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AN APPLICATION OF MCDM METHODS FOR RANKING ORGANIZATIONAL BARRIERS TO THE ADOPTION OF DIGITAL TECHNOLOGIES IN LOGISTICS ENTERPRISES

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ABSTRACT

In recent years, the interaction between digital technology and business processes in logistics enterprises has attracted increasing scholarly attention. The emergence of digitalization as a fundamental concept has necessitated the transformation of traditional business practices in logistics enterprises and the restructuring of their operational processes. This transformation has significantly improved business performance across several areas, including increased operational efficiency, reduced costs, improved decision-making processes, and enhanced customer satisfaction. Rapid advancements in information and communication technologies have made it essential for logistics enterprises to utilize digital technologies as a strategic tool to gain a competitive advantage. However, during the adoption of digital technologies in logistics enterprises, various organizational barriers arise, and identifying them and developing practical solutions are critical. In this context, identifying organizational obstacles encountered during the adoption of digital technologies in logistics enterprises is crucial to the effectiveness of logistics activities. Therefore, systematically defining the challenges experienced in the digital transformation process of logistics enterprises has become not an option but a necessity. Moreover, a review of the existing literature indicates that organizational barriers in the digital technology adoption process have been examined in a limited number of studies and have not been sufficiently emphasized. To address this research gap, this paper employs the interval valued Fermatean neutrosophic subjective weighting approach to determine and rank the importance levels of various organizational barriers encountered during the adoption of digital technologies.

Keywords: *Digital Technologies, Organizational Barriers to Digital Technology Adoption, Interval Valued Fermatean Neutrosophic Subjective Weighting Approach*

1. INTRODUCTION

The service and manufacturing sectors are becoming increasingly digitalized as the concept of sustainability gains importance (Korucuk *et al.*, 2022). Today, digital technologies enable the rapid development of products and services, and interest in this field is steadily increasing alongside the growth of financial resources. As digital technologies have begun to play a significant role in innovation and entrepreneurial activities, digitalization and digital innovations have become the backbone of venture creation (Chae and Gog, 2020). In this context, digital technologies refer to electronic tools, systems, devices, infrastructures, and resources that generate, store, or process data. The diverse characteristics of digital technologies enable the rapid overcoming of numerous barriers and the opening of new horizons at an unprecedented pace. In recent years, digital technologies have penetrated almost every aspect of life, including communication, entertainment, travel, finance, banking, and shopping (Bernstein and Anand, 2015). In another definition, digital technology is described as a technology that enables distribution through electronic networks across different platforms and allows information and processes to be created, processed, transmitted, and stored in digital environments. In this context, digital technologies enable businesses to increase operational efficiency, accelerate decision-making processes, and access information without time or location constraints. Moreover, these technologies strengthen inter organizational collaboration, contribute to the development of innovative business models, and serve as the fundamental building blocks of digital transformation in both the service and manufacturing sectors (Görçün *et al.*, 2024).

In other words, digital technologies suggest that developing countries need to adopt them in their business and management processes in order to compete in an increasingly competitive and constantly changing global market (Long *et al.*, 2018). However, as digital technologies continue to advance, the pace of technological change surpasses traditional business cycles, making it increasingly critical for organizations and individuals to adapt to this rapid transformation. Continuously evolving digital tools and applications are reshaping ways of working, skill requirements, and organizational structures, necessitating both strategic organizational flexibility and a lifelong learning mindset among individuals. Otherwise, businesses that fail to keep pace with digital transformation face an increased risk of losing competitiveness, while individuals risk becoming disadvantaged in the labor market (Brynjolfsson and McAfee, 2017).

Adaptation to digital technologies plays a critical role in enabling businesses to achieve their sustainability goals, while also introducing new risks such as data security and privacy concerns, cyber threats, and technological dependence. Nevertheless, through the effective adoption of innovative technologies, traditional production and consumption processes are being transformed, and more circular and sustainable models characterized by optimized resource use, reduced waste, and increased energy efficiency are emerging. In this process, digital solutions such as artificial intelligence, big data, the Internet of Things, and cloud computing contribute both to monitoring environmental impacts and to strengthening sustainable decision-making mechanisms, thereby enabling businesses to gain long term competitive advantage (Kandasamy *et al.*, 2023).

Therefore, in the digital transformation process of industrial enterprises, it is inevitable to fundamentally reconsider not only technological infrastructure but also existing business models and organizational structures. However, this transformation process may pose significant adaptation challenges for businesses and industrial sectors, including a shortage of skilled labor, employee resistance to acquiring new skills, and insufficient organizational flexibility. To overcome these challenges, it is crucial to systematically identify the organizational barriers hindering the transition from digital technology adoption to a sustainability oriented structure and to determine appropriate tools, managerial approaches, and strategic policies to accelerate this transition. The effective monitoring and implementation of these tools enable companies to strengthen their strategic management capabilities, achieve productivity gains, manage risks more effectively, gain competitive advantage, and make more informed, integrated, and sustainable decisions aligned with social, environmental, and economic impacts (Agrawal *et al.*, 2023).

Based on the issues discussed above, identifying and ranking the organizational barriers to the adoption of digital technologies in logistics enterprises is an important consideration. Determining and prioritizing these barriers will not only deliver value added benefits to logistics companies but also help address efficiency, effectiveness and cost related requirements. Therefore, this paper provides a guiding framework for addressing the identified gaps. Finally, the proposed decision making framework employed in this study to address the relevant decision problem helps fill existing theoretical and methodological gaps in the literature, offering valuable perspectives for researchers in the field. From this perspective, the study may serve as a critical reference point, particularly for researchers seeking to address decision making problems in this domain. Within this scope, the paper aims to identify organizational barriers to the adoption of digital technologies in logistics enterprises and to propose a solution using the Interval Valued Fermatean Neutrosophic Subjective Weighting Approach.

2. LITERATURE REVIEW

This section systematically reviews the literature on national and international studies on barriers to the adoption and use of digital technologies, presented in Table 1 below.

Table 1. Literature Revıew

Author(s)	Year	Objective	Method(s)
Wiengarten, *et al.*	2013	They investigated various big data challenges at the organizational and operational levels of different nodes within healthcare supply chains.	Resource-Based View (RBV) and Contingency Theory
Dwivedi, *et al.*	2017	Various barriers to the adoption of additive manufacturing in the automotive sector were examined, and their relationships were analyzed.	Fuzzy Interpretive Structural Modeling Method

Author(s)	Year	Objective	Method(s)
Holotiuk and Moormann	2018	They conducted an empirical study to examine the organizational adoption of blockchain technology.	Empirical Analysis
Drewry *et al.*	2019	They evaluated barriers to access to digital technology among producers engaged in crop, dairy, and livestock production.	Quantitative and Qualitative Analysis
Agrawal *et al.*	2020	The main barriers to the adoption of the digital supply chain were identified, and their interrelationships were analyzed.	Interpretive Structural Modeling
Saghafian *et al.*	2021	They addressed the key factors influencing technology adoption and use in organizations from a staged perspective.	Literature Review
Senna *et al.*	2022	They prioritized the barriers to the adoption of Industry 4.0 technologies.	Interpretive Structural Modelling (ISM) Methodology
Kandasamy *et al.*	2023	They investigated the barriers to the adoption of digital technologies within a functional circular economy network.	Total Interpretive Structural Modelling (TISM) and Matrix Multiplication Applied to Classification (MICMAC) Analysis
Kabra *et al.*	2023	They investigated the barriers to the adoption of information and digital technologies in humanitarian supply chain management.	Fuzzy AHP Approach
Oke *et al.*	2024	They identified the barriers to the adoption of digital technologies for sustainable construction in a developing economy.	Quantitative Research Design
Korucuk and Aytekin	2024	They conducted a field study examining the barriers to Logistics 4.0.	Polytopıc Fuzzy RANCOM
Kumar *et al.*	2025	They examined the barriers to the adoption of digitalization in SMEs within the context of sustainability and operational excellence.	Comprehensive Literature Review
Aytekin *et al.*	2025	They examined the evaluation of metaverse-based digital transformation strategies.	Interval-Valued q-Rung Orthopair Fuzzy Methodology
Bühler *et al.*	2025	They identified the barriers to the adoption of digital technologies for the circular economy.	Statistical Analysis
Wang *et al.*	2026	Institutional barriers to digital transformation in the renewable energy sector were identified.	Statistical Analysis

Source: Authors

According to a detailed literature review, Agrawal (2020) identified the main barriers hindering the implementation of digital transformation in the supply chain as "no sense of urgency, "lack of industry specific guidelines, "lack of digital skills and talent" and "high implementation and running costs. In another study, Kabra *et al.* (2023) examined five main barriers (strategic, organizational, technological, financial, and human) and 25 barriers that are interlinked with the adoption level of industrial digital technologies. The findings indicate that strategic barriers are the most significant, followed by organizational, technological, financial and human barriers. According to Korucuk and Aytekin (2024), the most important technological barriers in Logistics 4.0 are identified as "costs of implementing Logistics 4.0" and "necessity of implementing process driven management approaches. Along with these barriers, the study identifies organizational barriers that hinder the adoption of digital technologies in logistics enterprises and ranks them using MCDM methods. This provides managers with a concrete guide on which barriers to prioritize. The study also contributes to a clearer roadmap for digital transformation in logistics firms. By incorporating expert opinions from experienced managers and academics, the methodology ensures reliable results based on both practical and theoretical perspectives. The application of advanced MCDM methods, such as Interval Valued Fermatean Neutrosophic Subjective Weighting, allows for a flexible analysis of uncertainty and subjective expert evaluations. This provides a level of prioritization precision that traditional methods cannot offer. Furthermore, the study offers practical recommendations and strategies to overcome barriers to digital transformation, directly supporting logistics managers' decision-making. As indicated in the table above, studies focusing on organizational barriers to the adoption of digital technologies are limited. This situation points to a significant gap in the literature. This paper aims to help fill this gap by providing new and comprehensive perspectives on the barriers in question.

3. INTERVAL VALUED FERMATEAN NEUTROSOPHIC SUBJECTIVE WEIGHTING APPROACH

Classical fuzzy sets consider only the degree of membership, while Intuitionistic fuzzy sets (IFSs) consider both the degrees of membership and non membership. However, the restrictions imposed by IFSs and subsequently developed Pythagorean Fuzzy Sets (PFSs) on the sum of the first and second powers of the degrees of membership and non membership, respectively, have proven insufficient for modeling problems involving uncertainty. Neutrosophic Sets (NSs), on the other hand, model uncertainty using indeterminacy, truth, and falsity components. Furthermore, various interval-valued fuzzy sets (IVFSs) have been developed that model uncertainty as intervals rather than a single value. In this paper, Interval Valued Fermatean Neutrosophic Sets (IVFNSs), which combine the structures of Fermatean Fuzzy Sets, NSs, and IVFSs, have been preferred to overcome modelling problems. IVFNSs possess properties that enable the modeling of uncertainty in the context of indeterminacy, truthfulness, and falsity, combining features of both Fermatean Fuzzy Sets and Neutrosophic Sets (Broumi *et al.*, 2023).

The selection of the IVFN-Subjective Weighting Approach used in this study stems from the characteristics of the decision context and the nature of the available expert knowledge. The problem addressed requires an effective representation of ambiguity, imprecision, and potential inconsistency in experts' subjective judgments. While commonly used techniques such as the Analytic Hierarchy Process (AHP), Best-Worst Method (BWM), DEMATEL, or ISM provide robust frameworks for many multi-criteria decision-making (MCDM) problems, they often rely on structured pairwise comparison procedures or require experts to understand specific methodological scales and comparison logic. In this study, participating experts possess significant domain knowledge relevant to the problem. However, they may be unfamiliar with MCDM methodologies or the evaluation procedures required by pairwise comparison-based techniques. Training experts in these procedures could introduce additional cognitive load and inadvertently affect or distort their original judgments. Therefore, obtaining expert opinions as directly as possible, with minimal methodological mediation, is considered essential to preserving the authenticity of their evaluations. In this context, the IVFN Subjective Weighting Approach was chosen for this study. The following section will first present information about IVFNSs. The procedure for the IVFN-Subjective Weighting Approach will then be presented.

An IVFNS A can be described as $A = \{\langle x, \tilde{T}_A(x), \tilde{I}_A(x), \tilde{F}_A(x)\rangle | x \in X\}$. Here the truth membership degree is $\tilde{T}_A(x) = [T_A^L(x), T_A^U(x)] \in [0,1]$. The indeterminacy membership degree is represented by $\tilde{I}_A(x) = [I_A^L(x), I_A^U(x)] \in [0,1]$. On the other hand, the falsity membership degree is denoted $\tilde{F}_A(x) = [F_A^L(x), F_A^U(x)] \in [0,1]$. IVFNSs meet the conditions $0 \le \left(\tilde{T}_A(x)\right)^3 + \left(\tilde{I}_A(x)\right)^3 + \left(\tilde{F}_A(x)\right)^3 \le 2$, $0 \le \left(\tilde{T}_A(x)\right)^3 + \left(\tilde{F}_A(x)\right)^3 \le 1$, and $0 \le \left(\tilde{I}_A(x)\right)^3 \le 1$ (Broumi *et al.*, 2023).

For convenience, two IVFN numbers (IVFNNs) can be defined as $\varrho_1 = \left([T_{\varrho_1}^L, T_{\varrho_1}^U], [I_{\varrho_1}^L, I_{\varrho_1}^U], [F_{\varrho_1}^L, F_{\varrho_1}^U]\right)$, $\varrho_2 = \left([T_{\varrho_2}^L, T_{\varrho_2}^U], [I_{\varrho_2}^L, I_{\varrho_2}^U], [F_{\varrho_2}^L, F_{\varrho_2}^U]\right)$, respectively. Basic operations, the score function, Hamming distance measure, and Euclidean distance measure are provided in Eqs (1)–(8), where $\lambda > 0$ (Broumi *et al.*, 2023; Kamran *et al.*, 2024):

$$\varrho_1 \oplus \varrho_2 = \left(\begin{array}{c}\left[\sqrt[3]{\left(T_{\varrho_1}^L\right)^3 + \left(T_{\varrho_2}^L\right)^3 - \left(T_{\varrho_1}^L\right)^3\left(T_{\varrho_2}^L\right)^3}, \sqrt[3]{\left(T_{\varrho_1}^U\right)^3 + \left(T_{\varrho_2}^U\right)^3 - \left(T_{\varrho_1}^U\right)^3\left(T_{\varrho_2}^U\right)^3}\right], \\ \left[I_{\varrho_1}^L I_{\varrho_2}^L, I_{\varrho_1}^U I_{\varrho_2}^U\right], \left[F_{\varrho_1}^L F_{\varrho_2}^L, F_{\varrho_1}^U F_{\varrho_2}^U\right]\end{array}\right) \tag{1}$$

$$\varrho_1 \otimes \varrho_2 = \left(\begin{array}{c}\left[T_{\varrho_1}^L T_{\varrho_2}^L, T_{\varrho_1}^U T_{\varrho_2}^U\right], \left[\sqrt[3]{\left(I_{\varrho_1}^L\right)^3 + \left(I_{\varrho_2}^L\right)^3 - \left(I_{\varrho_1}^L\right)^3\left(I_{\varrho_2}^L\right)^3}, \sqrt[3]{\left(I_{\varrho_1}^U\right)^3 + \left(I_{\varrho_2}^U\right)^3 - \left(I_{\varrho_1}^U\right)^3\left(I_{\varrho_2}^U\right)^3}\right], \\ \left[\sqrt[3]{\left(F_{\varrho_1}^L\right)^3 + \left(F_{\varrho_2}^L\right)^3 - \left(F_{\varrho_1}^L\right)^3\left(F_{\varrho_2}^L\right)^3}, \sqrt[3]{\left(F_{\varrho_1}^U\right)^3 + \left(F_{\varrho_2}^U\right)^3 - \left(F_{\varrho_1}^U\right)^3\left(F_{\varrho_2}^U\right)^3}\right]\end{array}\right) \tag{2}$$

$$\lambda\varrho_1 = \left(\left[\sqrt[3]{1 - \left(1 - \left(T_{\varrho_1}^L\right)^3\right)^\lambda}, \sqrt[3]{1 - \left(1 - \left(T_{\varrho_1}^U\right)^3\right)^\lambda}\right], \left[\left(I_{\varrho_1}^L\right)^\lambda, \left(I_{\varrho_1}^L\right)^\lambda\right], \left[\left(F_{\varrho_1}^L\right)^\lambda, \left(F_{\varrho_1}^L\right)^\lambda\right]\right) \tag{3}$$

$$\varrho_1^{\lambda} = \begin{pmatrix} \left[\left(T_{\varrho_1}^L\right)^{\lambda}, \left(T_{\varrho_1}^L\right)^{\lambda}\right], \left[\sqrt[3]{1-\left(1-\left(I_{\varrho_1}^L\right)^3\right)^{\lambda}}, \sqrt[3]{1-\left(1-\left(I_{\varrho_1}^U\right)^3\right)^{\lambda}}\right], \\ \left[\sqrt[3]{1-\left(1-\left(F_{\varrho_1}^L\right)^3\right)^{\lambda}}, \sqrt[3]{1-\left(1-\left(F_{\varrho_1}^U\right)^3\right)^{\lambda}}\right] \end{pmatrix} \tag{4}$$

$$\varrho_1^c = \left(\left[F_{\varrho_1}^L, F_{\varrho_1}^U\right], \left[1-I_{\varrho_1}^L, 1-I_{\varrho_1}^U\right], \left[T_{\varrho_1}^L, T_{\varrho_1}^U\right]\right) \tag{5}$$

$$s(\varrho_1) = \frac{4+\left(\left(T_{\varrho_1}^L\right)^3+\left(T_{\varrho_1}^U\right)^3-2\left(I_{\varrho_1}^L\right)^3-2\left(I_{\varrho_1}^U\right)^3-\left(F_{\varrho_1}^L\right)^3-\left(F_{\varrho_1}^U\right)^3\right)\left(4-\left(T_{\varrho_1}^L\right)^3-\left(T_{\varrho_1}^U\right)^3-\left(I_{\varrho_1}^L\right)^3-\left(I_{\varrho_1}^U\right)^3-\left(F_{\varrho_1}^L\right)^3-\left(F_{\varrho_1}^U\right)^3\right)}{8} \tag{6}$$

$$d_H(\varrho_1, \varrho_2) = \frac{1}{6}\Big(\left|\left(T_{\varrho_1}^L\right)^3-\left(T_{\varrho_2}^L\right)^3\right| + \left|\left(T_{\varrho_1}^U\right)^3-\left(T_{\varrho_2}^U\right)^3\right| + \left|\left(I_{\varrho_1}^L\right)^3-\left(I_{\varrho_2}^L\right)^3\right| + \left|\left(I_{\varrho_1}^U\right)^3 - \right. \\ \left. -\left(I_{\varrho_2}^U\right)^3\right| + \left|\left(F_{\varrho_1}^L\right)^3-\left(F_{\varrho_2}^L\right)^3\right| + \left|\left(F_{\varrho_1}^U\right)^3-\left(F_{\varrho_2}^U\right)^3\right|\Big) \tag{7}$$

$$d_E(\varrho_1, \varrho_2) = \sqrt{\frac{1}{6}\begin{pmatrix} \left|\left(T_{\varrho_1}^L\right)^3-\left(T_{\varrho_2}^L\right)^3\right|^2 + \left|\left(T_{\varrho_1}^U\right)^3-\left(T_{\varrho_2}^U\right)^3\right|^2 + \left|\left(I_{\varrho_1}^L\right)^3-\left(I_{\varrho_2}^L\right)^3\right|^2 \\ + \left|\left(I_{\varrho_1}^U\right)^3-\left(I_{\varrho_2}^U\right)^3\right|^2 + \left|\left(F_{\varrho_1}^L\right)^3-\left(F_{\varrho_2}^L\right)^3\right|^2 + \left|\left(F_{\varrho_1}^U\right)^3-\left(F_{\varrho_2}^U\right)^3\right|^2 \end{pmatrix}} \tag{8}$$

Assume that $\varrho_j = \left(\left[T_{\varrho_j}^L, T_{\varrho_j}^U\right], \left[I_{\varrho_j}^L, I_{\varrho_j}^U\right], \left[F_{\varrho_j}^L, F_{\varrho_j}^U\right]\right)$ is a collection of IVFNNs, where *j* = 1, ..., *n*. The IVFN weighted average (IVFNWA) operator, and the IVFN weighted geometric (IVFNWG) operator are provided below, where $w_j \in [0,1]$ and $\sum_{j=1}^{n} w_j = 1$ (Broumi *et al.*, 2023).

$$\text{IVFNWA}(\varrho_1, \dots, \varrho_n) = \begin{pmatrix} \left[\left(1-\prod_{j=1}^{n}\left(1-\left(T_{\varrho_j}^L\right)^3\right)^{w_j}\right)^{\frac{1}{3}}, \left(1-\prod_{j=1}^{n}\left(1-\left(T_{\varrho_j}^U\right)^3\right)^{w_j}\right)^{\frac{1}{3}}\right], \\ \left[\prod_{j=1}^{n}\left(I_{\varrho_j}^L\right)^{w_j}, \prod_{j=1}^{n}\left(I_{\varrho_j}^U\right)^{w_j}\right], \left[\prod_{j=1}^{n}\left(F_{\varrho_j}^L\right)^{w_j}, \prod_{j=1}^{n}\left(F_{\varrho_j}^U\right)^{w_j}\right] \end{pmatrix} \tag{9}$$

$$\text{IVFNWA}(\varsigma_1, \dots, \varsigma_n) = \begin{pmatrix} \left[\prod_{j=1}^{n}\left(T_{\varrho_j}^L\right)^{w_j}, \prod_{j=1}^{n}\left(T_{\varrho_j}^U\right)^{w_j}\right], \\ \left[\left(1-\prod_{j=1}^{n}\left(1-\left(I_{\varrho_j}^L\right)^3\right)^{w_j}\right)^{\frac{1}{3}}, \left(1-\prod_{j=1}^{n}\left(1-\left(I_{\varrho_j}^U\right)^3\right)^{w_j}\right)^{\frac{1}{3}}\right], \\ \left[\left(1-\prod_{j=1}^{n}\left(1-\left(F_{\varrho_j}^L\right)^3\right)^{w_j}\right)^{\frac{1}{3}}, \left(1-\prod_{j=1}^{n}\left(1-\left(F_{\varrho_j}^U\right)^3\right)^{w_j}\right)^{\frac{1}{3}}\right] \end{pmatrix} \tag{10}$$

The following steps are used to apply the IVFN-Subjective Weighting Approach.

Phase 1. Criteria ($C = \{C_1, \dots, C_n\}$), and experts ($E = \{E_1, \dots, E_r\}$) are identified, where *j* = 1, ..., *n*; *k* = 1, ..., *r*.

Phase 2. The importance of the criteria is assessed by experts based on the verbal expressions given in Table 2. Table 2 also includes the IVFN number (IVFFN) equivalents of these verbal expressions.

Table 2. Linguistic expression and corresponding IVFNN equivalents for evaluations.

Linguistic Expressions	Codes	IVFNNs					
		T^L	T^U	I^L	I^U	F^L	F^U
Extremely High	EH	0.95	0.99	0.01	0.10	0.05	0.15
Very High	VH	0.85	0.95	0.10	0.20	0.25	0.35
High	H	0.75	0.85	0.20	0.30	0.35	0.45
Above Fair	AF	0.65	0.75	0.25	0.35	0.45	0.55
Fair	F	0.55	0.65	0.35	0.45	0.40	0.45
Below Fair	BF	0.45	0.55	0.25	0.35	0.65	0.75
Low	L	0.35	0.45	0.20	0.30	0.75	0.85
Very Low	VL	0.25	0.35	0.10	0.20	0.85	0.95
Extremely Low	EL	0.05	0.15	0.01	0.10	0.95	0.99

Source: Authors

Phase 3. Expert assessments are converted to IVFNNs. According to these transformations, the IVFN importance of j-th criterion is denoted $\iota_{jk} = \left(\left[T^L_{\iota_{jk}}, T^U_{\iota_{jk}}\right], \left[I^L_{\iota_{jk}}, I^U_{\iota_{jk}}\right], \left[F^L_{\iota_{jk}}, F^U_{\iota_{jk}}\right]\right)$, where $j = 1, ..., n; k = 1, ..., r$.

Phase 4. The experts' weights are computed in this stage. For his purpose, the verbal expressions in Table 1 are used. Accordingly, $g_k = \left(\left[T^L_{\iota_k}, T^U_{\iota_k}\right], \left[I^L_{\iota_k}, I^U_{\iota_k}\right], \left[F^L_{\iota_k}, F^U_{\iota_k}\right]\right)$ represents k-th expert's IVFN significance level. Eq. (11) is used to obtain a crisp number equivalent of g_k. Then, weights of experts are computed via Eq. (12).

$$S(g_k) = \frac{4+\left(\left(T^L_{g_k}\right)^3+\left(T^U_{g_k}\right)^3-2\left(I^L_{g_k}\right)^3-2\left(I^U_{g_k}\right)^3-\left(F^L_{g_k}\right)^3-\left(F^U_{g_k}\right)^3\right)\left(4-\left(T^L_{g_k}\right)^3-\left(T^U_{g_k}\right)^3-\left(I^L_{g_k}\right)^3-\left(I^U_{g_k}\right)^3-\left(F^L_{g_k}\right)^3-\left(F^U_{g_k}\right)^3\right)}{8} \quad (11)$$

$$\chi_k = \frac{S(g_k)}{\sum_{k=1}^{r} S(g_k)} \quad (12)$$

Phase 5. The integration of the importance of each criterion is carried out using Eq. (13).

$$\iota_j = \left(\begin{array}{c}\left[\left(1-\prod_{k=1}^{r}\left(1-\left(T^L_{\iota_{jk}}\right)^3\right)^{\chi_k}\right)^{\frac{1}{3}}, \left(1-\prod_{k=1}^{r}\left(1-\left(T^U_{\iota_{jk}}\right)^3\right)^{\chi_k}\right)^{\frac{1}{3}}\right], \\ \left[\prod_{k=1}^{r}\left(I^L_{\iota_{jk}}\right)^{\chi_k}, \prod_{k=1}^{r}\left(I^U_{\iota_{jk}}\right)^{\chi_k}\right], \left[\prod_{k=1}^{r}\left(F^L_{\iota_{jk}}\right)^{\chi_k}, \prod_{k=1}^{r}\left(F^U_{\iota_{jk}}\right)^{\chi_k}\right]\end{array}\right) \quad (13)$$

Phase 6. The weight coefficient of each criterion is calculated by applying Eq. (14). Here the $s(\iota_j)$ is the score function exemplified in Eq. (11).

$$w_j = \frac{s(\iota_j)}{\sum_{j=1}^{n} s(\iota_j)} \quad (14)$$

4. RESULTS

This paper examines the organizational barriers to the adoption of digital technologies in logistics enterprises. For this purpose, the IVFN Subjective Weighting Approach was employed. In determining the criteria, opinions were obtained from a total of five experts, including four logistics enterprise managers and one academic. The experts were selected based on their direct experience and knowledge related to the topic. During the selection process, managers with at least five years of experience in logistics and digital technology applications, as well as an academic with expertise in the relevant field, were preferred. This approach ensured a reliable and balanced expert evaluation by considering both practical and theoretical perspectives. The survey was administered face-to-face. In this context, information regarding the experts is presented in the table below.

Table 3. Information Regarding Experts

DMs	Graduation	Degree	Duty	Experience
DM-1	Business Administration.	Bachelor	Former General Manager	25
DM-2	Department of Economics	Bachelor	Distribution Specialist	15
DM-3	Business Engineer	Bachelor	Cargo Supervisor	17
DM-4	Logistics Management	Bachelor	Operations Supervisor	14
DM-5	Production and Operation Management	Ph.D.	Academic	20

Source: Authors

In addition, based on a review of the relevant literature and drawing on the studies by Wiengarten *et al.* (2013), Dwivedi *et al.* (2017), Agrawal *et al.* (2020), Kabra *et al.* (2023), Aytekin *et al.* (2025) and Korucuk (2026) Table 4 was constructed.

Table 4. The List of Criteria

Codes	Criteria
C1	Institutional Factors (Corporate Strategy, Organizational Processes, Organizational Culture, Organizational Structure, etc.)
C2	Resistance to Change
C3	Lack of Sector-Specific Guidelines
C4	Lack of Digital Skills and Capabilities and Insufficient Employee Competence/Expertise
C5	Lack of Technological Infrastructure
C6	Insufficient Knowledge/Understanding of the Benefits of Digital Technologies
C7	High Implementation and Operational Costs
C8	Leadership and Management-Related Barriers (Weak top management support, lack of vision, etc.)
C9	Organizational Structure and Process Barriers (Inflexible processes, slow decision-making mechanisms, etc.)

Source: Authors

The table of verbal assessments provided by the experts is presented below.

Table 5. The Verbal Assessments Provided by Experts

	C1	C2	C3	C4	C5	C6	C7	C8	C9
E1	H	H	F	H	VH	L	H	L	L
E2	VH	F	F	H	VH	F	AF	L	F
E3	L	H	L	VH	H	H	VH	F	F
E4	L	H	F	AF	H	H	H	L	F
E5	F	H	L	H	H	F	F	F	H

Source: Authors

The IVFNN equivalents for experts' linguistic evaluations are given in Table 6.

Table 6. The IVFNN equivalents for experts' linguistic evaluations

	C1						C2						C3					
	T^L	T^U	I^L	I^U	F^L	F^U	T^L	T^U	I^L	I^U	F^L	F^U	T^L	T^U	I^L	I^U	F^L	F^U
E1	0.75	0.85	0.20	0.30	0.35	0.45	0.75	0.85	0.20	0.30	0.35	0.45	0.55	0.65	0.35	0.45	0.40	0.45
E2	0.85	0.95	0.10	0.20	0.25	0.35	0.55	0.65	0.35	0.45	0.40	0.45	0.55	0.65	0.35	0.45	0.40	0.45
E3	0.35	0.45	0.20	0.30	0.75	0.85	0.75	0.85	0.20	0.30	0.35	0.45	0.35	0.45	0.20	0.30	0.75	0.85
E4	0.35	0.45	0.20	0.30	0.75	0.85	0.75	0.85	0.20	0.30	0.35	0.45	0.55	0.65	0.35	0.45	0.40	0.45
E5	0.55	0.65	0.35	0.45	0.40	0.45	0.75	0.85	0.20	0.30	0.35	0.45	0.35	0.45	0.20	0.30	0.75	0.85
	C4						C5						C6					
	T^L	T^U	I^L	I^U	F^L	F^U	T^L	T^U	I^L	I^U	F^L	F^U	T^L	T^U	I^L	I^U	F^L	F^U
E1	0.75	0.85	0.20	0.30	0.35	0.45	0.85	0.95	0.10	0.20	0.25	0.35	0.35	0.45	0.20	0.30	0.75	0.85
E2	0.75	0.85	0.20	0.30	0.35	0.45	0.85	0.95	0.10	0.20	0.25	0.35	0.55	0.65	0.35	0.45	0.40	0.45
E3	0.85	0.95	0.10	0.20	0.25	0.35	0.75	0.85	0.20	0.30	0.35	0.45	0.75	0.85	0.20	0.30	0.35	0.45
E4	0.65	0.75	0.25	0.35	0.45	0.55	0.75	0.85	0.20	0.30	0.35	0.45	0.75	0.85	0.20	0.30	0.35	0.45
E5	0.75	0.85	0.20	0.30	0.35	0.45	0.75	0.85	0.20	0.30	0.35	0.45	0.55	0.65	0.35	0.45	0.40	0.45
	C7						C8						C9					
	T^L	T^U	I^L	I^U	F^L	F^U	T^L	T^U	I^L	I^U	F^L	F^U	T^L	T^U	I^L	I^U	F^L	F^U
E1	0.75	0.85	0.20	0.30	0.35	0.45	0.35	0.45	0.20	0.30	0.75	0.85	0.35	0.45	0.20	0.30	0.75	0.85
E2	0.65	0.75	0.25	0.35	0.45	0.55	0.35	0.45	0.20	0.30	0.75	0.85	0.55	0.65	0.35	0.45	0.40	0.45
E3	0.85	0.95	0.10	0.20	0.25	0.35	0.55	0.65	0.35	0.45	0.40	0.45	0.55	0.65	0.35	0.45	0.40	0.45
E4	0.75	0.85	0.20	0.30	0.35	0.45	0.35	0.45	0.20	0.30	0.75	0.85	0.55	0.65	0.35	0.45	0.40	0.45
E5	0.55	0.65	0.35	0.45	0.40	0.45	0.55	0.65	0.35	0.45	0.40	0.45	0.75	0.85	0.20	0.30	0.35	0.45

Source: Authors

The results of the IVFN-Subjective Weighting Approach are presented in Table 7. The calculation of the IVFN integrated importance value for the C1 criterion in Table 7 is presented below.

$$\iota_{(C_1)} = \left(\begin{array}{c} \left[\left(1 - \prod_{k=1}^{r} \left(1 - \left(T^L_{\iota_{(C_1)k}}\right)^3\right)^{\chi_k}\right)^{\frac{1}{3}}, \left(1 - \prod_{k=1}^{r} \left(1 - \left(T^U_{\iota_{(C_1)k}}\right)^3\right)^{\chi_k}\right)^{\frac{1}{3}} \right], \\ \left[\prod_{k=1}^{r} \left(I^L_{\iota_{(C_1)k}}\right)^{\chi_k}, \prod_{k=1}^{r} \left(I^U_{\iota_{(C_1)k}}\right)^{\chi_k}\right], \left[\prod_{k=1}^{r} \left(F^L_{\iota_{(C_1)k}}\right)^{\chi_k}, \prod_{k=1}^{r} \left(F^U_{\iota_{(C_1)k}}\right)^{\chi_k}\right] \end{array} \right)$$

$$\iota_{(C_1)} = \left(\begin{array}{c} \left[\begin{array}{c} \left((1-(1-0.75^3)^{0.2} * (1-0.85^3)^{0.2} * (1-0.35^3)^{0.2} * (1-0.35^3)^{0.2} * (1-0.55^3)^{0.2})^{\frac{1}{3}}\right), \\ \left((1-(1-0.85^3)^{0.2} * (1-0.95^3)^{0.2} * (1-0.45^3)^{0.2} * (1-0.45^3)^{0.2} * (1-0.65^3)^{0.2})^{\frac{1}{3}}\right) \end{array} \right], \\ [(0.2^{0.2} * 0.1^{0.2} * 0.2^{0.2} * 0.2^{0.2} * 0.35^{0.2}), (0.3^{0.2} * 0.2^{0.2} * 0.3^{0.2} * 0.3^{0.2} * 0.45^{0.2})], \\ [(0.35^{0.2} * 0.25^{0.2} * 0.75^{0.2} * 0.75^{0.2} * 0.4^{0.2}), (0.45^{0.2} * 0.35^{0.2} * 0.85^{0.2} * 0.85^{0.2} * 0.45^{0.2})] \end{array} \right)$$

$$\iota_{(C_1)} = ([0.6680, 0.7908], [0.1947, 0.3000], [0.4559, 0.5519])$$

The score function value of is computed as seen below:

$$S(\iota_{(C_1)}) = \frac{4 + \left((0.668)^3 + (0.7908)^3 - 2(0.1947)^3 - 2(0.3)^3 - (0.4559)^3 - (0.5519)^3\right)\left(4 - (0.668)^3 - (0.7908)^3 - (0.1947)^3 - (0.3)^3 - (0.4559)^3 - (0.5519)^3\right)}{8}$$

$$S(\iota_{(C_1)}) = 0.6677$$

Finally, the weight coefficient of C1 is calculated as follows:

$$w_j = \frac{0.6677}{0.6677 + 0.7558 + \cdots + 0.5630} = 0.1136$$

Table 7. The Results of IVFN-Subjective Weighting Approach

	The IVFN Integrated Importance of Criterion (ι_j)						**$S(\iota_j)$**	**Weight**	**Rank**
	T^L	T^U	I^L	I^U	F^L	F^U			
C1	0.6680	0.7908	0.1947	0.3000	0.4559	0.5519	0.6677	0.1136	5
C2	0.7230	0.8253	0.2237	0.3253	0.3595	0.4500	0.7558	0.1286	4
C3	0.4919	0.5907	0.2798	0.3826	0.5144	0.5804	0.4338	0.0738	8
C4	0.7618	0.8694	0.1821	0.2853	0.3441	0.4455	0.8125	0.1383	2
C5	0.7980	0.9049	0.1516	0.2551	0.3059	0.4070	0.8665	0.1475	1
C6	0.6380	0.7432	0.2502	0.3528	0.4300	0.5110	0.6292	0.1071	6
C7	0.7366	0.8486	0.2036	0.3094	0.3534	0.4455	0.7826	0.1332	3
C8	0.4552	0.5534	0.2502	0.3528	0.5833	0.6591	0.3643	0.0620	9
C9	0.5882	0.6918	0.2798	0.3826	0.4416	0.5110	0.5630	0.0958	7

Source: Authors

As seen in Table 7, the most important criterion is "Lack of Technological Infrastructure." This result clearly demonstrates that the fundamental problems encountered in the examined system largely stem from insufficient technological infrastructure. Deficiencies in technological hardware, software, and digital integration reduce the effectiveness and speed of operational processes, degrade service quality, and impede the proper functioning of data-driven decision-making mechanisms. Moreover, these inadequacies in technological infrastructure not only affect operational processes directly but also indirectly create a ripple effect on other criteria such as human resource utilization, organizational flexibility, and innovation capacity. This situation ultimately results in a weakening of the system's overall performance and competitive strength. In this context, strategic and sustainable investments in technological infrastructure are considered critical for the successful completion of digital transformation and for ensuring the system's long term success.

5. CONCLUSION

Identifying organizational barriers to the adoption of digital technologies in logistics enterprises is crucial for achieving cost optimization and gaining sustainable competitive advantage. A systematic and holistic analysis of these barriers enables enterprises to generate greater added value from their digital transformation processes and directly contributes to improved operational efficiency. Identifying organizational barriers not only reveals key variables contributing to competitive advantage but also provides critical insights for enhancing cost efficiency, productivity, and overall organizational performance. In this context, the findings indicate that managers in logistics enterprises should prioritize organizational barriers during the digital transformation process and integrate them into strategic planning and resource allocation, thereby contributing to more effective management of digital transformation.

Within this framework, the study examined the organizational barriers encountered during the adoption of digital technologies in logistics enterprises with a corporate identity in the province of İzmir. According to the findings, the most significant organizational barriers faced by logistics enterprises in the digital technology adoption process were "Lack of Technological Infrastructure" and "Lack of Digital Skills and Capabilities and Insufficient Employee Competence/Expertise." This result indicates that infrastructural inadequacies and the shortage of qualified human resources constitute the primary limiting factors in the digital transformation process. In contrast, "Leadership and Management Related Barriers (weak top management support, lack of vision, etc.)" and "Lack of Sector-Specific Guidelines" were found to be relatively less important barriers. These findings suggest that, in order to accelerate the adoption of digital technologies in logistics enterprises, priority should be given to strengthening technological infrastructure and enhancing employees' digital competencies.

This paper should be evaluated in light of certain limitations. First, the research is limited to logistics enterprises with a corporate identity in the province of İzmir; therefore, the generalizability of the findings to other provinces, regions, or sectors may be limited. Second, the importance levels of the organizational barriers encountered during the adoption of digital technologies were determined using specific measurement tools and evaluation criteria; thus, the use of different methodological approaches, sample sizes, or data collection techniques may yield different results. Moreover, the study primarily focuses on presenting the current situation and does not comprehensively examine how organizational barriers may change over time or the long term performance effects of the digital transformation process. In this context, future studies covering diverse geographical regions, incorporating longitudinal analyses, and supported by qualitative methods may help make the findings more comprehensive and generalizable.

The study's findings comprehensively reveal the current state of organizational barriers to the adoption of digital technologies in logistics enterprises and provide managers with guidance for strategic decision making. In this context, the results enable the prioritization of these organizational barriers according to their level of importance, thereby contributing to a more effective and systematic management of the digital transformation process. Moreover, the study makes a significant contribution to the literature by addressing a notable gap in the limited number of empirical studies on the adoption of digital technologies in the logistics sector. In future research, this study may be extended using multi-criteria decision-making approaches or different parametric and non parametric methods; additionally, supporting the analysis with data from different regions, sectors, or longitudinal datasets may enhance the generalizability of the findings.

NOTE

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REFERENCES

Agrawal, P., Narain, R. and Ullah, I. (2020) 'Analysis of barriers to the implementation of digital transformation in the supply chain using an interpretive structural modelling approach', *Journal of Modelling in Management*, 15(1), pp. 297–317. doi:10.1108/JM2-03-2019-0066.

Agrawal, R. *et al.* (2023) 'Opportunities for disruptive digital technologies to ensure circularity in supply chain: A critical review of drivers, barriers and challenges', *Computers & Industrial Engineering*, 178, p. 109140. doi:10.1016/j.cie.2023.109140.

Aytekin, A. *et al.* (2025) 'Evaluation of metaverse-based digital transformation strategies via an interval-valued q-rung orthopair fuzzy methodology', *Applied Soft Computing*, 169, p. 112566. doi:10.1016/j.asoc.2024.112566.

Bernstein, E. and Anand, R. (2015) 'The great decoupling: An interview with Erik Brynjolfsson and Andrew McAfee', *Harvard Business Review*, 93(6).

Broumi, S., Sundareswaran, R., Shanmugapriya, M., Singh, P. K., Voskoglou, M. and Talea, M. (2023a) 'Faculty performance evaluation through multi-criteria decision analysis using interval-valued Fermatean neutrosophic sets', *Mathematics*, 11(18), p. 3817. doi:10.3390/math11183817.

Brynjolfsson, E. and McAfee, A. (2014) *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. New York: W.W. Norton & Company.

Bühler, L. *et al.* (2025) 'Barriers to the adoption of digital technologies for a circular economy: Insights from the manufacturing industry', *Journal of Circular Economy*, 3(3). doi:10.55845/YXFI4033.

Chae, B. and Goh, G. (2020) 'Digital entrepreneurs in artificial intelligence and data analytics: Who are they?', *Journal of Open Innovation: Technology, Market, and Complexity*, 6, p. 56. doi:10.3390/joitmc6030056.

Drewry, J. L. *et al.* (2019) 'Assessment of digital technology adoption and access barriers among crop, dairy and livestock producers in Wisconsin', *Computers and Electronics in Agriculture*, 165, p. 104960. doi:10.1016/j.compag.2019.104960.

Dwivedi, G., Srivastava, S. K. and Srivastava, R. K. (2017) 'Analysis of barriers to implement additive manufacturing technology in the Indian automotive sector', *International Journal of Physical Distribution & Logistics Management*, 47(10), pp. 972–991. doi:10.1108/IJPDLM-07-2017-0222.

Görçün, Ö. *et al.* (2024) 'Evaluation of Industry 4.0 strategies for digital transformation in the automotive manufacturing industry using an integrated fuzzy decision-making model', *Journal of Manufacturing Systems*, 74, pp. 922–948. doi:10.1016/j.jmsy.2024.05.005.

Holotiuk, F. and Moormann, J. (2018) 'Organizational adoption of digital innovation: The case of blockchain technology', in *ECIS 2018 Proceedings*, p. 202.

Kabra, G. *et al.* (2023) 'Barriers to information and digital technology adoption in humanitarian supply chain management: A fuzzy AHP approach', *Journal of Enterprise Information Management*, 36(2), pp. 505–527. doi:10.1108/JEIM-10-2021-0456.

Kamran, M., Nadeem, M., Żywiołek, J., Abdalla, M. E. M., Uzair, A. and Ishtiaq, A. (2024) 'Enhancing transportation efficiency with interval-valued Fermatean neutrosophic numbers: A multi-item optimization approach', *Symmetry*, 16(6), p. 766. doi:10.3390/sym16060766.

Kandasamy, J., Venkat, V. and Mani, R. S. (2023) 'Barriers to the adoption of digital technologies in a functional circular economy network', *Operations Management Research*, 16(3), pp. 1541–1561. doi:10.1007/s12063-023-00375-y.

Korucuk, S. (2026). 'Barriers to Innovation Management in Manufacturing Firms and the Selection of the Ideal Innovation Strategy: The Case of Samsun Province. *International Journal of Fuzzy Systems*, pp. 1-30. https://doi.org/10.1007/s40815-026-02223-0.

Korucuk, S. *et al.* (2022) 'Assessing green approaches and digital marketing strategies for twin transition via Fermatean fuzzy SWARA-COPRAS', *Axioms*, 11, p. 709. doi:10.3390/axioms11120709.

Korucuk, S. and Aytekin, A. (2024) 'A field study examining barriers to Logistics 4.0 using polytopic fuzzy RANCOM', *Journal of Process Management and New Technologies*, 12(3–4), pp. 90–100. doi:10.5937/jpmnt12-54800.

Kumar, R., Dutta, G. and Phanden, R. K. (2025) 'Digitalization adoption barriers in the context of sustainability and operational excellence: Implications for SMEs', *Engineering Management Journal*, pp. 1–17. doi:10.1080/10429247.2024.2372519.

Long, L.-A., Pariyo, G. and Kallander, K. (2018) 'Digital technologies for health workforce development in low- and middle-income countries: A scoping review', *Global Health: Science and Practice*, 6(1), pp. 41–48. doi:10.9745/GHSP-D-18-00167.

Oke, A. E., Aliu, J. and Onajite, S. A. (2024) 'Barriers to the adoption of digital technologies for sustainable construction in a developing economy', *Architectural Engineering and Design Management*, 20(3), pp. 431–447. doi:10.1080/17452007.2023.2187754.

Saghafian, M., Laumann, K. and Skogstad, M. R. (2021) 'Stagewise overview of issues influencing organizational technology adoption and use', *Frontiers in Psychology*, 12, p. 630145. doi:10.3389/fpsyg.2021.630145.

Senna, P. P. *et al.* (2022) 'Prioritizing barriers for the adoption of Industry 4.0 technologies', *Computers & Industrial Engineering*, 171, p. 108428. doi:10.1016/j.cie.2022.108428.

Wang, H. J., Chong, W. Y. and Wang, B. N. (2026) 'Institutional barriers to digital transformation in China's renewable energy: Evidence from Ningxia', *Energy Strategy Reviews*, 63, p. 102028. doi:10.1016/j.esr.2025.102028.

Wiengarten, F. *et al.* (2013) 'Exploring the important role of organizational factors in IT business value: Taking a contingency perspective on the resource-based view', *International Journal of Management Reviews*, 15(1), pp. 30–46. doi:10.1111/j.1468-2370.2012.00332.x.

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PRIMJENA MCDM METODA ZA RANGIRANJE ORGANIZACIJSKIH PREPREKA U USVAJANJU DIGITALNIH TEHNOLOGIJA U LOGISTIČKIM PODUZEĆIMA

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SAŽETAK

Posljednjih godina međudjelovanje digitalne tehnologije i poslovnih procesa u logističkim poduzećima privlači sve veći interes znanstvene zajednice. Pojava digitalizacije kao temeljnog koncepta nametnula je potrebu za transformacijom tradicionalnih poslovnih praksi u logističkim poduzećima te restrukturiranjem njihovih operativnih procesa. Ova transformacija značajno je unaprijedila poslovne rezultate u više područja, uključujući povećanje operativne učinkovitosti, smanjenje troškova, poboljšanje procesa donošenja odluka i veću razinu zadovoljstva korisnika. Brzi razvoj informacijskih i komunikacijskih tehnologija učinio je nužnim da logistička poduzeća koriste digitalne tehnologije kao strateški alat za stjecanje konkurentske prednosti. Međutim, tijekom usvajanja digitalnih tehnologija u logističkim poduzećima javljaju se različite organizacijske prepreke, a njihovo prepoznavanje i razvoj praktičnih rješenja od ključne su važnosti. U tom je kontekstu identifikacija organizacijskih prepreka koje se pojavljuju pri usvajanju digitalnih tehnologija u logističkim poduzećima presudna za učinkovitost logističkih aktivnosti. Stoga sustavno definiranje izazova s kojima se logistička poduzeća susreću u procesu digitalne transformacije više nije stvar izbora, već nužnost. Nadalje, pregled postojeće literature ukazuje na to da su organizacijske prepreke u procesu usvajanja digitalnih tehnologija razmatrane u ograničenom broju radova te im nije posvećena dostatna pozornost. Kako bi se adresirala navedena istraživačka praznina, u ovom se radu primjenjuje subjektivni pristup ponderiranja temeljen na intervalnim Fermatovim neutrosofijskim skupovima radi utvrđivanja i rangiranja razina važnosti različitih organizacijskih prepreka koje se javljaju pri usvajanju digitalnih tehnologija.

Ključne riječi: *digitalne tehnologije, organizacijske prepreke usvajanju digitalnih tehnologija, subjektivni pristup ponderiranja temeljen na intervalnim Fermatovim neutrosofijskim skupovima*