INFORMATION MODEL OF A DIGITAL PLATFORM FOR INDUSTRIAL COOPERATION

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Relevance. The efficiency of industrial cooperation depends on reliable and timely information exchange between enterprises. Data on the products a company manufactures, its production capacity, the orders it is able to fulfil, and its delivery capabilities are essential for selecting a suitable partner. In practice, however, such data are usually stored in isolated information systems. This leads to repeated data entry, prolonged partner search, and a lack of information for managerial decision-making. Consequently, developing a unified digital platform to manage regional industrial cooperation is a pressing scientific and practical task.

Aim and methods. The aim of this study is to develop an information model of a digital platform serving industrial cooperation, to identify its core data entities, and to propose an algorithm for selecting the enterprise that best matches a given order. The research applies systems analysis, information modelling, functional analysis, and multi-criteria evaluation.

Theoretical background. The concept of Industry 4.0 rests on the interconnection of production systems and on data-driven management [3]. Cyber-physical system architectures link physical equipment with the information environment and make it possible to monitor and analyse production processes in real time [2]. At the same time, smart, connected products are reshaping competition and creating new forms of interaction between firms [4]. These developments form the conceptual basis for organising industrial cooperation on a digital platform [1].

Information model. In the proposed platform, data are stored in a centralised database. Enterprises register in the system and enter information on their production profile and capabilities, while customers submit their demand for products or services in electronic form. The core entities of the model are the enterprise, product,

order, production capacity, supplier, customer, logistics, payment, and contract. These entities are interrelated and together form a unified information environment. For instance, one enterprise may manufacture several products, fulfil several orders, and cooperate with different suppliers; in database terms, this corresponds to one-to-many and many-to-many relationships between the entities.

The platform is organised as a three-tier architecture. The first tier is the user interface, which provides access through a web interface or mobile devices. The second tier is the application layer, which performs order management, enterprise search, analytics, monitoring, and notification functions. The third tier is the database layer, which stores data on enterprises, products, orders, and the other entities. Such a separation of responsibilities simplifies maintenance and allows individual components to be developed and scaled independently.

Enterprise selection algorithm. One of the key functions of the platform is the automatic or semi-automatic identification of the enterprise that best matches an order. For this purpose, four criteria are used: product or technological compatibility, production capacity, cost, and logistical convenience. The overall degree of compatibility is expressed by the following weighted additive formula:

$$M = w_1P + w_2Q + w_3C + w_4L,\ w_1 + w_2 + w_3 + w_4 = 1.$$

where M is the overall compatibility score; P is product or technological compatibility; Q is production capacity; C is the cost or price indicator; L is logistical convenience; and w_1, w_2, w_3, w_4 are the weight coefficients of the criteria. To make the criteria comparable, their values should be normalised to a common scale, and the cost indicator should be transformed so that a lower price yields a higher score. The weights may be set by expert judgement or by established multi-criteria methods, depending on the priorities of the customer.

The algorithm consists of the following stages: (1) entering the order into the system; (2) identifying its main requirements; (3) filtering suitable candidates from the enterprise database; (4) evaluating each enterprise against the criteria; (5) calculating the overall compatibility score; (6) ranking the enterprises; (7)

recommending the most suitable enterprises to the customer; and (8) initiating electronic communication and the order process with the selected partner. The algorithm supports, rather than replaces, human decision-making: the final choice may also take into account the financial condition of the enterprise, contract terms, quality indicators, and other organisational factors.

Integration with digital technologies. Cloud technologies allow data to be stored centrally and accessed remotely. Integration with Industry 4.0 technologies makes it possible to obtain data from production equipment automatically. Big Data methods are used to analyse large volumes of production and order data, while Internet of Things technologies transmit sensor data to the platform and thereby support monitoring of production status. In the future, artificial intelligence may be applied to demand forecasting and to recommending the most suitable partner.

Results. As a result of the study, an information model and a functional structure of a digital platform for managing industrial cooperation were proposed. The model integrates data on enterprises, products, orders, production capacities, and logistics in a single information environment. The criteria-based algorithm makes it possible to filter enterprises that meet the requirements of an order and to recommend them on the basis of a ranking. The accuracy and economic efficiency of the algorithm should be assessed by testing the approach on data from real enterprises.

Conclusion. The proposed information model helps to unite the main participants of regional industrial cooperation in a single digital environment. The platform makes it possible to search for enterprises, manage orders, analyse production capacities, and monitor logistics processes. Integrating the platform with electronic contracts, digital payments, artificial intelligence, predictive analytics, and Internet of Things technologies would further expand its functionality. At the same time, information security, data protection, and user authentication require particular attention during practical implementation.

Keywords: *digital platform, industrial enterprise, information model, database, cloud technology, Industry 4.0, electronic cooperation, algorithm.*

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