# Knowledge Sharing and Psychological Resilience: A Cluster Analysis of Future-oriented Competencies

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**Abstract**: Knowledge-sharing behaviours play an increasingly significant role in shaping individual psychological resilience, particularly amidst dynamic social and professional transformations (the VUCA and BANI environments). Psychological resilience is understood here (Seligman, 2023) as the ability to cope with adversity, adapt to new situations and maintain emotional balance despite stress. In the subject literature, it is conceptualised not as a static personality trait, but rather as a cultivable competency. This premise inspired a study aimed at exploring respondents' perspectives on what Seligman defines as key future competencies in his book "Tomorrowmind: Thriving at Work with Resilience, Creativity, and Connection—Now and in an Uncertain Future". According to the propositions presented in that book, the most important skill in a world characterised by volatility and uncertainty is the ability to adapt to specific conditions. Seligman posits that this trait is contingent upon the following dimensions: interpersonal relationships, resilience, a sense of meaning at work, prospection and creativity. The author of the present study expanded Seligman's proposed set of indicators to include selected aspects of knowledge sharing. This analysis focused on the competencies of building adaptability and workplace well-being aimed at defining the position of knowledge sharing behavior among other soft competencies as well as studying the relation between the cultivation of individual resilience and behaviors pertaining to knowledge sharing. Cluster analysis was employed to process the research data, enabling the identification of variable groups (skills) that respondents perceived to be of similar importance. Consequently, the analysis revealed that knowledge-related competency domains, do not create separate cluster but emerged within clusters emphasising the comprehension of the meaning and purpose of work, alongside the skills of creativity and prospection—namely, the anticipation of potential developmental scenarios.

**Keywords**: Knowledge exchange, Resilience, Cluster analysis, VUCA, BANI, Competences

## 1. Introduction-Theoretical Foundations of the Issue

As Dunbar (Dunbar 2004; Dunbar 2010; Gamble et al. 2014) observes, the human species has adapted to environmental shifts and undergone evolutionary transformations over hundreds of thousands of years, with cooperation and knowledge exchange acting as a common denominator. Thanks to these processes, we were able to transform our lives and, consequently, the ways we work. These transformations, driven primarily by the generation and dissemination of novel knowledge, have propelled humanity through successive technological revolutions, further accelerating the pace of change. However, this process incurs substantial human costs, manifesting in life and work models that directly contradict our innate abilities resulting from evolution. This transformation of reality, as Seligman (2023) argues, threatens our well-being in many unprecedented and unexpected ways.

The world around us is often described using the acronym "VUCA", a concept that defines contemporary reality as characterised by high Volatility, Uncertainty, Complexity, and Ambiguity (Sever, 2022). Originally coined by the United States military at the end of the Cold War to describe a new global order, the term has since been widely adopted across management, business, education and sociological analysis. Operating in such a world introduces unprecedented challenges for individuals and organisations alike. Traditional management models based on stability and predictability are no longer sufficient. They are being replaced by the need to develop competencies such as flexibility, psychological resilience, lifelong learning, as well as the ability to work effectively in diverse teams.

The BANI framework (Sever, 2023) conceptualises contemporary reality as even more demanding and unpredictable than the preceding VUCA model. The acronym BANI stands for Brittle, Anxious, Nonlinear and Incomprehensible. The term was proposed by the futurist Cascio (2020) in response to the growing complexity and unpredictability of global phenomena, particularly visible in the twenty-first century. Despite access to unprecedented volumes of data, individuals frequently remain incapable of fully comprehending the mechanisms governing the world. Information is frequently contradictory, demanding advanced analytical competencies and subsequently creating widespread disorientation and cognitive dissonance. In this new reality, the imperative shifts from forecasting the future to cultivating agility and mitigating the fallout of unforeseen disruptions. Ultimately, the BANI concept underscores the critical importance of emotional intelligence, relationship-building and flexibility for individuals and organisations navigating today's world.

The response to these challenges appears to be psychological resilience (Seligman, 2023). According to Seligman—a principal architect of positive psychology (Seligman, 2000)—resilience is defined as an individual's capacity to navigate adversity, adapt to adverse conditions and restore personal well-being following stressful or traumatic experience. Seligman (2023) emphasizes that resilience is not a fixed, innate trait, but rather a malleable competency that can be cultivated through targeted cognitive, emotional and behavioural strategies. Central to Seligman's theoretical framework is the method of interpreting events, termed "explanatory style". Highly resilient individuals tend to interpret negative events as transient, specific and unrelated to their core personality traits. Conversely, people exhibiting low psychological resilience are predisposed to viewing hardships as permanent, pervasive and indicative of intrinsic personal flaws. This pessimistic explanatory style fosters a sense of helplessness and reduced well-being (Eker, 2026).

Seligman (1991,1975) previously developed the theory of learned helplessness, showing that a lack of control over negative events can induce resignation and a decline in motivation. In subsequent works, however, he advanced the concept of the so-called learned optimism as the foundational pillar of resilience. Learned optimism involves consciously challenging negative beliefs and replacing them with more realistic and supportive interpretations. In the context of building psychological resilience, Seligman (2023) emphasises the importance of the PERMA model, which comprises five key elements of well-being: positive emotion, engagement, relationships, meaning and accomplishment. Each of these elements strengthens an individual's ability to cope with difficulties. For example, strong social relationships provide emotional support, while a sense of meaning helps individuals endure crises.

An analysis of the scholarly literature on employee knowledge sharing over the past three decades reveals a significant evolution in the conceptualization of this phenomenon. Early studies primarily focused on knowledge transfer mechanisms and the development of knowledge management systems within organizations. Publications from the 1990s concerning knowledge exchange by renowned authors such as Nonaka and Takeuchi (1995), as well as Davenport and Prusak (2000), accentuated the significance of the knowledge society and the knowledge-based economy (Drucker 1993; Probst et al., 2001). At that time, the labour market in most countries was an employer's market, and knowledge was treated as an attribute determining an employee's market attractiveness; consequently, it was monopolised or even appropriated (Słocińska, 2016). Fierce competition existed among employees, and from a job-security perspective, self-serving behaviours aimed at maintaining a competitive advantage were far more advantageous. Therefore, interpersonal relationships based on trust were in themselves extremely important at that time for gaining access to goods, information or knowledge (Albrychiewicz-Słocińska, 2022; Bloodgood & Chen, 2021). Hence, there was widespread recognition of all kinds of soft and social competencies, including communication skills and those related to emotional intelligence.

Three decades later, a completely different dynamic between these factors can be observed. Knowledge, now widely accessible due to computerisation, digitalisation, and AI technologies, is ceding its primacy to the pursuit of wisdom (Gamble et al., 2014). Under these conditions, knowledge-sharing behaviours exert a stronger impact on employee relationships and trust-building than employee relationships exert on interpersonal knowledge exchange processes. As the result more recent researches, increasingly examines the social, psychological, and technological determinants of knowledge-sharing behaviors, with particular emphasis on digital work environments, networked collaboration, and the growing importance of employees' competencies in selecting, interpreting, and co-creating knowledge (Nonaka & Toyama, 2007; Razmerita, et al., 2016; Serenko & Bontis, 2016; Wang & Noe, 2010).

The expansion of the information technology sector and the widespread digitalization of organizational processes have dramatically increased access to knowledge ( Zammit et al., 2016; Dong et al., 2021; Schaefer & Makatsaria, 2021). Consequently, contemporary organizations are confronted less with knowledge scarcity than with an overabundance of information and the challenge of assessing its quality, reliability, and usefulness. The phenomenon of information overload has elevated the importance of competencies related to critical information evaluation, source filtering, and the transformation of information into actionable knowledge (Szymkowiak et al., 2021; Eppler & Mengis, 2004; Bawden & Robinson, 2020). Furthermore, the emergence of generative artificial intelligence and large language models has further amplified the volume of available content, while simultaneously increasing the importance of employees' ability to evaluate credibility and apply information appropriately within specific contexts.

From an epistemological perspective, knowledge should not be equated with objective truth. It is socially constructed, embedded within particular cultural, organizational, and historical contexts, and continuously reinterpreted as a result of scientific progress, prevailing social beliefs, and dominant value systems

(Czarniawska, 2010, pp. 14–15). Contemporary knowledge management theories further emphasize that knowledge cannot be separated from the individual who acquires, interprets, and applies it. Knowledge emerges through dynamic interactions among individuals, organizations, and their environments rather than through the mere accumulation of information (Nonaka & Toyama, 2007; Nonaka, et al., 2000). Consequently, identical information may generate different forms of knowledge depending on individuals' prior experiences, competencies, and organizational contexts.

The democratization of access to knowledge resulting from digital technologies and open information resources (Czarnecka & Słocińska, 2012), combined with ongoing labor market transformations, has also reshaped knowledge-sharing behaviors themselves. Contemporary research increasingly views knowledge sharing as a reciprocal "give-and-take" process in which employees are expected not only to contribute knowledge but also to actively receive, interpret, and utilize knowledge provided by others. The effectiveness of knowledge sharing therefore depends not only on technological solutions but also on trust, organizational culture, the quality of social relationships, and employees' motivation to collaborate and learn (Muñoz-Pascual et al., 2021; Wang & Noe, 2010; Razmerita et al., 2016). As a result, contemporary approaches to knowledge management are moving beyond a narrow focus on information resources toward the creation of organizational environments that foster the collective creation, interpretation, and application of knowledge (Oliveira et al., 2021).

A key mechanism linking knowledge sharing with psychological resilience is the building of relationships based on trust and collaboration. Individuals who are eager to share their knowledge are more likely to become embedded within robust social networks that provide both emotional and substantive professional support. During crises, access to such support significantly reduces stress levels and makes it easier to find effective solutions to problems. Further, participating in a knowledge community nurtures a sense of belonging, a fundamental prerequisite for psychological well-being. We are observing a shift in how trust-based relationships and knowledge-exchange behaviours are perceived in the workplace. Due to the expanding ICT sector, the availability of knowledge has changed, and currently, in most workplaces (as well as in everyday life), employees struggle with an overabundance rather than scarcity of information and knowledge. Assessing the utility and reliability of knowledge and information has thus become problematic, while the boundaries between these two terms are increasingly blurred (Szymkowiak et al., 2021).

This analysis focused on the competencies of building adaptability and workplace well-being aimed at defining the position of knowledge sharing behavior among other soft competencies as well as studying the relation between the cultivation of individual resilience and behaviors pertaining to knowledge sharing.

## 2. Methodology

The analyzed study took the form of a questionnaire containing 20 statements, to which researched people responded on a five-point Likert scale (Carifio, Perla, 2008), where 1 not important and 5 very important, this scale allows to determine the relative intensity of different responses (Babbie, 2016). Referring to study four questionnaire validity procedures have been used: content (Rossiter 2008), face (Peter, 1981), construct (Cronbach and Meehl 1955) and nomological (Peter, 1981) ones. The survey was conducted at the turn of 2025/2026 (December-February) in online form. The survey was addressed to students of both full-time and part-time studies. Students of Polish-speaking and English-speaking courses of the Częstochowa University of Technology, from Management Faculty and Computer Science and Artificial Intelligence Faculty, were asked to fill in the worksheet. As a result, 355 correctly completed questionnaires were collected.

The STATISTICA program was used in the process of developing research results. Cluster analysis was used for object segmentation. This method, also called feature and object segmentation, is an example of an analysis that involves searching for and extracting clusters from data, i.e. groups of similar objects. The study used the nonoverlapping method, using a hierarchical data grouping algorithm (agglomerative method).

The one of the assumption of the research was that regardless of nationality and country, young people (students) improving their qualifications are subjected to similar pressure regarding functioning in the world of VUCA and BANI. Therefore, the ability to adapt to changing circumstances and build one's own resilience will be recognized as key competences in the work environment. The characteristics of the studied group in terms of demographic features are included in Tab. 1.

**Table 1: Characteristics of respondents by nationality, gender, age and professional experience**

| **Category** | **N=355** | **%** |
|---|---|---|
| **Nationality** | | |
| **Poland** | 157 | 55.8 |
| **Other** | 198 | 44.2 |
| **Gender** | | |
| Man | 197 | 55,5 |
| Woman | 158 | 44,5 |
| **Professional experience** | | |
| Yes | 272 | 76.6 |
| No | 83 | 23.4 |
| **Age** | | |
| 17-21 | 90 | 25.4 |
| 22-24 | 117 | 33.0 |
| 25-30 | 92 | 25.9 |
| **30+** | 56 | 15.8 |

Source: Own work

The preliminary study also was designed to verify the assumption made by comparing the results of the survey in relation to a group of Poles (it also included several students from Ukraine) and foreigners (students represented the following countries: Cameroon, Ukraine, Nigeria, Zimbabwe, Spain, Ethiopia, India, Algeria, Italy, Tunisia, Morocco, France, Egypt, Turkey, Iraq, Syria, Romania).

However, the Mann-Whitney U test showed that cultural considerations play a role in perceiving the importance of competence in the future. The differences concerned statements in the field of skills such as: quickly establishing contact with other people in the work environment, managing one's own time, effective rest, practical use of acquired knowledge and information, cooperation with other employees and drawing conclusions from one's own and others' experiences. With respect to each of these statements, Polish students declared a much higher assessment of the importance of these skills in the future.

## 3. Research Results

The reliability of the tool used was investigated using Cronbach's alpha index, KMO and Bartlett's test Tab. 2.

**Table 2: KMO and Bartlett test and reliability statistics results**

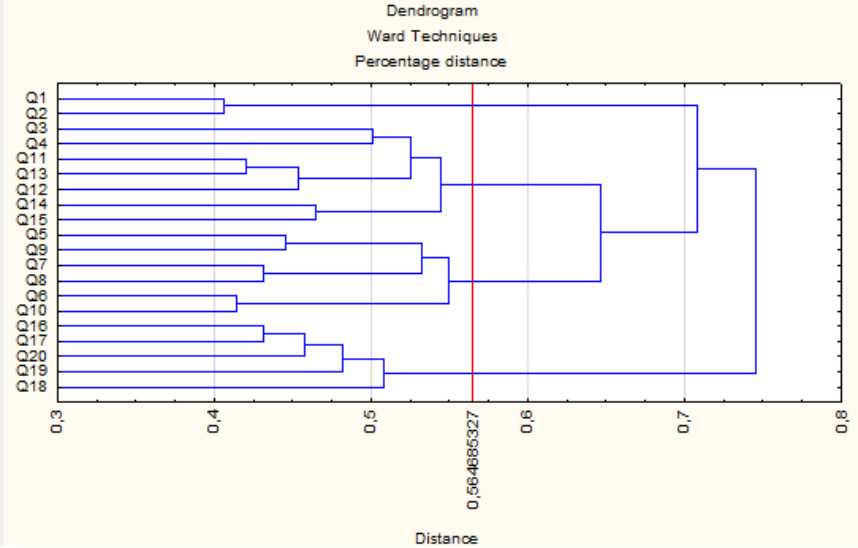
| | |
|---|---|
| **KMO** | **0,930** |
| **Bartlett's test of sphericity Chi$^2$** | 2972,57 |
| **df** | 190 |
| **significance** | 0,0000 |
| **Cronbach alpha** | 0,921 |

Source: Own work

The data reliability analysis revealed a good confidence level of 0.9210, indicating that no corrections were required for problematic items. As shown the Bartlett's test ($p<0.05$) indicates that the variables are significantly correlated and suitable for farther analysis.

Analysis of the scale reliability indicators for individual items showed that for the Cronbach alpha indicator, removing any of the items would not increase the overall indicator. With regard to the KMO index, the values indicate some of the items, underestimate the general index, but this happens at the level of hundredths and thousandths of decimal places, so it can be assumed that the statements adequately and consistently examine the research problem.

As a result of the applied procedure of analysis of clusters of variables, using the Ward Method as the agglomeration method and the percentage discrepancy as a measure of distance (coupling distance = 0.5586), the following division of variables into clusters (Tab. 3) was obtained on the basis of dendrogram (Fig 1).




Source: Own work

**Figure 1: Dendrogram**

An analysis of the mean response values indicates that the skills of personal time management and the practical implementation of acquired knowledge and information were deemed the most crucial for building adaptability and workplace well-being (Tab. 3). This indicates a strong position of knowledge and related behaviour in the opinions of the surveyed students in relation to the assessment of a set of key competences and their relevance in the future. However, By contrast, the skill of verbalising, transferring or explaining knowledge derived from life and professional experience to others was considered the least significant. This may result from the underestimation of the importance of soft skills in the process of knowledge transfer between people, which is a typical feature for representatives of Generation Z (Szymkowiak et al., 2021).

**Table 3: Belonging to clusters**

| **Variable/Question**<br>**Meaninig of the competences** | **Mean and Deviation Stand.** | | **Clusters** |
|---|---|---|---|
| | **Mean** | **Deviation Stand.** | |
| **Q1. Quickly connect with other people in the work environment** | 4.126760 | 0.934728 | 1 |
| **Q2. The ability to build bonds with others in the workplace.** | 4.123944 | 0.939627 | 1 |
| **Q3. Ability to analyze potential scenarios of the development of the situation in relation to the tasks performed.** | 4.191549 | 0.835266 | 3 |
| **Q4. Building your own belief that you can succeed in a particular endeavor.** | 4.214085 | 0.859854 | 3 |
| **Q5. Ability to manage your own time.** | 4.495775 | 0.760508 | 4 |
| **Q6. The ability to push negative emotions away from each other, not to exaggerate problems.** | 4.149296 | 0.884722 | 4 |
| **Q7. The ability to derive satisfaction from the work performed.** | 4.138028 | 0.896063 | 4 |
| **Q8. Optimistic attitude to work.** | 4.107042 | 0.914312 | 4 |
| **Q9. The ability to rest effectively.** | 4.222535 | 0.910423 | 4 |
| **Q10. The ability to deal with emotions flexibly and productively, especially negative ones.** | 4.180282 | 0.942502 | 4 |
| **Q11. The ability to focus on a task for an extended period of time.** | 4.132394 | 0.893760 | 3 |
| ***Q12. The ability to look for ways to continuously develop and learn.*** | 4.211267 | 0.852307 | 3 |

| Variable/Question<br>Meaninig of the competences | Mean and Deviation Stand. | | Clusters |
|---|---|---|---|
| | Mean | Deviation Stand. | |
| ***Q13. Ability to use the acquired knowledge and information in practice.*** | 4.315493 | 0.793093 | 3 |
| ***Q14. Ability to collaborate with other employees.*** | 4.152112 | 0.907884 | 3 |
| **Q15. The ability to build one's own commitment to work.** | 4.140845 | 0.915895 | 3 |
| ***Q16. Ability to impart/translate knowledge resulting from professional and life experience to others.*** | 3.935211 | 0.932026 | 2 |
| ***Q17. The ability to identify people in the organization who can help us in our work, using their own knowledge and experience.*** | 4.047887 | 0.930017 | 2 |
| **Q18. Ability to analyze the present and past in order to predict the future.** | 4.061972 | 0.963510 | 2 |
| **Q19. The ability to draw conclusions from one's own and others' experiences.** | 4.281690 | 0.802241 | 2 |
| **Q20. Ability to create original ideas useful and desirable for the organization.** | 4.129578 | 0.968486 | 2 |

In italics items connected with knowledge sharing behaviour.

Source: Own work

By conducting a substantive analysis of the variables grouped within the individual clusters, the following competence areas were identified:

- Interpersonal relationships and interactions.
- Knowledge, prospection, creativity.
- Meaning and purpose of work.
- Psychological resilience.

In the next step of the data analysis procedure, representative variables were selected using formula (1), substituting appropriate values from the distance matrix for individual groups. The center of gravity method proposed by Pluta (1977, pp. 41-42) was used here, consisting in calculating the distances of each variable from the others in multi-element groups of variables and selecting the one for which the sum of the distances determined in this way is the smallest (Tab.4). With regard to clusters 2 and 3, the statements about knowledge sharing appear as the items that most adequately describe the clasts.

**Table 4: Representatives of clusters**

| Cluster number | Question number | Statement – competences |
|---|---|---|
| **C1** | Q1 | Ability to build bonds with others in the workplace |
| **C2** | Q16 | Ability to verbalize/impart/translate knowledge resulting from life and professional experience to others |
| **C3** | 13 | Ability to use the acquired knowledge and information in practice |
| **C4** | 10 | Ability to deal with emotions flexibly and productively, especially negative ones |

Source: Own work

In the next step of the statistical analysis, respondents were grouped according to the similarity of their multifactor profiles based on demographic characteristics and the structures established through cluster analysis (Carifio, Perla, 2008). A cluster analysis of observations was carried out using Ward's method as the agglomeration method and percentage disagreement as the distance measure (linkage distance = 11.5444). Based on the dendrogram, respondents were divided into four groups according to demographic characteristics and the competence dimensions analysed:

1. The first group is dominated by women and respondents with professional experience. While they represent a relatively younger group of participants (22–24), they indicate the high importance of interpersonal relationships and interactions, the meaning of work and building psychological

resilience. However, they perceive the competencies of knowledge, prospection and creativity as somewhat less important.

2. The second group is also dominated by women and people with professional experience and comprises mainly individuals aged 30 and above. Its representatives attach significantly less importance to interpersonal relationships; psychological resilience is paramount to them, whereas the meaning of work, alongside knowledge, prospection, and creativity, are evaluated as less important.
3. The third group consists mainly of men with professional experience, aged 25–30. They present divergent evaluations regarding relationships and interactions, as well as the domain of knowledge, prospection and creativity. For this group, the significance of building psychological resilience and the meaning of work is lower than in the first two groups.
4. The fourth group consists primarily of men and people without professional experience representing the youngest age category (17–21). Their assessment of the importance of all the analysed areas is significantly lower than that of respondents in the earlier groups.

## 4. Discussion

The results of the study in relation to the surveyed students should be generalized on three levels. The first of these levels of analysis emphasizes the importance of the cultural factor in the analysis of knowledge-sharing behavior, which is confirmed by the research of Ardichvili et al., (2006) and Jacks et al. (2012).The second level indicates that competences related to the perception of the importance of behaviour in the field of knowledge sharing in the future do not create a separate focus, but are combined with other statements, emphasizing their importance for the ability to predict and build the meaning of work in the context of increasing adaptability and well-being of the individual. The cluster analysis revealed relationships between the individual variables that differed somewhat from those initially assumed based on Seligman's work (2023), creating new conglomerates representing different content. The domain that fully overlaps with Seligman's theses is interpersonal relationships and interactions. By contrast, the domain of knowledge-sharing competencies was absorbed into the areas of meaning and purpose of work, as well as prospection and creativity. The domain of psychological resilience partially overlaps with the assumptions of the original theory. The third level of analysis leads to the profiling of the surveyed students in terms of their attitude towards the issue of resilience and knowledge sharing as key competences in the future. Although the clusters/profiles obtained do not present clear-cut portraits of the respondents selecting specific clusters, two groups of participants merit particular attention. The first is a very distinct group of students representing the youngest age bracket, who do not yet have any professional experience and for whom the competencies examined are much less important than for those who already have some degree of work experience. Another notable group consists of employees for whom each of the listed competencies is perceived as important or very important. This group comprises mainly young workers aged 22–24, who are at the outset of their careers and in a period of dynamic professional development. Somewhat surprising is the group of the oldest students participating in the study, for whom—contrary to expectations—interpersonal relationships and knowledge hold less importance. This may be correlated with their existing experience and an entrenched conviction regarding the strength of the competencies they already possess.

Addressing the study's proposition positing a relation between the domains of knowledge and psychological resilience, a correlation analysis was conducted using Kendall's tau coefficient for representatives of the respective clusters (Tab. 5).

**Table 5: Kendall's tau coefficient**

| Cluster | C1 | C2 | C3 | C4 |
|---|---|---|---|---|
| **C1 (Q1)** | - | | | |
| **C2 (Q16)** | .261 | - | | |
| **C3 (Q13)** | .341 | .321 | - | |
| **C4 (Q10)** | .269 | .315 | .343 | - |

$p<0.05$

Source: own work

The analysis indicates that psychological resilience (C4) correlates most robustly with the domain of the meaning and purpose of work (C3), which encompasses variables related to the skills of collaborating with others and the practical application of knowledge and information acquired. This domain also correlates with competencies in shaping relationships and interpersonal interactions (C1). The domain of knowledge, prospection and creativity (C2) is most strongly linked to area C3.

## 5. Conclusions

To summarise the research findings, the following final observations should be made referring to studied students. First, knowledge-related competency domains emerged within clusters emphasising the comprehension of the meaning and purpose of work, alongside the skills of creativity and prospection—namely, the anticipation of potential developmental scenarios. This underscores the significance of knowledge sharing for the effective functioning of employees in the workplace. Second, professional experience exerts a substantial influence on the perceived importance of individual competencies, particularly regarding attitudes toward knowledge and knowledge-sharing behaviours. Unfortunately, no direct relationship was demonstrated between psychological resilience and knowledge-sharing competencies. At the same time, it must be emphasised that the impact of knowledge sharing on psychological resilience depends on the context in which it takes place. In environments characterised by a high level of competition or a lack of trust, knowledge sharing may be limited or even perceived as a threat. Under such conditions, individuals may feel anxious about being judged or having their knowledge exploited by others, which has a negative impact on their psychological well-being. Therefore, cultivating an organisational and social culture that promotes openness, collaboration and mutual respect is vital. A supportive environment fosters the free flow of knowledge and the building of relationships based on trust. In such circumstances, knowledge sharing becomes a natural component of functioning, and its positive influence on psychological resilience is significantly amplified.

In summary, knowledge sharing is a complex process that affects many aspects of an individual's functioning. Its significance transcends the cognitive sphere, encompassing emotional and social dimensions as well. By strengthening relationships, developing competencies, building a sense of agency and providing positive experiences, knowledge sharing contributes to the cultivation of psychological resilience. Promoting such behaviour should be an important element of activities both in organisations and in the education system, as well as in everyday life.

The conducted cluster analysis may serve an exploratory function, enabling the further formulation of research hypotheses. The grouping results may inspire subsequent research—for example, incorporating age and cultural contexts—and lead to more advanced statistical analyses.

**Ethics Declaration:** This research did not require ethical approval because the survey was completely anonymous, and the data collected were used, in the form of aggregated summaries, solely for scientific research purposes.

**AI Declaration:** I declare that I did not use AI in this article, all the text was manually written.

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