

С Е К Ц І Я 1.
ІННОВАЦІЇ В ЕКОНОМІЦІ,
ПРОБЛЕМИ РОЗВИТКУ ЦИФРОВОЇ ЕКОНОМІКИ

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DIGITALIZATION OF SUPPLY CHAIN: TREATS AND BENEFITS

Today nobody doubts that digitalization of supply chain has potential to dramatically lower costs, increase product availability, and even create new markets unknown or unavailable prior to great availability of key technologies [2, p. 55], but in the same time as like as each innovation it is coherent with treats and benefits. For example, to classical set of trade facilitation principles (transparency, simplification, harmonization and standardization) now joins also digitalization of supply chain that investigates inclusion of quality management system based on processes into digital space. Thus, digitalization as process requires correct, structured internal quality management system that is ready for massively transformation for a business - but it is only possible when an organisation has once successfully digitised. Taking into consideration that digitisation is aimed on conversion information and products into digital format that helps to eliminate our need in traditional things like paper and face-to-face interaction, than we can suggest that it can be very helpful during COVID-19 pandemic.

Development of digital technologies also has impact on theoretical and practical aspects of paradigms, principles and models of supply chains. According to Dmitry Ivanov, Internet of Things, cyber physical systems, additive manufacturing, and smart, connected products, facilitate the development of Industry 4.0 and are driven digital supply chains [1, p. 8]. These innovations facilitate economic activity providing instruments for big data analytics, advanced tracking and tracing technologies. Accompanying such technological advances are

similar advances in organizational practice and culture, shaped by socio-technical considerations of new technology use [3, p. 338-339].

Scholars and practitioners defined digitalization as process that initially changed industry and supply chain. If digital supply chain is outcome of physical, digital asset data and information bidirectionally between nodes and links in supply network of organisation, as the driver of physical production and distribution integration, then digitalization of industry is logic outcome of its historical evolution (see table 1).

Table 1.

Industry 4.0: peculiarities of evolution

<i>#</i>	<i>Stage</i>	<i>Description</i>
<i>1</i>	<i>2</i>	<i>3</i>
1.	Industry 1.0	Mechanisation based on steam and water power has initiated new manufacturing technologies (metallurgy, textiles).
2.	Industry 2.0	Electrification and gas have allowed to start mass production and production lines, engines and turbines. First wave of globalisation has started from development of telegraph communications.
3.	Industry 3.0	Digitisation and automation have initiated spread of operations technologies (real time computers, machine controls, robots) and later – information technologies, digital networks and Internet. Start of second wave of globalization [1, p. 184].
4.	Industry 4.0	Convergence of information t and operation technologies. Supply chains of organizations were restructured as digital supply networks, accepting entirely different methods to achieve the flow of physical items (material, resources and people), money, transactions and information. Start of third wave of globalization.

Digitalization and its main outcome Industry 4.0 also has more broad elements implemented into supply chains and marketing. For example, digital supply chains today allows to flows of materials and items through inbound, internal and outbound supply chains of organisations. Also digital supply chains rely on real-time data, not the current model of batch updates of data followed by manipulation, where operational planning of materials and item flows are influenced by the extent of bidirectional data and information. Manufacturing execution system, warehouse management system and transport management systems play leading roles as digital hubs of connectivity and data collection/analytics [3]. CRM (client relation management) systems with sensor based data collection and analytics capability. In marketing digitalization of products and services inspired new digital business models to

optimise customer interaction and access, because of Industry 4.0 is vision, not methodology that requires organisations to understand how the holistic vision could be implemented within their enterprise and its supply network (see table 2 and figure 1).

Table 2.

Industry 4.0: peculiarities of evolution

#	Parameter	Organization	Supply network
1.	Cooperation	Work together across functions.	Build trust between partners.
2.	Coordination	Data and messaging standards implementation	Data and messaging standards and CRM implementation.
3.	Collaboration	Divisions and functions share information and networks building.	Share information for collaborative planning.
4.	Integration	Network access to data of organization.	Extend through each supply chain.

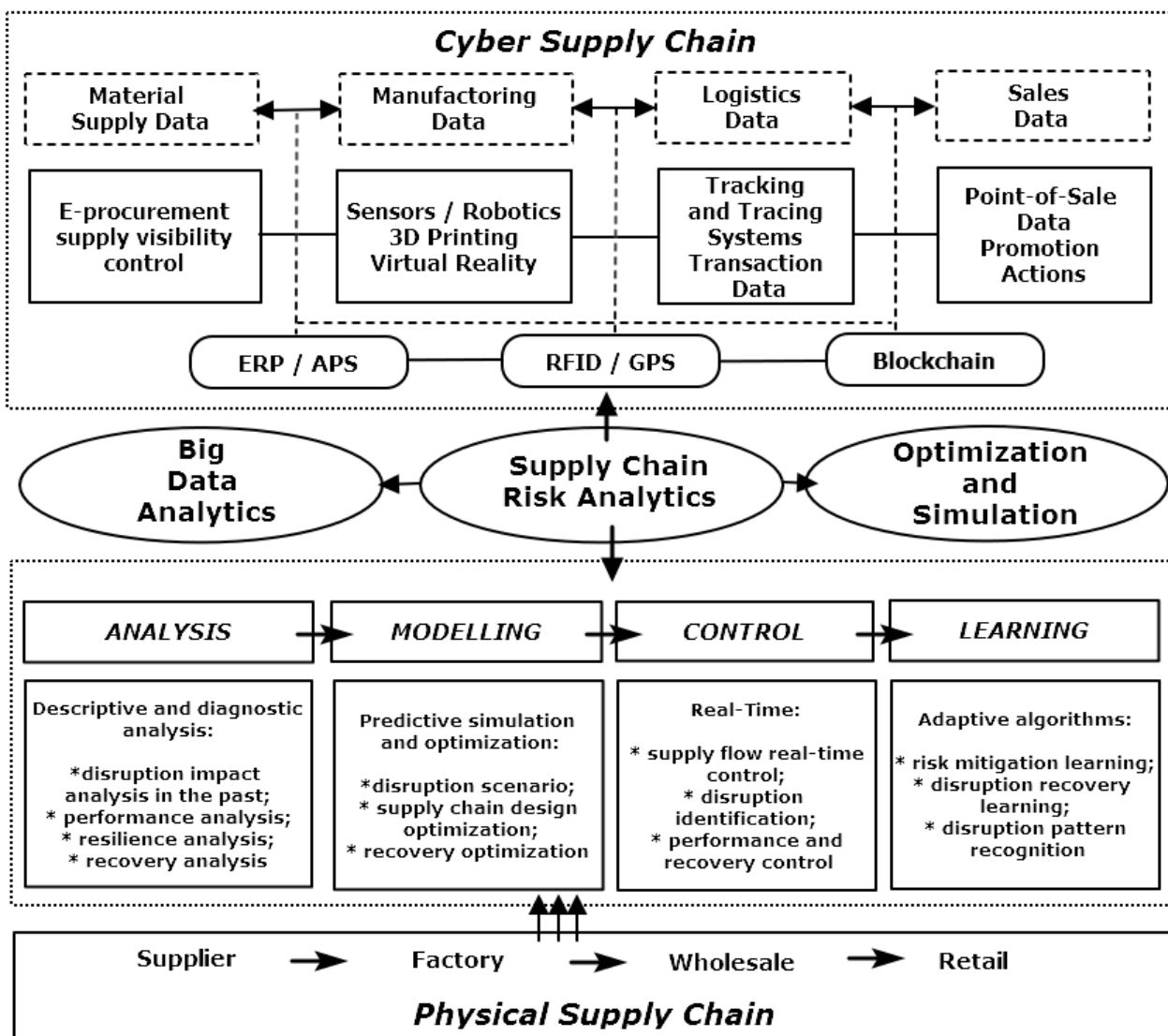


Fig. 1. Digitalization and supply chain risk prevention

Anyhow digitalization demands research has dynamic nature that facilitates in analysing, learning and evaluating its drivers and outcomes that range from time competitiveness to risk management and resilience. Risks in the supply chains can be mitigated by descriptive and predictive use of big data analytics to gain visibility and forecast accuracy, reduction in information disruption risks or improved contingency of plan activation. Reductions in supply and time risks can be achieved by using advanced trace and tracking systems leading to real-time coordinated activation of contingency policies. Thus, if world becomes more interconnected and digital-based, then risks of cyber-attacks becomes increasingly prominent.

Activity aimed on protection of business environment and networks from cyber threats becomes top priority of company when it is looking to innovative and introduce new technologies. If company digitalizes its supply chain and organizational environment, this means that was done next necessary step needed for future development. Financial and time-saving benefits are logical outcomes of mentioned above changes. But to get desired profit company should be ready to risk [4, p. 118].

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