

## ABSTRAK

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Judul : Analisis Sistem Rantai Pasok Obat: *Systematic Literature Review*

Rantai pasokan farmasi yang kompleks dan melibatkan banyak aktor rentan terhadap gangguan operasional seperti keterlambatan distribusi, fluktuasi permintaan, ketergantungan impor, serta perbedaan regulasi (GMP, GDP) antarnegara. Transformasi digital (IoT, AI, Blockchain) dan Pharmaceutical Supply Chain 4.0 berpotensi meningkatkan efisiensi serta ketahanan, namun di Indonesia masih terhambat infrastruktur, regulasi, dan kesiapan industri. Penelitian ini bertujuan untuk menganalisis mekanisme, regulasi, tantangan dan inovasi, peran teknologi digital rantai pasok obat. Penelitian ini menggunakan *systematic literature review* dengan penelusuran PubMed, ScienceDirect, dan Google Scholar. Artikel diseleksi mengikuti tahapan PRISMA dan kriteria PICOS, kemudian dilakukan ekstraksi data dan sintesis tematik. Sebanyak 41 artikel dianalisis, terdiri dari 8 artikel dari PubMed, 11 artikel dari ScienceDirect dan 31 artikel dari Google Scholar. Hasil menunjukkan negara berpendapatan tinggi cenderung memiliki rantai pasok lebih terstandar, terintegrasi digital dan didukung regulasi kuat untuk meningkatkan *traceability* serta mencegah obat palsu. Sebaliknya, negara berpendapatan menengah dan rendah, termasuk Indonesia, masih menghadapi keterbatasan infrastruktur logistik, penerapan regulasi yang belum merata, minim integrasi sistem informasi, serta kesenjangan distribusi *urban-rural* yang meningkatkan risiko stock-out. Teknologi digital seperti *Internet of Things*, *Artificial Intelligence*, *blockchain*, dan analitik data berpotensi meningkatkan visibilitas, ketertelusuran, efisiensi dan ketahanan rantai pasok, namun memerlukan kesiapan data, infrastruktur dan tata kelola yang memadai.

**Kata kunci:** Farmasi, rantai pasok obat, *systematic literature review*

## **ABSTRACT**

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*Judul : Drug Supply Chain System Analysis: A Systematic Literature Review*

*The complex pharmaceutical supply chain, involving multiple actors, is vulnerable to operational disruptions such as distribution delays, demand fluctuations, import dependency, and varying regulations (GMP, GDP) across countries. While digital transformation (IoT, AI, Blockchain) and Pharmaceutical Supply Chain 4.0 offer potential for enhanced efficiency and resilience, implementation in Indonesia remains hindered by infrastructure, regulatory, and industry readiness limitations. This study aims to analyze the mechanisms, regulations, challenges and innovations, and the role of digital technology in pharmaceutical supply chains through a systematic literature review of PubMed, ScienceDirect, and Google Scholar databases, following PRISMA guidelines and PICOS criteria, with thematic synthesis of 41 selected articles (8 from PubMed, 11 from ScienceDirect, 31 from Google Scholar). Findings reveal that high-income countries exhibit more standardized, digitally integrated supply chains supported by robust regulations for improved traceability and counterfeit prevention, whereas middle- and low-income countries, including Indonesia, face logistics infrastructure limitations, uneven regulatory enforcement, minimal information system integration, and urban-rural distribution disparities that heighten stock-out risks. Digital technologies such as IoT, AI, blockchain, and data analytics hold promise for enhancing visibility, traceability, efficiency, and supply chain resilience, yet require adequate data readiness, infrastructure, and governance.*

**Keywords:** *Pharmaceutical supply chain, pharmacy, systematic literature review*