– Continuous Learning: Systems must evolve with changing processes and emerging defects.

– Integration Complexity: Seamless coordination between AI, hardware, and factory IT systems remains a hurdle.

– Future integration with IoT, 5G, and robotics will enable self-correcting production ecosystems, where AI not only detects but also autonomously resolves quality issues.

Conclusion

AI-powered quality inspection marks a shift from reactive to proactive quality management. It enhances product quality, reduces costs, and supports digital transformation, becoming essential in modern smart manufacturing systems.

References

1. AI-Driven Quality Inspection in Manufacturing [Electronic resource]. – Access mode: https://www.siemens.com/industrial-automation. – Access date: 15.04.2024.
2. Deep Learning for Visual Quality Inspection [Electronic resource]. – Access mode: https://developer.nvidia.com. – Access date: 15.04.2024.

UDC 004

SUPPLY CHAIN COLLABORATIVE SCHEDULING SYSTEM: INTELLIGENT TRANSFORMATION FROM EFFICIENCY OPTIMIZATION TO VALUE RECONSTRUCTION

Zhang Longlong, master's degree student,
Kazakou V., PhD in Engineering, associate professor, Sokalava H., senior lecturer
Vitebsk State Technological University, Vitebsk, Republic of Belarus

The core attributes of the Supply Chain Collaborative Scheduling System (SCCDS) reflect a profound transformation from single-entity execution to collaborative decision-making, with its core advantages constructed through three key dimensions:

First, cross-entity collaborative decision-making capability. Unlike traditional rule-driven software, SCCDS leverages real-time data collection (e. g., capacity, inventory, order demand) and intelligent algorithm modeling to achieve proactive optimization of multi-stakeholder resources.

Second, multi-dimensional constraint integration capability. The system translates the intertwined constraints in complex supply chain scheduling. It identifies Pareto optimal solutions to reconcile conflicting objectives across these constraints.

Third, dynamic adaptability and resilient architecture. By using IoT to real-time sense environmental changes such as demand fluctuations and supply disruptions, and integrating probabilistic modeling to reserve capacity and inventory buffers, SCCDS enables flexible adjustment of scheduling plans.

The core competency system of the Supply Chain Collaborative Scheduling System (SCCDS) constructs an intelligent scheduling "digital hub" through three dimensions:

First, end-to-end digital twin modeling enables collaborative mapping from local to global levels.

Second, the intelligent optimization engine overcomes combinatorial explosion challenges.

Third, human-machine collaborative decision-making creates an interaction paradigm of "machine intelligence + human expertise".

These three capabilities complement each other, forming a data-driven, algorithm-empowered, and human-machine collaborative intelligent scheduling system.

The implementation of the Supply Chain Collaborative Scheduling System (SCCDS) faces three core challenges: data sharing barriers, interest allocation conflicts, technical implementation difficulties.

The Supply Chain Collaborative Scheduling System (SCCDS) reinvents competitive advantages across four key dimensions: efficiency enhancement, resilience building: collaboration deepening, sustainable development.

Looking ahead, SCCDS will leverage multi-agent technology to enable autonomous node collaboration, reverse-drive resource allocation based on real-time demand, and break industrial boundaries to spawn new models like C2M (Customer-to-Manufacturer) and "production-as-delivery". This evolves SCCDS from a tool into an intelligent ecological hub that reconstructs the logic of value creation.

More than a technical tool, SCCDS represents a revolution in management philosophy. It marks the shift of supply chains from "inter-enterprise competition" to "network-level collaboration". In the future, SCCDS will become the core engine of enterprise digital transformation, helping build a more agile, resilient, and sustainable supply chain competitive edge.

References

1. Chopra, S. Supply Chain Management: Strategy, Planning, and Operations / S. Chopra, P. Meindl. – Pearson, 2021.

УДК 677 023 77

ИНФОРМАЦИОННЫЕ ТЕХНОЛОГИИ КАК БАЗОВЫЕ ТЕНДЕНЦИИ СОВРЕМЕННЫХ СОЦИАЛЬНО-ЭКОНОМИЧЕСКИХ ПРОЦЕССОВ

Демидов В. Е., студ., Быков М. Ю., к.и.н., доц.
Российский университет транспорта, г. Москва, Российская Федерация

Одновременный процесс глобализации и цифровой трансформации всех сфер общественной жизни неизбежно приводит к созданию сложной системы социальных институтов и экосистем в условиях изменчивой среды. В совокупности это формирует новые механизмы коммуникации на самых разных уровнях социального взаимодействия.

Темп вхождения в повседневную жизнь потребителей новейших цифровых технологий нарастает. Революционным технологическим прорывом может стать искусственный интеллект (ChatGPT, CharacterAI, Rytr и др.), способный выполнять присущие человеку как творческие, так и сложные интеллектуальные задачи, но с более высокой скоростью.

Цифровые инструменты Big-data, Интернет вещей (IoT), облачные сервисы и блокчейн-технологии открывают новые возможности для функционального развития предприятий, организаций и государственных структур. Оценка экономического риска, изменения рыночной конъюнктуры, обоснование экономических программ и проектов