Regional digital divide in Hungary from the perspective of ICT skills

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The dynamics of the new, digital economy lead to inequalities, and this form of inequality is the so-called digital divide (Van Dijk 2002, 2006; Dewan-Riggins 2005). The term appeared three decades ago and the phenomenon is primarily traced back to unequal access to digital technological conditions. However, in the early 2000s, policy-makers' interest in the subject waned, given the extent of access to digital technologies (computers, the Internet) by the public. At the same time, it has become more and more clear that inequalities can also stem from other sources.

Van Dijk (2006), one of the most cited authors on the subject, points out alongside Riggins and Dewan (2005) or Hilbert (2011) that the phenomenon can be interpreted primarily as a gap between those who have and those who do not have access to digital technologies. Although the digital divide is in most cases examined from the perspective of a lack of technological opportunities, many forms of inequality (technological, intangible, material, social, educational) can be observed behind the phenomenon (Van Dijk 2009).

In addition to the multifaceted interpretation of the phenomenon of the digital divide, the complexity of the phenomenon is also indicated by the fact that, according to the literature, the digital divide has several, even overlapping, dimensions. Van Dijk and Hacker (2003, Van Dijk 2006) shed light on four different dimensions of the digital divide based on access: material access, motivational / mental access, skill access, usage access. It shows that the different possibilities of access to digital technologies alone do not explain the formation of the digital divide, and the provision of appropriate technological conditions are not sufficient to bridge the information inequality and the digital divide (Szeles 2018). Furthermore, barriers to access that cause the digital divide change over time and are influenced by different factors. At first, physical access and motivation can be a barrier, and once these are resolved, the gap can stem from differences in skills and the extent to which digital technologies are used (Van Dijk – Hacker 2003).

Similarly, according to DiMaggio et al. (2001), five factors define the digital divide; these are the quality of technological connections, autonomy of use, skills, social support, and the purpose of using the Internet. According to Mossberger et al. (2003), the digital divide may refer to inequality in access, skills, economic opportunities, and a democratic situation. According to Philip et al. (2017), there are two well-defined approaches to the phenomenon: digital divide is on the one hand due to the lack of technological infrastructure to support digital connections; on the other hand to the differences in the level of digital skills.

The digital divide can be interpreted at the level of individuals, households, businesses and geographical areas (OECD 2001). The latter is regional digital divide (Vicente-López 2011), which poses a number of challenges, especially in less developed regions (Salemink et al. 2017).

Nowadays, more and more questions arise when discussing the relationship between digitalization and economic development in less developed regions, and exploring the causes of regional digital inequalities. Among the many questions that arise, the present research seeks to answer the question of how the digital divide between regions has changed in Hungary in the light of the digital (ICT) skills of employees.

To answer the research question, a survey is conducted at the county level based on the 2001 and 2011 census, and 2016 micro-census data. The identification of occupations according to digital skills is based on the OECD (2016) ISCO code-based categorization, which was developed on the basis of the PIAAC (Program for the International Assessment of Adult Competencies) survey. On the one hand, the OECD (2016) distinguishes two groups of occupations that require general ICT skills: Communication and Information Search (CIS) and Office Productivity Software (OPS) groups, on the other hand, it examines ICT specialist-intensive occupations characterized by the use of everyday programming language.

In our analysis, we determined the digital divide between Hungarian counties firstly, by counting location quotient (LQ). Results show that in Budapest, the concentration of digitally intensive employees is high. The LQ values of Budapest stood out from the LQ values of the counties in all cases, blurring the differences between the county LQ values. For this reason, we decide to omit the data from Budapest in our further investigations, and it has been revelaed that CIS and OPS type of digitally intensive occupations are relatively highly concentrated in counties, especially with large universities. ICT specialist-intensive occupations show a different spatial distribution, they are mainly concentrated in the northern, more industrialized counties of Hungary.

In our further analysis, as a second step, only without Budapest we tried to represent the counties along two dimensions (CIS-OPS and ICT specialist-intensive occupations) for all three years separately by principal component analyses. As a third step, we plot the county values of the formed 2-2 principal components on a graph for each of the three years. Based on the drawn line of the gap, we could determine the sets of relatively digitally intensive and non-digitally intensive counties. It has become clear that there are counties which remain relatively digitally underdeveloped over the years and unable to improve their relative position (like Bács-Kiskun, Békés, Nógrád, Somogy, Szabolcs-Szatmár-Bereg, Jász-Nagykun-Szolnok, Tolna and Zala). Digitalization can be detected in case of most of the counties, but in most cases with respect to one (CIS-OPS) or the other (ICT specialist-intensive) dimension. Baranya, Csongrád counties are above the average for all three years according to CIS-OPS dimension, Heves and Komárom-Esztergom are above the average for all three years according to only ICT specialist intensive dimension. There are only two counties (Győr-Moson-Sopron and Pest) that have been relatively highly digitized all three years for both dimensions, and there are two counties (Borsod-Abaúj-Zemplén and Fejér), where the level of digitalization for both of the dimensions was relatively high, but changed over the years.

Our primary findings highlighted that the digital divide is detectable in Hungary on the level of counties, and it is changing over the time. In the perspective of 16 years, the research reveals where digital underdeveloped and developed areas are located; and what kind of dimension of digitalization determines the relative position of counties.