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THEORETICAL AND PARCTICAL STUDY ON IMPLEMENTATION OF MODERN TECHNOLOGIES IN HUMAN CAPITAL MANAGEMENT

Introduction

New technologies are present in every sector of economy. They play a significant role and have an impact on business[1]. Their expansion can be seen in the development of smart cities and healthcare services. An increasing number of industrial processes take advantage of modern technologies where robots are used and manufacturing is automated. Moreover, agriculture and automotive sector also apply modern technologies. Their application is also growing rapidly in HR departments where they support staff recruitment processes[2] and employee performance management[3]. What is more, HR departments start using virtual reality (VR) to develop trainings and visualisations. The objective of the article is to present the use of modern technologies in the context of HRM. It will describe the applications and functions of modern technologies in present-day management. A case study based on company X will be conducted that will show practical applications of technological tools in business and economy. Conclusions will be drawn and presented on the basis of the analysis of the literature on the subject and the case study.

1. Modern technologies in HRM

Digitization, artificial intelligence (AI) and business process automation involve strong emotions in the society. This is also an issue that is the subject of research of numerous investigators and HRM specialists. Several debates concern ethical issues of the solutions in question. On the one hand, companies see in the new technologies a panacea for operational problems that they face on every day basis. They consider modern technologies to be an opportunity to increase business performance, to save money and to increase employee

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[1] F. Guilliford, A. Parker Dixon, *AI: the HR revolution*, „Strategic HR Review" 2019, Vol. 18, No. 2, pp. 52-55.
[2] N. Nawaz, A. M. Gomes, *Artificial Intelligence Chatbots are New Recruiters,* (IJACSA) „International Journal of Advanced Computer Science and Applications" 2019, Vol. 10, No. 9.
[3] B. Buck, J. Morrow, *AI, performance management and engagement: keeping your best their best*, „Strategic HR Review" 2018, Vol. 17, No. 5, pp. 261–262.

effectiveness. The application of these technologies is to increase the output and reduce costs. New technologies respond to changes in working environment and the challenges that are presently encountered by employers[4]. Digitization has an impact both on employees and employers as regards new professions, the development of competencies and employment forms[5].

On the other hand, there are fears that new technologies will exclude some professional groups, particularly the ones from smaller communities and with lower levels of education. Many people are afraid to be replaced by automation. Without doubt this is going to happen with simple, administrative and repetitive operations. However, numerous workplaces will be enhanced. More and more frequently, letters AI stand for augmented rather than artificial intelligence. Such an approach and idea of AI testifies to the enhancement and improvement of human labour in order to use human potential more effectively[6]. Present-day employers have problems with the acquisition of employees, their retainment and development in the company. With the ageing of the society the problem increases of the shortage of staff as well as of the quality of applicants[7]. A substantial number of employers employ foreign staff. Such cities as Krakow, Warsaw or Wroclaw, where several companies have their shared service centres or head offices, have had the problem for years to acquire employees that have a very good or perfect command of such foreign languages as French, German, Dutch or any Scandinavian ones. Moreover, IT companies have problems with the shortage of staff. This is a major challenge and they compete in the ways how to reach potential candidates, in their financial offers and the benefits for the staff.

Currently, an increasing number of employees work remotely[8]. This is possible due to the developments in technologies, which evidently makes work in remote teams more effective. Thanks to modern technologies it is possible to work with people in various parts of the world

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[4] L. Kohnova, J. Papula, N. Salajová, *Internal Factors Supporting Business and Technological Transformation in the Context of Industry 4.0*, „Verslas: teorija ir praktika" 2019, pp. 137-145.
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and the opportunity to conduct videoconferences makes the contact closer. Being in touch, sharing documents and keeping them in the cloud enables access to them from any place in the world. It is possible to work on one document with people around the world and enjoy the joint effects of the work. Obviously, the technological progress may involve some risks related to remote work. Full remote work may result in the sense of longing for a personal contact with other people. It may result in the sense of alienation[9]. Everyday routine of leaving home is involved with several activities that are not done in remote work settings[10]. There are fundamental questions that appear in the context of new technologies:

- What results can be achieved through the application of new technologies?
- How can the concentration and energy be used that are saved thanks to machines and the automation of business processes?

In the publication entitled *Management Body of Knowledge,* the Turnaround Management Association - a business advisory organization from Chicago, together with academics and business practitioners, presents the most common reasons of company problems. The main causes of the fall of companies include management mistakes that generate subsequent problems within organizations. Obviously, business reality is not one-dimensional and economic and political situation also have a significant impact on company's wellbeing.

In order to protect organizations against negative consequences of economic and social changes one should focus on the application of new technologies in management. The present situation – the COVID-19 pandemic - forced many companies to turn to remote working and use new technologies. The article presents a case study that shows the specifics of the implementation of new technologies in organizations.

2. Practical case study of company X

Company X operates in the area of new technologies and it develops systems for smart houses. It is based in Great Britain and has been on the market since 2014. It cooperates on a permanent basis with 50 employees. They live both in GB and Poland. Company X cooperates with 45 developers in Poland. It has B2B contracts with IT service providers who develop control systems for smart houses. In the article the developers who provide IT services for

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[9] A. Jeran, *Praca zdalna jako źródło problemów realizacji funkcji pracy*, „Opuscula Sociologica" 2016, pp. 49-61.
[10] M. Charalampous, C. A. Grant, C. Tramontano, E. Michailidis, *Systematically reviewing remote e-workers' well-being at work: a multidimensional approach*,
https://www.tandfonline.com/doi/abs/10.1080/1359432X.2018.1541886 (Accessed: 23.03.2020).

Company X in Britain will be referred to as *collaborators* while company X as an *employer*. This is a kind of simplification assumed by the author as in the light of legal regulations these people are rather service providers to the company than its employees. However, it is a common practice in Poland and several European countries (e.g. Ukraine) to apply B2B contracts in IT sector. A decreasing number of developers accept employment based on an employment contract. A B2B cooperation ensures more flexibility for both parties. Moreover, this form is beneficial to many workers as they pay lower contributions related to the provision of work while the British company can also reduce its administrative expenses. The developers are not afraid of this form of employment as the demand for their services is so high that they are confident to have new offers of work or cooperation after they complete a project with the company. New technologies give an opportunity to work for people who live in other countries but they also create the necessity to develop new forms of employment. Typical office procedures in company X, signing agreements for example, are conducted with the use of electronic signature. This is a substantial convenience factor both for the employer and the employees and this attribute is emphasized in employer branding. What is more, the use of new technologies is environmentally friendly as the company does not produce paper documents and the employees do not pollute the environment by commuting.

The table below presents the duration of developer collaboration with company X.

Table 1. Cooperation period with the company X

Cooperation period with company X	Number of collaborators
0-1 year	11
1-3 years	14
3-5 years	16
5-6 years	9

Source: Author's research based on data obtained from company's X HR department.

In the case of 9 people, the collaboration period with company X amounts to 5-6 years. For 16 people the period ranges from 3 to 5 years; 14 people have worked for over a year but shorter than for 3 years while 11 people have worked for less than a year. The 50 people team consists of 40 males and 10 females. Considering the average employment in IT sector, the staff retention level in company X is good. A high staff turnover in IT sector is a significant challenge. The so called voluntary turnover and the challenges involved with developer recruitment constitute major issues for IT sector employers. According to the data in the article entitled *Employee Tenure Becomes Hot Topic for Tech Companies,* the employment time of

IT workers in one company is within the range of 1-4 years[11] , while according to the *Society for Human Resource Management* (SHRM) the average time is up to 3 years. Due to the new forms of collaboration in the IT sector and the impossibility to differentiate legal forms of employment and collaboration between companies and developers one has to assume that the above figures concern either employees who are employed on employment or B2B contracts. Thanks to the fact that the collaborators work in company X longer than the average time of employment in the sector, the company does not have significant labour costs that are related to the waste of human potentials. The loss of short-term employees involves substantial labour costs and does not result in any value added for companies (such workers only start learning about the company and its functioning before they leave).

Thanks to new technologies the work for company X has been provided entirely on the remote basis since the foundation of the company. The developers work from homes, which results in savings both in time and the costs related to commuting. The employment of remote workers means flexibility and convenience for the company. The use of the new model of working makes it possible for company X to recruit workers from all over the world; the limitation that emerges here is the issue of time zones. This is critical when recruiting highly specialized experts in neural networks, AI and machine learning. The selection of the best candidates is complicated and the lack of territorial limitations gives competitive advantage. Due to the fact that company X conducts recruitment in Poland, it saves substantially on the remuneration for work. The cost of company's operations would be much higher if the company looked for specialists on the British labour market. Another reason why the processes of recruitment and selection are carried out in Poland is the fact that Poland has well qualified developers. They participate in international projects and consequently their skills and expertise are appreciated by foreign investors. However, the opinion of the CEO of company X is that Polish developers lack business approach and they do not look at the project from a larger perspective. Nevertheless, he points out that some change can be seen in this area especially as regards younger developers who entered the labour market 2-3 years ago. These workers are oriented towards both the development of their technical skills and the knowledge about such agile management methods as Scrum or Agile.

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[11]   https://auriga.com/blog/2015/employee-tenure-becomes-hot-topic-for-tech-companies/   (Accessed: 25.03.2020).

Remote working involves numerous issues related to staff management. The HR department in company X faces several challenges with regard to the application of modern communication tools. The HR department consists of two people working in UK. The first challenge is the facilitation of communication in the organisation. How to organise communication to make it transparent to everybody? The department uses Keybase to maintain constant communication between the staff. Particular channels in the program are used for mutual communication and the exchange of information about work on everyday basis. In order to provide more personal contacts between individuals, company X applies video-conference tools: *Zoom* and *Webex*. This makes it possible to organize everyday work and enables an individual approach to the workers in virtual world. In this way the developers can participate in morning stand-ups where they discuss the assignments of the previous day and the tasks to be done on that day. Such meeting are conducted in small groups. Thus, team members are updated about the progress in a given project and about the tasks that have been completed, are being performed and will be carried out later. According to the HR department, such solution works very well and it makes work of the international team possible without leaving their homes. Video-conferences are used for the meetings of the whole company. In this way company X manages vertical, horizontal and diagonal communication within the organization. All information is transferred through modern technologies.

Company X applies technology in e-mail communication and data storage. All documents concerning personnel policy are stored in SharePoint within the company. Thanks to the advanced functions used for granting access to read, edit and comment on documents, data are secure and can be accessed only by authorized persons. Company X is a learning organization and in order to share knowledge it uses such mew tools as *Confluence*. This solution, which was developed by an Australian company Atlassian, inspired the owner of company X to implement the concept that increases creativity. Every collaborator may spend one day a month on a project of his/her own. The objective of such an approach is on the one hand to recognize the merit of each collaborator and on the other, to provide the opportunity for the growth of creativity. The company X CEO hopes that this time will be devoted to the development of improvements and the generation of innovative ideas. The HR department admits that thanks to the ideas that were suggested by the collaborators resulted in the upgrade of the latest version of the software that is manufactured in Poland.

The recruitment and selection processes in company X are also conducted remotely. All job applications on specialized portals are processed online. As the HR department operates in

the UK, they had to learn how to recognize what sources of applicant acquisition are the most adequate n Poland. The expertise in this area and its practical use in the business practice has been possible thanks to the new technologies. The HR uses 3 sector portals in Poland: *Pracuj.pl, No Fluff jobs* and *Just Join IT*. Thanks to these portals, the HR are able to reach individuals who either start their careers in IT or have some (up to 5 years) working experience. More experienced applicants are contacted either through recommendations from current collaborators or through the search in *LinkedIn, GitHub, Stack Overflow*. Company made efforts to use AI algorithms in CV selection but the results were not satisfactory. The algorithms were able to find profiles by criteria through key words and at this stage their role finished. Some human factor was missing, which is necessary when selecting an effective team member. M. Suchar proved in his analyses that CVs have an insignificant relevance (0.19) as regards an adequate selection of employees in the recruitment process[12]. Table 2 presents the relevance and prevalence of commonly available selection tools.

Table 2. Selection tools

Tool	Prevalence (%)	Relevance
Job interview	97	0.33 unstructured 0.43 structured
Verification of references	96	0.13
Mental fitness tests	91	0.54
Personality tests	80	0.38
Personal questionnaires	97	0.19 biographical data

Source: M. Suchar, *Modele karier - Przewidywanie kolejnego kroku*, Wydawnictwo C.H. Beck, Warszawa 2010, p. 36.

The fact that an applicant to a particular job position uses key words in his/her application does not show the context how the words were used and they may only be declaratory. Company X made a decision to apply logical operators in the search for information in various portals, the so called *Boolean search* in the course of *direct search* for applicants.

Having selected an adequate applicant, company X applies a structured job interview and mental fitness tests. The applicants are also given a practical task which consists in developing a code.

The new staff implementation is also conducted remotely. The collaborators receive necessary materials from HR. The access to particular IT systems is done on the remote basis.

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[12] M. Suchar, *Modele karier - Przewidywanie kolejnego kroku*, Wydawnictwo C.H. Beck, Warszawa 2010, p. 36.

Periodic interviews and assessments of the work completed are also performed with the application of modern technologies. Company X implemented a system of constant feedback. The collaborators who work together are in touch only through modern technologies.

The HR team plays a crucial role in the development of company's X organizational structure. The team creates the personnel policy of the company which clearly defines the ways how the HR functions should contribute to the development of the company. It is the HR team which, together with the management, develops leadership, creates and develops company's resources. All development operations that are directed towards the employees are done remotely through modern forms of education. Company has developed a custom to organize knowledge sharing sessions. Collaborators or the whole teams inform about their achievements and in vide- conferences present how they were accomplished. Moreover, virtual sessions are held during which participants share the conclusions from unsuccessful projects (the so called *lesson learned).* Issues that regard leaving the organization are settled through modern technologies. Exit interviews are held in the form of video-conferences or online questionnaires.

The HR team also takes care of the work-life balance. On the one hand, the employees have more time because they do not commute. On the other hand, there is a risk that the balance may be upset due to the lack of actual separation between work and home zones. The HR team realizes that employees have problems with defining the moment when they should stop working. On the other hand there is a temptation to do housework during working hours which results in extending work time. Remote working involves both opportunities and threats. Moreover company X takes care of the work-life balance within the *employee assistant program* which provides guidelines for maintaining a proper work-life balance. The company also provides consultations with an external organizational psychologist whose task is to care about the wellbeing of employees.

Conclusions

The following conclusions can be drawn on the basis of the analysis:

1.   Currently several functions of HR have changed and HR workers are key advisers to company boards and owners rather than purely administrative workers.

2.   HR specialists should understand business needs and be able to suggest and develop appropriate actions to support the organization in reaching business targets. It is HR

departments that often have to suggest modern IT tools to improve internal processes within the organization.

3. The image of employees has changed. The employee is an individual who produces value. The role of employees in organizations is of crucial importance. It is a frequent case that the staff constitute a competitive advantage. Modern technologies are a support for present-day organizations.

4. Modern technologies make remote working possible. Territorial limitations disappear. The staff can cooperate with companies from all over the world.

5. Remote working and the implementation of modern technologies provides the opportunity to achieve work-life balance. However, it may involve a risk of alienation.

6. Modern technologies introduce such new employment forms to HRM as *business to business*.

7. The implementation of modern technologies may replace paper-based documents. Virtual copies of documents that are stored in the cloud can be accessed from various places. However, the security of data is a significant issue.

8. Modern technologies are applied at every stage of employment: from the recruitment to the end of cooperation.

9. The implementation of modern technologies involves numerous benefits as well as some limitations and risks.

10. Modern technologies are only a tool. It is always a human who is responsible for their appropriate application.

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Abstract

The article presents the role of modern technologies in human capital management. Analysis was conducted of challenges that face present-day employers. The tools and a new approach to staff management are illustrated by company X which develops smart houses. New technologies are presented that enable an optimization of business processes in organization X. Opportunities and threats are shown that are related to the application of modern technologies in human capital management.