



THE INFORMATION AND DECISION-MAKING SYSTEM IN MANAGEMENT ACTIVITY. THE IMPACT OF DIGITAL TRANSFORMATION ON ORGANIZATIONAL PERFORMANCE

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Abstract: In the context of current economic and technological transformations, information has become one of the most valuable resources of modern organisations. The development of digital technologies, the growing volume of available data and the need for rapid, well-grounded decisions have significantly changed the way organisations operate. The information system and the decision-making system are two essential components of management, in a permanent relationship of interdependence. The quality of information directly influences the quality of managerial decisions, while the effectiveness of decisions determines organisational performance. This paper analyses the role of information and decision-making systems in management activity, highlighting the impact of digital transformation on organisational processes. The main components of information systems, the stages of the decision-making process, modern digital technologies, and the benefits generated by their integration into organisational activities are presented. The research is theoretical in nature and is based on an analysis of scientific literature published between 2017 and 2023. The results show that digitalisation contributes to improving decision-making efficiency, optimising resource utilisation, and enhancing organisational performance.

Keywords: information system, decision-making system, management, digitalisation, digital transformation, organisational performance, information management.

1. INTRODUCTION

Contemporary society is characterised by rapid advances in information technologies and a continuous increase in the volume of information used in economic activity, [5]. In this context, organisations must constantly adapt their managerial processes to meet the demands of an ever-changing competitive environment, [4, 10].

Information is the foundation of all managerial activities, [8, 9]. Planning, organising, coordinating, motivating and controlling cannot be carried out efficiently in the absence of accurate, complete and timely information, [12]. For this reason, the information system occupies a central position within the organisation, ensuring the link between its various departments and management levels, [2].

The decision-making system represents the mechanism through which available information is transformed into concrete decisions and actions. The managerial decision is the result of a complex process of analysing and evaluating information, aimed at choosing the most appropriate course of action to achieve organisational objectives, [2, 3].

Digital transformation has profoundly changed the way information and decision-making systems function, [1, 4, 11]. The use of integrated databases, ERP systems, CRM platforms, Business Intelligence solutions, and artificial-intelligence-based tools has increased information-processing speed and improved the quality of the decision-making process, [6].

The importance of this topic is justified by the need to understand how digital technologies influence managerial activity and contribute to the development of efficient and competitive organisations, [5, 7]. An organisation's success increasingly depends on its ability to collect, analyse and use available information to make rapid, well-grounded decisions, [1].

The research objectives are:

- analysis of the concept of the information system;
- presentation of the structure and functions of the information system;

- highlighting the role of the decision-making system in management;
- analysis of the relationship between information and decision-making;
- identification of the benefits and challenges associated with digitalisation;
- highlighting current trends in the development of information and decision-making systems.

2. THE INFORMATION SYSTEM IN MODERN ORGANISATIONS

The information system comprises the totality of data, information, information flows, procedures and technical means used for collecting, processing, transmitting and storing information required for organisational activities, [2, 9]. According to modern approaches, the information system provides the support needed for all managerial functions and serves as a link between the internal and external environment of the organization, [9, 12].

The quality of information directly influences the efficiency of managerial decisions, [2]. Information flows represent the path taken by information between the various departments and hierarchical levels of the organisation and may be vertical, horizontal or diagonal, [8].

In the context of digital transformation, organisations use integrated IT systems that allow rapid access to information and facilitate the decision-making process, [1, 4]. The development of databases and IT platforms contributes to reducing information-processing time and increasing organisational efficiency, [6].



Fig. 1. Structure of the organisational information system, [8, 9]

The information system fulfils several essential functions within the organisation:

- documentation function;
- communication function;
- coordination function;
- control function;
- decision-support function.

Table 1. Components of the information system, [2, 9]

Component	Main role	Example
Data	Informational raw material	Orders, invoices, reports
Information	Decision support	Economic indicators
Information flows	Information transmission	E-mail, ERP
Procedures	Processing rules	Work instructions
Technical means	Data processing	Servers, computers
Human resources	Information management	Managers, operators

3. THE DECISION-MAKING SYSTEM AND ITS ROLE IN MANAGEMENT

The decision-making system comprises all the processes, methods, and mechanisms by which managers make decisions to achieve organisational objectives, [2, 3]. The decision-making process is one of the most important managerial activities, as it directly influences organisational performance, [2]. The quality of a decision depends on the quantity and quality of information available at the time it is made, [8, 12].

The stages of the decision-making process are:

- problem identification;
- information collection;
- development of alternatives;

- evaluation of alternatives;
- selection of the optimal solution;
- decision implementation;
- monitoring of results.
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Fig. 2. Stages of the decision-making process, [2, 9]

Managers make decisions under varying conditions of certainty, risk, or uncertainty, [2]. Depending on the management level, decisions may be strategic, tactical or operational.

Table 2. Classification of managerial decisions, [2, 3].

Decision type	Time horizon	Management level	Example
Strategic	Long-term	Senior management	Major investments
Tactical	Medium-term	Middle management	Production planning
Operational	Short-term	Operational management	Daily scheduling

4. THE INTERDEPENDENCE BETWEEN THE INFORMATION SYSTEM AND THE DECISION-MAKING SYSTEM

The information system and the decision-making system cannot function independently, [2, 8]. The information provided by the information system forms the basis of the decision-making process, while the decisions made generate new information flows, [8, 12].

This relationship of interdependence can be observed across all management functions, [2]. In the planning stage, information is needed on available resources, market demand and organisational objectives. In the control stage, information is used on the results achieved and the degree to which objectives have been met, [9].

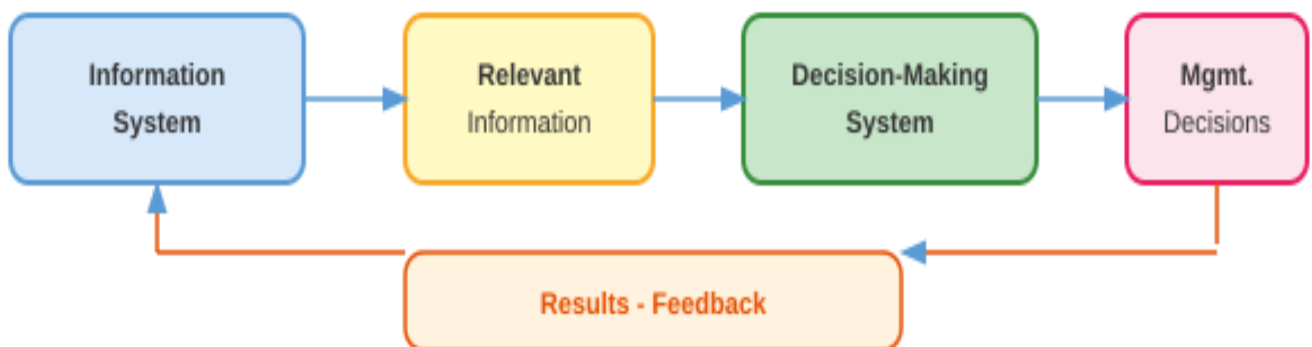


Fig. 3. Relationship between the information system and the decision-making system, [8,11]

A high-performing information system leads to:

- improved decision quality;
- reduced reaction time;
- reduced uncertainty;
- efficient use of resources;
- improved organisational performance.

5. THE IMPACT OF DIGITAL TRANSFORMATION ON INFORMATION AND DECISION-MAKING SYSTEMS

Digital transformation is the process of integrating digital technologies into all organisational activities, [4, 11]. Vial [11] defines digital transformation as a process in which digital technologies create disruptions that trigger strategic responses from organisations seeking to modify their value creation paths.

Table 3. Effects of digitalisation on the organization, [1, 5]

Benefit	Estimated impact
Productivity	35%
Cost reduction	25%
Decision-making speed	20%
Service quality	15%
Other benefits	5%

According to recent studies, digitalisation contributes to increased productivity, reduced operational costs and improved decision-making, [5, 10]. Zhai, Yang and Chan [12] empirically demonstrate that digital transformation significantly improves firm performance, including operational efficiency.

6. DIGITAL TECHNOLOGIES USED IN INFORMATION AND DECISION MANAGEMENT

Digital transformation has given rise to technologies capable of radically changing the way organisations collect, process and use information, [1, 4]. These technologies enable process automation, reduced response times and greater efficiency in managerial activities, [9, 11].

Organisations currently use complex IT systems for data management and decision-making support, [6]. These solutions contribute to improved internal communication, optimised resource utilisation and increased competitiveness, [7].

The main technologies in use are:

- ERP systems (Enterprise Resource Planning);
- CRM systems (Customer Relationship Management);
- Business Intelligence (BI);
- Big Data;
- Cloud Computing;
- Artificial Intelligence (AI);
- Internet of Things (IoT).

6.1. ERP systems and their role in management

ERP systems are integrated IT platforms that allow all organisational processes to be managed through a common database, [5, 7]. Through an ERP system, information generated in one department becomes immediately available to other departments within the organization, [5, 9].



Fig. 4. Architecture of an integrated ERP system, [7, 9]

Table 4. Benefits of ERP system implementation, [5, 7]

Benefit	Effect on the organisation
Information integration	Elimination of separate databases
Process automation	Reduced working time
Real-time monitoring	Faster decisions
Operational control	Error reduction
Productivity growth	Organisational efficiency

6.2. CRM systems and customer relationship management

CRM systems are used to manage relationships between an organisation and its customers, [7]. They allow the collection and analysis of information on consumer behaviour and contribute to improving decision-making in the field of marketing and sales, [7, 12].



Fig. 5. Information flow in a CRM system, [5, 7]

6.3. Business intelligence and decision support

Business Intelligence encompasses the technologies and methods used to transform data into information useful for decision-making, [6]. BI solutions enable the analysis of large volumes of data, trend identification, forecasting and monitoring of economic indicators, [6, 9].

Table 5. Functions of Business Intelligence systems, [6, 9]

Function	Utility
Reporting	Generation of managerial reports
Analysis	Trend identification
Forecasting	Estimation of future results
Monitoring	Tracking of indicators
Decision support	Grounding of decisions

6.4. Artificial intelligence and the decision-making process

Artificial intelligence is one of the most important development directions for modern information systems, [1, 5]. AI algorithms enable the analysis of large volumes of data, the identification of hidden patterns, the generation of forecasts and the automation of certain decision-making processes, [1, 9].

Table 6. Level of use of digital technologies in organisations, [5, 1]

Technology	Usage level (%)
ERP	85
CRM	78
Business Intelligence	70
Cloud Computing	88
Artificial Intelligence	55

7. ADVANTAGES AND LIMITATIONS OF DIGITALISING INFORMATION AND DECISION-MAKING SYSTEMS

The implementation of digital technologies generates numerous benefits for organisations, but also entails certain challenges, [1, 4].

Advantages:

- rapid access to information;
- reduced operational costs;
- increased productivity;
- improved communication;
- evidence-based decision-making;
- increased competitiveness.

Limitations and challenges:

- high implementation costs;
- need for staff training;
- resistance to change;
- cyber-security risks;
- dependence on IT infrastructure;
- difficulties in system integration.

Table 7. Advantages of digitalisation [1, 4, 5]

Domain	Main benefit
Management	Rapid and well-grounded decisions
Finance	Cost reduction
Production	Increased productivity
Marketing	Customer insight
Logistics	Stock optimisation

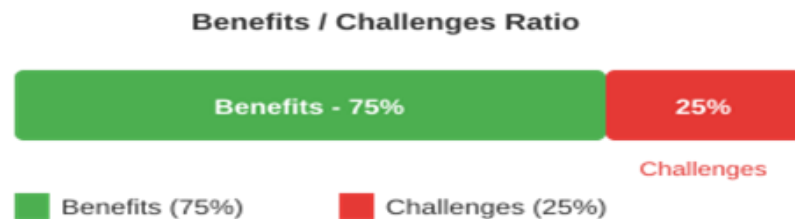


Fig. 6. Ratio of benefits to challenges of digitalization, [1, 11]

Despite these difficulties, the literature indicates that the advantages of digitalisation significantly outweigh the costs and risks associated with its implementation, [1, 4, 5].

8. CURRENT TRENDS AND DEVELOPMENT PERSPECTIVES OF INFORMATION AND DECISION-MAKING SYSTEMS

The evolution of digital technologies is driving significant changes in the structure and functioning of information and decision-making systems, [4, 5]. Modern organisations are increasingly using intelligent technologies capable of processing large volumes of data and providing advanced support for the decision-making process, [1, 6, 10].

The most important current trends include:

- development of artificial intelligence;
- expansion of cloud technology use;
- integration of Big Data solutions;
- automation of information processes;
- development of predictive systems;
- use of Industry 4.0 technologies;
- growing importance of cyber security.

8.1. Big Data and Advanced Data Analysis

The growing volume of data generated by organisations has given rise to the concept of Big Data, [1, 5]. Big Data analysis enables the identification of market trends, demand forecasting, analysis of consumer behaviour and reduction of decision-making risks, [5, 6].

Table 8. Use of Big Data in managerial activity, [6, 5]

Domain	Applicability
Marketing	Customer behaviour analysis
Production	Process optimisation
Finance	Risk assessment
Logistics	Stock management
Human resources	Staff performance analysis

8.2. Cloud Computing and Access to Information

Cloud Computing enables access to information and applications via the internet, without the need for complex local IT infrastructure, [4, 10]. Its main advantages are high accessibility, cost reduction, operational flexibility and efficient cross-departmental collaboration, [4].

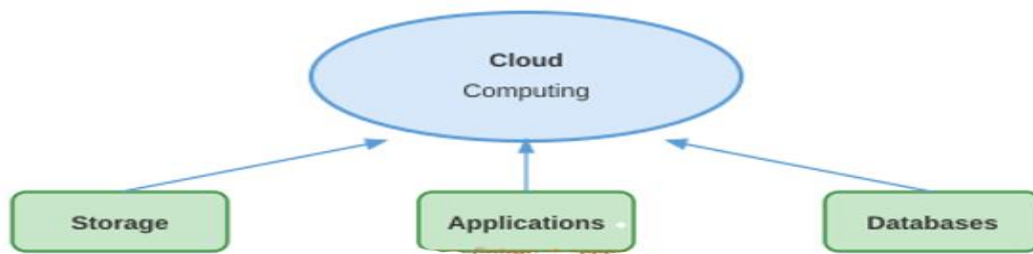


Fig. 7. Operating model of Cloud services, [1, 4,]

8.3. Industry 4.0 and the Intelligent Organisation

The Industry 4.0 concept involves the integration of digital technologies into organisational and industrial processes [4, 5]. By using these technologies, organisations can achieve reduced operational costs, increased productivity and improved quality of products and services [5, 10].

Table 9. Estimated impact of Industry 4.0 technologies [4, 5]

Indicator	Estimated improvement
Productivity	+30%
Quality	+25%
Response time	+20%
Costs	-15%
Operational efficiency	+35%

9. DISCUSSION AND INTERPRETATION OF RESULTS

Analysis of the literature reveals a direct relationship between organisational performance and the quality of the information system in use [2, 5, 8]. Organisations that invest in digitalisation achieve superior results in terms of operational efficiency and competitiveness [1, 4, 5].

The studies reviewed confirm that modern technologies enable managers to make evidence-based decisions rather than relying solely on experience or intuition [1, 6, 9]. An important aspect highlighted in the literature is the integration of ERP, CRM, and Business Intelligence systems into a unified management platform [5, 6, 7].

Table 10. Influence of digitalisation on management functions, [1, 5]

Management function	Impact of digitalisation
Planning	More accurate forecasts
Organising	Efficient coordination
Motivating	Rapid communication
Controlling	Real-time monitoring
Evaluation	Complex analyses

The research results confirm that the success of modern organisations increasingly depends on their ability to use information and digital technologies efficiently, [1, 4, 5].

10. CONCLUSIONS

The information system and the decision-making system are essential components of the management of modern organisations, [2, 8]. In the context of the digital economy, their role has become increasingly important in ensuring organisational performance and competitiveness, [4, 5].

Digital transformation has significantly contributed to the development of information and decision-making systems through the introduction of modern technologies such as ERP, CRM, Business Intelligence, Big Data, Cloud Computing and Artificial Intelligence, [1, 4, 5, 6, 7]. The use of these technologies allows increased information-processing speed, improved decision quality and optimised resource utilization, [6].

The research results confirm that organisations investing in digitalisation gain significant competitive advantages, reflected in increased productivity, reduced costs and improved capacity to adapt to changes in the external environment, [1, 4, 5, 10].

Looking ahead, the development of artificial-intelligence-based technologies will lead to the emergence of increasingly autonomous information and decision-making systems, capable of providing strategic support for organisational management, [1, 5].

Therefore, investments in information infrastructure and the development of digital competencies are an essential condition for organisational success in the knowledge-based economy, [4, 5, 12].

Author contributions: Conceptualization, methodology, data curation, investigation, writing – original draft, review and editing: M.F.(I.), M.I.E., U. The authors have read and agreed to the published version of the manuscript.

Funding source: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflicts of interest: There is no conflict of interest.

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