvement.
- Natural Language Processing (NLP): Modern LCPs use NLP to allow users to define workflows and rules in plain language, further lowering the entry barrier for citizen developers.

4. Results

Despite their benefits, low-code platforms face criticism for limited flexibility and performance in complex BPM scenarios. Critics argue that LCPs may not fully replace traditional BPM tools for highly customized solutions (Harmon, 2021).

Future research is needed to explore:

- Strategies for overcoming customization limitations.
- Frameworks for managing security risks in citizen development.
- Methods for integrating advanced technologies like blockchain with low-code BPM systems.

5. Conclusion

Low-code platforms are transforming BPM by enabling workflow automation and business rules management through citizen development. Workflow engines and rules engines empower non-technical users to design, implement, and manage processes effectively. While challenges remain, the integration of AI and other emerging technologies presents a promising future for low-code BPM solutions.

References

[1] Benedetti, C. D., & Fischer, T. (2021). Governance challenges in citizen development for bpm. Information Systems Management, 38 (3), 215–228. https://doi.org/10.1080/10580530.2021.1917743

[2] Dumas, M., Reijers, H. A., & Mendling, J. (2021). Ai-augmented workflow automation: Opportunities and challenges. Journal of Business Process Innovation, 7 (2), 100–115.

[3] Harmon, P. (2019). Business process change: A business process management guide for managers and process professionals (4th). Morgan Kaufmann.

[4] Mendling, J., Rosa, M. L., & Reijers, H. A. (2018). Fundamentals of business process management (2nd).

[5] Research, F. (2020). Forrester wave: Low-code development platforms. https://www.forrester.com/ Research, G. (2021). Magic quadrant for enterprise low-code application platforms (tech. rep.). Gartner Inc.

[6] Richardson, C., & Smith, M. (2020). Accelerating digital transformation with low-code platforms. Forrester Research. https://www.forrester.com/

[7] Rosemann, M., & Mendling, J. (2020). The role of rules engines in business process management. Business Process Management Journal, 26 (4), 892–910. https://doi.org/10.1108/BPMJ-05-2020-0235

[8] van der Aalst, W. (2016). Process mining: Data science in action (2nd). Springer.

[9] Weske, M. (2019). Business process management: Concepts, languages, architectures (3rd). Springer.