

**ZESZYTY NAUKOWE
WYŻSZEJ SZKOŁY HUMANITAS**

**HUMANITAS UNIVERSITY'S
RESEARCH PAPERS**

**ZARZĄDZANIE
MANAGEMENT**

TOM XXVI

ZESZYT 2/2025

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Sosnowiec 2025

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Edukacji i Nauki



Rozwój
Czasopism
Naukowych

Dofinansowano ze środków budżetu państwa w ramach programu
Rozwój Czasopism Naukowych (RCN/SN/0563/2021/1)

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- (B) Data Collection (zbieranie danych)
- (C) Statistical Analysis (analiza statystyczna)
- (D) Data Interpretation (interpretacja danych)
- (E) Manuscript Preparation (redagowanie opracowania)
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ARTIFICIAL INTELLIGENCE TOOLS ON CONSUMER PURCHASE ATTITUDE

WPŁYW NARZĘDZI SZTUCZNEJ INTELIGENCJI NA POSTAWY ZAKUPOWE KONSUMENTÓW

Abstract: This study investigates the influence of modern technological advancements specifically the application of Artificial Intelligence (AI) on consumer purchase attitudes. The study focuses on key AI-related variables: AI-generated content, AI-based chatbot systems, and trust in AI. The primary objective is to assess how these factors positively shape consumers' perceptions, trust levels, and purchase decision-making processes concerning products and services. In addition, the research considers complementary variables such as psychological attitudes, trust in technology, and habitual usage behavior. Quantitative data were collected and analyzed using SPSS software. The analytical methods employed include factor analysis, reliability testing, T-tests, ANOVA, correlation, and regression analysis to examine the relationships and impact levels among the variables. The findings indicate that AI utilization significantly enhances consumer trust, perception, and purchase attitudes. Furthermore, the study reveals demographic differences - particularly in relation to education and age - that influence these outcomes. The results offer valuable insights for policymakers and practitioners seeking to improve the application of AI in future marketing and e-commerce strategies.

Keywords: Artificial Intelligence (AI), AI-generated content, Chatbot AI, Trust in AI, Consumer Purchase Attitude

Streszczenie: Niniejsze badanie analizuje wpływ nowoczesnego postępu technologicznego, w szczególności zastosowania sztucznej inteligencji (AI) na postawy zakupowe konsumentów. Badanie koncentruje się na kluczowych zmiennych związanych ze sztuczną inteligencją: treściach generowanych przez AI, systemach chatbotów opartych na AI oraz zaufaniu do AI. Głównym celem jest ocena, w jaki sposób czynniki te pozytywnie kształtują postrzeganie konsumentów, poziom zaufania i procesy podejmowania decyzji zakupowych dotyczących produktów i usług. Ponadto w badaniu uwzględniono zmienne uzupełniające, takie jak postawy psychologiczne, zaufanie do technologii i nawykowe zachowania związane z użytkowaniem. Dane ilościowe zostały zebrane i przeanalizowane przy użyciu oprogramowania SPSS. Zastosowane metody analityczne obejmują analizę czynnikową, testy wiarygodności, testy T, ANOVA, korelację i analizę regresji w celu zbadania relacji i poziomów wpływu między zmiennymi. Wyniki wskazują na to, że wykorzystanie sztucznej inteligencji znacząco zwiększa zaufanie konsumentów, ich percepcję i postawy zakupowe. Co więcej, badanie ujawnia różnice demograficzne – w szczególności w odniesieniu do wykształcenia i wieku – które wpływają na te wyniki. Wyniki oferują cenne spostrzeżenia dla decydentów i praktyków dążących do poprawy zastosowania sztucznej inteligencji w przysłych strategiach marketingowych i e-commerce.

Słowa kluczowe: sztuczna inteligencja (AI), treści generowane przez AI, Chatbot AI, zaufanie do AI, postawy zakupowe konsumentów

INTRODUCTION

In recent years, Artificial Intelligence (AI) has rapidly penetrated the fields of digital marketing and online commerce, emerging as a critical factor influencing business operations, consumer behavior, and purchase attitudes. Today, businesses are increasingly leveraging AI technologies to offer optimized and rapid communication with consumers, recommend relevant products and services, predict consumer needs, and streamline the purchasing process. Notably, chatbots, automated recommendation systems, and AI-generated content are being widely used to increase consumer engagement and influence purchase decisions. These technologies enable businesses to maintain 24/7 communication with consumers, offer personalized advice based on individual preferences and behaviors, and provide fast and automated services—thus making the online shopping experience more tailored and effective. However, there is a lack of in-depth studies in the context of Mongolia that explore how consumers perceive AI, how much they trust these systems, and how these perceptions affect their purchase attitudes toward products and services. Given Mongolia's unique digital usage patterns, technological adop-

tion levels, and cultural characteristics, such research is essential and may yield different outcomes compared to studies conducted in other countries (Gantulga et al., 2021)¹.

Mongolia was selected as the focus of this study due to its unique socio-technological context, which makes it a valuable case for understanding consumer responses to artificial intelligence (AI) in marketing. As a developing country with rapidly growing digital infrastructure and widespread use of social media, Mongolia offers a distinctive environment where traditional consumer values intersect with emerging technologies. This setting allows researchers to explore how AI-generated content, AI chatbots, and trust in AI influence purchasing behavior in a market that is still forming its digital habits and trust systems.

One peculiarity of the Mongolian context is the high level of smartphone penetration and active engagement on platforms like Facebook, despite a relatively small population (Gantulga, Sample, & Tugsbat, 2022)². This creates a highly connected digital consumer base that interacts with brands primarily through online channels. Additionally, consumer trust in technology and institutions in Mongolia can be influenced by cultural values, generational differences, and levels of digital literacy, which makes it a meaningful context to examine the role of trust in AI.

The purpose of the study was to investigate how different AI components specifically AI-generated content, AI chatbots, and trust in AI affect consumer purchasing attitudes. The aim was not only to measure their individual effects but also to understand how these elements collectively shape consumer decision-making in an emerging digital economy.

Therefore, this study aims to investigate the progressive application of AI in business and its influence on consumer purchase attitudes, specifically from the perspective of Mongolian consumers. It seeks to identify new opportunities in the marketing sector and offer practical recommendations for businesses. Moreover, the study contributes to a deeper understanding of the interrelationship between consumer trust, technological acceptance, and purchase attitudes in the era of digital transformation. The findings will provide innovative insights for marketing strategies and support the development of more consumer-centric and effective service models.

The novelty and significance of this study lie in the following aspects: It presents a pioneering empirical study based on the Mongolian consumer environment, addressing the emerging topic of how AI influences consumer purchase attitudes. It

¹ U. Gantulga, B. Sampil, A. Davaatseren, *Analysis of E-Commerce Adoption in Ulaanbaatar*, "Mongolia. Korea International Trade Research Institute" 2021, 17(1), 2021, 67–80.

² U. Gantulga, B. Sample, A. Tugsbat, *Predicting RFID adoption towards urban smart mobility in Ulaanbaatar, Mongolia*, "Asia Marketing Journal" 2022, 24(1), Article 2, <https://doi.org/10.53728/2765-6500.1584>.

integrates key AI components — AI-generated content, AI-based chatbots, and trust in AI — as core variables and explores their relationship with consumer purchase attitudes. The study uses an innovative research model to measure the relationship between AI technology adoption and consumer responses. In this regard, the study provides a detailed analysis of how core AI elements – AI-generated content, chatbot AI, and trust in AI – affect consumer purchase attitudes depending on demographic variables such as age, gender, education, and income. It also contributes by offering practical recommendations on how businesses can effectively utilize AI tools in their marketing and sales strategies. The primary objective of this study is to identify, based on both theoretical and empirical grounds, how AI-generated content, chatbot AI, and consumer trust in AI influence consumer purchase attitudes. Additionally, it aims to assess the interrelationships among these factors.

THEORETICAL BACKGROUND

ARTIFICIAL INTELLIGENCE IN DIGITAL MARKETING

The introduction of Artificial Intelligence in marketing is an innovative technological solution aimed at automating marketing activities and making them more efficient and customer-centric. AI utilizes technologies such as machine learning, algorithms, and data mining to analyze consumer behavior and market data, enabling businesses to develop optimized marketing strategies, campaigns, and personalized offers and messages. As a result, organizations and service providers can better understand customer needs and make more effective marketing decisions.

AI in marketing is particularly significant because it allows businesses to make data-driven decisions. By utilizing AI technology, businesses can perform in-depth analysis on large amounts of data, providing better insights into consumer behavior, preferences, and needs. AI tools can collect information from various sources, such as previous purchases, search histories, website interactions, and social media engagement, to identify patterns in data and predict future consumer behavior. Furthermore, AI is effectively used to create personalized content that aligns with individual customer needs and interests, thereby delivering more targeted marketing messages, product recommendations, and offers. The integration of AI technologies in retail environments has been found to significantly enhance consumers' unplanned purchase intentions (Gantulga, U., & Dashrentsen, D. 2023)³.

With the ongoing development of technology and the increasing opportunities for AI in digital marketing, the potential for the future remains limitless. AI is being used

³ U. Gantulga, D. Dashrentsen, *Factors influence impulsive buying behavior*. Zeszyty Naukowe Wyższej Szkoły Humanitas Zarządzanie, 24(1), 2023, 9–25. <https://doi.org/10.5604/01.3001.0053.4041>.

more frequently for risk identification, consumer research, and aligning business operations with target customers. In digital marketing, the use of AI not only influences marketing strategies, business models, and processes but also impacts consumer behavior. The primary goal of AI in digital marketing is not to replace human involvement in crucial decisions but to create a stronger, more active digital marketing environment. This allows advertisers to quickly identify potential customer needs and adjust their AI tools in digital marketing to boost sales (Campbell, 2020)⁴.

In digital marketing, AI helps platforms like Facebook and Instagram save users time by quickly helping them find the products or services they need, making the entire experience from browsing to purchasing much more pleasant and efficient. These platforms direct users toward offers and promotions that match their needs based on detailed data analysis of user information. Additionally, AI assists marketers in identifying trends and making predictions.

AI-GENERATED CONTENT

Utilizing AI-generated content in marketing activation allows service providers to save time, produce high-quality content at low cost, and automatically generate diverse content ideas within a specific context. This leads to more efficient use of time and resources and enables faster market entry for products and services. On the consumer side, it offers engaging and appealing products and services that align closely with individual interests and preference. In recent years, the advancement of artificial intelligence has enabled the automatic generation of diverse content for marketing purposes. AI-generated content plays a significant role in enhancing communication with consumers, promoting products and services, and increasing brand value. A study by Huang and Rust (2021⁵) found that AI-generated content can enhance consumers' perception of brands and foster a more positive attitude by providing personalized and contextually relevant information. Similarly, Chatterjee et al. (2022)⁶ concluded that high-quality AI-generated content attracts consumer attention, builds trust toward brands, and stimulates purchase intention. Moreover, previous researchers noted that consumers are generally more accepting of AI-generated content when it is transparently disclosed and meets their needs (Longoni et al., 2019)⁷. However, they also warned that overly automated, emotionless content might reduce consumer trust.

⁴ C.S. Campbell, *How marketers can leverage AI*. Business Horizons. "Academy of Marketing Studies journal", 2020.

⁵ M.H. Huang, *Artificial Intelligence in Service*. "Journal of Service Research", 24(1), 2021, 3–20.

⁶ S.R. Chatterjee, *Artificial intelligence and marketing: A systematic literature review*. "Journal of Business Research", 142, 2022, 263–276.

⁷ C.B. Longoni, *Resistance to medical artificial intelligence*. "Journal of Consumer Research", 46(4), 2019, 629–650.

Based on these theoretical findings, the first hypothesis of this study is proposed as follows:

H1: AI-generated content has a positive effect on consumer purchase attitude.

CHATBOT

Chatbots are AI-powered systems that receive user inquiries, process them, and respond with relevant information. Professional chatbot services enable businesses—from retailers to service providers—to manage customer interactions quickly and efficiently without human involvement. (Dave Chaffey). Technological advances in AI have not only impacted consumers' daily lives but also significantly transformed marketing and sales strategies for businesses. One such innovation is the chatbot—a program capable of engaging with users via text or voice, responding to inquiries automatically, and operating based on AI or rule-based system. For businesses, chatbots reduce service costs, enable 24/7 customer interaction, and provide personalized product recommendations based on user data. For instance, Nike utilizes AI-powered chatbots to offer tailored suggestions aligned with customer purchase history and preferences, thereby boosting sales. AI-based chatbots have emerged as essential tools for real-time interaction with consumers, providing assistance, answering questions, and influencing purchasing decisions. These chatbots can personalize interactions based on consumer data and offer tailored recommendations. According to Sivarajah et al. (2022)⁸, the use of chatbots increases consumer awareness, accelerates decision-making, and improves the likelihood of purchase. Likewise, Ashfaq et al. (2020)⁹ found that AI chatbots enhance customer satisfaction and trust by offering friendly, consistent, and personalized communication. Therefore, the second hypothesis of this study is formulated as:

H2: AI-based chatbots have a positive effect on consumer purchase attitude.

TRUST IN AI

Trust in AI refers to the psychological willingness of consumers to rely on AI systems, services, or products, even when they have doubts or perceive certain risks (Li, 2021)¹⁰. Research suggests that marketers must consider consumer trust when utilizing AI-based decision-making systems. When consumers trust the decisions made by AI, it positively influences their purchasing decision. Studies have

⁸ U.I. Sivarajah, *The role of AI-driven chatbots in customer decision-making: A value creation perspective*. "Information Systems Frontiers", 2022.

⁹ M.Y. Ashfaq, *Chatbot service failure and recovery: How do consumers react to it?* "Journal of Retailing and Consumer Services", 57, 102221, 2020.

¹⁰ J.Z. Li, *An empirical investigation of trust in AI*. "School of Business and Management", Jilin University, Changchun, China, 2021.

shown that AI-generated recommendations have a favorable impact on consumer purchase decisions. This impact is strongly associated with trust in AI, indicating that the presence of trust significantly shapes consumer buying attitudes. Numerous studies have confirmed that trust in AI strongly influences consumers' purchasing decisions. The ability of AI to provide personalized and data-driven recommendations contributes significantly to building consumer trust (Luo, 2022)¹¹. AI-based interactions that deliver valuable information to consumers foster not only one-time purchases but also repeat buying behavior and brand loyalty (Komiak, 2020)¹². The perception that AI-enabled online stores and service platforms offer more reliable, convenient, and optimized choices enhances consumer acceptance and use of AI. This ultimately leads to increased sales and altered consumer behavior (Cicek, 2024)¹³. Trust in AI affects consumers' purchasing decisions both directly and indirectly. When consumers perceive the information provided by AI-based systems as accurate and trustworthy, they are more likely to form positive attitudes toward the products and services and increase their likelihood of purchasing.

Consumer trust in artificial intelligence is a key factor influencing AI adoption. When consumers trust the information, advice, or recommendations provided by AI, and believe that the system ensures data security and privacy, they are more likely to act on such recommendations and proceed with purchases Gursoy et al. (2019)¹⁴. Researchers demonstrated that trust in AI significantly impacts consumer behavior, with high-trust individuals being more confident in following AI-generated suggestions and exhibiting a stronger intention to purchase. Additionally, Terres et al. (2022)¹⁵ found that when consumers perceive AI-generated product recommendations as reliable, their trust and purchase attitudes improve. Conversely, low levels of trust in AI may lead to hesitation, delays in decision-making, or complete avoidance of purchases.

Based on this reasoning, the third hypothesis is proposed:

H3: Trust in AI has a positive effect on consumer purchase attitude.

Based on above theoretical background, we proposed the following research model.

¹¹ Y. Luo, *The influence of customer trust and artificial intelligence on customer engagement and loyalty in the home-sharing economy*. "Frontiers in Psychology", 2022.

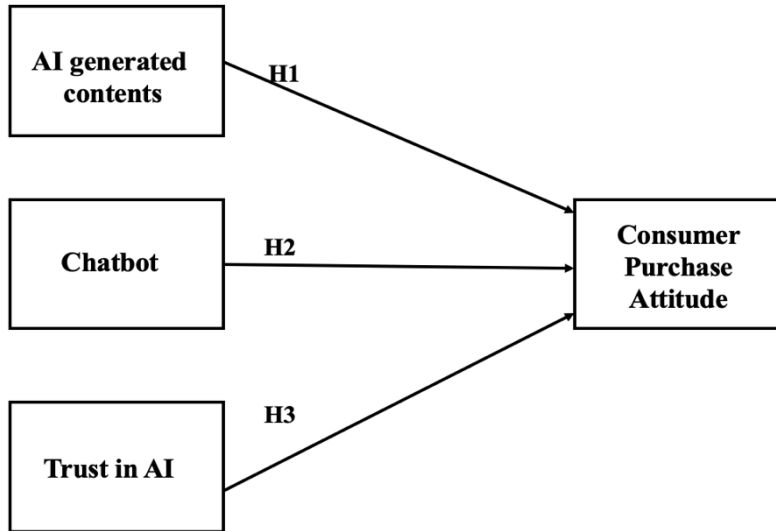
¹² S.Y. Komiak, The effects of personalization and familiarity on trust and adoption of recommendation agents, 2020.

¹³ M. Cicek, *Using the term 'artificial intelligence' in product descriptions reduces purchase intentions*. "Journal of Hospitality Marketing & Management", 2024.

¹⁴ D.C. Gursoy, *Consumers acceptance of artificially intelligent (AI) device use in service delivery*. "International Journal of Information Management", 49, 2019, 157–169.

¹⁵ L.A. Terres, *Trust in artificial intelligence: A systematic literature review*. "Technological Forecasting and Social Change", 179, 121636, 2022.

Figure 1. Research model
Rysunek 1. Model badawczy



Source: own study.

RESEARCH METHODOLOGY AND ANALYSIS

To achieve this, a quantitative research approach was employed using regression analysis, ANOVA, and T-tests to measure the relationships between the independent variables and purchasing attitudes. These techniques were chosen because they allow for the testing of statistically significant relationships and differences across demographic groups. A random sampling method was applied to select 320 participants based on age and social media activity levels, ensuring the sample was representative of active online consumers in Mongolia. This methodological approach provides robust and generalizable findings relevant for both academia and practitioners aiming to apply AI tools in similar markets.

The data was analyzed using statistical software such as SPSS, and the analysis included the following steps: Reliability analysis (e.g., Cronbach's Alpha), Factor analysis (to validate constructs), Regression analysis (to examine causal relationships), Correlation analysis (to assess the strength and direction of relationships), and T-tests (to compare group means and test hypotheses). To test the proposed hypotheses of this study, a primary survey was conducted using Google Forms during March and April of 2025. A total of 337 social media users aged 12 and above were selected through random sampling. Based on demographic statistics from January 2025, the population of Ulaanbaatar aged between 12 and 65 was

estimated at 1,699,000, of which approximately 81% (1,376,190 individuals) were active users of Facebook and other social media platforms. This figure was considered as the target population of the study. The required sample size was calculated to be 384 using the following formula:

$$n = \left(\frac{Z \times s}{e} \right)^2$$

Although the ideal sample size was 384, a total of 337 responses were collected. After removing incomplete or invalid responses, 320 valid responses were analyzed. These respondents were considered representative of the target population, and the data were analyzed using SPSS version 27 to obtain the results.

To process the results of this study, various statistical analyses were conducted using the SPSS 27 software. Reliability analysis and factor analysis were first applied to examine the consistency and structure of the dataset. To test the hypotheses, regression analysis, correlation analysis, t-test, and one-way ANOVA were conducted.

RELIABILITY ANALYSIS

To assess the reliability of each variable, Cronbach's alpha coefficient values were examined. As shown in the table, all variables have Cronbach's alpha values greater than 0.8, indicating high internal consistency and suggesting that the survey items reliably measure the underlying constructs.

Table 1. Reliability analysis

Tabela 1. Analiza niezawodności

Variables	Items representing each variable in the questionnaire	N	Cronbach's α
AI generated content [Cont]	Cont. 1	4	0.901
	Cont. 3		
	Cont. 4		
	Cont. 5		
Chatbot AI [Chat]	Chat. 1	4	0.891
	Chat. 2		
	Chat. 3		
	Chat. 4		
Trust in AI [Trust]	Trust. 1	4	0.929
	Trust. 2		
	Trust. 3		
	Trust. 4		

Consumer purchasing attitude [Att]	Att. 1	4	0.943
	Att. 2		
	Att. 3		
	Att. 4		

Source: own research.

Before conducting factor analysis, the sampling adequacy was measured using the Kaiser-Meyer-Olkin (KMO) test. A KMO value above 0.6 is considered acceptable, indicating that the sample size is sufficient to represent the population. Additionally, Bartlett's Test of Sphericity was employed to determine whether the variables used in the factor analysis are sufficiently correlated. This test examines the null hypothesis that the variables are uncorrelated in the population. A p-value less than 0.05 indicates that the correlation matrix is significantly different from the identity matrix, meaning the variables are related and suitable for factor analysis.

Table 2. KMO analysis

Tabela 2. Analiza KMO

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.946
Bartlett's Test of Sphericity	Approx. Chi-Square	4815.215
	df	120
	Sig.	0.000

Source: own research.

The findings confirm that the sample demonstrates sufficient representativeness and meets the statistical requirements necessary for conducting meaningful factor analysis.

Table 3. Correlation analysis

Tabela 3. Analiza korelaciji

Corellations		Cont_S	Chat_S	Trust_S	Att_S
Cont_S	Pearson Corellation	1			
	Sig.	<.001			
Chat_S	Pearson Corellation	0.615	1		
	Sig.	<.001	<.001		
Trust_S	Pearson Corellation	0.791	0.651	1	
	Sig.	<.001	<.001	<.001	
Att_S	Pearson Corellation	0.739	0.659	0.811	1
	Sig.	<.001	<.001	<.001	<.001

Source: own research.

This analysis aimed to determine how three independent variables — AI-generated content, AI-based chatbots, and trust in AI — affect the dependent variable, consumer purchase attitude.

From the results of the correlation analysis shown in the table, it can be observed that the dependent variable, consumer purchase attitude has a high level of significance with the independent variables AI-generated content and trust in AI.

In contrast, the AI-based chatbot shows a medium level of significance with the dependent variable. Since the „P value significance” is less than 0.05, it can be concluded that all the variables are correlated with each other.

HYPOTHESES TEST

The results of this study show that the three factors considered (AI-generated content, AI-based chatbots, and trust in AI) have a 70% positive influence on consumer purchasing behavior. This indicates that these factors significantly impact consumers' purchase decision-making. Therefore, the use of artificial intelligence technology plays a crucial role in positively influencing consumer purchasing attitude.

Table 4. ANOVA
Tabela 4. ANOVA

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	196.070	3	65.357	249.423	.000 ^b
	Residual	82.802	316	0.262		
	Total	278.872	319			
a. Dependent Variable: Att_S						
b. Predictors: (Constant), Trust_S, Chat_S, Cont_S						

Source: own research.

F-test: This test is used to determine whether the developed model is statistically significant or not. The higher the value of the F-test, the more significant the model is. In our study, the F value is 249.423, indicating that the developed model is statistically significant and that the „Impact of Artificial Intelligence on Consumer Purchasing Behavior” can be explained by this model.

Table 5. Regression analysis
Tabela 5. Analiza regresji

Coefficients ^a						
Model B		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		Std. Error	Beta			
1	(Constant)	0.315	0.136		2.320	0.021
	Cont_S	0.209	0.051	0.209	4.077	0.001
	Chat_S	0.207	0.045	0.190	4.603	0.001
	Trust_S	0.516	0.053	0.521	9.780	0.001
a. Dependent Variable: Att_S						

Source: own research.

The „t” value should be 1.96 or higher, and the „Sig.” value should be equal to or greater than 0.05. From the table, it can be seen that the values of all variables exceed these thresholds, indicating that the three independent variables have a direct correlation with the dependent variable. A T-test was conducted to determine how users of different age groups perceive AI-generated content. Participants aged 12-34 were categorized into Group 1, while participants aged 35 and above were

categorized into Group 2 for the analysis.

Table 6. Independent sample test by age group

Tabela 6. Test niezależnych prób według grup wiekowych

Independent Samples Effect Sizes					
		Standardizer ^a	Point Estimate Lower	95% Confidence Interval	
				Upper	
Cont_S	Cohen's d	0.93481	-0.123	-0.347	0.101
	Hedges' correction	0.93703	-0.123	-0.346	0.101
	Glass's delta	0.86092	-0.134	-0.358	0.091

Source: own research.

Levene's Test ($F = 4.755$, $Sig = 0.030$) indicates a variance difference, so the result of the „Equal variances not assumed” row was used. The result of the T-test ($t = -1.106$, $df = 292.831$, $p = 0.270$) shows that since the p-value is greater than 0.05, there is no statistically significant difference in the understanding of content based on age. The mean difference (Mean Difference = -0.11499) suggests a slight difference in content reception levels between the age groups, but this difference is not statistically significant. The 95% confidence interval is [-0.31966, 0.08968], and since 0 is included within this interval, it confirms that the difference is not reliable. Effect Size (Cohen's $d = -0.123$) indicates a very small effect. Age differences do not affect users' understanding of AI-generated content.

The following analysis was conducted to examine how trust in AI differs based on educational background. Respondents who selected „complete secondary education” and „other” were grouped into Group 1, while respondents with a bachelor's or master's degree were grouped into Group 2. The analysis was then carried out.

Table 7. Independent sample test by level of education

Tabela 7. Test niezależnych prób według poziomu wykształcenia

Independent Samples Effect Sizes					
		Standardizer ^a	Point Estimate Lower	95% Confidence Interval	
				Upper	
Trust_S	Cohen's d	0.92938	-0.432	-0.681	-0.183
	Hedges' correction	0.93158	-0.431	-0.680	-0.182
	Glass's delta	0.94083	-0.427	-0.681	-0.171

Source: own research.

The T-test analysis results showed that the average trust in AI differs statistically between participants with different educational levels. According to Levene's Test ($F = 0.243$, $Sig = 0.622$), there is no significant difference in variance between the two groups, so the result from the row "Equal variances assumed" was used. The T-test result ($t = -3.429$, $df = 318$, $p < 0.001$) indicates that the p-value is less than 0.05, meaning the difference is statistically significant. The mean difference (Mean Difference = -0.40183) shows that individuals with higher education levels have greater trust in AI. The 95% confidence interval is [-0.63241, -0.17126], which does not include 0, further confirming the significance of the difference. The effect size (Cohen's $d = -0.432$) indicates a medium effect (as per the interpretation: $d = 0.2$ is small, $d = 0.5$ is medium, and $d = 0.8$ is large). To further validate the results of the correlation analysis and to determine whether the research hypotheses are supported, a one-way ANOVA (Analysis of Variance) was conducted.

Table 8. One-Way ANOVA

Tabela 8. Jednoczynnikowa analiza wariancji ANOVA

Attitude Sum of Squares		One-way ANOVA				
		Df	Mean Square	F	Sig.	
Con- tent	Between Groups	160.162	16	10.010	25.550	0.001
	Within Groups	118.710	303	0.392		
	Total	278.872	319			
Chat	Between Groups	141.588	16	8.849	19.531	0.001
	Within Groups	137.284	303	0.453		
	Total	278.872	319			
Trust	Between Groups	189.205	15	12.614	42.764	0.001
	Within Groups	89.667	304	0.295		
	Total	278.872	319			

Source: own research.

The content generated by artificial intelligence was found to have a positive relationship with consumer purchase attitude, with an F-value of 25.550. Similarly, AI-based automated chatbots showed a positive influence on consumer purchase attitude with an F-value of 19.531. Most notably, trust in artificial intelligence demonstrated the strongest positive correlation with consumer purchase attitude, with an F-value of 42.764. These results are statistically significant at the 99% confidence level. Since the F-values for each variable exceed the critical value of 2.45, the research hypotheses are fully supported. H1 passed the reliability test, confirming that AI-generated content—such as images, videos, and text - captures users' attention and interest, thereby positively influencing their purchasing attitude. H2 also met the reliability criteria, indicating that AI-based automated chatbots positively influence consumer purchasing attitude by providing users with quick and efficient access to product and service information, which directly enhances the user experience. H3 passed the reliability test as well, supporting the notion that trust in AI - when AI systems are perceived as reliable, transparent, and secure - leads consumers to accept AI-based features and make purchase decisions based on insights generated by AI. This has been shown to have a positive impact on consumer purchasing attitude in this study.

CONCLUSION AND RECOMMENDATIONS

CONCLUSION

This study aimed to examine how AI-generated content, AI chatbots, and trust in AI influence consumers' purchasing attitudes. A total of 320 participants were selected through random sampling, based on age and activity level on social media. The results of the regression analysis demonstrated that the combined influence of the three independent variables explained 70.3% of the variance in consumer purchasing attitude ($R^2 = 0.703$), confirming the suitability of the selected variables. The ANOVA analysis showed that the model was statistically significant ($F = 249.423$, $p = 0.000$). Among the variables, Trust in AI had the strongest positive impact ($\beta = 0.521$, $p < 0.001$), suggesting that when consumers trust AI, they are more likely to make purchases through platforms powered by AI. Notably, consumer trust is not only relevant to AI systems but also plays a crucial role in shaping perceptions of brands, products, and services, ultimately influencing their purchase decisions. AI-generated content ($\beta = 0.209$) and AI chatbots ($\beta = 0.190$) also had statistically significant and positive effects on consumer purchasing attitudes ($p < 0.001$). T-tests and ANOVA analysis revealed that demographic factors such as gender, age, and social media usage patterns were associated with varying levels of acceptance toward AI elements. For instance, while female consumers demonstrated slightly lower trust in AI than males, they responded more positively to AI-generated content and chatbots. Additionally, T-test results showed that education level affected trust in AI, whereas age did not significantly impact attitudes toward AI-generated content. Overall, the findings indicate that the integration of AI into marketing is not only a cost-saving technological innovation but also a strategic tool that can directly influence consumer decision-making. Building consumer trust, personalizing content, and improving the quality of chatbot interactions can enhance brand loyalty and drive sales.

RECOMMENDATIONS

Based on the findings of this study, it is recommended that businesses and marketers prioritize building trust in AI systems, as this factor had the strongest positive influence on consumer purchasing attitudes. Trust can be enhanced by ensuring transparency in how AI is used, protecting consumer data, and maintaining ethical standards. Additionally, companies should invest in improving the quality and responsiveness of AI chatbots, making them more interactive, human-like, and capable of providing helpful and contextually appropriate responses. Enhancing the personalization and relevance of AI-generated content is also essential, as this can significantly increase consumer engagement and influence purchase decisions. Since

demographic factors such as gender, education level, and social media activity levels were shown to affect attitudes toward AI, businesses should tailor their AI strategies to match the preferences of specific consumer segments. For instance, emotionally intelligent content and user-friendly chatbot interfaces may be particularly effective for female consumers. Furthermore, leveraging social media as a primary channel for deploying AI tools can be a strategic advantage, given the high levels of consumer activity on these platforms. Lastly, businesses should implement continuous monitoring and feedback systems to evaluate and refine their AI applications, ensuring that they remain effective and aligned with evolving consumer expectations. By adopting these approaches, companies can maximize the strategic potential of AI in marketing and improve both consumer satisfaction and business outcome.

SUGGESTIONS FOR FUTURE RESEARCH

Since this study was limited to consumers in Ulaanbaatar, future research should include participants from rural areas. Comparative studies across industries—such as e-commerce, banking, healthcare, and education - can yield deeper insights into how AI affects consumer decisions in various sectors. To better interpret the results, qualitative methods such as interviews or focus groups should be used to capture deeper user insights. Moreover, experimental research comparing consumers who have and have not used AI services could provide more robust findings. Analyzing how demographic factors - such as gender, age, education level, income, and social media usage - affect trust in AI and purchasing attitudes may allow for more targeted segmentation and marketing strategies.

RESEARCH LIMITATIONS

Several limitations should be noted. First, data was collected over a short period using random sampling from 320 residents of Ulaanbaatar, which may limit the generalizability of the findings nationwide. Furthermore, the absence of a pre-test phase for the questionnaire may have affected the clarity, structure, and logical flow of survey items. Second, as AI-related consumer research is relatively new in Mongolia, there was a lack of prior domestic literature. The questionnaire items and measurement scales were therefore primarily adapted from international studies. While efforts were made to translate and culturally adjust the items, risks of misinterpretation due to language nuances or cultural differences remain. Third, the validity of the measurement scales within the Mongolian cultural context has not been empirically validated prior to this study. As a result, participants may have interpreted items differently, which could impact the reliability of the measurements and accuracy of the statistical findings.

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THE POTENTIAL APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN HUMAN RESOURCE MANAGEMENT

MOŻLIWOŚCI ZASTOSOWANIA SZTUCZNEJ INTELIGENCJI W ZARZĄDZANIU ZASOBAMI LUDZKIMI

Abstract: The potential applications of artificial intelligence in human resource management are vast – ranging from the automation of tasks such as recruitment and employee selection, onboarding, payroll processing, and employee documentation management to performance management, which is crucial for success in day-to-day operations. These trends point to a revolution in HRM practices. Artificial intelligence offers unparalleled opportunities for enhancing workforce management, optimizing processes, and supporting strategic decision-making. Numerous academic studies indicate a sharp increase in interest in AI applications in human resource management.

The aim of this article is to analyse the potential applications of artificial intelligence in human resource management. The paper presents the role and significance of AI in HRM, with a particular focus on the automation of HR processes. It adopts the thesis that the use of artificial intelligence can improve the effectiveness of decisions made within HR functions.

The literature review is complemented by a brief bibliometric analysis based on data sourced from the Scopus database.

Keywords: AI, artificial intelligence, HR, human resource, HRM, human resource management, machine learning

Streszczenie: Możliwości zastosowania sztucznej inteligencji w zarządzaniu zasobami ludzkimi są ogromne – od automatyzacji takich zadań, jak rekrutacja i selekcja pracowników, wdrażanie nowych pracowników, przetwarzanie listy płac, zarządzanie dokumentacją pracowniczą, po zarządzanie wydajnością zespołów, które warunkuje sukces w codziennych procesach. Trendy te wskazują na rewolucjonizującą praktyk HRM. Sztuczna inteligencja oferuje nieograniczone możliwości doskonalenia zarządzania pracownikami, optymalizacji procesów i informowania o decyzjach strategicznych. Liczne opracowania naukowe wskazują na gwałtowny wzrost zainteresowania zastosowaniami AI w zarządzaniu zasobami ludzkimi. Celem artykułu jest analiza możliwości zastosowania sztucznej inteligencji w zarządzaniu zasobami ludzkimi. Zaprezentowano w nim rolę i znaczenie sztucznej inteligencji w zarządzaniu zasobami ludzkimi. W szczególności skoncentrowano się na automatyzacji procesów zarządzania zasobami ludzkimi, przyjmując tezę, że wykorzystanie sztucznej inteligencji może poprawić efektywność decyzji podejmowanych w ramach funkcji HR. Przegląd literatury przedmiotu został wzbogacony krótką analizą bibliometryczną przygotowaną w oparciu o dane pochodzące z bazy Scopus.

Słowa kluczowe: AI, sztuczna inteligencja, HR, zasoby ludzkie, HRM, zarządzanie zasobami ludzkimi, uczenie maszynowe

INTRODUCTION

Over the past two decades, the rapid development of artificial intelligence (AI) has transformed various aspects of daily life while also significantly impacting different branches of various industries. As businesses strive to remain competitive in an increasingly digital landscape, their operations have undergone changes to integrate innovative technologies. The ways in which businesses operate have been profoundly reshaped to accommodate new methods of data-driven decision-making, automation, and process optimization across all industries. One of the most transformative impacts of machine learning-driven strategies has been felt in the field of human resource management (HRM). Nowadays, AI is a powerful tool for changing how HR functions, enabling organizations to rethink their approach to recruiting, onboarding, performance evaluation, and employee engagement.

Artificial intelligence holds immense significance in business management, which offers vast opportunities to revolutionise traditional practices¹. The impor-

¹ U. Murugesan, P. Subramanian, S. Srivastava, A. Dwivedi, *A study of Artificial Intelligence impacts on Human Resource Digitalization in Industry 4.0*, „Decision Analytics Journal” 2023, 7, p. 1-2.

tance of AI-driven approaches grow as businesses increasingly embrace data-driven decision-making². Computational intelligence is seen as a powerful instrument for reinvention of how the business sector operates. This shift has been described as a “sea change” in managing employee tasks³. Automated reasoning, in particular, holds a pivotal role that is expected to intensify, which leads to greater effectiveness, equity, and a more personalised approach within organisations⁴. Thus, AI transforms key HRM processes, which include recruitment (candidate screening, selection, interviewing), performance management, employee development and training, engagement, and strategic workforce planning. Furthermore, beyond HR, machine intelligence supports sustainability and improves ESG performance⁵.

The aim of the article is to analyse the potential applications of artificial intelligence in human resource management. The study presents the role and significance of artificial intelligence in HRM. In particular, it focuses on the automation of human resource processes, adopting the thesis that the use of artificial intelligence can enhance the effectiveness of decision-making within HR functions.

DEFINING ARTIFICIAL INTELLIGENCE

Artificial intelligence is widely described as the branch of computer science and engineering focused on creating intelligent machines, particularly intelligent computer programs that can perform tasks typically requiring human intelligence⁶. It is characterised as the study of computations which allow perception, reason and action⁷. Hence, AI can also be understood as the ability of a machine to understand, learn, and interpret on its own in a human-like manner, with the aim to understand and simulate human thought processes, and design machines that mimic this behaviour⁸. Moreover, the value of AI lies in achieving the specific goal in the shortest, most effective period possible⁹. It is essential to note the significant

² A. Batz, D. D'Croz-Barón, C.J. Vega Perez, C.A. Ojeda-Sanchez, *Integrating machine learning into business and management in the age of artificial intelligence*, 2023, p. 2.

³ M. Madanchian, H. Taherdoost, *Barriers and Enablers of AI Adoption in Human Resource Management: A Critical Analysis of Organizational and Technological Factors*, Information, 16, 2025, p. 6.

⁴ L. Ghedabna et al., *Artificial Intelligence in Human Resource Management: Revolutionizing Recruitment, Performance, and Employee Development*, 20, 2024, p. 2.

⁵ Y. Xiao, *The impact of artificial intelligence driven ESG performance on sustainable development of central state owned enterprises listed companies*, 2025, p. 16.

⁶ N. Saini, *Research paper on artificial intelligence and its applications*, „International Journal for Research Trends and Innovation” (IJRTI) 2023 8, p. 356.

⁷ N.H. Patil, S.H. Patel, S.D. Lawand, *Research Paper On Artificial Intelligence And It's Applications*, „Journal of Advanced Zoology” 2023, 8, p. 229-230.

⁸ Z. Chen, *Ethics and discrimination in artificial intelligence-enabled recruitment practices*, „Humanities and Social Sciences Communications” 2023, p. 7.

⁹ A. Radonjić, H. Duarte, *Artificial intelligence and HRM: HR managers perspective on decisiveness and challenges*, „European Management Journal” 2024, 42, p. 58.

distinction between computational intelligence and simple automation – AI necessitates machine to replicate human thinking, not just human tasks¹⁰. Ultimately, AI encompasses a spectrum of different technologies.

Machine learning (ML) is described as an area of artificial intelligence that enhances system performance through computational techniques that learn from data and are rooted in mathematics, statistics, and computer science¹¹. It involves techniques that allow machines to learn and improve from experience automatically, without explicit programming¹². Therefore, ML algorithms analyse data in mining operations to classify or predict crucial findings¹³. They allow AI to enable decision-making abilities by learning from past data and can accurately represent intricate systems by discerning patterns within extensive datasets¹⁴. Consequently, in HRM, ML applications can streamline organisational operations and improve employee experience¹⁵, being used in the areas like HR planning, talent acquisition, performance evaluation, employee performance prediction, information retrieval, and classification of HR data¹⁶.

Deep learning (DL) is a more complex form or a subset of machine learning. Thus, based on artificial neural networks (its algorithms mimic the architecture of the biological neural networks of the human brain) for predictive analysis¹⁷, DL has increasingly proven valuable in data-rich environments, demonstrating the ability of machines to replicate adaptive human decision-making¹⁸. Additionally, like ML, deep learning empowers computers to learn from data without explicit programming, enabling applications such as automated resume screening, predicting employee performance, and creating personalised development plans¹⁹.

¹⁰ J. Dima, M.H. Gilbert, J. Dextras-Gauthier, L. Giraud, *The effects of artificial intelligence on human resource activities and the roles of the human resource triad: opportunities and challenges*, *Frontiers in Psychology*, 15:1360401, 2024, p. 2.

¹¹ A. Batz, *Integrating machine learning into business...*, p. 2.

¹² N. Saini, *Research paper on artificial intelligence...*; N.H. Patil, *Research Paper On Artificial Intelligence and It's...*, p. 235.

¹³ A. Gupta et al., *Sustainable training practices predicting job satisfaction and employee behavior using machine learning techniques*, 2023, p. 1918.

¹⁴ M. Madanchian, *Barriers and Enablers of AI Adoption...*, p. 3; N.H. Patil, *Research Paper On Artificial Intelligence and It's...* p. 230.

¹⁵ M. Madanchian, *Barriers and Enablers of AI Adoption...*, p. 2.

¹⁶ A. Benaboua, F. Touhamia, *Empowering human resource management through artificial intelligence: a systematic literature review and bibliometric analysis*, „International Journal of Production Management and Engineering” 2025, 13(1), p. 64; W. Li, X. Zhou, *Machine Learning-Based Human Resource Management Information Retrieval And Classification Algorithm*, *Scalable Computing: Practice and Experience*, 25(6), 2024, p. 5435.

¹⁷ N. Saini, *Research paper on artificial intelligence...*, p. 356; N.H. Patil, *Research Paper On Artificial Intelligence And It's...*, p. 236; J. Dima, *The effects of artificial intelligence on human resource activities...*, p. 2.

¹⁸ A. Singh, A. Shaurya, *Impact of Artificial Intelligence on HR practices in the UAE*, „Humanities and Social Sciences Communications” 2021, 8(1), p. 2.

¹⁹ R. Raman, *Transformative AI in human resource management: enhancing workforce planning with topic modeling*, „Cogent Business & Management” 2024, 11(1), p. 6.

Natural language processing (NLP) is technology within artificial intelligence that enables AI systems to understand, analyse and interpret human language²⁰. Therefore, NLP for comprehending, interpreting, and altering human speech or unstructured text information found in data uses computational methods. It is useful for tasks such as analysing resumes, conducting AI-powered interviews and improving communication within organisation²¹. Thus, the common implementation is utilised in areas such as talent acquisition, recruitment, employee motivation and engagement, and employee performance prediction²². In addition, it facilitates the handling of unorganised HR information²³.

The development and evolution of AI in business context is usually referred to the historical progression and increasing sophistication of AI technologies integrated into organisational practices²⁴. While originating from early concepts that focused mainly on achieving goals in complex situations, AI has evolved beyond mechanical and repetitive tasks to encompass analytical and thinking capabilities²⁵, driven by the advancements in machine learning, deep learning, predictive analytics, and more recently, generative AI (GAI). This dynamic development is impacting businesses worldwide, enabling task automation, optimising the use of big data for enhanced decision-making, increasing efficiency and productivity, and transforming workplace structures, roles, and practices across diverse industries²⁶. Organisations are recognising the growing inevitability and strategic significance of AI for competitiveness and are compelled to adapt their operations in response to the technological development²⁷.

BIBLIOMETRIC ANALYSIS

Bibliometric analysis was conducted on April 9, 2025. A total of 457 documents were identified in the Scopus database. The first publication registered in Scopus was in 1996, authored by G. Barbaro et al., from the journal *Cardiologia* (Rome, Italy), titled '*Clinical meaning of ventricular ectopic beats in the diagnosis of HIV-related myocarditis: a retrospective analysis of Holter electrocardiographic recordings, echocardiographic parameters, histopathological and virologic findings.*'

²⁰ R. Raman, *Transformative AI in human resource management...*, p. 6.

²¹ W. Li, *Machine Learning-Based Human Resource Management Information Retrieval...*, p. 5434.

²² A. Benaboua, *Empowering human resource management through artificial intelligence...*

²³ W. Li, *Machine Learning-Based Human Resource Management Information Retrieval...*, p. 5432.

²⁴ N.H. Patil, *Research Paper On Artificial Intelligence and It's...*, p. 230; N. Nawaz, H. Arunachalam, B.K. Pathi, V. Gajenderan, *The adoption of artificial intelligence in human resources management practices*, „International Journal of Information Management Data Insights” 2024, 4(1), p. 2.

²⁵ N.H. Patil, *Research Paper On Artificial Intelligence and It's...*, p. 236-237; S. Basu, B. Majumdar, K. Mukherjee, S. Munjal, C. Palaksha, *Artificial intelligence-HRM Interactions and Outcomes: A Systematic Review and Causal Configurational Explanation*, „Human Resource Management Review” 2023, 33, p. 5.

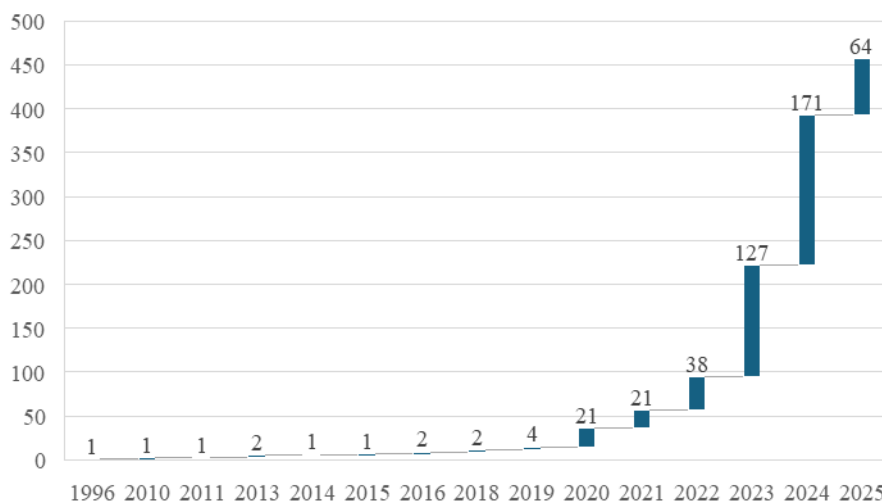
²⁶ J. Dima, *The effects of artificial intelligence on human resource activities...*, p. 8.

²⁷ N. Nawaz, *The adoption of artificial intelligence in human resources management...*, p. 2.

No records meeting the specified criteria were registered in the following years. It wasn't until 2010-2011 that one publication each appeared. From 2013 to 2018, an increase of 1-2 publications per year was noted. A significant rise in the number of publications in the database began in 2020. Substantial interest in the analysed topic occurred in 2023, showing upward trends. In the first quarter of 2025 alone, 64 records were recorded (Figure 1).

Figure 1. Number of records identified in the Scopus database in each year

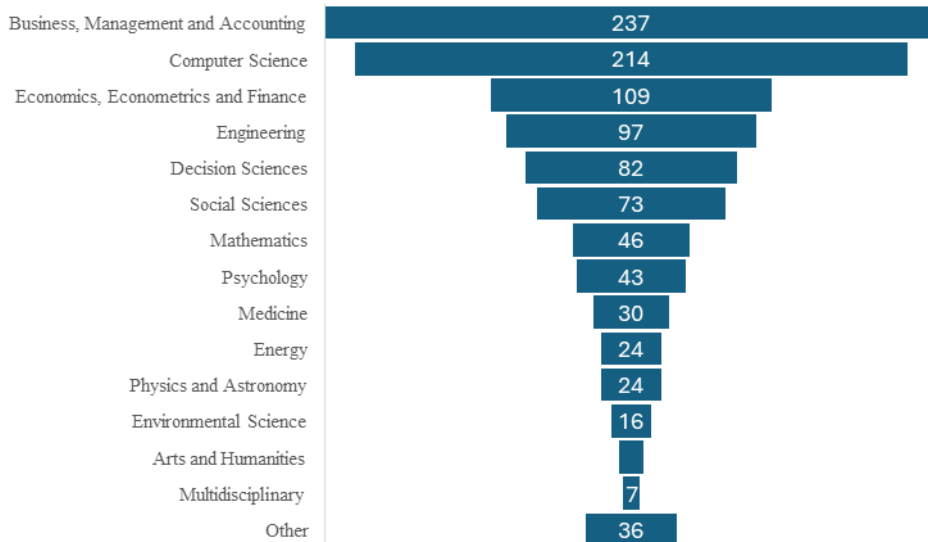
Rysunek 1. Liczba rekordów zidentyfikowanych w bazie danych Scopus w każdym roku



Source: Author's own work based on data from the Scopus database.

Analysing the structure of the identified publications in terms of the categories they belong to (Figure 2), it can be observed that the highest number of records were identified in the categories of "Business, Management and Accounting" (51.9%), "Computer Science" (46.8%), "Economics, Econometrics and Finance" (23.9%), "Engineering" (21.2%), "Decision Sciences" (17.9%), and "Social Sciences" (16.0%).

Figure 2. Number of records identified in each category in the Scopus database
 Rysunek 2. Liczba rekordów zidentyfikowanych w każdej kategorii w bazie danych Scopus



Source: Author's own work based on data from the Scopus database.

The highest number of publications in the Scopus database comes from “Lecture Notes in Networks and Systems” (5.5% of identified records), “Personnel Review” (2.6%), “Human Resource Management Review” (2.2%), and “International Journal of Human Resource Management” (1.8%).

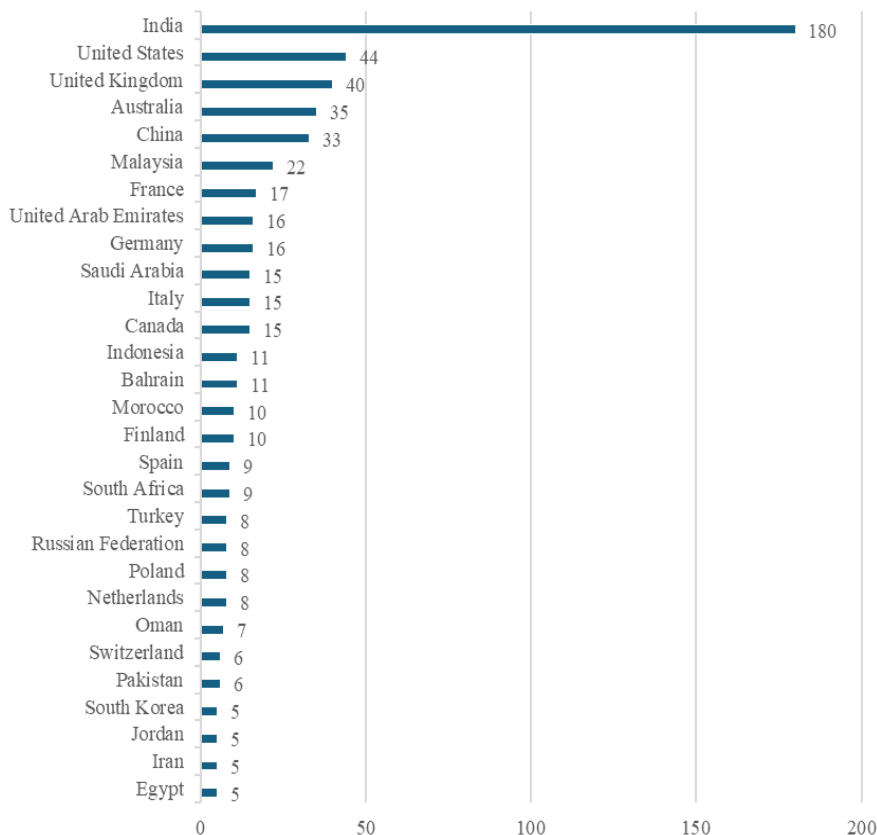
The identified records with publications predominantly come from India (39.4%), the United States (9.6%), the United Kingdom (8.8%), Australia (7.7%), and China (7.2%) – (Figure 3). Among them, the majority of publications were articles in serial publications (37.4%), conference materials (28.4%), and book chapters (22.5%).

Authors with the highest number of publications in the Scopus database include A. Malik (12 publications, accounting for 2.6% of identified records), P. Budhwar (11, 2.4%). In the next position are V. Prikshat and A. Varma (5 publications each, 1.1%).

Among the universities with the highest number of publications in the identified records are Amity University (3.3%), GLA University, Mathura (2.5%), Symbiosis International Deemed University (2.4%), The University of Newcastle, Australia (2.2%), Aston Business School (2.2%), and Aston University (2.0%).

Figure 3. Number of records identified in the Scopus database in each country

Rysunek 3. Liczba rekordów zidentyfikowanych w bazie danych Scopus w każdym kraju



Source: Author's own work based on data from the Scopus database.

PRACTICAL APPLICATIONS OF AI IN HUMAN RESOURCE MANAGEMENT (HRM)

AI-driven tools, such as applicant tracking systems and resume screening algorithms, automate the initial evaluation of candidates; while swiftly sifting through extensive applicant pools to pinpoint individuals whose qualifications align with job requirements²⁸. Moreover, there is a possibility to analyse candidate data for a prediction which candidates are most likely to succeed²⁹. Besides chatbots and virtual assistants are increasingly used for initial candidate screening, conducting prelimi-

²⁸ A. Benaboua, *Empowering human resource management through artificial intelligence...*, p.68; R. Gupta, *Impact of Artificial Intelligence (AI) on Human Resource Management...*, p. 26-27; A. Singh, *Impact of Artificial Intelligence on HR practices...*

²⁹ U. Murugesan, *A study of Artificial Intelligence impacts...*, p. 3.

nary interviews, and answering candidate questions, providing instant assistance and real-time communication. AI-powered systems also aid in evaluating candidates by providing behaviour-specific analysis or assessing verbal and non-verbal cues³⁰.

AI automates aspects of the onboarding process by providing personalized training and development programs for new hires³¹. In learning and development, AI-driven tools facilitate personalized learning plans, identify skill gaps, and recommend tailored training programs and resources based on individual employee needs and preferences³². AI also supports continuous learning and helps in re-skilling and upskilling employees³³. Computational intelligence seems to take over the tasks that are mechanical or analytical in nature.

By enabling data-driven insights, real-time feedback, and predictive analysis, AI transforms performance management. Computational intelligence-powered tools analyse employee data, including as productivity metrics and feedback, to provide continuous feedback and generate more objective and comprehensive performance evaluations compared to traditional methods. Real-time performance tracking is allowing for immediate feedback and enables HR managers to identify issues and take corrective action³⁴. Predictive analytics in performance management can forecast future performance trends and potential, aiding in decision-making regarding promotions or resource allocation³⁵.

AI is crucial for workforce planning by using predictive analytics to forecast future workforce needs and identify skill gaps. In terms of employee retention, AI algorithms analyse employee data to identify patterns and trends that may indicate low engagement or a high risk of turnover, enabling HR professionals to take proactive measures³⁶. Predictive analytics tools are used to predict employee turnover or attrition with accuracy that depends on the quality and precision of the data and

³⁰ L. Ghedabna, *Artificial Intelligence in Human Resource Management...*, p. 8.

³¹ M. Madanchian, H. Taherdoost, N. Mohamed, *AI-based human resource management tools and techniques; a systematic literature review*, „Procedia Computer Science” 2023, 229; N. Nawaz, *The adoption of artificial intelligence in human resources management...*, p. 369.

³² U. Murugesan, *A study of Artificial Intelligence impacts...*; X. Huang, F. Yang, J. Zheng, C. Feng, L. Zhang, *Personalized human resource management via HR analytics and artificial intelligence: Theory and implications*, „Asia Pacific Management Review” 2023, 28, p. 601.

³³ V. Priksat, M. Islam, P. Patel, A. Malik, P. Budhwar, S. Gupta, *AI-Augmented HRM: Literature review and a proposed multilevel framework for future research*, „Technological Forecasting & Social Change” 2023, 193, p. 6-8.

³⁴ L. Ghedabna, *Artificial Intelligence in Human Resource Management...*, p. 3; X. Huang, *Personalized human resource management via HR analytics...*, p. 601; R. Raman, *Transformative AI in human resource management...*, p. 13-14.

³⁵ E. Mask, J. Pearl, *Artificial Intelligence in Human Resources: Ethical Implications and Performance Enhancement*, „Research” 2024, p. 12; R. Gupta, *Impact of Artificial Intelligence (AI) on Human Resource Management (HRM)*, „International Journal for Multidisciplinary Research” (IJFMR), 2024, 6(3), p. 26-27.

³⁶ A. Benaboua, *Empowering human resource management through artificial intelligence...*, p. 69; U. Murugesan, *A study of Artificial Intelligence impacts...*, p. 3.

algorithms used³⁷. AI also contributes to employee engagement and satisfaction by analysing data to understand factors influencing these areas and enabling tailored support and communication.

Enhancing the overall employee experience is possible by providing tailored interactions and support across various touchpoints. AI's ability to sense, investigate, study, and operate in a personalized approach allows organizations to offer tailored support³⁸. Which includes providing personalized training programs and development paths, recommending relevant resources, offering personalized compensation and benefits packages, and providing personalized responses to employee queries³⁹. Predictive analytics contributes to enhancing the employee experience. It is done by anticipating individual needs, identifying factors influencing engagement or turnover, and enabling proactive interventions. This data-driven personalization fosters a more engaged and satisfied workforce⁴⁰.

The implementation of AI in HRM offers numerous benefits for organisations and employees alike, while revolutionising traditional practices. Furthermore, it is proven that AI technologies significantly enhance efficiency, as well as accuracy and decision-making in HR functions⁴¹, such as automating repetitive and time-consuming administrative tasks⁴². Additionally, computational intelligence enables improved data analysis and reporting, which leads to more insightful, objective and data-driven decisions among the areas covered by human resource management. One of the most important benefits in favour of integrating Intelligent Systems within organisations include cost and time savings by streamlining operations and improving resource allocation⁴³, and tailored development opportunities⁴⁴. Additionally, it assists with strategic functions like organisational network analysis, succession planning, and designing more flexible, adaptable, and inclusive structures⁴⁵, ultimately supporting organisational effectiveness, productivity and competitive advantage⁴⁶.

³⁷ R. Gupta, *Impact of Artificial Intelligence (AI) on Human Resource Management...*, p. 27.

³⁸ N. Nawaz, *The adoption of artificial intelligence in human resources management...*, p. 3.

³⁹ X. Huang, *Personalized human resource management via HR analytics...*, p. 601.

⁴⁰ R. Gupta, *Impact of Artificial Intelligence (AI) on Human Resource Management...*, p. 27.

⁴¹ U. Murugesan, *A study of Artificial Intelligence impacts...*, p. 2.

⁴² N. Nawaz, *The adoption of artificial intelligence in human resources management...*, p. 3; R. Raman, *Transformative AI in human resource management...*, p. 6; U. Murugesan, *A study of Artificial Intelligence impacts...*, p. 3.

⁴³ Z. Chen, *Ethics and discrimination in artificial intelligence-enabled...*, p. 5.

⁴⁴ R. Raman, *Transformative AI in human resource management...*, p. 10.

⁴⁵ U. Murugesan, *A study of Artificial Intelligence impacts...*, p. 3.

⁴⁶ K.D.V. Prasad, *Generative AI as a catalyst for HRM practices mediating effects of trust*, 2024, p. 2; D.E. Matytsin, "Smart" outsourcing in support of the humanization of entrepreneurship in the artificial intelligence economy, n.d., p. 2; R. Gupta, *Impact of Artificial Intelligence (AI) on Human Resource Management...*, p. 28.

FUTURE OF AI IN HRM

The future of Intelligent Systems is characterised by ongoing innovation, development and transformation⁴⁷. Research indicates a steep rise in academic interest and application of AI in HRM. Trends emerging are poised to revolutionize HRM practices, while offering unparalleled opportunities to refine workforce management, optimise processes, and inform strategic decision-making. A significant development is the mainstream emergence of generative AI (GAI), with tools like ChatGPT and Google Gemini rapidly expanding cases in business and management⁴⁸. Due to AI capabilities expansion beyond mechanical tasks to analytical and thinking capabilities, monitoring new developments and embracing AI responsibly is crucial for organizations to maintain an advantage and navigate the changing landscape.

Through automated resume screening, candidate assessment, and predicting candidate success, reducing time, effort, bias, and costs associated with manual processes, Artificial Intelligence powered tools are revolutionising HRM⁴⁹. Due to this it is enhancing efficiency, accuracy, and decision-making across various HR functions. Therefore, Machine Intelligence is crucial for talent development and retention, as it facilitates personalized learning plans, as well as it identifies skill gaps, recommends tailored training programs, and predicts employee turnover⁵⁰. By automating repetitive tasks, Computational systems free up HR professionals to focus on more strategic initiatives, human-centric endeavours, employee coaching, and fostering positive corporate culture⁵¹. Furthermore, AI-powered tools and analytics contribute to enhancing employee engagement, satisfaction, and experience through personalized communication, real-time feedback, and tailored support, ultimately supporting organizational effectiveness and productivity.

The integration of other technologies, such as Blockchain and the Internet of things (IoT) is an emerging trend in HRM. Blockchain technology holds potential for enhancing data security, enabling transparent and verifiable tracking of HR processes, which is particularly relevant given the sensitive nature of employee data handled by Intelligent Systems⁵². The Internet of things (IoT), which involves

⁴⁷ R. Raman, R. Kowalski, K. Achuthan, A. Iyer, P. Nedungadi, *Navigating artificial general intelligence development: Societal, technological, ethical, and brain-inspired pathways*, „Scientific Reports” 2025 15, p. 16; E. Mask, *Artificial Intelligence in Human Resources...*, p. 13-14.

⁴⁸ A. Batz, *Integrating machine learning into business...*, p. 10; R. Raman, *Transformative AI in human resource management...*, p. 9-10; K.D.V. Prasad, *Generative AI as a catalyst for HRM practices...*, p. 2.

⁴⁹ U. Murugesan, *A study of Artificial Intelligence impacts...*, p. 2-3.

⁵⁰ R. Raman, *Transformative AI in human resource management...*, p. 12.

⁵¹ A. Radonjić, *Artificial intelligence and HRM...*, p. 61.

⁵² E. Mask, *Artificial Intelligence in Human Resources...*, p. 12; N.H. Patil, *Research Paper On Artificial Intelligence and Its...*, p. 230.

connecting physical objects via sensors to the internet⁵³, may provide vast amounts of real-time, detailed data on employee behaviour and environmental factors.

It can be leveraged for various purposes, such as optimising workplace comfort⁵⁴, monitoring health and safety, and potentially enhancing productivity and efficiency⁵⁵. In summary, the combination of AI with IoT enables embedded analytics and predictive modelling within the interconnected workplace, while Blockchain can support ethical data management by providing robust governance frameworks⁵⁶. Future research is exploring how these innovative technologies can collectively support and maximise the potential of AI-driven HRM⁵⁷.

CHALLENGES OF AI IN HRM

The use of artificial intelligence is surrounded by major concerns of ethical considerations and bias⁵⁸. A fundamental issue is an algorithmic bias, which is situation where AI systems may inadvertently perpetuate or even amplify existing biases present in historical data, flawed software design, or designer preferences. This may lead to discriminatory outcomes in critical areas like recruitment and performance assessment. It can potentially undermine efforts toward diversity and inclusion and aggravating existing inequalities⁵⁹. Another concerning ethical challenge is the lack of transparency in many AI decision-making processes, which are referred to as “black box” problems. This term describes processes where internal mechanisms are not visible or understandable to users. In brief, these systems are described as opaque, meaning the relationship between inputs and outputs is obscured, and the rationale for a specific prediction is not given. Overall, this opacity can erode trust and accountability, making it difficult for employees to understand or challenge AI-driven decisions. To address those issues, it is needed to implement robust ethical frameworks and guidelines, include diverse and representative datasets to prevent bias, develop explainable AI models for greater transparency, and establish clear accountability mechanisms and oversight⁶⁰. In conclusion, key ethical principles like fairness and explicability are essential when integrating AI in HRM⁶¹.

⁵³ U. Murugesan, *A study of Artificial Intelligence impacts...*, p. 2.

⁵⁴ R. Raman, *Transformative AI in human resource management...*, p. 10.

⁵⁵ U. Murugesan, *A study of Artificial Intelligence impacts...*, p. 2.

⁵⁶ R. Raman, *Transformative AI in human resource management...*, p. 13.

⁵⁷ M. Madanchian, *Barriers and Enablers of AI Adoption...*, p. 11.

⁵⁸ R. Raman, R. Kowalski, K. Achuthan, A. Iyer, P. Nedungadi, *Navigating artificial general intelligence development: Societal, technological, ethical, and brain-inspired pathways*, „Scientific Reports” 2025, 15, p. 15-16; R. Gupta, *Impact of Artificial Intelligence (AI) on Human Resource Management...*, p. 28; E. Mask, *Artificial Intelligence in Human Resources...*, p. 12; A. Batz, *Integrating machine learning into business...*, p. 14.

⁵⁹ R. Raman, *Evaluating human resources management literacy...*, p. 22.

⁶⁰ E. Mask, *Artificial Intelligence in Human Resources...*, p. 14.

⁶¹ M. Madanchian, *Barriers and Enablers of AI Adoption...*, p. 12.

Computational systems necessitate extensive data collection and analysis, which introduces significant data privacy and security concerns. Particularly, AI systems in HRM handle confidential and personal employee information. Risks include questions about the extent of data collection, the security of personal information, the boundaries of data usage, the potential data breaches and misuse of data⁶². Artificial Intelligence-powered HRM systems are expanding the scope and frequency of data collection. It leads to concerns about employees potentially losing control of their information and being unaware of how their data is being gathered or used⁶³. Organizations must implement robust data protection measures, which includes secure storage, access controls, and ensures compliance with privacy regulations like GDPR, in order to safeguard employee data⁶⁴. Data privacy and security will remain paramount as AI technologies in HR develop. Similarly, the systems may be prone to errors and inaccuracies. Those can stem from flawed software design, overfitting models, or relying on biased, incomplete, or noisy data sets⁶⁵. Data quality is also a major concern, because messy data requires significant cleaning and management effort. Such errors can lead to inaccurate evaluations or predictions in areas like recruitment, performance management, or employee attrition⁶⁶. Algorithmic bias itself is considered a form of inaccuracy⁶⁷. Interoperability issues with existing HR systems and challenges in maintaining the data used to train AI models also represent practical hurdles in the effective deployment of AI in HRM⁶⁸. Addressing these issues requires ensuring data integrity, consistency, and transparency in data management and analysis procedures.

CONCLUSIONS

In conclusion, artificial intelligence (AI) is having a growing impact on human resource management (HRM), while fundamentally reshaping traditional practices through data-driven applications. This transformation is powered by various technologies, including machine learning (ML), deep learning (DL), and natural language processing (NLP). These innovations enable capabilities ranging from

⁶² E. Mask, *Artificial Intelligence in Human Resources...*, p. 10; M. Madanchian, *Barriers and Enablers of AI Adoption...*, p. 4.

⁶³ S.R. Chowdhury, S. Guha, N.L. Sanju, *Artificial Intelligence Enabled Human Resource Management: A Review and Future Research Avenues*, „Archives of Business Research” 2024, 12(6), p. 104.

⁶⁴ W. Gryniewicz, R. Zygała, A. Pilch, *AI in HRM: case study analysis. Preliminary research*, „Procedia Computer Science” 2023, 225, p. 2357.

⁶⁵ R. Gupta, *Impact of Artificial Intelligence (AI) on Human Resource Management...*, p. 7; S. Basu, *Artificial intelligence–HRM Interactions and Outcomes...*, p. 6.

⁶⁶ E. Mask, *Artificial Intelligence in Human Resources...*, p. 9.

⁶⁷ F. Diefenhardt, *Automating the managerial gaze: critical and genealogical notes on machine learning in personnel assessment*, „The International Journal of Human Resource Management” 2025, p. 7.

⁶⁸ M. Madanchian, *Barriers and Enablers of AI Adoption...*, p. 11-12.

understanding human language in texts to mimicking adaptive human decision-making. There is a reflection of this significant trend, with a rapid increase in publications noted, particularly from 2020 onwards. Especially showing interest increasing notably in 2023 and gaining further momentum in the first quarter of 2025, with key contributions from India, the United States, and the United Kingdom. This research spans multiple disciplines, notably business, management and accounting, and computer science.

The practical applications of AI in HRM are extensive and transformative, impacting recruitment and selection through automated screening, candidate prediction, and chatbots and automating and enhancing core HR processes like onboarding, training with personalized adaptive programs, and performance evaluation using real-time, data-informed feedback. Using Computational Intelligence is also crucial for workforce planning and retention by using a predictive model and for significantly enhancing the overall employee experience through personalization across various touchpoints. The widespread implementation of Machine Intelligence in HRM offers numerous benefits. Those including increased efficiency, accuracy, and data-driven decision-making, leading to cost and time savings and allowing HR professionals to focus on strategic tasks, ultimately supporting organizational effectiveness and competitive advantage.

Nevertheless, the adoption of artificial technologies in HRM presents critical challenges. One of the most significant ethical considerations is the risk of bias, which includes algorithmic bias that can perpetuate discrimination and the „black box” problem, where decision-making processes lack transparency, necessitating robust ethical frameworks and diverse data. Furthermore, the extensive data collection required introduces substantial data privacy and security risks, demanding secure storage, access controls, and compliance with regulations such as GDPR. System errors stemming from flawed design, poor data quality, and interoperability issues also pose practical hurdles. To sum up, the future of AI in HRM is dynamic, with emerging trends like Generative AI and the potential integration with technologies such as Blockchain and IoT promising further advancements in data security, transparency, and workplace insights. While challenges must be addressed, the strategic importance of AI for competitiveness compels organizations towards responsible adoption and monitoring to navigate this evolving landscape effectively.

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Aleksandra Smolarek – a student at the Silesian University of Technology, Faculty of Automatic Control, Electronics and Computer Science, majoring in Interdisciplinary Studies: Control, Electronic and Information Engineering, with a specialisation in Automatic Control. She is an active member of the 'Data Science' Student Research Group. Academic interests include the application of artificial intelligence in various industrial sectors, process optimisation and automation, as well as data analysis.

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- (C) Statistical Analysis (analiza statystyczna)
- (D) Data Interpretation (interpretacja danych)
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THE FUTURE OF INDUSTRIAL 3D PRINTING BASED ON SELECTED COMPANIES

PRZYSZŁOŚĆ PRZEMYSŁOWEGO DRUKU 3D NA BAZIE WYBRANYCH PRZEDSIĘBIORSTW

Abstract: The aim of this paper is to explore the future of industrial 3D printing based on selected companies. This project focuses on analysing, assessing and forecasting the development of 3D printing technology and identifying the impact of these changes on selected companies. The survey, conducted among companies operating in the 3D printing sector, aims to identify in detail current trends in the industrial application of this technology. The project will focus on key aspects such as new printing materials, printing technologies, applications in different industrial sectors and challenges of implementation in mass production. Based on the collected survey data, the project provides an analysis of the dynamics of industrial 3D printing, and the findings will help companies to adapt to current trends and effectively use this innovative technology to increase competitiveness in the market.

Keywords: business management, industrial production, 3D printing, SWOT analysis

Streszczenie: Celem niniejszego artykułu jest zbadanie przyszłości przemysłowego druku 3D na bazie wybranych przedsiębiorstw. Projekt ten koncentruje się na analizie, ocenie i prognozowaniu rozwoju technologii druku 3D oraz identyfikacji wpływu tych zmian na wybrane przedsiębiorstwa. Badania ankietowe, przeprowadzone wśród firm działających w sektorze druku 3D, mają na celu szczegółowe zidentyfikowanie aktualnych trendów w zastosowaniu tej technologii w przemyśle. Projekt skoncentruje się na kluczowych aspektach, takich jak nowe materiały drukarskie, technologie druku, zastosowania w różnych sektorach przemysłowych oraz wyzwania związane z wdrożeniem do produkcji masowej. Projekt w oparciu o zgromadzone dane ankietowe dostarcza analizy dynamiki rozwoju przemysłowego druku 3D, a wyniki badań pomogą przedsiębiorstwom w dostosowaniu się do bieżących trendów i efektywnym wykorzystaniu tej innowacyjnej technologii w celu zwiększenia konkurencyjności na rynku.

Słowa kluczowe: zarządzanie przedsiębiorstwem, produkcja przemysłowa, druk 3D, analiza SWOT

INTRODUCTION

3D printing, also known as additive manufacturing (AM), is an innovative technology that is transforming industry in an extremely dynamic way. The ability to create three-dimensional objects by applying layers of material opens up new perspectives for many industries. Industrial 3D printing, thanks to its versatility and growing interest, is entering the future, enabling companies to increase production efficiency, reduce costs and optimise processes.

With technological advances and growing interest in 3D printing, many companies from various industries are investing in this sector, introducing new solutions and utilising this technology in their production. These companies face many challenges and opportunities that the future of 3D printing brings. This article focuses on researching selected companies that are leaders in their fields and actively use 3D printing technology. An analysis of the current capabilities of 3D printing was conducted. Emphasis was placed on identifying the benefits that 3D printing can bring to companies, such as increased production flexibility, shorter delivery times, reduced material consumption and product customisation. In addition, the challenges that may arise, such as the costs of investing in 3D printing technology, staff training and possible technological limitations, were analysed.

The results of the research will contribute to a better understanding of the prospects for industrial 3D printing and enable companies to adapt their strategies to make appropriate use of this technology in the future. It will be possible to provide recommendations and conclusions for selected companies, which will help them plan their investments, develop implementation strategies and ensure competitiveness in the market.

INDUSTRIAL 3D PRINTING IN LITERATURE

3D printing, or additive manufacturing, is the process of producing three-dimensional objects by applying material in layers. Although 3D printing technology has become widely popular in the last decade, it has a long history dating back to the mid-1980s. 3D printing technology has its roots in the work of Charles W. Hull, who is considered the father of 3D printing. In 1984, Hull patented a process called stereolithography, which involves curing liquid plastic (light-curing resin – photopolymer) using UV radiation. This is the first 3D printing method to be patented and commercialised. The author himself still runs 3D Systems, a manufacturer of specialised 3D printing solutions¹.

In the 1980s and 1990s, 3D printing technology developed slowly, with companies such as 3D Systems and Stratasys being the most important pioneers. Over time, various 3D printing methods were introduced, such as selective laser sintering (SLS) and fused deposition modelling (FDM), which enabled printing in different materials. The development of available printing technologies is closely linked to advances in chemistry and metallurgy².

Early applications of 3D printing focused mainly on industry. Stratasys was a pioneer in the development of 3D printers for industrial applications, enabling the production of prototypes and tools in a more efficient and flexible manner. The high cost of patented solutions created a relatively closed and niche environment that was largely unknown to the general public, and technological progress was limited due to low demand and competition.

With the expiry of key patents between 2002 and 2014, interest in 3D printing methods grew. Many new companies were established, innovatively developing existing technologies and producing copies of early machines that were no longer protected by patent law. Over time, 3D printing, especially in the form of desktop 3D printers, became available not only to mega-corporations, but also to small businesses and individual users.

In recent years, there has also been a clear shift in the use of 3D printing in industry – technologies once used exclusively as a prototyping tool are now being implemented in small-batch and mass production processes, replacing conventional technologies in some applications.

Additive manufacturing technologies have been used by business and industry for many decades, but with the development of new technologies, lower costs and progress in the implementation of 'Industry 4.0', 3D printing is moving from being a curiosity or niche solution to becoming an indispensable part of business.

¹ R. Jemghili, A. Ait Taleb i K. Mansouri, *Additive Manufacturing Progress as a New Industrial Revolution*, 2021, pp. 1-2.

² Ibidem, pp. 1-6.

3D printing is an invaluable tool in the conceptual phase of a project – rapid prototyping allows solutions to be tested before mass production in a relatively quick and inexpensive manner. For salespeople, this technology makes it possible to hand over a model or prototype, which often attracts attention and interest, leading to the conclusion of a contract.

Rapid tooling is a complementary application of 3D printing to traditional manufacturing and machining methods. Printed tools, moulds and shape templates reduce production preparation time and significantly reduce the risk of costly errors. This application is not limited to prototyping (e.g. injection moulds) – modern materials have properties that allow these tools to be successfully used in series production. For example, as prototyping and manufacturing of moulds: injection moulds, casting moulds, thermoforming moulds, vacuum forming moulds, extrusion moulds, grippers and other manipulation tips for industrial robots, fastening and positioning elements for workpieces, templates, tracers, e.g. for drilling holes or bending, plugs (e.g. for protecting holes before painting), unusual machine and equipment parts.

3D printing of the above elements can offer a number of advantages over conventional solutions³:

- Cost – in the case of small production runs, manufacturing positioning or fastening elements tailored to the workpiece will be uneconomical in the case of CNC machining, especially if the production of these parts is outsourced to an external company. 3D printing will be a much cheaper solution, and the use of appropriate fasteners will increase work efficiency and prevent defects.
- Time – the lead time for custom-made industrial parts can be several weeks. The lead time for 3D printing is usually a few days, and if a company has a printer, it is possible to implement a new part for use even within a single work shift.
- Quality – typical tools made using CNC metal machining technology can damage the surface of the workpiece. Polymers used in 3D printing have lower hardness, which reduces the risk of surface scratching. Conventional solutions based on supplementing metal parts with plastic or rubber inserts are available on the market, but they are significantly more expensive and less readily available than 3D-printed parts, and at the same time they wear out relatively quickly depending on the nature of production⁴.
- Flexibility – a single 3D printer is capable of producing parts of various sizes, from different materials (including combining different materials within a single print) without the need for time-consuming retooling and reconfiguration of the machine.

³ Guide to Rapid Tooling, „Formlabs” 2022, pp. 6-15.

⁴ J. Kmošek, *3D printing in Automotive: How Škoda Auto made it*, Prusa Research, 2022, Available: https://blog.prusa3d.com/3d-printing-in-skoda-auto_73147/.

In the industrial manufacturing sector, metal printing is becoming increasingly important. Technologies such as metal powder laser printing enable the precise creation of durable, complex metal components that meet strict industry standards. The aerospace sector in particular is using 3D printing technology to produce more efficient and lightweight components. Thanks to these solutions, it is possible to reduce the weight of spacecraft, which translates into lower mission costs and increased efficiency⁵.

Manufacturers in the automotive sector are also beginning to integrate parts printed from metal powders into their production processes. Currently, this mainly concerns sports and luxury cars, but as history shows, advanced technologies eventually become commonplace in budget vehicles as well. Examples include aluminium pistons printed by MAHLE for the Porsche 911 GT2 RS and heat shields with integrated water channels fitted as standard in the Bugatti Chiron and its variants, produced in cooperation with Nikon SLM Solutions⁶.

Increasing the working areas of 3D printers enables the production of larger components, which is particularly important in industries where large components are required, such as aerospace and automotive. Particularly with regard to metal production and the increasingly larger SLS/SLM machines, an increase in demand for large-format printing is expected – one example is the American company Relativity Space, which prints parts for its rockets, including engines, on powerful machines. The company reports not only lower production costs for engines using 3D printing technology, but also their significantly lower weight compared to conventionally manufactured counterparts, and points to integrated functionalities that would be impossible to achieve with traditional manufacturing⁷.

PROSPECTS FOR THE DEVELOPMENT OF 3D PRINTING IN INDUSTRY – RESULTS OF OUR OWN RESEARCH

The development of 3D printing technology is an important area of transformation in many industrial sectors, with more and more companies realising the potential of this innovative technology. The study aimed to identify current trends, challenges and expectations related to the use of 3D printing in industry. By analysing the prospects for development, it aims to provide valuable information for

⁵ Nikon SLM Solutions, *Case Study: Monolithic Thrust Chamber*, Lübeck 2019, pp. 2-5.

⁶ Nikon SLM Solutions, *Bugatti Develops and Builds Functional Components for High-Performance Vehicles with the SLM® Additive Manufacturing Technology from SLM Solutions*, 11 03 2019 [Online]. Available: <https://www.slm-solutions.com/company/news/detail/bugatti-develops-and-builds-functional-components-for-high-performance-vehicles-with-the-slmr-additive-manufacturing-technology-from-slm-solutions/>.

⁷ A. Vance, *These Giant Printers Are Meant to Make Rockets*, Bloomberg, 18.10.2017 [Online]. Available: <https://www.bloomberg.com/news/articles/2017-10-18/these-giant-printers-are-meant-to-make-rockets>.

companies, investors and research institutions interested in the further advancement of this technology.

The study is based on questionnaires sent to a selected group of respondents. The questions cover areas related to experience in 3D printing, identification of benefits and barriers, and forecasts for the future of this technology in a given industrial sector. The survey was anonymous, and no email addresses or personal information of respondents were collected. The population to which the questionnaires were sent consisted of representatives of manufacturing companies from various industries, 3D printer manufacturers, and journalists and media professionals working in the field of 3D printing. The recipients are located all over the world, and requests to participate in the survey were sent by email or via contact forms on company websites. A total of 115 questionnaires were sent out. The survey contained 20 questions and was prepared using Google Forms in Polish and English.

An analysis of the answers to the demographic questions shows that the target population was successfully reached – the majority of respondents were people working in manufacturing companies (85% of respondents), in technical positions (50% of respondents) or in management positions (35% of respondents). Geographically, according to the location of the companies, most are based in the European Union – 70%, with 40% of them based in Poland. Outside the EU, the only region from which responses were received is North America.

Taking into account the business profile of the companies, the following companies took part in the survey:

- services – 5.0%,
- trade – 5.0%,
- manufacturing – automotive – 10.0%,
- manufacturing – industrial machinery and equipment – 35.0%,
- manufacturing – other – 40.0%,
- other – 5.0%.

The first aspect examined was the attitude of companies towards 3D printing technology. The high percentage of companies adopting this technology (80% of respondents) came as something of a surprise, although based on this data it can be concluded that its use is mainly based on rapid prototyping technologies. This largely coincides with predictions and is also supported by anecdotal observations and personal experience. In the context of Poland's position on the international technological arena, the fact that the majority of Polish companies surveyed (87%) have implemented this technology and the remaining small proportion (13%) are considering such a step can be seen as positive. In the context of the application of these technologies in mass production, as many as 70% of respondents did not consider introducing 3D printing, 30% considered it, but 15% gave up due to technical limitations and 15% gave up for economic reasons.

Another topic surveyed was the respondents' perception of the potential benefits of introducing 3D printing in mass production. The respondents noted, above all, the possibility of product personalisation (35%), and appreciated the possibility of cost optimisation (25%) and the production of complex shapes (25%). Of all the questions with the option to add your own answer, this question was the most popular – three companies took advantage of this opportunity, pointing to the repeatable quality of production and its flexibility and versatility through the printing of unavailable spare parts, which is also a frequently mentioned business model for specialised printing farms. One respondent mentioned the possibility of using recycled materials, which is true, but it is not a distinguishing feature of additive technologies.

Industrial production as a whole undoubtedly has an environmental cost, which is regulated by increasingly restrictive standards and legal requirements. As part of this process, 3D printing must also be analysed in terms of its environmental cost. Although additive technologies are by definition characterised by a low percentage of waste generated, they are not without harmful features. Both FDM and various types of stereolithography release harmful volatile organic compounds, and liquid photopolymers are overwhelmingly classified as harmful or hazardous substances. The responses of most respondents indicate an insufficient level of knowledge about the potential danger among those surveyed, and the responses were as follows:

- the introduction of 3D printing may contribute to waste reduction (50%),
- the introduction of 3D printing may have a positive impact on the environment (35%),
- production processes may have an impact on the environment (10%),
- no impact (5%).

With regard to the challenges facing industrial production using additive technologies, respondents focused on three key factors: quality, market acceptance and the cost of investing in new technologies. The detailed results are as follows:

- quality and consistency of printed products – 35%,
- market acceptance of 3D-printed products – 30%,
- investment costs in new technology – 25%,
- production speed – 5%,
- the need to adapt logistics processes – 5%.

An interesting perspective is provided by a breakdown by region and a comparison of the opinions of respondents from Poland and North America. The biggest challenges for Polish companies in introducing 3D printing are, in order: investment costs in new technology (50%), market acceptance of 3D-printed products (37%) and production speed (13%). In contrast, for North American countries, the challenges are: the quality and consistency of printed products (67%), the cost of investing in new technology (17%) and market acceptance of 3D-printed products

(16%). Companies from across the Atlantic pay much more attention to production quality, although market acceptance does not seem to be a significant problem. Operating in a much more lucrative market, these companies are also not as discouraged by investment costs as Polish companies. Among Polish companies, concerns about cost and customer reaction to printed parts dominate.

An additional measure allowing for a broader interpretation of the survey results is the assessed level of awareness of company management and employees about the potential applications of 3D printing technology, where Polish companies fall below average (Table 1).

Table 1. Level of awareness of potential applications of 3D printing technology

Tabela 1. Poziom świadomości na temat potencjalnych zastosowań technologii druku 3D

Assessment level	Level of management awareness of potential applications of 3D printing technology (percentage share)		Employee awareness of potential applications of 3D printing technology (percentage share)	
	All countries	Poland	All countries	Poland
Tall	35,00	13,00	20,00	25,00
Average	35,00	50,00	50,00	38,00
Low	30,00	37,00	30,00	37,00

Source: own study.

The level of awareness among Polish management regarding the potential applications of 3D printing technology ranges from moderate to low, with all other countries surveyed performing significantly better. The situation is similar when looking at the level of awareness among employees on this topic.

CONCLUSIONS

The future of 3D printing in industry promises a revolution in manufacturing processes and gradual changes that will ultimately revolutionise the approach to manufacturing. We are currently witnessing the dynamic development of this technology, and forecasts suggest that its impact will be even more significant in the coming years. One of the key areas of development is the gradual replacement of traditional manufacturing methods with 3D printing.

One of the most promising aspects is the flexibility that 3D printing brings to manufacturing processes. Instead of using injection moulds, which are expensive and time-consuming to produce, companies can now quickly and economically create prototypes and finished products using 3D printing technology. This flexi-

bility allows production to be tailored to individual customer needs, which is particularly valuable in the era of product personalisation.

The ecological dimension of 3D printing also plays a key role in industry. The process generates significantly less waste than traditional manufacturing methods, which is in line with the growing interest in sustainable development. Waste reduction and raw material consumption are becoming a priority for companies and an important image factor, and 3D printing allows them to effectively achieve these goals.

From an economic perspective, 3D printing can significantly change the face of manufacturing. Reducing the costs associated with injection moulds, storage and transport of finished moulds can contribute to lower production costs. In addition, innovative applications of 3D printing in the creation of custom components and parts can open up entirely new markets and business opportunities.

Industrial 3D printing is thus becoming not only a production tool, but an integral part of the transformation of the entire sector. As the technology continues to evolve, we can expect to see an increase in the use of 3D printing in various industries, making it a key element in the strategies of companies striving for efficiency, flexibility and sustainability. Ultimately, the future of 3D printing in industry heralds a new era of manufacturing, where innovation, personalisation and environmental concerns will drive the design of products and production processes.

The development of 3D printing technology in industrial applications does not, of course, mean the end and automatic replacement of existing manufacturing methods. Additive techniques will take their place, complementing classic methods with their capabilities, just as they have their own unique set of risks and limitations.

On an economic scale, it is not possible to produce, for example, thin-walled components using currently available methods, especially small components that are subject to certain loads, such as electrical connectors in the automotive sector. With the current state of technology, it will of course still be more economical to use injection moulds for the production of unchanging components in multi-million quantities.

Investing in 3D printing requires a change in the way we design and certain sacrifices. It is a long-term investment that initially requires greater expenditure and carries the risk of failures, which are expected and necessary in order to develop standards and methodologies. It is a relatively new technology, and attempts to apply it on an industrial scale date back only 5-10 years, with realistic possibilities for use in mass production (e.g. in series of 25,000 pieces) only recently becoming effective and economical.

Most printing technologies also require additional processing after printing, which significantly increases manufacturing costs. Only in the case of FDM technology is this avoidable in most cases, but a new approach to design is required. Staff experienced in designing injection moulds or subtractive manufacturing will have to be thoroughly trained and gain new experience in this manufacturing

technology, and new design standards and appropriate training courses will be necessary.

Another obstacle unique to FDM is the raw material. While individual customers are unlikely to have problems sourcing a roll of polymer that meets their requirements, professional manufacturers who consume many tonnes of material have major problems with stocking up, despite the fact that the material used in the manufacturing process is exactly the same as that used in injection moulding, and filament production is a technologically simple process that has been known for decades. Effectively, FDM and injection moulding use the same two raw materials: plastic and electricity, so the cost of producing a single part should be similar, which is not currently the case. One of the reasons for this state of affairs is the focus of filament manufacturers on retail customers who will pay for the goods with a large margin imposed, which is much more lucrative than trading with large customers at wholesale prices, especially since in most cases, especially with manufacturers producing high-quality material, the demand from individual customers is so large that they sometimes have problems maintaining stock levels and constant availability of the full range of products offered. In addition, many filament manufacturers do not find it profitable to invest in maintaining strict quality standards. If the filament is of good quality and the customer buys, for example, one spool per quarter for their own use, they will most likely not notice minor deviations in the shade of color, gloss and other properties. For a manufacturing company ordering thousands of identical parts, this can already be a huge problem – it will be much easier to notice differences between individual elements from a large production series, which may be unacceptable from the point of view of quality control of the final product and even lead to the need to dispose of part of the production. A certain solution for farms may be the production of their own filament, which, however, requires significant investments, employment of specialized personnel, and causes a loss of focus. Nevertheless, companies such as Prusa Research or Slant 3D have decided to make such investments, replacing part of the purchased raw material with their own production. Another solution for FDM technology is printers with a pellet feeder, but this is a much more expensive solution, less scalable and intended mainly for large-format printers. The material in such a situation is the same raw material that is the input in the production of injection molds.

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- (D) Data Interpretation (interpretacja danych)
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THE ROLE OF EMOTIONAL INTELLIGENCE IN CAREER SUCCESS: RESEARCH STUDY

ROLA INTELIGENCJI EMOCJONALNEJ W OSIĄGANIU SUKCESU ZAWODOWEGO: BADANIE EMPIRYCZNE

Abstract: Emotional intelligence (EI) plays a crucial role in various aspects of human functioning, including professional development and career achievement. However, there is not much research conducted in this respect in Poland. Therefore, the aim of this study is to investigate the relationship between emotional intelligence and career success among Polish employees. The study involved 124 participants (94 women and 30 men). Emotional intelligence was assessed using the Trait Emotional Intelligence Questionnaire – Short Form (TEIQue-SF) consisting of four subscales: well-being, self-control, emotionality, and sociability. Career success was measured with the Minnesota Satisfaction Questionnaire (MSQ), assessing external and internal career success. The results revealed a positive, however moderate, correlation between emotional intelligence and career success ($r=.40$; $p < .01$).

Regression analysis further revealed that only well-being, one of the components of emotional intelligence, turned out to be statistically significant predictor of overall career success. Additionally, individuals in managerial positions demonstrated higher levels of emotional intelligence, particularly in the sociability dimension. Some gender and age differences were also observed in the studied measures. The findings support the relevance of emotional intelligence in career development. Further research with a larger and more diverse sample is recommended to validate these results.

Keywords: emotional intelligence, career success, job satisfaction, gender differences, managerial roles

Streszczenie: Inteligencja emocjonalna (IE) odgrywa kluczową rolę w różnych aspektach funkcjonowania człowieka, w tym w rozwoju zawodowym i osiąganiu sukcesów w karierze. Jednakże w Polsce przeprowadzono dotąd niewiele badań w tym zakresie. Celem niniejszego badania było zatem zidentyfikowanie związku między inteligencją emocjonalną a sukcesem zawodowym wśród polskich pracowników. W badaniu wzięło udział 124 uczestników (94 kobiety i 30 mężczyzn). Inteligencja emocjonalna została oceniona za pomocą Kwestionariusza Inteligencji Emocjonalnej jako Cechy – Wersja Skrócona (TEIQue-SF), który obejmuje cztery podskale: dobrostan, samokontrolę, emocjonalność oraz towarzyskość. Sukces zawodowy mierzono przy użyciu Minesockiego Kwestionariusza Satysfakcji z Pracy (MSQ), który ocenia sukces zawodowy wewnętrzny i zewnętrzny. Wyniki ujawniły pozytywną, choć umiarkowaną korelację pomiędzy inteligencją emocjonalną a sukcesem zawodowym ($r = 0,40$; $p < 0,01$). Analiza regresji wykazała ponadto, że jedynie dobrostan – jeden z komponentów inteligencji emocjonalnej – okazał się statystycznie istotnym predyktorem ogólnego sukcesu zawodowego. Dodatkowo osoby zajmujące stanowiska kierownicze wykazywały wyższy poziom inteligencji emocjonalnej, szczególnie w zakresie towarzyskości. Zaobserwowano również pewne różnice ze względu na płeć i wiek wśród badanych. Uzyskane wyniki potwierdzają znaczenie inteligencji emocjonalnej w rozwoju kariery zawodowej. W celu weryfikacji tych wyników zaleca się przeprowadzenie dalszych badań z udziałem większej i bardziej zróżnicowanej próby.

Słowa kluczowe: inteligencja emocjonalna, sukces zawodowy, satysfakcja z pracy, różnice płciowe, rola kierownicza

INTRODUCTION

Career success has become one of the most highly valued priorities in contemporary society. Modern culture increasingly promotes the pursuit of self-fulfilment and the achievement of successive career milestones¹. A dynamic, market-driven society drives individuals to engage in constant competition and strive for success. Those who achieve it are often perceived as successful people and role models².

¹ A. Cybal-Michalska, *Świat, w którym „kariera robi karierę”. O satysfakcji z kariery i poczuciu zawodowego sukcesu*, Wydawnictwo Naukowe UAM, Poznań 2013; T. Kupczyk, *Uwarunkowania sukcesów kadry kierowniczej w gospodarce opartej na wiedzy*, Difin, Warszawa 2009.

² F. Bylok, *Wzór sukcesu w społeczeństwie polskim w okresie transformacji społeczno-ustrojowej*, „Anales. Etyka w życiu gospodarczym” 2005, no. 8(1), pp. 87–96.

Researchers argue that in such a competitive environment, one of the key advantages over rivals can be a high level of emotional intelligence³. This concept emerged in the literature relatively recently⁴ and has quickly gained widespread attention. Over the past two decades, emotional intelligence (EI) has appeared in numerous scientific articles, psychology textbooks, and even popular media, including comics⁵.

Goleman, a pioneer in applying emotional intelligence to the workplace, argued that it plays a more critical role in professional success than cognitive intelligence (IQ)⁶. There are a significant number of academic studies that confirm the positive influence of emotional intelligence on career outcomes⁷. However, there is limited evidence within the Polish context. Therefore, this study proposes the following hypothesis:

H1. There is a positive correlation between emotional intelligence and career success.

Firstly, this study aims to contribute to the existing body of knowledge by providing empirical evidence from Poland, representing different cultural and socio-economic contexts. Secondly, given the growing importance of career success among young Poles⁸, the topic seems particularly important for understanding the role of EI in shaping career outcomes. Furthermore, from an economic perspective, the growing importance of career development is favourable for the Polish economy as labour is considered one of the key drivers of the country's economic growth and development⁹. As reported by EY, labour productivity in Poland, measured as GDP per hour worked, has increased by 9.6% over the last five years and will continue rising¹⁰. Therefore, examining the correlation between emotional intelligence and

³ A. Matczak, K.A. Knopp, *Znaczenie inteligencji emocjonalnej w funkcjonowaniu człowieka*, Liberi Libri, Warsaw 2013.

⁴ J.D. Mayer, P. Salovey, *Emotional intelligence*, "Imagination, Cognition, and Personality" 1990, vol. 9(3), pp. 185-211.

⁵ D. Szczygieł, A. Jasielska, A. Wytykowska, *Psychometric properties of the Polish version of the Trait Emotional Intelligence Questionnaire - Short Form*, "Polish Psychological Bulletin" 2015, vol. 46(3), pp. 447-459.

⁶ D. Goleman, *Inteligencja emocjonalna*, Media Rodzina, Poznań 1995.

⁷ V. Jain, S. Jain, P. Rastogi, *An analysis of the role of emotional intelligence in career success in commercial banks of India*, "Revista ESPACIOS" 2020, vol. 41(05); . Poon, *Career commitment and career success: Moderating role of emotion perception*, "Career Development International" 2004, vol. 9(4), pp. 374-390; I. Urquijo, N. Extremera, G. Azanza, *The contribution of emotional intelligence to career success: Beyond personality traits*, "International Journal of Environmental Research and Public Health" 2019, vol. 16(23), <https://doi.org/10.3390/ijerph16234809>.

⁸ E. Krause, *Kariera zawodowa i jej znaczenie dla młodych dorosłych – komunikat z badań*, "Szkoła – Zawód – Praca" 2023, nr 25(1), s. 408-443.

⁹ A. Szymczak, M. Gawrycka, *Praca jako dobro indywidualne i społeczne*, "ICM.edu.pl" 2015, https://cejsh.icm.edu.pl/cejsh/element/bwmeta1.element.desklight-0a3daabc-28f4-40f5-8298-8127df0cb-b08/c/22_04.pdf [accessed: 2.04.2025].

¹⁰ M. Wierzychowska, *EY prognozuje, że do 2027 roku produktywność w Polsce będzie nadal rosła w relatywnie szybkim tempie*, "EY", 13 March 2025, https://www.ey.com/pl_pl/newsroom/2025/03/produktywnosc-polska-ey [accessed: 2.04.2025].

career success seems to be a particularly important topic. Higher productivity may depend not only on technical skills, but also on emotional competencies such as adaptability, collaboration, and effective leadership in dynamic work environments.

LITERATURE REVIEW

CAREER SUCCESS: THEORETICAL FOUNDATIONS

The concept of career success is characterized by its subjective and interdisciplinary nature, which has led to the emergence of numerous definitions. Seibert et al. define career success as the cumulative result of behaviours aggregated over a relatively long period¹¹. This definition highlights two important characteristics of the concept. First, it is interpreted as the outcome of long-term actions rather than single achievements. Second, it applies to any individual who holds a job, regardless of their field of activity¹².

Judge et al. describes career success as actual or perceived career-related accomplishments acquired during the span of a professional career¹³. This distinction between actual and perceived accomplishments forms the basis for the differentiation between objective and subjective career success¹⁴. Hughes defines objective career success as “real achievements,” which are observable, measurable, and verifiable by others¹⁵. In contrast, subjective career success is characterized as “perceived achievements,” reflecting an individual’s evaluation of their career experiences. Objective career success is typically measured by indicators such as salary, the number of promotions and social status¹⁶. Subjective career success, on the other hand, is often conceptualized as an individual’s satisfaction with their current employment or with the trajectory of their career to date¹⁷. The relationship between objective and subjective career success has been widely examined, with numerous studies¹⁸ reporting a positive correlation between these two dimensions.

¹¹ S.E. Seibert, J.M. Crant, M.L. Kraimer, *Proactive personality and career success*, „Journal of Applied Psychology” 1999, vol. 84(3), p. 416–427.

¹² M. Pietruszewski, *Wskaźniki sukcesu zawodowego i ich operacjonalizacja w praktyce badawczej*, „Humanizacja Pracy” 2015, nr 279, p. 169–182.

¹³ T.A. Judge, D.M. Cable, J.E. Boudreau, R.D. Bretz, *An Empirical Investigation of the Predictors of Executive Career Success*, „Personnel Psychology” 1995, vol. 48, no. 3, p. 485–519.

¹⁴ A.E. Abele, D. Spurk, J. Volmer, *The construct of career success: Measurement issues and an empirical example*, „Zeitschrift für Arbeitsmarktforschung” 2011, vol. 43, no. 3, pp. 195–206, <https://doi.org/10.1007/s12651-010-0034-6>.

¹⁵ E.C. Hughes, *Men and their work*, Free Press, New York 1958.

¹⁶ P. Heslin, *Self- and other-referent criteria of career success*, „Journal of Career Assessment” 2003, vol. 11(3), p. 262–286.

¹⁷ J. Poon, *Career commitment and career success...*; S.E. Seibert, J.M. Crant, M.L. Kraimer, *Proactive personality and career success...*, p. 420.

¹⁸ A.E. Abele, *The construct of career success...*, p. 195–206; T.A. Judge, *An Empirical Investigation...*,

Etymologically, the word “success” derives from the Latin term *successus*, which means a favourable outcome, triumph, accomplishment, or achievement¹⁹. It is often associated with the realization of goals²⁰, effectiveness²¹, as well as wealth, prestige, and fame²². Pietruszewski²³ points out that the concept of success is broader than the concept of career success. However the latter seems to be the dominant element of the former. Kupczyk²⁴ also highlights that career success can be interpreted through various academic disciplines, such as management, psychology, sociology, and economics. As a result, its meaning may vary depending on the disciplinary perspective.

Numerous scientific studies have indicated that success is frequently linked with professional career achievements. One study conducted by Firkowska-Mankiewicz²⁵ found that Poles most often associated success with material aspects (47.5%), professional achievements (28.6%), self-fulfilment (27.7%), and family life (26.5%). Another study carried out by Byłok²⁶ reported that 49% of Poles identified professional careers as the primary source of success in their lives. It may be noted that over the few years between the two studies, the position of work as a key source of success has increased. This trend may be attributed to the consolidation of the market economy in Poland, where society places a growing emphasis on career achievement²⁷.

This shift is reflected in a recent study conducted by Krause²⁸, which examined perceptions of career success among young Poles aged 18-36. The study found that for 65% of respondents, career success was considered one of the most important values in their lives. Interestingly, most young women associated career success primarily with material aspects: financial independence (90,6%), followed by self-fulfilment and satisfaction (78.1%). This emphasis may reflect the unfavourable economic conditions affecting women in Poland. According to the *Global Gender Gap Report 2024*, Poland ranked 75th out of 156 countries, indicating a substantial disparity in earnings between men and women.

p. 485-519; S.E. Seibert, J.M. Crant, M.L. Kraimer, *Proactive personality and career success...*, p. 425.

¹⁹ J. Tokarski, *Słownik wyrazów obcych*, PWN, Warszawa 1980, p. 573.

²⁰ A. Cybal-Michalska, *Świat, w którym „kariera robi karierę”...*, p. 25.

²¹ J.C. Maxwell, *Leadership 101: What Every Leader Needs to Know*, Thomas Nelson, Nashville 1994.

²² T. Kupczyk, *Uwarunkowania sukcesów...*, p. 33.

²³ M. Pietruszewski, *Wskaźniki sukcesu zawodowego...*, p. 172.

²⁴ T. Kupczyk, *Uwarunkowania sukcesów...*, p. 33.

²⁵ A. Firkowska-Mankiewicz, *Czym jest sukces życiowy dla współczesnego Polaka? Kontekst socjodemograficzny i psychologiczny*, [in:] H. Domański, A. Rychard (eds.), *Elementy nowego ładu*, Wydawnictwo Instytutu Filozofii i Socjologii PAN, Warszawa 1997, p. 304–305.

²⁶ F. Byłok, *Wzór sukcesu...*, p. 90.

²⁷ M. Pietruszewski, *Wskaźniki sukcesu zawodowego...*, p. 172.

²⁸ E. Krause, *Kariera zawodowa...*, p. 413.

EMOTIONAL INTELLIGENCE: CONCEPT AND ORIGINS

The concept of emotional intelligence (EQ – “emotional intelligence quotient”, also known as EI – “emotional intelligence”) was introduced in academic literature by Mayer and Salovey in 1990. They defined it as a set of competencies enabling individuals to recognize, understand, and manage their own and other people’s emotions²⁹. Although these researchers pioneered the conceptualization of emotional intelligence, its roots can be traced back to the 1920s. In that period, Edward Thorndike introduced the concept of “social intelligence” as the ability to establish and maintain close relationships with others³⁰. In the following years, psychologist Howard Gardner distinguished between “interpersonal intelligence” and “intrapersonal intelligence”. The former refers to understanding other people’s intentions, motivations, and desires. The latter involves self-awareness of one’s own emotions, desires, and fears, which enables individuals to manage their lives more effectively³¹.

Since then, emotional intelligence has been conceptualized in various ways by numerous researchers. For example, Bar-On defines it as a range of emotional and social competencies that influence individuals’ ability to cope with everyday demands³². Those competencies include interpersonal skills, adaptability, and stress management.

Goleman refers to emotional intelligence as “a fundamental skill of the human heart” emphasizing its importance in creating a happier, more empathetic, and kinder society³³. Emotional intelligence is a strong predictor of mental and physical health³⁴. Higher EI is associated with lower stress, greater life satisfaction, and better well-being³⁵. Individuals with high EI cope more effectively with stress and social pressure, showing greater optimism and emotional resilience³⁶.

²⁹ J.D. Mayer, P. Salovey, *Emotional intelligence*, „Imagination, Cognition, and Personality” 1990, vol. 9(3), p. 185–211; J.D. Mayer, P. Salovey, *What is emotional intelligence?*, [in:] P. Salovey, D. Sluyter (eds.), *Emotional development and emotional intelligence: Educational implications*, Basic Books, New York 1996, p. 3–31.

³⁰ K.V. Petrides, *Ability and Trait Emotional Intelligence. History and Background*, 2011, <https://psychometriclab.com/adminsdata/files/Trait%20EI%20-%20HID.pdf> [accessed: 5.04.2025].

³¹ Ibidem, p. 656.

³² R. Bar-On, *Emotional Quotient Inventory (EQ-i): Technical Manual*, Multi-Health Systems, Toronto 1997.

³³ D. Goleman, *Inteligencja emocjonalna...*, p. 4.

³⁴ J. Sadowska, J. Brachowicz, *Znaczenie inteligencji emocjonalnej w funkcjonowaniu człowieka*, „Przegląd Psychologiczny” 2008, nr 51(1), p. 55–70; M. Moroń, K. Biolik-Moroń, *Trait emotional intelligence and emotional experiences during the COVID-19 pandemic outbreak in Poland: A daily diary study*, „Personality and Individual Differences” 2021, vol. 168, p. 110348.

³⁵ R. Bar-On, J. M. Brown, B. D. Kirkcaldy, E. P. Thomé, *Emotional expression and implications for occupational stress: An application of the Emotional Quotient Inventory (EQ-i)*, „Personality and Individual Differences” 2000, vol. 28(6), pp. 1107–1118.

³⁶ R. Gabel-Shemueli, S.L. Dolan, J.L. Cerdin, *Emotional intelligence as predictor of cultural adjustment for success in global assignments*, „Career Development International” 2005, vol. 10(5), p. 375–395; J.D. Mayer,

Self-confidence, ambition, perseverance in pursuing goals, and a creative approach to failures – characteristics of emotionally intelligent individuals – provide a competitive advantage in the job market³⁷. Numerous scientific studies³⁸ have demonstrated that emotionally intelligent individuals achieve greater success in their professional careers. For example, Jain et al. found that emotional intelligence significantly predicts career success among employees of major Indian banks³⁹. Similarly, Poon showed that emotion perception moderates the link between work engagement and salary, highlighting its key role in career success⁴⁰. From an academic perspective, Khassawneh et al. found that emotional intelligence significantly affects professors' performance in higher education and is linked to student outcomes⁴¹.

Not only does emotional intelligence help to maintain inner well-being, but it can also prevent psychological disorders and addictions⁴². For example, one study found a positive correlation between low EI and self-harming tendencies among 490 high school students. The likelihood of self-harm reached 75% for those scoring below 2.47 on the TEIQue, compared to 25% for those scoring above 4.50⁴³.

THE IMPACT OF EI ON LEADERSHIP

The literature highlights a positive correlation between managers' emotional intelligence and both project success and subordinates' performance. For example, a study conducted by Acheampong et al. found that employing managers with high EI can substantially increase the effectiveness of the project by 50,7%⁴⁴. However, the authors pointed out that the research was performed in Ghana, and the findings should be only interpreted within the country's context, which limits the generalisability of the results.

P. Salovey, D. Caruso, L. Cherkasskiy, *Emotional intelligence*, [in:] R.J. Sternberg, J. Kaufman (eds.), *The Cambridge handbook of intelligence*, Cambridge University Press, Cambridge 2011, p. 528–549.

³⁷ D. Goleman, *Inteligencja emocjonalna...*, p. 56.

³⁸ V. Jain, *An analysis of the role...*; J. Poon, *Career commitment and career success...*; T. Kupczyk, *Uwarunkowania sukcesów...*; A.E. Sękowski, E.M. Sitko, *Inteligencja emocjonalna i motywacja osiągnąć u kobiet na stanowiskach kierowniczych*, „Psychologia – Edukacja i Społeczeństwo” 2018, nr 10(2), p. 17–28.

³⁹ V. Jain, *An analysis of the role...*, p. 5.

⁴⁰ J. Poon, *Career commitment and career success...*, p. 384

⁴¹ O. Khassawneh, T. Mohammad, R. Ben-Abdallah, S. Alabidi, *The relationship between emotional intelligence and educators' performance in higher education sector*, “Behavioral Sciences” 2022, vol. 12(12), p. 511, <https://doi.org/10.3390/bs12120511>.

⁴² A. Matczak, *Inteligencja emocjonalna – kierunki i metody badań*, „Psychologia, Edukacja i Społeczeństwo” 2007, nr 4; J. Sadowska, J. Brachowicz, *Znaczenie inteligencji emocjonalnej...*, p. 55–70.

⁴³ K.V. Petrides, *Ability and Trait Emotional Intelligence...*, 2011 [accessed: 5.04.2025].

⁴⁴ A. Acheampong, D.G. Owusu-Manu, E. Kissi, P.A. Tetteh, *Assessing the influence of emotional intelligence (EI) on project performance in developing countries: The case of Ghana*, „International Journal of Construction Management” 2021, p. 1–11, <https://doi.org/10.1080/15623599.2021.1958279>.

Similarly, a study performed by Rezvani et al. found that the emotional intelligence of project managers has a significant positive impact on project success⁴⁵. Specifically, the research revealed that emotionally intelligent project managers were more likely to create an environment of trust and satisfaction within their teams, which led to better project outcomes.

Another study reviewed research conducted between 2010 and 2017 on nurse leaders' emotional intelligence⁴⁶. The author concludes that emotional intelligence competencies – particularly interpersonal skills and stress management – are crucial for effective leadership in the healthcare environment.

Furthermore, Lima and Silva explored the mediating effect of interpersonal skills on project success⁴⁷. Their study suggests that while emotional intelligence alone may not directly result in project success, it significantly enhances project managers' interpersonal skills. This, in turn, leads to fostering a supportive and productive work atmosphere – critical for achieving project goals.

In Poland, one study conducted by Sękowski and Sitko found that female leaders demonstrated higher levels of self-confidence, perseverance, flexibility, and a greater ability to take ownership in comparison to their subordinates⁴⁸. These findings suggest that emotional intelligence may contribute significantly to leadership qualities, enabling individuals to exhibit behaviours that enhance their effectiveness in leadership roles.

Finally, Maldonado and Márquez reviewed 104 scientific articles published between 1998 and 2022 on the topics of emotional intelligence, leadership, and teams⁴⁹. They found that leaders' emotional intelligence positively influences both team performance and business outcomes. It is worth noting that none of these studies focused on the Polish context.

To summarize, the relationship between emotional intelligence and career success has been extensively examined in the literature. However, a noticeable research gap remains within the Polish context. This is particularly relevant, as career success is currently regarded as one of the most important life goals for many Poles⁵⁰.

⁴⁵ A. Rezvani, A. Chang, A. Wiewiora, N.M. Ashkanasy, P.J. Jordan, R. Zolin, *Manager emotional intelligence and project success: The mediating role of job satisfaction and trust*, „International Journal of Project Management” 2016, vol. 34(7), p. 1112–1122, <https://doi.org/10.1016/j.ijproman.2016.05.012>.

⁴⁶ P.E. Prezerakos, *Nurse managers' emotional intelligence and effective leadership: A review of the current evidence*, „The Open Nursing Journal” 2018, vol. 12(1), p. 86–92, <https://doi.org/10.2174/1874434601812010086>.

⁴⁷ L.F. Lima, F.Q. Silva, *Emotional intelligence and success of project management: The mediating effect of interpersonal skills*, „International Journal of Project Organisation and Management” 2020, vol. 12(1), p. 54, <https://doi.org/10.1504/ijpom.2020.105714>.

⁴⁸ A.E. Sękowski, E.M. Sitko, *Inteligencja emocjonalna i motywacja osiągnieć...*, p. 17–28.

⁴⁹ I.C. Maldonado, M.D.B. Márquez, *Emotional intelligence, leadership, and work teams: A hybrid literature review*, „Heliyon” 2023, vol. 9(10), e20356, <https://doi.org/10.1016/j.heliyon.2023.e20356>.

⁵⁰ E. Krause, *Kariera zawodowa i jej znaczenie...*, p. 408.

RESEARCH METHOD AND MATERIAL

PARTICIPANTS

A total of 124 respondents participated in the study. However, as two indicated that they were not employed at the time, their responses were excluded. Therefore, the analysis was based on data from 122 working adults (93 women and 29 men). Most participants were aged between 26 and 35 (54.1%), while the smallest group consisted of individuals aged 56-65 (0.8%). A significant proportion of participants (54.1%) were in the early stages of their careers, having one to five years of work experience. Additionally, 27.9% reported five to ten years of experience, while 18% had eleven or more years. The statistics regarding the length of service at the current place of employment were similar. The majority of respondents (54.9%) had been employed at their current workplace for 2 to 5 years, followed by 34.4% with one year or less, and 7.4% with 6 to 10 years of service.

The sample represented a wide range of functional backgrounds and professions. Respondents included financial analysts, programmers, cashiers, leisure time animators, building inspectors, surveyors, hairdressers, and journalists (see Table 1).

Table 1. Examples of Occupations Reported by Respondents

Tabela 1. Przykłady zawodów zgłoszonych przez respondentów

Industry	Professions Reported by Respondents
Finance and Insurance	Accountant, Debt Collector, Financial Analyst
Healthcare and Social Assistance	Doctor, Dietitian, Psychologist, Social Benefits Officer, Trichologist
Education	Special Education Teacher, Teacher, Teaching Assistant
Culture and Arts	Costume Designer, Graphic Artist/Illustrator, Photographer
Telecommunications and IT	IT Specialist, IT Department Manager, Logistics Specialist, Programmer
Administration and Support Services	Customer Service Specialist, AML Specialist, HR Specialist, Marketing Specialist,
Other Non-material Service Activities	Antiquarian, Hairdresser, Journalist, Local Animator, Personal Trainer
Other Material Service Activities	Glass Processing Worker, Production Equipment Operator, Professional Driver

Source: Author's own study based on conducted research.

MEASURES

Emotional Intelligence. The Trait Emotional Intelligence Questionnaire - Short Form (TEIQue-SF) assessed self-perceived emotional intelligence. The instrument consists of 30 items, rated on a 7-point Likert scale, where 1 indicates “does not apply to me at all” and 7 indicates “applies to me completely”. The questionnaire scored four dimensions of emotional intelligence: *well-being*, *self-control*, *emotionality* and *sociability*. An overall emotional intelligence score (*overall EI*) is calculated by averaging the scores of all four dimensions. Reverse scoring was used for questions containing denials⁵¹.

Career success. The Minnesota Satisfaction Questionnaire (MCQ) measured participants’ career success. The scale consists of 20 statements that measure two dimensions: intrinsic and extrinsic career success. The intrinsic dimension relates to an individual’s feelings about aspects of their work that can be objectively measured, such as compensation or the number of promotions. The extrinsic dimension, on the other hand, refers to an individual’s impressions of more subjective aspects of their work, including social status, relationship with co-workers, and alignment with personal values. The higher the outcome in each scale, the higher the level of work satisfaction⁵².

PROCEDURE

The questionnaires were distributed online, and participation was voluntary. The estimated completion time for the study was approximately 10 minutes.

Participants had the opportunity to review their results from the Trait Emotional Intelligence Questionnaire (TEIQue-SF). To access their results, they were asked to provide an email address, to which a report with their scores was sent. A total of 46% of the participants took advantage of this option.

The results of the Job Satisfaction Questionnaire (MSQ) were calculated manually by summing the scores on the respective dimensions. The results of the Trait Emotional Intelligence Questionnaire (TEIQue-SF) were automatically generated through the website www.psychometriclab.com/scoring-the-teique/, which provides an instant scoring system for the test.

⁵¹ K.V. Petrides, *Psychometric properties of the Trait Emotional Intelligence Questionnaire (TEIQue)*, [in:] C. Stough, D.H. Saklofske, J.D.A. Parker (eds.), *Assessing emotional intelligence: Theory, research, and applications*, Springer Science + Business Media, 2009, p. 85–101.

⁵² D.J. Weiss, R.V. Dawis, G.W. England, L.H. Lofquist, *Manual for the Minnesota Satisfaction Questionnaire*, University of Minnesota, Industrial Relations Center, 1967.

RESULTS AND DISCUSSION

OVERALL SAMPLE ANALYSIS

The average level of emotional intelligence among respondents was 4.85, which corresponds to 69.3% (see Table 2). According to Petrides⁵³ scores between 30-69% are classified as average, 70-99% as above average, and 1-29% as below average. Hence, the participant's result at the upper limit of the average range indicates a relatively high level of overall emotional intelligence. Moreover, the results for the well-being and emotionality factors were particularly high.

Table 2. Average Level of Emotional Intelligence Among Participants
Tabela 2. Średni poziom inteligencji emocjonalnej wśród uczestników

Emotional intelligence component	Score at TEIQue-SF (max = 7)
Well-being	5.10
Self-control	4.67
Emotionality	4.95
Sociability	4.53
Overall EI	4.85

Source: Author's own study based on conducted research.

The average level of career success among respondents was 72.4%, indicating high satisfaction within the studied group⁵⁴. Participants reported relatively high satisfaction with both the external (68.7%) and internal (73.4%) dimensions of their careers (see Table 3).

Table 3. Average Level of Career Success Among Participants
Tabela 3. Średni poziom sukcesu zawodowego wśród uczestników

Career success component	Score at MCQ (M)
External Career Success (max M = 30)	20.60
Internal Career Success (max M = 60)	44.02
Overall Career Success (max M = 100)	77.42

Source: Author's own study based on conducted research.

⁵³ K.V. Petrides, *Psychometric properties of the Trait Emotional Intelligence Questionnaire (TEIQue)*, [in:] C. Stough, D.H. Saklofske, J.D.A. Parker (eds.), *Assessing emotional intelligence: Theory, research, and applications*, Springer Science + Business Media, 2009, p. 85–101.

⁵⁴ D.J. Weiss, R.V. Dawis, G.W. England, L.H. Lofquist, *Manual for the Minnesota Satisfaction Questionnaire...*, p. 45.

RELATIONSHIP BETWEEN CAREER SUCCESS AND EMOTIONAL INTELLIGENCE

Descriptive statistics and intercorrelations between the variables have been presented in Table 4. The correlation analysis revealed a positive, however moderate correlation between emotional intelligence and career success ($r = .40$, $p < 0.01$). A stronger correlation has been observed with internal success ($r = .42$), and weaker with external success ($r = .29$).

This result suggests that individuals with higher emotional intelligence tend to perceive themselves as more successful in their careers. Particularly, this perceived success appears to be more strongly associated with internal factors such as job satisfaction or alignment with personal values, more than with external factors, like the number of promotions or salary.

Table 4. Descriptive Statistics and Intercorrelations Among Study Variables
Tabela 4. Statystyki opisowe i współzależności między badanymi zmiennymi

	M	SD	1	2	3	4	5	6	7
Internal Career Success	3.67	0.81	1						
External Career Success	3.43	1.03	0.79**	1					
Overall Career Success	3.62	0.82	0.97**	0.92**	1				
Well-being	5.09	1.15	0.35**	0.27**	0.33**	1			
Self-Control	4.67	1.04	0.33**	0.24**	0.32**	0.68**	1		
Emotionality	4.95	0.84	0.30**	0.15	0.26**	0.49**	0.43**	1	
Sociability	4.53	1.03	0.31**	0.25**	0.31**	0.51**	0.55**	0.52**	1
Overall Emotional Intelligence	4.85	0.81	0.42**	0.29**	0.40**	0.85**	0.82**	0.74**	0.79**

Note: ** $p < 0.01$

Source: Author's own study based on conducted research.

Furthermore, the correlation analysis indicates a strong positive relationship between internal and external factors of career success ($r = .79$), indicating that individuals who highly rated their internal career success also tend to highly value external factors.

All dimensions of career success are positively correlated with well-being (internal: $r = .35$, external: $r = .27$, overall: $r = .33$), suggesting a strong link between career success and individuals' well-being. This dimension of EI specifically measures the level of life satisfaction and optimism, the feeling of fulfilment, and the sense of emotional balance (Petrides, 2013).

Internal career success was positively correlated with all dimensions of emotional intelligence, particularly with overall EI ($r = .42$), followed by self-control ($r = .33$), sociability ($r = .31$), and emotionality ($r = .30$). In contrast, the study revealed only weak correlation between external career success and most EI dimensions with the weakest correlation found in emotionality factor ($r = .15$). This low score suggests that emotionality may have limited relevance to external indicators of career success.

Overall career success significantly correlates with all emotional intelligence dimensions, especially self-control ($r = .32$) and sociability ($r = .31$). Strong relationships were also found between overall EI and well-being ($r = .85$), as well as with other EI components (self-control: $r = .65$, sociability: $r = .51$, emotionality: $r = .49$). These results suggest that emotional intelligence is most strongly associated with well-being.

To identify the most influential predictors among describing emotional intelligence in relation to overall career success a backward stepwise regression analysis was performed (see Table 5 for details). Calculations showed that only well-being turned out to be statistically significant. The rest of the variables, i.e. self-control, emotionality, and sociability have been excluded from the model. Results show that well-being explains 10% of the variance in overall job satisfaction, which means that other factors, which were not considered in the research, play a role in job career development.

Table 5. Results of Regression Analysis with Dependent Variable Overall Satisfaction
Tabela 5. Wyniki analizy regresji ze zmienną zależną Ogólna satysfakcja

Model	Unstandardized Coefficients		Standardized	t	Sig
	B	Std. Error	Beta		
(Constant)	2.43	0.32		7.59	< .001
Well-being	0.23	0.06	0.33	3.83	< .001

Note: Dependent variable: Overall job satisfaction. Variables removed: self-control, emotionality, sociability. $R^2 = .11$; Adjust. $R^2 = .10$; $F(1,120) = 14,66$, $p < .001$

Source: Author's own study based on conducted research.

COMPARATIVE ANALYSIS

In order to determine differences between men and women and age groups, respectively, the Student's t-test and one-way ANOVA were performed. Among all studied variables related to career success and emotional intelligence, the Student's t-test showed statistically significant differences between men and women only in the case of self-control [$t(120) = -3,086$, ($p = .003$)]. Men achieved higher levels of self-control in comparison to women. One-way ANOVA revealed differences between age groups only in terms of internal career success. The older participants of the study the higher intrinsic career success they demonstrate (details contains Table 6).

Table 6. Intrinsic Career Success and Age
Tabela 6. Wewnętrzny sukces zawodowy a wiek

Age	n	Internal Career Success
18-25	38	3.44 (.89)
26-35	66	3.68 (.72)
above 36	18	4.10 (.78)
$F(2,119)$	$F(2,119) = 4,376^*$	$1 < 3^*$

Note: ** $p < .05$

Source: Author's own study based on conducted research.

A high self-reported score on self-control among male participants suggests a greater perceived ability to manage emotions, impulsivity, and stress. While this result is consistent with some studies⁵⁵, others report different outcomes. For example, longitudinal research by Matthews et al. found that girls outperformed boys in self-regulation measures⁵⁶. Similarly, Weis et al. observed that women demonstrated higher levels of behavioural self-regulation compared to men⁵⁷.

In the case of the relationship between age and career success, the findings differ surprisingly from previous research. The results suggest that only intrinsic indicators of career success are related to participants' age. Specifically, a sense of purpose, personal fulfilment, and satisfaction tend to increase with age. However, numerous other studies⁵⁸ have also reported a positive correlation between age and objective indicators of career success.

⁵⁵ A. Matczak, K.A. Knopp, *Znaczenie inteligencji emocjonalnej...*, p. 80.

⁵⁶ J.S. Matthews, C.C. Ponitz, F.J. Morrison, *Early gender differences in self-regulation and academic achievement*, „Journal of Educational Psychology” 2009, vol. 101(3), pp. 689-704, <https://doi.org/10.1037/a0014240>.

⁵⁷ M. Weis, T. Heikamp, G. Trommsdorff, *Gender differences in school achievement: The role of self-regulation*, *Frontiers in Psychology*, 2013, vol. 4, Article 442, <https://doi.org/10.3389/fpsyg.2013.00442>.

⁵⁸ T.W.H. Ng, L.T. Eby, K.L. Sorensen, D.C. Feldman, *Predictors of objective and subjective career success: A meta-analysis*, „Personnel Psychology” 2005, vol. 58(2), pp. 367-408, <https://doi.org/10.1111/j.1744-6570.2005.00515.x>; S.E. Seibert, J.M. Crant, M.L. Kraimer, *Proactive personality and career success...*, p. 430.

ANALYSIS OF MANAGERS

Managers constituted 12.2% of the respondents. Their average level of emotional intelligence was 5.43, which was 13.2% higher than that of respondents in non-managerial positions (4.79) (see Figure 1). Managers scored higher in each dimension of emotional intelligence. This finding may suggest that individuals in managerial roles may possess or be required to develop higher emotional intelligence due to the demands associated with their role in the organisation.

Interestingly, the greatest disparity was observed in the domain of sociability. Managers scored on average 20.5% higher than other respondents. This suggests that managers possess stronger interpersonal and communication skills⁵⁹, which are crucial for effective leadership⁶⁰. Our findings are consistent with previous research. For instance, a study involving 233 high school students revealed that those rated as popular by their peers were likely to exhibit higher levels of emotional intelligence⁶¹.

Another study conducted by Stein et al. found that top executives scored significantly higher on eight out of fifteen dimensions of the Emotional Quotient Inventory (EQ-i)⁶². Moreover, executives with higher levels of empathy, self-regard, reality testing, and problem-solving were more likely to achieve higher profitability within their companies.

In conclusion, these results suggest that emotional intelligence plays an important role in professional life, enabling individuals to pursue and succeed in managerial positions. Moreover, the study highlights sociability as a potentially decisive factor in attaining and maintaining managerial roles.

⁵⁹ K.V. Petrides, *Psychometric properties of the Trait Emotional Intelligence Questionnaire...*, p. 93.

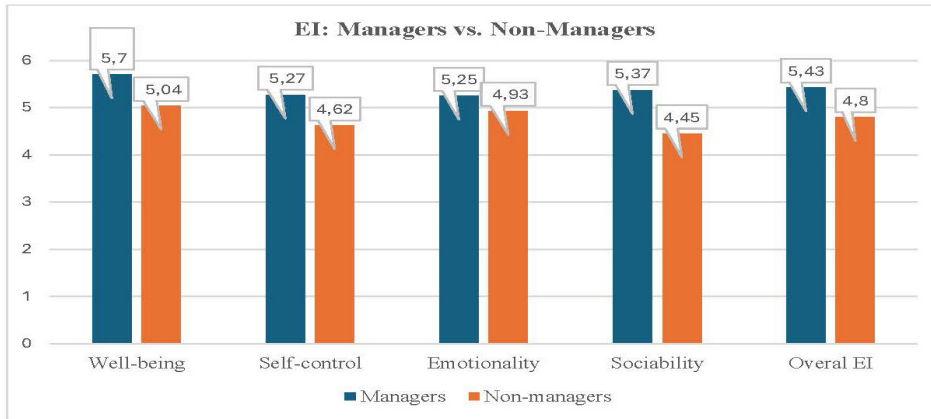
⁶⁰ J.C. Maxwell, *Leadership* 101...

⁶¹ A. Matczak, K.A. Knopp, *Znaczenie inteligencji emocjonalnej...*, p. 21.

⁶² S.J. Stein, P. Papadogiannis, J.A. Yip, G. Sitarenios, *Emotional intelligence of leaders: A profile of top executives*, "Leadership & Organization Development Journal" 2009, vol. 30(1), p. 87–101.

Figure 1. Emotional Intelligence: managers vs. non-managers

Rysunek 1. Inteligencja emocjonalna: menedżerowie vs. osoby niebędące menedżerami



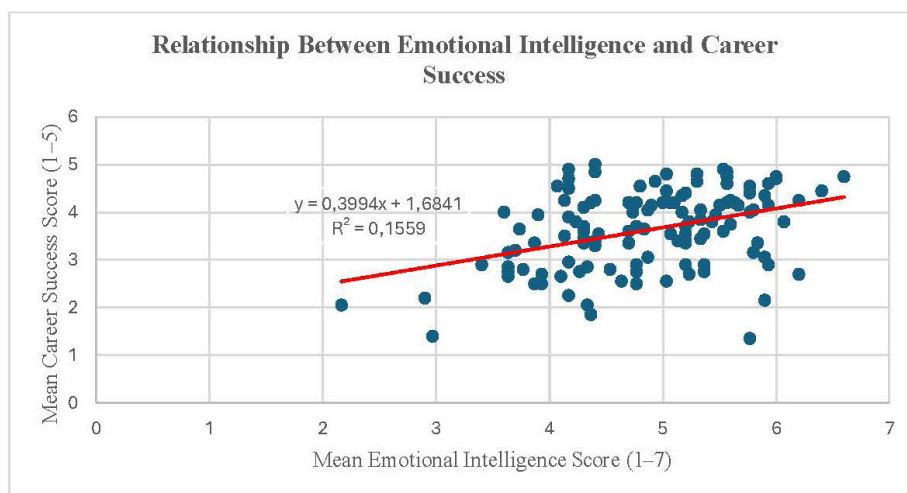
Source: Author's own study based on conducted research.

CONCLUSIONS

The aim of the present study was to examine whether emotional intelligence is positively correlated with career success. A moderate positive correlation ($r = .40$, $p < .01$) was found (see Figure 2), confirming the research hypothesis. Emotional intelligence accounted for approximately 16% of the variance in career success ($R^2 = .16$). This result suggests that individuals with higher levels of emotional intelligence are more likely to achieve greater professional success.

Figure 2. Scatterplot Depicting the Relationship Between Emotional Intelligence and Career Success

Rysunek 2. Wykres rozrzutu przedstawiający związek między inteligencją emocjonalną a sukcesem zawodowym



Source: Author's own study based on conducted research.

Furthermore, regression analysis showed that well-being accounts for 10% of the variance in overall career success. While this indicates a statistically significant impact, it also suggests that other important factors, beyond the scope of this study, contribute to career success. The study also found that men scored higher in self-control, a component of emotional intelligence. Internal career success was shown to increase with age, aligning with previous research. In addition, managers demonstrated significantly higher emotional intelligence than non-managers, particularly in social skills, with an average difference of 20%. These findings may have practical relevance in the context of Poland's projected increase in labour productivity, suggesting that emotional competencies could play a key role in enhancing workforce performance. A limitation of this study was the relatively small sample size (122 participants), which limits the generalizability of the findings. Therefore, the results should be interpreted with caution. In addition, the reliance on self-report measures, as highlighted by Mayer et al.⁶³ represents another limitation. Since both emotional intelligence and career success were assessed subjectively by the participants, this could have introduced biases in the results. This highlights the need to use objective measures in future studies in order to obtain more reliable and accurate results.

⁶³ J.D. Mayer, P. Salovey, D. Caruso, L. Cherkasskiy, *Emotional intelligence*, [in:] R.J. Sternberg, J. Kaufman (eds.), *The Cambridge Handbook of Intelligence*, 3rd ed., Cambridge University Press, Cambridge 2011, p. 528–549.

Despite these limitations, the study provides substantial evidence for the role of emotional intelligence in achieving career success. Although the effect of emotional intelligence on intrinsic career success was modest, even a small advantage can be meaningful in today's competitive work environments. This suggests that assessing and developing emotional competencies may be particularly beneficial in such contexts. Future research should employ more comprehensive methodologies, including objective indicators of career success. The reliability of findings could also be improved through longitudinal or experimental study designs.

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- (A) Study Design (projekt badania)
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- (C) Statistical Analysis (analiza statystyczna)
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THE PROBLEM OF INNOVATIVENESS OF AN ORGANIZATION IN THE PERCEPTION OF STUDENTS IN THEIR FINAL YEARS OF STUDIES

PROBLEM INNOWACYJNOŚCI ORGANIZACJI W PERCEPCJI STUDENTÓW OSTATNICH LAT STUDIÓW

Abstract: The cognitive goal of the publication is to explain the concept of innovativeness and to recognize the issues of organizational innovation. The research goal is to get to know the opinions of students related to the perception of innovativeness in relation to the terms describing it at the organizational level. Examining the perception of organizational innovation by students seems important because they are a potential resource of many organizations. The research method used in the publication is based on a review of the subject literature and an empirical study carried out using an original survey questionnaire. The argumentation process concerns considerations focused on the perception of innovativeness and the recognition of innovativeness in organizational practice. The analysis of the results includes a description of the basic research results. The research revealed diverse attitudes of respondents towards various issues related to innovativeness. The analysis and results of the research procedure confirmed the multiplicity of perceptions of organizational innovativeness and its problematic nature. The research results may be useful for entities for which innovation is part of their daily activities. In addition, recognizing the phenomenon of innovativeness complexity may constitute the basis for further research in this area.

Keywords: innovativeness, conditions of innovativeness, level of innovativeness

Streszczenie: Celem poznawczym publikacji jest wyjaśnienie pojęcia innowacyjności oraz rozpoznanie zagadnień innowacyjności organizacyjnej. Celem badawczym jest poznanie opinii studentów związanych z postrzeganiem innowacyjności w odniesieniu do określeń ją opisujących na płaszczyźnie organizacyjnej. Zbadanie postrzegania innowacyjności organizacyjnej przez studentów wydaje się istotne z tego względu, że są oni potencjalnym zasobem wielu organizacji. Metoda badawcza wykorzystana w opracowaniu opiera się na przeglądzie literatury przedmiotu oraz badaniu empirycznym zrealizowanym za pomocą autorskiego kwestionariusza ankiety. Proces wywodu dotyczy rozważań skoncentrowanych wokół percepcji innowacyjności oraz rozpoznania innowacyjności w praktyce organizacyjnej. Analiza wyników obejmuje opis podstawowych rezultatów badawczych. Badania ujawniły zróżnicowane postawy respondentów wobec różnych zagadnień związanych z innowacyjnością. Dokonana analiza oraz rezultaty postępowania badawczego potwierdziły wielorakość percepcji innowacyjności organizacyjnej oraz jej problematyczności. Wyniki badań mogą być przydatne dla podmiotów, dla których innowacyjność wpisuje się w obszar codziennej aktywności. Ponadto rozpoznanie zjawiska złożoności innowacyjności może stanowić podstawę do dalszych badań w tym obszarze.

Słowa kluczowe: innowacyjność, uwarunkowania innowacyjności, poziom innowacyjności

INTRODUCTION

The issues of innovativeness are currently eagerly taken up by both theoreticians and practitioners of management¹. Many agree that innovativeness has its origins in highly specialized staff² and that people are the inspirers and creators of innovative ideas and concepts³. Human resources are undoubtedly a key resource influencing the innovativeness of an enterprise, because it is people who are the creators of innovative solutions⁴. Innovativeness in relation to human resources can be perceived as a practice, idea, policy, program or system that concerns individual functions of human resources management, assuming that they are new (different, innovative) for the organization⁵. The use of specific management practices that stimulate innovative behavior of employees should support expectations in the form of increased organizational innovativeness⁶.

¹ S.M. Dos-Santos, A.C Pacagnella Jr, P.L. Fournier, C. Morini, L.A. Santa-Eulalia, *Critical success-factors for the innovativeness of the electronic industry: An analysis in developed and developing countries*, „Creativity & Innovation Management” 2022, vol. 31, iss. 4, p. 574.

² M. Such-Pyrgiel, *Innowacyjne metody i narzędzia badawcze w postaci aplikacji wykorzystywane w procesie rekrutacji i selekcji zawodowej*, Teka Komisji Prawniczej PAN– Oddział Lublin, t. XI, 2018, nr 2, p. 426.

³ A. Pietroń-Pyszczyk, *Czynniki ograniczające innowacyjność pracowników*, „Acta Universitatis Lodzensis Folia Oeconomica” 2013, nr 288, p. 335.

⁴ A. Rakowska, A. Karasek, *Praktyki zarządzania zasobami ludzkimi a innowacyjność przedsiębiorstwa*, „Zeszyty Naukowe Politechniki Śląskiej”. Seria: Organizacja i Zarządzanie, 2017, z. 114, p. 413.

⁵ Z. Ciekankowski, *Innowacyjne zarządzanie zasobami ludzkimi w przedsiębiorstwie*, „Nowoczesne Systemy Zarządzania” 2018, z. 13, nr 3, p. 156.

⁶ M. Gableta, A. Bodak, *Koncepcja zarządzania zasobami ludzkimi z perspektywy wzrostu innowacyjności pracowników*, „Zeszyty Naukowe Małopolskiej Wyższej Szkoły Ekonomicznej” 2014, t. 24, nr 1, p. 97.

The construction of the work (structure, content) was subordinated to the topic of the publication. The order of the description of the content is divided into theoretical and empirical parts. The theoretical part reviews selected literature on the subject in the field of organizational innovativeness and its determinants. The empirical part focuses on the unidimensional analysis of research results and was conducted based on a specifically designated research goal. A quantitative research approach was used based on the author's survey questionnaire distributed in electronic form. The publication presents basic research results (without conducting in-depth analysis), which was the author's intention. The final part of the study indicates further research directions, also referring to the limitations of the research procedure.

LITERATURE REVIEW

Innovativeness is a key entrepreneurial orientation⁷ and is conditioned by many different external and internal factors⁸. The innovativeness of enterprises is determined by, among others, their activities⁹, where the ability to frequently transform goals, methods and organizational forms is valued¹⁰. Moreover, innovativeness is only possible when companies have the appropriate intellectual potential – a potential that is built and constituted by employees who are committed to work. The ability to acquire and maintain this most valuable resource – human resources – providing enterprises with a competitive advantage (resulting de facto from innovativeness) is currently one of the most strategic challenges for all enterprises¹¹. Innovation based on the accumulation of knowledge is the foundation for building the competitive advantage of enterprises¹² and has a positive impact on their sustainable development¹³. It should be emphasized that not only the issue of organizational development is important, but also the need to create an organizational culture promoting innovation and change¹⁴.

⁷ J. Ognjanović, A. Mitrović, M. Milašinović, *Entrepreneurial Innovativeness as a Factor of Success Entrepreneurial Business Performance*, „Economy and Market Communication Review” 2014, vol. 14, no. 2, p. 424.

⁸ D. Rojek, *Strategic Management-Related Factors of Enterprise Innovativeness*, „Scientific Papers of Silesian University of Technology. Organization & Management” 2022, iss. 163, p. 487.

⁹ A. Kamińska, *The Activity of Business Environment Institutions in Terms of Supporting the Innovativeness*, „Scientific Papers of Silesian University of Technology. Organization & Management” 2023, iss. 170, p. 211.

¹⁰ K. Pająk, *Innowacyjność a kapitał społeczny*, [in:] M. Strużycki (ed.), *Innowacyjność w teorii i praktyce*, Szkoła Główna Handlowa, Warszawa 2006, p. 33.

¹¹ J. Mazur, *Motywowanie i rozwój pracowników o wysokim potencjale*, [in:] S. Borkowska (ed.), *Zarządzanie talentami*, Instytut Pracy i Spraw Socjalnych, Warszawa 2005, p. 107.

¹² F. Mroczko, *Zarządzanie innowacjami*, [w:] G. Kobyłko, M. Morawski (ed.), *Przedsiębiorstwo zorientowane na wiedzę*, Difin, Warszawa 2006, p. 249.

¹³ M. Zieba, S. Durst, Ch. Hinteregger, *The impact of knowledge management on sustainability*, „Journal of Knowledge Management” 2022, vol. 26, iss. 11, p. 234.

¹⁴ A. Talaja, M. Vuković, *Does Adhocracy Organizational Culture Mediate the Environmental Dynamism – Innovativeness Relationship?*, „Journal of Contemporary Management Issues Management” 2024, vol. 29, no. 2, p. 91.

The innovativeness of an enterprise is determined by both the ability to identify innovation needs and the appropriate staff, technical and financial preparation in the field of designing and implementing various innovation initiatives. Therefore, not only the management and specialists should be involved in this process, but also the entire staff¹⁵. Nowadays, innovativeness has become one of the key factors determining the success of an enterprise¹⁶. Innovativeness can be associated with, among others: the ability and/or tendency of an organization to create, disseminate and use knowledge, the ability to implement innovation in practice, the process of refining new ideas and transforming creative ideas into practical solutions¹⁷. In business practice, innovativeness is often associated with new products and services, and therefore also with changes in technological processes¹⁸ and is therefore associated with the issue of innovation. Innovativeness can be expressed in the use of new or improved solutions, methods of conduct, instruments in the sphere of human resources or financial policy. It should also be noted that innovativeness is not limited only to the internal environment of the organization, but can also have an external dimension¹⁹. The ability of an enterprise to create innovative solutions absolutely requires the integration of various sources that stimulate innovativeness. The knowledge needed for this purpose can be obtained by an enterprise from both internal and external sources, as the resources that make up the innovation potential of a specific enterprise can be created independently or transferred from the environment²⁰.

Innovative companies can include achievable development goals in their strategies²¹ and create conditions for employees to be creative and develop. This is facilitated by appropriately structured structures, systems and procedures that direct and stimulate employee behaviors and, consequently, have a strong impact on both organizational learning and innovativeness²². The level of innovativeness in a company is based on employee creativity, which results in many improving changes. Innovativeness suggests that specific innovation processes are implemented in organizations²³ in

¹⁵ M. Brojak-Trzaskowska, *Społeczno-kulturowe determinanty aktywności innowacyjnej przedsiębiorstw*, [in:] E. Okoń-Horodyńska, A. Zacharowska-Mazurkiewicz (ed.), *Tendencje innowacyjnego rozwoju polskich przedsiębiorstw*, Instytut Wiedzy i Innowacji, Warszawa 2008, p. 182.

¹⁶ P. Nowakowska, *Zarządzanie zasobami ludzkimi w innowacyjnym przedsiębiorstwie*, „Zarządzanie innowacyjne w gospodarce i biznesie” 2023, nr 1(36), p. 53.

¹⁷ T. Myjak, *Innovativeness Unveiled: Exploring Concept and Shaping Conditions in Personnel Function*, „Social Entrepreneurship Review” 2023, no. 3, p. 38.

¹⁸ M. Gableta A. Bodak, *Koncepcja zarządzania zasobami ludzkimi...*, s. 96.

¹⁹ M. Brojak-Trzaskowska, *Społeczno-kulturowe determinanty...*, p. 172.

²⁰ W. Popławski, A. Sudolska, M. Zastempowski, *Współpraca przedsiębiorstw w Polsce w procesie budowania ich potencjału innowacyjnego*, Towarzystwo Naukowe Organizacji i Kierownictwa. Stowarzyszenie Wyższej Użyteczności „Dom Organizatora”, Toruń 2008, p. 206.

²¹ T. Kassa, M. Kegne, *Factors affecting innovativeness of small and medium enterprises in Benishangul Gumuz Regional State, Ethiopia*, „Journal of Innovation and Entrepreneurship” 2025, vol. 14, no. 18, p. 2.

²² K. Kolterman, *Innowacje technologiczne w procesie budowy przewagi konkurencyjnej MSP*, Difin, Warszawa 2013, p. 39.

²³ A. Francik, *Sterowanie procesami innowacyjnymi w organizacji*, Akademia Ekonomiczna, Kraków 2003, p. 113.

various functional areas of the company²⁴. The level of innovativeness is also assessed by the number of ideas – employee suggestions regarding changes of all kinds. It is not enough to note that the level of innovativeness in an organization is coupled with the conditions in which the processes implemented in organizations take place. Therefore, it is important to constantly shape the innovative activity of group members and all participants of the entire organization in order to raise the level of its propensity and ability to create and implement innovations²⁵. Taking into account the previous considerations, it can be stated that it is necessary to put more emphasis on innovativeness management in the enterprise, which is the process of shaping innovative competences. What is more, innovation management provides much greater chances for the development of an enterprise in times of crisis or economic slowdown²⁶.

Innovativeness is important not only at the level of specific enterprises, but is also becoming an increasingly important source of growth for national economies²⁷. Basically, innovativeness affects the competitiveness of the national economy and its position on an international scale²⁸. Therefore, innovativeness has a macro aspect – it concerns the entire economy, and a micro aspect – at the level of an individual enterprise²⁹. Reference to both the micro- and macroeconomic perspectives concerns a broad perception of innovativeness and such an approach is currently one of the most important elements influencing the rate of growth of the potential of modern highly developed economies³⁰. On the sidelines, it is worth adding that secondary research shows that Poland is unfortunately a country with little innovation, while the innovativeness of Polish enterprises (excluding small enterprises) is average and diversified³¹. Other studies show that there is a positive correlation between knowledge sharing in an enterprise and the innovativeness of micro, small and medium-sized enterprises³².

²⁴ T. Myjak, *Uwarunkowania procesów innowacyjnych w przedsiębiorstwie budowlanym*, [in:] A. Chodyński, D. Fatuła, M.A. Leśniewski (eds.), *Innowacyjność, konkurencyjność, jakość, wiedza i uczenie się komponentami rozwoju organizacji w zmiennym otoczeniu*, Oficyna Wydawnicza Krakowskiej Akademii im. Andrzeja Frycza Modrzewskiego, Kraków 2022, p. 65.

²⁵ A. Francik, *Sterowanie procesami innowacyjnymi...*, p. 63.

²⁶ J. Kubicka, *Nowe wyzwania w zarządzaniu innowacjami*, [in:] S. Marciniak, W. Wiszniewski, E. Głodziński (eds.), *Zarządzanie innowacjami a cykle gospodarcze. Wyzwania, relacje, metody*, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2015, p. 54.

²⁷ J. Tidd, J. Bessant, *Zarządzanie innowacjami. Integracja zmian technologicznych, rynkowych i organizacyjnych*, Oficyna a Wolters Kluwer business, Warszawa 2013, p. 25.

²⁸ P. Kupis, K. Zaniewska, *Kierunki rozwoju polityki innowacyjnej w Polsce*, [in:] K. Poznańska, R. Sobiecki (eds.), *Innowacje w przedsiębiorstwie. Wybrane aspekty*, Oficyna Wydawnicza Szkoła Główna Handlowa, Warszawa 2012, p. 11.

²⁹ B. Rogoda, *Przedsiębiorczość i innowacje*, Akademia Ekonomiczna, Kraków 2005, p. 17.

³⁰ A.P. Balcerzak, *Wiedza i innowacje jako kluczowy czynnik rozwoju gospodarczego w XXI wieku*, [w:] E. Okoń-Horodyńska, R. Wisła (eds.), *Kapitał intelektualny i jego ochrona*, Instytut Wiedzy i Innowacji, Warszawa 2009, p. 20.

³¹ M. Romanowska, *Innowacyjne przedsiębiorstwo w nieinnowacyjnej gospodarce*, „Przegląd Organizacji” 2015, nr 8, p. 5.

³² A. Lemańska-Majdzik, K. Okręglika, *Intra-Organizational Knowledge Sharing and Innovation of Polish Enterprises*, „Zeszyty Naukowe Wyższej Szkoły Humanitas. Zarządzanie” 2024, t. 25, nr 4, p. 80.

RESEARCH METHODOLOGY

The selection of the research sample was purposeful. The pool included respondents with knowledge related to the discussed topic. The study involved full-time and part-time students of the last year of first degree and second degree studies from four fields of study offered to students by the Faculty of Economics of the Academy of Applied Sciences in Nowy Sącz (table 1). The majority of the respondents were women (73.3%), which corresponds to the actual structure of students of this Faculty by gender. More than half of the population of respondents represented the following field: Economics, and almost every fourth - Management. The larger group of respondents were students of full-time studies (almost 60%) vs. part-time studies. When selecting the sample, the respondents were guided by the fact that during their studies, the respondents learned about issues related to innovativeness - from the theoretical side, and in terms of practice - they had already completed professional internships in various economic entities (e.g. in enterprises, local government units, banks) and had the opportunity to experience the innovativeness of these entities to a greater or lesser extent. The author wanted to investigate how people at this stage of education (the last year of studies) perceive specific statements defining organizational innovativeness.

Table 1. Structure of respondents (in % of responses)

Tabela 1. Struktura badanych (% odpowiedzi)

Gender of respondents	
Female	73.3
Male	26,7
Field of study	
Economics	54,3
Management	24,8
e-Administration	5,7
Economics and finance of enterprises	15,2
Form of studies	
Full-time	59
Part-time	41

Source: own study.

The research procedure concerning the discussed issues began at the end of 2024 and was finalized at the beginning of 2025. The research was quantitative in nature. The survey technique was used using an original survey questionnaire, which was distributed in electronic form. The choice of the research tool was ba-

sed on the adopted research conceptualization. The research tool consisted of two parts. The first, substantive, concerned obtaining information from respondents related to the perception of innovation. The second, metric, was related to obtaining information characterizing the respondents, i.e. gender and the specific field and form of study. A total of 105 respondents were surveyed, assuming that this number would ensure the reliability of the obtained results. The selection of the research sample resulted from the adopted research assumptions.

The analysis of the research results contains basic statistics in the form of the number of responses. The basis for conducting the analyses were the indications of students, and the results of the survey questionnaire – the basis for formulating the original conclusions.

The study of the literature on the subject contributed to the establishment of two research theses:

T1: The innovativeness of an enterprise is mainly determined by the ability to identify innovation needs.

T2: Innovativeness occurs in organizations focused on the intellectualization of professional activities.

The research theses were verified in a descriptive manner, without the use of statistical indicators, which was the author's intention and can be treated as a preview of further, in-depth research. The research results are a fragment of more extensive empirical research.

RESEARCH RESULTS

The results presented in the work are a reference to part (not the whole) of the survey questionnaire. When describing the empirical data, a descriptive analysis of the basic research results was used. Respondents were asked to respond to various issues, categories describing innovativeness (table 2). They had the opportunity to choose an answer option using a 5-point Likert scale, where 1 means – strongly disagree, and 5 – strongly agree.

Table 2. Perception of innovativeness (in % of responses)

Tabela 2. Postrzeganie innowacyjności (% odpowiedzi)

Specification	I disagree	I have no opinion	I agree
Innovativeness is related to the issue of innovation	7,7	14,3	78,1
Innovativeness is the key to success in business	7,7	7,6	84,7
Innovativeness is the basis for building a competitive advantage of an enterprise	6,7	9,5	83,8
Innovativeness is possible only when the organization has the appropriate intellectual potential	9,5	21,9	68,6
In the current conditions, it is necessary to put more emphasis on innovativeness management in the enterprise	9,5	16,2	74,3
Innovativeness of the enterprise should involve not only management and specialists, but also the entire staff	7,7	14,3	78,1
The level of innovativeness can be assessed by the number of ideas and suggestions of employees regarding various changes	11,5	14,3	74,3
The level of innovativeness is based on the creativity of employees, as a result of which many improving changes are created	8,6	5,7	85,7

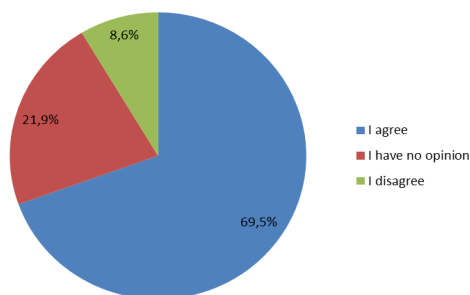
Source: own study.

When analyzing the research material, it was decided – for a more expressive presentation of empirical data – to block (consolidate) the five-point scale to three response options: „I agree” (combining the options: „I strongly agree” and „I rather agree”), „I have no opinion”, and „I disagree” (combining the options: „I strongly disagree” and „I rather disagree”). It was observed (graph 1) that the largest percentage of indications (85.7%) concerned the statement that the level of innovativeness is based on employee creativity, as a result of which many improving changes are created. It should be noted that employee creativity is an increasingly valued competence in the organization, a key competence and a competence of the future that should be permanently developed. Slightly fewer (84.7%) indicated that innovativeness is the key to success in business, as well as that innovativeness is the basis for building a competitive advantage of the enterprise (83.8%). Due to the presence of a market economy, in which the role of competitiveness is emphasized, it should be pointed out that in the minds of the respondents, innovativeness is the „feature” of an enterprise that allows it to compete with others, stay on the market, and also allows it to become a leader in its industry.

Exactly 78.1% of respondents indicated that not only management and specialists should be involved in the company's innovativeness, but also the entire staff, and that innovativeness is related to the issue of innovation. It can be assumed that the respondents also indicate themselves as the source and subject of innovation, that activity in this area also belongs to them and is not only the domain of management and superiors. 74.3% of respondents considered that in the current conditions it is necessary to put more emphasis on innovativeness management in the company, as well as that the level of innovativeness can be assessed by the number of ideas and suggestions of employees regarding various changes. Almost 70% of respondents stated that the company's innovativeness is mainly determined by the ability to identify innovation needs (chart 1), which allows us to consider thesis no. 1 as correct.

Figure 1. Research results – thesis 1

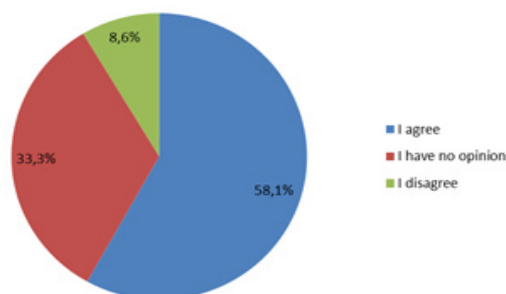
Rysunek 1. Wyniki badań – teza 1



Source: own study.

Figure 2. Research results – thesis 2

Rysunek 2. Wyniki badań – teza 2



Source: own study.

The respondents' answers in this area may arouse research curiosity and create another problem to be explored in terms of the level of the ability to identify the company's innovation needs, what methods can be used in individual companies and who or what is the source of such needs. It is worth adding that these needs may vary depending on the specific business entity (and may concern, for example, technologies that distinguish the company from others), expectations regarding the competences of employees or cooperation with various entities. Slightly fewer respondents (68.6%) indicated that innovativeness is only possible when the organization has the appropriate intellectual potential. The fewest indications concerned the fact that innovativeness occurs in organizations focused on the intellectualization of professional activities (less than 2/3 of the respondents), which is illustrated in chart no. 2.

The statement referring to the fact that innovation occurs in entities focused on the intellectualization of work can be considered as confirmation of thesis no. 2. However, the fact that it was placed in last place by the respondents - among the statements provided - may give rise to some controversy. Research caution suggests that it is not only in such organizations that we are dealing with innovativeness.

SUMMARY

Employees employed in an organization are diverse and it is natural that some people are more innovative than others. The former are characterized by employee ingenuity and the use of innovativeness to a large extent. In a similar way, one can refer to the innovativeness of enterprises, which has always been the key to success in business. Every organization that wants to operate for many years in a competitive market must not only keep up with changes, but rather anticipate changes, take on challenges to the changing reality by stimulating innovativeness. In addition, an organization that actually wants to be innovative should know the needs and expectations of its customers and have knowledge about the activities of competitors in the field of innovativeness.

Studying the perception of innovativeness by respondents is not a new issue, but it is certainly still being deepened by both theoreticians and practitioners, which influenced the choice of the author's research area. The author's research provided insight into respondents' perceptions of innovation in relation to terms describing this characteristic at the organizational level. The main objective of this study was to investigate students' perceptions of organizational innovation, which was achieved by analyzing survey results and theoretical insights. The results showed that the survey respondents exhibited diverse attitudes toward various innovation issues. The research results confirmed the multiple perceptions of organizational innovation and its problematic nature. The results obtained provide answers to

the research problems posed in the introduction. First, the study confirmed that the innovativeness of an enterprise is mainly determined by the ability to identify innovation needs. Second, the study addressed the issue of innovation occurring in entities focused on the intellectualization of work.

The limitation of this study is that it only considers the perceived innovativeness by students and that a non-random sample was selected. The small research sample obliges to be cautious in interpreting the research results. The research results cannot therefore be generalized, but they may become an inspiration for further empirical considerations. Further research can help understand the complexity of categories defining innovativeness and its significance from the perspective of both employees (current and future) and companies. Future analyses (e.g. cross-gender) could show how women and men perceive innovativeness – comparable or different? Similarly, cross-group analysis could be conducted by field and form of study. Further research should focus on examining a broader group. Future research could show whether and possibly how specific individual characteristics of the respondents (primary and secondary identity) influence the perception of innovativeness. The same could be done in the case of organizational characteristics (organizational identity). Further research could also check whether and possibly to what extent employee innovativeness can be linked to other organizational resources (e.g. information).

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DETERMINANTS OF PARTICIPATORY MANAGEMENT IN AN AGILE ORGANIZATION IN THE LIGHT OF OWN RESEARCH

DETERMINANTY ZARZĄDZANIA PARTYCYPACYJNEGO W ZWINNEJ ORGANIZACJI W ŚWIETLE BADAŃ WŁASNYCH

Abstract: Participatory management plays a crucial role in agile organizations, enabling greater employee engagement in decision-making processes and enhancing the organization's ability to adapt to a dynamic environment. The aim of this article is to identify the key determinants of participatory management in an agile organization and analyze their interrelationships. The study employs the Multiple Correspondence Analysis (MCA) method, which allows for a graphical interpretation of relationships between variables and the determination of their impact on organizational functioning. Empirical data were collected through a survey conducted among 303 respondents between April and May 2023. The research findings indicate that active participation of teams in decision-making processes, open communication, shared responsibility for organizational outcomes, and knowledge exchange are key factors influencing the effectiveness of participatory management. The

results also suggest that agile organizations that successfully implement these practices achieve higher levels of flexibility and operational efficiency. This article contributes significant value to organizational management research by providing empirical evidence on the importance of participatory management in the context of agility. The presented conclusions may serve as practical guidelines for managers seeking to implement participatory management models in dynamically structured organizations.

Keywords: Agile organization, participatory management, enterprise, organization, MCA analysis

Streszczenie: Zarządzanie partycypacyjne odgrywa kluczową rolę w organizacjach zwinnych, umożliwiając większe zaangażowanie pracowników w procesy decyzyjne oraz zwiększając zdolność organizacji do adaptacji w dynamicznym otoczeniu. Celem artykułu jest identyfikacja kluczowych determinant zarządzania partycypacyjnego w organizacji zwinnej oraz analiza ich wzajemnych powiązań. W badaniu zastosowano metodę analizy wielokrotnej korespondencji (MCA), która pozwala na graficzną interpretację zależności pomiędzy zmiennymi i określenie ich wpływu na funkcjonowanie organizacji. Dane empiryczne zebrano za pomocą ankiety przeprowadzonej wśród 303 respondentów w okresie kwiecień–maj 2023 roku. Wyniki badań wykazują, że aktywne uczestnictwo zespołów w procesach decyzyjnych, otwarta komunikacja, współodpowiedzialność za wyniki organizacji oraz wymiana wiedzy stanowią kluczowe czynniki wpływające na skuteczność zarządzania partycypacyjnego. Wyniki sugerują również, że organizacje zwinne, które skutecznie wdrażają te praktyki, osiągają wyższy poziom elastyczności oraz efektywności operacyjnej. Artykuł wnosi istotną wartość do badań nad zarządzaniem organizacjami poprzez dostarczenie empirycznych dowodów na znaczenie zarządzania partycypacyjnego w kontekście zwinności. Przedstawione wnioski mogą stanowić praktyczne wskazówki dla menedżerów dążących do wdrażania partycypacyjnych modeli zarządzania w organizacjach o dynamicznej strukturze.

Słowa kluczowe: zwinna organizacja, zarządzanie partycypacyjne, przedsiębiorstwo, organizacja, analiza MCA

INTRODUCTION

Contemporary organizations operate in a dynamic and changing environment that requires flexible and effective management methods. The increasing complexity of business processes, ongoing digitalization, and the growing role of innovation mean that traditional hierarchical models are increasingly giving way to approaches based on cooperation and adaptability. In this context, an agile organization is gaining importance as a model that allows for quick adaptation to changing market conditions. One of the key elements influencing the effectiveness of an agile organization is participatory management, which allows for greater employee involvement in processes decision-making and shaping strategy organizational¹.

¹ DK Masai, J. Sang, R. Odunga, *Effect of Strategic Agility Enablers on Corporate Performance of Un-*

Participatory management constitutes important tool strengthening agility of the organization through decentralization of decisions, open communication and building employees' joint responsibility for achieving goals. Participatory practices support innovation, increase team motivation and enable better use of the intellectual potential of the organization. Despite the growing interest in this approach, there is still a need for an in-depth analysis of the determinants of effective participatory management in agile organizations. The literature on the subject indicates various factors that determine the effectiveness of this model, but there is a lack of comprehensive research empirical taking into account specificity agile structures organizational².

The goal the article is identification key determinants of participatory management in an agile organization and analysis of their mutual relationships. The research involved multiple correspondence analysis (MCA), which enables graphical interpretation of the relationships between variables and allows determining which aspects of participatory management are most important in the context of organizational agility. The article presents both the theoretical foundations of participatory management and its importance for agile organizations, as well as the results of empirical research, which provide new conclusions on topic effective implementation this approaches . Structure article includes a theoretical part , which discusses the concept of an agile organization and the importance of participatory management in this model. Then, the research methodology and the method of using MCA analysis to identify key determinants are presented. The next part presents the research results, which show the relationships between various aspects of participation in management and the ability of the organization to adapt. The last part contains a discussion of the results, conclusions and recommendations for organizations striving to implement effective practice participatory.

Article he brings value added to existing ones research by providing empirical evidence of the importance of participatory management in the context of agile organizations. The results of the MCA analysis allow for a better understanding of participatory management patterns and provide practical guidelines for its implementation in enterprises with a dynamic structure. This study contributes to the development of knowledge in the area of modern management methods and can provide a basis for further analyses of the effectiveness of practices participatory in various sectors economy.

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² D.A. Bray, M. Reeves, S. Levin, JD Harnoss , D. Ueda, G.C. Kane, J.S. Johnson, D. Billespie, *Adapt and thrive: How business leaders can best understand the complex Interplay between companies, economies, and societies?*, „MIT Sloan Management Review” 2019, no. 4-5, pp. 1-23.

BEING MANAGEMENT PARTICIPATORY

Participatory management constitutes one of the key management models of modern organizations, the essence of which is the active involvement of employees in decision-making processes, co-creation of strategies and taking actions aimed at developing the organization. This model is based on the belief that involving team members in management not only increases their motivation and commitment, but also contributes to increased innovation, operational efficiency and abilities adaptive organizations in a dynamic environment³. The foundation management participatory is the belief that employees have knowledge, experience and competences that can be a valuable resource in making decisions of strategic importance. In this organizational model, the role of the leader is not limited only to issuing orders and controlling the implementation of tasks, but above all to creating conditions that are conducive to active exchange of information, open communication and undertaking joint initiatives. An important aspect is building an organizational culture based on trust, transparency and shared responsibility for achieved results⁴.

One of the most important elements management participatory is the decision-making process that is not limited to management staff only, but involves various organizational levels. In organizations using this model, various forms of participation are used, from consultation and dialogue, through delegation of competences, to full co-decision-making. The degree of employee involvement depends on the organizational structure, specificity activities and accepted model management. Important aspect participation is also open communication, which enables the free flow of information and exchange of ideas between employees and management. Organizations based on participatory management emphasize transparency in decision-making processes, which increases the sense of agency among team members and promotes greater identification with organizational goals. Lack of access to information or limited ability to express opinions can lead to a decrease in commitment and a sense of exclusion from essential processes organizational⁵.

Participatory management contributes myself also for development employee competences, as it enables gaining new experiences, improving analytical and strategic skills and building a culture of cooperation. Employees who have a real influence on shaping the organization's activities feel more responsible for the decisions they make, which can translate into increased work efficiency, better organization of pro-

³ M. Chyłek, *Contemporary management enterprise and participation employee*, „Notebooks Scientific University Natural and Humanistic Sciences in Siedlce” 2011, no. 90, pp. 183–194.

⁴ T. Mendel, *Participation in management contemporary organizations*, Academy Publishing House Economics in Poznań, Poznań 2001.

⁵ J. Piwowarczyk, *Participation in management and motivation employees*, Office Economics, Kraków 2006.

cesses and greater flexibility in responding on changing myself conditions market. The next important element The aim of the participatory approach to management is to create mechanisms that facilitate the exchange of knowledge and experience. Organizations operating on the basis of this model often implement various forms of cooperation, such as mentoring, coaching, working groups or information exchange platforms, which facilitate the building of intellectual capital and strengthening innovation. Joint decision-making and knowledge sharing influences the better use of resources organizational and raises quality being worked out solutions⁶.

Participatory management it binds It also faces challenges, including the need to properly prepare leaders to act as moderators of decision-making processes, not just people who issue orders. This requires not only a change in the approach to management, but also the implementation of appropriate tools and methods supporting co-decision-making. Another significant challenge is the balance between employee autonomy and the need to maintain operational efficiency and coherence of the organization's activities. Excessive decentralization of decisions can lead to difficulties in management and an extension of the processes taking up decisions⁷.

Contemporary organizations , especially operating in conditions of dynamic changes and uncertainty, increasingly recognize the importance of participatory management as a tool that allows for increased flexibility and competitiveness. The introduction of participatory mechanisms supports the creation of a learning organization, in which employees not only perform assigned tasks, but also actively participate in creating strategies and directions of development. As a result, these organizations gain greater adaptability and better use the potential of their team, which is important advantage on contemporary market⁸.

RESOURCE MANAGEMENT HUMAN RESOURCES IN AN AGILE ORGANIZATION

Resource Management Human resources management in an agile organization requires a flexible approach to the structure of teams, decision-making methods and methods of developing employee competencies. The key feature of this model is the ability of the organization to respond quickly to changing environmental conditions and effectively adapt to new market challenges. Traditional hierarchical models, in which decision-making processes are centralized, turn out to be ineffective in an environment that requires innovation and continuous adaptation.

⁶ R. Stocki, P. Prokopowicz, G. Żmuda, *Full participation in management*, Wolters Kluwer, Kraków 2008.

⁷ J. Dyczkowska, T. Dyczkowski, *Participatory management and job satisfaction in small and medium-sized enterprises enterprises*, „Works Scientific University Economics in Wrocław” 2014, no. 340, pp. 9–31.

⁸ M. Dankiewicz, *Participatory management and self - confidence effectiveness*, „Notebooks Scientific University Economics in Kraków” 2014, no. 937, pp. 151–163.

Therefore, in agile organizations, human resources management focuses on decentralizing responsibility, strengthening the self-organization of teams and building culture based on openness and cooperation⁹.

One of the most important aspects management resources The human element in an agile organization is to shape a team structure that enables effective decision-making and dynamic response to changing working conditions. Teams operating in such organizations are characterized by a high degree of autonomy and are responsible for achieving goals within clearly defined values and strategic priorities. Instead of a strict hierarchy, models are introduced based on cooperation cross-functional, in which employees have the ability to make independent decisions and directly influence the projects being implemented. This makes the organization more flexible and able to quickly adapt to the changing myself conditions market¹⁰.

In an agile organization, the key the role of employee competence management, which cannot be limited only to traditional career paths and hierarchical promotions. Talent development is based on continuous expansion of skills and their adaptation to the current needs of the organization. In practice, this means investing in the interdisciplinarity of teams and providing employees with opportunities to acquire new competences in various areas of the company's activity. In this management model, it is also important to promote an approach based on learning through experience, mentoring and cooperation within the framework various projects¹¹.

Motivating and engaging employees in an organization based on the principles of agility requires moving away from traditional evaluation and remuneration systems towards models based on organizational values and common goals. Values such as transparency, openness to change, readiness to experiment and responsibility for team results become the foundation for assessing work efficiency. Remuneration in an agile organization is not based only on individual achievements, but also takes into account the contribution to the development of the team and the organization as a whole. Providing flexible forms of work that allow employees to better adapt to professional and personal requirements is also crucial, which increases their satisfaction and long term engagement¹².

Important element management resources The approach to recruitment and selection of employees is also important in an agile organization. In traditional models, these processes focus mainly on matching candidates to specific roles and

⁹ B. Mikuła, A. Potocki, *Methods management innovative and participatory*, Oficyna Publishing Antiqua, Kraków 1997.

¹⁰ D. Łochnicka, *Scope and effects use direct Participation employees in Polish enterprises*, „Notebooks Scientific Higher Schools Bankowa we Wrocławiu” 2013, no. 4, pp. 117–128.

¹¹ K. Zimniewicz, *Science of organization and management*, PWN, Warsaw 1990.

¹² S. Anderson, T. Wilson, *Decentralization and Organizational Agility: A Comparative Study*, “Journal of Strategic Management” 2017, no. 1(42), pp. 56-71; R. Davis, H. Collins, *Flexibility in Action: How Organizational Adaptability Drives Success*, “Journal of Organizational Change Management” 2020, no. 3(37), pp. 212-228.

positions, while in agile organizations, more emphasis is placed on the ability to learn, adapt and cooperate in a dynamic environment. People with a high level of flexibility are sought, who can work effectively in teams, make decisions and actively engage in achieving organizational goals. Therefore, recruitment is not a one-time process, but is part of the continuous improvement of teams and their adaptation competences for changing myself conditions market¹³.

In agile organizations important organizational culture is also important, as it promotes openness to change and building relationships based on trust and cooperation. Creating a work environment in which employees feel appreciated, have space to experiment and develop their ideas, leads to increased creativity and innovation. Trust and mutual respect are key elements that enable efficient functioning in a dynamic and demanding surroundings business¹⁴.

Resource Management in an agile organization also requires modern tools supporting communication and information exchange. Digital technologies play an important role in ensuring effective cooperation, regardless of the location of team members. Project management tools, knowledge sharing platforms and systems for quick decision-making contribute to better functioning of the organization based on on rules agility¹⁵.

Integration all these elements within the human resources management strategy allows the organization to build teams that are able to quickly adapt to changes, cooperate effectively and continuously improve their competences. This allows not only to increase operational efficiency, but also to develop innovation and competitive advantage, which is crucial in a dynamic and demanding surroundings market¹⁶.

PARTICIPATORY MANAGEMENT IN AGILE ORGANIZATION

Participatory management in an agile organization is a key element enabling effective functioning of teams in a dynamic and unpredictable business environment. The basis of this approach is the assumption that employees actively participate in decision-making processes, which leads to a better adjustment of organizational activities to real market challenges. This model assumes not only the decentralization of decisions, but also the building of an organizational structure in which employees have a real impact on the development of the company and its strategic directions. In the

¹³ D.A. Bray, M. Reeves, S. Levin, J.D. Harnoss, D. Ueda, G.C. Kane, J.S. Johnson, D. Billespie, *Adapt and thrive: How can business leaders best understand the complex interplay between companies, economies, and societies?*, "MIT Sloan Management Review" 2019, no. 4-5, pp. 1-23.

¹⁴ P. Cappelli, A. Tavis, *HR goes agile*, "Harvard Business Review" 2018, no. 3-4, pp. 46-52.

¹⁵ S. Kurnia, S.W. Chien, *Building organizational agility through strategic management accounting: A case study of an Indonesian manufacturing company*, "Journal of Asia Business Studies" 2020, no. 4(14), pp. 591-612, <https://doi.org/10.1108/JABS-09-2019-0253>.

¹⁶ H. He, L. Harris, *The impact of organizational agility on crisis management and company performance: A moderation analysis*, "Journal of Business Research" 2021, no. 122, pp. 698-708, <https://doi.org/10.1016/j.jbusres.2020.11.026>.

context of agile organizations, which are characterized by high flexibility and the ability to adapt, participatory management is not only a tool for increasing team involvement, but also a mechanism for better use potential human and resources organizational¹⁷.

One of the most important aspects The most important factor in agile organization is the active participation of the team in decision-making. Employees who have the opportunity to influence the direction of the organization's activities are more likely to identify with its goals and take greater responsibility for the results of their actions. Enabling teams to make decisions shortens the reaction time to changes and increases their ability to solve problems effectively. In organizations using traditional management models, decision-making processes are usually concentrated at the management level, which can lead to delays and limited adaptation to changing myself conditions In organizations based on¹⁸ participatory management, teams make decisions autonomously, which allows them to react faster to challenges and efficiently implement innovative solutions¹⁹.

Influence members team on the direction of the organization's development is another key element of participatory management in agile structures. Employees who participate in shaping the strategy demonstrate a higher level of motivation and engage in activities that go beyond their basic duties. In traditional management models, innovations and strategic changes are introduced mainly by the management staff, while in agile organizations, teams often initiate new solutions that are then implemented throughout the company. Active participation of employees in defining strategic priorities promotes better alignment of the organization's activities with the real needs of the market, and also increases their commitment to implementation long term goals²⁰.

Openness and transparency Communication is another important factor influencing the effectiveness of participatory management in an agile organization. In environments based on participation, the lack of transparency in the flow of information can lead to a decrease in trust and an increase in the risk of bad decisions. Teams that have access to full and reliable information are able to make more informed decisions and adapt their activities more quickly to changing conditions. Transparency of communication also strengthens cooperation between departments, which helps eliminate silo management and supports the building of interdisciplinary teams that are able to implement complex tasks. Projects in a way more effective²¹.

¹⁷ R. Davis, H. Collins, *Flexibility in Action: How Organizational Adaptability Drives Success*, "Journal of Organizational Change Management" 2020, no. 3(37), pp. 212-228.

¹⁸ J.V. Cunha, A. Rego, S.R. Clegg, J. Rodrigues, *Organizational resilience: A research review*, "International Journal of Management Reviews" 2021, no. 1(23), pp. 25-51, <https://doi.org/10.1111/ijmr.12250>.

¹⁹ J.G. Cegarra-Navarro, J.C. Sánchez-García, B. Marco-Lajara, A. García-Pérez, *Building organizational resilience in the face of the COVID-19 pandemic: The role of strategic agility*, "Sustainability" 2021, no. 6(13), p. 3054, <https://doi.org/10.3390/su13063054>.

²⁰ P. Cappelli, A. Tavis, *HR goes agile*, "Harvard Business Review" 2018, no. 3-4, pp. 46-52.

²¹ K. Brown, L. Jones, *The Impact of Decision-Making Speed on Organizational Agility*, "Journal of Applied Psychology" 2018, no. 2(123), pp. 345-35.

Co-responsibility employees for organizational results plays a key role in participatory management and significantly affects the effectiveness of teams. In organizations using traditional management approaches, responsibility for the results achieved rests mainly with the management staff, which can lead to a lack of employee involvement. In agile organizations, the emphasis is on collective responsibility, in which each team member has a real impact on the final result of organizational activities. A high level of shared responsibility promotes greater initiative and proactivity employees, which translates into better organizational results and greater company resilience on unpredictable changes in the environment market²².

Constant exchange knowledge and experience between employees is one of the foundations of participatory management in agile organizations. Employees who regularly share their observations are able to identify potential problems more quickly and develop effective solutions. This process contributes to the continuous learning of the organization and building a culture of innovation, which is necessary to remain competitive in a dynamic market environment. Organizations based on participation invest in systems supporting the exchange of knowledge, such as project management platforms, databases with best practices Whether programs mentoring, which they make it possible employees getting new competences and development their own skills²³.

Participatory management in an agile organization is not only a model that increases the efficiency of operations, but above all a mechanism that enables long-term development and maintaining high adaptability. Aspects such as active participation of teams in decision-making, real influence on the direction of the organization's development, openness and transparency of communication, a high level of shared responsibility for results and constant exchange of knowledge and experience are of key importance here. Integration of these elements in the daily functioning of the organization allows for building a work environment that is conducive to innovation, efficiency and a high level of employee engagement, which in consequence leads to lasting advantages competitive on market²⁴.

²² J. Zhen, Z. Xie, K. Dong, *Impact of IT governance mechanisms on organizational agility and the role of top management support and IT ambidexterity*, "International Journal of Accounting Information Systems" 2021, no. 40, pp. 100-501.

²³ A.G. Raišienė, S. Bilan, V. Smalskys, J. Gečienė, *Emerging changes in attitudes to inter-institutional collaboration: the case of organizations providing social services in communities*, "Administratie si Management Public" 2019, no. 33, pp. 34-56.

²⁴ K. Brown, L. Jones, *The Impact of Decision-Making Speed on Organizational Agility*, "Journal of Applied Psychology" 2018, no. 2(123), pp. 345-35.

ANALYSIS OF OWN RESEARCH

The aim of the research was to determine the determinants of participatory management in an agile organization and to analyze how different aspects of employee participation in decision-making processes affect the functioning of the organization. It was assumed that organizations with a higher level of employee participation are characterized by greater operational efficiency, better information flow and a higher level of team engagement. The research hypothesis assumed that the degree of employee participation in the management of the organization has a significant impact on its agility and ability to adapt in a dynamic environment.

The research asked questions about the level of team participation in decision-making, the influence of employees on the direction of the organization's development, the degree of openness and transparency of communication, the sense of shared responsibility for results, and the intensity of knowledge and experience exchange in teams. The verification of these issues was aimed at determining which aspects of participatory management are most important in the context of organizational agility and what relationships exist between individual factors.

The research method was a survey conducted in April-May 2023 on a sample of 303 respondents. Respondents were asked to assess various aspects of participatory management in their organization, which allowed for the collection of data on their experiences and opinions on the functioning of teams in the context of organizational agility.

In order to identify the relationships between the analyzed variables, MCA analysis was determined. The use of this method allowed for the presentation of relationships between factors in a multidimensional space, which allowed for the determination of similarities and differences between individual determinants of participatory management. Thanks to this analysis, it was possible to indicate areas with the greatest impact on the formation of participatory management structures and to understand which aspects are crucial for the effective functioning of the organization in a dynamic environment.

In progress research tried myself to evaluate determinants management participatory in an agile organization, taking into account opinions respondents on topic key aspects this approaches (table 1).

Table 1. Determinants management participatory in an agile organization , N = 303
 Tabela 1. Determinanty zarządzania partycypacyjnego w zwinnej organizacji, N = 303

Determinants of participatory management in an agile organization	Definitely not	Rather not	I don't have an opinion	Rather yes	Deutschland yes
The team active participates in the decision-making process (1)	5	37	53	129	89
Team members influence the organization's development direction (2)	11	33	50	117	113
The organization supports open communication and transparency (3)	6	25	52	108	75
Employees feel co- responsible for the organization's results (4)	11	20	41	112	114
The team regularly shares knowledge and experience (5)	10	31	45	104	99

Source: own study.

Analysis results shows varied approach to issues related to the participation of teams in decision-making, the influence of team members on the development of the organization, open communication, and shared responsibility for results and exchange knowledge and experience. In relation to the active team participation in the decision-making process, a decidedly negative position was expressed by 5 people, while 37 people assessed this aspect rather negatively. No unequivocal opinion was declared by 53 respondents. A significant part of the respondents, 129 people, assessed this area rather positively, and 89 respondents expressed determined support.

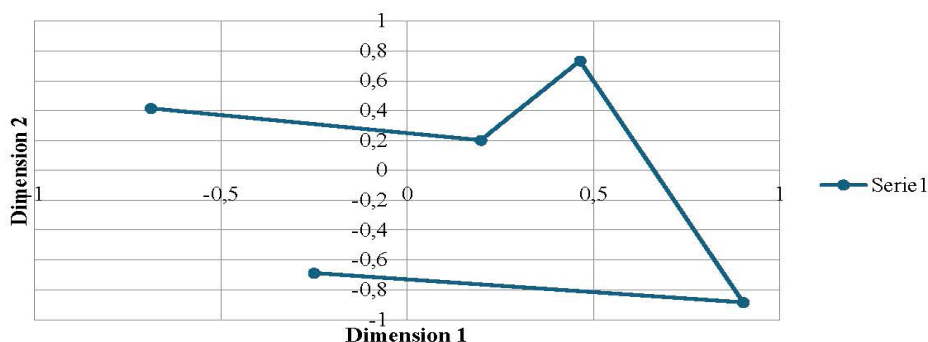
In case of influence members team 11 respondents expressed a decidedly negative assessment of the direction of the organization's development, and 33 rather negative. 50 respondents adopted a neutral attitude towards this determinant. 117 people viewed this aspect of participatory management positively, and 33 people decidedly negative, positive opinion 113 respondents expressed this. If it's about supporting open communication and transparency in the organization, 6 people assessed this element definitely negatively, while 25 respondents expressed a rather negative opinion. No specific opinion in this respect was declared by 52 participants of the study. In turn, 108 people assessed this aspect rather positively, and 75 respondents gave definitely positive answers.

In the context co-responsibility employees 11 people took a negative position on the organization's results, and 20 respondents took a rather negative position.

41 participants of the study declared an undefined attitude. 112 people expressed a rather positive approach to this determinant, while 114 respondents considered I for definitely positive.

Last analyzed area it concerned exchange knowledge and experience in teams. It was assessed definitely negatively by 10 people, and rather negatively by 31 respondents. No unequivocal opinion was declared by 45 people. This aspect was assessed rather positively by 104 respondents, and definitely positively by 99 people.

Figure 1. Multiple Correspondence Analysis (MCA)
Rysunek 1. Analiza wielokrotnej korespondencji (MCA)



Source: own study.

In order to identify the relationships between factors influencing participatory management in an agile organization, MCA analysis was determined. Fig. 1. presents the distribution of variables on two dimensions, which allows for determining the similarities and differences between the analyzed factors.

On the horizontal axis marked as Dimension 1 reflects the main difference in the approach to participatory management, while the vertical axis of Dimension 2 presents an additional dimension differentiating the analyzed aspects. Individual factors are distributed in the space of the graph in a way that allows them to be compared. Factors located closer to each other show greater structural similarity, while those located further away are more diverse.

The observed distribution indicates the existence of certain groups of variables that can be interpreted as sets of similar nature. Points placed on the graph in a scattered manner suggest greater diversity of answers among respondents, while those concentrated around specific areas may indicate stronger connections between given aspects of participatory management.

The analysis allows us to determine the degree of influence of individual determinants on shaping agile management. Factors that are in the extreme areas may indicate significant differences in the perception of participation, while variables

located closer to the center of the coordinate system may be more universal and widely accepted in the context of organizational management.

CONCLUSIONS

Analysis results research she allowed to determine the key determinants of participatory management in an agile organization and their impact on the functioning of teams. The results indicate that employee participation in decision-making processes is diverse and its level depends on several important factors, such as organizational culture, the degree of openness to transparency and the management structure. It has been shown that the greater the team's involvement in decision-making, the greater its ability to adapt to dynamic conditions organizational . Research showed that open communication and clarity management processes play an important role in shaping the participatory style of managing an organization. Employees who have access to information and understand organizational goals are more likely to be involved in decision-making and identify with the company's values. High transparency in an organization also promotes an increased sense of shared responsibility for results, which is reflected in higher efficiency of team activities and bigger innovation taken initiatives.

Identified too relevant the impact of knowledge and experience exchange on the effectiveness of participatory management. Organizations in which employees regularly share information and actively participate in the learning process achieve better results in terms of agility and flexibility of operation. Knowledge exchange enables better adaptation to changing conditions, as well as it favors working out creative solutions. MCA analysis showed that determinants participatory management are not evenly distributed, which indicates the existence of certain patterns and groups of variables of greater or lesser importance for the functioning of an agile organization. Factors related to the team's participation in the decision-making process and knowledge exchange were placed in areas indicating their strong connections, which may suggest that they are crucial for building a participatory culture. At the same time, it was noted that some variables, such as joint responsibility for the organization's results, may be perceived differently by respondents, which may result from differences in models management used in the tests organizations.

Results research indicate that participatory management in an agile organization is not a uniform process, and its effectiveness depends on many interdependent factors. Key determinants such as open communication, active participation of employees in decision-making processes and a culture of knowledge sharing have a significant impact on increasing organizational agility. These areas require special attention, as their development can contribute to the growth efficiency and competitiveness of the organization.

Based on the results research recommends myself implementation of activities aimed at strengthening participatory management in organizations striving to increase their agility and efficiency. Particular attention should be paid to creating an organizational culture that promotes open communication and transparency of decision-making processes. Transparency in management increases the sense of responsibility among employees and promotes their greater involvement in achieving organizational goals. Regularly informing teams about the company's strategy, goals and results allows for a better understanding of the direction of development and increases readiness employees to take up independent initiatives.

Important area demanding attention is also paid to developing mechanisms that support active employee participation in decision-making processes. Implementing tools that enable co-decision-making and consulting key organizational issues contributes to an increased sense of influence on the company's functioning, which translates into greater motivation to act. Creating structures based on team autonomy allows for better use of their potential and shortening the time reaction on changing myself conditions market.

Important element building participatory culture is the development of systems that support the exchange of knowledge and experience between employees. Organizations should invest in mechanisms that facilitate knowledge sharing, such as cooperation platforms, mentoring, coaching or training programs. Creating a space for the exchange of information and good practices promotes increase innovation and efficiency Actions teams.

Strengthening co-responsibility employees for the organization's results requires building a work environment based on cooperation and mutual trust. It is worth striving for remuneration systems and performance evaluations to take into account not only individual achievements, but also the contribution to the development of the entire team and organization. Emphasizing the importance of cooperation and collective success can contribute to the growth commitment and efficiency employees.

The quest for agility organizational requires comprehensive approach to participatory management. Key activities should focus on strengthening open communication, developing team autonomy, facilitating knowledge exchange and building a sense of shared responsibility. Integrating these elements within the organizational strategy will increase adaptability and improve efficiency actions in dynamic surroundings business.

Limitations research were due to several factors that could affect the interpretation of the results and their scope of generalization. One of the key limitations was the selection of the sample, which included 303 respondents, which, although it ensured representativeness for a specific group, did not allow for a full reflection of the diversity of organizations using participatory management. It was possible

that there were differences resulting from the industry, organizational structure or scale of operations of enterprises, which could affect on obtained results. The next limitation was method collecting data, based on a survey based on respondents' declarations. The subjective nature of the answers could have influenced the results, as the study participants assessed their experiences and perceptions of participatory management, which could lead to an anchoring effect or an inaccurate assessment of the actual processes taking place in organizations. It is not possible to verify the answers based on other research methods, such as observation or data analysis organizational, could restrict fuller interpretation phenomena.

The limitation was also using multiple correspondence analysis (MCA) as the main method to explore relationships between variables. Although this method allows identification of patterns and relationships, does not provide direct information about the direction and strength of the influence of individual factors. Therefore, the results should be treated as a starting point for further research using more advanced methods quantitative or qualitative. Additional a challenge was possibility influence factors contextual factors, such as organizational culture, specificity of the economic sector or market environment, on the research results. These factors could have shaped the approach to participatory management, but the research did not take them into account in detail, which could have led to certain simplifications in interpretation results.

Important limitation was also the time of the study, covering the period from April to May 2023. The results could be dependent to some extent on the current market situation, and in particular on the dynamic economic and technological changes influencing the way organizations are managed. It is possible that in other periods of time the results could look different, especially if organizations were adapting own models management to new challenges.

That because on these limitations The obtained results should be interpreted with caution and treated as a basis for further research that could complement the analysis with additional variables, apply methodological triangulation and take into account perspective different groups stakeholders in the organization. Future directions research they can concentrate myself on in-depth analysis of the impact of participatory management on the long-term agility of the organization and its ability to adapt in conditions of market uncertainty. It may be particularly important to examine how different models of participation affect operational efficiency in organizations operating in different sectors of the economy. Considering industry conditions would allow for the identification of specific factors determining effectiveness management participatory in the context of organizational.

Interesting direction research Maybe to be also analysis the impact of new technologies, such as artificial intelligence and decision support systems, on participatory processes in agile organizations. Research may focus on identifying

mechanisms that enable the use of modern tools to increase the transparency of decision-making processes and employee involvement in shaping organizational strategies. In this context, it may also be important to determine the role of data analysis and learning algorithms machine in improvement mechanisms co-decision . The next area demanding further research is to evaluate long-term effects of participatory management on the development of employee competences and their motivation to take initiatives. Analysis of the impact of participatory management methods on talent retention and organizational culture can provide valuable information on how to build lasting engagement in organizations with a high level of agility. It is also worth taking into account differences resulting from the level of professional experience and employee preferences, which would allow for better adjustment of participatory strategies to the needs different groups in the organization.

Tests they can too include analysis international, allowing to compare different approaches to participatory management in organizations operating in different cultural contexts. Identifying similarities and differences in the scope of applied practices and their effectiveness depending on the norms and values dominant in a given country could provide new conclusions regarding the impact conditions cultural on way management of the organization. Further exploration topic Maybe also include analysis resilience of organizations with a high level of participation to crises and emergency situations. Examining how organizations based on participatory management respond to sudden market changes, economic crises or global turbulence can provide important information on the effectiveness of these methods in conditions of high uncertainty. Integration of research in this area with scenario analysis could allow for the development of recommendations regarding strategies for building resistance organizational by at the same time behavior agility.

Taking into account those aspects in future research may allow for a more comprehensive understanding of the mechanisms of participatory management and its role in building modern and adaptive organizations. Further analyses may also contribute to the development of new management models that take into account both technological factors and changing employee expectations towards organizational structure and culture.

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WELLBEING AND PSYCHOLOGICAL SAFETY IN AN AGILE ORGANIZATION – ANALYSIS OF OWN RESEARCH

WELLBEING I PSYCHOLOGICZNE BEZPIECZEŃSTWO W ZWINNEJ ORGANIZACJI – ANALIZA BADAŃ WŁASNYCH

Abstract: The aim of this article is to analyze the key determinants of well-being and psychological safety in agile organizations and their impact on team effectiveness. The study focuses on the relationships between psychological safety, innovation, employee engagement, and an organization's ability to manage change. A survey conducted on a sample of 303 respondents between April and May 2023 was analyzed using Pearson correlation, allowing for the determination of the strength and direction of the relationships between the studied variables. The results indicate that open communication, team support, promoting work-life balance, and a culture of learning from mistakes significantly enhance psychological safety and wellbeing, leading to greater engagement, better ada-

ptability, and higher innovation levels. The study highlights the importance of integrating wellbeing strategies into organizational management to improve long-term efficiency and resilience. The findings provide practical insights for managers and decision-makers, supporting the development of an organizational culture based on trust, collaboration, and employee development. The originality of the research lies in its empirical verification of the impact of psychological safety on agile organizations, offering valuable insights for management practices.

Keywords: wellbeing, psychological safety, agile organization, enterprise, Pearson correlation

Streszczenie: Celem artykułu jest analiza kluczowych determinant wellbeing i psychologicznego bezpieczeństwa w organizacjach zwinnych oraz ich wpływu na efektywność zespołów. Badanie koncentruje się na zależnościach między psychologicznym bezpieczeństwem a innowacyjnością, zaangażowaniem pracowników i zdolnością organizacji do zarządzania zmianą. Ankieta przeprowadzona na próbie 303 respondentów w okresie kwiecień-maj 2023 została poddana analizie z wykorzystaniem korelacji Pearsona, co pozwoliło określić siłę i kierunek zależności między badanymi zmiennymi. Wyniki wykazują, że otwarta komunikacja, wsparcie zespołowe, promocja równowagi między życiem zawodowym a prywatnym oraz kultura uczenia się na błędach znacząco wzmacniają psychologiczne bezpieczeństwo i wellbeing, co przekłada się na większe zaangażowanie, lepszą adaptacyjność i wyższą innowacyjność. Badanie podkreśla konieczność integracji strategii wellbeing z zarządzaniem organizacyjnym w celu zwiększenia długoterminowej efektywności i odporności organizacji. Wyniki dostarczają praktycznych wskazań dla menedżerów i decydentów, wspierając rozwój kultury organizacyjnej opartej na zaufaniu, współpracy i rozwoju pracowników. Oryginalność badań wynika z empirycznej weryfikacji wpływu psychologicznego bezpieczeństwa na organizacje zwinne, dostarczając cennych wniosków dla praktyki zarządzania.

Słowa kluczowe: wellbeing, psychologiczne bezpieczeństwo, zwinna organizacja, przedsiębiorstwo, korelacja Pearsona

INTRODUCTION

Wellbeing and psychological safety in agile organizations are key factors influencing work efficiency, innovation and long-term employee engagement. Modern organizations operate in a dynamic and demanding environment that requires not only high flexibility, but also the ability to quickly adapt to changes. In this context, building an organizational culture based on trust, open communication and supporting employee well-being takes on strategic importance. Employees who feel safe in their workplace are more likely to engage in decision-making processes, take the initiative and implement innovative solutions. A high level of well-being and psychological safety translates into team stability, reduced staff turnover and increased operational efficiency¹.

¹ *Workplace Safety in Poland 2023*, Safe at Work Coalition, 2023, available online: https://bezpieczniwpracy.pl/wp-content/uploads/2023/09/Raport_Bezpieczenstwo_Pracy_w_Polsce_2023-1.pdf.

The aim of the article is to analyze the key determinants of well-being and psychological safety in an agile organization and their impact on team effectiveness. The research attempts to determine the relationship between the level of psychological safety and innovation, employee engagement and the ability of the organization to effectively manage change. In particular, the analysis covered aspects such as openness to expressing opinions, the level of mutual support in the team, care for work-life balance and the approach to mistakes as an element of the learning process. The research results allow for the identification of areas requiring special attention and the indication of actions that can contribute to building a work environment conducive to well-being and effectiveness.

The structure of the article includes a theoretical part, which discusses the importance of well-being and psychological safety in agile organizations and their impact on key management processes. Then, the research methodology is presented, describing the tools used and the method of collecting and analyzing data. The next part presents the research results and their interpretation in the context of contemporary management models. The last part contains a summary of the results, conclusions and recommendations for the implementation of strategies that support the development of an organizational culture based on well-being and psychological safety.

The article contributes significant value to research on organizational management by providing empirical evidence of the importance of psychological safety in the context of team effectiveness and innovation. It also indicates practical solutions that can be implemented by organizations striving to increase their adaptive potential and create an environment conducive to long-term employee engagement. The obtained results can be the basis for further research on the impact of psychological safety on organizations operating in conditions of dynamic changes and growing expectations towards modern methods of human resources management.

EMPLOYEES AS THE MOST PRECIOUS ORGANIZATION RESOURCE

Employees are the most valuable resource of any organization, because it is their knowledge, skills and commitment that determine the competitiveness and ability of the company to adapt in a dynamically changing environment². Modern organizations, regardless of the industry, increasingly recognize that human capital is a key factor in building a strategic advantage³. Highly qualified and motivated

² N.C. Tsourveloudis, K.P. Valavanis, *On the measurement of enterprise agility*, "International Journal of Intelligent and Robotic Systems" 2002, No. 33, pp. 329-342.

³ R.T. Munodawafa, S.K. Johl, *A Systematic Review of Eco-Innovation and Performance from the Resource-Based and Stakeholder Perspectives*, „Sustainability” 2019, No. 11, pp. 60-67; A. Doś, *Contemporary concepts purpose companies in terms of implementation rules Sustainable development*, in: T. Famulska, J. Nowakowski, *Controversy around finance*, PWN, Warsaw 2011, pp. 34-44.

staff enable the development of innovations, effective implementation of processes and flexible response to changing market conditions. Unlike material resources, such as technology or infrastructure, human resources have the ability to self-improvement and development, which makes their value increase as new competences and experiences are acquired⁴.

Human capital management requires not only the right selection of employees, but also the creation of conditions that enable their development, professional satisfaction and commitment⁵. Organizations that invest in the development of their employees build a culture of innovation and agility, which promotes long-term success. Supporting employees through training, mentoring and coaching programs increases their effectiveness and improves their ability to cope with new challenges. Talent management is also of particular importance, as it allows the organization to identify and develop key competencies necessary to achieve strategic goals⁶.

An important element of human resources management is also building employee engagement, which affects their efficiency, loyalty and readiness to take on additional initiatives⁷. A high level of engagement contributes to increased productivity and also to reducing staff turnover, which is a significant challenge for organizations in a competitive labor market. Employees who feel appreciated, have the opportunity to influence decisions and work in an environment based on trust and cooperation, show greater motivation to act and readiness to take on new challenges⁸.

An organizational culture based on values such as participation, open communication, and mutual support not only promotes better team functioning, but also increases innovation⁹. Organizations that allow employees to freely exchange knowledge support their creativity and the creation of new solutions that can contribute to the development of the company. Employees who have the opportunity to learn from mistakes and experiment are more willing to take the initiative, which in the long run translates into organizational success¹⁰.

⁴ C. Li, F. Lalani, *The COVID-19 pandemic has changed education forever: A review of the significant effects of COVID-19 on education*, „Journal of Educational Change” 2021, No. 22(3), pp. 34-35.

⁵ Ch. Yang, H.M. Liu, *Boosting company performance via enterprise agility and network structure*, „Management Decision” 2012, no. 6(59), pp. 4-12.

⁶ R.J. Krumsvik, *Crisis-driven digital transformation in higher education: An analysis of current trends and future directions*, „International Journal of Educational Technology in Higher Education” 2021, No. 18(1), pp. 15-19.

⁷ P. Cappelli, A. Tavis, *HR goes agile*, „Harvard Business Review” 2018, no. 3-4, pp. 46-52; S. Meredith, D. Francis, *Journey towards agility: The agile wheel explored*, „The TQM Magazine” 2000, no. 12 (2), pp. 1-11.

⁸ J. Zhen, Z. Xie, K. Dong, *Impact of IT governance mechanisms on organizational agility and the role of top management support and IT ambidexterity*, „International Journal of Accounting Information Systems” 2021, No. 40, pp. 100-501.

⁹ V.D. Kusuma, *Proposed corporate performance management using knowledge-based performance management system (KBPMs) for private individuals*, „Journal of Economics and Business UBS” 2024, no. 13(1), 296. e-ISSN : 2774-7042, p-ISSN: 2302-8025.

¹⁰ *Concepts and notions of well-being: A review and an attempt at systematization*, „Studia z Teorii Wychowania” 2019, No. 10(1), pp. 9-25, available online: <https://bibliotekanauki.pl/articles/1878766.pdf>.

Taking care of well-being and psychological safety at work is an important element of the human resources management strategy. Creating an environment in which employees feel comfortable, have access to support and the possibility of maintaining a work-life balance affects their long-term engagement and work effectiveness. Organizations that implement policies supporting mental health, flexible forms of work and a culture based on mutual respect achieve better results and are more resilient to changes in the market environment.

THE ROLE OF WELLBEING AND PSYCHOLOGICAL SUPPORT IN A MODERN ORGANIZATION

Wellbeing and psychological support play a key role in shaping modern organizations that strive to increase efficiency, innovation and long-term employee engagement. Modern companies operate in a dynamic, unpredictable environment, which requires a flexible approach to human resource management and ensuring conditions that are conducive to both psychological well-being and high team productivity. The departure from traditional hierarchical structures and the transition towards organizations based on cooperation, agility and open communication makes the role of wellbeing increasingly important, and its impact goes beyond the area of employee satisfaction, influencing strategic organizational goals¹¹.

Taking care of well-being in the workplace translates into greater organizational resilience to change and crises. Employees who feel comfortable and have adequate psychological support cope better with stress and adapt more easily to new challenges. Organizations that consistently implement well-being strategies have lower absenteeism, lower staff turnover, and greater commitment to achieving business goals. Creating an environment conducive to well-being is not limited to physical health, but also includes emotional stability, a sense of security, and social support¹².

Psychological support plays a key role in building an organizational culture based on trust and openness. Employees who feel heard and have access to support mechanisms show greater motivation and initiative, which directly translates into their effectiveness. The introduction of mentoring and coaching systems and psychological support programs helps employees cope better with pressure and professional challenges, which leads to an increase in their satisfaction and loyalty to the organization. Employers who consciously invest in the development of emotional and social competences of their teams gain more committed and resi-

¹¹ I. Steinerowska-Streb, *Psychological safety in an organization from the perspective of management sciences and quality*, „Przegląd Organizacji” 2020, No. 9(968), pp. 3-11.

¹² R. Klamut, *Security as a psychological concept*, „Scientific Papers of Rzeszów University of Technology. Economics and Humanities” 2012, No. 19(4), pp. 19-28.

lient employees who can cooperate effectively and make independent decisions¹³.

Modern organizations face the challenge of adapting the work environment to the diverse expectations of employees. In the era of hybrid work and distributed teams, well-being and psychological safety must also include activities aimed at integrating teams and building a sense of belonging, even in a situation of limited direct contact. Supporting mental well-being in such conditions requires modern tools, such as communication management systems, collaboration platforms or team sentiment analysis tools. Organizations that can effectively manage relationships in a remote and hybrid model gain a greater ability to attract talent and maintain a high level of engagement in the long term¹⁴.

Wellbeing and psychological support play an important role in the process of adapting to change and building organizational resilience. In an environment where employees can openly talk about their needs and concerns, it is easier to introduce innovations and effectively implement transformation strategies. Organizations that consistently develop policies supporting mental health and work-life balance achieve better results in change management and minimize the negative effects of pressure related to the need to adapt to new market conditions¹⁵.

CONCEPT WELLEING AND PSYCHOLOGICAL SUPPORT IN AGILE ORGANIZATION

Wellbeing and psychological safety of work in an agile organization are key elements of building an environment that supports employee effectiveness, innovation and long-term engagement. Modern organizations operate in a dynamic environment that requires flexibility and the ability to adapt both at the individual and team level. In this context, providing employees with conditions that support their well-being and a sense of psychological safety becomes not only a matter of organizational ethics, but also a strategic tool for increasing the competitiveness and resilience of the organization¹⁶.

One of the fundamental aspects of psychological safety in the work environment is the ability to freely express opinions and participate in decision-making processes. In

¹³ A. Florczak, *Psychological mechanisms of health safety*, „Studies and Works of the Faculty of Economics and Management of the University of Szczecin” 2019, No. 56(2), pp. 45-56.

¹⁴ A. Wilczyński, E. Kołoszycz, *Applying the PERMA model in employee wellbeing*, „E-mentor” 2023, No. 2(99), pp. 39-46.

¹⁵ *Wellbeing in the organization: Between science and marketing hype*, SWPS University of Social Sciences and Humanities, 2023, available online: <https://swps.pl/centrum-prasowe/informacje-prasowe/36332-wellbeing-w-organizacji-miedzy-nauka-a-marketingowym-szumem>.

¹⁶ *Mental Wellbeing of Employees in Poland*, Mindy, 2021, available online: https://activityland-ingslxcontent.blob.core.windows.net/content-bike/Raport_Wellbeing_mentalny_pracownikow-Mindy_2021.pdf.

organizations where open communication is supported, employees are more willing to engage in discussions, share their ideas and take the initiative to solve problems¹⁷. The lack of fear of evaluation or negative consequences promotes greater creativity and innovation, which translates into the effectiveness of the organization as a whole. An open communication culture not only increases employee satisfaction, but also allows for more effective conflict management and building relationships based on trust¹⁸.

Teamwork and mutual support are other important elements that affect psychological safety at work. A work environment in which team members can count on each other builds a sense of stability and confidence, which in turn affects their motivation and level of engagement. Organizations that promote a culture of collaboration observe better team dynamics, higher efficiency in task execution, and greater resilience to crisis situations. The ability to effectively cooperate in difficult situations also strengthens trust within the organization, which is the foundation of well-functioning agile structures¹⁹.

Work-life balance is becoming one of the key factors influencing employee well-being. In organizations that actively support work-life balance, employees demonstrate higher levels of motivation, are less likely to experience burnout and are more able to effectively manage their responsibilities. Ensuring flexibility in work organization, the ability to adjust the schedule to individual needs and introducing policies that support mental well-being helps increase productivity and long-term employee loyalty to the organization²⁰.

One of the key elements of psychological safety is approaching mistakes as an element of the learning process. Organizations that promote a culture of experimentation and treat mistakes as an opportunity for development create an environment that is conducive to innovation and openness to change. In environments where making mistakes is associated with fear of consequences, employees show less willingness to take risks, which leads to stagnation and limitation of the development potential of the organization. Promoting an attitude based on reflection and analysis of experiences allows organizations to adapt to changes more effectively and improve operational processes²¹.

¹⁷ T. Alaa Diame, M.A. Jaleel, M.S. Ettym, H. Günerhan, *Data management and decision-making process using machine learning approach for enterprises*, „Journal of Intelligent Systems and Internet of Things” 2024, no. 8(1), 75- 88, <https://doi.org/10.54216/JISIoT.080107>.

¹⁸ Health security vs. psychological well-being, „Rocznik Bezpieczeństwa i Obronności” 2017, No. 11(1), pp. 123-135, available online: <https://cejsh.icm.edu.pl/cejsh/element/bwmeta1.element.ceon.element-5c57429b-ec12-3a55-8e98-f6bfe1beb0d4/c/pdf-01.3001.0012.2379.pdf>; E. Karakaya, A. Hidalgo, C. Nuur, Diffusion of eco-innovations: A review. *Renewable and Sustainable Energy Reviews* 2014, No. 33, p. 394.

¹⁹ R.T. Munodawafa, S.K. Johl, A Systematic Review of Eco-Innovation and Performance from the Resource-Based and Stakeholder Perspectives, „Sustainability” 2019, No. 11, pp. 60-67.

²⁰ Applying the PERMA model in employee wellbeing, „E-mentor” 2023, No. 2(99), pp. 39-46, available online: <https://www.e-mentor.edu.pl/eng/article/index/number/99/id/1605>.

²¹ V. Nath, R. Agrawal, *Agility and lean practices as antecedents of supply chain social sustainability*,

Psychological safety also plays a significant role in stimulating innovation. Employees who feel comfortable expressing their ideas and engaging in creative processes are more motivated to collaborate on new solutions. Innovative organizations that consistently develop a culture that supports psychological safety achieve better results in implementing changes and new strategies. The lack of fear of evaluation or failure promotes openness to experimenting and testing unconventional solutions, which is a key factor in success in a competitive business environment²².

Integrating well-being and psychological safety into the daily functioning of an organization requires not only implementing appropriate policies and strategies, but also consciously building an organizational culture in which every employee feels appreciated and supported. Organizations that effectively combine these aspects with participatory management gain more engaged and change-resistant employees, which translates into their ability to achieve long-term strategic goals. Taking care of psychological safety and well-being in an agile organization is not only an element of building a positive image of the employer, but is the foundation for effective and stable functioning in a changing economic environment²³.

ANALYSIS OF OWN RESEARCH

The aim of the research was to determine the impact of well-being and psychological safety of work on the functioning of teams in an agile organization and to identify key factors shaping these areas. In particular, it was sought to determine the extent to which a sense of safety in expressing opinions, team support, work-life balance, approach to making mistakes and the impact of psychological safety on team innovation affect work efficiency and employee engagement. The study aimed to determine whether a high level of psychological safety contributes to increased employee participation in decision-making processes and their willingness to take the initiative in an agile organization.

The research hypothesis assumed that well-being and psychological safety of work in an agile organization have a significant impact on the level of employee engagement, their ability to effectively cooperate and the innovation of teams. It was assumed that organizations that promote open communication, support a culture of learning from mistakes and care about work-life balance achieve a higher level of organizational effectiveness and flexibility.

The research asked questions about the level of psychological safety in the organization, including the extent to which employees feel comfortable expressing the-

„International Journal of Operations & Production Management” 2020, No. 10, pp. 1589-1611.

²² Y. Doz, M. Kosonen, *The Dynamics of Strategic Agility: Nokia's Rollercoaster Experience*, „California Management Review” 2008, No. 50, pp. 1-6.

²³ R. Raschke, *Process-based view of agility: The value contribution of IT and the effects on process outcomes*, „International Journal of Accounting Information Systems” 2010, No. 11, pp. 297-313.

ir opinions and sharing ideas, and whether the team provides support in difficult situations. It also analyzed the extent to which the organization promotes work-life balance and whether it allows employees to learn from mistakes, treating them as part of the development process. Another important issue was determining the impact of psychological safety on the team's innovativeness and its ability to take risks in the context of implementing new solutions.

The research method was a survey conducted in April-May 2023 on a sample of 303 respondents. The study participants were asked to assess individual aspects of psychological safety and well-being in their organizations, which allowed for the collection of quantitative data enabling the analysis of the relationships between variables. In order to determine the strength and direction of the relationships between the analyzed factors, the Pearson correlation coefficient was calculated. This analysis allowed for the assessment of the degree to which individual aspects of well-being and psychological safety of work interact. Thanks to this, it was possible to determine which factors have the greatest impact on shaping an organizational culture based on participation, openness and trust. The correlation also allowed for the identification of potential areas requiring further analysis and the indication of relationships that may be of significant importance for effective team management in agile organizations.

The research aimed to assess the level of well-being and psychological safety of work in an agile organization by analyzing the opinions of respondents on key aspects of this issue. The research results allow us to understand to what extent employees feel safe expressing their opinions, to what extent teams support each other in difficult situations, and what importance it has for the organization to promote work-life balance. In addition, the analysis included an assessment of the approach to errors as an element of the learning process and the impact of psychological safety on the team's innovativeness.

In relation to the sense of security in expressing one's own opinions, 5 respondents took a definitely negative position, while 25 assessed this aspect rather negatively. 53 people declared that they had no clear opinion on this issue. A significant part of the respondents, 124 respondents, assessed this area rather positively, and 99 people gave a definitely positive answer. In the case of support in difficult situations, 10 people strongly disagreed with the statement that the team supports each other, and 30 respondents considered this to be rather untrue. 41 respondents took a neutral attitude towards this issue. 119 people expressed a positive assessment of this aspect of participatory management, and 78 respondents assessed it definitely positively.

The promotion of work-life balance was assessed negatively by 15 respondents, while 34 considered this aspect to be rather poorly implemented. An undefined attitude to this issue was declared by 45 respondents. 117 respondents responded rather positively to this issue, while 96 people assessed it strongly positively. In relation to the organisation's approach to errors and treating them as an element of the learning process, 19 respondents strongly disagreed with this approach, while

24 people considered it not to be properly implemented. A neutral attitude towards this issue was declared by 54 respondents. 111 people expressed a rather positive attitude to this practice, while 80 respondents assessed it strongly positively.

The last analyzed area concerned the impact of psychological safety on the team's innovativeness. It was assessed strongly negatively by 9 respondents, and 38 people considered this aspect to be rather poorly implemented. 50 people took an undefined position. 115 respondents had a rather positive attitude to this issue, while 108 people expressed a strongly positive opinion.

Table 1. Wellbeing and psychological security in an agile organization, N = 303

Table 1. Wellbeing i psychologiczne bezpieczeństwo w zwinnej organizacji, N = 303

Wellbeing and psychology safety at work in an agile organization	Definitely NOT	Rather NOT	I don't have an opinion	Rather YES	Definitely YES
Employees feel safe to express their opinions (1)	5	25	53	124	99
The team supports each other in difficult situations (2)	10	30	41	119	78
The organization promotes work-life balance (3)	15	34	45	117	96
Employees are not afraid to make mistakes and learn from them (4)	19	24	54	111	80
Psychological safety enhances innovation in the team (5)	9	38	50	115	108

Source: own.

The correlation analysis presented in Table 2 allows for determining the relationships between the individual aspects of well-being and psychological safety at work in an agile organization, which were assessed in Table 1.

Table 2. Correlation table, N = 303

Table 2. Tabela korelacji, N = 303

	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>1</i>	1				
<i>2</i>	0.98	1			
<i>3</i>	0.99	0.98	1		
<i>4</i>	0.98	0.98	0.97	1	
<i>5</i>	0.98	0.95	0.98	0.95	1

Source: own.

High values of correlation coefficients indicate strong connections between the analyzed variables, which suggests that the elements that make up psychological safety and well-being in the work environment are closely related and mutually reinforce each other. The highest correlation values are observed between the sense of safety in expressing opinions and other factors, which may indicate that openness in communication is a key element in shaping an atmosphere conducive to both cooperation and innovation. A strong correlation with the level of team support in difficult situations suggests that employees who feel safe in expressing their opinions also experience greater support in the work environment.

The significant correlation between promoting work-life balance and other factors indicates that organizations that care about employee well-being also create conditions that are conducive to their engagement and effectiveness. The high correlation between treating errors as an element of the learning process and team innovation confirms that the culture of psychological safety affects the willingness to experiment and implement new solutions. Slightly lower correlation values between some variables may indicate that some aspects of well-being and psychological safety at work can be shaped independently of each other or depend on specific organizational factors. Nevertheless, the general arrangement of values in Table 2 suggests that all the analyzed areas are interconnected and constitute integral elements of participatory management in an agile organization.

CONCLUSIONS

The analysis of the research results allowed us to determine significant relationships between well-being, psychological safety at work and the functioning of teams in an agile organization. The data obtained confirm that organizations promoting open communication, supporting their employees in difficult situations and providing the opportunity to learn from mistakes achieve a higher level of team engagement and effectiveness. The research results showed that psychological safety, understood as the ability to freely express opinions and experiment without fear of negative consequences, is crucial for organizational innovation and dynamics. Employees who feel safe in their work environment show greater initiative, are more willing to engage in decision-making processes and are more willing to take risks in order to implement new solutions.

The strong correlation between the level of team support and psychological safety indicates that organizations with a culture of mutual help and trust can more effectively build a participatory work environment. A supportive team provides a foundation for knowledge exchange, which in turn translates into better organizational performance and greater resilience to unforeseen challenges. Open communication in the organization is also important for employee well-being, as

it eliminates the feeling of isolation and strengthens their self-confidence in the workplace. Employees who feel that their opinions are heard and taken into account show greater loyalty to the organization and higher levels of job satisfaction.

The identified relationships between promoting work-life balance and other well-being factors indicate that organizations that care about this aspect increase not only work comfort, but also long-term employee engagement. Lack of care about work-life balance can lead to burnout, which negatively affects team effectiveness and employee turnover. Agile organizations that implement policies that enable flexible work time management and promote work-life balance show greater stability and the ability to attract and retain talent.

The high correlation between treating mistakes as an element of the learning process and team innovation confirms that an organizational culture based on openness to experimentation promotes the emergence of new ideas and their effective implementation. In organizations where making mistakes is treated as an element of development, employees show greater willingness to take on challenges and engage in projects that require creativity and an unconventional approach. Fear of mistakes and negative consequences inhibits innovation, which can lead to organizational stagnation and limited adaptability in a dynamic business environment.

Correlation analysis confirmed that all the factors studied are closely related, which suggests that well-being and psychological safety at work cannot be treated as isolated elements of management. Creating an environment that encourages open communication, mutual support and encouraging initiatives affects the ability of the organization to function in an agile way, increasing flexibility and resistance to change. Organizations that ignore these aspects may encounter difficulties in building a participatory culture and maintaining a high level of employee engagement.

The research results provide important premises indicating that well-being and psychological safety of work in an agile organization should be treated as key determinants of its success. Taking care of these elements not only increases operational efficiency, but also improves the quality of cooperation, supports innovation and builds lasting employee engagement. Implementing solutions that support building a culture of openness, work-life balance and the possibility of free experimentation should be one of the priorities for organizations striving to increase their competitiveness and adaptability in a changing business environment.

Organizations striving to increase agility and efficiency should focus on building a work environment that promotes well-being and psychological safety. The development of an organizational culture based on open communication and transparency is crucial, allowing employees to freely express their opinions without fear of negative consequences. Providing a space for constructive dialogue promotes increased engagement and increases teams' readiness to take initiatives and implement innovations.

Strengthening mutual support in teams should become a priority, as an atmosphere of trust and cooperation translates into greater work efficiency and resistance to unforeseen challenges. Organizations should implement mentoring and coaching programs that support knowledge exchange and build relationships based on mutual support. Employees who feel they can count on the help of their colleagues are more willing to engage in the implementation of team goals and show greater initiative.

Promoting work-life balance should be an important part of your HR strategy. Implementing flexible work options, such as hybrid work, task-based work, or additional days off for regeneration, can significantly improve employee well-being and long-term engagement. Organizations that give their employees more autonomy over their time management experience higher levels of motivation and satisfaction, which translates into lower staff turnover and greater operational efficiency.

Changing the approach to errors and treating them as part of the learning process can increase the level of innovation in an organization. Creating space for experimentation and testing new solutions without fear of sanctions allows teams to better adapt to changing market conditions and develop new competencies. Introducing retrospection mechanisms and analyzing experiences gained during project implementation allows organizations to better use the knowledge they have gathered and avoid repeating the same mistakes.

Implementing these solutions requires consistent action and commitment from management to build an environment that supports well-being and psychological safety at work. Organizations that take these steps can not only increase their efficiency and flexibility, but also create an organizational culture that supports employee development and promotes long-term success in a dynamic business environment.

The limitations of the study are mainly due to the sample size of 303 respondents, which allows for the analysis of the relationships between variables but does not allow for the full generalization of the results to all agile organizations. Differences in industries, management structures, and organizational culture may affect well-being and psychological safety at work, which requires further research. The data collection method based on self-assessment of respondents may have introduced subjectivity and the effect of social desirability, which could have affected the reliability of the results. Another limitation is the time perspective of the study conducted in April-May 2023, which means that the results reflect only the state at a given moment and may not take into account long-term changes. The Pearson correlation used allowed for the identification of relationships between variables, but does not clearly determine the direction of causality. The results indicate strong connections between well-being and psychological safety, but do not allow for the unambiguous determination of which factors are the cause and which are the consequence.

An additional limitation is the diversity of organizations from which respondents came. Differences in the approach to participatory management and the degree of

implementation of wellbeing practices may have influenced the obtained results. The lack of consideration of the organizational context in the detailed analysis means that some of the results may not be fully representative of other management models. Due to these limitations, the results should be interpreted with caution. Future studies may include a larger sample of respondents, qualitative research, and additional analyses to determine the causality of the observed relationships.

Future research may focus on the long-term impact of well-being and psychological safety of work on the effectiveness and innovation of agile organizations. An important direction is the analysis of industry and cultural differences in the scope of participatory management and their impact on employee satisfaction and engagement. It is also worth examining the role of modern technologies, including artificial intelligence and digital tools, in shaping psychological safety, as well as ways to minimize the negative effects of digitalization.

Further exploration should take into account the importance of leadership style, especially transformational leadership, in building a culture of openness and cooperation. It may also be crucial to determine the impact of well-being on talent retention and organizational resilience in crisis situations. Analysis of adaptation mechanisms in difficult economic conditions can provide practical recommendations for companies striving for greater flexibility and stability of teams. This research will allow for a better understanding of how organizations can effectively integrate well-being with management practices, increasing their competitiveness and ability for long-term development.

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OPPORTUNITIES AND CONDITIONS OF IMPLEMENTING GAMIFICATION IN HUMAN RESOURCE MANAGEMENT IN ORGANIZATIONS

MOŻLIWOŚCI I WARUNKI IMPLEMENTACJI GRYWALIZACJI W OBSZARZE ZARZĄDZANIA ZASOBAMI LUDZKIMI PRZEDSIĘBIORSTWA

Abstract: Gamification represents an innovative approach to supporting human resource management by applying game-based mechanisms within organizational contexts. The objective of this study is to examine the opportunities and conditions for implementing gamification in human resource management, with particular focus on its practical effects based on a case study of SolarEdge. The research findings indicate that the implementation of gamification mechanisms contributed to increased employee motivation, engagement, and competency development. Key determinants of effectiveness included rule transparency, point-based reward systems, individualized incentives, and alignment of challenges with organizational specifics. The study employed empirical research utilizing a diagnostic survey method and a structured questionnaire administered to SolarEdge employees.

Keywords: human resource management, gamification, employee motivation, employee engagement, competency development, innovation implementation

Streszczenie: Grywalizacja stanowi innowacyjne narzędzie wspierające zarządzanie zasobami ludzkimi poprzez wykorzystanie mechanizmów znanych z gier w kontekstach organizacyjnych. Celem opracowania jest analiza możliwości i warunków implementacji grywalizacji w zarządzaniu zasobami ludzkimi w przedsiębiorstwie, ze szczególnym uwzględnieniem efektów wdrożenia tego rozwiązania na przykładzie firmy SolarEdge. W badaniach wykazano, że wdrożenie mechanizmów grywalizacji przyczyniło się do wzrostu motywacji, zaangażowania oraz rozwoju kompetencji pracowników. Zidentyfikowano również czynniki determinujące skuteczność tego typu rozwiązań, takie jak: transparentność zasad, system punktowy, indywidualizacja nagród oraz dostosowanie wyzwań do specyfiki organizacyjnej. Praca oparta została na badaniu empirycznym przeprowadzonym metodą sondażu diagnostycznego z wykorzystaniem kwestionariusza ankiety wśród pracowników SolarEdge.

Słowa kluczowe: zarządzanie zasobami ludzkimi, grywalizacja, motywacja pracowników, zaangażowanie pracowników, rozwój kompetencji, wdrażanie innowacji

INTRODUCTION

In the contemporary business environment, organizations are continuously searching for innovative methods to enhance employee motivation, engagement, satisfaction, and performance in an increasingly dynamic and competitive labor market. Rapid technological development, globalization, evolving employee expectations, generational diversity, and the growing importance of knowledge-based work have fundamentally transformed the conditions under which human resource management (HRM) operates. These changes have created a need for modern HRM solutions that not only optimize personnel processes but also strengthen organizational commitment, foster professional development, and build sustainable competitive advantage through human capital¹.

One such method that has attracted increasing attention in recent years is gamification — the application of game-design elements and mechanics, such as point systems, leaderboards, badges, challenges, and reward structures, in non-entertainment organizational contexts to influence employee behavior and improve organizational outcomes². Gamification transforms conventional HR processes into engaging, interactive experiences that promote intrinsic motivation, strengthen organizational identification, and enhance job satisfaction. It supports various ar-

¹ B. Mikuła, T. Myjak, H. Trzcińska, *Wprowadzenie do zarządzania zasobami ludzkimi*, „Funkcje i Instrumenty” 2013, p. 47-50

² M. Smolarek, J. Dzieńdziora, *Impact of Personal Branding on the Development of Professional Careers of Managers*, „European Research Studies Journal” 2022, vol. XXV, nr 1, p. 133-147.

areas of HRM, including recruitment, onboarding, training, competency development, performance management, and career advancement³.

Properly designed gamification mechanisms allow organizations to foster individual and collective motivation, reinforce desired behaviors, and align employee objectives with broader organizational goals. This approach is particularly relevant for younger generations entering the labor market, such as Generations Y and Z, who are highly receptive to dynamic feedback systems, digital tools, and reward-based development frameworks⁴. The growing digitalization of HR processes and the increasing use of information technologies further facilitate the integration of gamification into modern HRM practices.

The purpose of this article is to analyze the opportunities and conditions for implementing gamification in human resource management based on the case study of SolarEdge — a company operating in the rapidly growing renewable energy sector. The main hypothesis highlights gamification as an innovative and flexible human resource management tool, particularly relevant in rapidly evolving sectors such as the renewable energy industry. The research combines theoretical considerations with empirical data collected through a diagnostic survey conducted among SolarEdge employees. The study identifies key success factors and potential challenges associated with gamification implementation, offering practical managerial recommendations for organizations considering gamification as a human capital management tool.

CONCEPTUAL FRAMEWORK OF GAMIFICATION AS AN HR INNOVATION

Human resource management (HRM) constitutes one of the fundamental pillars of contemporary organizations, playing a critical role in shaping long-term competitiveness, adaptability, and organizational success⁵. As a multidisciplinary field, HRM integrates principles from psychology, sociology, economics, labor law, and organizational behavior to address the increasingly complex challenges of managing people in dynamic business environments⁶. HRM focuses on acquiring, developing, motivating, and retaining human capital, which represents the most valuable strategic resource of any organization. Its objectives encompass both organizational effectiveness and the psychosocial well-being of employees, balancing business goals with personal development and job satisfaction⁷.

³ A. Dziopak-Strach, *Koncepcja grywalizacji w zarządzaniu zasobami ludzkimi organizacji*, Akademia WSB, Dąbrowa Górnicza 2022, p. 23.

⁴ J. Koivisto, J. Hamari, *The rise of the motivational information systems: A review of gamification research*, "International Journal of Information Management" 2019, 45, p. 994.

⁵ M. Sępek, *Zarządzanie zasobami ludzkimi*, „Przedsiębiorczość i Zarządzanie” 2010, t. XI, z. 11, p. 53.

⁶ M. Morawski, J. Niemczyk, K. Perechuda, E. Stańczyk-Hugiet: *Zarządzanie. Kanony i trendy*, Wydawnictwo C.H. Beck, Warszawa 2010, p. 178.

⁷ A. Dziopak-Strach, *Koncepcja grywalizacji w zarządzaniu...*, p. 23.

Within this evolving HRM landscape, innovative tools have emerged to address the changing needs of organizations and employees. Among these, gamification has gained significant attention as a modern approach to enhancing employee motivation, engagement, and organizational performance⁸. Gamification involves the application of game mechanics —such as point systems, leaderboards, badges, challenges, and rewards — within non-game organizational contexts to stimulate desired behaviors and improve work outcomes⁹. Drawing upon principles of behavioral psychology, gamification transforms traditional HR processes into interactive and engaging experiences that foster intrinsic motivation, strengthen organizational identification, and create dynamic learning environments¹⁰.

Properly implemented gamification systems offer a range of benefits, including higher employee engagement, improved performance, accelerated competency development, and enhanced job satisfaction. By providing clear objectives, immediate feedback, and visible recognition of achievements, gamification supports both individual and collective motivation¹¹.

The application of gamification in HRM extends across various functional domains, including recruitment, selection, onboarding, training, performance management, and career development¹².

The application of gamification in employee selection represents an innovative approach that introduces game elements into business recruitment contexts. Its primary objective is to influence candidate behavior and motivation during recruitment procedures. This method is gaining growing popularity, especially among younger generations such as Generation Y and Z, who have grown up in the era of digitalization and naturally adapt to interactive forms of assessment¹³.

One of the key advantages of incorporating gamification into recruitment lies in its ability to enhance the objectivity of candidate evaluation by enabling the collection of comprehensive data related to applicants' skills, competencies, and behavioral tendencies. Automated scoring systems improve the accuracy of assessing candidates' predispositions and minimize subjective biases that may otherwise influence hiring decisions¹⁴.

⁸ M. Silic, G. Marzi, A. Caputo, *The Effects of a Gamified Human Resource Management System on Job Satisfaction and Engagement*, „Human Resource Management Journal” 2022, p. 1.

⁹ E. Bombiak, M. Cisek, *Grywalizacja jako innowacja w obszarze funkcji personalnej*. „Współczesne wyzwania w zarządzaniu zasobami ludzkimi”, Uniwersytet Przyrodniczo-Humanistyczny w Siedlcach, 2019, p. 3.

¹⁰ A. Dziopak-Strach, *Koncepcja grywalizacji w zarządzaniu...*, p. 23.

¹¹ M. Ma, X. Zhao, H. Shen, *Impact of Gamification on Knowledge Sharing – The Mediating Role of Self-Determination*, „International Journal of Business Studies and Innovation” 2022, vol. 2, no. 2, p. 43-48.

¹² B. Sharma, P. Arora, M. Budhiraja, *A Systematic Literature Review of Gamification Applications in Human Resource Processes: Insights, Trends, and Future Directions*, „Library Progress International” 2024, vol. 44, no. 3, p. 11533–11538.

¹³ J. Zerrer, R.-C. Harting, M. Gerst, *Potentials and Challenges of Gamification in Recruiting*, „Procedia Computer Science” 2020, Vol. 176, p. 1120-1129.

¹⁴ F. Leutner, S.C. Codreanu, S. Brink, T. Bitsakis, *Game based assessments of cognitive ability in recruitment: Validity, fairness and test-taking experience*, „Frontiers in Psychology” 2023, vol. 13, s. 1-3.

Additionally, gamified recruitment tests facilitate more accurate evaluation of candidates' competencies in simulated, work-related conditions. This allows for effective assessment of problem-solving skills, time management abilities, creativity, and analytical thinking. Such assessment formats significantly increase the validity of the recruitment process by ensuring that selected candidates demonstrate actual suitability for the given position¹⁵.

Beyond objective benefits for employers, gamification positively influences candidate experience. The interactive and engaging nature of gamified recruitment increases candidate participation rates, while simultaneously positioning the employer as an innovative and attractive organization. This contributes to employer branding and supports the acquisition of highly qualified talent¹⁶.

From an organizational perspective, the implementation of gamification tools may involve significant investment costs associated with the development, customization, and maintenance of gamified platforms. Gamification proves most effective in mass recruitment scenarios or when filling entry-level positions characterized by high applicant volumes and relatively standard competency requirements. Its effectiveness may be more limited for highly specialized roles where complex skills are difficult to model within gamified frameworks¹⁷.

Modern human resource management faces numerous challenges arising from a dynamic labor market, increasing innovation demands, and the need for organizations to continuously adapt to employees' evolving expectations. In response, gamification has gained considerable attention, aligning with the principles of Motivation 3.0, which emphasize the fulfillment of three core psychological needs: autonomy, mastery, and purpose as key drivers of employee satisfaction and performance¹⁸.

In terms of mastery, gamification supports skill development through scalable task difficulty and continuous performance feedback. As employees observe their own progress and accumulate accomplishments, they experience satisfaction from skill enhancement and increased work effectiveness. Simultaneously, incorporating organizational narratives and values into gamified systems connects daily tasks to the broader mission of the organization, deepening employees' identification with corporate goals and fostering long-term commitment¹⁹.

¹⁵ I. Nikolaou, K. Georgiou, V. Kotsaralidou, *Exploring the Relationship of a Gamified Assessment with Performance*, „The Spanish Journal of Psychology” 2019, vol. 22, e6, p. 3-7.

¹⁶ L. Abuladze, L. Hasimi, *The Effectiveness and Attractiveness of Employer Branding: The Effects and Role of Gamification in Recruitment Activities*, „Conference Paper” 2023, p. 4-8.

¹⁷ M.B. Armstrong, R.N. Landers, *Gamification of employee training and development*, „International Journal of Training and Development” 2018, vol. 22, no. 2, p. 3-4.

¹⁸ S. Deterding, D. Dixon, R. Khaled, L. Nacke, *From Game Design Elements to Gamefulness: Defining „Gamification”*, „Proceedings of the 15th International Academic MindTrek Conference” 2011, p. 9-13.

¹⁹ A. Roblek, M. Meško, D. Krapež, *A Complex View of Industry 4.0*, SAGE Open, 2016, vol. 6(2), p. 5

Gamification is widely applied in professional development, supporting training programs, mentoring, and talent development initiatives. Interactive learning formats, occupational simulations, and realistic work scenarios enable more effective knowledge acquisition and the development of interpersonal skills such as communication, teamwork, and problem-solving. Personalized development paths, guided by ongoing performance assessments, allow training programs to be tailored to individual employee needs²⁰.

Despite its numerous benefits, implementing gamification presents certain challenges. Overemphasis on competition may create tension within teams and decrease motivation among individuals who are less resilient to pressure. Moreover, the development and implementation of advanced gamification systems often entail significant financial investments, including content design, software acquisition, and trainer preparation. Therefore, the success of gamification largely depends on aligning the design of gamified tools with the organization's specific context and the individual characteristics and professional profiles of employees²¹.

In summary, as organizations face growing complexity and uncertainty in the modern labor market, HRM must continually evolve to address emerging challenges. Gamification offers a promising approach to strengthening employee motivation, engagement, and development, while simultaneously supporting organizational adaptability and long-term competitiveness. Its successful integration into HRM systems requires both theoretical understanding and practical expertise, as well as ongoing evaluation to ensure sustained effectiveness and alignment with organizational needs²².

METHODOLOGY

The empirical study was conducted at SolarEdge between May and June. The questionnaire consisted of 20 questions, including 4 demographic questions and 16 substantive questions, primarily utilizing closed-ended formats and multiple-choice options. The questionnaire design was based on a review of the subject literature and formulated in direct relation to the identified research problems and hypotheses. The survey was conducted exclusively online using the Microsoft Forms platform, allowing for efficient data collection from employees participating in the company's gamification programs.

²⁰ W. Załoga, *Rozwój zawodowy pracowników w ujęciu literaturowym – wybrane aspekty*, „Nowoczesne Systemy Zarządzania” 2019, z. 14, nr 2, p. 29-41.

²¹ A. Kumar, T. Sowdamini, S. Manocha, P. Pujari, *Gamification as a Sustainable Tool for HR Managers*, „Acta Universitatis Bohemiae Meridionalis” 2021, Vol. 24, No. 2, p. 7.

²² T.M. Scholz, C. Uebach, *Making Gameful Work Work: The Gamification of Strategic Human Resource Management*, „Proceedings of the 55th Hawaii International Conference on System Sciences” 2022, p. 6994-7000.

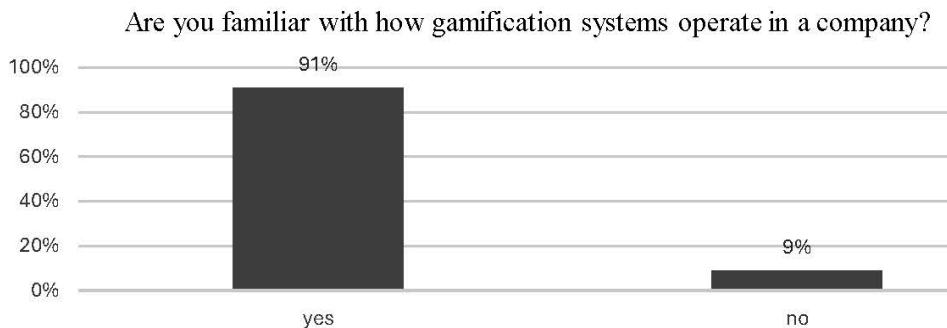
All respondents participating in the study were male, representing 100% of the sample. The largest share of respondents was in the age group of 25 to 34 (77.3%), while 9.1% were under 25 years old, 9.1% belonged to the 35 to 44 age group, and 4.5% were aged 45 to 54.

Regarding length of service at SolarEdge, 81.8% of employees had been employed for 1 to 3 years, while 18.2% had worked at the company for less than one year. In terms of departmental affiliation, 81.8% of respondents worked in the Technical Support department, 9.1% in IT, 4.5% in Human Resources, and 4.5% in Marketing.

RESULTS AND DISCUSSION

The results of the conducted survey confirm that the implementation of gamification mechanisms at SolarEdge is generally well understood and positively perceived by employees. The very high level of familiarity with the system's rules (91% of respondents) suggests that the company has ensured effective communication and onboarding regarding gamification principles, which is a crucial factor for the success of such programs (fig. 1).

Figure 1. Level of familiarity with the functioning of gamification systems in a company
Rysunek 1. Poziom znajomości funkcjonowania systemów grywalizacji w przedsiębiorstwie

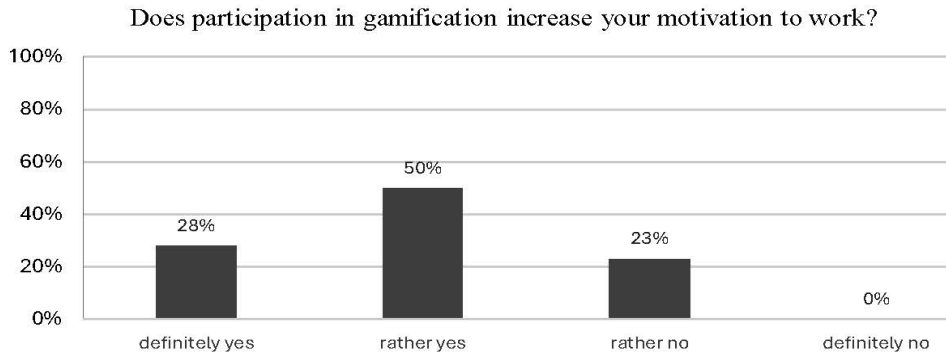


Source: own study.

The high percentage of regular participants (55%) and the overall broad participation in gamification activities (82%) demonstrate that gamification has become an integral part of daily employee functioning. The positive impact of gamification on motivation is also clearly visible: a combined 78% of employees reported that participation in gamification increased their work motivation, which confirms the effectiveness of the motivational mechanisms applied (fig. 2).

Figure 2. The impact of gamification on work motivation

Rysunek 2. Wpływ grywalizacji na motywację do pracy

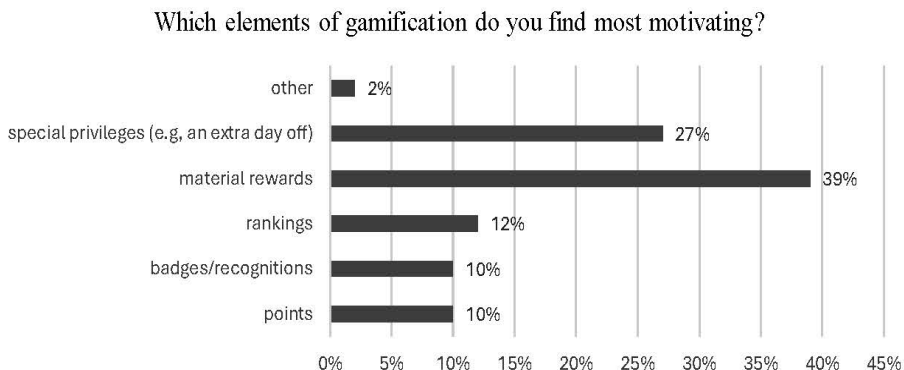


Source: own study.

Particularly noteworthy is the strong role of material rewards, indicated as the most motivating element by the majority of respondents (fig. 3). This demonstrates that financial incentives remain a significant factor, although the presence of diversified elements such as badges, rankings, or additional privileges shows that non-financial forms of recognition also play a complementary role in stimulating employee engagement.

Figure 3. The most motivating elements of gamification

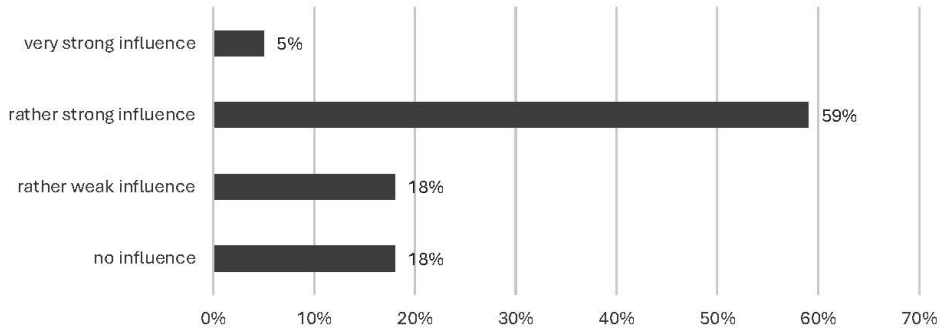
Rysunek 3. Najbardziej motywujące elementy grywalizacji



Source: own study.

The system was also positively evaluated in terms of perceived fairness (73%), which is a critical condition for long-term acceptance and sustainability of gamification programs. The data indicate that gamification not only influences individual motivation but also contributes to building cooperation between employees — 59% confirmed that gamification fosters teamwork (fig. 4).

Figure 4. The impact of gamification on employee engagement
Rysunek 4. Wpływ grywalizacji na zaangażowanie pracowników

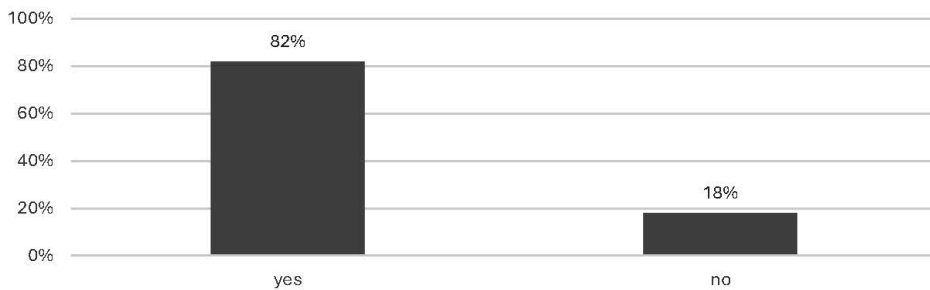


Source: own study.

An important finding is that 82% of employees believe that gamification supports their professional development. This suggests that gamification at SolarEdge is not limited to short-term motivational effects but may also serve as an effective tool for competency development and continuous learning.

The declared impact of gamification on job engagement and satisfaction is equally promising. Nearly two-thirds of respondents reported that gamification had a significant or very significant influence on their engagement, while the vast majority (82%) felt more appreciated thanks to the system (fig. 5). Additionally, most employees indicated that gamification contributes positively to their job satisfaction.

Figure 5. Sense of appreciation resulting from the gamification system
Rysunek 5. Poczucie uznania wynikające z systemu grywalizacji



Source: own study.

Although a majority of respondents did not see an urgent need for changes in the existing gamification system, a certain group of employees expressed interest in expanding the variety of gamification formats, especially by introducing more team-based competitions and adjusting rules to better fit departmental specifics.

This indicates that while the current system is effective, its further evolution could enhance inclusivity and flexibility, responding to the different expectations of employee groups²³.

The analysis also revealed no clear preference between individual and team-based gamification, as employees' opinions in this regard were evenly distributed. This suggests that both formats may be valuable, depending on the nature of tasks and specific organizational needs. Overall, the obtained results support the main research hypothesis that gamification positively affects employee motivation and professional development. The high levels of acceptance, participation, and satisfaction confirm that properly designed gamification mechanisms can be an effective tool in contemporary human resource management, particularly in dynamic sectors such as the renewable energy industry.

The conducted research allowed for a comprehensive assessment of the role gamification plays in human resource management at SolarEdge. The results confirm that the application of gamification mechanisms contributes positively to shaping employee motivation, engagement, and professional development. The high level of familiarity with gamification rules and the substantial participation rate demonstrate that the implemented solutions have been successfully integrated into daily HR processes and accepted by employees. A significant finding of the study is the clear impact of gamification on employee motivation. The majority of respondents indicated that participation in gamified activities enhances their willingness to engage in professional tasks. This confirms that properly designed gamification elements — particularly material rewards, points, rankings, and recognition badges — can stimulate intrinsic motivation while simultaneously reinforcing extrinsic motivational factors²⁴. Additionally, a substantial proportion of employees reported that gamification fosters collaboration and supports the development of key professional competencies, which emphasizes the broader developmental function of gamification beyond mere task motivation.

The positive outcomes achieved at SolarEdge are strongly associated with the carefully planned implementation process of gamification. Before introducing the system, the company conducted a comprehensive analysis of employee needs, organizational goals, and potential motivational factors. The process involved defining specific objectives for gamification, selecting appropriate game mechanics, integrating them with existing HR procedures, ensuring transparent communication of rules, providing employee training, and establishing mechanisms for continuous monitoring and adjustment of the system. This systematic, multi-stage approach contributed to the high acceptance of gamification among employees and its effective integration into the organizational culture²⁵.

²³ A.C. Tomé Klock, P. Toledo Palomino, L.A. Lima Rodrigues, *Gamification towards and alongside equity, diversity and inclusion: Looking back to move forward*, „New Media & Society” 2024, p. 1-26.

²⁴ N.K. Dewi, *Implementation of Gamification-based Reward and Recognition System to Increase Employee Motivation and Loyalty*, „Journal of Management” 2024, Vol. 3, No. 2, p. 401-404, ISSN 3026-3239.

²⁵ K.D.V. Prasad, M.R. Mangipudi, *Gamification for Employee Engagement: An Empirical Study With E-Commerce Industry*, „Montenegrin Journal of Economics” 2021, Vol. 17, No. 4, p. 150-153.

Another valuable observation concerns the perception of fairness in the implemented gamification system. Most employees viewed the system as fair and transparent, which is crucial for maintaining long-term trust and the sustainable functioning of motivational programs. At the same time, several respondents indicated potential areas for improvement, suggesting that gamification mechanisms require continuous evaluation and periodic adjustments to remain effective and inclusive across various departments and job roles²⁶.

The conducted research confirms that gamification represents an effective tool for enhancing employee motivation, engagement, and professional development in human resource management. The results obtained at SolarEdge demonstrate that properly designed and systematically implemented gamification mechanisms are positively perceived by employees and contribute to building organizational commitment, strengthening cooperation, and supporting the development of key competencies.

CONCLUSION

The study indicates that a well-structured implementation process — including needs analysis, appropriate selection of motivational elements, clear communication, and continuous system monitoring — plays a crucial role in ensuring the success of gamification programs. The findings also emphasize the importance of maintaining balance between material and non-material rewards, as well as between individual and team-based formats, to address the diverse expectations of employees²⁷.

The analysis of research results allows us to confirm that gamification positively influences employee motivation and professional development. The findings are consistent with the growing body of literature emphasizing the potential of gamification as an innovative HRM tool, particularly in organizations operating in dynamic sectors such as the renewable energy industry.

From a managerial perspective, the research confirms that gamification may serve not only as a short-term incentive but also as a strategic instrument for supporting talent development, strengthening organizational commitment, and building a culture of engagement. To fully leverage the benefits of gamification, it is essential to regularly monitor employee expectations, maintain a balanced mix of individual and team-based elements, and adjust reward structures to the evolving needs of diverse workforce segments²⁸.

²⁶ J. Dzieńdziora, M. Smolarek, D. Żebrak, E. Gross-Golacka, *Organizational Factors of Commitment to Innovation vs. Innovative Behavior in SMEs in the Renewable Energy Sources (RES) Industry, Energies*, 15(15), 2022, p. 8-12.

²⁷ M. Sailer, J.U. Hense, S.K. Mayr, H. Mandl, *How gamification motivates: An experimental study of the effects of specific game design elements on psychological need satisfaction*, „Computers in Human Behavior” 2017, 69, p. 371–380

²⁸ L. Tuohiniemi, *Gamified strategy canvas: A novel concept for streamlining strategies through gamification*, University of Vaasa, 2024, p. 68-75.

In conclusion, the obtained results confirm the relevance of gamification in modern human resource management and highlight its significant potential for enhancing organizational effectiveness through improved employee satisfaction, commitment, and skills development.

The research results confirm the main hypothesis and are consistent with existing literature highlighting gamification as an innovative and flexible human resource management tool, particularly relevant in rapidly evolving sectors such as the renewable energy industry.

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- (A) Study Design (projekt badania)
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- (C) Statistical Analysis (analiza statystyczna)
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HUMAN RESOURCE MANAGEMENT STRATEGY IN SHARED SERVICE CENTERS

STRATEGIA ZARZĄDZANIA ZASOBAMI LUDZKIMI W CENTRUM USŁUG WSPÓLNYCH

Abstract: Human resource management strategies in Shared Service Centers are characterized by high complexity and significant impact on organizational operational efficiency. The SSC sector in Poland requires a specific approach to human capital management due to the nature of services provided and dynamic changes in the business environment. The most important determinants of centers' effectiveness turned out to be career path transparency, internal communication quality, and alignment of development strategies with actual employee needs, as well as perceptual differences between management and operational staff. The purpose of the article is to analyze the impact of human resource management strategies on the functioning of Polish Shared Service Centers and identify key areas requiring intervention. The analysis is based on empirical research conducted using a diagnostic survey method on SSC employees using an online questionnaire.

Keywords: human resource management, shared service center, management strategies, personnel strategies, internal communication

Streszczenie: Strategie zarządzania zasobami ludzkimi w Centrum Usług Wspólnych charakteryzują się wysoką złożonością i znaczącym wpływem na efektywność operacyjną organizacji. Sektor CUW w Polsce wymaga szczególnego podejścia do zarządzania kapitałem ludzkim ze względu na specyfikę świadczonych usług oraz dynamiczne zmiany w otoczeniu biznesowym. Najważniejszymi determinantami skuteczności funkcjonowania centrów okazały się być transparentność ścieżek kariery, jakość komunikacji wewnętrznej oraz dopasowanie strategii rozwojowych do rzeczywistych potrzeb pracowników, a także różnice percepcyjne między kadrą zarządzającą a pracownikami operacyjnymi. Celem artykułu jest analiza wpływu strategii zarządzania zasobami ludzkimi na funkcjonowanie polskich Centrów Usług Wspólnych oraz identyfikacja kluczowych obszarów wymagających interwencji. Analiza opiera się na badaniu empirycznym przeprowadzonym metodą sondażu diagnostycznego na pracownikach CUW z wykorzystaniem kwestionariusza ankiety online.

Słowa kluczowe: zarządzanie zasobami ludzkimi, centrum usług wspólnych, strategie zarządzanie, strategie personalne, komunikacja wewnętrzna

INTRODUCTION

Shared Service Centers constitute a key element of the cost optimization strategy for contemporary organizations, enabling the centralization of support processes while maintaining high service quality. In a dynamically changing business environment, the effectiveness of these structures increasingly depends on efficient human capital management. The true success of centers does not stem solely from refined procedures or advanced IT systems - the foundation of their efficiency lies with people, whose engagement and professional expertise directly translate into final results¹.

The issue of human resource management in Shared Service Centers constitutes a key element determining the operational effectiveness of these structures. In the context of dynamic market changes and growing demands for cost optimization, human capital in SSCs takes on a strategic character, surpassing the importance of material or financial resources². Contemporary research indicates that human resource management strategies in Shared Service Centers extend beyond traditional administrative functions, encompassing advanced motivational systems, competency development programs, and talent retention initiatives³.

¹ Z. Łukaszczyk, *Centrum usług wspólnych sposobem na redukcję kosztów i standaryzację procesów przedsiębiorstwa na przykładzie KHW S.A.*, „Zeszyty Naukowe. Organizacja i Zarządzanie / Politechnika Śląska” 2017, nr 101, p. 306.

² Z. Zaporowska, M. Szczepański, *Exploration of Lean Management Methods Used in Shared Services Centers, Drivers and Barriers to Process Selection for Improvements in the Light of Risk Management and ESG Reporting*, „Sustainability” 2022, vol. 14, nr 8, art. 4695, p. 6.

³ M. Šikýř, *Best Practices In Human Resource Management: The Source Of Excellent Performance and Sustained Competitiveness*, t. 14, 2013, p. 45-46.

The main objective of this study is to examine how selected human resource management strategies influence team satisfaction and the quality of services provided within Shared Service Centers. Of particular interest is the comparison between the perspectives of managerial staff and those of operational employees - differences in perceptions of the effectiveness of specific strategies may provide valuable insights for management practice. Empirical data were collected through an online survey, enabling quantitative analysis and the formulation of recommendations⁴.

The aim of the research is to determine the impact of human resource management strategies on employee satisfaction and the quality of services in Polish Shared Service Centers⁵. Special attention was devoted to identifying differences in the perception of the effectiveness of these strategies between management staff and operational employees. Based on the defined research objective, the following research problem was formulated: How do human resource management strategies influence the functioning of Shared Service Centers?

In response to the formulated research problem, the following hypothesis was developed: There is a significant relationship between adopted human resource management strategies and the operational effectiveness of Shared Service Centers⁶.

HUMAN RESOURCE MANAGEMENT STRATEGIES IN SHARED SERVICE CENTERS

The term “strategy” originates from the Greek words “stratos” (army) and “agein” (to lead), which underscores its military roots⁷. The transfer of this concept to the field of organizational management took place in the second half of the XX century, when structural analyses of industrial corporations revealed the need to adapt hierarchies to long-term developmental plans⁸. Contemporary strategic approaches are evolving from linear planning models toward emergent concepts, as confirmed by observations of decision-making processes in innovative organizations⁹.

The mission of the organization remains a pivotal element of the strategic system, serving as a stabilizer in situations of axiological conflicts. The strategy imple-

⁴ R. Gawłowski, P. Modrzyński, *Shared Services Centers in the Public and Private Sectors: The Case Study of the United Kingdom*, “Journal of Corporate Responsibility and Leadership” 2017, vol. 4, nr 2, p. 25-42.

⁵ M. Pindelski, *Świadomość strategii i jej realizacji. Perspektywa pracowników sprzedaży*, Oficyna Wydawnicza SGH - Szkoła Główna Handlowa w Warszawie, Warszawa 2019, p. 117.

⁶ A. Kaczorowska, *Shared service centers in public administration in Poland*, “Information Systems in Management” 2017, vol. 6, nr 3, p. 181-191.

⁷ A.M. Rizzo, *Analisi comparativa della occupazione dei bibliotecari in Italia e in Polonia*, Bibliotheca Nostra, Śląski Kwartalnik Naukowy 2018, nr 3, p. 101-108.

⁸ A. Kaleta, A. Witek-Crabb, *Nowoczesny model zarządzania strategicznego – koncepcja badawcza*, „Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu” 2016, t. 420, p. 132.

⁹ Ibidem, p. 3.

mentation process still poses the greatest challenge, with the participatory model emerging as a solution - one where bottom-up employee initiatives form an essential component of decision-making processes. In the context of Shared Service Centers, this model is applied through cross-departmental working groups whose members actively contribute to shaping operational objectives¹⁰.

The strategic concept of human resource management is now considered an indispensable element of enterprise functioning in changing economic conditions¹¹. Personnel strategies, serving as model concepts for long-term workforce management, are reflected in programs, tasks, and specific HR decisions¹². The issue of human resource management in Shared Service Centers is a key element determining the operational effectiveness of these structures¹³.

In the process of evolving the personnel function, several phases can be distinguished: operational, tactical, and strategic¹⁴. Personal determinants of the emergence of the strategic phase are considered to include factors related to the business environment (dynamics of change, globalization), organizational factors (restructuring, decentralization of management), and employee-related factors (striving for greater flexibility and autonomy). The strategic approach focuses on dynamically understanding the relationships between tasks in the area of human resources and the company's strategy, as well as perceiving employees as part of the organization's assets¹⁵.

Shared Service Centers are organizationally distinct units specializing in integrating auxiliary processes for parent entities. The essence of their operation lies in consolidating repetitive business operations - such as accounting, human resource management, or IT services - which enables achieving economies of scale and standardization of procedures¹⁶. In Poland, the dynamic development of the Shared Service Center sector began at the beginning of the XXI century, which was associated with an influx of foreign investments seeking qualified personnel at competitive labor costs¹⁷.

¹⁰ P. Kuczyński, *Misja i wartości...*, p. 41.

¹¹ S. Borkowska (ed.), *Zarządzanie zasobami ludzkimi w Polsce. Przeszłość, teraźniejszość i przyszłość*, Wolters Kluwer, Warszawa 2007, p. 61.

¹² M. Tyrańska, *Strategie personalne we współczesnych przedsiębiorstwach*, Uniwersytet Ekonomiczny w Krakowie, Kraków 2022, p. 353.

¹³ V. Wilusz, *Centra usług wspólnych jako optymalny model biznesowy dla korporacji o zasięgu globalnym*, „Ekonomia Międzynarodowa” 2020, nr 32, p. 310.

¹⁴ M. Tyrańska, *Strategie personalne...*, p. 354.

¹⁵ Ibidem, p. 357.

¹⁶ Z. Łukaszczyk, *Centrum Usług Wspólnych sposobem na redukcję kosztów...*, p. 305.

¹⁷ M. Kuźmicki, K. Linkiewicz, *Current state of the sector of modern business services in Lublin and prospects for development / Stan i perspektywy rozwoju sektora nowoczesnych usług biznesowych w Lublinie*, „Economic and Regional Studies” 2021, vol. 14, nr 3, p. 310 -315.

METHODOLOGY

The study was conducted using a diagnostic survey method with an online questionnaire technique. The primary research tool was an anonymous online questionnaire directed to employees of Shared Service Centers across various organizational levels. The cross-sectional study was carried out between May 26 and June 4, 2025.

The questionnaire comprised 22 questions, including 5 demographic questions and 17 substantive questions utilizing a five-point Likert scale. The tool's design was based on a review of the subject literature and precise identification of research needs stemming from the study's main hypothesis. The questionnaire was distributed exclusively electronically via the Microsoft Forms platform.

The study involved 69 employees of Shared Service Centers operating in Poland. The sample structure included 55% women¹⁸ and 45% men, with the largest age group being 26–35 years old (46%). In terms of positions held, 37.7% of respondents worked in operational roles, 36.2% in specialist positions, and 26.1% represented management staff. Most participants (67%) were employed in customer service departments, with 48% having 1 to 3 years of work experience.

RESULTS AND DISCUSSION

Analysis of the results indicates that HRM strategies in the surveyed organizations moderately address employees' developmental needs. The largest group of respondents (42%) rated this aspect at level 4 on a 1–5 scale, which suggests a positive, though not fully satisfactory, approach to professional development. Development programs were assessed as effective in translating into the growth of competencies necessary for task performance, with a predominance of positive ratings: 45% (at level 4).

¹⁸ A. Rzepka, J. Dziendziura, M.K. Smolarek, K. Kmiotek, *Kapitał kariery menedżerskiej kobiet w małych i średnich przedsiębiorstwach*, „Journal of Modern Science” 2023, t. 54, nr 5, p. 291-317.

Figure 1. Distribution of responses to the question: To what extent do the HRM strategies in your organization address the developmental needs of employees?

Rysunek 1. Rozkład odpowiedzi na pytanie: W jakim stopniu strategie HRM w Twojej organizacji odpowiadają na potrzeby rozwojowe pracowników?

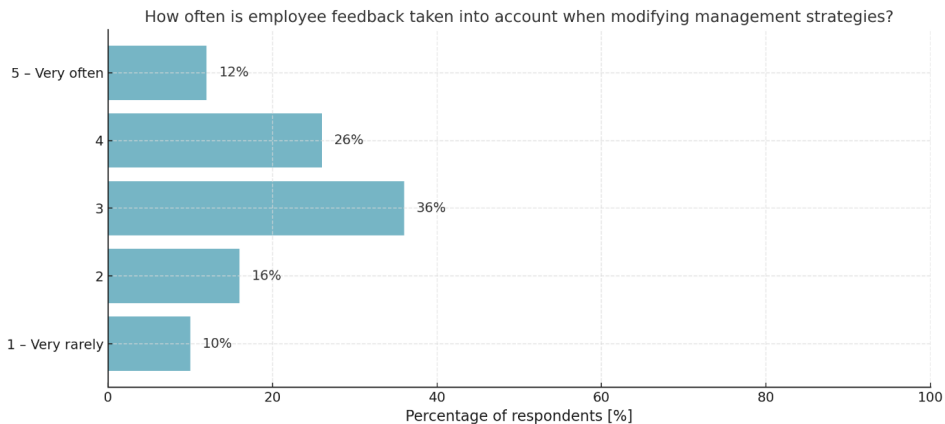


Source: Author's own study.

The effectiveness of motivational systems in building employee engagement received mixed evaluations, with a slight predominance of positive opinions: 29% (at level 4). The organizational culture was rated as conducive to the exchange of experiences between management and operational staff, though with noticeable areas for improvement (33% at level 4, 26% at level 3, and 26% at level 5). A significant finding was the moderate frequency of incorporating employee feedback into management strategy modifications: 36% (at level 3). The quality of communication between employees and management was rated moderately positively, with the most frequent ratings being 3 and 4 (33% each). The results suggest that although communication is rated moderately positively, there is still room for improvement in many areas.

Figure 2. Distribution of responses to the question: How often is employee feedback taken into account when modifying management strategies?

Rysunek 2. Rozkład odpowiedzi na pytanie: Jak często informacje zwrotne od pracowników są brane pod uwagę przy modyfikowaniu strategii zarządzania?

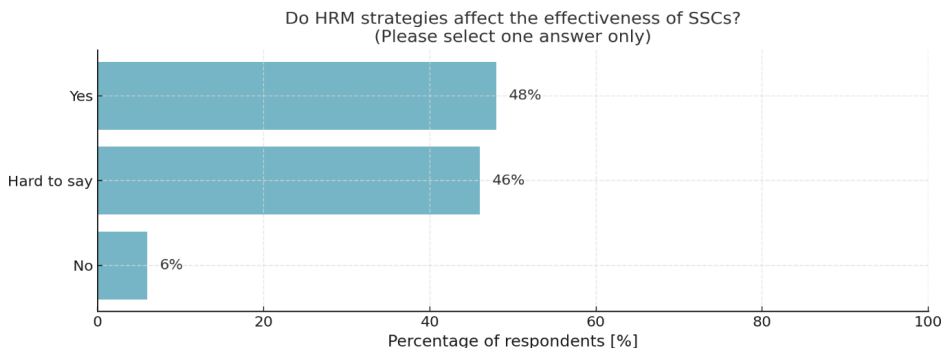


Source: Author's own study.

A clear majority of respondents- 48% - confirmed the impact of HRM strategies on the operational effectiveness of SSCs, while 46% chose the answer “hard to say,” which may indicate insufficient communication of the effects of HR actions. Among the identified benefits, the most frequently mentioned were reduced turnover (17%), improved service quality (10%), and increased operational efficiency (9%).

Figure 3. Distribution of responses to the question: Do HRM strategies affect the effectiveness of SSCs?

Rysunek 3. Rozkład odpowiedzi na pytanie: Czy strategie zarządzania zasobami ludzkimi mają wpływ na skuteczność SSC?



Source: Author's own study.

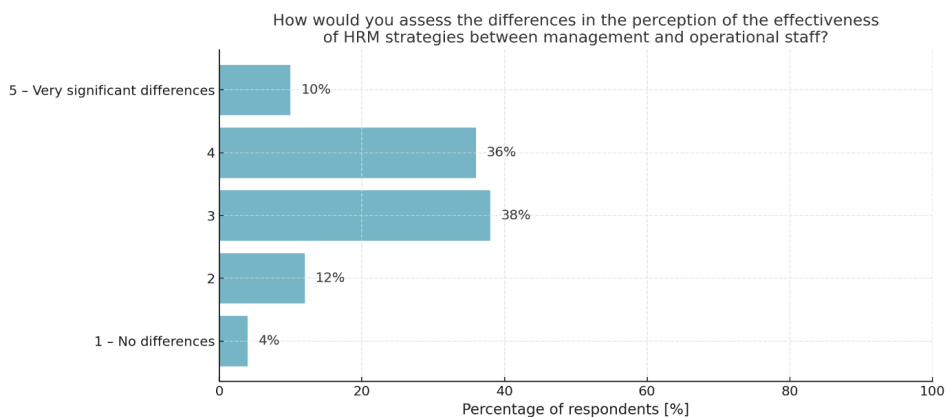
In the question regarding strategies implemented in organizations, employee development was the most frequently indicated (24% of all responses), followed by internal communication (20%,) and employee retention (16%). Respondents most often indicated the motivational strategy as having the greatest impact on SSC effectiveness (39%), followed by performance management (17%) and communication (16%).

Analysis of the expected changes revealed that respondents considered the most important to be the introduction of more transparent career paths (24%), better communication between management and employees (23%), and better alignment of training to needs (20%). Also significant were the responses indicating a need for a greater focus on competency development (18%) and increased employee involvement in HR-related decisions (14%).

The study confirmed the existence of differences in the perception of HRM strategy effectiveness between various organizational levels (38% at level 3, 36% at level 4). Although no strong discrepancies were observed, the results suggest the presence of certain interpretative tensions, which may mean that perceptual differences exist but do not constitute strong divergences.

Figure 4. Structure of responses to the question: How do you assess the differences in the perception of the effectiveness of HRM strategies between management and operational staff?

Rysunek 4. Struktura odpowiedzi na pytanie: Jak oceniasz różnice w postrzeganiu skuteczności strategii zarządzania zasobami ludzkimi między kadrą kierowniczą a pracownikami operacyjnymi?



Source: Author's own study.

The obtained results confirm the theoretical assumptions about the significance of HRM strategies in the functioning of Shared Service Centers¹⁹. The identification of employee development strategies as the most frequently implemented aligns with the premise that investments in human capital are a key element of competitive advantage²⁰. Simultaneously, the varied assessments of motivational systems' effectiveness indicate the need for a more personalized approach to managing employee engagement²¹.

The moderate rating of how frequently employee feedback is incorporated into strategic decisions suggests the necessity to strengthen participatory mechanisms in management²². This aspect is particularly critical in the context of SSCs, where service quality largely depends on the engagement of operational teams²³.

The results of the study indicate key areas requiring intervention in Polish Shared Service Centers. Particular attention should be paid to career path transparency, which has been identified as the priority area for change²⁴. Furthermore, the importance attributed to internal communication underscores the need for investment in information systems that support the flow of information between organizational levels²⁵.

The conducted study confirms the hypothesis of a significant relationship between human resource management strategies and the operational effectiveness of Shared Service Centers. Motivational strategies, transparency of career paths, and the quality of internal communication are pivotal to SSC success. The research also revealed significant gaps in the perception of HRM effectiveness, indicating the need for better alignment of strategies with the expectations of diverse employee groups²⁶.

Based on the analysis of responses, several general conclusions can be drawn. Firstly, HRM strategies are perceived as important tools influencing organizational functioning. Secondly, their effectiveness largely depends on the way they are

¹⁹ S. Ferencikova, D. Grachová, *Shared service centers in the Central and Eastern Europe: Theoretical framework*, "Journal of Eastern European and Central Asian Research (JEECAR)" 2024, vol. 11, nr 2, p. 188-201.

²⁰ Ł. Sułkowski, *Epistemologia w naukach o zarządzaniu*, Polskie Wydawnictwo Ekonomiczne, Warszawa 2005, p. 301.

²¹ M. Smolarek, J. Dzieńdziora, *Impact of Personal Branding on the Development of Professional Careers of Managers*, "European Research Studies Journal" 2022, vol. XXV, nr 1, p. 133-147.

²² A. Tomala, *Projektowanie efektywnego transferu wiedzy w organizacji – studium przypadku na podstawie projektów migracyjnych realizowanych w dwóch organizacjach typu SSC, „e-mentor”* 2022, nr 5(97), p. 26-35.

²³ L. Sołoducho-Pelc, A. Sulich, *Strategie zrównoważonego rozwoju przedsiębiorstw – perspektywy badawcze*, „Studia i Prace Kolegium Zarządzania i Finansów” 2024, nr 197, p. 9-25.

²⁴ A. Mirski, *Strategie innowacji w zarządzaniu przedsiębiorstwem*, „Zeszyty Naukowe. Organizacja i Zarządzanie / Politechnika Śląska” 2014, z. 74, p. 557-568.

²⁵ V. Schulz, W. Brenner, *Characteristics of shared service centers, Transforming Government: People, Process and Policy* 2010, vol. 4, nr 3, p. 210-219.

²⁶ H. Pachciarek, M. Szarek, *Wdrażanie strategii zarządzania zmianą gospodarczą w regionie z wykorzystaniem metodyki „foresight”*, „Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania” 2015, nr 39/4, p. 235-247.

implemented and tailored to the needs of specific employee groups. Thirdly, organizations striving for greater efficiency should place greater emphasis on communication, message consistency, and actively incorporating employee feedback²⁷.

From these observations, practical recommendations also follow. Above all, it is advisable to strive for greater transparency regarding career paths. Employees should be aware of the development opportunities available to them, what competencies are expected, and what actions they can take to advance or expand their qualifications. The absence of such information may lead to a sense of stagnation, which in the long term can result in decreased motivation and increased turnover.

Another significant element is the alignment of training programs. Instead of implementing universal solutions, better results can be achieved through an individualized approach - based on the analysis of the needs of specific teams. In this context, ongoing evaluation of the effectiveness of such initiatives also becomes important²⁸.

Another important issue is communication. Information regarding HRM strategies should be conveyed in a clear, regular, and accessible manner. Otherwise, even well-designed solutions may be perceived as unclear or misaligned with the organizational reality. Improving communication can also help reduce discrepancies in how HRM initiatives are perceived by different groups within the organization. It is worth considering greater employee involvement in the planning of HR actions. Even limited participation in consultations or surveys can enhance the relevance of implemented solutions and strengthen employees' sense of influence over their work environment²⁹.

In summary, the collected data demonstrate that human resource management strategies in Shared Service Centers have the potential to genuinely support both organizational and employee development, provided they are implemented consistently, adapted to needs, and communicated in a clear manner. Effective HRM is not merely a formal document, but a set of actions that must be rooted in the realities of each team and its daily experiences.

CONCLUSION

Contemporary companies operate in an environment where effectiveness, cost control, and gaining a market advantage are increasingly important. The Shared Service Center addresses these needs by enabling organizations to centralize and automate key support processes for their core business. However, even the best

²⁷ K. Kłincewicz (ed.), *Zarządzanie, organizacje i organizowanie – przegląd perspektyw teoretycznych*, Wydawnictwo Naukowe Wydziału Zarządzania Uniwersytetu Warszawskiego, Warszawa 2016.

²⁸ L. Christophers, D. Klimkeit, *Global Business Services als Transformationstreiber: Eine Fallstudie der heutigen Möglichkeiten von Shared Services*, "Der Betriebswirt" 2022, vol. 63, nr 1, p. 13-26.

²⁹ P. Kuczyński, *Misja i wartości...*, p. 41.

systems and procedures will not deliver the expected results if they are not implemented by qualified, motivated, and committed employees³⁰.

In today's rapidly changing business world, where technology and automation are constantly evolving, people are the most important and unique resource. Therefore, investing in effective team management forms the foundation of sustainable competitive advantage and distinguishes organizations that are not only able to adapt to change but also grow thanks to the engagement of their employees.

The aim of this study is therefore to analyze the impact of human resource management strategies on the functioning of the Shared Service Center.

The conducted analysis has brought us closer to answering the question of how human resource management strategies influence the functioning of Shared Service Centers. Based on empirical data, it can be stated that HRM strategies are not merely formal organizational tools, but play a significant role in shaping service quality, employee engagement, and overall job satisfaction. This relationship is not one-dimensional – the effectiveness of implemented strategies depends on many factors, such as the consistency of internal communication, the availability of development initiatives, and the transparency of promotion rules. A particular cognitive value of this work lies in the comparison of perspectives between management and operational staff. Differences in the assessment of the same HRM initiatives highlight the need for greater attentiveness in designing personnel policies and for better alignment with the actual expectations of various groups within the organization. The results of the study show that effective human resource management is not only about accurate assumptions, but above all about the ability to consistently implement and adapt them to changing work conditions³¹.

Although the conclusions and recommendations presented in this work refer to specific cases, they may serve as inspiration for further reflection on the role of HRM in modern organizations. The complexity and dynamism of the business environment mean that Shared Service Centers will continue to seek solutions that improve their operations. In this context, the human factor remains one of the key areas for investment and development.

This study is an attempt to capture this relationship and to indicate directions worth pursuing when planning and implementing personnel strategies within SSCs. Considering the limitations of the research - primarily its cross-sectional nature and reliance on self-assessment by respondents - it is worth continuing to explore this topic by expanding the analysis to include qualitative data, inter-or-

³⁰ S. Fayezi, A. Zutshi, A.O'Loughlin, *Understanding and Development of Supply Chain Agility and Flexibility: A Structured Literature Review*, "International Journal of Management Reviews" 2017, vol. 19, p. 379–407.

³¹ J. Staszewska, M. Smolarek, J. Foltys, D. Wotzka, P. Frącz, *The possibilities of cooperation among family firms within a cluster environment*, "European Research Studies Journal" 2024, t. 27, nr 2, p. 132-154.

ganizational comparisons, or in-depth case studies. Such an approach could contribute to an even fuller understanding of the role that HRM plays in the development and efficiency of contemporary organizations.

In a world where procedures can be automated and data can be quickly processed, it is people who remain the hardest resource to replicate. Therefore, the quality of their management may determine competitive advantage long before strategic decisions are made.

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6. Recenzenci oceniają artykuły pod względem formalnym i merytorycznym. Dokonując oceny formalnej, recenzenci sprawdzają w szczególności: czy tytuł jest zgodny z zawartością artykułu, czy abstrakt adekwatnie opisuje zawartość artykułu, czy słowa kluczowe zostały odpowiednio dobrane, czy objętość artykułu jest odpowiednia, czy tekst jest zrozumiały, czy tekst jest napisany poprawnym językiem, czy w tekście użyto poprawnej terminologii, czy konstrukcja tekstu jest spójna i logiczna, czy ilustracje zostały w tekście umieszczone poprawnie (jeśli użyto), czy jakość graficzna ilustracji jest właściwa (jeśli użyto), czy odsyłacze zostały skonstruowane poprawnie oraz czy zawartość odsyłaczy i bibliografii jest adekwatna do treści artykułu. Dokonując oceny merytorycznej, recenzenci sprawdzają w szczególności: czy artykuł stanowi nowe ujęcie omawianego problemu, czy autor właściwie sformułował tezy artykułu (problemy badawcze), czy metody badawcze zostały użyte poprawnie, czy autor w odpowiedni sposób rozwinął postawiony problem badawczy, czy sformułowane konkluzje są wartościowe dla nauki, czy artykuł spełnia kryteria pracy naukowej, czy artykuł ma charakter oryginalny, czy temat artykułu jest aktualny.

7. Nazwiska recenzentów poszczególnych artykułów nie są ujawniane. Raz w roku czasopismo „Zarządzanie” podaje do publicznej wiadomości listę recenzentów współpracujących z redakcją.

8. Ostateczną decyzję o przyjęciu lub nieprzyjęciu tekstu do druku podejmuje redaktor naczelny, po zapoznaniu się z recenzjami artykułu. Redaktor naczelny podejmuje decyzję o nieprzyjęciu tekstu do druku, jeśli co najmniej jeden z recenzentów oceni tekst jako negatywny – tekst niekwalifikujący się do druku.

INFORMACJE DLA AUTORÓW ZGŁASZAJĄCYCH PUBLIKACJĘ W CZASOPISIMIE NAUKOWYM „HUMANITAS ZARZĄDZANIE”

1. Procedura zgłaszania artykułów

W czasopiśmie „HUMANITAS Zarządzanie” publikowane są artykuły naukowe, dotyczące najnowszych osiągnięć naukowych w dziedzinie nauk o zarządzaniu, z podkreśleniem znaczenia omawianych zagadnień dla rozwoju nauki lub praktyki gospodarczej. Publikowane są również artykuły dyskusyjne, sprawozdania z konferencji naukowych poświęconych problematyce nauk o zarządzaniu oraz recenzje monografii i innych prac naukowych, jak również informacje z działalności komitetów i towarzystw naukowych.

Artykuł zgłaszany do publikacji powinien zawierać wstęp, główne omówienie zagadnienia oraz podsumowanie lub wnioski (Wytyczne edytorskie dla Autorów). Objętość artykułu nie powinna przekraczać 40 000 znaków, natomiast sprawozdania z konferencji i recenzje nie powinny przekraczać 10 000 znaków.

Każdy tekst zgłaszany do publikacji w czasopiśmie „HUMANITAS Zarządzanie” powinien być dostarczony w wersji elektronicznej w formacie WORD drogą e-mailową na adres: redakcjazn@humanitas.edu.pl lub na adres:

Redakcja Zeszytów Naukowych HUMANITAS Zarządzanie
ul. Kilińskiego 43
41-200 Sosnowiec
e-mail: redakcjazn@humanitas.edu.pl

Autor wraz z artykułem zobowiązany jest złożyć podpisany Kwestionariusz autorski (Formularz dla Autora) wraz ze wszystkimi oświadczeniami oraz umowę wydawniczą (dokumenty do pobrania na stronie www.zarzadzanie.humanitas.edu.pl z zakładki Informacje dla Autorów).

Nazwa pliku powinna odpowiadać nazwisku autora (np. Nowak.doc). Abstrakt oraz słowa kluczowe w języku polskim i angielskim muszą znajdować się na końcu pliku zawierającego tekst. Na końcu pliku należy także umieścić krótką notkę biograficzną i dane adresowe autora (autorów). Autor zgłaszający tekst do publikacji zobowiązany jest wypełnić i złożyć w Redakcji kwestionariusz autorski dostępny na stronie internetowej czasopisma.

Autorzy tekstów zgłaszanych do publikacji w czasopiśmie „HUMANITAS Zarządzanie” zobowiązani są do przestrzegania najwyższych standardów profesjonalnych i etycznych. Redakcja nie dopuści do publikacji tekstów autorów naruszających standardy etyczne, a w szczególności dopuszczających się praktyk o charakterze „ghostwritingu” i „guest

authorshipu” (z „ghostwriting” mamy do czynienia wówczas, gdy ktoś wniósł istotny wkład w powstanie publikacji, bez ujawnienia swojego udziału jako jeden z autorów lub bez wymienienia jego roli w podziękowaniach zamieszczonych w publikacji. Z „guest authorship” mamy do czynienia wówczas, gdy udział autora jest znikomy lub w ogóle nie miał miejsca, a pomimo to jest autorem/współautorem publikacji). Powyższe praktyki są przejawem nierzetelności naukowej, a wszelkie wykryte przypadki będą przez Redakcję demaskowane, włącznie z powiadomieniem odpowiednich podmiotów (instytucje zatrudniające autorów, towarzystwa naukowe, stowarzyszenia edytorów naukowych itp.). Redakcja będzie też dokumentować wszelkie przejawy nierzetelności naukowej.

Autor/Autorzy, podając dane kontaktowe, wyrażają jednocześnie zgodę na ich publikację w HUMANITAS Zarządzanie.

Od 1 stycznia 2020 r. autorzy niebędący pracownikami Akademii Humanitas w Sosnowcu, zainteresowani publikacją artykułu naukowego w czasopiśmie ZN WSH. Zarządzanie, partycypują w kosztach opracowania i wydania Zeszytów. Koszt ten wynosi 330,00 zł brutto (słownie: trzysta trzydzieści złotych 0/00 groszy): 200 zł w momencie złożenia artykułu i 130 zł w terminie 14 dni po otrzymaniu pozytywnych recenzji na rachunek bankowy Wydawcy: 24 1050 1360 1000 0008 0337 9932. Z opłaty za publikację zwolnieni są Autorzy z zagraniczną afiliacją. Więcej informacji na stronie: <https://zeszytyhumanitas.pl/resources/html/cms/MAINPAGE>

2. Wytyczne edytorskie

UWAGA!

- **Każdy artykuł musi zawierać: cel, tezy artykułu (problemy badawcze), metody badawcze – powinny być uwzględnione zarówno w streszczeniu, jak i w treści artykułu.**
- **Zakończenie musi się odnosić do powyższych kwestii (celu, tezy i metod badawczych).**
- **Autor musi w treści artykułu w odpowiedni sposób rozwinąć postawiony problem badawczy.**
- **Sformułowane konkluzje muszą być wartościowe dla nauki.**
- **Artykuł musi spełniać kryteria pracy naukowej oraz mieć charakter oryginalny.**
- **Temat artykułu musi być aktualny.**

W celu usprawnienia procedury wydawniczej prosimy o zastosowanie się do następujących zaleceń technicznych:

- **objętość artykułu – ½ arkusza wydawniczego (20.000 znaków zespacjami);**
- **format papieru A4;**

- marginesy: 2,5 cm;
 - edytor MS Word PL (wersja dowolna);
 - interlinia –1,5; wyrównanie obustronne;
 - czcionka podstawowa – Times New Roman CE 12p;
 - akapit 1,25 cm;
 - streszczenia i bibliografia 12p;
 - tytuł artykułu – czcionka pogrubiona 14p;
 - podtytuły – czcionka pogrubiona 12p;
 - tytuły tabel – u góry, do lewej 11p; tabele – czcionka 10p;
 - podpisy rysunków i wykresów pod obiektem, do lewej, 11p;
 - tytuły rysunków i tabel w języku polskim i angielskim;
 - źródła rysunków, tabel i wykresów – pod obiektem, opis tak jak w przypisach.
 - przypisy – przypisy dolne, czcionka 10p; odwołania do literatury w przypisach wg wzoru: Inicjał imienia, Nazwisko, *Tytuł pracy*, Wydawnictwo, Miejsce i rok wydania, s.
 - alfabetyczny wykaz bibliografii wg wzoru:
 1. Nazwisko I., *Tytuł artykułu*, „Tytuł periodyku” rok, nr
 2. Nazwisko I., *Tytuł pracy*, nazwa wydawnictwa, miejsce i rok wydania
 3. Nazwisko I., *Tytuł artykułu*, [w:] I. Nazwisko (red.), *Tytuł pracy*, nazwa wydawnictwa, miejsce i rok wydania
- proszę nie stosować formatowania stylami typu „nagłówek”

Artykuł powinien zawierać zarówno w języku polskim, jak i w języku angielskim:

- tytuł,
- słowa kluczowe (min. 5),
- krótkie streszczenie publikacji (ok. 1000 znaków typograficznych ze spacjami),
- tytuły tabel, rysunków, wykresów, ilustracji,
- notę o Autorze/Autorach (w języku polskim oraz angielskim),
- dane kontaktowe do Autora/Autorów (adres korespondencyjny, telefon, e-mail).

Układ artykułu:

- na początku tytuł i stopień naukowy, imię i nazwisko autora, nazwa instytucji (afiliacja),
- tytuł w języku polskim,
- tytuł w języku angielskim,
- streszczenie w języku polskim,
- słowa kluczowe w języku polskim,
- streszczenie w języku angielskim,
- słowa kluczowe w języku angielskim,
- wstęp,
- rozdziały,
- podsumowanie,

- bibliografia sporządzona alfabetycznie (kolejność według nazwisk autorów),
- nota biograficzna o Autorze w języku polskim,
- nota biograficzna o Autorze w języku angielskim,
- dane kontaktowe do Autora (do opublikowania).

3. Prenumerata

Osoby zainteresowane prenumeratą czasopisma proszone są o kontakt mailowy z Oficyną Wydawniczą „Humanitas” wydawnictwo@humanitas.edu.pl lub redakcjazn@humanitas.edu.pl lub telefoniczny 32 363 12 25.

Wszelkich dodatkowych informacji udziela:

dr Olimpia Grabiec
redakcjazn@humanitas.edu.pl

Więcej informacji na stronie: www.zeszytyhumanitas.pl

Dane kontaktowe zostały umieszczone za zgodą Autorów.



OFICyna WYDAWNICZA

HUMANITAS

Zapraszamy do współpracy z Oficyną Wydawniczą „Humanitas”. Oferujemy autorom i podmiotom instytucjonalnym usługi profesjonalnego opracowania redakcyjnego, graficznego i technicznego książek oraz ich wydanie w wersji tradycyjnej i elektronicznej – szybko i profesjonalnie!

Usługi, które oferujemy

- ✓ recenzja
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