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The development of modern-day competences in education, in the context of an agile approach

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Our daily lives are undergoing a major transformation before our eyes. Digitalisation and digital content, social media platforms, the unlimited amount of information available on the internet, require a whole new set of people and knowledge. We need new competences to thrive that our parents and grandparents of the previous generation did not even know about. A different dimension of awareness has emerged, raising many questions from the digital, financial, consumer and sustainability perspectives. The messages and lessons from various studies and articles suggest that many individuals are not adequately prepared for these challenges, for a variety of reasons. Inherited patterns, lack of awareness-raising, some aspects of exclusion are all factors working against the process, which is also influenced by the openness, receptiveness and willingness of individuals to embrace new things. The emergence of awareness as a competence is clearly an expectation of the 21st century, without which we become very vulnerable in our challenging lives and our ability to succeed is therefore questionable. Agility as an individual competence is also a child of the 21st century. A few years ago, agility was understood more at an organisational level, but for an organisation to become agile, it needs to have agile people. Many education, training and training courses are trying to develop this approach, but the education system can also do a lot to achieve this. In this study, we analysed the generational characteristics of identification with the agile approach by processing 5,067 evaluable questionnaires in a quantitative primary research. The research found that Generation X identifies most with the agile approach. Generations Y and Z, although they have a positive view of agility, are willing and able to identify with it, but in their case there is still a strong lack of concrete knowledge and understanding. The aim of our study is to present the state of competences in modern times, including the different dimensions of awareness through the ability to be agile, in order to highlight the differences and identities in different generational, educational and other aspects, based on the results of a primary research conducted in Hungary. The literature used for this study will help to evaluate the research findings and to understand the relationship between education, agility and competences. They also help to understand why the study links these three areas, illustrate the cause and effect relationship, and in all cases studies are closely linked to the interpretation of these three areas and their impact on each other.

KEYWORDS

project orientation, agility, agile thinking, education, competences

Introduction

There is little need to prove or disprove that the world around us and our times are full of changes, both large and small. Adapting to change, adapting to it and staying relevant requires having certain qualities, skills, knowledge or some special (even distinctive) 'thing'. Education is an essential place for the development of competences. It also needs to adapt rapidly to changes in the

labour market and place a strong emphasis on the development of modern-day competences (Bouland-van Dam et al., 2022). The rise in the value of modern-day competences is also explained by our fast-paced, turbulent business environment. The faster our environment changes, the faster we need to respond to changing conditions. But only those with the ability to change quickly can do this. What is modern-day competence? Skills that have been made necessary by the trends and changes of the present age. We need only think, for example, of the rise of digitalisation, or the technological and innovation trends that have shaped our lives in recent years. These changes (trends) have given rise to new competences and necessitated new skills, and education clearly needs to adapt to this. It has to keep pace with technological, social and economic changes (Webb et al., 2021). And the accelerating world has made competences such as agile thinking even more important, as we can best adapt to change if we do so quickly, dynamically, with a planned approach and preferably with little resistance. Agility as a competence is a combination of several things. It is a combination of variability, flexibility, openness and agility, which means the ability to react and adapt dynamically to change. Agility can be an individual competence as well as an organisational one. Education must be prepared to train agile professionals who are able to meet the above (Milenković, 2022). Modern-day competences include skills, abilities and knowledge that enable workers to successfully navigate a complex, dynamic and digitalised world (Pulakos et al., 2019). These competences include digital literacy (Kim et al., 2018; Tzafilkou et al., 2022), creative thinking, critical thinking, appropriate problem-solving skills, teamwork, emotional intelligence, people-centredness, communication skills, acceptance and understanding of change, etc. As can be seen from the list (which is not exhaustive), education must be able to build not only professional (lexical) knowledge in individuals, but also develop certain competencies for successful change management and implementation (Kotter, 1996). Education needs to move away from lexical teaching to a more practical, problem-oriented direction (Mursalin et al., 2024), where learners and students can actually develop the basic competencies that will enable them to become more agile or champions of change themselves. They need to be able to work independently, to apply the knowledge they have acquired in practice (Fjeldheim et al., 2024) and to adapt to a rapidly changing environment. Education has a huge responsibility in this regard (Webb et al., 2021), because if we do not develop the competences in the present that will enable the next generations to successfully enter the world of work, we will leave them with a full individual competitiveness gap that will have an aggregate impact on overall economic performance. Today's world is characterised by trends such as artificial intelligence, globalisation, intercultural change, green transformation, automation and robotisation. These increasingly require skills and competences that go beyond traditional knowledge. Digital skills are no longer only important in the labour market (Patwardhan et al., 2023), as digitalisation is now present in some form in almost every aspect of our lives. And critical thinking, problem-solving skills or creativity would help learners not only to adapt to changing conditions but also to be able to generate and generate change themselves. Agility, competences and education are indeed closely linked. Education must develop competences (this is its fundamental mission), among which the ability to be agile can help to better meet the challenges of the modern age (Silalahi et al., 2020; Figure 1).

It is worthwhile and necessary to develop an agile approach, but it is no longer limited to work. We also benefit in our daily lives by adapting flexibly and quickly, by detecting changes and opportunities, and by seeking to take advantage of them ourselves (Wijayanti et al., 2021). Developing modern-day competences can also contribute to individual well-being and social inclusion. Not to mention that people with agile competences can also achieve better performance, and thus better pay, through their skills (Dai et al., 2013). Developing the ability to be agile can enhance and improve flexibility, faster execution, teamwork, continuous feedback and communication (Chonko and Jones, 2005). At the same time, education can best achieve high standards of training agile professionals if it itself becomes agile. This means that learners and students themselves become real participants in the learning process, project-based learning emerges (Setemen et al., 2023). It enables students to encounter and solve problems in the learning process, to work together in teams, while they can continuously monitor their own progress and track their own development. In addition, creativity, collective thinking and collaborative skills need to develop. If we think about it, these are golden competences for a future job or working in a project team, but we can say the same about implementing change projects and processes. The development of competencies and an agile approach should appear almost hand in hand in education (Vinesian et al., 2023). Developing the right competencies is the key to success, while agility provides the right framework and approach for the effective application of competencies. The present study seeks to confirm the significant role of education in enhancing competences and to demonstrate that agility is now an essential, one might say key competence (Ahmad et al., 2023). It draws the attention of educational stakeholders to the fact that the development of appropriate competences is a fundamental condition, or even a key to the competitiveness of a country or society, and that it is therefore necessary to review from time to time the competences that a nation wishes to develop in its society. The importance and necessity of agility has been amply demonstrated by the changes of recent years, and agility and an agile approach have their place among the basic (key) competences of the 21st century. Educational institutions have a responsibility to create an environment where learners can enter the world equipped with state-of-the-art competences and an agile mindset. This paper aims to demonstrate and strengthen the link between education, competences and an agile mindset, drawing not only on the literature but also on primary research. The latter also answers how the study addresses individual and organisational competences. The survey sought respondents' views on their perceptions of agile and what they perceived

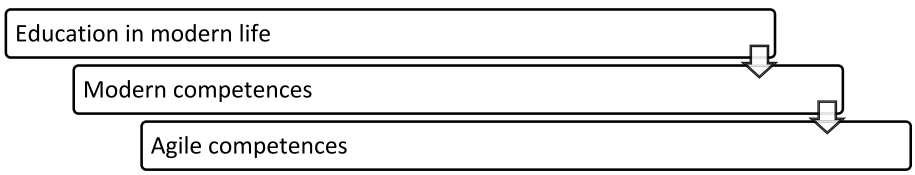

FIGURE 1
The responsibility of education in building modern-day competences. Source: own editing.

to be the most important competences required for an agile approach. We wanted to see what level of these competences they have and whether it is indeed necessary for education to develop competences that would enable individuals to become more agile in their daily lives. The primary research, which is closely linked to the literature, has been of considerable help in answering this question. A fundamental research question is the relationship between competences, agility and education and the closeness of this relationship. In addition to the research question, the hypotheses will be stated, which will be explained in the material and method section. In addition to the literature analysis and methodology, the own research results will be presented, and the paper will conclude with conclusions, recommendations and a short summary.

Literature background

In our fast-changing world, adaptation has become an essential condition for staying competitive. And to compete, factors such as innovation, research and development, education and training, quality, etc. are the best tools to mitigate the effects of the crisis (Girod et al., 2023). However, one must also understand that becoming innovative does not come out of nowhere, just as development does not come out of a vacuum. There are certain inputs that need to be created in individuals in order for them to become a breeding ground for innovation or development. The right competences and agility are increasingly important in organisations and should become increasingly important in education (Peng et al., 2022). In which areas should competences be developed? Examples include business intelligence applications, supply chains, agility, the development of which influences the extent to which an organisation develops rapid adaptability and flexibility in response to its changing environment (Wijayanti et al., 2021). The primary focus is on organisational agility, as it is clearly demonstrable to what extent a business organisation adapts to or tracks change. However, agility is not only a competence, but indeed an attitude, a way of thinking and behaving (de Carvalho, 2023). The latter can be characterised at the firm level, but also at the individual level (Lim et al., 2017). In general, an agile organisation ultimately requires a large number of agile individuals (employees) with the basic competences for agility. The latter have either been acquired and developed by individuals in the education system, or have been developed by the enterprise itself in its people. Either way, agile attitudes and competences can only be developed through conscious development in organisations and individuals (Santoso, 2021), which require targeted investment in human resources (Ferguson and Reio, 2010). However, being agile is rewarding and worthwhile (Buffone, 2021), so it is worthwhile to develop the competences that facilitate it in a meaningful way. Competency development has always proven to be a key factor in building the competitiveness of organisations (Weinert, 2001). Basically, we can distinguish between key and distinctive competencies, between which we can identify a significant difference. A key competence encompasses all the skills, attributes and aptitudes that are necessary for an organisation to carry out its core activities and meet customer needs (Prahalad and Hamel, 1990). However, a distinctive competence goes beyond this. It is what can differentiate competitors from each other that can result in the real differences between two competing economic agents. Those who can acquire or develop such competences more quickly than their competitors, and who can put them to good use, can expect to gain competitive advantages (Weinert, 2001). A competitive advantage is any capability or capacity to satisfy consumer needs at a higher level than before. These particular competences cannot be acquired or built up by everyone, and therefore not everyone performs or achieves the same results in competition (Deming, 2018). If a competence is missing, it must be created, built up or attracted. The education system can also help with this (Kaya, 2023). The emergence of agility in education does not only mean that students can learn about its meaning or content. That is where a successful education system would begin, one that would undertake to train and employ individuals with a more agile approach, fostering their active and autonomous problem solving, proactive thinking and positive receptiveness to change (Lombardo and Eichinger, 2001). They need to be able to change quickly and adapt to changing conditions (AlNuaimi et al., 2022). Educational institutions and actors need to provide an environment in which young people can learn how to become true team players, become resilient and become champions of change. Education can shape individuals' mindsets and agile attitudes from the primary level (Dai and De Meuse, 2021). Most importantly, curricula, courses and training themselves should aim to develop agile competences. The curriculum should also include: developing complex thinking, developing problem-solving skills (Kek and Huijser, 2017), developing teamwork, developing collaboration, developing communication, developing digital skills, green thinking, etc. A shift in the direction of not only acquiring lexical knowledge but also applying it in creative and innovative ways would be crucial. For this to happen, the educational system and processes themselves must be flexible, with space and time for creativity, brainstorming and teamwork. The experience gained here could be put to good use later on, for example in project implementation and management. A debate can arise when it comes to whether agility is now a core or a distinctive competence. The correct answer in this case is that it should be essential for everyone, but not everyone has yet managed to adopt an agile approach. While some actors are more receptive and open to the subject, others are less so, so agility will always be a distinctive competence. While some can become agile and adapt better, others cannot, so competitive advantages are not shared to the same extent (and profits even less). Agile education also provides insight into what the labour market needs, what competences future employers want to include (Tessarini and Saltorato, 2021). It also shows the trends that are strongly influencing the development of the global economy today. Digitalisation or the green transition can be seen here as a key trend. These already require competences that were less important 15–20 years ago. The world is therefore changing faster and with shorter cycle times, so agility has perhaps never been more important than it is today (Pangestu, 2024). It is not enough to know the essence of agility, you have to act like it, you have to become truly agile. What does it mean to have agility skills? They develop better adaptability, respond more effectively to challenges, increase their value in the labour market, understand the essence of change, learn new technology more easily (Lai et al., 2021), deal better with challenges and conflicts, and communicate better. Individuals with agile competencies are often more creative, innovative and also able to take a leadership role in managing change (they can be agents or champions of change), which can lead to sustainable success for the whole firm in the long term (Eghbal and Hoveida, 2021). Agility can provide deep roots for organisational innovation. Agility is a talent that can both create new things (Dalcher, 2021) and make you more reactive to change. It requires being extremely open-minded, not being averse to new things and being receptive to change. Where individuals have high levels of uncertainty, are afraid of new things or have difficulty accepting change, agile functioning is more difficult to develop. For this reason, one of the most important tasks of education is to teach individuals to be open, receptive and to recognise the opportunities for agility. The ability to be agile must therefore be developed in individuals first, and then

organisations can further invest in their people to create an even more agile business environment for themselves (Meyer et al., 2021). Business agility, according to this interpretation, goes beyond organisational analysis, it requires not only an analysis of organisational culture, but also the behaviour and attitudes of individuals (Muduli and Pandya, 2018). An organisation with an agile approach is created when it is made up of a large number of employees with an agile approach (Storme et al., 2020). Therefore, it is first and foremost the people as individuals that need to be addressed and developed in this direction. Primary research is trying to find answers to the extent to which these can be discovered at the level of individuals and different generations.

Materials and methods

In a primary research study, quantitative data collection was carried out using non-random sampling procedures and the arbitrary sampling technique. No filter condition was applied in the selection of subjects. The arbitrary sampling method is not a probability sampling method, nor did we aim to achieve a sample representative of any population. Our aim was to select the elements of the population that were considered typical, average and the most accessible. The reason for this was that there were no financial resources available to conduct the research, so this procedure was chosen in order to meet the research objectives. The stratified technique was used within the arbitrary sampling, where the stratifying criterion was generational affiliation. The aim of stratified random sampling was to successfully recruit from each generation in a simple and cost-effective manner. Nevertheless, the sampling technique does not represent any population. Given the limitations of the technique, the results obtained from the sample are not representative despite the large number of items. Thus, the findings and results presented in this study are valid for the sample. Among the survey methods, the online form was chosen, resulting in 5,067 evaluable questionnaires. The sample was 51% male and 49% female respondents. The age distribution of the sample was as follows: Baby Boomer generation: 5.2%; Generation X: 20.5%; Generation Y: 19.9%, Generation Z: 51.6%; Generation Alpha: 2.9%. 13.6% of the respondents live in the capital, 21.6% in a large rural city, 24.8% in a small town and 39.9% in a village. 7.5% of the sample have a primary education, 55.6% have a secondary education, 23.6% have a higher education (BSc) and 13.4% have an MSc. The research tool was a pre-tested standardised questionnaire, which covered the topics of knowledge and perception of agile approach, characteristics and utilisation of agile approach, perception of competences needed for agile approach. The questionnaire used closed questions in the form of nominal (single-choice, multiple-choice selective, ranking questions) and metric measurement levels (Likert and semantic differential scales). Scaling questions were based on a scale of 1 to 4. One reason for this is the individual scale preference of Hungarian respondents: due to the school grading system, our Hungarian respondents are most stable in interpreting a scale of up to five grades as opposed to scales of 1–7, 1–9, or 1–10. The even scale was chosen because the middle value (3) for the odd (1–5) scale is an escape route for respondents and the presence and possible overrepresentation of "indifferent" consumers choosing the middle value complicates the segmentation process from both a statistical and a professional point of view. Therefore, we opted for an even scale, which, by excluding the middle value, will lead the respondent to take a more rigorous stance, thus contributing more to the successful conduct of the segmentation. In addition to the conclusions drawn from the literature, the results of a qualitative study were used to develop the standardised questionnaire. This involved conducting individual interviews with the help of a semi-structured interview guide, with an arbitrary selection of 5–5 people from each generation. During the evaluation of the qualitative research results, the traditional content analysis methodology was applied, and the final structure and response alternatives of the standardised questionnaire were developed in the light of the qualitative results and feedback received. In the framework of the primary research described in this paper, our research objective was to analyse the generation-specific characteristics of identification with the agile approach using a quantitative research method. Based on the literature, we focus on the following hypotheses:

- Awareness of the agile approach differs across generations (H1)
- The perception of agile management philosophy is differentiated across generations (H2).
- The implications of the practical application of the agile approach are perceived differently across generations (H3).

Descriptive statistics, bivariate and multivariate analyses were used to process the quantitative results and test the hypotheses using SPSS 26.0 software. To examine the correlation of the results measured on the metric scale, the analysis of variance method was used, including the one-way ANOVA method for comparing multiple sample means. The mean of a metric dependent variable was compared between more than two groups. The post-hoc test was used to determine which pairs of groups were significantly different. In doing so, significance values were used to determine the existence of correlations (sig < = 0.05). Internal correlations were analysed along the comparison of group means using the F-statistic, i.e., the coefficient of variance of the means within samples. For the correlation tests described in this study, where the significance value according to the ANOVA table was below 0.05, a statistical relationship between the two variables was confirmed. The Pearson's Khi-square significance values were used for the correlation analysis at nominal measurement levels, and the absolute values of the Adjusted Residual (Adj.R) were used for the establishment and analysis of the internal correlations.

Results

For the first time, we analysed knowledge and awareness of the agile approach in relation to each generation (Table 1). The results of the correlation test proved that there is a correlation between knowledge of agile approach and generational affiliation (Perason's Khi-square = 0.000; H1 confirmed).

We then examined the degree of identification with the agile approach in the sample in a generation-specific way (Table 2). We were able to confirm a statistical correlation between the two variables (sig = 0.000; H2 confirmed) and internal analyses showed that members of Generation X and Y are the most likely to identify with this approach.

The consequences of the practical benefits and application of the agile approach were also perceived differently by each generation (Table 3). In this case, too, we were able to confirm that there is a correlation between generational affiliation and the perception of the practical benefits of the agile approach (sig < =0.05, H3 confirmed).

For the competencies, knowledge and attitudes required for an agile approach, we also found a correlation between the perceived importance of these competencies, knowledge and attitudes and generational affiliation (sig < =0.05; Table 4). In other words, the

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TABLE 1 Analysis of the correlation between generational affiliation and knowledge of agile approaches.

Knowledge of Agile approach/ belonging to a generation			Which generation are you in, based on your age?					Total
			Baby boomer	Generation X	Generation Y	Generation Z	Alpha generation	
How familiar are you with the agile approach	I've never heard of it, I do not know what it means	Count	77	181	159	782	52	1.251
		% within how familiar you are with the agile approach	6.2%	14.5%	12.7%	62.5%	4.2%	100.0%
		Adjusted Residual	1.8	−6.1	−7.3	8.9	3.0	
	I've heard this expression before, but I do not know what it means	Count	32	131	155	570	32	920
		% within how familiar you are with the agile approach	3.5%	14.2%	16.8%	62.0%	3.5%	100.0%
		Adjusted Residual	−2.6	−5.2	−2.5	7.0	1.1	
	I've heard of it, and I know roughly what it means	Count	54	281	242	606	24	1.207
		% within how familiar you are with the agile approach	4.5%	23.3%	20.0%	50.2%	2.0%	100.0%
		Adjusted Residual	−1.3	2.8	0.2	−1.1	−2.2	
	I know what it means in theory, but I have not used it in practice	Count	34	138	167	316	19	674
		% within how familiar you are with the agile approach	5.0%	20.5%	24.8%	46.9%	2.8%	100.0%
		Adjusted Residual	−0.2	0.0	3.4	−2.6	−0.2	
	I know what it means and I have used it in my work	Count	34	190	152	199	12	587
		% within how familiar you are with the agile approach	5.8%	32.4%	25.9%	33.9%	2.0%	100.0%
		Adjusted Residual	0.7	7.6	3.9	−9.1	−1,3	
	I currently work in a place where I am employed (almost) every day	Count	31	117	131	140	9	428
		% within how familiar you are with the agile approach	7.2%	27.3%	30.6%	32.7%	2.1%	100.0%
		Adjusted Residual	2.0	3.7	5.8	−8.2	−1.1	
Total		Count	262	1.038	1.006	2.613	148	5.067
		% within how familiar you are with the agile approach	5.2%	20.5%	19.9%	51.6%	2.9%	100.0%

Source: own editing based on independent research.

TABLE 2 Degree of identification with the agile approach in a cross-generational context.

How well can you identify with the agile approach? (where, 1 = not at all, 4 = fully)			
Generations	*N*	Mean	Std. deviation
Baby boomer	262	2.59	1.038
Generation X	1.038	2.93	0.917
Generation Y	1.006	2.87	0.910
Generation Z	2.613	2.71	0.907
Alpha generation	148	2.50	1.027
Total	5.067	2.77	0.927

Source: own editing based on independent research.

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TABLE 3 Perception of agility use and generational affiliation.

A practical view of the agile approach		*N*	Mean	Std. deviation	Sig
Helps reduce time to market	Baby boomer	262	2.32	1.437	0.000
	Generation X	1.038	2.69	1.232	
	Generation Y	1.006	2.46	1.283	
	Generation Z	2.613	2.47	1.195	
	Alpha generation	148	2.00	1.309	
	Total	5.067	2.49	1.243	
Helps strengthen its market role	Baby boomer	262	2.40	1.391	0.000
	Generation X	1.038	2.90	1.186	
	Generation Y	1.006	2.72	1.243	
	Generation Z	2.613	2.75	1.111	
	Alpha generation	148	2.06	1.361	
	Total	5.067	2.74	1.187	
Helps improve quality	Baby boomer	262	2.45	1.335	0.000
	Generation X	1.038	2.87	1.148	
	Generation Y	1.006	2.82	1.172	
	Generation Z	2.613	2.78	1.131	
	Alpha generation	148	2.29	1.268	
	Total	5.067	2.78	1.164	
Contribute to more successful projects	Baby boomer	262	2.48	1.347	0.000
	Generation X	1.038	2.99	1.171	
	Generation Y	1.006	2.90	1.170	
	Generation Z	2.613	2.92	1.141	
	Alpha generation	148	2.31	1.309	
	Total	5.067	2.89	1.178	
Helps increase competitiveness	Baby boomer	262	2.55	1.385	0.000
	Generation X	1.038	2.97	1.208	
	Generation Y	1.006	2.85	1.235	
	Generation Z	2.613	2.89	1.150	
	Alpha generation	148	2.09	1.225	
	Total	5.067	2.86	1.205	
Supports digitisation	Baby boomer	262	2.39	1.403	0.000
	Generation X	1.038	2.79	1.235	
	Generation Y	1.006	2.77	1.249	
	Generation Z	2.613	2.73	1.200	
	Alpha generation	148	2.24	1.269	
	Total	5.067	2.72	1.236	
Supports innovation	Baby boomer	262	2.53	1.397	0.000
	Generation X	1.038	2.98	1.213	
	Generation Y	1.006	2.89	1.239	
	Generation Z	2.613	2.88	1.175	
	Alpha generation	148	2.28	1.303	
	Total	5.067	2.87	1.219	
Helps you adapt to the changing market environment	Baby boomer	262	2.59	1.400	0.000
	Generation X	1.038	3.03	1.154	
	Generation Y	1.006	2.93	1.217	
	Generation Z	2.613	2.84	1.172	
	Alpha generation	148	2.34	1.286	
	Total	5.067	2.87	1.201	

(Continued)

TABLE 3 (Continued)

A practical view of the agile approach		*N*	Mean	Std. deviation	Sig
Generally helps to respond more quickly to change	Baby boomer	262	2.61	1.412	0.000
	Generation X	1.038	3.02	1.186	
	Generation Y	1.006	2.93	1.223	
	Generation Z	2.613	2.89	1.160	
	Alpha generation	148	2.28	1.329	
	Total	5.067	2.89	1.205	
Helps you better understand customer needs	Baby boomer	262	2.45	1.418	0.000
	Generation X	1.038	2.81	1.193	
	Generation Y	1.006	2.75	1.202	
	Generation Z	2.613	2.72	1.132	
	Alpha generation	148	2.17	1.296	
	Total	5.067	2.71	1.186	
Helps increase customer satisfaction	Baby boomer	262	2.51	1.361	0.000
	Generation X	1.038	2.85	1.207	
	Generation Y	1.006	2.77	1.219	
	Generation Z	2.613	2.79	1.139	
	Alpha generation	148	2.20	1.299	
	Total	5.067	2.77	1.192	
Helps create real value	Baby boomer	262	2.41	1.349	0.000
	Generation X	1.038	2.79	1.190	
	Generation Y	1.006	2.66	1.192	
	Generation Z	2.613	2.62	1.166	
	Alpha generation	148	2.09	1.367	
	Total	5.067	2.64	1.199	
Helps to make cooperation between partner areas more effective	Baby boomer	262	2.39	1.371	0.000
	Generation X	1.038	2.86	1.225	
	Generation Y	1.006	2.83	1.186	
	Generation Z	2.613	2.80	1.170	
	Alpha generation	148	1.98	1.358	
	Total	5.067	2.77	1.212	
Helps better planning	Baby boomer	262	2.41	1.333	0.000
	Generation X	1.038	2.80	1.206	
	Generation Y	1.006	2.76	1.195	
	Generation Z	2.613	2.74	1.143	
	Alpha generation	148	2.07	1.398	
	Total	5.067	2.72	1.193	
Increase predictability	Baby boomer	262	2.31	1.301	0.000
	Generation X	1.038	2.71	1.185	
	Generation Y	1.006	2.65	1.177	
	Generation Z	2.613	2.53	1.160	
	Alpha generation	148	1.95	1.269	
	Total	5.067	2.56	1.187	
Changes the general mindset of workers	Baby boomer	262	2.39	1.362	0.000
	Generation X	1.038	2.87	1.158	
	Generation Y	1.006	2.76	1.203	
	Generation Z	2.613	2.73	1.154	
	Alpha generation	148	2.25	1.428	
	Total	5.067	2.73	1.192	

(Continued)

TABLE 3 (Continued)

A practical view of the agile approach		*N*	Mean	Std. deviation	Sig
Increases employee engagement	Baby boomer	262	2.36	1.331	0.000
	Generation X	1.038	2.58	1.223	
	Generation Y	1.006	2.50	1.228	
	Generation Z	2.613	2.57	1.170	
	Alpha generation	148	2.04	1.329	
	Total	5.067	2.53	1.210	
Reduces the frequency of conflicts	Baby boomer	262	2.31	1.296	0.005
	Generation X	1.038	2.51	1.157	
	Generation Y	1.006	2.42	1.216	
	Generation Z	2.613	2.48	1.162	
	Alpha generation	148	2.20	1.364	
	Total	5.067	2.46	1.186	
Helps manage risks promptly and effectively	Baby boomer	262	2.50	1.333	0.000
	Generation X	1.038	2.81	1.180	
	Generation Y	1.006	2.76	1.191	
	Generation Z	2.613	2.75	1.172	
	Alpha generation	148	2.09	1.396	
	Total	5.067	2.73	1.200	
Increases the chances of project success	Baby boomer	262	2.48	1.380	0.000
	Generation X	1.038	2.91	1.227	
	Generation Y	1.006	2.83	1.169	
	Generation Z	2.613	2.81	1.150	
	Alpha generation	148	2.10	1.318	
	Total	5.067	2.80	1.197	
Reduces organisational and operational risks	Baby boomer	262	2.35	1.284	0.000
	Generation X	1.038	2.62	1.175	
	Generation Y	1.006	2.64	1.169	
	Generation Z	2.613	2.59	1.135	
	Alpha generation	148	2.16	1.371	
	Total	5.067	2.58	1.169	
Increases information security risks	Baby boomer	262	2.16	1.378	0.000
	Generation X	1.038	2.47	1.245	
	Generation Y	1.006	2.44	1.233	
	Generation Z	2.613	2.47	1.189	
	Alpha generation	148	2.06	1.346	
	Total	5.067	2.43	1.227	
Should be known to everyone	Baby boomer	262	2.38	1.392	0.000
	Generation X	1.038	2.83	1.239	
	Generation Y	1.006	2.74	1.256	
	Generation Z	2.613	2.68	1.226	
	Alpha generation	148	2.27	1.358	
	Total	5.067	2.69	1.253	

Source: own editing based on independent research.

TABLE 4 Perception of competences needed for an agile approach and intergenerational correlation.

Assessing the competences required for an agile approach		*N*	Mean	Std. deviation	Sig
Flexibility. adaptability	Baby boomer	262	2.77	1.382	0.000
	Generation X	1.038	3.17	1.197	
	Generation Y	1.006	3.10	1.197	
	Generation Z	2.613	3.04	1.188	
	Alpha generation	148	2.06	1.366	
	Total	5.067	3.04	1.222	
Team game	Baby boomer	262	2.67	1.328	0.000
	Generation X	1.038	3.09	1.169	
	Generation Y	1.006	3.08	1.110	
	Generation Z	2.613	3.00	1.084	
	Alpha generation	148	2.24	1.358	
	Total	5.067	2.99	1.140	
Working independently	Baby boomer	262	2.57	1.345	0.000
	Generation X	1.038	2.93	1.156	
	Generation Y	1.006	2.90	1.138	
	Generation Z	2.613	2.74	1.080	
	Alpha generation	148	2.12	1.324	
	Total	5.067	2.78	1.140	
Accuracy. precision	Baby boomer	262	2.63	1.369	0.000
	Generation X	1.038	3.03	1.155	
	Generation Y	1.006	2.99	1.151	
	Generation Z	2.613	2.95	1.097	
	Alpha generation	148	2.20	1.447	
	Total	5.067	2.94	1.156	
Liability	Baby boomer	262	2.60	1.385	0.000
	Generation X	1.038	3.08	1.180	
	Generation Y	1.006	3.01	1.182	
	Generation Z	2.613	2.97	1.144	
	Alpha generation	148	2.20	1.438	
	Total	5.067	2.96	1.193	
Trust	Baby boomer	262	2.77	1.284	0.000
	Generation X	1.038	3.02	1.210	
	Generation Y	1.006	3.01	1.180	
	Generation Z	2.613	2.99	1.169	
	Alpha generation	148	2.18	1.427	
	Total	5.067	2.96	1.203	
Proactivity	Baby boomer	262	2.53	1.363	0.000
	Generation X	1.038	2.93	1.275	
	Generation Y	1.006	2.98	1.205	
	Generation Z	2.613	2.84	1.199	
	Alpha generation	148	2.24	1.398	
	Total	5.067	2.85	1.239	

(Continued)

TABLE 4 (Continued)

Assessing the competences required for an agile approach		*N*	Mean	Std. deviation	Sig
Commitment	Baby boomer	262	2.64	1.334	0.000
	Generation X	1.038	2.99	1.182	
	Generation Y	1.006	2.88	1.190	
	Generation Z	2.613	2.89	1.128	
	Alpha generation	148	2.26	1.381	
	Total	5.067	2.88	1.178	
Focused attention	Baby boomer	262	2.64	1.302	0.000
	Generation X	1.038	2.98	1.202	
	Generation Y	1.006	2.93	1.159	
	Generation Z	2.613	2.92	1.139	
	Alpha generation	148	2.17	1.372	
	Total	5.067	2.90	1.181	
Openness	Baby boomer	262	2.77	1.294	0.000
	Generation X	1.038	3.08	1.202	
	Generation Y	1.006	3.01	1.257	
	Generation Z	2.613	3.03	1.151	
	Alpha generation	148	2.32	1.360	
	Total	5.067	3.00	1.204	
Greetings	Baby boomer	262	2.58	1.375	0.000
	Generation X	1.038	2.90	1.201	
	Generation Y	1.006	2.84	1.195	
	Generation Z	2.613	2.90	1.151	
	Alpha generation	148	2.30	1.363	
	Total	5.067	2.86	1.195	
Courage	Baby boomer	262	2.53	1.318	0.000
	Generation X	1.038	2.95	1.170	
	Generation Y	1.006	2.77	1.207	
	Generation Z	2.613	2.83	1.139	
	Alpha generation	148	2.30	1.417	
	Total	5.067	2.81	1.184	
Efficiency	Baby boomer	262	2.65	1.330	0.000
	Generation X	1.038	3.07	1.219	
	Generation Y	1.006	3.06	1.158	
	Generation Z	2.613	2.97	1.149	
	Alpha generation	148	2.16	1.408	
	Total	5.067	2.97	1.195	
Solution centricity	Baby boomer	262	2.77	1.333	0.000
	Generation X	1.038	3.13	1.223	
	Generation Y	1.006	3.07	1.202	
	Generation Z	2.613	3.04	1.140	
	Alpha generation	148	2.16	1.344	
	Total	5.067	3.02	1.198	

(Continued)

TABLE 4 (Continued)

Assessing the competences required for an agile approach		*N*	Mean	Std. deviation	Sig
Striving for simplicity	Baby boomer	262	2.59	1.294	0.000
	Generation X	1.038	2.80	1.169	
	Generation Y	1.006	2.80	1.190	
	Generation Z	2.613	2.68	1.149	
	Alpha generation	148	2.20	1.318	
	Total	5.067	2.71	1.179	
Open and clear communication	Baby boomer	262	2.71	1.383	0.000
	Generation X	1.038	3.08	1.215	
	Generation Y	1.006	2.99	1.234	
	Generation Z	2.613	3.03	1.136	
	Alpha generation	148	2.20	1.350	
	Total	5.067	2.99	1.202	
Striving for substance in communication	Baby boomer	262	2.73	1.356	0.000
	Generation X	1.038	3.09	1.229	
	Generation Y	1.006	3.01	1.221	
	Generation Z	2.613	2.96	1.172	
	Alpha generation	148	2.23	1.262	
	Total	5.067	2.96	1.215	
Detailed documentation	Baby boomer	262	2.61	1.287	0.000
	Generation X	1.038	2.91	1.103	
	Generation Y	1.006	2.95	1.080	
	Generation Z	2.613	2.85	1.080	
	Alpha generation	148	2.16	1.334	
	Total	5.067	2.85	1.113	
Methodologies and tools	Baby boomer	262	2.59	1.212	0.000
	Generation X	1.038	2.93	1.042	
	Generation Y	1.006	2.91	1.040	
	Generation Z	2.613	2.90	0.988	
	Alpha generation	148	2.20	1.302	
	Total	5.067	2.87	1.041	
Follow plans to the letter	Baby boomer	262	2.79	1.227	0.000
	Generation X	1.038	3.02	1.032	
	Generation Y	1.006	2.97	1.050	
	Generation Z	2.613	2.92	0.978	
	Alpha generation	148	2.21	1.336	
	Total	5.067	2.92	1.038	
Close cooperation with the client	Baby boomer	262	2.79	1.303	0.000
	Generation X	1.038	3.19	1.067	
	Generation Y	1.006	3.12	1.053	
	Generation Z	2.613	3.05	1.031	
	Alpha generation	148	2.38	1.362	
	Total	5.067	3.06	1.079	

(Continued)

TABLE 4 (Continued)

Assessing the competences required for an agile approach		*N*	Mean	Std. deviation	Sig
Personal communication between team members	Baby boomer	262	2.92	1.281	0.000
	Generation X	1.038	3.27	1.094	
	Generation Y	1.006	3.18	1.135	
	Generation Z	2.613	3.14	1.071	
	Alpha generation	148	2.06	1.476	
	Total	5.067	3.13	1.131	
Contractual agreement	Baby boomer	262	2.63	1.267	0.000
	Generation X	1.038	2.94	1.122	
	Generation Y	1.006	2.97	1.099	
	Generation Z	2.613	2.88	1.094	
	Alpha generation	148	2.31	1.389	
	Total	5.067	2.88	1.126	
Managing change effectively	Baby boomer	262	2.93	1.265	0.000
	Generation X	1.038	3.26	1.084	
	Generation Y	1.006	3.24	1.040	
	Generation Z	2.613	3.13	1.056	
	Alpha generation	148	2.32	1.405	
	Total	5.067	3.14	1.094	
Adequate. working end result	Baby boomer	262	2.94	1.351	0.000
	Generation X	1.038	3.30	1.099	
	Generation Y	1.006	3.24	1.068	
	Generation Z	2.613	3.19	1.084	
	Alpha generation	148	2.14	1.355	
	Total	5.067	3.18	1.124	

Source: own editing based on independent research.

perception of the importance of the knowledge and competences required for an agile approach differs between generations. This can be a major source of generational conflict in a workplace if the difference between individuals is not taken into account by an employer.

Conclusions and summary

In the course of the research, you can clearly demonstrate that there is a statistically verifiable difference between the generations in this respect by examining the level of knowledge and identification with the agile approach. What we have seen in the light of the results is that there is a higher than expected proportion of Generation X and Generation Y members who are familiar with the agile approach or who are already using it in practice. Generation Alpha and Generation Z had a higher proportion of people who were not familiar with agile, which is not surprising as this generation is typically still in the early stages of their working life or career and therefore does not have much practical experience with agile (Table 1). In terms of identification with the agile approach, we have seen that Generation X is the most open to the approach and can identify most with its philosophy, which is not surprising given that they are the most familiar with it and apply it in practice. Generations Y and Z, however, also have a positive view of agility and are willing and able to identify with the approach, although in their case they lack specific knowledge and skills. We believe that this should be addressed in education, by introducing agile methodologies that will enable the generations to get to know the ways and characteristics of this management and project approach as soon as possible (Table 2). Generation X was the generation most aware of the practical benefits and aspects of the application of the agile approach. They were the most appreciative of the benefits of an agile approach. In addition to Generation X, Generation Y and in many cases Generation Z also had an above-average appreciation of the practical benefits of an agile approach, which reflects a positive attitude towards the philosophy (Table 3). Similar results were found for the competences and knowledge required for an agile approach, with Generation X rating the importance of the knowledge required for this approach the highest, but in this case it was also true that Generation Y and, even more so, Generation Z recognised the importance of a number of competences (Table 4). The awareness

of the agile approach, the degree of identification with it, its practical usefulness and the importance of the competences required for it were all rated differently by each generation. The results suggest that for generations Y and Z, the focus should be on the cognitive elements of education, and for the attitude towards agile, the focus should be on the cognitive elements. We believe that higher education in particular has a major role and responsibility in this respect, as these two generations are dominant among the users of higher education, and therefore it is through the involvement of higher education institutions that the agile approach can be successfully implemented and understood by these two target groups. Project-based education and methodology, based on practice and market knowledge, and involving market players, would be more in line with the expectations of these generations in terms of content and didactic elements. In our opinion, this could be beneficial for many companies and enterprises, as it would allow them to employ employees who are familiar with the given approach in practice and can apply it, which would also be a major advantage in terms of recruitment and successful retention.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical approval was not required for the study involving human samples in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

JV: Conceptualization, Data curation, Formal analysis, Investigation, Project administration, Resources, Validation, Visualization, Writing – original draft, Writing – review & editing. AC-K: Conceptualization, Data curation, Formal analysis, Investigation, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. MG-F: Conceptualization, Formal analysis, Methodology, Software, Supervision, Validation, Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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