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Summary of the main contribution:

In recent years, significant progress has been made in using artificial intelligence (AI) to improve the monitoring of business processes, decision-making, and automation. This comprehensive review synthesizes the main findings from various studies in this area, addressing challenges, conceptual frameworks, and practical applications.

Introduction to End-to-End Process Monitoring (E2E-PM)
End-to-End Process Monitoring (E2E-PM) represents a paradigm shift from traditional monitoring methods by automating the detection of faults, execution, identification, and diagnosis to initiate timely interventions. For example, in Amazon's supply chain, sensors automatically detect and rectify issues like unscannable packages, ensuring smooth operations. E2E-PM ensures that interventions happen quickly, mitigating long-term adverse effects and optimizing processes.

Challenges of Implementing E2E-PM
Implementing E2E-PM faces several challenges, including the difficulty of diagnosing failures in a timely manner, the lack of information on interventions in existing case studies, and the limited optimization of performance measures. For instance, diagnosing wear and tear on machine parts on production lines poses a greater challenge than identifying slow production chain.

Improving Case Studies with E2E-PM
To address these challenges, a conceptual framework is proposed using the scenario of a large water mixing tank. This framework illustrates how Principal Component Analysis (PCA) aids in defect detection and diagnosis, although with limitations in simulating real-world variability and disturbances.

Artificial Intelligence in Transforming Business Processes
AI plays a pivotal role in transforming business processes by automating tasks, enhancing cognitive understanding, and enabling cognitive interactions. Various AI techniques such as semantic understanding, statistical clustering, and neural networks are employed to address information processing challenges, optimize operations, and improve customer service.

AI-Based Methods for Business Process Automation and Decision Support
A systematic literature review highlights the importance of AI in business process automation and decision support. Key findings reveal the need to define search criteria to obtain relevant results and the predominance of keywords related to AI and Business Process Management (BPM). However, the review emphasizes the need for future research to incorporate more AI-focused methodologies to better understand business operations.

Conclusion:

To conclude, integrating AI into business process monitoring and decision-making offers transformational potential, improving efficiency, customer service, and operational outcomes. However, challenges remain in terms of data variability, ethical considerations, and interdisciplinary collaboration. Future research efforts should focus on refining AI methodologies, improving interdisciplinary collaboration, and addressing ethical and societal implications to fully realize the potential of AI-driven business process transformation. This comprehensive review highlights the pivotal role of AI in redefining business processes and decision-making paradigms, offering insights into current challenges and future directions for research and implementation.