

Are the Robots Going to Take Our Jobs? This Is How American and Hungarian Economists of Generations Y and Z Conceive the Impact of Artificial Intelligence

KITTI DIÓSSY*

*Corvinus University of Budapest, Doctoral School of Business and Management;
kitti.diossy@uni-corvinus.hu

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Abstract

This paper examines how American and Hungarian economists of generation Y and Z view the impact of artificial intelligence (AI) in the short and long term. The choice of topic is motivated by the integration of AI into our everyday lives. Research has been carried out in human resources and social perspectives. Based on the responses of 147 Hungarian and 105 American economists surveyed within the framework of an online, anonymous questionnaire method, a positive vision emerges for young economists. They were confident in the social and economic welfare effects of AI. No significant difference can be found between the thinking of the two generations and the opinion of the nations. The most important conclusion from the empirical results is that AI does not take away the job of economists, but transforms it, and supports to appreciate the virtues of human resources. Accordingly, employers need to develop a short- and long-term action plan to secure their employees' future.

Keywords: artificial intelligence, human resources, generations

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1. Introduction

During the daily routine, I often encounter artificial intelligence. The relevance of the research topic is indubitable, but its short-term (5-10 years) and long-term (10-30 years) outcomes are more questionable. Both “layman” and researchers share the question how human resources and artificial intelligence might relate to each other. There will be jobs that disappear, transform, or do not change significantly in the foreseeable future. Thus, the question arises: Are robots going to steal our jobs?

There can be several possible outcomes of the research. At microeconomic level: artificial intelligence could be an additional product, or a replacement product of human resources. The presented scenarios assume completely different economic policy measures. Correspondingly, the companies should have an effective action plan for the upcoming changes.

The research seeks answer what effect artificial intelligence might have on us; and what impact digitization and robotization will have on human work. I examine this question by asking the workers of the future: economists of generations Y and Z, what they think about the subject. Nevertheless, “we” and the generations that follow us will play a very important role in shaping the coexistence of robots and humans (Zhong, et al., 2017).

My research region is Hungary and the United States, since these countries faithfully represent the view of developed countries where considerable funds are invested in research and development of artificial intelligence and other countries that also developed, but AI support is not a primary concern at the state level. In our country the support of artificial intelligence has not played a prominent role, neither at the national level, nor at the level of the European Union. However, United States is at the forefront of funding R&D incorporating artificial intelligence (OECD, 2019).

2. Theoretical background of the research areas and target groups

The major tools of the Fourth Industrial Revolution will create new opportunities for the development of various processes, have the potential to increase efficiency and productivity, and together will have a significant impact on boosting and modernizing the economy. With artificial intelligence in focus (Mangler, 2015). There is still debate whether artificial intelligence could replace human work. In 2017 Stephan Hawking believed that if they could invent functional and effective artificial intelligence, it would be the most defining “revolutionary” event of the recent times (Tegmark & Werner, 2018). Robotics and artificial intelligence have been a “hot topic” on the agenda of the recent World Economic Forum too, where economists like Roubini or Stiglitz have also been involved (Dirican, 2015). The convergence of AI and robotics has several potential benefits for science. Laboratory automation systems can physically take advantage of

techniques used in the field of AI to conduct scientific experiments (OECD, 2019). According to an article by Tegmark Werner (2018), 50% of jobs is expected to be automated within 20 years. One of the most important issues that preoccupy people today is the Fourth Industrial Revolution and its implications, which will completely subvert the world of companies, HR, and machine-to-human collaboration (Nagy, 2018). Elon Musk has repeatedly warned scientists about the dangers of artificial intelligence. Bill Gates, CEO of Microsoft has also expressed concerns that robots can soar beyond human capabilities in multiple areas (Russell, 2015). However, jobs will not disappear to the extent as previously expected, but the jobs of less educated people are at much greater risk than those of the educated workforce (Arntz, et al., 2016).

In Hungary, supporting artificial intelligence and robotics has boomed in recent years. Hungary is not (yet) at the forefront of the R&D of artificial intelligence; therefore, the Artificial Intelligence Coalition has been established to improve this situation. The Hungarian AI Coalition was formed in 2018 operating within the framework of the Digital Welfare Program, with the participation of 78 international and domestic companies, universities, scientific workshops, professional and administrative organizations. Its objective is to make Hungary as an important member of the international AI community (Digitális Jóléti Program, 2020). The country's Artificial Intelligence Strategy is expected to contribute 14%, or HUF 7,000 billion, to the country's GDP by 2030 (MTI, 2020). According to the research of PWC (2019), the impact of artificial intelligence will start to be felt in Hungary from the late 2030s.

In the United States, the focus primarily entails top-level IT aspects such as cloud-based computing, Big Data, and virtual reality (VR) (Zhong, et al., 2017). A significant number of previous research pieces in the U.S. and Europe also reports that automation and digitalization can lead to the loss of our future jobs (Arntz, et al., 2016). A study published by Carl Benedikt Frey and Michael Osborne (one of the most cited) (2013) approaches change from a negative side, with 47% of current jobs (in the USA) threatened with disappearance, so almost every second workplace would be in danger. In contrast, the OECD study estimates a change of only 9% in developed countries in the proportion of jobs lost due to automation. This poses a serious challenge, as both studies show that low-skilled employees are most at risk (Cséfalvay & Hlács, 2016). The research concludes that robots would not destroy the work and value of humans in the future, accordingly, we can only argue that it is a transformation.

Today's unresolved question is how to address the expectations of the two youngest age groups in order to share knowledge by meeting their needs (Singh, 2014). After all, information and communication technologies (ICT) are our new "digital age" that will be exploited by generations Y and Z (Seele & Lock, 2017).

Generation Y (born between 1980 and 1994 (Zemke et al, 2000)) is committed to work, expect immediate feedback and intend to stand on several legs. This is the first "digital"

generation born into the world of technology, as part of their everyday lives. They are highly qualified in digital skills (Bencsik et al, 2016). They cultivate their relationships primarily on social media and easily accept cultural differences (Törőcsik et al, 2014). The majority of Generation Y is already present in the labour market and have a university degree. The generation is characterized by ‘multitasking’ (Bencsik et al, 2016). For them, the concepts of success, career and money are of paramount importance. In order to consider themselves successful in life, their work need to be important, and work-life balance is fundamental (Tari, 2010).

Generation Z (born between 1995 and 2009 (Zemke et al, 2000)) is flexible and smart, tolerant of different cultures, content and knowledge oriented (Törőcsik et al, 2014). It is important to emphasize that Generation Z is the first global generation in the world (Homo Globalis). Regarding a Forbes magazine survey, it can be argued that the technology is in their blood. It is a careerist, professionally ambitious generation, coupled with technical and a high level of language skills. Therefore, it is an excellent workforce (Bencsik et al, 2016). Today’s youth are members of a generation that grows up using the Internet and knows the verbal and visual world of the Internet (Tari, 2011).

A company can be successful if it employs its personnel based on their competencies, skills, abilities, experience, complemented by their personal and individual motivations and principles. Thus, it is key to satisfy their expectations and needs (Bencsik et al, 2016).

3. Methods

As a research method, I applied an online questionnaire survey, because this is the most commonly used primary research and information retrieval technique, suitable for descriptive, explanatory and exploratory purposes. Information can be gathered about attitudes, knowledge, opinions, expectations, or experiences. Its advantage is that it is relatively easy to implement, anonymous, so it is easier for people to answer, it usually does not limit the respondents, and properly designed and completed questionnaires provide relevant information (Boncz, 2015).

Altogether 252 people filled the questionnaires, of which 147 were Hungarian and 105 were American. Out of the 252 people, 122 are from generation Y (56 Hungarian and 66 American) and 130 from generation Z (91 Hungarian and 39 American).

My preliminary assumption is that due to generational and R&D differences in the countries, there could be some variance in the results between the opinions of respondents in the two nations.

4. Results

Based on the theoretical backgrounds I organized my hypotheses into groups to perform the analysis along the following lines: 1) Confidence, motivation and interest 2) Areas affected by artificial intelligence 3) Results for soft and hard skills 4) Relationship between artificial intelligence and human resources 5) Overview and vision of artificial intelligence

All in all, I have not rejected the first hypothesis group, according to which economists are confident in the labour market. However, I have rejected the hypothesis that there is a difference between the motivation of Hungarian and American economists, as there is hardly any difference between the motivation and the factors. I have rejected the hypothesis that AI and robotization have motivating effect on people's work, because it is true that they have a positive approach to it, still it does not motivate them in their work.

In the second group of hypotheses I examined the areas affected by AI. The Hungarians' and Americans' perception of which areas are affected by the artificial intelligence the most in short term is very similar (logistics, engineering area, entertainment, transport, telecommunications). However, in the long term, this consistency does not exist. The Hungarians suppose that space exploration, healthcare and education; while Americans anticipate that healthcare, engineering, transportation and telecommunications will be outstanding. Thus, I reject my hypothesis that young Hungarians and Americans have different views on areas most affected by artificial intelligence in the short term. Nevertheless, the hypothesis that the Hungarian and the American youth's attitudes about areas mostly affected by artificial intelligence in long term, is not rejected, because there are no obvious similarities.

The third group of hypotheses examined the differences in opinions about soft and hard skills. Based on my research, I clearly do not reject the hypothesis that both soft and hard skills are important from the viewpoint of economists. Since both soft and hard skills can be developed, I do not reject it in the case of Americans, but I reject it in the case of Hungarians, therefore I reject the hypothesis overall. In this case, these values have become more valuable in terms of human resources, as they believe that work can only be effective if artificial intelligence and human strength work together.

The fourth group of hypotheses covers a comprehensive area: the relationship between artificial intelligence and human resources. All things considered, I do not reject my hypothesis that, according to the respondents, human work will not cease completely, it will only be transformed. Based on the research results, I do not reject my hypothesis that both American and Hungarian economists have a different opinion in the short and long term on how robots will be like us. As it was clear that from both nations' respondents think in the short term, robots will be moderately or slightly similar, while

in the long term, they will look like us significantly. In addition, I cannot reject my hypothesis that both American and Hungarian economists believe that there is a difference between short-term and long-term forecasts in the relationship between robots and human resources in the labour market.

The fifth hypothesis group, which examines the AI overall picture, needs further analysis. At this point of the research, I can argue that I cannot observe a significant difference between the American and Hungarian young economists' opinion on the view of artificial intelligence and they have a positive vision about this subject.

Along with my findings in the previous subsection, I continue the research with a deeper and more complex analysis. After analysing the profile of the respondents, I applied the SPSS software to test the established hypotheses, to analyse the data and to prepare interpretations. During the statistical analysis, Association examination, Independent t-test, 5-component factor analysis and Regression model equation were performed, the results of which are described below.

Association study

In the association examination, based on the Chi-square test, there is an association between two variables if $\text{Pearson Chi-square} = 0.000 < 0.05$. The strength of the relationship can be assessed by the Cramer V index: between 0.00 and 0.3 is weak, up to 0.7 is moderate, and 0.7 and above is strong (Hunyadi & Vita, 2008a).

Summarizing the results, there is a *weak* relationship:

- between income and generations; between generations and how they think robots will be like us;
- between AI, HR and income;
- between national affiliation and how they think robots will be like us;
- between generations and also nationalities, in the way they think, jobs do not disappear, they are only transformed in the long term;
- between generations and whether they feel threatened by artificial intelligence;
- between nationality and how they think the workplace supports AI;
- between generations and also nationalities, that they believe the government should support more AI;
- between nationality and the fact that they believe that social responsibility will play a greater role;
- between nationality and the fact that they believe the quality of life will increase;
- between nationality and the fact that they believe that the protection of personal rights will play a greater role as a result of AI.

A *strong* association can be discovered between national affiliation and perceptions of the relationship between AI and HR (Pearson Chi-square = $0.00 < 0.05$). The relationship according to the Cramer V index: $0.737 > 0.7$ (Hunyadi & Vita, 2008a).

Independent t-test

During the independent t-test, I examined the difference between the generations Y and Z and the thinking of the Americans and Hungarians.

As a result, there was *no* significant difference between the opinions of generations such as the thinking of nations on the issues examined: 1) Applying AI at work and 2) Motivation under the influence of AI. The significance level of the tested data was above the 5% threshold and the $|t|$ value is less than 1.96 in all cases.

The result corroborates my previous finding that respondents' opinions do not differ on a generational or national basis.

Factor analysis

During the factor analysis, I formed groups for the attitude test based on 20 questions in the questionnaire. The first 10 questions considered the relationship between AI and human resources, followed by 10 questions about AI and society. I applied factor analysis to globally determine attitudes for the 252 respondents. The statements were rated on a Likert scale with a value of 1-5 (1: strongly disagree, 5: strongly agree), supplemented by an option 0 (I cannot/do not want to answer). I converted the original options 1-5 to 1-3 (with 0 additions).

Initially I tested whether the variables were suitable for performing the analysis, and then examined the suitability of the data. This was followed by the determination of the number of factors. Based on the Variance Ratio method 5 components became optimal to provide an explanation of 54.285% for the entire sample, which exceeds the target of 50%. The Scree plot elbow rule and the Maximum Likelihood method also indicated 5 factors; accordingly, I ran the factor analysis with 5 factors. Based on the obtained results, I performed the rotary factor analysis on the sample. The groups created on the basis of the factors were arranged in descending order according to their size.

The first group included *positive* questions that affect our *lives*. In this group, both Hungarian and American respondents were positive (3+ values on the Likert scale) about AI.

The second group included *negative* questions about *work*. For the negative questions, the respondents did not agree with the statement (3 values on the Likert scale), except

that they could not clearly judge whether their wages would change, either in a negative or positive direction.

The third group included issues with a *positive* impact on our *society*. In this group, the opinions of American and Hungarian economists differed to a certain extent on each issue. According to US respondents, the government should better support R&D on AI, nevertheless Hungarian respondents still feel less at risk from AI. Young Americans formulated a more positive vision of the social impact of AI and social responsibility compared to the Hungarian respondents.

The fourth group included *long-term* relevant issues. According to young economists, our lives will clearly change in the positive direction as a result of AI, as our quality of life, and they believe that jobs will not disappear but will change in the long term.

The fifth and final group included questions related to the *long-term* operation of *firms* in the light of AI. According to economists, it is profitable for companies to invest in AI in the long term, but the company can function without it.

Regression analysis

Regression analysis was used to determine the functional positive or negative relationships among variables. Based on the questionnaire, I designated the question examining 10-10 attitudes as independent variables. A dependent variable of the model is how young economists support the use of artificial intelligence in their workplace which was explained by independent variables. In the linear regression model, the explained percentage of the total standard deviation is 54.5% and the standard error of the estimate is 0.733, which can be considered as low, making the modelling effort effective. The significance value of the F-test in the ANOVA table is less than 0.05, so there is a relationship. Normality, multicollinearity and auto-correlation tests were also performed with favourable results. Regression model building considered 5% entry criterion. The significance level of each variable | t | value was close to zero (<0.05), so the variables had a significant effect on the outcome variable. Tolerance levels were greater than 0.2 and VIF values were less than 3.

The non-standardized regression equation is the following:

$$\text{AI support in the workplace} = 0,626 + 0,273 * Q1 + 0,177 * Q2 + 0,080 * Q7 - 0,089 * Q10 + 0,170 * Q12 + 0,150 * Q13$$

- Q1 I would love to work for a company that uses artificial intelligence
- Q2 I would love to learn how to work with robots
- Q7 My workplace supports the use of artificial intelligence

- Q10 A company can be operational in the long term without artificial intelligence
- Q12 Our daily life is beneficially influenced by artificial intelligence
- Q13 Humanity must adapt to robots and accept the future

The model shows that question 10, that a company can be operational in the long term without the use of AI, has a negative effect on the model. The other variables have a positive effect on the extent to which AI is supported in the workplace. Therefore, with all the other variables unchanged, if fillers prefer to work for a company that uses artificial intelligence, or prefer to learn how to work with robots, they support more the use of artificial intelligence. Respondents argue that our daily lives are more influenced by artificial intelligence or if humanity has to adapt more and more to robots and accept the future, it will induce fillers to be more supportive of the use of artificial intelligence in the workplace.

5. Discussion and recommendations

As a summary of my research analysis, I conclude that both Hungarian and American economists of generations Y and Z have a significantly positive and optimistic view of the effects of the artificial intelligence.

Regarding the relationship between the younger generations and AI, I can argue that youth believe that our daily lives will be beneficially influenced by AI. They do not feel threatened, since they think that human work will not cease completely, it will only transform and in the short term, robots will complement human resources. However, I would like to mention that artificial intelligence and robotization have no motivating effect on young people during work, and it is not at the key topic of their interests. Attitudes of young economists to AI holds countless opportunities. It seems they would love to work for a company that employs AI and learn how to work with a robot. Furthermore, young Hungarians and Americans have different views on which areas are most affected by artificial intelligence in the short and long term. It is an opportunity that can be exploited in the 21st century because preparing for the change would be profitable for companies in this way. However, I identify as threat that both American and Hungarian economists say that in the long term there will be tasks/jobs that will be performed entirely by robots, and it indicates that some tasks will disappear in the long term. Also, if they are not interested in AI, they will not be involved in research and developments in the near future, although the knowledge of this generation would be essential to develop long-term strategic goals.

Despite the fact that the results of this research have indicated that people do not have a clear vision, still I can truly argue that most of them are optimistic about the topic, regardless of generation and geographical area.

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