THE NECESSARY SOFT SKILLS FOR CORPORATE IT GOVERNANCE SYSTEM — BASED ON STUDENTS' OPINIONS IN HUNGARIAN HIGHER EDUCATION IN ECONOMICS

Timea Juhasz [*], Krisztina Inczedy [**]

* Alexandre Lamfalussy Faculty of Economics, University of Sopron, Sopron, Hungary
** *Corresponding author*, Hungarian University of Agriculture and Life Sciences, Godollo, Hungary
Contact details: Hungarian University of Agriculture and Life Sciences, Páter Károly Str. 1, 2100 Godollo, Hungary

Abstract

Today, soft skills are undoubtedly just as important to employees and employers as hard skills. Research in information technology (IT) is increasingly showing that hard skills are not enough to do a job well. Our paper presents the results of a study conducted in 2023–2024 with the aim of analysing which soft skills are necessary to work successfully as a user in SAP S/4HANA. The authors explored what soft skills are needed to perform specific IT activities in complex enterprise resource planning (ERP) systems. Although studies on hard and soft skills among ERP users have been conducted previously (Boyle & Strong, 2006), these studies did not focus on SAP S/4HANA systems. This research was carried out with students at Budapest Business University, who learn SAP S/4HANA sales and distribution and material management modules from a beginner level. The authors conducted a questionnaire-based quantitative study with 215 students. Results were analysed using SmartPLS 4 and the Statistical Package for the Social Sciences (SPSS) 28. To analyse the hypotheses, the authors performed single and multiple variable mean and variance analyses and used a structural equation modeling (SEM) model to show how the individual elements of the examined issue are interrelated. The results reflected that learners were confident in having sufficient soft skills to operate the system at the end of the course. There are skills that vary in strength between genders and have a significant impact on the ability to operate the system. Examples include diligence, personal development, and reliability. Context- and performance-related soft skills have a significant impact on an individual's ability to successfully complete SAP S/4HANA tasks. The results proved that soft skills are also necessary for the proper operation of SAP S/4HANA.

Keywords: SAP S/4HANA, Employment, Soft Skill, SAP S/4HANA Activity, IT

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1. INTRODUCTION

According to the article by Joseph et al. (2010), there has been very little research on soft skills in the information technology (IT) field. One of the reasons for this is probably that, for a long time, companies have traditionally believed that hard skills were the only fundamental part of IT.

The most important skills required in this area were professional knowledge, experience, and language skills. Over the years, however, it has become clear that these skills are no longer sufficient to be successful in the labour market; indeed, soft skills are of vital importance to manage. This fact has been supported by (Syahrin et al., 2024; Bhati, 2022; Mitashree, 2020) that our globalised and rapidly evolving world now expects a potential employee to have strong soft skills in addition to hard skills.

The most commonly required soft skills include communication, teamwork, and leadership skills (Bhati, 2022). The study of soft skills is also important because research has shown that there is a link between soft skills and work productivity. (Hamid & Younus, 2022).

Soft skills are now more widely recognised as a key determinant of success in the workplace, and it matters which soft skills employers expect their employees to have, and which skills can actually help them to do a job successfully. However, the fact is, as mentioned earlier, that soft skills are not as common in the IT sector. Thus, among other things, there are very few studies that show what soft skills are needed for integrated systems to work.

For this reason, the authors set out to examine what soft skills are needed to operate the SAP S/4HANA system. The authors' research on SAP S/4HANA users was designed to show whether soft skills are necessary in addition to hard skills for working in complex integrated systems. The researchers conducted the study at Hungary's largest university of economics, where students learn how to use SAP S/4HANA as part of their practical courses. The authors stated in their research objectives that their aim was to examine which soft skills students possess that are necessary for successful system operation, whether users differ in these skills in terms of certain aspects, and what user activities the examined skills affect and how. The authors conducted the investigations using questionnaire research and used single and multiple variable analysis to evaluate the results. The results confirmed that soft skills must be taken into account for the proper and successful operation of SAP S/4HANA.

Although soft skills are playing an increasingly important role in today's world of work, this area has not yet been thoroughly investigated. Studies have tended to focus on hard skills rather than soft skills, particularly in IT fields.

However, soft skills are more difficult to develop. The study also points out that context- and performance-related soft skills are particularly important in the context of the issue under investigation. As these skills take a long time to develop, it is essential that compulsory school education also focuses on strengthening them, which is why the study can be useful not only for employers but also for educational institutions.

The structure of this paper is as follows. Section 2 reviews the relevant literature. Section 3 analyses the methodology that has been used to conduct empirical research on the soft skills required to use SAP S/4HANA. Section 4 presents the results of the conducted research. Section 5 provides the discussions. Section 6 gives the conclusions that were taken after the research.

2. LITERATURE REVIEW

According to the Cambridge Dictionary (n.d.), a skill is "the ability to do an activity or job well, especially because you have practised it".

According to Merriam-Webster Dictionary (n.d.), the word dates back to the 13th century and is derived from the Middle English word skill, meaning distinction, knowledge.

In the 1950s, the US military started to look at skills in relation to behaviour. The psychologist Paul G. Whitmore (as cited in Baker, 2024) defined hard and soft skills at the time as hard skills being all the technical skills that are specifically needed for warfare, while soft skills are all other important skills that are needed to do the job but are independent of machines.

The concept and study of soft skills emerged in the 1980s in labour market and educational research (Stasz et al., 1990; Swiderski, 1987; Priest, 1987), among others, and from the 1990s onwards, the concept was used more widely, and studies on the subject were produced (Donovan, n.d.).

There is no organisation today that is not aware of the skills, does not know the difference between hard and soft skills, and does not identify the skills it needs when looking for employees.

Rainsbury et al. (2002) explain hard skills as follows. Hard skills are related to the technical elements required to perform certain tasks on the job and are associated with the consideration of acquired knowledge.

In contrast, Matturro et al. (2019) argue that soft skills can be defined as a combination of skills and attitudes that enable individuals to do their jobs better. Soft skills are complementary to technical skills.

However, defining and testing soft skills is not so easy. One explanation for this, according to Cinque (2016), is that soft skills have different names in different countries. He points out that European Union (EU) countries have different approaches to soft skills and different methods for teaching and assessing soft skills. This explains why there are different ways of naming soft skills and different definitions (Galster et al., 2022).

For example, soft skills as nothing more than the competencies people have between themselves (Cimatti, 2016).

Donovan (n.d.) describes these skills as being broadly applicable, non-industry specific, and enabling individuals to work together in organisations.

Martins et al. (2020) include emotional intelligence, communication, and creativity among soft skills.

However, Abdullah-Al-Mamun (2012) also finds that soft skills play an important role in workplace success. In his view, individuals who have the right soft skills can work well with others and set an example for other colleagues.

Brungardt (2011) notes that today's successful workers have more autonomy; therefore, they can make more decisions and communicate effectively with others in the organisation. For this reason, Brungardt (2011) considers the following four soft skills to be very important for an employee to have: teamwork, problem-solving, decision-making, and communication.

Leaders must have a particularly strong soft skill set. Kenton (2025) writes that many people think leaders cannot be successful if they do not have the right soft skills. Abrahams and Groysberg (2021), in their article, also discuss that the ability/skill to listen is very important for managers, because those who do not listen to their subordinates and employees are much more likely to lose their employees. Moreover, it is often the good and productive employees who leave. The question arises as to which soft skills are really the most important.

Robles (2012) identifies the following 10 skills for business leaders: integrity, communication, courtesy, responsibility, social skills, positive attitude, professionalism, flexibility, teamwork, and work ethic.

Seetha (2014), based on a Malaysian study, identifies six critical soft skills, which were communication, positive attitude, interpersonal skills, teamwork, analytical and problem-solving, and leadership.

There are a couple of different ways of grouping soft skills. One was defined by European Skills, Competences, Qualifications and Occupations (ESCO, n.d.), having six major groups for soft skills (called transversal skills by ESCO). This study uses Skillmatch structure and grouping (Juhász et al., 2022).

The findings confirm that this important issue is already present in engineering jobs. According to ten Caten et al. (2019), soft skills will become more important than technical skills for current and future engineers. In their study, ten Caten et al. (2019) found that engineering graduates are highly technically skilled but generally lack interpersonal competencies and entrepreneurial attitudes. A solution to address this gap could be for professors to encourage creativity and innovation-oriented thinking in their students at the university. Research by de Campos et al. (2020) shows that the most important soft skills for engineers are in six main groups: problem solving, communication, teamwork, ethical approach, emotional intelligence, and creative thinking. These are made up of different soft skills, but they cover well the competencies that an engineer should have. Stevens and Norman's (2016) study in New Zealand analysed the skills of university graduates. It shows that basic technical knowledge (hard skill) is enough, and that soft skills are much more needed because, many argue, they cannot be taught in the workplace.

In 2022, a New Zealand survey of IT job advertisements in the software industry was published. One of the key findings was that only 18% of the advertisements did not include soft skills (Galster et al., 2022), meaning that companies are increasingly looking for candidates to have soft skills as well as hard skills.

Lyu and Liu (2021) conduct research in the US energy sector job advertisement, finding that there is an increase in soft skills.

Borges and de Souza (2024) conduct a study resulting in the identification of 33 soft skills for software engineering. They find that communication, teamwork, organization, leadership, and learning are the top 5 soft skills. This research showed some similarity to the one conducted on the project manager's soft skill sets, stating that communication, leadership, interpersonal, teamwork, and emotional intelligence are needed (Kearney et al., 2024). University students were also approached about soft skill requirements for their future (Laurisz et al., 2024).

Although you do not necessarily need an engineering degree to work in SAP S/4HANA systems, it is essential that users have basic IT skills. Relatively few studies have addressed the relationship between enterprise resource planning (ERP)/ SAP S/4HANA and soft skills. Boyle and Strong (2006) conduct a survey of ERP users to find out what hard and soft skills graduate students need in the ERP world. The results showed that less technical than other knowledge and skills are needed. Boyle and Strong's (2006) analysis confirms that, in addition to ERP technical knowledge, these students also need a range of skills such as interpersonal skills, the ability to work in a team, leadership, and collaboration.

This study fills a gap in the literature by examining the soft skills required to operate the highly developed SAP S/4HANA systems. The authors were unable to find any studies on a similar topic and, therefore, aim to fill this gap. Although the studies mentioned above touch on the field of IT, they do not deal with the operation of SAP S/4HANA, which is why the authors' study fills a gap.

The aim of the research is precisely to examine as many soft skills as possible related to the operation of this system to obtain the most accurate picture of the soft skills required to use the system.

The authors of the study use the EU classification of soft skills (Juhász et al., 2022) in their research. This is a comprehensive soft skills system that includes 36 skills and attempts to cover them all. By examining these soft skills, the authors analyse the soft skills required for successful work with SAP S/4HANA in a quantitative questionnaire survey.

3. RESEARCH METHODOLOGY

The research was carried out in 2023–2024 at the Faculty of Foreign Trade of Budapest Business University, where nearly 5,000 students are currently studying. Students in the international management course study SAP S/4HANA as part of a compulsory course, including the material management and sales and distribution modules in weekly practical classes. The university has deliberately undertaken to teach a software that is currently used by 280 million users and developed in around 100 locations around the world (https://www.sap.com/). Learning this software will enable students to find a job more easily in the Hungarian or international labour market after graduation.

During the two hours per week, they simulate various company logistics processes in the system, create documents, check reports, and study the integration between the modules. The aim of

the course is that by the end of the semester, students should be able to perform basic operations of material management and sales and distribution processes independently and work as a user in the system in a company. Based on the feedback that students give after the course, many of them will use the system in their employment, either as users or as junior consultants in the labour market. The course is very popular because students know that they would find it very difficult to acquire this knowledge on their own, especially if they could not access the system and learn ERP skills at university.

The researchers carried out the research in two semesters. Every six months, nearly 120 students have the opportunity to take the course. In the last class, students were given the opportunity to voluntarily fill in a questionnaire accessible online, in which the researchers asked them about the skills needed to operate ERP systems, why ERP systems are important in the labour market, and what activities students could perform with this knowledge. Thus, in both modules, students had to be able to prepare basic master data, generate orders and shipments, create customer invoices, and, if necessary, post supplier invoices.

The research was conducted in a direct quantitative manner because the researchers wanted to explore the correlations. When analysing the correlations, the authors were directly interested in how soft skills influence the activities performed in SAP.

It would be worthwhile to supplement the research with qualitative structured interviews in the future, in which students could be asked about their expectations regarding the operation of the system and emotional factors.

Completion of the questionnaire was voluntary and anonymous, so the researchers took into account the university's general data protection regulation (GDPR), i.e., respondents could not be identified on the basis of their answers.

The response rate was close to 90%, which also showed that the students were willing to talk about this knowledge; 215 students participated in the research over the course of a year.

The questionnaire was designed by the researchers themselves. The questions asked were divided into three broad categories. The first group of questions dealt with the characteristics of the sample: gender, age, and any work experience of the respondents. The second group of questions dealt with the characteristics of the soft and hard skills of the respondents and the skills required to operate the system. The third set of questions examined the importance of learning the ERP system.

The 16-question questionnaire consisted of closed questions constructed from categorical and metric variables. The metrics were five-point Likert scales, with one representing not at all typical and five representing completely typical. Table 1 summarizes the structure of the questionnaire.

Table 1. Structure of the questionnaire

Specific characteristics of respondents	*Skills needed for ERP to work*	*The importance and applicability of ERP knowledge in the labour market*
Gender of respondents. Age of respondents. Respondents' work experience. Knowledge of the SAP S/4HANA module before university education. The SAP S/4HANA module was used before university education.	Strength of the learner's soft skills. Strength of the learner's hard skills. Which soft and hard skills are needed to make the system work?	Why is it important to know your corporate governance system? How well can you use the skills you have acquired in the labour market? How much can you charge for this knowledge?

Source: Authors' elaboration.

Before the questionnaire was posted on the Internet, the researchers carried out a test to check if all the questions were clear to the students. Five students filled in the questionnaire, and none of them had any problems with the clarity of the questions, so the questionnaire was sent out unchanged.

In addition, the questionnaire, having included the researchers' own questions, asked ten more students to answer the questions after the research and then compared the results with a large sample. The analyses showed similar results for the respondents, so the researchers found that the questions covered the content they wanted to ask about.

Responses were evaluated using a variety of methods, including frequency, analysis of means and variances, independent samples t-test, and structural equation modeling (SEM) model. SEM was used by the authors to examine and test causal relationships between variables. SEM is suitable for analyzing relationships between multiple variables. The SEM model consists of a measurement model

and a structural model. The measurement model allows for the analysis of the relationship between latent variables and indicators, while the structural model allows for the analysis of the relationships between latent variables. The independent latent variable is the explanatory variable, while the dependent variable is the explained variable.

In the study and the current analysis, the authors focused on answering the following questions:

RQ1: According to the respondents, what are the necessary soft skills for a user to work successfully in SAP S/4HANA?

RQ2: Are there differences in the assessment of soft skills based on gender, work experience and whether someone has used SAP S/4HANA as a user?

RQ3: What is the impact of soft skills on someone's ability to successfully perform activities in SAP S/4HANA?

The authors were able to place the research questions in the following target structure, as shown in Figure 1.

Figure 1. The research objective structure
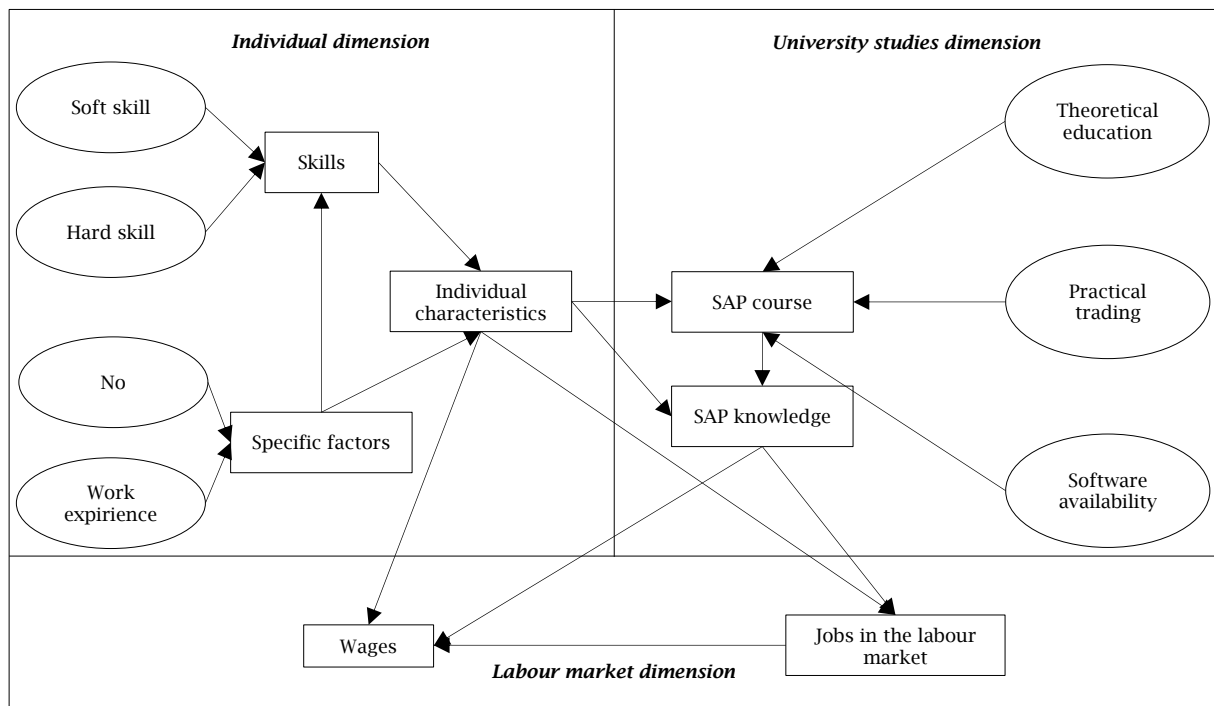
Source: Authors' elaboration.

In the research, the authors examined the research questions in three dimensions: in relation to the individual, university studies, and the labour market. The figure clearly shows that for individual characteristics, the analysis focused on how gender, labour market experience, and skills influenced students' knowledge and their performance in the course.

On the one hand, the course provided the students with access to the system provided by the university during the lessons, and on the other hand, the students not only acquired practical knowledge of the system, but also theoretical (mainly logistics, finance, foreign trade) knowledge. The success of the course could be measured mainly by whether the students could find jobs after graduation, where SAP S/4HANA knowledge is a prerequisite or an advantage.

This knowledge is currently very valuable in the Hungarian labour market, and the depth of knowledge and the characteristics of the individual can be used to negotiate very high wages from employers. The expected salary level was also the subject of the research. The present study does not focus on the hard skills of students; the central analytical issue will be soft skills.

This paper presents the research findings along the lines of an analysis of the validity of the following hypotheses.

H1: The students in the study believe that they have the right level of soft skills to perform user-level tasks in SAP S/4HANA systems.

H2: Respondents in this study will differ in terms of the soft skills needed to be successful according to gender, work experience, and whether someone has worked with SAP S/4HANA before.

H3: According to the respondents, soft skills have an impact on the ability to successfully perform tasks in SAP S/4HANA.

The sample specification is presented in Table 2.

Table 2. Specification of the sample

Featured on	*N*	*%*
No	Male: 89 Female: 126	Male: 41.4 Female: 58.6
Did you have any work experience?	No: 21 Worked half a year or less: 31 Worked more than half a year but not more than one year: 44 Worked for more than a year: 119	No: 9.8 Worked half a year or less: 14.4 Worked more than half a year, but not more than one year: 20.5 Worked more than a year: 55.3
Did you know any of the SAP S/4HANA modules before your university education?	No: 163 Yes: 52	No: 75.8 Yes: 24.2
Did you use any of the SAP S/4HANA modules before your university education?	No: 166 Yes: 49	No: 77.2 Yes: 22.8

Source: Authors' elaboration.

The data in Table 2 shows that more than 40% of women participated in the study than men. One of ten of the students had never worked. About three times more students were not familiar with SAP S/4HANA or used it before the course. This is certainly an important message for the course instructors, as they are able to provide the majority of students with knowledge that is definitely new and up to date. The cross-tabulation studies confirmed that 9% of women had never worked, while

the figure for men was almost similar, at 9.8%; 21.3% of men knew SAP S/4HANA, and the same proportion had used it. For women, the figure was 26.2%, in terms of knowledge, while 23.8% had some practical experience of the system.

4. RESULTS

In the research, the authors basically used the EU's classification and definitions of soft skills (Juhász et al., 2022). This means that for each soft skill, the researchers explained to the respondents in one sentence what the skill meant. That is, for each skill, a one-sentence definition was included in the questionnaire to avoid having problems of interpretation for respondents or misunderstandings of the skills.

Respondents were asked to rate each skill on a five-point Likert scale. A one indicated not at all typical, and a five indicated completely typical.

The researchers first wanted to find out how learners rate the strength of their own soft skills and what they think a particular soft skill is needed to work successfully in an integrated system.

In Table 3, the authors present the mean and standard deviation of the respective scores for both questions.

Table 3. Student soft skills and the soft skills required for successful system implementation

Skills	*N*	*How strong do you feel in the following soft skills?*		*What soft skills do you need to be able to work in SAP S/4HANA as a user?*	
		M	*SD*	*M*	*SD*
Coaching	215	3.61	1.007	3.67	1.081
Networking	215	3.49	0.885	3.67	1.131
Ethical behaviour	215	4.44	0.733	3.84	1.099
Negotiation skills	215	4.06	0.849	3.54	1.097
Leadership	215	3.69	0.976	3.56	1.138
Motivating others	215	3.85	0.891	3.44	1.178
Communication	215	3.90	0.889	3.94	1.010
Respecting diversity	215	3.99	0.927	3.31	1.188
Ability to work in a team	215	4.16	0.868	3.93	0.935
Accountability	215	4.34	0.774	4.53	0.722
Patience	215	3.72	1.031	4.43	0.769
Self-regulation	215	3.94	0.818	4.13	0.979
Entrepreneurship	215	3.66	0.918	3.36	1.179
Goal orientation	215	4.21	0.780	4.14	0.937
Motivation	215	4.07	0.851	3.98	1.000
Self-management	215	4.03	0.82	4.18	0.902
Flexibility	215	4.03	0.834	4.13	0.846
Taking the initiative	215	3.53	0.936	3.58	1.042
Stay tuned	215	3.99	0.902	4.35	0.851
Customer focus	215	3.80	0.833	3.87	0.998
Diligence	215	4.16	0.799	4.39	0.753
Respect for privacy	215	4.21	0.83	3.66	1.165
Personal development	215	4.06	0.795	4.06	0.921
Positive attitude	215	4.07	0.803	3.94	0.958
Reliability	215	4.34	0.763	4.40	0.853
Efficiency	215	4.18	0.74	4.50	0.703
Respect for the environment	215	4.00	0.883	3.29	1.168
Adaptability	215	4.04	0.814	3.99	0.983
Conflict resolution	215	3.88	0.867	3.65	1.121
Creativity	215	3.74	0.984	3.54	1.126
Organisational skills	215	3.84	0.979	3.67	1.127
Decision making	215	3.60	0.951	4.00	0.955
Quality management capability	215	3.65	0.867	3.95	0.953
Strategic thinking	215	3.71	0.826	4.17	0.937
Problem solving	215	4.01	0.800	4.43	0.763
Critical thinking	215	4.04	0.799	4.28	0.857

Note: M is mean, SD is standard deviation.
Source: Authors' elaboration.

Table 4 shows the two questions students had to answer. That is, they first had to assess their own soft skills. All the students who filled in the questionnaire were second- or third-year students, so they already had professional and practical courses at university that could have helped them to develop some soft skills beforehand. These included negotiation skills, communication, management practices, problem-solving, entrepreneurship, and networking.

Students felt strongest in the following five soft skills. These were ethical behaviour (M = 4.44, SD = 0.733), trustworthiness (M = 4.34, SD = 0.763), accountability (M = 4.34, SD = 0.774), respect for privacy (M = 4.21, SD = 0.830) and goal orientation (M = 4.21, SD = 0.740). They felt the least strong in networking (M = 3.49, SD = 0.885), initiative (M = 3.53, SD = 0.936), decision making (M = 3.60,

SD = 0.951), coaching (M = 3.61, SD = 1.007) and quality management (M = 3.65, SD = 0.867). It is interesting to note that the development of less strong skills has already appeared in the context of university subjects, and yet students do not feel that they are sufficiently strong in those skills. The strongest skills are less specifically related to business activities and are strongly present in all areas of life in situations where they may be needed, so it is not by chance that they are perceived as the strongest skills. For all the strong skills, respondents had similar views, as evidenced by the low values of the variances.

The second question, the results of which are shown in the table, asked which soft skills respondents think are necessary to successfully perform a task in SAP S/4HANA ERP. Here, the top five skills were accountability (M = 4.53, SD = 0.722),

efficiency (M = 4.50, SD = 0.703), problem solving (M = 4.43, SD = 0.703), patience (M = 4.43, SD = 0.769), and reliability (M = 4.40, SD = 0.853). The least important soft skills mentioned in response to this question were respect for the environment (M = 3.29, SD = 1.168), respect for diversity (M = 3.30, SD = 1.188), entrepreneurship (M = 3.36, SD = 1.179), motivating others (M = 3.44, SD = 1.178) and negotiation skills (M = 3.54, SD = 1.097). Among the last five least important skills, the authors were surprised to see that students mentioned entrepreneurship. One of the great advantages of integrated systems is that they allow a company to coordinate its operations very nicely in one system, even if they are complex. So, if an organisation has a strong entrepreneurial spirit and wants to find a system to support it that is IT-friendly, integrated systems are the perfect choice, whether the business is small or large,

complex or less complicated. This is why the authors felt it was surprising that the students did not feel that this soft skill is definitely beneficial and can be important for laying the foundations for a proactive, innovative systems approach.

The other surprising result, which can be read from the table, is that the strongest soft skills are not included, none of them, among the most important soft skills. However, the data shows that for accountability (M = 4.34, SD = 0.744), efficiency (M = 4.18, SD = 0.740), problem solving (M = 4.01, SD = 0.800), patience (M = 3.72 SD = 1.031), and reliability (M = 4.34, SD = 0.763), all important soft skills except patience are rated by students as good on average. However, they still need to improve their patience, although in this case, the standard deviation is very high, which means that there is no unanimity among students in this respect.

Table 4. Independent samples t-test results (p = 0.05)

Skills	No			Work experience			SAP use		
	t	**p**	**M**	**t**	**p**	**M**	**t**	**p**	**M**
Coaching	3.642	0.000	Male: 3.9 Female: 3.4						
Ethical behaviour				-2.273	0.012	Y: 4.47 N: 4.10			
Leadership	1.902	0.029	Men 3.84 Women: 3.59	-1.787	0.038	Y: 3.73 N: 3.33			
Respecting diversity	-1.675	0.048	Men 3.87 Women: 4.08						
Ability to work in a team	-2.335	0.010	Male: 4.0 Female: 4.28						
Accountability				-2.134	0.017	Y: 4.38 N: 4.00			
Self-regulation				-1.978	0.029	Y: 3.97 N: 3.67			
Goal orientation				-2.533	0.006	Y: 4.26 N: 3.81			
Motivation				-2.618	0.005	Y: 4.12 N: 3.62			
Taking the initiative	3.141	0.001	Male: 3.76 Female: 3.37						
Stay tuned				-2.265	0.012	Y: 4.04 N: 3.57			
Diligence	-1.931	0.027	Men 4.03 Women: 4.25	-2.419	0.008	Y: 4.20 N: 3.76			
Respect for privacy	-2.295	0.011	Man: 4.06 Woman: 4.32						
Reliability				-2.508	0.006	Y: 4.39 N: 3.95			
Efficiency				-2.42	0.008	Y: 4.22 N: 3.81			
Respect for the environment	-2.120	0.018	Men 3.85 Women: 4.11						
The conflict solution	1.727	0.043	Men 4.00 Women: 3.79						
Decision making	3.526	0.000	Men 3.87 Women: 3.41						
Quality management capability	3.619	0.000	Male: 3.9 Female: 3.48	-2.049	0.021	Y: 3.69 N: 3.29			
Strategic thinking	3.556	0.000	Men 3.94 Women: 3.55						
Problem solving				-2.408	0.008	Y: 4.06 N: 3.62			
Critical thinking	2.324	0.011	Men 4.19 Female: 3.94				-2.211	0.03	Y: 4.27 N: 3.98

Note: Y: have experience or have worked with SAP S/4HANA, N: have no experience or have not worked with SAP S/4HANA.
Source: Authors' elaboration.

In light of the above results, it can be said that the students' soft skills are suitable for them to work successfully in an SAP S/4HANA system, i.e., the authors accept *H1*.

H2 examines whether there is a difference in soft skills between gender, work experience, and whether or not someone has worked with SAP S/4HANA. For this analysis, the researchers used an independent sample t-test. The authors have marked the results where significant differences

could be identified in Table 4. In these cases, the researchers also provided the results of the tests and means.

By gender, the table clearly shows that for many soft skills, there was evidence of a difference. When looking at skills with significant differences, women were stronger than men in the following: respect for the environment, respect for privacy, diligence, willingness to work in a team, and respect for diversity.

Differences could also be demonstrated by work experience for several soft skills. Here, for all significant differences, those with work experience showed stronger skills. To sum it up, whether or not one works typically has an impact on the soft skills of individuals.

SAP S/4HANA use showed a significant effect for only one skill: critical thinking. *H2* can be partially accepted by the authors in view of the above results. Table 4 shows that differences could be detected by gender and work experience, but not by SAP S/4HANA practice.

The research also focused on the activities that students were able to perform after completing the course. For each activity, they had to decide how well they could perform the task in the system. One meant no at all, while five meant complete agreement. Table 5 presents the results (mean, standard deviation) for the given operations.

The average results showed that all the activities listed could be roughly completed by the students. They can mostly create master data, but they are also familiar with the most important logistical operations in the system. The course material is structured in such a way that they can create, modify, and view the most basic processes on both the material management and sales and distribution side: order, delivery, invoice, and master data in the system. As the results show, the course

has achieved its objective because these activities are known and used at a skill level by the learners. Even the standard deviation values, except for listing and calculating, show that the respondents had similar opinions about each activity.

Table 5. Activities performed in SAP S/4HANA

Activity	M	SD
I can log in to the system.	4.76	0.559
I can create material in the system.	4.65	0.637
I can set up suppliers.	4.44	0.856
I can create customers.	4.34	0.882
I can create an order in the system.	4.20	0.928
I can make deliveries in the system.	4.03	1.018
I can create invoices in the system.	3.93	1.065
I can retrieve lists from the system.	3.97	1.023

Source: Authors' elaboration.

In addition, the researchers analysed how the students' soft skills explain their ability to perform certain operations in the system. To this end, the authors grouped the 36 soft skills examined in Table 3 into four clusters based on the EU Skillmatch project, which were: self-image and worldview, context and performance, social interaction, and methodological, intuitive, and lateral thinking (Juhász et al., 2022). Where each of the skills belongs is shown in Figure 2, produced by the authors.

Figure 2. 36 soft skill groupings based on the EU Skillmatch project
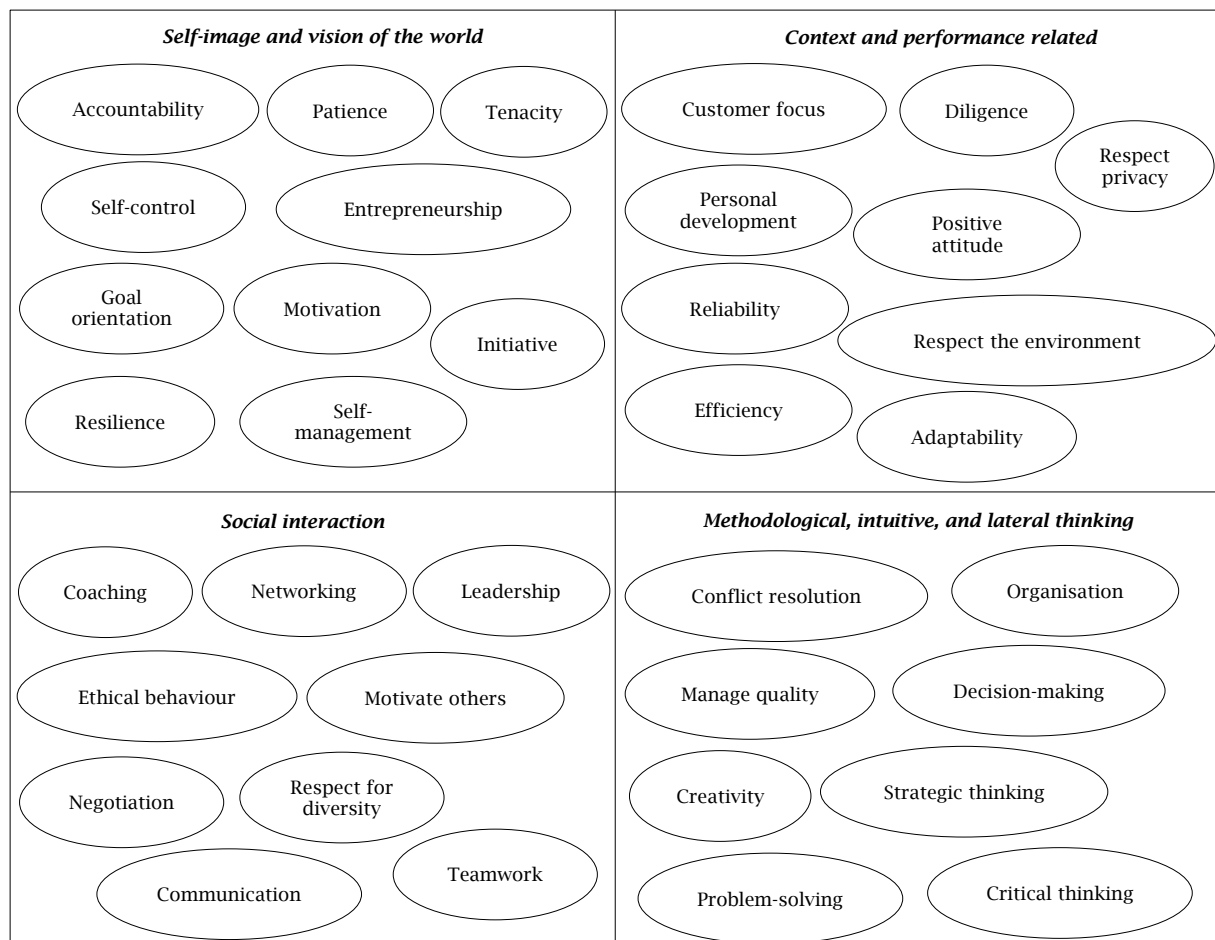
Source: Authors' elaboration.

Table 6. Constructs and items

Constructs	Code	Item	Factor weight	Cronbach alpha	CR	AVE	VIF
Social interaction	S1	Coaching	0.785	0.774	0.841	0.515	1.338
	S2	Negotiation skills	0.713				1.448
	S3	Leadership	0.718				1.539
	S4	Motivating others	0.650				1.450
	S5	Communication	0.715				1.515
Context and performance related	C1	Diligence	0.701	0.813	0.863	0.514	1.540
	C2	Respect for privacy	0.672				1.551
	C3	Personal development	0.711				1.510
	C4	Positive attitude	0.748				1.503
	C5	Reliability	0.763				1.627
	C6	Adaptability	0.700				1.455
Methodological, intuitive, lateral thinking	M1	Conflict resolution	0.692	0.849	0.884	0.523	1.481
	M2	Creativity	0.627				1.403
	M3	Decision making	0.730				1.565
	M4	Quality management capability	0.798				2.094
	M5	Strategic thinking	0.769				2.071
	M6	Problem solving	0.742				1.880
	M7	Critical thinking	0.691				1.760
Self-image and vision of the world	SE1	Entrepreneurship	0.703	0.711	0.821	0.535	1.371
	SE2	Goal orientation	0.727				1.357
	SE3	Motivation	0.779				1.451
	SE4	Taking the initiative	0.714				1.286
SAP S/4HANA activity	E1	I can log in to the system.	0.559	0.890	0.913	0.573	1.822
	E2	I can create material in the system	0.740				2.556
	E3	I can set up suppliers	0.858				4.228
	E4	I can create customers	0.811				3.324
	E5	I can create an order in the system	0.859				3.626
	E6	I can make deliveries in the system	0.806				3.777
	E7	I can create invoices in the system	0.746				3.472
	E8	I can retrieve lists from the system	0.616				1.994

Note: CR: Composite reliability; AVE: Average variance extracted; VIF: Variance inflation factor.
Source: Authors' elaboration.

Table 6 presents the items and latent variables. Standardized factor weights are appropriate if the value for an item is above 0.5 (Hair et al., 2024). Therefore, only variables with factor weights higher than this were included in Table 3. The adequacy of the VIF value for multicollinearity of indicators should be below the value of 5. The reliability of latent variables was checked by the authors using Cronbach's alpha (adequate if higher than 0.7) with CR (adequate if higher than 0.7) (ResearchWithFawad, n.d.). For convergence validity, the authors used AVE (appropriate if higher than 0.5) (ResearchWithFawad, n.d.).

Table 7. Heterotrait-monotrait (HTMT) rate

	SAP S/4HANA activities	Context and performance-related	Methodological, intuitive, lateral thinking	Self-image and vision of the world	Social interaction
SAP S/4HANA activities					
Context and performance-related	0.387				
Methodological, intuitive, lateral thinking	0.282	0.677			
Self-image and vision of the world	0.332	0.529	0.444		
Social interaction	0.270	0.575	0.755	0.406	

Source: Authors' elaboration.

As can be seen from Table 7, the multicollinearity of the indicators was good, with all VIF values below the limit value of 5. The Cronbach's alpha values were between 0.711 and 0.890. All CR values were above 0.8. The lowest AVE value was 0.513, which was still above the limit.

The validity of discriminant validity in measurement models must also be analysed, which is done by looking at how different concepts are measured differently. This was analysed by the authors using the HTMT ratio, which should be below 0.850 (ResearchWithFawad, n.d.), and was valid in all cases in the model.

Following the measurement model, the authors carry out a test of the structured model. Bootstrap sampling was used to test the significance of the path coefficients. The sub-sample size was 5.000 and the p-value was a significance level of 0.05. Among other things, the analysis was carried out to determine whether the independent variables have a significant effect on the dependent variables and the value of the beta coefficient, i.e., the influence of one variable on the other. The authors also analysed the magnitude of the R-squared in terms of how much of the change in the endogenous variable is explained by the exogenous variables. The authors' model is presented in Figure 3.

Figure 3. SAP S/4HANA activities in the light of soft skills
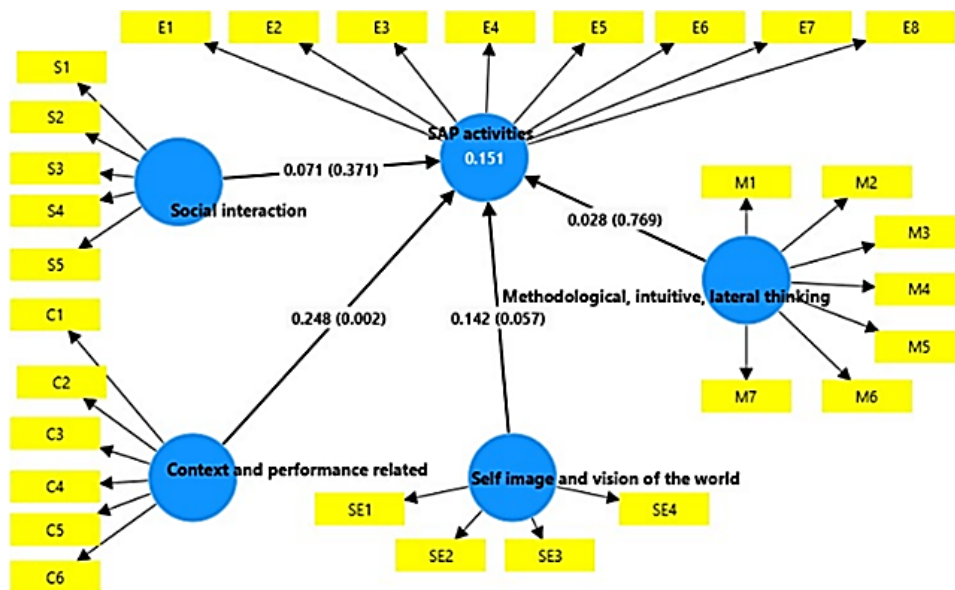
Source: Authors' elaboration.

The endogenous variable shows the R-squared. The arrows indicate the significance level of p-value and the value *β*. If the p-value does not exceed 0.05, the relationship is a significant relationship. The direct, full relationship between variables is summarized in Table 8, which shows the beta value, the t-statistic (acceptable if above the value of 0.1.96) (ResearchWithFawad, n.d.), and the significance level (if below 0.05, it confirms a significant relationship).

Table 8. Direct, full links

Relationship	*β-value*	*t statistics*	*p-value*
Context and performance-related → SAP activities	0.248	3.119	0.002
Methodological, intuitive, lateral thinking → SAP activities	0.028	0.293	0.769
Self-image and vision of the world → SAP S/4HANA activities	0.142	1.903	0.057
Social interaction → SAP S/4HANA activities	0.071	0.895	0.371

Source: Authors' elaboration.

The results demonstrated that only one skill set, "context and performance related", had a significant effect on the success rate of performing operations in the SAP S/4HANA system. In this latent variable, the reliability and positive attitude skills had very high factor weights. Finally, the figure also shows that soft skills, especially those related to context and performance, explained 15.1% (R-squared) of the variation in SAP S/4HANA activities.

On this basis, the authors can partially accept *H3*. In light of the results presented, the thesis-hypothesis table is drawn up in Table 9.

Table 9. Hypothesis-thesis table

Hypothesis	Decision	Thesis
H1	Adoption	The students in the research believe that they have the right level of soft skills to perform user-level tasks in SAP S/4HANA systems.
H2	Partial acceptance	In the research, respondents differ in terms of the soft skills needed to be successful according to gender, work experience.
H3	Partial acceptance	According to the respondents in the study, soft skills related to context and performance have an impact on one's ability to successfully perform tasks in SAP S/4HANA.

Source: Authors' elaboration.

5. DISCUSSION

Soft skills are now as important as hard skills in filling jobs. This is supported by research by Deng et al. (2015) among former students at the University of Southern California. Their goal was to assess what skills employers want to see in job seekers. The final result was that interpersonal skills are just as important as skills directly related to the job. This finding was also confirmed by Caeiro-Rodriguez et al.'s (2021) research, conducted in collaboration with several European universities. The students agreed that soft skills are very important, and some even argued that soft skills are even more important than hard skills.

Interestingly, the importance of soft skills in the IT field is also increasing and they are essential to work effectively (Verma & Bedi, 2008). Forman et al. (2023) found that both soft and hard skills are needed to be successful in the IT field. It is perhaps no coincidence that employers are now focusing not only on hard skills but also on soft skills for potential job seekers who are digitally literate. Galster et al. (2022) analysed IT job advertisements and found that only 18% of ads did not include a soft skill.

This study has shown that soft skills can have an impact on the ability to manage an ERP-integrated system. Systems that are definitely designed to help firms meet the challenges of a globalised world as easily as possible.

For ERP systems, there have been relatively few studies on skills.

The study by Mahdavian and Mostarjeran (2013) concluded that the most important soft skills for key users are people skills and conceptual skills. On the human side, they need to be able to reduce resistance and have leadership and managerial skills, as they are in charge of their own areas, as well as the ability to work in teams. Conceptual skills can be explained by the logic of the system, according to which one of the main objectives of implementing such systems is to create integration. The study showed that, unfortunately, key users do not have the skills that can lead to the failure of ERP implementation.

In the authors' study, students rated leadership skills as moderately important, openness to teamwork as important, while skills involving methodological, intuitive, and lateral thinking were not significantly associated with successful work in the system. Several reasons for the discrepancy in the results may be due to the fact that three-quarters of the respondents surveyed by the authors had not used SAP S/4HANA before the course, and, therefore, felt even less in the six months they spent learning the system in non-edge situations that these skills were really needed. Another reason for the difference may be that the Hungarian study did not focus on the implementation situation, but on the success of working with the system already implemented.

Finally, in relation to the latest trend of cloud ERP implementation, Mohasseb (2024) published one of the conclusions of which was that there is a positive correlation between teamwork and the success of cloud ERP implementation. The other finding supported that "workforce engagement" also has a positive impact on successful implementation in the Egyptian context. The current research has demonstrated that engagement can be based on persistence, which is very important for working in ERP systems, where successful performance can strengthen the employee's loyalty towards the system and organization.

6. CONCLUSION

This paper presents some results of a study carried out in 2023 and 2024. The initial objective of the study was to identify soft skills that can contribute to the successful work of users as users in SAP S/4HANA.

Even though the research was conducted with students who actually studied and worked with the logistics modules of such systems for at least half a year, the authors acknowledge the fact that the number of the received questionnaires was limited and the research itself was limited to one university's students.

The results indicate that, after assessing 36 soft skills, the students are strong, but not the strongest, in the soft skills that they believe are absolutely necessary to be able to perform well in this integrated system. However, they still need to develop their patience in particular, which is essential if they are not to give up when working in this system.

An important message of the research is that subjects aimed at developing soft skills should also be included in the curriculum. In the SAP S/4HANA training program, instructors sought to develop these skills in their students. Through situational exercises, students learned how to teach their future colleagues how to use a particular transaction when asked to do so by their employers. They also learned how to work in a team and how to communicate in the event of a system error. In addition, they learned how to adapt to the changes associated with the introduction of the SAP S/4HANA system in terms of workload, communication, and stress management.

Another important finding of the research was that soft skills related to context and performance had a demonstrable impact on learners' ability to perform basic user tasks in the system. A surprising finding for the authors was that there was no significant effect on performance for the methodological, intuitive, and lateral thinking skills taken together.

As a future continuation of the research, it would be worthwhile to investigate whether researchers can obtain similar results when working in the finance and controlling modules.

Furthermore, the authors intend to examine job advertisements related to SAP S/4HANA users to see how similar or different the expectations of employers and users are regarding the soft skills needed to be successful in their jobs.

Limitation derives from the fact that only selected number of students were studying SAP at the university.

The authors also recommend that the research should be performed on the web-based SAP S/4HANA, which provides a different user integration since the system is accessed via a website and tiles instead of a desktop application. The results then should be compared to see if there are different soft skills requirements if the SAP S/4HANA is used from a browser than from a desktop application.

The research, therefore, confirmed that even when operating such a large and complex system correctly, it is important not to forget that, in addition to hard skills, soft skills also play a very important role, and developing these skills is just as time-consuming and difficult a task as developing hard skills.

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