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SCIENTIFIC REVIEW

Impact of Digitalization on the Labour Market: The Case of North Macedonia

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ABSTRACT

The impact of digitalization on the labour market is very complex and is manifested in different conditions for job creation and job protection, changed needs for occupations and skills, coping with skills mismatch and labour shortage etc. The aim of the research is to determine the possible implications of digitalization on the labour market in North Macedonia, by analyzing relevant labour market indicators and the results of employees' survey based on identified hypotheses.

The analysis of the labour market indicators shows that despite the positive changes, the situation on the Macedonian labour market remains unfavorable i.e. low employment rates, growing skills mismatch and labour shortages in conditions of still high unemployment. The survey results indicate that the digitalization may not cause serious job losses, but it can lead to significant shifts in the employment structure (regarding sectors, occupations, skills, nature of jobs, pressure on the lower skill levels etc.). The influence of digitalization on the labour demand will depend on the employment sector and job profile, as well as on the investments in technology and relevant experience to use it. Also, digitalization could reduce the labour shortages caused by demographic ageing. The survey results show that digitalization will impose changes in the education and professional expertise, management style and organizational culture, as well as in trade union organizations. The findings of this research are meaningful for policy makers, state institutions, employers, trade unions and other stakeholders. The digitalization implies need for coherent approach of all involved parties in North Macedonia.

Key words: *Digitalization, labour market, skills, jobs, education, management relations, trade unions, North Macedonia*

JEL Classification: O30, J2, J6, J51, J53, I25

INTRODUCTION

In the last decade there has been a large increase of researches related to digitalization and labour market. Their results are illustrating the complexity of digitalization's impact on the labour market and the need for profound research of certain aspects. They should be seen in the context of the current and expected situation on the labour market due to economic and demographic changes. Nowadays, when the world is faced with Covid-19 pandemic of global dimensions, digitalization of the work is even more actual issue. In new circumstances, this process is significantly speeded up and helps the normal function in all areas where it could be applied.

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The labour market in North Macedonia in the last few decades was faced with many problems, which are continuously transforming and becoming more emphasized. They are manifested in low employment, high unemployment and inactivity of the working-age population, as well as growing mismatch of the supply and demand on the labour market. The reforms in the educational process, made towards compulsory secondary education and encouragement of the young people to continue in high education, didn't take in consideration the labour market needs. It resulted in growing occupational mismatch, rise of the job vacancies in circumstances of still high unemployment and high values of youth NEET[1] indicators (Janeska, Lozanoska, 2018). At the same time North Macedonia is face with population and labour force aging, as well as huge emigration abroad, particularly of the highly educated population. Having on mind the necessity and the speed of digitalization process, as well as the complex situation on the Macedonian labour market, we consider that is very important to identify how the digitalization will affect certain aspects on the labour market in the country.

The aim of the paper is to determine the possible implications of digitalization on the labour market in North Macedonia, by analyzing relevant labour market indicators and the results of employees' survey based on identified hypotheses discussed in recent theoretical and empirical researches. The methodological approach of the study is based on literature review, analysis of labour market data and indicators for North Macedonia and survey realized for the needs of this research. Therefore, a questionnaire related to the impact of digitalization on the jobs and work was created and the survey was conducted in June-July 2020.

The added value of this research derives from linking the analysis related to changes and current situation on the labour market in North Macedonia and survey results on the employees' opinions about the impact of digitalization on jobs and work. Without the pretense of comprehensiveness, the paper provides grounds for discussion on different impacts of digitalization on the labour market in the country. With this research, initial knowledge was gained for various aspects, which due to their complexity implies further profound research for each of them.

LITERATURE REVIEW

Numerous researches show that digitalization brings transformations in all sectors of activity. One of them (Macías, 2018) points out that there are several ways to transform the economic processes through the digital technology. They are related to flexibility of production (due to the processing power), availability of information (digital technologies make data more available), network effects (creating demand-side economies of scale, through social networks, software systems and digital industrial applications), and zero marginal costs (because the digital goods are non-rival and infinitely expandable).

At the same time digitalization implies great transformations of the working conditions, due to the mass use of networks, internet and the available online platforms. Many studies confirm that this new ways of work provides flexibility of the lifestyle, freedom of action, but also brings disadvantages associated with the sacrifice of financial security, the unpredictability of incomes, the need to learn new skills, the increase of the risk of unemployment for workers with specific qualifications. Digitalization also brings changes in labour legislation, because employment changes considerably, through the use of online platforms, through remote work etc. (Vasilescuet al., 2020).

The new technological advances imply the re-skilling of the labour force and changing the world of work, including job substitution, transformation, creation, and lose. The innovation cycle is faster than the changes in the labour market and people's skills. Thus, the current economic environment requires digital knowledge for a large share of the jobs, because

[1] NEET – persons not in employment, education or training.

digitalization uses information technology infrastructure and the Internet, as technological support. As a result, the imbalances on the labour market growth are reflected in increasing the duration of unemployment, in long-term unemployment and higher structural unemployment (Cedefop, 2018). All this implies great challenges on the labour market.

The impact of digitalization on the labour market can be observed through different aspects that reflect the complexity of its functioning. Thus, according the recent researches, technological change in general and digitalization in particular, will most likely induce structural change. Under the assumptions that the digitalization is going to have large impact on the technical equipment of the economy in the future, considerable effects on the composition of employment can be expected. Digitalization may, if everything is assumed equal, increase job turnover and, in doing so, facilitate an even more efficient division of labour within the economy (Walwei, 2016). Economic literature is discussing that the possible results of technological change can be seen either in "capital-skill complementarity" or in a polarization of skills (Krusell et al., 2002; Autor et al., 2003). In the case of capital-skill complementarity the demand for highly skilled workers performing creative tasks will increase further, while low-skilled workers in comparison are most likely to lose their job ("skill-biased technological change"). By contrast, the hypothesis on polarization of skills implies more risks for workers with medium skills assuming that non-manual routine tasks are more threatened by digital technologies than low-skilled workers often performing manual non-routine tasks ("routine-biased technological change") (Goos et al., 2014).

The impact of digitalization on the labour market is very complex issue. Many researches are setting different hypotheses related to one or more aspects considering this impact. One comprehensive research by Klaus Fuest and co-authors is compiling a list of 12 hypotheses on the future of work in the age of digitalization (Fuest et. al., 2017). In addition, these hypotheses are elaborated and without pretensions to completeness, supplemented by the views of other authors or the results of recent studies on the same aspects.

The first hypothesis is that the *digitalization creates jobs*, meaning that new technologies pave the way to new products and services – and hence to new occupations. OECD evidence shows that 65% of kids today will do jobs that have not yet been invented. Being a lifelong learner is the most important attribute for success, and will grow in importance in our dynamic and competitive world. Knowing one's own learning style and developing the self-discipline and determination to grasp new skills throughout a lifetime will be critical (OECD, 2016). The digitalization reduces costs for setting up a business and finding employment, as well as creates opportunities for small companies to innovate and grow faster (by making it easier to distribute products, market services and reach a global audience). This is of great importance for job creation opportunities by successful start-ups. For example, around 3% on average across all countries — creates a disproportionate amount of jobs, from 21% (in Netherlands) to 52% (in Sweden) of the total job creation by micro startups (Calvino, et. al., 2015). It also impacts traditional companies, which can reduce their marginal cost of production. This has a growth effect on supply and helps to push up demand for labour force. A 2015 report by the Fraunhofer Institute found that European companies which are intensive users of robotics are less likely to offshore production to low-wage regions, simply because robots improve their cost position so much that they can stay in high-wage regions (European Commission, 2017).

Second hypothesis is that *automation protects jobs*. In traditional industries, the efficiency gains realized by greater automation help make products and services more affordable (by boosting demand for them), raises competitiveness and prevents work from being offshored to locations with low labour costs (Fuest et. al., 2017). Instead of equating automation with job displacement, manufacturers should approach modernization as a means of freeing up factory workers to fill more productive and meaningful roles. In fact, it is predicted that up to 133 million new roles may emerge as companies embrace automation and uncover new opportunities for humans to work alongside machines, because the labour relationship between

humans and machines evolves, as well as the required set of skills (WEF, 2020). It implicates that proactive reskilling efforts over time will be necessary in order to protect workers and support the future needs of advanced manufacturing companies. Such an approach is beneficial both for workers and global population that will benefit from employed workers, but also for companies that can innovate more quickly with a better skilled workforce.

The statement that *jobs are put at risk when labour productivity increases*, is the third hypothesis in Fuest's research. But, when discussing this hypothesis we need to have in mind that in almost all developed economies, labour productivity growth is gradually slowing down. The results of recent researches are confirming that in EU-28, growth in labour productivity has been slowing steadily in last decades, and the European Commission even speaks of a European "productivity gap" (Neufeind and Priesmeier, 2020). Over the period 2008-2016, annual growth in euro area labour productivity per person employed slowed to an average of around 0.5% (based on a three-year moving average), from an average of around 1.1% over the course of the decade to 2007. If we consider only the post-crisis period of recovery from 2013 to 2016, euro area labour productivity growth averaged just 0.6% per year (ECB, 2017). Economists refer to this phenomenon as a "productivity crisis" mainly caused by the lack of investment in technology. There are and many other discussions and researches on the relation between digitalization and productivity. Namely, the productivity is mainly linked to job quality because it has the potential to create more non-routine jobs and because workers who are performing routine activities, and who are replaced by machines, are induced to reallocate their labour supply in intense non-routine occupations and to perform tasks with a higher marginal productivity' (Keister, Lewandowski, 2016). Some research suggests that productivity gains will possibly lead to higher wages and lower working hours (Muñoz-de-Bustillo et al., 2017). Related to this hypothesis the general impact of digitalization on economic productivity is also subject of debate. Researchers point out that in the past, innovation and technology have not always led to an immediate increase in productivity and that the effects of implementing digital technologies are not fully realized until several years later (Valenduc, Vendramin, 2016). Besides that, they warn that digitalization will only lead to increased productivity if organizational changes occur at the same time.

In this context is the fourth hypothesis that *the speed of the technological transformation is overestimated*. It takes a long time for innovation to unfold its impact on a broad scale. Investment in technology must reach a critical mass, while extensive experience of handling it is needed, especially in industrial processes. Delgado is discussing that implementing new technology includes several steps. They refer to necessity to provide continuous updates on all available information about the new technology; increasing efficiency by encouraging questions from employees and including them when selecting new technology tools; informing the workers by highlighting new opportunities created by technology and how it will support the processes and organizational culture; and the workers should recognize the growing value of new technology in the workplace and to take the opportunities to gain new skills or adapt their existing skills to new challenges (Delgado, 2018).

Fifth hypothesis is focused on the assumption that the *digitalization leads to structural changes in the economy*, related to the nature of jobs that will be available in the future. The digitalization doesn't reduce the total number of working hours, but it will reduce the number of hours worked by people with fewer skills. This means that routine activities with little complexity and a modest level of interpersonal interaction are at risk. The Bruegel Foundation indicates that the percentage of jobs at risk of substitution by Information Communication Technology (ICT) is even higher in Europe than in the US (54% compared with 47%), particularly in Southern Europe where employment in occupations at high risk of substitution is higher (Bowles, 2014). Certain studies debate on the changes in the labour supply resulting from the development of digitalization. There are authors that seriously challenge the scale of this substitution, arguing that jobs are bundles of tasks rather than a simple reflection of one kind of

task. Even if some tasks are substitutable by machines, this does not imply that the whole job will disappear, as many jobs require a combination of tasks and related skills. A Eurofound report analyzing EU jobs in terms of skills and tasks is underlining that they are bundled together, with only a limited number of jobs remaining focused on routine mono-tasks (Eurofound, 2016). In other words, as jobs increasingly tend to require various skills, and notably intellectual and social skills, they are not easily substitutable by machines or technology. This is especially referring to the service sector, which includes the vast majority of EU jobs. It means that the implications of the technical change are mediated by many factors generating a significant degree of inaction in terms of structural change.

Sixth hypothesis states that the *effects of digitalization on employment are highly specific and demand individual answers*. The impact of digitalization on jobs will not be evenly distributed nor happen at a steady pace. It is most likely to be concentrated in certain jobs, selected sectors and particular geographical areas. For example, machine learning, which underpins advancements in artificial intelligence (AI), is already being adopted by a range of industries, affecting even high-skill jobs like finance or law. Other workers or sectors, for example long-haul truckers, are not predicted to be affected immediately, but when adoption of automated trucking begins, the change may be sudden as cost savings of up to 30% could result in a drop of demand for truckers in Europe and the United States (ITF, 2017).

Due to great changes in the population development worldwide, the seventh hypothesis opens the discussion about the *mutual benefit of demographics and digitalization*. In terms of the working-age population decrease and intensified aging of the existing labour force, automatons can provide valuable help, stepping in where human resources are lacking, but also providing better support to people as they go to work, relieving them of heavy physical labour (for example in construction). The mutual effects of demographic and technological changes can be seen in several aspects (**Basso, Jimeno, 2019).** First, changes in labour supply affect factor prices (wages and the price of robots), altering the relative profitability of labour-intensive and automated sectors. Second, demographic changes affect savings and the interest rate, altering the amount of resources available for investment in capital accumulation, innovation, and automation. Third, as the efficiency of R&D may depend on the age structure of population, the need of new goods is also affected when the population age structure changes. Based on these aspects it can be concluded that a fall in fertility leads the economy to a new balanced growth path with lower GDP per capita growth, a higher degree of automation, and a lower labour income share.

The eight hypothesis is that the *education will take on even greater importance in the future world of work in terms of intensified digitalization.* The digitalization imposes the need for employees to acquire new skills and qualifications and to accept the necessity for lifelong learning. It requires substantial investment and far-reaching reforms across all levels and forms of education. Jobs created by new technologies predominantly require high skills. Frey & Osborne (2016) estimated that almost half of all the new jobs require high skills (such as data scientists, cloud architects, security analysts etc.). European Centre for the Development of Vocational Training (Cedefop, 2016) figures for the past decade and its estimates for the next decade suggest that occupations that require either low/elementary or high skills are growing in importance, while the mid-skilled professions are almost non-exclusively decreasing in importance. In order to avoid a skills mismatch between labour supply and demand, education and learning programmes need to target more technical, creative and entrepreneurial skills demanded by automation (European Economic and Social Committee, 2017). In this context and social aspect should not be neglected. So, in the process of acquiring new skills and qualifications, it is important that children from socially deprived families get equal chances for good education as those from wealthier social strata (Fuest et. al., 2017).

The assumption that *when choosing their job, young people should attach great importance to the purpose and meaning of their activity* is the ninth hypothesis. Loyalty toward employers is

slowly diminishing, while switching jobs and choosing the right one is becoming common practice. The results of recent study show that the sense of belonging to a company for the employees nowadays is determined by being recognized for accomplishments at work, by valuating their contributions in meetings, having feeling comfortable of being themselves at work etc. (Huppert, 2017). The young people often start their careers in more routine jobs and subsequently move to jobs with higher problem-solving content. Transitioning from jobs at greater risk of automation to those at lower risk is an opportunity for young women and men to find work that best suits their interests and skills, and to progress to higher wages, better working conditions and improved career prospects (ILO, 2020). That is why a management style that expresses appreciation and nurtures personal strengths, as well as modern organizational culture, are key factors for employee retention.

The tenth hypothesis is that there will be a *shift in the work methods used, moving away from a focus on presence and toward a focus on results*. For career beginners in particular, the freedom to choose where and when work is done is significant. The increasing importance of digital technologies and the rapid pace of change in employees' roles and competencies make fundamental change at the workplace essential. For example, a majority of Swiss employees are now reliant on digital technologies, and their work involves primarily knowledge-intensive roles requiring high levels of creativity and interaction (Deloitte, 2018). This research emphasizes that a modern workplace that meets these criteria must be designed to promote flexibility, collaboration and connectivity, if it is to improve employee performance and satisfaction.

Digitalization is bringing change to the boardroom, imposing a need for a new type of manager. This is the eleventh hypothesis that is focusing on the role of the managers who at the same must realize efficiencies in existing business and driving the transformation toward new business models. These managers should steer the organization, change the working processes and set an example to the staff, not just by living out a value-based management style. Digitalization also requires employers to create new forms of management, which means that it has to evolve, for instance, by providing guidelines to employees rather than trying to control all the risks. New technologies can, in fact, facilitate both the monitoring of employees and the recording of work activities, making it easier for employees to prove that certain tasks have been carried out, in both cases monitoring the outcome rather than the process (European Economic and Social Committee, 2017). This could increase the workers' level of motivation, by providing more freedom and responsibility to organize their own work. No less important is to involve the employees when significant decisions are made, in terms of both informing and consulting with them.

All above discussed hypothesis related to the future of work in the age of digitalization implicates *new forms of work requiring someone to represent workers' interests*, which is twelfth hypothesis. When employers become customers and regular staff becomes "gig workers", there is a shift in the balance of power between the contractual parties (Fuest et. al., 2017). To uphold social cohesion in situation where working relationships are becoming ever more virtual, what used to be "employees" must develop a new solidarity and organize themselves. A research (Voss and Riede, 2018) has shown that trade unions and workers representation bodies expect a weakening of workers' participation and the erosion of collective bargaining at national and/or company level, which can be one of digitalization's most important risks. Therefore, trade unions need to build new competences, must adapt and more actively address and campaign on the issue of digitalization and the future of work. It was noted that trade unions need to develop new competences and make better use of digital technologies for communication and lobbying work, mainly by engaging more strongly in forms of digital communication such as interactive websites, online platforms or other means of electronic communication. The results of this research also point out that most online workers were demanding legal protection, appropriate working time, good working conditions and especially health and social security protection.

They are aware of the risks and problematic working conditions which digitalization and on-line works entails.

The elaborated twelve hypotheses and a brief overview of some recent researches related to the relevant issues of each of them, unequivocally show the complexity of the impact of digitalization on the labour market. In addition, they indicate that all the observed aspects are very compound for themselves and that each of them should be subject of more profound research.

MAIN FEATURES OF LABOUR MARKET IN NORTH MACEDONIA

The impact of digitalization on the labour market in North Macedonia is in close relation to its features. Main characteristics of the Macedonian labour market are relatively low employment, accompanied with informal employment, then high unemployment, as well as inactivity of significant part of the working-age population. Besides that, current and expected demographic trends in the country should be taken into account.

More detailed picture of the Macedonian labour market can be drawn if we take a closer look at the changes and the structure of employment and unemployment. Also we compare last available labour market indicators for North Macedonia with the average of EU-28. In last decade the employment rates noticed an increase, but the data for 2019 shows that they are still significantly lower than the average of EU-28 (Table 1). This statement also applies to employment by gender and age, with employment rates for women and youth (aged 15-24 years) remaining very low (44.7% and 20.7% respectively).

Table 1. Labour market indicators for North Macedonia and EU-28, 2010 and 2019

	North Macedonia		EU-28
	2010	**2019**	**2019**
Employment rate (per cent population aged 15-64)	**43.5**	**54.7**	**69.2**
Employment rate of **men** (per cent population aged 15-64)	52.8	64.4	74.4
Employment rate of **women** (per cent population aged 15-64)	34.0	44.7	64.1
Employment rate (per cent population aged **15-24**)	15.4	20.7	35.7
Employment rate (per cent population aged **25-54**)	55.8	66.8	81.1
Employment rate (per cent population aged **55-64**)	34.2	45.1	60.0
FTE employment rate (per cent population aged 20-64)	**48.1**	**59.2**	**73.9**
Employment in **Services** (per cent total employment)	51.5	54.5	70.5
Employment in **Industry** (per cent total employment)	29.0	31.1	24.1
Employment in **Agriculture** (per cent total employment)	19.1	13.9	3.6
Self-employed (per cent total employment)	13.1	11.9	13.5
Part-time employment (per cent total employment)	5.9	4.4	19.1
Unemployment rate (per cent labour force)	**32.2**	**17.4**	**6.4**
Youth unemployment **rate** (per cent labour force 15-24)	53.7	35.6	14.4
Youth unemployment **ratio** (per cent population aged 15-24)	17.9	11.4	6.0
Long-term unemployment rate (per cent labour force)	26.7	13.1	2.6

Source: State Statistical Office of North Macedonia, Labour Force Survey 2010 and 2019; Eurostat data

Distribution of employment by sectors corresponds with the structure of the Macedonian economy. Despite the increase in the period 2010-2019 the share of employed in services in North Macedonia is significantly lower that EU-28, while the participation of the employed in industry was and remains higher due to its increase in manufacturing and construction. Regardless of the decrease of the share of employed in agriculture in total employment, in North Macedonia it remains more than three times higher than the average of the EU-28. Despite of this fact, self-employment rate in North Macedonia could be assessed as low. Usually the higher share of employment in agriculture is associated with self-employment, but this deviation is the

result of relatively high informal self-employment, especially in agriculture. Extremely low and decreasing part-time employment is also in relation to the undeclared work in the country. LFS data for 2019 shows that about 128.000 persons (that is 16.1% of the total employment) were informally employed.

The unemployment is long-term problem in North Macedonia. Although the unemployment rate was almost halved in the period 2010-2019, it is two and a half times higher than the EU-28 average. Despite the manifested changes, the main features of unemployment also are unfavorable. In 2019 the youth unemployment rate (35.6%) and long-term unemployment rate (13.1%) remained extremely high. Besides unemployment, inactivity is also great problem in North Macedonia. In this respect indicative are the NEET indicators, particularly of the young population, that refers to the share of population that is neither in employment nor in education and training. In 2019 NEET indicators, for the total population aged 20-34 amounts 31.2% and for particular five year age groups they are as follows: 25.8% (20-24), 34.9% (25-29) and 32.1% (30-34) (Eurostat, 2019). These indicators are about two times higher compared to the average for EU-28. Unemployment and inactivity imply the obsolescence of acquired knowledge and skills of human resources, which are, among other things, important for the digitalization process.

Current unfavorable situation on the Macedonian labour market will get worse due to the so-called "demographic effect" implying that young cohorts entering the labour market will be by far smaller than older cohorts who will retire. In last two decades population in North Macedonia is in a process of intensive demographic ageing due to low birth rates (since 2019 natural population increase is negative) and huge permanent emigration abroad of young and highly educated population. The IOM World Migration Report 2020 shows that North Macedonia, with an emigration rate of about 25%, is in the group of top 20 countries of emigration worldwide in 2019 (IOM, 2019). So, on mid and long term decline of labour supply and more intensified labour force ageing could be expected (Janeska, Lozanoska, 2018a).

As for the other features of the labour market, in context of digitalization it is important to point to the mismatch of the supply and demand of the labour force. The Skills Needs Analysis of the Employment Agency, which has been realized since 2007, displays that there is a continuous shortage of labour force with tertiary education in certain fields (especially programmer, mechanical engineer, construction engineer, doctors, computer scientists, technological engineer etc.) and constant increase of those with vocational education for technical professions and medical staff (mechanical technician, medical nurses, construction technician, electro technician, welder, glassmaker, tinsmith, driver of cargo vehicle, operator with construction machines etc.) (ESA, 2020).

This is a result of the increasing coverage of young people with tertiary education. This implies great change in the structure of labour supply by skills level, which is manifested in an increasing share of academics within the working-age population and bottlenecks, particularly concerning occupations requiring medium skills level. On mid and long term this will cause serious challenges on the Macedonian labour market in context of digitalization, due to the expected lower inflow of new generations of labour force and less attractiveness for attracting labour force from abroad.

At the same time increased recruitment difficulties and skills shortages are noticed in the number of job vacancies. The job vacancy rate has increased from 1.23% (2012) to 1.77% (2019) and the number of vacancies was almost doubled (from 4729 to 9053, respectively). The highest number of job vacancies (3114 in 2019), was recorded in the occupations - service and sales workers (State Statistical Office of North Macedonia, 2020). This is confirming the complexity of the skills mismatch on the Macedonian labour market.

An empirical analysis of occupational mismatch by comparing the ratio of people with a given education level working at an inappropriate skill level to all workers within that same education level, show that it is higher for people with a tertiary level of education than for those with an upper secondary level of education across all years. At the higher level of education, the overall

degree of occupational mismatch rose from 19.6% in 2012 to 22.2% in 2017, while for the intermediate level of education it remains almost the same (14.8% and 14.3%, respectively) (Blazevski-Mojsoska, 2019). Over-skilling as the proportion of employed people who are overeducated is manifested due to the lack of jobs for certain profiles of workers, leading some of them to accept work which requires lower qualifications. The abovementioned analysis shows that the highest incidence of over-skilling is observed among services and sales workers. As for the under-education it occurs among the higher occupations (for example managers) and among technicians, associate professionals and clerical support workers.

All above mentioned features should be taken into consideration when observing the results of the survey about the impact of digitalization on the Macedonian labour market.

SURVEY RESULTS

In order to obtain knowledge about the attitudes of the employees in North Macedonia on the impact of digitalization on the labour market, associated with elaborate hypotheses in this paper, a survey research based on questionnaire was realized. For the analysis of the gathered data qualitative research have been used. Qualitative research gives opportunity the acquired answers and opinions to be related to different research phases and to be used for verification of the discussed hypothesis (Mesihovic, 2003). In this paper the attained answers were put in relation to the current situation in North Macedonia and were also discussed in terms of the elaborated hypotheses.

The questionnaire was divided in two subsections. The first part refers to demographic and socio-economic data (sex, age, education and occupation) of the respondents. In the second part of the questionnaire, the questions were related to the impact of digitalization on the labour market. They were based on the above elaborated hypotheses, but modified considering the current characteristics of the labour market in North Macedonia. The part of the survey consisted of 12 close-ended questions, among which some with single or multiple choice, while others with ranking scale. This approach in formulating the questionnaire was chosen in order to provide information to the respondents for possible impacts of different aspects of the digitalization and at the same time to give them opportunity to choose and to express their attitudes in context of the present situation on the labour market in North Macedonia.

The questionnaires were send by e-mail to the human resource management departments of different institutions (ministries, agencies, public enterprises, banks, insurance companies etc.), with request to distribute them to at least 5 of their employees. The answered questionnaires were sent back by e-mail. The survey was conducted in the period June-July 2020, in time of the Covid-19 pandemic, which undoubtedly has reflected on the responses from the institutions and the number of the filled questionnaires. The research was realized in new reality imposed by the lock-down, the increased number of persons who started to work from home, the emphasized need to be on-line in order to stay connected and to finish everyday work tasks. This was additional incentive for the employees from these institutions to be involved in the discussion on the importance and the impact of the digitalization in North Macedonia.

With the survey were gathered 85 questionnaires. Out of them 15 were not completely filled and were excluded from the analysis. So, 70 gathered questionnaires were numerated upon their receipt and the answers were noted in one excel table. It was designed for purpose the answers for each question to be sorted. Afterwards, they were presented in separate tables and figures.

The application of qualitative research is based on thematic analysis, provides authenticity and gives certain qualitative values of the research (Neuman, 2006). The results of the survey were interpreted through thematic analysis related to jobs and labour demand; structural changes in the economy and impact in different sectors; demography and education; management styles and organizational culture; trade unions. The answers on the questions were

analyzed in context of the previous researches, available data and existing situation on the labour market in North Macedonia.

Main features of the respondents related to gender, age, education and occupation are:

- Dominant share of women – two thirds (67.1%) of the respondents are women and one third (32.9%) are men.
- Relatively balanced share of youth, middle-aged and older workers – 14.3% of the respondents are young (20-29 years), 25.7% are younger middle age employees (30-39), 32.9% older middle age employees (40-49), 15.7% are aged 50-59 years, and 11.4% are 60+.
- Prevailing respondents with tertiary education – more than four-fifths (88.6%) of the respondents have tertiary education, and the share of those with higher and secondary education is relatively small i.e. 2.9% and 8.5%, respectively.
- Majority of the respondents are economists, lawyers and engineers from various fields.

The survey results regarding the question about whether the **digitalization will create new jobs and occupations** show that two thirds of the respondents (58.6%) think that the application of new technologies will condition the emergence of new products and services, and with that of new occupations. This to some extent confirms the hypotheses that digitalization creates jobs. Still, relatively high is the share of those who think that it depends on the sector and the profile of the work (more than one third of the respondents i.e. 35.7%). Only 5.7% of the respondents don't think that the digitalization creates new jobs and occupations. In the last decade (2010-2019) the digitalization of the work processes is continually increasing, but with different intensity depending on the nature of jobs. It is predominantly emphasized in the financial sector, in some industrial branches, as well as in the public sector, particularly in the inter-institutional communication, records and exchange of data through interoperability platforms etc. Along with these changes, the increase of the number of employees was noticed.

In the context of the creation and protection of jobs, the respondents were asked what they think about **the automation impact on the protection of jobs**. Almost equal is the share of respondents who see positive impact from automation on increase of the demand for products and services (31.4%) and on rise of the competitiveness (30.0%). About two fifths of the respondents don't expect automation to protect the jobs (38.6%). The answers of this question correspond with the existing situation in North Macedonia. In terms when there isn't wide application of the automation it is impossible realistically to determine its impact on the job protection.

Significant share of respondents reflects that the **productivity increase which is a result of the digitalization will not considerably put at risk the jobs.** So, according 57.1% of the respondents, being less employed will generate more output, while 42.9% think that the digitalization will not put at risk the jobs due to low productivity levels and due to relatively small investments in fixed assets and new technologies. The available data show that the productivity level in the Macedonian economy was and remains relatively low and with oscillating trend (Trpeski, 2019).

Technological improvements have significant impact on the labour market. In this regard, almost 80% of the respondents share the opinion that the impact of technological speed on labour demand will depend on the investment in the technology, as well as on the experience for its use (Figure 1).

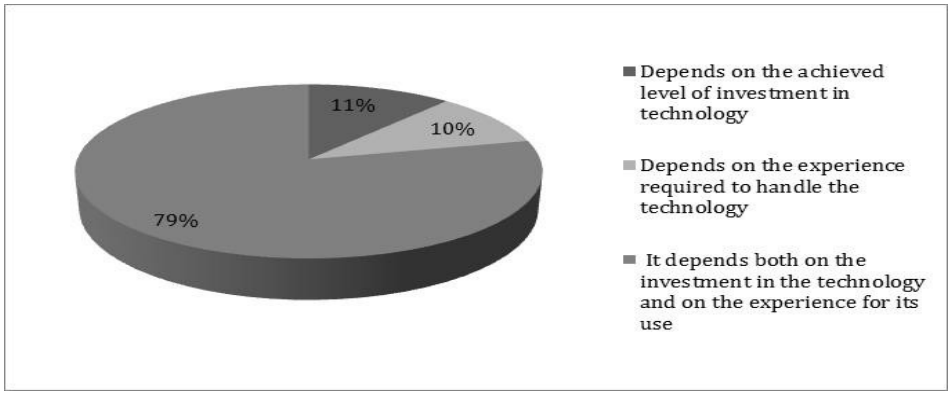

Figure 1. The impact of technological transformation speed on the labour demand

Source: Survey research of the authors

The respondents had an opportunity to rank their answers on the question how **the digitalization leads to structural changes in the economy and impacts the labour market**, related to three aspects (Figure 2). Highest rank is given to the statement that the digitalization will impact the nature of jobs (by 47.1% of the respondents) and that it will increase the pressure on the lower skill levels (by 39.7%). As for the impact of digitalization on the labour demand, almost half of the respondents gave rank two. The answers of the respondents on the first two aspects of this question correspond with the changes in the scope and structure of the job vacancies. Namely, in the last decade they have increasing influence on the labour demand, as well as great impact on the nature of jobs. Their statements to the third aspect of the question are also relevant. In the coming years should be expected increased pressure on the employed and unemployed persons with low education level[2], whose share in 2019 was about 18% and more than 25%, respectively.

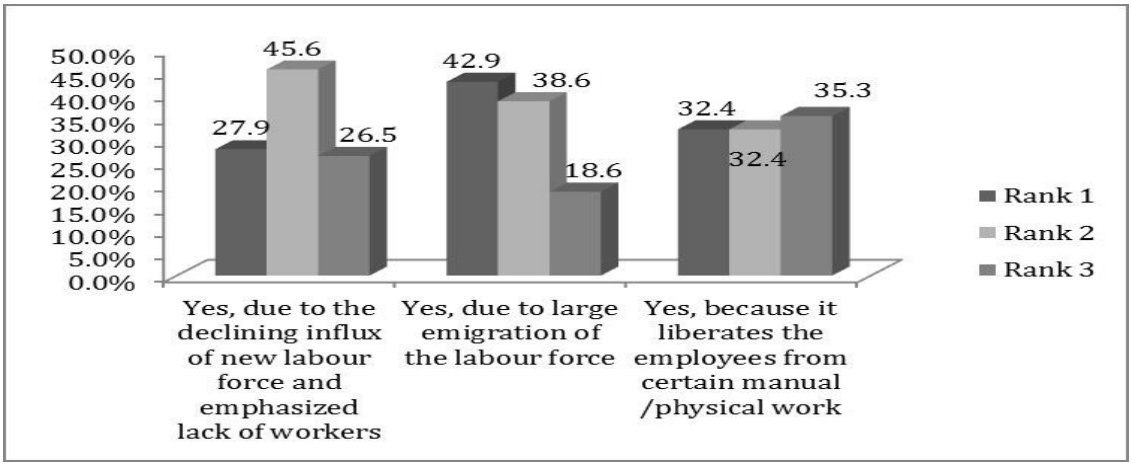

Figure 2. Digitalization leads to structural changes in the economy and impacts the labour market

Source: Survey research of the authors

Concerning **the effects of digitalization in different sectors**, 94.3% of the respondents consider that it is specific and require a single answer in each sector. Only 5.7% think that they are the same in all sectors. The Fund for Innovations and Technology Development of North Macedonia (FITD, 2020), continously is announcing calls for accelerating the technological

[2] Low education level refers to persons without education, with incomplete primary education and primary education.

development of the public (mainly for municipalities) and private sector. Thus, they announce calls for submission of project proposals for financing under the Support Instrument – Co-financed Grants for Technological Development for Accelerated Economic Growth. Majority of the companies and institutions which can use this opportunity are from the following sectors: trade, education, health, agriculture, construction, energy, catering etc.

In North Macedonia **demographics and digitalization** will be of mutual benefits on middle and long-term. It is particularly emphasized in current situation of negative natural population increase, enormous emigration abroad and intensified demographic ageing. By giving rank one, 42.9% the respondents confirm that the digitalization will mitigate the consequences of the large labour force emigration abroad, 27.9% of the respondents stated that the digitalization will alleviate the declining inflow of new labour force and emphasized lack of workers and 32.4% that it will liberates the employees from certain manual/physical work (Figure 3).

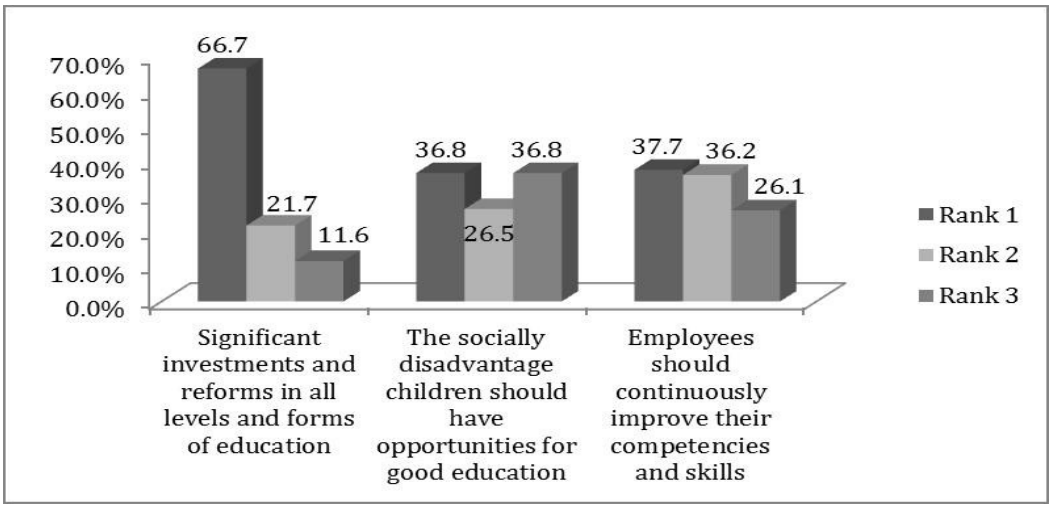

Figure 3. Digitalization is mitigating the demographic consequences of aging and labour shortages

Source: Survey research of the authors

When it comes to **the digitalization and the changes in education**, two thirds of the respondents (66.7%) gave highest rank on the need for significant investments and far-reaching reforms in all levels and forms of education (Figure 4). This answer corresponds with the current situation in North Macedonia in this area. Namely, in progress are strategic reforms in the primary education and continuous improvement of the programs for secondary and high education, which among other, are determined by the digitalization process. About 38% of the respondents also gave rank one for the need to continuously improve competencies and skills of the employees. Similar percentage of the respondents (36.8%) recognized the significance of the opportunities for good education for socially disadvantaged children. In the period 2010-2019 the poverty rate (Laeken indicator) of children and youth (0-17 years) is in range from 32% to 28%. In these circumstances the coverage of these children with good education is of great importance for their inclusion on the labour market (State Statistical Office of North Macedonia, 2021).

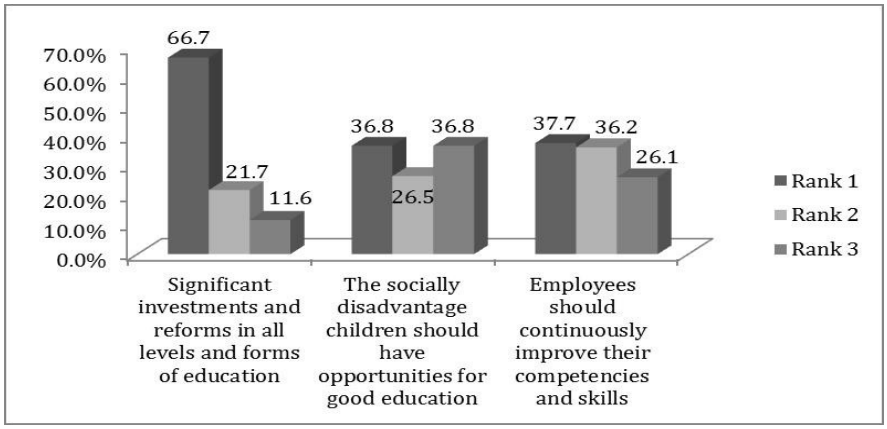

Figure 4. Digitalization imposes changes in the education

Source: Survey research of the authors

The results of the survey also show that when choosing a job, **young people pay more importance to the style of management that respects their personal affinities**, which is seen by giving rank one on this statement by 39.7% of the respondents (Figure 5). By ranking two, 45.7% that is majority of the respondents recognize the importance of professional expertise to work in a company, while 36.8% of them, by ranking two, distinguish the rising importance of the organizational culture for attracting talents. In terms when there is paradox situation on the Macedonian labour market, with high labour supply, but lack of skilled workers, it is expected that the workers will look to work in companies and institutions that respects their personal affinities and professional expertise.

Figure 5. Digitalization and the importance of professional expertise and organizational culture

Source: Survey research of the authors

The previously stated is confirmed with the answer on the question related to the digitalization impact on the necessary changes in the organizational culture from the aspect of the methods of work and the need to shift the focus of work from physical presence to results. About 73% of respondents have noted that it depends on the activity and the profile of work.

Besides changes in the organizational culture, the **digitalization implies the need for a new type of managers**. In this respect, respondents gave highest rank for the necessity of changes in the work processes (46.3%) and for applying a value-based management style (47.8%). Most of the respondents (40.3%) gave rank two on the statement that the digitalization will require application of new business models (Figure 6).

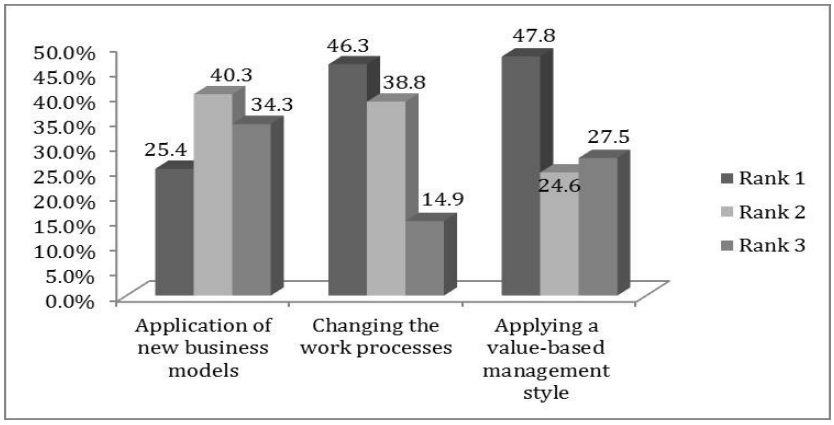

Figure 6. Digitalization implies the need for a new type of managers

Source: Survey research of the authors

Digitalization imposes new forms of work, which presuppose **changes in the ways how worker's interests are represented by the trade union organizations**, which is acceptable for almost half of the respondents (46.8%). Still, more than one third of the respondents (35.7%) answered that they don't know if this kind of changes are necessary to happen.

Survey results more or less are confirming the hypotheses and show that regarding the impact of digitalization there will be challenges in different aspects of the Macedonian economy, especially on the labour market.

CONCLUSION

Based on the desktop research, labour market features in North Macedonia and survey results on the impact of digitalization on Macedonian labour market, several conclusions can be noted. Numerous theoretical discussions and empirical researches are confirming that the digital technologies fundamentally change the nature and meaning of work. The literature review and elaborated hypothesis on the impact of digitalization on the labour market shows the complexity of this issue and that it influences many aspects. The process of digitalization of work in the last decades has gone through various stages and there is no doubt that in new circumstances of Covid-19 global pandemic it will be significantly modified and accelerated.

Considering the complexity of the digitalization process, the impact on the Macedonian labour market will depend on its features. Despite the positive changes, the current situation is still unfavorable due to low employment rates and high unemployment rates, as well as mismatch of the supply and demand on the labour market. It implicates recruitment difficulties in circumstances when there is a rising number of job vacancies and still high unemployment. At the same time the Macedonian labour market is faced with occupational mismatch, over-skilling and under education.

The survey results more or less are confirming the elaborated hypotheses and indicate that the digitalization may not cause serious job losses, but it can lead to significant shifts in the employment structure (regarding industries, occupations, skills, nature of jobs, pressure on the lower skill levels etc.). The influence of digitalization on the labour demand will depend on the employment sector and job profile, as well as on the investments in technology and relevant experience to use it. Also, digitalization will reduce the labour shortages caused by demographic aging.

Digitalization is a process which will impose serious policy responses. The results of this research are meaningful for policy makers, state institutions, employers, trade unions and other stakeholders in North Macedonia. The digitalization implies need for coherent approach of all

involved parties. It will impose the need for reforms in all levels and forms of education, changes in management style, organizational culture, work processes and application of new business models, as well as, union organization. So, the role of the state is very important, since creating policies and undertaking appropriate measures is necessary to support the public and private sector in their process of digitalization.

The study provides an insight of digitalization's impact on the labour market in North Macedonia, and the findings may help in creation of related policies. The attention of policy makers in the country should be focused on:

- Reforms in all levels of educational process, related to the impact of digitalization on the labour market;
- Support of the lifelong learning process and continuous skill improvements of the employees in public and private sector;
- Equal attention on the investment in the technology and on the skills and experience for its use;
- Changes in the regulatory framework;
- Adjustment of labour market programmes and creation of flexible labour market policies which can provide job security;
- Retention of talents in the country and talent management in public institutions and private companies;
- Promotion of new management style and organizational culture;
- More attention on social dialogue as a mean for establishing supporting measures.

The research confirms the complexity of this issue and offer additional knowledge on the ways in which digitalization influence different areas such as labour supply and demand, productivity, labour force aging, job transformation, management style, organizational culture etc. Having in mind this, inevitable is the fact that in the process of digitalization, North Macedonia will be faced with big challenges on the labour market and further in-depth research for each of the mentioned aspects is needed.

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