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MAPPING THE DIGITAL MARKETING HARD SKILLS OF UNIVERSITY STUDENTS IN THE VISEGRAD REGION*

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Abstract. The growing role of digital marketing and the increasing importance of data-driven tools are reshaping the labour market's expectations. Identifying the differences between labour market requirements and students' skills is essential for advancing university courses. Despite the increasing presence of digital marketing content in study programmes, there is still a lack of comparative empirical research assessing the level of digital marketing skills among students in Central Europe. The aim of this paper is to investigate and map the digital marketing hard skills of university students in the Visegrad region, with particular emphasis on their ability to use digital tools, their perceived proficiency and areas requiring further development to meet modern labour market expectations. Using purposive sampling, data were collected via an online survey administered between June 2025 and January 2026, among Hungarian, Polish and Slovak students. The total sample size consisted of 1200 respondents (400 from each country), aged 18 - 30, enrolled in study programmes incorporating marketing-related courses. The questionnaire included items regarding digital marketing skills and students' perceived proficiency in specific digital tools. The findings reveal a clear concentration of skills in domains that are highly visible within students' environments, like social media and AI, while automation and analytics skills remain comparatively underdeveloped. At the level of specific digital marketing tools, self-reported proficiency ranged predominantly from beginner to intermediate level. Significant differences between countries were also observed. These findings underscore the need to more closely align curricula with the requirements of the labour market.

Keywords: digital skills; marketing skills; higher education; AI proficiency; social media tools

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JEL Classifications: M31, J24, I23

1. Introduction

The modern world is increasingly characterised by rapid technological advancement, accelerating digitalisation, and continuously evolving labour market demands, which significantly reshape expectations about what people should know to be employable (Dickson, 2023). Marketing is one of the sectors most heavily influenced by the digital revolution. The integration of digital platforms, artificial intelligence, machine learning, and data-driven decision-making has fundamentally reshaped marketing strategies, customer interaction, and value creation

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processes (Dwivedi et al., 2021; Kumar et al., 2021). In today's fast-paced business world, companies are leaning heavily on digital tools to get to know their customers better. Instead of providing the same message to everyone, they utilise technology to learn what people like and create offers that feel personal (Paschen et al., 2019). Because of this shift, being good at "old school" marketing isn't enough anymore. Modern marketers need to be technologically savvy and able to solve problems. They have to be comfortable using new software, thinking on their feet, and quickly adjusting whenever a new technology changes the game (Herhausen et al., 2020; Van Laar et al., 2020). Higher education institutions play an important role in training future marketing professionals for the challenges of the digital economy. Universities are increasingly expected to provide students with appropriate skills that meet changing labour market demands, particularly in digital marketing contexts (Mabungela et al., 2025). This challenge is particularly relevant for Generation Z, who are defined as individuals born between 1995 and 2012. Generation Z has grown up in a fully digital environment and is highly familiar with digital technologies, social media and online communication platforms. However, being familiar with technology does not necessarily mean that someone is professionally competent in the digital sphere (Van Laar et al., 2020; Kovacs, 2021). Therefore, understanding the competencies required by future marketing professionals is essential for aligning educational programmes with labour market needs. Checking what marketing skills students actually have, it is a great way to see if they're truly ready for the job. It helps us spot the gap between what's being taught in class and what companies actually need right now.

2. Theoretical background

Nowadays, the ability to use digital tools effectively is no longer just an additional asset on the labour market, but rather a standard expectation of employers. Digitalisation increases the demand for non-routine work that requires information processing and problem-solving. New technologies increase the complexity of tasks performed by employees, requiring a diverse set of skills (Antonazzo et al., 2021; Antonazzo et al., 2025). Employees require an extensive range of skills, combining strong cognitive and socio-emotional skills with hard digital skills (OECD, 2019). At the same time, digital skills mean a broad array of competencies, including basic knowledge of technology, critical thinking, problem-solving skills, and more (Audrin & Audrin, 2022). However, their scope is changing in parallel with the development of specific technologies (e.g., artificial intelligence, automation, analytics). Emerging technologies create both opportunities and challenges for not only in industry but also in higher education, requiring curricula to be adapted to changing labour market requirements, including an increasing emphasis on the development of digital skills (OECD, 2019). From an educational perspective, the development of such competencies depends significantly on the curriculum design. Iqbal (2023) demonstrates that the structure of marketing curricula has a significant impact on graduates' career outcomes, especially when study programmes combine conceptual knowledge with practical, tool-based training.

Labour market research confirms that marketing positions increasingly require interdisciplinary skills, combining creativity, an analytical approach and technological fluency (Di Gregorio et al., 2019; Key et al., 2019). These patterns can be interpreted through the lens of value creation and delivery in marketing, both for the customer and other stakeholders in the organisation. In the context of digitalisation, the decision-making process is becoming increasingly complex, multidimensional, multi-channel and based on multiple customer touchpoints. Advanced information technologies, particularly tools based on artificial intelligence, are useful support in processing vast amounts of customer data (Cherednichenko et al., 2023). Today's consumers switch between real and virtual spaces, where interactions are spread across social media, e-commerce systems, e-mail and mobile channels. Each subsequent interaction generates data on the needs, preferences and behaviours of recipients, making the delivery of value strongly dependent on the information obtained and processed (Štefko et al., 2023). As a result, effective customer relationship management and value delivery become based on the ability to collect, analyse and interpret data, which emphasises the importance of hard digital skills in marketing practice.

The growing importance of digital proficiency raises questions about the extent to which higher education institutions equip students with business-relevant digital skills that meet the dynamic changes in industry expectations. In this context, there is a gap between the outcomes of education and the requirements of the labour market, particularly in areas subject to dynamic technological developments (OECD, 2019). This

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phenomenon can be interpreted as a skill mismatch resulting from the asymmetry between the pace of technological change and the organisational capabilities of educational institutions (Lichy & Khvatova, 2019). Although the labour market requires skills related to the use of modern tools, these changes are not always reflected in education programmes. In the case of digital marketing, this issue seems particularly important, as it is based on rapidly developing advertising systems, sales platforms and analytical software, whose functionalities are subject to constant modification (Gayatri & Az, 2021). Changing expectations relate not only to labour market requirements, but also to the needs of students who want curricula covering a wide range of practical digital skills and the use of digital marketing tools and platforms (Viana & Gomes, 2024).

In a broader perspective, therefore, debate arises not only about the general level of students' digital skills, but also about their structure and ability to use specific tools. Companies require not only general technological proficiency, but also the ability to work with data and specific platforms and systems (OECD, 2019; Beck et al., 2025). This means that the value of skills in the labour market is determined by their suitability for specific activities, rather than solely by their formal classification as "marketing" or "technological". As a result, skills associated with digital marketing are finding wider application in businesses, also fitting into e-commerce, product management and sales analytics. As a consequence, employment decisions are increasingly based on specific and measurable skills, rather than just on a formally acquired university degree in a particular field (Tomlinson, 2017). This implies that preparing students for employment should not be limited to a general introduction to digital competencies. Equally important is training in task-oriented skills that enable working with data and specific platforms and tools. Digital marketing skills can be seen as an example of specialised skills that are transferable and go beyond basic marketing roles. Therefore, it seems reasonable to examine the extent to which students enrolled in marketing-related courses develop hard digital skills considered essential for employment in marketing positions (Gayatri & Az, 2021; Cicha & Rizun, 2025).

3. Research objective and methodology

The aim of this paper is to investigate and map the digital marketing hard skills of university students in the Visegrad region, with particular emphasis on their ability to use digital tools, their perceived proficiency and areas requiring further development to meet modern labour market expectations. The following research questions were formulated:

- RQ1: Which digital marketing skills do students demonstrate across key marketing domains, and how do these skills vary among the selected countries?
- RQ2: What is the perceived level of students' digital marketing skills, and how does this level differ among the selected countries?
- RQ3: What are students' self-assessed proficiencies with specific social media tools, and are there significant differences among selected countries?
- RQ4: What are students' self-assessed proficiencies with specific AI tools, and are there significant differences among selected countries?
- RQ5: What are students' self-assessed proficiencies with specific email marketing tools, and are there significant differences among selected countries?

Data collection was performed using an online survey. The study was conducted between June 2025 and January 2026. We used a purposive sampling method. Our research sample consists of university students enrolled in study programmes that include marketing-related courses. The age range of the participants was 18 to 30 years. We have collected data from three countries from the Visegrad region: Hungary, Poland and Slovakia. The analyses presented in this paper were carried out based on answers provided by 400 respondents from each country, resulting in a total sample size of n=1200. The respondents' participation in the study was voluntary and anonymous. They were informed about the purpose of the research and that they could withdraw at any time.

The questionnaire consisted of questions related to digital marketing skills, covering students' abilities, competencies, and the use of specific tools. To identify students' digital skills in different marketing domains, we used dichotomous questions. To assess their perceived proficiency in various digital marketing tools, we

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used a 5-point scale. Each point of the scale was explained in the questionnaire to ensure that all respondents interpreted the categories in a consistent way: 1 - no skills at all (I have no experience or knowledge in this field); 2 - beginner (I am beginning to learn this topic/tool, I can perform simple tasks with guidance); 3 - intermediate (I know this tool/software, I can perform defined and routine tasks independently); 4 - advanced (I know the advanced functions of this tool/software, and I can perform various tasks independently); 5 - expert (I have full proficiency in using this tool/software, and I am able to share my knowledge with others).

The data analysis was performed using Jamovi software. Research questions were tested by applying non-parametric tests such as the Chi-square test of independence for categorical questions (yes/no), while the Kruskal-Wallis test was applied for ordinal data acquired from scaling questions. The specific differences across countries were identified by the Dwass-Steel-Critchlow-Fligner pairwise comparisons.

3. Results and discussion

The acquired results show a certain diversity in digital skills of selected marketing domains among university students. In general, the majority of students indicated no skills in Google Analytics, email marketing and user experience (UX) or user interface (UI), while a certain degree of skills was indicated in social media marketing and in AI in marketing. Furthermore, statistically significant differences were identified across countries in three domains: social media marketing, AI in marketing and email marketing. Based on Table 1, it can be stated that the declarations on skills in social media marketing were highest among Slovak students, followed by Hungarian students, while in Poland, more than half of the students indicated no skills in social media marketing. According to the results, 19% of Hungarian students declare having skills in email marketing, which is the highest number among the examined countries. In general, it can be stated that university students mostly have skills in AI in marketing and social media marketing.

Table 1. University students' digital skills in different marketing domains

Items	Answer	Hungary	Poland	Slovakia	p-value
Google analytics	yes	40,5%	38,5 %	32,8 %	0,063
	no	59,5%	61,5 %	67,3 %	
Social media marketing	yes	75,3 %	48,3 %	88,3 %	< 0,001*
	no	24,8 %	51,7 %	11,8 %	
AI in marketing	yes	94,8 %	99,0 %	99,3 %	< 0,001*
	no	5,3 %	1,0 %	0,8 %	
Email marketing	yes	19,0 %	8,3 %	10,3 %	< 0,001*
	no	81,0 %	91,8 %	89,8 %	
UX/UI	yes	12,0 %	8,5 %	9,3 %	0,219
	no	88,0 %	91,5 %	90,8 %	

* – Significant differences between countries according to Chi-square test of independence ($p < 0.05$).
Source: Own study

In addition, students across all three countries evaluated their perceived proficiencies in further marketing skills such as search engine optimisation, graphic software, pay-per-click marketing, content management system, customer relationship management, creating and managing e-shops and creating and managing websites. On average, students are more skilled in graphic software (3,28), followed by creating and managing websites (2,34), creating and managing e-shops (2,02) and search engine optimisation (2,01). Students' Pay-per-click marketing, CMS and CRM skills are between no skills to beginner level.

Based on the obtained results, it can be stated that there exist statistically significant differences across countries in all evaluated skills (Table 2). Hungarian students declare higher proficiency in comparison to Slovak and Polish students in the following skills: creating and managing websites (2,69), CMS and CRM (2,60), search engine optimisation (2,32), PPC marketing (2,30) and creating and managing e-shops (2,21). In the case of graphic software, Polish students indicated the highest proficiency (3,61).

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Table 2. Perceived proficiencies of university students' digital marketing skills

Item	Overall	Hungary	Poland	Slovakia	p-value
SEO (Search Engine Optimization)	2,01	2,32[a]	1,95[b]	1,76[b]	< 0,001*
Graphic software (Photoshop, Corel, Canva)	3,28	3,34[a]	3,61[a]	2,88[b]	< 0,001*
PPC marketing	1,72	2,30[a]	1,56[b]	1,55[b]	< 0,001*
CMS and CRM	1,82	2,60[a]	1,82[b]	1,57[b]	< 0,001*
Creating and managing e-shops	2,02	2,21[a]	1,97[b]	1,89[b]	< 0,001*
Creating and managing websites	2,34	2,69[a]	2,12[b]	2,23[b]	< 0,001*

* – Significant differences between countries according to Kruskal-Wallis test ($p < 0.05$). Means in the same row with different superscripts are statistically different according to Dwass-Steel-Critchlow-Fligner pairwise comparisons ($p < 0.05$).

Source: Own study

Across all three countries, students reported the highest perceived proficiency in using Facebook and Instagram tools. They also assessed their skills relatively high regarding TikTok, which can be classified as intermediate level or above (mean values ranging from 2,46 in Slovakia to 3,53 in Hungary). Clear cross-country differences emerge, although they vary by specific platform. Results show the highest scores in most tools among Hungarian students. An exception is observed for Facebook Ads, Instagram Ads, and Meta Business Suite, where Polish students' perceived level is slightly higher (3,60 for Facebook Ads and Instagram Ads; 2,89 for Meta Business Suite). In contrast, Slovak students obtained the lowest average scores in most social media tools. Across all countries, the lowest self-assessment of skills is reported for LinkedIn Ads (Table 3).

Table 3. University students' perceived proficiencies in social media tools

Item	Overall	Hungary	Poland	Slovakia	p-value
Facebook insights	2,84	3,70[a]	2,77[ab]	2,67[b]	< 0,001*
Instagram insights	3,06	3,20	2,91	3,20	0,054
Meta Business Suite	2,51	2,84[a]	2,89[a]	2,20[b]	< 0,001*
Facebook ads	2,98	3,47[a]	3,60[b]	2,52[c]	< 0,001*
Pinterest Ads	2,49	2,81[a]	2,34[b]	2,30[b]	< 0,001*
LinkedIn Ads	2,00	2,46[a]	1,96[b]	1,63[c]	< 0,001*
Instagram ads	3,15	3,57[a]	3,60[b]	2,85[b]	< 0,001*
TikTok ads	2,93	3,53[a]	2,85[b]	2,46[c]	< 0,001*

* – Significant differences between countries according to Kruskal-Wallis test ($p < 0.05$). Means in the same row with different superscripts are statistically different according to Dwass-Steel-Critchlow-Fligner pairwise comparisons ($p < 0.05$).

Source: Own study

Analysis of AI tools revealed an uneven distribution of skills across the platforms. ChatGPT achieves by far the highest average scores in all three countries (above advanced). This indicates that ChatGPT has become the dominant AI tool in the student environment, significantly outperforming all other platforms. In contrast, the remaining tools (Gemini, Writesonic, Copilot, Midjourney) average scores range from no skills to an intermediate level at most. This pattern demonstrates a strong concentration of skills around a single, widely adopted tool rather than a broad understanding of the AI ecosystem. Cross-country comparisons show that Hungary achieves the highest average scores in four out of five tools (Writesonic, Copilot, Midjourney, ChatGPT). These differences are statistically significant and suggest that Hungarian students may have a more diverse exposure to AI technologies compared to Polish and Slovak students. The only exception is Gemini, where Polish students obtain the highest scores (3,13), indicating relatively greater familiarity with this specific tool (Table 4).

Table 4. University students' perceived proficiencies in AI tools

Item	Overall	Hungary	Poland	Slovakia	p-value
Gemini	2,86	2,89[a]	3,13[a]	2,55[b]	< 0,001*
Writesonic	1,55	1,93[a]	1,41[b]	1,31[b]	< 0,001*
ChatGPT	4,32	4,48[a]	4,35[b]	4,13[c]	< 0,001*
Copilot	2,40	2,76[a]	2,14[b]	2,31[b]	< 0,001*
Midjourney	1,63	1,98[a]	1,52[b]	1,40[b]	< 0,001*

* – Significant differences between countries according to Kruskal-Wallis test ($p < 0.05$). Means in the same row with different superscripts are statistically different according to Dwass-Steel-Critchlow-Fligner pairwise comparisons ($p < 0.05$).

Source: Own study

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Compared with the findings on social media and AI tools, students' skills in email marketing overall are at a similarly beginner level, or slightly higher, with average scores ranging from approximately 2,06 (SmartEmailing) to 2,63 (Mailchimp). That may indicate limited integration of e-mail automation into marketing curricula and practical training. Hungarian students achieve the highest average scores in all of the analysed tools, demonstrating a systematic advantage in the area of e-mail automation. Poland and Slovakia show lower levels of skills, with Slovakia recording the lowest scores from all countries in several tools, such as MailerLite, AWeber, SmartEmailing and GetResponse (Table 5). In most cases, these cross-country differences are statistically significant. Overall, the results suggest that students do not develop proficiency in any specific e-mail marketing tool. Instead, their skills remain limited to basic operational tasks.

Table 5. University students' perceived proficiencies in e-mail marketing tools

Item	Overall	Hungary	Poland	Slovakia	p-value
Mailchimp	2,63	2,97[a]	2,27[b]	2,27[b]	0,004*
MailerLite	2,44	3,00[a]	2,30[b]	1,51[c]	< 0,001*
Ecomail	2,28	2,51	1,97	2,10	0,056
AWeber	2,06	2,59[a]	1,79[b]	1,29[b]	< 0,001*
SmartEmailing	2,09	2,49[a]	1,82[b]	1,59[b]	< 0,001*
GetResponse	2,15	2,53[a]	2,39[a]	1,24[b]	< 0,001*

* – Significant differences between countries according to Kruskal-Wallis test ($p < 0.05$). Means in the same row with different superscripts are statistically different according to Dwass-Steel-Critchlow-Fligner pairwise comparisons ($p < 0.05$).

Source: Own study

The findings indicate a pattern among university students in the Visegrad Region in the structure of digital marketing skills. The results reveal a clear dominance of tools that are currently popular and visible in the market, while students declare a weaker level of knowledge of tools related to analytics or automation. Findings align with the broader debate on digital skills in Europe, suggesting a reactive nature of skills development in the context of existing market trends (European Commission 2023; OECD, 2021). However, many of the earlier studies that broadly analysed ICT skills and digital literacy in the context of education (e.g., Verhoeven et al., 2020) did not explicitly address the marketing domain. In turn, studies devoted to marketing skills rarely focused on specific ICT tools and concentrated on labour market expectations rather than the skills actually possessed by students (e.g., Di Gregorio et al., 2019; Key et al., 2019; Kovács, 2021).

In this study, students' skills were examined both at the level of individual digital marketing domains (SEO, AI, PPC, UX/UI, Google Analytics) and their knowledge and ability to use specific tools (e.g., Photoshop, LinkedIn Ads, Mailchimp). Although a significant proportion of students declare having skills in general digital marketing domains, their self-assessment of proficiency in specific tools in their field is substantially lower and unevenly distributed. For example, students' skills in artificial intelligence are concentrated on a single dominant tool (ChatGPT), while their proficiency in using alternative applications remains limited (e.g., Gemini, Copilot, Writesonic, Midjourney). A similar pattern can be observed in the area of social media, where relatively high skills mainly concern the Meta ecosystem, with a lower level of knowledge of other advertising platforms. This suggests that skill development is concentrated around platforms, and it does not exhibit a systemic structure. As a result, perceived skills within a given domain do not necessarily translate into broad technical capabilities or the ability to transfer knowledge between different tools.

This discrepancy is consistent with the Dunning-Kruger effect (1999) and research on the perceived skill gap. Exposure to a tool does not necessarily translate into the ability to use it effectively in practice. Furthermore, previous studies have shown that declared digital skills may be overestimated when assessments are made at a general level (e.g., Porat et al., 2018). Declarations at the level of the digital marketing domain (e.g., I have skills in email marketing) may reflect conceptual awareness rather than demonstrated ability to operate multiple tools in this area. This observation is also consistent with the distinction between declarative and procedural competencies (Anderson, 1982). Students may possess declarative digital marketing skills (e.g., the ability to create social media sales funnels) without developing proficiency in diverse tool environments. This suggests that identifying skills at the domain level may reflect cognitive recognition of the subject, while proficiency at the tool level more accurately reflects the ability to use it in practice.

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The strong concentration of students' skills around social media and AI tools can be interpreted through the lens of the Theory of Diffusion of Innovation. According to this approach, technologies characterised by low perceived complexity, high observability of results and high compatibility with existing practices are adopted more quickly than solutions requiring in-depth analytical skills or systems thinking. This interpretation is further supported by technology acceptance models. For example, from the perspective of the Technology Acceptance Model (Davis & Granić, 2024) and UTAUT (Venkatesh et al., 2003), the perception of specific tools is shaped by factors such as perceived ease of use, usefulness, or social influence. Platforms such as Meta, ChatGPT, and Canva are widely present in the academic and media environment, which may contribute to their acceptance. Similar mechanisms are also indicated by other studies on technology (e.g., Kandoth & Shekhar, 2022), which show that users are more willing to develop skills in technological tools that are popular and widely used in their environment. This phenomenon can also be related to network effects and platform dominance, which tend to concentrate user competencies around technologies with the largest user bases. The findings suggest that this process leads to selective skill development. From an employability perspective, this implies a potential risk of a skills gap between education and the labour market (Aljohani et al., 2022). Industry reports suggest that there is a growing demand for analytical skills, marketing systems integration and data management (Deloitte, 2023; McKinsey, 2025). The results of the study, therefore, suggest a need to develop universal skills, in particular analytical and automation-related, which can be transferred across different platforms, while simultaneously exposing students to a broader variety of tools.

The advantage observed in Hungary suggests that the structure of the curricula and the resources available to the education process shape the level of digital marketing skills. This is consistent with Human Capital Theory as well as the literature on teaching and learning (e.g., OECD, 2021), which indicates that skill levels, including digital skills, are substantially influenced by educational institutions. In addition, digital technologies such as e-learning, online self-learning tools and virtual reality-based training methods can not only support the educational process itself, but also prepare individuals for future lifelong learning in online environments (Urbancová et al, 2021). The findings indicate that even within a relatively homogeneous age group, skill levels vary between countries. The observed differences concern not only access, but also the type of skills developed. This suggests the importance of education-related factors, such as the availability of computer labs, the scope of practical classes, the use of specific tools, or cooperation with the business sector. The differences observed between the countries studied can therefore be interpreted not only in terms of individual preferences or technological exposure, but also in terms of the study programme, which highlighted the need for further research into curricula design in shaping digital skills.

Conclusions

Our study has identified a competency gap among university students in Hungary, Poland, and Slovakia. This is characterised by a state of being digitally immersed, yet professionally unempowered. While students are generally comfortable with social media and trend-driven generative AI tools, they often lack the technical skills required for a career in marketing. Our findings suggest that current skills development is influenced more by personal exposure than by professional mastery. There has been a marked decline in skill levels in specialist areas such as data-driven analytics, CRM automation and UX optimisation. We found that self-assessed proficiency remains intermediate and varies significantly across borders, indicating a clear gap between casual technology use and the rigorous, highly specialised skills that are expected to be in demand in the labour market.

To implement these findings into professional practice, higher education should shift its focus from teaching individual social media platforms to developing broader, transferable digital marketing competencies. Curricula should place greater emphasis on analytical and automation skills, treating them as core components rather than optional additions. By encouraging students to move beyond basic familiarity with social media and generative AI, professional software suites can help them understand key principles, such as performance measurement, campaign optimisation, and customer journey automation. These skills remain valuable even as specific tools and technologies change. In practice, these skills can be supported through experiential learning, including practical case studies, simulations, and collaboration with industry partners, where students gain experience in analysing data and making strategic decisions. By integrating AI as a structured support tool for productivity

and decision-making, universities can better prepare graduates to use technology effectively and meet the evolving demands of the modern labour market.

This study faces several limitations. First, we used purposive sampling, which, while appropriate for targeting specific groups of university students, reduces the ability to extend our findings to a broader population. Second, the data presented in the paper are based on self-reported measures, which do not capture objectively validated skill levels. This approach may result in over- or underestimating students' actual competencies. Third, the geographical scope of the study includes only Hungary, Poland, and Slovakia, excluding the fourth Visegrad Country, the Czech Republic, which limits the completeness of cross-country comparisons. Future research should incorporate all V4 countries. Additionally, future studies could benefit from combining self-reported measures with objective assessments to obtain a more accurate picture of students' digital competencies.

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