

THE MEDIATING ROLE OF PERSONAL FEATURES IN THE RELATIONSHIP BETWEEN JOB DESIGN COMPONENTS AND WORKERS' SATISFACTION AND PERFORMANCE IN THE CONTEXT OF DIGITALIZATION

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ABSTRACT

The key social component of every workplace is the employee, whose personal characteristics and competencies enable the organization to achieve its fundamental goals: survival, growth, and development. Management may acquire the most advanced technologies and design the most challenging tasks, but without employees who possess the appropriate characteristics—both current and potential—improvement in business outcomes remains uncertain. In this regard, the paper focuses on examining the relationships between key workplace components—specifically the technical system and the structure of work assignments—and how these, mediated by workers' personal features, influence their satisfaction and performance. The study is based on a random sample of 125 respondents who completed a questionnaire composed of question segments drawn from several validated scales designed to measure the constructs analysed in this paper. The results reveal a significant and strong mediating effect of employees' personal features on the relationship between the technical system and the structure of work tasks, on the one hand, and employee satisfaction and performance, on the other. The paper contributes to the HRM process by highlighting that employees' personal characteristics must be taken into account, as they represent an important and influential mediator that consistently affects employee satisfaction and performance in the context of digitalization.

KEYWORDS: *Personal Features, Mediation Impact, Job Design, Satisfaction and Efficiency, Digitalization*

INTRODUCTION

This paper examines the relationships among four key constructs of job design in the context of digitalization and the Fourth Industrial Revolution (Industry 4.0). Two constructs are defined as predictors, a third as a mediating variable, while employee satisfaction and

performance are treated as dependent variables. All of these constructs are theoretically framed as specific segments of the workplace. In this regard, the first segment—employee attitudes toward the technical system—relates to the technologies used to perform tasks in the context of digitalization and Industry 4.0. This segment addresses a range of issues, including

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the use of technological devices in the workplace (e.g., computers and machines), applications for workplace communication (internal and external networks and platforms), various software tools, devices and applications for acquiring new knowledge and skills, technologies for facilitating management, planning, and communication, and, in some cases, applications that distract from efficiency (Ninaus et al., 2021). These issues need to be analysed in light of changes in both the micro- and macro-contexts of the workplace, driven by artificial intelligence and automation, including the increasingly complex and nuanced human-machine interface.

This idea remains especially relevant in systems where the integration of cyber-physical artifacts with humans, teams, and organizations is reshaping work environments (Patriarca et al., 2021). The technical system plays a critical role in both worker and managerial performance, particularly with the growing use of empathetic software solutions and emerging technologies such as quantum computing in professional workplaces.

The second segment—employee attitudes toward work assignments—corresponds to the second predictor latent variable, which concerns the content of work in the context of digitalization and Industry 4.0. This construct includes issues such as aligning work tasks with organizational goals, increasing the number of activities performed, assuming greater responsibility in task execution, coping with rapid changes, maintaining higher levels of interest in work, and addressing the growing demand for creativity in task realization. It also encompasses the blurring boundary between leisure and working time. Contemporary research, including studies on gender differences in work-related factors, highlights additional aspects such as the need for continuous training, the difficulty of executing new tasks, autonomy in choosing how to perform work, and readiness for learning and skill improvement (Ou & Pan, 2021).

The essence of autonomy at work may be influenced by technological changes, but it is primarily shaped by management maturity, higher levels of education, and the development of emotional intelligence—trends that evolve in parallel. Without these, autonomy risks becoming negligible. From the early foundations of job analysis to current approaches, examining the impact of standard job components on autonomy and freedom in the workplace, and consequently on employee satisfaction, reveals certain conflicting tendencies. Modern technologies, for example, may reduce the physical strain on workers by enabling remote instructions, yet they may simultaneously increase overall workload by allowing participation in multiple processes at once. In this way, technology

can both enhance autonomy—by facilitating knowledge and skill development—and restrict it, through heightened managerial control.

Therefore, when examining relationships among job components, it is necessary to isolate certain variables for the sake of model simplification, while also recognizing the potential for additional, interacting influences. These influences may reinforce each other or act in opposing directions, depending on the specific context and observed relationships. In sum, while some assumptions about the effects of digital technologies are clear, others remain inconclusive (Bal et al., 2021). Looking ahead, technological applications may foster greater trust among co-workers and strengthen relationships between managers and employees, thereby supporting higher levels of autonomy across diverse business contexts.

The third segment—workers' personal features—serves as the mediating variable in this research model. It reflects changes in employee characteristics in the context of digitalization and Industry 4.0. This construct encompasses factors such as the growing demand for diverse skills and competencies, faster and more accurate task performance, higher levels of self-control, greater trust and clearer delegation of authority, reduced absenteeism, and decreased monotony and fatigue in the workplace (Samani et al., 2015). The focus here is on the role of personal characteristics in mediating the relationship between workplace design and employee satisfaction and performance. This also provides employees with additional ways to influence their jobs, which may align better with specific job types or individual preferences.

When organizations are considered, particularly the more flexible small and medium-sized enterprises, the mediating role of human capital quality becomes even more evident. In such cases, the relationship between technological improvements (through diverse digital platforms and solutions) and organizational agility and efficiency is strongly shaped by employee characteristics (Ahmed et al., 2022). A similar logic applies at the micro-organizational level, where all changes must ultimately be implemented by individuals. Here, cause-effect relationships need to be identified, modelled, and monitored to support continuous learning and improvement.

Moreover, attention to personal features allows employees to appreciate the broader effects of their work and to recognize the value their jobs bring to their lives (Slemp & Vella-Brodick, 2013). This dimension is crucial not only at the micro-organizational level but also at the macro-organizational level. Modern strategic tools and guidelines suggest that each individual worker is expected to contribute daily in alignment with the balanced scorecard approach to strategy-fo-

cused organizations.

The last segment considered in this paper—employee satisfaction and performance, treated here as a dependent latent variable—focuses on the efficiency and well-being of employees in the context of digitalization and Industry 4.0. This construct includes factors such as employees' clearer understanding of their individual contributions to organizational goals, the convergence of multiple tasks into more challenging jobs, improved communication and mutual understanding among colleagues, and the increasing stress levels associated with modern workplaces (Ramos-Villagrasa et al., 2019). While this construct is primarily linked to management, organizational, and individual efficiency, it also intersects with other scientific fields, enabling a more comprehensive understanding of this contemporary phenomenon.

Research confirms a clear dose–response relationship between job satisfaction and individual work performance. Employees with higher levels of job satisfaction typically demonstrate stronger task and contextual performance and engage less frequently in counterproductive behaviours compared to those with lower satisfaction (Koopmans et al., 2014). Moreover, workforce aging influences both worker health and safety and overall organizational productivity. Even though robots, automated machines, and Industry 4.0 solutions can increasingly perform tasks once carried out by humans, workers continue to carry out manual tasks that require uniquely human capabilities. Importantly, automation does not inherently guarantee high levels of flexibility (Finco et al., 2020). Flexibility still depends on employees themselves—their cognitive abilities, motivation, and behaviour.

Job complexity further shapes employee outcomes. It is expressed not only in motivational task characteristics such as autonomy, task variety, task significance, task identity, and job feedback but also in motivational knowledge characteristics, including complexity, information processing, problem solving, skill variety, and specialization (Morgeson & Humphrey, 2006). These dynamics underline the importance of effective people management, especially in light of issues such as worker fatigue, which may lead to errors with potentially serious consequences, and monotony, which can undermine motivation.

Therefore, if the challenge is to redesign contemporary human resource management to meet the objectives of sustainable HRM, attention should be directed toward a mix of employee-development–flexible and time-flexible workplaces. Such an approach can increase both employee job satisfaction and organizational performance, which are key outcomes of sustainable HRM (Davidescu et al., 2020).

Task performance has been measured through

items such as planning and completing work on time, optimizing planning processes, achieving desired outcomes, distinguishing core from peripheral issues, setting correct priorities, performing tasks efficiently, and collaborating productively with others (Koopmans et al., 2013). Performance criteria used in related research include reliability, error rates, productivity, ergonomics, efficiency, safety, time, and quality, spanning diverse fields such as engineering, computer science, decision sciences, management, accounting, social sciences, economics, neuroscience, and psychology (De Simone et al., 2022).

In some studies, employee satisfaction and performance are treated as distinct constructs, while in others they are integrated. Since the focus is on the role of employees' personal characteristics in the model, their level of satisfaction and performance is considered to be determined by the technical system and job content, which represent key categories of every workplace.

Following the introduction, the paper reviews recent literature, where the key variables of the model related to sustainable human resource management are outlined. The next sections present the methodological and conceptual framework, followed by the research results. Finally, based on findings from the business context of Bosnia and Herzegovina, the paper concludes with a discussion and recommendations for future research.

LITERATURE REVIEW

Mary Parker Follett, one of the most prominent authors in management, defined management as the execution of work through other people. This definition emphasizes that people are the medium through which business strategy is implemented and key strategic and operational goals are achieved, reflecting a profound philosophical perspective (Mendenhall et al., 2000). In this regard, research that positions human characteristics as mediators—between the technical system and the structure of work assignments as independent variables, and work performance as a dependent variable—is both relevant and appropriate in the contemporary era, as society undergoes rapid and transformative technological development. In general, when an organization values employee commitment and affiliation, employees expect reciprocal support from the organization. When such support is perceived, employees are more likely to enhance innovation and learning, to make constructive use of diversity, and to focus on the long-term development of the organization. In turn, they are motivated to reward the organization with high performance (Jeong & Kim, 2022).

These insights suggest that workplace design and human resource development should be regarded as simultaneous processes that mutually and reciprocally influence one another.

The contemporary system of organizational design, as defined by Henry Mintzberg, emphasizes that different strategies and technical systems require clear and specific organizational configurations in order to optimize the achievement of strategic and operational goals. Modern research at the macro-organizational level builds on this by modelling business structures through management knowledge and human capital as mediating variables. In this approach, predictor variables such as strategic thinking, strategic planning, and strategic innovation are examined in terms of their indirect effects on enterprise performance. Given that the key elements of organizational structure are jobs and organizational units—understood as clusters of jobs—the mediating role of job design becomes highly significant. As the smallest unit of organizational structure, working positions help shape both individual and organizational efficiency, making them an important component of business decision-making.

The key elements of any workplace are the technical system, the work assignment related to a job or position, and the features of the worker who executes the tasks. The workplace itself is designed through the process of job analysis, the outcome of which is a document known as job systematization. This document contains three main components. The first two are primarily concerned with work activities: the job description, which specifies the tasks to be performed, and the job specification, which defines the knowledge and personal characteristics required of the individual performing those tasks. The third component is job standardization, which outlines the indicators used to evaluate employee performance. These indicators encompass not only quantitative measures but also motivational and behavioural aspects, reflecting the consequences of employee satisfaction. The first two components—job description and job specification—are directly connected to the technical system, work assignments, and worker features. The third component, job standardization, integrates two critical segments: employee satisfaction and efficiency in the workplace, or more precisely, overall performance.

The primary idea behind early job design was to create work systems with standardized operations and highly simplified tasks, making workers almost as interchangeable as machine parts (Hackman & Oldham, 1976; Oldham & Hackman, 2010). Initially, this approach focused only on quantitative aspects of standardization, such as norms, rate systems, and employee efficiency. After Elton Mayo's work with Roethlisberger and Dickson and the famous Hawthorne experiment,

socio-psychological factors were introduced into the study of performance. These considerations highlighted qualitative elements, including worker behaviour, as additional determinants of employee outcomes. In this context, it is essential to revisit and update earlier findings by examining workplace design in the contemporary environment of Industry 4.0 and digitalization. Specifically, research should investigate the mediating role of employees' personal characteristics in the relationship between technical systems and job assignments, on the one hand, and employee satisfaction and performance, on the other. The aim is to identify workplace segments that, under modern conditions, contribute to improved employee effectiveness and, consequently, to the survival, growth, and development of organizations.

The impact of the new cyber-physical environment on job creation remains uncertain. Technology alone does not determine organizational change; rather, employees' willingness to accept or resist technological tools plays a decisive role. Thus, these phenomena should be examined within the broader influence of Industry 4.0 and digitalization on organizational decision-making and implementation. Modern technological solutions enable employees to perform increasingly complex tasks, often delegating routine responsibilities to technology by giving clear instructions. Nevertheless, human capacity remains indispensable in innovation processes. Work content and job design will continue to evolve, particularly in adjusting and modifying human-machine relations, where human intervention is required to enhance technological capacity and application. For the foreseeable future, however, human workers will remain central to innovation (Waschull et al., 2020).

When strategy, culture, and structure are analyzed in relation to organizational effectiveness, knowledge management is found to exert both full and partial mediating effects within this constellation of relationships (Zheng et al., 2010). These findings support the development of research models that highlight how the application of knowledge management in organizations operates primarily through people, even in an era marked by the rapid advance of artificial intelligence. The implementation of knowledge management enhances employees' positive characteristics and thereby their individual effectiveness. At the same time, knowledge management concepts can be embedded technically through advanced systems and better-structured work assignments.

Related research also examines mediation and moderation effects in organizational and human resource management. For example, the mentoring process has been studied as a moderating variable in analyzing the mediating effect of work achievement

on the relationship between job identity and job satisfaction. Mentoring, in addition to guiding career development, involves the transfer of knowledge, skills, and experience from mentor to mentee. In this case as well, individual characteristics—competences and knowledge—play a role in shaping the mediating effect of mentoring, linking job content, achievement at work, and job satisfaction. These categories are closely related and often treated as integrated (Jiang et al., 2020).

In this sense, there is strong reason to suspect the existence of an intermediary influence of employee characteristics. Specifically, these characteristics mediate the influence of the quality of the technical system and the structure of work assignments—as key components of job content—on both the efficiency and satisfaction of human resources.

By highlighting these relationships, researchers provide both individuals and organizations with actionable insights into the mechanisms through which work characteristics influence job performance. These mechanisms take into account not only the environmental attributes of work but also employees' personal preferences, which are key factors in human resource processes such as selection and work redesign (Peiró et al., 2020).

Today's environment imposes rapid technological and social changes that affect organizations, with direct implications for organizational design and, consequently, workplace design. Talent management therefore goes beyond simply finding and hiring suitable candidates. It also involves uncovering employees' attributes and hidden abilities and creating systematic programs for their development. Employees must be properly trained, educated, and supported in order to achieve their best personal performance and, in turn, contribute to optimal organizational performance (Čizmić & Ahmić, 2020). Given the changing context, employee performance, particularly that of talented employees, can no longer be observed in a single dimension. Instead, it must be assessed along at least two dimensions: production-related aspects and behavioural aspects, which together form the integrated category of overall worker performance.

METHODOLOGICAL AND RESEARCH CONCEPTUAL FRAMEWORK

A logical-analytical approach breaks down the workplace into its fundamental components and defines the independent and dependent constructs of the model. Within this framework, certain workplace constructs are conceptualized as predictor latent variables, others as mediator latent variables, and still others as criterion or dependent latent variables. Technological

development and social change create an entirely new context for work. Due to the application of Industry 4.0 and digitalization, both complex and less complex tasks can now be integrated within a single workplace.

When examining the construct related to the technical system, it is important to recognize that an increasing number of jobs require the intensive, daily use of Industry 4.0 technologies. These technologies can be understood as sophisticated extensions of the employee's toolkit, and employees' perceptions of them may serve as a relevant measure, expressed through their attitudes toward their use at work. This construct focuses on several key issues: human-machine interaction in the workplace; the availability of user-friendly options and the speed of technology adoption; the flexibility of tools that support work performance; the operational efficiency of advanced machines and tools related to employee performance; and the more frequent and effective use of such technologies. It also addresses the growing trend of reducing the need for physical presence in the workplace. In contemporary analyses of the technical system, the emphasis is placed on how technological innovations enhance workplace practices. Specifically, employees' attitudes are examined in relation to their understanding of technology and their perceptions of how technological solutions support their work performance.

The issues considered here relate to the application of technological innovations and achievements generated by the Industry 4.0 revolution. These include machines and software solutions that enhance automation and work efficiency, accelerate workplace learning, improve communication, clarify planning processes, enable more precise control, and increase dedication to task completion. At the micro level of organizations, the modern business environment must be continuously scrutinized in order to better design future workplaces. The central challenge is to achieve a balance between human and technological requirements within the framework of post-industrial society. The goal of this effort is to optimize job design for human operators, thereby maximizing their performance capacity as well as their satisfaction and well-being (Fletcher et al., 2020).

In line with this aim, a reflective six-item construct was developed to measure the phenomenon described above. For this purpose, an adapted version of the System Usability Scale (SUS) was used to assess the usefulness of technical systems at work. The SUS was originally developed by John Brooke (Sheu et al., 2017).

The characteristics and content of tasks performed in the workplace, under the conditions of Industry 4.0 and digitalization, represent the next construct in the model and function as an independent

variable. This construct is measured through employees' attitudes toward various aspects of contemporary changes and activities at work. Key issues considered in digital working environments include the clearer definition of tasks, the creation of more engaging assignments, the empowerment of workers to perform tasks independently, the growing pace and variety of work activities, the required level of creativity, and the ability to manage work–life balance.

This construct, consisting of six items, draws on an adapted version of the Work Design Questionnaire (WDQ). It addresses issues such as job variety, authority and control, required knowledge for task performance, and other critical elements of work design (Bargsted et al., 2019).

The construct of employee features represents the third variable in the model, functioning as the mediating variable within the framework of a simple mediation analysis. This construct captures changes in the characteristics of job performers in the context of Industry 4.0 and digitalization.

It focuses on six key questions:

1. Has digitalization increased the demand for diverse employee skills and competencies?
2. Has digitalization enabled faster and more precise task performance in the workplace?
3. Has digitalization enhanced employee independence at work?
4. Has digitalization fostered greater trust, openness, politeness, and clearer delegation of authority?
5. Has digitalization reduced employee absenteeism and increased awareness of workplace obligations?
6. Has digitalization reduced nervousness at work in general?
7. Has digitalization reduced the level of monotony and fatigue in the workplace?

In this segment, the emphasis is placed on employee characteristics, which are measured using a scale based on the Traits Personality Questionnaire (TPQ), adapted for application in the context of Industry 4.0 and digitalization (Ghani et al., 2016).

When discussing employee satisfaction in modern conditions, a wide range of questions can be considered. Job satisfaction is shaped not only by micro-level aspects of work but also by broader factors related to the strategic orientation of the organization. Accordingly, analysis may include issues such as satisfaction with the organizational climate, workplace equipment, opportunities for advancement and development, as well as satisfaction with strategic aspects of the business—particularly the organization's mission, strategy, and social responsibility. Levels of satisfaction may vary across different groups of employees. For this rea-

son, it is advisable for managers to develop strategies that are differentiated and tailored to the preferences and needs of each group (Gross et al., 2021). In the context of Industry 4.0 and digitalization, employee satisfaction is further shaped by attitudes toward several issues: positive or negative feelings about work, the quality of relationships between colleagues, workplace safety and security, managerial commitment to employee well-being, fulfilment through task performance, and satisfaction with compensation. To capture these diverse facets, job satisfaction was measured using single items, allowing for broad coverage of the domain (Macdonald & Macintyre, 1997).

Job security in the contemporary context is a particularly complex issue. Since many occupations are becoming obsolete, absolute job security can no longer be guaranteed. Instead, it is indirectly reflected in the organization's capacity for innovation and long-term sustainability. In addition, cybersecurity has become a relevant aspect of both organizational and employee security. These conditions require adjustments and the combination of measurement scales to ensure the validity of findings. A sound understanding of these issues may contribute to better alignment between human resource management policies and job design practices, which in turn can lead to improved employee performance (Hernaus & Pološki Vokić, 2014).

Employee performance itself is closely intertwined with satisfaction. It may be assessed in terms of reduced absenteeism, improved interpersonal relations, integrated job descriptions, and increased productivity enabled by new technologies, while also addressing the need to minimize risky behaviours that could harm the organization. Performance was measured here using five items. The items represent adjusted questions covering employees' attitudes toward several aspects of work in the context of Industry 4.0 and digitalization. These include attitudes toward (1) the contribution of digitalization itself, (2) the scope of work that can be realized at the workplace, (3) success in achieving goals, (4) differentiation of performance relative to peers, (5) the quality of work outcomes—measured through client satisfaction, implementation time, and execution costs—(6) knowledge related to products or services, and (7) the organization's competitive position.

Although numerous factors influence employee performance, evidence shows that stress has a negative effect, whereas emotional intelligence—a core employee trait—has a positive effect (Yozgat et al., 2013). Accordingly, a modified version of the Individual Work Performance Questionnaire (IWPQ) was applied, consisting of eight items designed to measure satisfaction and performance in an integrated manner across organizations operating in the context of Indus-

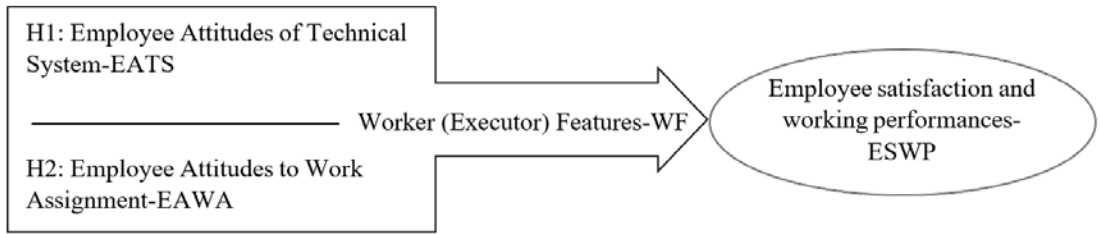


FIGURE 1. Conceptual framework of the research

SOURCE: Authors' illustration

try 4.0 and digitalization.

In line with the preceding discussion, additional research is conducted to test the mediating role of personal worker features (WF) in the relationship between workplace factors and employee outcomes. Specifically, the study examined whether employees' perceptions of the workplace technical system and of work assignments, as predictor variables, influence employee satisfaction and performance indirectly through worker features as a mediator.

Based on this framework, the following research proposals were formulated:

RP1: Is there a statistically significant mediation effect of personal worker features on the relationship between employee satisfaction and the workplace technical system?

RP2: Is there a statistically significant mediation effect of personal worker features on the relationship between employee satisfaction and workplace job assignments?

The central research problem is grounded in the assumption that digitization and Industry 4.0 are intensively redefining both social and business systems. However, the most relevant phenomena should be analysed at the micro level, where their influence on the formation of key job components—those that determine employee satisfaction and performance—can be more precisely understood.

This research further assumes that these components do not directly affect employee satisfaction and performance, nor organizational outcomes as a whole. Rather, their effects are mediated by employees' mindsets, which are shaped by personal characteristics that determine their acceptance of, or resistance to, workplace changes.

Accordingly, the research hypotheses are defined as follows:

1. Personal worker features significantly mediate the relationship between the workplace technical system and employee satisfaction and per-

formance.

2. Personal worker features significantly mediate the relationship between workplace job assignments and employee satisfaction and performance.

The first construct, defined as Employee Attitudes toward the Technical System (EATS), represents the first independent latent variable. The second construct, Employee Attitudes toward Work Assignments (EAWA), serves as the second independent latent variable. The third construct, Worker Features (WF), is treated as a latent variable with an assumed mediating role. Finally, Employee Satisfaction and Work Performance (ESWP) is defined as the fourth construct, functioning as the dependent latent variable.

To operationalize the conceptually defined research, a questionnaire was developed and structured into several key components. Some of these represent latent variables—constructs of the conceptual research model. As identified earlier, the four main components of the model function as latent variables, each formed by six manifest variables (items) that serve as observable measures of the constructs. These items were based on adjusted, validated scales.

All questionnaire items were measured on a seven-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"). The internal consistency and reliability of each item exceeded 0.80 on Cronbach's alpha, while the overall reliability of each construct was approximately the same. These results confirm that the measures are at an acceptable level for this type of research.

The assumption of normality was tested using descriptive statistics. Results showed that measures of central tendency (arithmetic mean, mode, median) did not deviate significantly from one another, and the distribution satisfied requirements of skewness and kurtosis for normality.

The sample consisted of 125 randomly selected respondents from companies of predominantly service orientation, representing different types of work and hierarchical levels.

With regard to age, the largest share of respondents (37.6%) were between 41 and 50 years, accounting for more than one-third of the sample. Another 32.8% fell into the 31–40 age range. Together, these two groups comprised over 70% of all respondents. Respondents aged 51–65 made up 15.2% of the sample, while 14.4% were between 18 and 30 years.

In terms of gender, 65.6% of respondents were women and 34.4% were men, suggesting a reasonably balanced structure.

Educational attainment was relatively high: 44.8% had completed college, while 36% held a master's degree. Thus, more than 80% of respondents had at least a college or master's qualification. Additionally, 17.6% had completed doctoral studies, while only 1.6% had finished high school.

The organizational structure of the sample was also balanced, with approximately half of respondents employed in private companies and half in state-owned organizations. Regarding profitability, the majority of organizations were operating profitably, while only a very small proportion reported losses in the most recent business year. This pattern corresponded with responses concerning the regularity of salary payments.

Finally, organizational innovativeness was assessed in terms of introducing new or enriched products and services, as well as the ability to identify new markets and customer segments. About 60% of organizations were oriented toward innovative business practices, while 40% operated within standard business areas without major changes in operations.

In mediation analysis, the independent variable (X) is assumed to influence the mediator (M), which in turn affects the dependent variable (Y). In other words, the relationship between the independent and dependent variables is considered indirect, as the mediator intervenes in the cause–effect pathway (Abu-Bader & Jones, 2021).

To test the mediating role of worker features, Hayes's procedure for mediation analysis was applied. Separate analyses were conducted to examine the relationship between (1) the technical system and employee satisfaction and performance, and (2) work assignments and employee satisfaction and performance, with worker features serving as the mediator in both cases. Both hypotheses were tested using a simple mediation model.

RESEARCH FINDINGS AND INTERPRETATION

Variation in the independent variables significantly explained variation in the presumed mediator. In this study, the independent variables were the technical

system and work assignments, while the mediator was worker features. Variation in the mediator, in turn, significantly explained variation in the dependent variable, namely employee satisfaction and work performance.

To estimate the indirect effects in these relationships, a bootstrap procedure with 5,000 resamples was applied using SPSS macros (Zhao et al., 2010). This method provides an empirical sampling distribution to test the significance of mediation effects.

Based on the model description above, a simple linear mediation model was constructed and is presented in Figure 2. This figure graphically illustrates the relationships among the variables through total, indirect, and direct effects. Using Hayes's PROCESS macro for SPSS, the percentage of the indirect (mediated) effect relative to the total effect was calculated.

Hayes (2009) provides formulas for estimating and testing such effects across five different types of models, as well as SPSS macros capable of probing moderated mediation models. These procedures employ several approaches, including the bootstrapping of conditional indirect effects.

The regression coefficients of the model were estimated using the PROCESS macro, which is widely applied in mediation and moderation analysis (Hayes & Rockwood, 2017). All analyses and calculations were performed in SPSS using PROCESS syntax, version 2.16 (Hayes, 2013).

Specifically, the analyses employed PROCESS Model 4, in which Y represents Employee Satisfaction and Work Performance (ESWP), X represents Employee Attitudes toward the Technical System (EATS), and M represents Worker Features (WF), as illustrated in Figure 2 (Abu-Bader & Jones, 2021). For the first model, the total, direct, and indirect effects of EATS (X) on ESWP (Y) through WF (M) were calculated. For the second model, the same effects were calculated with Employee Attitudes toward Work Assignments (EAWA) as the independent variable (X).

A mediating effect is evident when the direct effect of the independent variable on the dependent variable changes in intensity once a mediator is introduced into the model. The strongest evidence of mediation occurs when the direct relationship decreases considerably.

After calculation using the SPSS PROCESS macro, the total effect of EATS on ESWP was estimated at 0.7365 with a standard error of 0.0475, and the test indicated that this effect was statistically significant. In the simple mediation model, the direct effect of EATS (X) on ESWP (Y) was 0.49437 (SE = 0.0657), while the indirect effect through WF was 0.2428. These results indicate the presence of mediation.

After calculation and testing, it is evident that a significant portion of the relationship between the

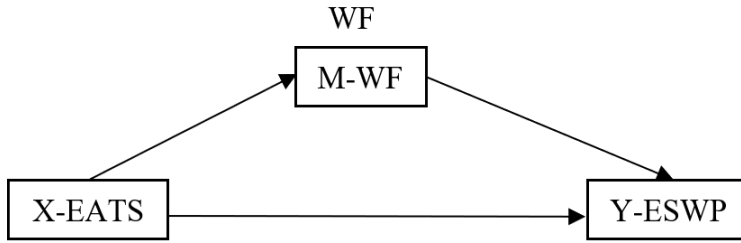


FIGURE 2. Simple mediation model X-EATS → M-WF → Y-ESWP

SOURCE: Authors' illustration

TABLE 1. Total, Direct and Indirect effect of X:EATS on Y:ESWP (M:WF)

Model : 4						
Y : ESWP						
X : EATS						
M : WF						
Sample						
Size: 125						
***** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y *****						
Total effect of X on Y						
Effect	se	t	p	LLCI	ULCI	c_cs
.7365	.0475	15.5087	.0000	.6425	.8305	.8134
Direct effect of X on Y						
Effect	se	t	p	LLCI	ULCI	c'_cs
.4937	.0657	7.5197	.0000	.3637	.6237	.5453
Indirect effect(s) of X on Y:						
	Effect	BootSE	BootLLCI	BootULCI		
WF	.2428	.0759	.1143	.3997		
Completely standardized indirect effect(s) of X on Y:						
	Effect	BootSE	BootLLCI	BootULCI		
WF	.2681	.0834	.1243	.4423		
***** ANALYSIS NOTES AND ERRORS *****						
Level of confidence for all confidence intervals in output:						
95.0000						
Number of bootstrap samples for percentile bootstrap confidence intervals:						
5000						

SOURCE: Authors

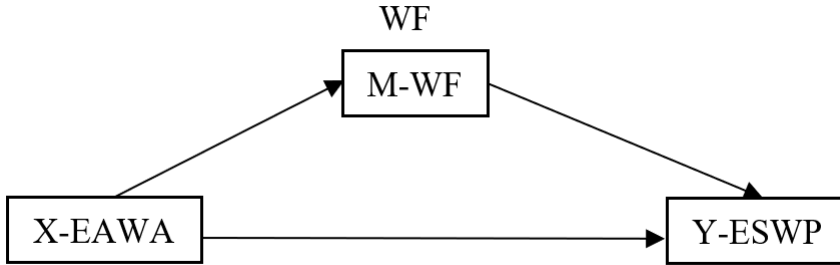


FIGURE 3. Simple mediation model X-EAWA → M-WF → Y-ESWP

SOURCE: Authors’ illustration

technical system and employee satisfaction and performance is explained indirectly through the worker features construct. The total effect was 0.7365, of which the direct effect was 0.4937 and the indirect effect 0.2428. The completely standardized indirect effect was slightly larger at 0.2681, confirming the earlier calculation. The indirect effect was statistically significant, as the model’s p-value was below 0.05 and the bootstrap confidence interval did not include zero. Approximately one-third of the total effect (33% or more) was mediated through worker features.

These findings suggest that even in companies with well-equipped workplaces, management must also consider worker features, which significantly influence overall satisfaction and performance. This implies that business performance can only be improved by combining technological development with effective human resource and talent management practices. It is not sufficient for management to simply place the right people in the right positions. Technological progress and the use of state-of-the-art equipment may be baseline requirements, but in the contemporary environment shaped by Industry 4.0 and digitalization, the decisive factor is comprehensive people management—particularly the recruitment, retention, and development of talented employees.

Additionally, the relationship between EAWA and ESWP was tested in the same way, in order to examine the mediating role of WF between these two variables. The corresponding model is presented in Figure 3.

The same methodology was applied to this model, and the analysis showed that all relationships were statistically significant (Preacher & Hayes, 2008). Calculations were conducted using Hayes’s PROCESS macro for SPSS, Model 4, and the results are presented in Table 2.

Based on the calculations, the direct effect of EAWA (X) on ESWP (Y) was 0.5804 with a standard error of 0.0762. The indirect effect, with WF as the mediating variable, was 0.1796. This indirect effect was

statistically significant, as the model’s p-value was below 0.05 and the bootstrap confidence interval did not include zero. The total effect was 0.7599 with a standard error of 0.0447, with the indirect effect accounting for nearly 24% of the total effect. This proportion is both practically and statistically significant, thereby confirming the second research hypothesis.

These results suggest that when a company defines and organizes workplace content and job assignments, almost one quarter of the effect on employee satisfaction and performance is mediated by worker features. This finding highlights the importance of integrating human resource processes—such as recruitment, development, and retention—into organizational practices.

A closer examination of the relationships in which employee competencies act as a mediator—between organizational characteristics such as autonomy and employee performance—shows that focusing solely on these links is insufficient for high-quality decision-making and business improvement. Even in simplified models, the indirect influence of certain predictors can be recognized, particularly their impact on satisfaction and performance through the characteristics and competencies of employees.

Such a model suggests that the structure of work assignments, especially the degree of autonomy, can indirectly influence performance through the competencies of human resources. To verify this mediating effect, multiple regression analysis was conducted (Yu & Ko, 2017).

In this context, it is necessary to create distinct constructs based on job design components, with a specific emphasis on worker features. This allows for comparison and analysis of their mutual influence and helps to define new logical and statistical positions of the variables. The ultimate goal is to support better strategic and operational decisions that can be imple-

TABLE 2. Total, Direct and Indirect effect of X:EAWA on Y:ESWP (M:WF)

```

*****
Model : 4
Y : ESWP
X : EAWA
M : WF

Sample
Size: 125

***** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y *****

Total effect of X on Y
Effect   se      t      p    LLCI   ULCI   c'_cs
.7599   .0447  16.9999 .0000 .6715   .8484   .8375

Direct effect of X on Y
Effect   se      t      p    LLCI   ULCI   c'_cs
.5804   .0762   7.6161 .0000 .4295   .7312   .6396

Indirect effect(s) of X on Y:
      Effect  BootSE  BootLLCI  BootULCI
WF    .1796   .0856   .0459     .3689

Completely standardized indirect effect(s) of X on Y:
      Effect  BootSE  BootLLCI  BootULCI
WF    .1979   .0946   .0504     .4082

*****
Level of confidence for all confidence intervals in output:
95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
5000
    
```

SOURCE: Author

mented with greater effectiveness, as demonstrated in this study.

The findings of this paper align with previous research. For example, Li et al. (2021) demonstrated that employee dedication to work (job commitment) fully mediates the relationship between trust in the organization and certain aspects of organizational leadership, on the one hand, and safety-related behaviour, on the other.

The main contribution of the present research lies in its separate examination of the technical aspects of the workplace and the structure of work, considered alongside the mediating role of employee characteristics in shaping satisfaction and performance. This approach offers the potential to develop a specific theoretical model relevant for the future work environment shaped by Industry 4.0 and the anticipated Industry 5.0.

In addition, innovation is closely linked to com-

petent and talented employees who possess specific characteristics. Regardless of the organizational environment, meaningful improvements cannot be achieved without effective recruitment and retention strategies that account for these characteristics. An innovative organizational culture further contributes to enhancing innovative work behaviour (Shanker et al., 2017). The research presented in this paper is complementary to these findings, as it emphasizes the role of employee characteristics as a mediator between contemporary technological changes in the workplace and employee satisfaction and performance, including attitudes toward improving work outcomes. At the same time, an updated system of job descriptions—reflecting changes in job content and tasks—can also shape employee behaviour, particularly their tendencies toward innovation. This provides a clearer picture of potential actions for improving both employee performance and overall organizational effectiveness.

Although the technical system and job content, when properly designed, positively influence employee satisfaction and performance in the context of digitalization, the findings also show that employee characteristics, considered in isolation, have a strong and significant effect on satisfaction, which includes aspects of performance as well.

However, step-by-step hierarchical multiple regression analysis revealed that employee characteristics added only a small and statistically insignificant amount of variance to the dependent variable (employee satisfaction and performance). In fact, in the multiple regression model, the third predictor could be excluded because it was not statistically significant (Čizmić et al., 2022).

Despite these results, the initial findings from simple regression models, combined with the theoretical reasoning of this study, suggest that it may not be appropriate to exclude employee characteristics entirely. While workplace design parameters have a significant influence on satisfaction and effectiveness, personal characteristics remain an important factor that should not be disregarded.

In light of these findings, it is reasonable to suggest that the role of employee personal characteristics as a construct should be reconsidered within an updated model. Specifically, future research should examine its mediating influence on the relationship between the technical system and employee satisfaction and performance, as well as on the relationship between work assignments and employee satisfaction and performance.

The contribution of this paper lies in demonstrating the mediating role of employee personal characteristics and confirming their strong influence. In the context of human resources, these characteristics must be considered, as they represent an important mediator through which different independent variables can more consistently affect employee satisfaction and performance, and consequently, overall organizational performance.

In addition to the direct effects of the technical system and the structure of work assignments, this study confirmed a strong indirect effect operating through employee personal characteristics on both satisfaction and performance.

When considering the influence of various factors on employee satisfaction and performance, it is important to account for the cause-and-effect relationships among the different constructs and their logical and statistical positions within the model. This is particularly relevant in economics and management, where dependent and independent variables may shift roles; for example, price can influence quantity supplied, but quantity supplied can also influence price, depending

on the context.

Viewed more broadly, the organization as a socio-technological system—with a strong social dimension—acts as a mediator between management decisions and organizational outcomes. Within this system, the workplace remains a crucial category. Beyond general examinations of job design and its impact on satisfaction and performance, it is necessary to break job design down into several constructs to better capture the intensity and position of individual job design elements in relation to employee outcomes. At the same time, the applicability of traditional theories of job design, employee satisfaction, and performance must be reconsidered in light of contemporary digitalization, which permeates organizations and reshapes their essential components, including the workplace itself.

In modern conditions, companies often focus on incorporating new technologies into workplace structures in order to maintain competitiveness. However, this is neither a simple nor a one-sided process, as it requires careful adjustment of the human-machine interface—even without considering emerging expectations associated with the Internet of Bodies or the Internet of Everything, though the same mechanisms may apply in those contexts.

While debates on taxing robots and the emergence of the so-called “robotic workplace” have gained attention, in practice the human remains at the center of observation. In the context of human resource management, robots—regardless of their level of intelligence—should be viewed as part of the technical system, functioning as extensions of employees. Workers instruct and control these advanced tools and machines, which assist them in enhancing performance, but ultimate responsibility for tasks remains with employees.

This implies that even with the acquisition of sophisticated technology, including artificial intelligence systems capable of machine learning and cloud-based functioning, the human employee—with unique personal characteristics—remains a vital component of every organization. Indeed, the recently formulated principles of Industry 5.0, whose contours are slowly emerging, are explicitly oriented around human centrality.

The structure of tasks can be clearly defined, yet in modern conditions—where phenomena such as “de-jobbing” are increasingly relevant—other factors also come into play. These factors, shaped by the personal characteristics and behaviour of employees, strongly influence key aspects of performance. In this context, employee satisfaction and performance depend not only on technological equipment and clearly defined work tasks that help prevent excessive strain,

but also on personal characteristics. A substantial share of the variance in satisfaction and performance is indirectly explained through the mediating role of these characteristics, which reflect employees' capacity, competence, and behaviour.

Looking ahead, organizations must complement effective recruitment and retention with contemporary human resource management practices that support teamwork and talent development. Such practices should cultivate higher-quality employee characteristics in the context of ongoing technological enrichment and structured task design. This, in turn, will foster greater employee satisfaction and performance, ultimately leading to more effective implementation of business strategies and more stable organizational operations.

For decades, management and organizational

science have sought ways to increase the efficiency of professional employees, much as earlier efforts focused on blue-collar workers in the last century. Today, it is evident that employee characteristics must be taken into account. The effects of new technologies and the evolving content of jobs do not yield full results directly; rather, they act as predictors whose impact on performance is largely mediated by employee personal characteristics, including dedication to work.

In this sense, the chain of needs, desires, actions, satisfaction, and performance can be understood as part of the broader process of employee motivation. This process incorporates various elements of quality of working life and ultimately leads to higher levels of satisfaction and performance. Such reasoning is consistent with the principles of Hackman and Oldham's job characteristics model.

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MEDIJACIJSKA ULOGA OSOBNIH KARAKTERISTIKA U ODNOSU IZMEĐU KOMPONENATA OBLIKOVANJA POSLA I ZADOVOLJSTVA TE USPJEŠNOSTI ZAPOSLENIKA U KONTEKSTU DIGITALIZACIJE

SAŽETAK

Ključna društvena komponenta svakog radnog mjesta je zaposlenik, čije osobne karakteristike i kompetencije omogućuju organizaciji ostvarenje temeljnih ciljeva: opstanka, rasta i razvoja. Menadžment može nabaviti najsvremeniju tehnologiju i osmisliti najzahtjevnije zadatke, no bez zaposlenika koji posjeduju odgovarajuće - postojeće i potencijalne - karakteristike, poboljšanje poslovnih rezultata ostaje neizvjesno. U tom kontekstu, ovaj se rad fokusira na ispitivanje odnosa između ključnih komponenti radnog mjesta - tehničkog sustava i strukture radnih zadataka - te načina na koji one, posredstvom osobnih karakteristika zaposlenika, utječu na njihovo zadovoljstvo i radnu uspješnost. Istraživanje je provedeno na slučajnom uzorku od 125 ispitanika koji su ispunili anketni upitnik sastavljen od segmenata pitanja preuzetih s nekoliko validiranih skala za mjerenje analiziranih konstrukata. Rezultati pokazuju značajan i snažan medijacijski učinak osobnih karakteristika zaposlenika u odnosu između tehničkog sustava i strukture radnih zadataka, s jedne strane, te zadovoljstva i uspješnosti zaposlenika, s druge strane. Rad doprinosi području upravljanja ljudskim resursima naglašavajući kako osobne karakteristike zaposlenika treba uzeti u obzir jer one predstavljaju važan i utjecajan posrednički čimbenik koji dosljedno utječe na zadovoljstvo i uspješnost zaposlenika u kontekstu digitalizacije.

KLJUČNE RIJEČI: *osobne karakteristike, medijacijski učinak, oblikovanje posla, zadovoljstvo i učinkovitost, digitalizacija*