

ORIGINAL RESEARCH PAPER

## The effect of gamification on improving the performance of organizations by mediation of knowledge management

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### ABSTRACT

**BACKGROUND AND OBJECTIVES:** Knowledge is a key factor and strategic resource for gaining assets and non-functional organizational capabilities. Knowledge Management is the knowledgeable process of creating, validating, presenting, distributing and using the knowledge in an organization. Successful organizations consider human resource development as a fundamental principle. Many organization find their knowledge management process to be ignored by the employees. Gamification is a way of enhancing knowledge management with game design elements to increase employee's engagement, content creation and satisfaction.

**METHODS:** The research method was descriptive-survey and based on variance-based structural equation modeling. The statistical population included 384 employees of the sports organization of selected metropolises. The statistical sample size was determined by stratified random sampling method, 384 employees who answered the research tools: questionnaires of gamification, performance improvement and knowledge management. The validity of the instrument was confirmed by 5 professors of sports management and their reliability was calculated with Cronbach's alpha coefficient and combined reliability in the dimensions of the questionnaires, higher than 0.696 and 0.757, respectively. Data analysis was performed by descriptive and inferential statistics tests and sobel test in SPSS 22.0 and SmartPLS 2.0.

**FINDINGS:** The relationship between research constructs with their dimensions, gamification with performance improvement and knowledge management with performance improvement of positive and significant research model ( $T \geq 2.86$ ) and research model fit (GOF = 0.589) was evaluated as strong. As a result, managers of metropolitan municipal sports organizations can play a mediating role in the relationship between gamification and performance improvement by implementing knowledge management in the organization.

**CONCLUSION:** According to the research results, although gamification is an effective factor in improving employee performance, but knowledge management plays a crucial role. Therefore, it is suggested that municipal sports managers pay special attention to knowledge management and gamification to improve employee performance.

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## INTRODUCTION

Organizations face many challenges throughout their life, and in most situations, contrary to expectations, it may be necessary to leave the organization to resolve these challenges. The sustainable use of the organization's resources is the key to the success of organizations (Riege, 2005). In addition to human, physical or financial resources, knowledge is a relatively abstract but no less important key resource than other resources of an organization. Knowledge gives the organization a decisive advantage over its competitors and ensures the flow of organizational processes now and in the future (Richter, 2009; Sawairnathan and Halimoon, 2017). With the maxim "Knowledge is power," one can express a desire for success and an edge over the competition. On the one hand, it's very important that organizations protect their knowledge well. On the other hand, they need to be able to use their knowledge freely in their internal processes (Helm et al., 2007). The sustainable use of business resources is a key to corporate success. The notion of "knowledge is power" represents the struggle for success and competitive advantages in the world of business. While on the one hand, the adequate protection of the company's own knowledge is of great importance for companies, on the other hand, a free and open handling of knowledge is required in the internal process (Huerta, 2012). Organization can take advantage of the knowledge, ideas, experience and intellectual capital that their employees have as an inexhaustible capital to respond to a wide range of challenges. In order to achieve success and not fall behind competitors, organizations should use the knowledge available to their employees as one of the main factors of their success (Powell et al., 2016). The lack of knowledge Management (KM) can have extensive consequences for the company's ability to function in the event of an employee's absence, such as losing the ability of organizations to perform work. In addition, the lack of knowledge can waste time and increase the cost of training and acquiring knowledge that was previously handled by colleagues. These cases make KM a competitive factor for organizations (Abila and Kantola, 2016). KM comprises the processes of creating, storing, transferring and applying knowledge within a company (Alavi et al., 2001). Knowledge Management Systems (KMS) is a system for applying and using KM principles to typically enable

employees and customers to create, share and find relevant information quickly (Fernandez et al., 2014). A Knowledge Management System is a valuable tool for any business operating in our data-driven digital world, particularly those that sell products and provide services (Desouza et al., 2005). Examples of KMS are Content Management Systems (CMS), Wikis, Blogs, Enterprise Social Networks (ESN), Groupware systems or Bug tracker (Chin et al., 2015). They allow employees to create documents or other forms of knowledge artifacts (videos, instructions, tickets), to store and structure them. Creating and maintaining a shared and searchable knowledge base supports the re-usage of knowledge and, hereby, value-creation of the company. But a KMS alone cannot guarantee successful KM. The relevance of different contextual factors for Knowledge Sharing (KS) and KM such as relational models (Boer et al., 2011), subjective norms (Chennamaneni et al., 2012), corporate culture (Javernick-Will, 2012) but also barriers have been examined comprehensively (Hong et al., 2011). Withholding of knowledge has a negative impact on KS behavior of the knowledge community as a whole like intra-organizational knowledge-hiding (Singh et al., 2008) and may additionally lead to knowledge gaps. These can have far-reaching consequences for the company's operating capability in the event of an employee's absence like loss of the organizations' ability for task performance (Levy, 2011). In addition, the loss of knowledge can result in spending a lot of time and money on training and acquiring knowledge that is or has been in the hands of colleagues (Serenko et al., 2016). This makes KM capability a competitive factor for organizations (Chuang, 2004). The lack of KM can have extensive consequences for the company's ability to function in the event of an employee's absence, such as losing the ability of organizations to perform work. These cases make KM a competitive factor for organizations (Cechanowicz et al., 2013). Deterding et al. (2011) in research, lack of motivation, lack of trust, lack of promotion of positive attitudes towards KS and KMS, lack of effective processes for KMS and then, evaluating the success rate of these systems are the reasons why employees do not use the KMS. KMS usually have a proper structure and design, but nevertheless, these systems remain unused. Among the mentioned factors, lack of motivation of employees in using KMS is known as the main reason for the failure of

these systems (Deterding *et al.*, 2011). Ardichvili *et al.* (2003) provide a summary of the key issues that affect KMS used by employees:

1. *Motivation to share knowledge*
2. *Lack of trust*
3. *Creating a positive attitude towards KS and KMS*
4. *Creating effective processes for sharing knowledge and evaluating the success of KMS*

Applying information and communication technology to enrich knowledge exchanges will act as an organizational accelerator. There are many ways to increase employee motivation, improve their attitudes, and help them find meaning and enjoyment in sharing the knowledge they acquire. Video game designers use rewards, badges, medals and challenges and leaderboard (Friedrich *et al.*, 2020).

The phenomenon of creating gaming experiences is specially called gamification. To understand what gamification is, one must first understand the game. Games have existed since ancient times and are an integral part of all cultures throughout history (Friedrich *et al.*, 2020). They are one of the oldest forms of social interactions among humans and are defined as a formalized expression of play which allows practitioners to go beyond direct physical interaction and immediate imagination (Tajpour *et al.*, 2018). There are several important aspects of games beyond the immediate definition. Digital games have reached an incredible level of complexity as compared to classical games. Chess and similar games, like go board game, still retain a form of “nobility” status among games, since they are complex in the number of combinations of moves one can make on the board (Yamani, 2021; Ozcinar *et al.*, 2021). Computers being able to match the human brain in its capacity to accurately predict outcomes is a recent phenomenon. Since digital games provide an infinitely larger range of movements and freedom it also adds an additional layer of complexity, too complex some contend (Braga, 2022). For example, moving around in a game seems simple but there are many variables at play to achieve it. The feeling of games is also a high interesting area, with environmental physics and graphics and freedom of choice. However, some games that are quite far from meeting today’s standard of graphical requirement, or diversity of choices, are still played by gamers

seeking compelling storylines (Schell, 2005). This shows the compelling power that the feel of a game holds over our interest and motivation, going beyond the simple visual needs of players (Ahmed, 2017).

#### *Gamification elements:*

Game elements were chosen to trigger the mentioned game mechanics.

Points and gifts can be earned by the order picker for good results in the process. Points give feedback about the rendered performance. Therefore, it is important that the user understands how points are measured. Besides feedback, points target the mechanics competition and result transparency (DaSilva Alcantara *et al.*, 2022). Badges are given to the staff member for outstanding performance and the fulfillment of certain goals. They trigger the game mechanics’ concrete objectives, competition, and result transparency. Badges can also foster collaboration as order pickers with the same badges could feel a connection between each other. To support the game mechanics competition, it was chosen to use a high score list. As mentioned before, however, the high score list does not display the ranked results of each individual order picker, but the team’s outcome. Hence, the game element can trigger collaboration as well. The game element, level, was chosen to target the mechanics, concrete objectives and result transparency. The level displays the result of the order picker in the categories of executed picks, required time per order, and errors per order. Thus, the staff member gets feedback about his performance and his improvement in the particular categories (Ikhida *et al.*, 2022). Another element that was chosen is a meaningful stories. The other elements are combined into a story that has been told during the use of the gamification application. As there are decisions to make within that story, it supports the game mechanic, freedom of choice (Suh *et al.*, 2022). Challenges and Contests can also be included in gamified KMS. These tasks are typically limited in time: users have a pre-set timeframe to fulfill them – two hours, a day or a week (Trees, 2015). Challenges are tasks that need to be fulfilled in the time given in order to receive a reward – a badge or a pre-defined amount of points. In contests, users compete for the best performance within a given timeframe. Challenges and contests put users under time pressure, which according to

Andrews and Farris (1972) increases several aspects of performance including usefulness, innovation and productivity. Turning a task into a time-constrained challenge renders it to be of higher priority. Users who decide to pursue the challenge allocate more resources to task-relevant activities and avoid distractions more (Baumann, 1998). Setting up challenges is not optimal for all kinds of tasks though. Time pressure increases performance, but at the same diminishes precision and output quality (Moore and Tenney, 2012). Users under time pressure rely more heavily on various heuristics and their focus scope is narrowed. Thus time-limited challenges and contests are not suitable for creative tasks or those that require great precision and analytical approach. On the other hand, they may prove beneficial for simple and repetitive tasks, such as “In the next hour, share your latest KMS contribution with 5 of your colleagues who might benefit from it”. The last common gamification aspect is the use of achievements. Ironically, achievements actually came out of the gamification of playing games. Meta-goals that players could accomplish when playing a game or set of games within an established system. For example, Xbox achievements earned from playing various Xbox games all add together to give a player their gamer score, which is used in the community as an indication of overall gaming prowess (Werbach, 2014). The aim of gamification is to support and motivate the users to perform tasks promoted by the services (Caponetto, et al., 2014). This goal is pursued by providing affordances for gameful experiences and thus making the target activities more engaging. Gameful experiences similar to those created by games, such as flow, a feeling of mastery, and intrinsic motivations (Ryan et al., 2006), have been at the core of the discussion of gamification as a means to motivate behavioral and psychological outcomes (Huotari et al., 2012). For instance, in the case of gamified exercise applications, the services at their core aim at increasing exercise, thus serving a utilitarian purpose. In addition to the main service, gamification features are implemented by adding a hedonic element to the activity, with the aim of motivating and supporting the user to increase exercise: for example, providing feedback, achievable goals, progress, and encouragement. The engaging elements of gameplay are employed to create more enjoyable exercise experiences. Werbach (2014),

define gamification as: the use of game design elements in non-game contexts, which is one of the most common definitions that is used in the literature. The term gamification is often used to cover other terms like serious games, games with a purpose or game-based learning (Krath, et al., 2021), these concepts relate to game-based applications and their definitions are not mutually exclusive, but they serve different purposes that distinguish them from each other. With the aim of enhancing the motivation of recipients, gamification has been applied to various contexts such as education and learning or business (Trees et al., 2015). Also for the context of KM, benefits of gamification have been addressed but predominantly not in a holistic way (Shpakova et al., 2019) but limited to selective measures such as points for content creation (Swacha et al., 2021). Paying attention to employees and above all their job performance as the biggest and most important asset of the organization is a phenomenon that has grown a lot in the last few decades. Many developments in recent years, in the form of decentralization of management systems, reduction of organizational classes, employee participation in the decision-making process, and things like that, are entirely due to the fact that the attitude of organizations towards the workforce has changed, and the organization's employees have a new definition (Šajeva, 2014). Nowadays, industrial, commercial and even service organizations have turned more than before to increase their level of productivity by increasing the expertise, satisfaction and attachment of their human resources and related productivity with improving their job performance (Endramanto et al., 2021; Mirzapour et al., 2019). This research is not commissioned by specific organization, which would normally narrow down the scope. But at the same time the performance improvements and KM in municipal metropolitans is initially very similar, raising the same kind of problems. This allows to make the final result of research concrete enough, so that it could be easily implemented in municipal metropolitans with minor or no changes. Even though gamification can be used in various KM functions, the research concentrates specifically on improvements performance of employee. This will help to narrow the scope and concentrate on explicit functions of gamification that can be helpful especially in this area of KM. The aim of this study was to identify the

effect of gamification on improving the performance of employees of organization of metropolitan cities of Iran through the mediation of knowledge management. The current study have been carried out in Tehran in 2021.

## MATERIALS AND METHODS

### Survey design and data collection

The present research, in terms of purpose, method of data collection, and, type, is applied, survey, and causal-descriptive, respectively and is specifically based on the structural equation modeling. The statistical population of the research was made up of employee of sport organization of Tehran, Tabriz, Mashhad and Shiraz municipal sports organization who were 126000 people according to the obtained information from the human resource departments. 384 employees completed the researcher-developed questionnaire. The first section of the questionnaire contains demographic variables and the second part, contains questions related to research variables Questionnaires of gamification, performance improvement and knowledge management. The validity of the instrument was confirmed by 5 professors of sports management and their reliability was calculated with Cronbach's alpha coefficient

and combined reliability in the dimensions of the questionnaires. The survey for the given research was designed with the online surveys and reporting tool. The survey was provided in Farsi language. It was distributed as a link through social media all data collected remained confidential. Before sharing the survey link, the questions were tested on 60 volunteers and the feedback was collected and slight changes on the order of questions and professional terms used were made. 419 people opened the survey, 405 started responding and finally 384 fully submitted their responses. Data analysis were performed by descriptive and inferential statistics tests and Sobel test in SPSS 22.0 and SmartPLS 2.0 software. Table 1 shows that Cronbach's Alpha Coefficient and the compound reliability of all variables are than the least acceptable number.

Table2 shows the dimensions of variables of the questionnaire.

## RESULTS AND DISCUSSION

### Descriptive statistics and factor analysis for variables entering the analysis

Demographic data showed 44% of the respondents were females and 56% were males. Also, the highest frequency of age was between 31

Table 1: Cronbach's alpha, combined reliability of variables

Variables	Questions	Cronbach's alpha	Combined reliability
Gamification	26	0.863	0.884
Improvement performance	23	0.754	0.806
Knowledge management	25	0.954	0.959

Table 2: Cronbach's alpha, combined reliability of variable

Dimensions	Variables	Questions	Cronbach's alpha	Combined reliability
Gamification	Point and gift	7	0.765	0.816
	Challenges	4	0.714	0.776
	Levels	2	0.706	0.802
	Budge	2	0.715	0.836
	Meaningful stories	4	0.758	0.846
	Achievements	7	0.736	0.815
Improvement performance	Efficiency	9	0.693	0.757
	Effectiveness	6	0.702	0.796
	Productivity	3	0.723	0.804
	Development	5	0.704	0.765
Knowledge management	Knowledge creation	7	0.820	0.767
	knowledge Shearing	6	0.850	0.890
	knowledge replication	5	0.833	0.883
	Knowledge storage and organization	7	0.898	0.992

and 41 years with 51% and highest frequency of experiences was between 5 to 10 years with 51%. Finally, in terms of education level, the highest number belonged to bachelor's degree 40%, and the lowest number belonged to doctoral education 20%. The demographic data are presented in Table 3.

Data Analysis

Exploratory Factor Analysis (EFA) showed 3 constructs: the results of the Kaiser-Mayer-Olkin (KMO) test and the significance of Bartlett's test ( $P < 0.05$ ) and ( $KMO < 0.596$ ) sample size and data are suitable for factor analysis. Also, the results of Bartlett's test were also indicative. There is a definite correlation between the items of each structure. Then, due to the standardization of these questionnaires and experts' consensus about the research items, Confirmatory Factor Analysis (CFA) was used and measures (items) were observed in all three structures of the research with factor loads higher than 0.5. Fitting index models: measurement models with (index reliability, convergent validity and discriminant validity) and a structural model that includes T value, coefficient of determination (R-squared values), and the effect size measure ( $F^2$ ) was used. Evaluation of structural model fit: After assessing the validity and reliability of the measurement model, the structural model was examined.

T-values: The simplest criterion for measuring the relationship between variables in the structural part of the model is the significance of T-values. If the value of these numbers exceeds 1.96 and 2.58, it indicates the correctness of the relationship between the variables and, as a result, the confirmation of the research (the relationship between categories and structures) at the confidence level of 95 and 99

percent. In the present study, according to Table 4, it was ( $T \geq 2.860$ ). Effect size criteria ( $F^2$ ): Cohen (1988) introduced values of 0.02, 0.15 and 0.35 or more as indicators of small, medium and large effect size of one structure on another structure. According to Table 4, the results showed that effect size value ( $F^2 < 0.293 < 9.264$ ) was higher than middle and larger.

Results

The results of Table 4 showed that all the paths and relationships between the constructs whose significance coefficients of T values are greater than 2.58 are significant at the 99% confidence level.  $F^2$  in the range of (0.293-9.264) have a more than middle and large effect on their structure.

Regarding the coefficient of determination ( $R^2$ ), a measure of the model's predictive accuracy, squared correlation between a specific endogenous construct's actual and predicted values is calculated.  $R^2$ , as the most commonly used measure of structural model, represents the exogenous latent variables' combined effects on the endogenous latent variable. Its value ranges from 0 to 1, however, the values of 0.75, 0.50, or 0.25 for endogenous latent variables can be respectively described as substantial, moderate, or weak (Hair, et al., 2014). In the current research, it was ( $0.403 < R^2 < 0.903$ ), which was clear in Fig. 1. Researchers also examine Stone-Geisser's  $Q^2$  value (Geisser, 1974; Stone, 1974), besides the coefficient of determination, to measure the model's predictive relevance. This is done by resampling procedure, also known as bootstrapping, and is applied just for reflective models not he formative ones. In the structural model,  $Q^2$  values more than zero prove the path model's predictive relevance for a certain reflective endogenous latent variable. As provided in

Table3: The demographic data

Variables	Value	Frequency	Percentage
Gender	male	216	56%
	Female	164	44%
Age	20 to 30	100	26%
	31 to 41	196	51%
	More than 42	88	23%
	Under 5	42	11%
Experience	5 to 10	196	51%
	More than 10 year	146	38%
Education	Bachelor degree	156	40%
	Master degree	151	39%
	Doctorate degree	77	20%

Table 4: Result from model directions by structural equations

Dimensions	Variables	T-value	P value	Path coefficient	F <sup>2</sup>	Result
Gamification	Point and gift	7	0.765	0.795	0.816	Confirmed
	Challenges	4	0.714	0.703	0.776	Confirmed
	Levels	2	0.706	0.564	0.802	
	Budge	2	0.715	0.590	0.836	Confirmed
	Meaningful stories	4	0.758	0.794	0.846	Confirmed
	Achievements	7	0.736	0.864	0.815	Confirmed
Improvement performance	Efficiency	9	0.693	0.775	0.757	Confirmed
	Effectiveness	6	0.702	0.812	0.796	Confirmed
	Productivity	3	0.723	0.647	0.804	Confirmed
	Development	5	0.704	0.571	0.765	Confirmed
Knowledge management	Knowledge creation	7	0.820	0.889	0.767	Confirmed
	knowledge shearing	6	0.850	0.940	0.890	Confirmed
	knowledge replication	5	0.833	0.930	0.883	Confirmed
	Knowledge storage and organization	7	0.898	0.950	0.992	Confirmed
Gamification --> KM		3.306	0.010	0.492	0.293	Confirmed
KM --> IP		6.433	0.0001	0.513	0.404	Confirmed
Gamification --> IP		2.860	0.019	0.452	0.297	Confirmed

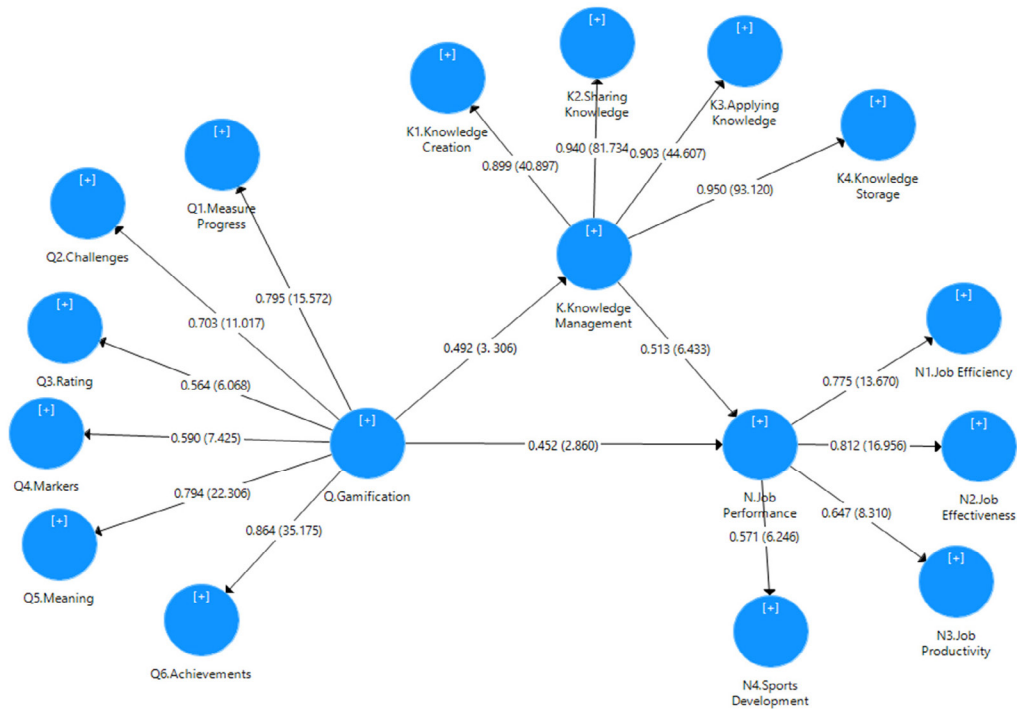


Fig. 1: T-values and path coefficients of latent variables

Table 5: A Global Goodness-of-Fit Index for Structural Equation Modeling

Dimensions	Average Commonality	R <sup>2</sup>	GOF	Quality
Gamification	0.781	-	-	-
Improvement performance	0.649	0.403	0.511	Better fit
Knowledge management	0.919	0.483	0.667	Better fit
Overall of models	0.783	0.443	0.589	Better fit

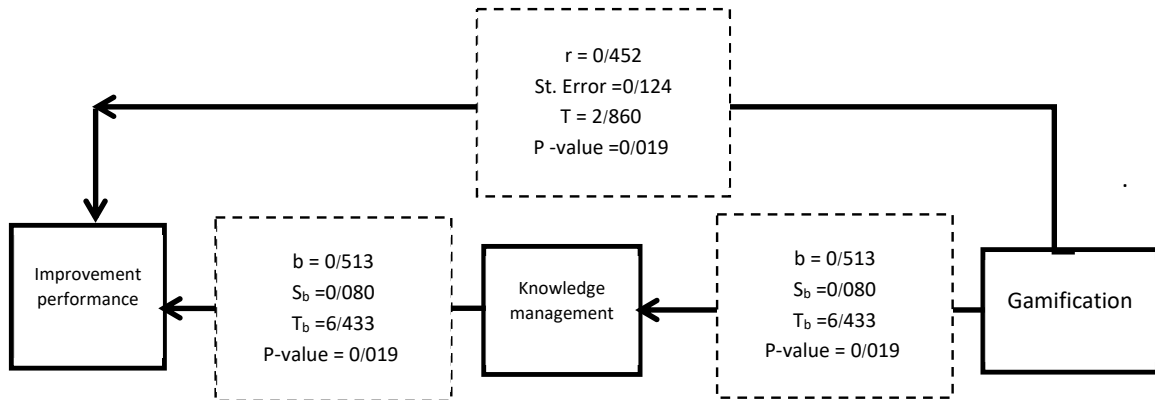


Fig. 2: Mediating Effects through Sobel Test.

Fig. 1 all the latent variables exhibit a significant level of predictive relevance ( $0.291 < Q^2 < 0.647$ ).

The next statistical procedure which has been administered in the study relates to GOF. The calculated index of GOF for the current study in Table 5 is more than 0.36, representing a good criterion to confirm the model (Wetzels, et al. 2009). Thus, the estimated model has demonstrated adequate fit to the data, as indicated by GOF index.

To measure the significance of mediating variable knowledge management, the study conducted Sobel test. The Sobel test is used to measure the significance of a mediation effect. It is a specialized T-test providing a method to determine the significance of mediation effect after the reduction in the effect of the independent variable in the model (Sobel, 1982). Results were summarized in Fig. 2 showed that the value of the Sobel test statistic is greater than 1.96 in the positive direction. Therefore, the mediating effect of knowledge management can be confirmed at the 95% significance level. Considering the error level of the value ( $Z \geq 0.05$ ), then the observed indirect effect of the mediating variable (KM) effect test is significant and confirms it.

### Discussion

Due to the area of gamification being new as a phenomenon although with wide-spread recognition as a viable tool for various efficiency gains, there is not a lot of scientific data on the subject. Most of the research done is on a small scale and done in homogenous environments, which limits the scientific viability. What has been proven is the possibility of using gamification in various situations with a probable positive outcome. Though the research is not conclusive in any way, it shows a high degree of promise, but it needs further study in order to be an empirically proven tool for useful organizational improvement. The results in prioritizing the dimensions of the questionnaires with the confirmatory factor analysis test showed that: from the point of view of the respondents in the structure of gamification dimensions of municipality's: point and gift, challenges, levels, budge, meaningful stories, achievements, in the structure of improving employees' job performance dimensions efficiency, effectiveness, productivity, development and in the KM dimensions knowledge creation, knowledge shearing, knowledge replication



knowledge storage and organization respectively, are in priority and in a direct and meaningful relationship. also, the structure of gamification with the structure of improving the job performance of employees, the structure of gamification with the structure of KM and the structure of KM with the structure of improving the job performance of employees have a direct and positive relationship, moreover the variable of KM as a mediator in the relationship between the independent variable of gamification and the dependent variable Improving the job performance of employees plays a role. According to research findings, gamification as a new approach in organizational behavior issues can play a constructive and improving role in the direction of organizational KM processes among employees. This approach can improve individual and collective mechanisms to store, share, create and use knowledge by creating and strengthening motivation among employees through game mechanisms and dynamics (Krath, et al., 2021). In explaining the results of the research on the structure of gamification in the organization of municipalities and its relationship with each of the dimensions, it can be said: progress is measured by scoring and giving tangible or intangible rewards by encouraging and persuading them to improve their job performance and duties. The challenges of gamification in the missions of the municipal organization are effective in increasing the productivity and efficiency of employees, as well as the mediating role of KM in providing innovation, creativity and attractiveness in the activities and programs provided by the municipal organization, for citizens. Leveling is effective in promoting the performance of the employees of the municipal sports organization and encouraging them to achieve the goals and strategies set by the organization (Huotari et al., 2012, Levy, 2011). The analysis showed, that gamification indeed provides various possibilities to increase the motivation of employees for KM activities. But to unfold its potential a gamified KMS requires for a fitting environment. In other words, gamification will be successful in the long term only in combination with an appropriate corporate culture and an organizational climate that promote an open exchange of knowledge and rewards KM activities. A corporate culture, which is characterized by open exchange and fair feedback has a positive influence on the attitude of the employees towards the division

of knowledge exchange (Shpakova et al., 2019).

## **CONCLUSION**

This paper shows evidence that gamification, through points, badges, challenges, achievements and other game elements provides employees with the platform to compete in, enhances their confidence and assist to satisfy certain higher needs from Maslow's pyramid. In the end, it helps to fulfill the main goal, which is to increase employees' performance improvement with the KM when it comes to contributing valuable content, organizing and improving it, or using it in a meaningful way. All these could be achieved also with a financial reward system, but the advantage of gamification is the relatively low costs: although points and badges have to be earned by the employees, the company pays nothing to issue them. The role of gamification is not just about bringing more fun into work life and making unpleasant experiences feel good. It is not even only about raising the motivation of employees. Gamification can significantly increase the efficiency of many business processes, including performance appraisal. It is based on psychology and human instincts, like desire for competition, accomplishment, and status. It is important to remember that any form of performance appraisal, whether we speak about traditional appraisals or gamified ones, is only as good as the whole performance management system that it is operating within. Even the most up-to-date and efficient in sport organizations. This paper clarified what gamification is, what elements it uses and how it can support companies fulfill their KM oriented goals and performance improvement. Closer attention was paid to various psychological mechanisms and their role in gamification effectiveness. Additionally, demographic and cultural factors that can be of influence in gamification adoption and use were discussed.

## *Suggestions*

According to the obtained results, the subsequent suggestions are suggested to the metropolitan municipality of organizational managers:

1. Use the research model that has a suitable fit to achieve their effective goals for performance improvement of employees;
2. By setting up an idea management system such as a suggestion system, a think tank, an advisory

council in the organization and using the experiences and knowledge of their employees, they should take advantage of the elements of gamification and aspects of knowledge management in order to improve the job performance of their employees;

3. Conducting this research in other organizations comparing the results obtained with the present study.

#### *Limitations and future research*

The present study is limited by the fact that it was carried out in a cultural organization. As a suggestion, more organizations can be involved to determine what other factors (for example, organizational culture) can affect the overall results. It is suggested to carry out more research that shows the impact of different motivational drivers on job satisfaction to finally investigate the relationship between job satisfaction and work commitment. Another interesting direction for future studies is to investigate the understanding of the role of different elements of game design and how and how much these elements affect long-term work commitment, motivation and job satisfaction, either negatively or positively.

#### **AUTHOR CONTRIBUTIONS**

M.R. Bahadoran performed the literature review, questionnaire design, analyzed and interpreted the data, prepared the manuscript text, and manuscript edition. H. Ghasemi, A. Farahani and M. Hosaini supervised and performed the corrections and reviewed the article and controlled the results of the research

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#### **CONFLICT OF INTEREST**

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

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#### **ABBREVIATIONS (NOMENCLATURE)**

<i>CFA</i>	Confirmatory Factor Analysis
<i>CMS</i>	Content Management System
<i>EFA</i>	Exploratory Factor Analysis
<i>ESN</i>	Enterprise Social Networks
<i>GOF</i>	Goodness of Fit Criterion
<i>KM</i>	Knowledge Management
<i>KMO</i>	Kaiser-Mayer-Olkin
<i>KMS</i>	Knowledge Management System
<i>KS</i>	Knowledge Sharing

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