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The impact of IT solutions on the transformational processes of the labour market in Poland

doctoral dissertation in the field of social sciences, the disciplines of economics and finance,
written under the scientific guidance of Professor Ewy Kusidel
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SUMMARY OF DOCTORAL DISSERTATION

Nowadays, changes in the labour market are very dynamic. These changes are influenced by many determinants, among which one of the most important is technological progress. The related digital transformations, changes in the strategies of companies using technology and the next, fourth industrial revolution, are changing entire labour markets.

The influence of technology on the labour market has long been widely discussed in economics, but it does not provide clear answers. Extreme opinions often appear in the literature on the subject due to the positive and negative consequences for employment. The mechanism of interaction between modern technologies and the labour market (as well as employment) is complex and multifaceted and results not only in changes in the labour market, but also in civilization changes.

In the literature on the subject, the impact of modern technologies on the labour market is often examined from the perspective of robotization or production automation. This dissertation discusses this impact through a broad literature review, covering the impact of technological innovation, automation and robotization. However, the most important element of the work, was to conduct own research in the empirical part, on the basis of which the changes taking place on the Polish labour market were assessed from the perspective of the impact of broadly understood information technologies – IT (*Information Technology* in Polish literature called Information and Communication Technologies – ICT).

The main aim of this dissertation is the influence of information technologies on transformational processes in the labour market in Poland, understood as changes in the employment[1] structure at the national and provincial levels. The employment structure was defined on the basis of the Polish Classification of Activities (pl. Polska Klasyfikacja Działalności, PKD[2]), with particular emphasis on changes in section J (information and communication).

The main goal of the thesis was accompanied by specific goals and a number of research hypotheses. The first specific goal was the assessment of tendencies in the IT job market as a result of technological changes and their diversified impact. These tendencies were assessed in the IT sector labour market in terms of their regional attractiveness against the background and in relation to the tendency of changes in the labour market in general in all sectors in Poland. Another specific goal was to compare tendencies in the IT job market (in terms of possible

[1] More precisely, most of the analyses were based on data on people aged 15+ according to LFS (unless it was clearly stated that it was another source, e.g., data collected from the pracuj.pl portal). However, in order to avoid repetition and to keep the text flowing, the term number of working/employees was used interchangeably.
[2] Foreign equivalents of PKD are the NACE and ISIC codes.

significant variables reflecting this technological change) in relation to the total market in case of atypical events – which the COVID–19 pandemic certainly was.

The studies were carried out, depending on data availability, in three–genertime perspectives: 1995–2020. 2008–2020 and 2019–2020. For the period 1995–2020 (for which data on employees in PKD sections were available only at the national level), the transformation of the labour market was assessed at the national level. For the years 2008–2020, it was also possible to take into account changes taking place in the structure of employees at the regional level (NUTS 2). On the other hand, changes in the IT labour market, presented from the point of view of regional attractiveness, were assessed in the period 2019–2020 due to the availability and use of primary data collected using the *web scraping* method specifically for the planned study. For this purpose, a *web scraping* tool (in the Python programming language) was built, which was used to collect data from the *pracuj.pl* portal about job offers understood as vacancies and professional activation in the IT section reported directly by employers. This tool was also used to obtain statistical data on job vacancies in all sections for which demand is generally reported on the Polish labour market.

The effects of the work are included in the dissertation, which consists of five chapters. The analysis of the available literature on the subject made it possible to prepare the first three chapters and, on this basis, to conduct the scientific research presented in the last empirical chapter. This study made it possible to achieve the objectives set out in this dissertation and to verify the hypotheses.

The summary of the dissertation contains conclusions resulting from the implementation of the objectives of the work and the verification of the research hypotheses presented in the introduction. It was emphasized that the labour market had undergone a transformation from the point of view of the employment structure, and the influence of modern technologies has been reflected in recent decades in an increase in demand for professions related to the IT section. Moreover, the attractiveness of regional labour markets in the IT sector, despite the fact that it is spatially diversified (in terms of the level of the attractiveness index), in most regions NUTS 2 shows a positive tendency, which was proved in the dissertation. In addition, it was emphasized that the development of technology is reflected not in the reduction of employment, but in changes in the occupational structure, towards increasing the share of IT specialists in the total number of employees. It was also emphasized, based on the analysis of the available literature on the subject, that it is not possible to unequivocally assess the mutual impact of technological innovations on the labour market, because constant changes, various processes, as well as atypical situations make it extremely difficult to formulate precise and unambiguous conclusions. The dissertation also pointed out that transformation is a relatively long process, but the occurrence of events such as the COVID–19 pandemic may significantly and in a short time affect the transformation processes.

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