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NYNA NEETs and Digitalisation: How Many Challenges on the Horizon?

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Abstract

The strong increase in digitalisation due to the Covid-19 pandemic changed many aspects of people's lives, making it possible to overcome physical barriers, accelerate the simplification of many tasks, and facilitate access to information. Nevertheless, not all segments of the population benefit(ed) from these services in the same manner, therefore increasing social inequalities. The most disadvantaged struggled with access to digital tools; the low-educated struggled due to problems connected with the use of these tools; and those living in rural areas due to the limited availability of a fast broadband connection. Individuals not in education, employment, or training (NEETs) are usually over-represented among people with these personal characteristics, reinforcing the need to support their digital inclusion for active participation in the labour market. This article focuses on NEETs aged 25–29 years who identified as "not young, not adults" (NYNA), to verify if a wide use of digital tools is associated with a more active approach to feelings and actions taken to access the labour market. Data used in this study are based on a survey conducted within the EEA grant project Track-In: Public Employment Services Tracking Effectiveness in Supporting Rural NEETs and refer to the Mediterranean countries of Italy, Portugal, and Spain. Findings suggest the importance of digital competencies in enhancing socio-emotional skills—key mediators being the capacity to front situations and "trait self-control"—with the area of residence as moderator, which emphasises the need for region-specific interventions for rural NYNA NEETs.

Keywords

digital competencies; digitalisation; labour market; rural NYNA NEETs; socio-emotional skills

1. Introduction

Recent years have been marked by challenging socio-economic events worldwide, with Europe being particularly affected. These crises have exacerbated pre-existing inequalities, further widening gaps between countries. Informed by the European Pillar of Social Rights (EPSR), which provides a comprehensive framework for evaluating the social and economic conditions of European citizens, this study aligns with its overarching dimensions of equal opportunities and access to the labour market and social protection and inclusion (European Commission, 2017). These dimensions, encompassing several key principles, are crucial to understand the broader challenges faced by disadvantaged populations, particularly youth and children.

Despite progress in reducing early school leaving and NEET (not in education, employment, or training) rates over the past decade, Southern and Eastern European countries continue to experience persistently higher levels of youth disengagement from both education and the labour market. These educational and employment disparities are exacerbated by factors such as the prevalence of precarious work conditions and high unemployment rates, particularly among younger populations (International Labour Organization, 2024).

Furthermore, the dual transition towards green and digital economies has introduced new complexities, in addition to these challenges (UNICEF, 2024). While some regions, such as Northern and Central Europe, may be adapting more rapidly to these transformations, others, particularly Southern and Eastern Europe, face significant obstacles in ensuring that young people are equipped with the necessary skills to engage with emerging societal demands (European Investment Bank, 2021). This misalignment between evolving demands (e.g., labour market requirements) and the skills (e.g., digital competencies) of vulnerable groups, such as "not young, not adult" (NYNA) NEETs (Caroleo et al., 2020; Pastore et al., 2021), raises critical questions regarding social inclusion and the ability to meet the European Union's long-term employment and sustainability objectives (Maucorps et al., 2023).

Given these socio-economic challenges and aiming to contribute to the ongoing discourses intersecting inequality, employment, and social protection, this study examines the role of specific structural inequalities related to digitalisation and digital competence, considering the domains of education, employment, and social protection. Specifically, we delve into the digital competencies of and internet use by NYNA NEETs and verify the association with some emotional skills that the labour market considers even more important for employability. We also aim to verify whether significant differences arise in digital and socio-emotional skills based on the degree of urbanisation of the subjects' place of residence. If, on the one hand, digitalisation can connect people living in remote areas by removing distance, on the other hand, people living in rural areas experience major difficulties in connecting due to the less frequent availability of a fast connection. Compared to the current literature, as a step forward, we believe that the proposed model is the first attempt to study the association between digital competencies and socio-emotional skills in a particular segment of the population—NEETs aged between 25 and 29 years and identified as NYNA (Caroleo et al., 2020; Pastore et al., 2021)—and the impact of the level of urbanisation on this association. Individuals in this age group require the attention of specific research and policymaking, as individuals with these characteristics may have completed formal education but struggle to establish stable employment. Moreover, unlike younger NEETs, NYNA NEETs may face greater psychological and/or economic pressures and risk long-term economic exclusion (Caroleo et al., 2020; Pastore et al., 2021) and increased gaps in socio-emotional and digital competencies.

The application of partial least squares structural equation modeling (PLS-SEM)—which is discussed in more detail below—draws on a well-established body of scientific literature and helps evaluate the proposed indicators, some of which could have significant implications in the future. The remainder of this article is structured as follows: Section 2 reviews the different constructs connected to digital competencies, socio-emotional skills, the capacity to front situations, and trait self-control, and presents the hypotheses tested in this study. Section 3 concerns data collection, methodology, and data analysis. Section 4 discusses the results, further research and practical implications, and the main limitations of the study. Section 5 presents a brief conclusion of the article.

2. Digital and Socio-Emotional Skills: Pathways for NEETs

2.1. Key Skills for NEETs: Digital Competencies

Digital competencies are fundamental in the current labour market, especially as economies become more digitised. Framed as a person's ability to use digital tools and platforms effectively across various domains, such as information retrieval, communication, content creation, and problem-solving (Calvani et al., 2008; van Laar et al., 2017), these competencies are more than just technical knowledge, encompassing the ability to critically engage with and create content on digital platforms. Being capable of using ICTs effectively is essential not only in everyday life—for instance, in learning, entertainment, and leisure—but also in developing professional competencies, which are crucial in an increasingly digital world (Charles et al., 2022; Tomczyk, 2024). Basic digital competencies, acquired through formal, non-formal, and informal education systems, encompass knowledge, abilities, and attitudes necessary for using e-services typical of digital citizens, while also providing the foundation for building professional digital competencies (Hämäläinen et al., 2021; Pettersson, 2018), crucial for successful integration into the labour market (Bejaković & Mrnjavac, 2020).

In this regard, different frameworks have emerged, proposing various areas of digital competence that may be relevant in diverse societal domains. Professional engagement and the use of digital resources are examples of such key areas (Redecker & Punie, 2017). The former involves leveraging digital technologies for communication, collaboration, and professional development, such as participating in online learning communities or using digital tools for institutional communication. The latter encompasses skills such as selecting, creating, and sharing digital content while critically assessing the credibility of sources, understanding licensing requirements, and ensuring accessibility. As such, mastering such digital competencies is essential for navigating the evolving digital landscape and enhancing professional efficacy, ensuring active participation in a digitally-driven world.

In contrast, the absence of digital competencies could be a key factor contributing to the disadvantage of certain groups. Especially for young people (Haddon et al., 2020; Mascheroni et al., 2020), this lack of competence may hinder their ability to fully benefit from the opportunities provided by today's information society and the increasingly digitised labour market. This is even more challenging for NEETs, for whom digital competencies can be the key to bridging the gap between social exclusion and active labour market participation (Neagu et al., 2021), mostly for those living in rural areas (Simões & Marta, 2024). The literature highlights that young people in rural areas or from disadvantaged backgrounds often lack the essential digital competencies to engage fully with the labour market (Simões, 2024; Simões & Marta, 2024), which

increasingly relies on online job searches, remote work opportunities, and digital training programmes (OECD, 2024). The lack of digital literacy has been identified as a key barrier preventing these individuals from accessing employment and educational opportunities, thereby perpetuating social inequalities (Matli & Ngoepe, 2021). However, digital literacy is not only a matter of technical skills; it also involves critical thinking, adaptability, and resilience.

2.2. Key Skills for NEETs: Socio-Emotional Skills

Engaging with digital tools can promote problem-solving abilities and build self-efficacy in individuals, which can enhance their confidence in handling various social and professional situations. These cognitive and emotional skills overlap with those associated with socio-emotional skills, such as self-regulation, stress management, and interpersonal communication (Carlotto, 2015), which enable individuals to understand and manage emotions, establish positive relationships with others, and make responsible decisions (Goleman, 2009; Wheeler, 2016). The distinct existing frameworks for socio-emotional skills tend to provide structured approaches to our understanding of how these abilities contribute to personal and professional development, especially through adaptability, effective communication, and emotional regulation.

There is growing consensus in the literature that socio-emotional skills constitute a multidimensional and endogenous construct, encompassing traits and behaviours that evolve through life experience and learning (Kankaras & Suarez-Alvarez, 2019; OECD, 2024). OECD's socio-emotional skills framework, for instance, categorises these skills into domains like emotional regulation (e.g., stress-resistance), collaboration (e.g., empathy), engaging with others (e.g., sociability), and task performance (e.g., self-control), seeking to provide understanding on how they can influence employability, active citizenship, health and well-being (OECD, 2024; see also Kankaras & Suarez-Alvarez, 2019). Following this framework, Kankaras and Suarez-Alvarez (2019) present socio-emotional skills as endogenous personal abilities that are reflected in consistent patterns of thinking, emotions, and behaviour. Such skills are cultivated through both formal and informal learning experiences and play a crucial role in influencing socio-economic outcomes throughout a person's life. Research indicates that socio-emotional skills, which develop and evolve, especially during adolescence, have significant effects on various key areas of life, including academic success and overall well-being (Chernyshenko et al., 2018). These skills are flexible and can be influenced by a wide range of individual and contextual factors (Salmela-Aro & Upadyaya, 2020).

One socio-emotional ability crucial to dealing with everyday events is the capacity to front situations (Luthans et al., 2006). This can be defined as the capacity to face challenging, stressful, or emotionally charged situations with resilience, composure, and adaptive coping strategies. It is often related to emotional regulation, problem-solving, and the capacity to maintain a positive or neutral mindset in the face of adversity, involving a combination of psychological traits and skills essential to one's successful integration and permanence into the labour market (Bonanno et al., 2004).

Also important and highlighted by OECD within the framework of socio-emotional skills is the trait of self-control, defined as the endogenous ability to "avoid distractions and focus attention on the current task in order to achieve personal goals" (OECD, 2024). This involves regulating one's thoughts, emotions, and behaviours over time, especially when faced with temptations or the urge for immediate gratification (Baldwin et al., 2018; Paschke et al., 2016). Thus, "trait self-control" is a cornerstone of effective functioning

in numerous life dimensions, such as academic achievement, health behaviour, financial stability, mental health, social relationships, career success, and overall life satisfaction (Hagger et al., 2019; Lippman et al., 2015). By developing this self-control, individuals can create more fulfilling lives, handle stress better, achieve greater success, and experience improved physical and mental health (Baumeister & Vohs, 2007; Hagger et al., 2013). The interconnection between trait self-control and other life areas underlines its importance in shaping a person's trajectory over time, which is particularly relevant for success in the labour market, especially among youth and entry-level workers (Heckman et al., 2006; Kautz et al., 2014; Lippman et al., 2015). Studies show individuals with higher trait self-control tend to be more productive, perform better in their roles, work well under pressure, and handle unexpected challenges with more resilience; ultimately fostering higher wages and greater labour success (Heckman et al., 2006; Lippman et al., 2015).

Socio-emotional skills are therefore essential endogenous skills in the context of labour market engagement, as they influence how individuals cope with stress, deal with social challenges, and communicate effectively, all of which are key factors for long-term career success (Wheeler, 2016). For NEETs, socio-emotional skills can be the difference between active participation in the labour market and continued marginalisation (Ellena et al., 2021). Research consistently demonstrates that socio-emotional skills are critical for employability (e.g., Allen et al., 2020; Heckman et al., 2018; Loayza et al., 2021). They help individuals to interact positively with colleagues, employers, and public employment services (PES) professionals. Furthermore, these skills are closely linked with resilience and coping strategies, which allow young people to handle rejection or failure when job-seeking and deal with the ups and downs of entering the labour market (Heckman et al., 2018).

In our conceptual model, socio-emotional skills are, thus, theorised as endogenous personal abilities that condition individuals' effectiveness in the labour market and in social integration more broadly. However, in the empirical component of this study, this latent construct is proxied through two observed indicators: (a) one reflecting the individual's self-perception regarding their ability to manage complex social situations and (b) another related to the presence of supportive social networks. We acknowledge that these indicators capture partial aspects of the broader construct. Nevertheless, we consider that together they provide a meaningful proxy for socio-emotional capacities relevant to labour market engagement, especially for vulnerable youth populations, such as NEETs.

2.3. Digitalisation and the Role of internet Usage

The aforementioned insights also do the groundwork for another important dimension of digitalisation and its relationship with socio-emotional skills: the intensity of internet usage (intensity of use). This is a multifaceted variable that measures how frequently, and for how long, an individual engages with digital platforms. It includes the use of the internet for education, job searching, social media interaction, entertainment, and self-improvement (Blaszczynski, 2006). Research suggests that higher internet usage correlates with better access to resources such as online job markets, remote learning opportunities, and networking (Davis et al., 2020), making it an increasingly key tool for facing the challenges of being NEET (Neagu et al., 2021). Simultaneously, studies have shown that low-intensity internet usage is often associated with lower engagement in educational or job-seeking activities, particularly among rural NEETs (Szpakowicz, 2023). Nevertheless, the mere presence of the internet does not automatically lead to the development of skills. Rather, it is the nature and type of activities that individuals engage in online, as well

as the tools they use, that are key determinants of digital competencies and socio-emotional skills (Gutiérrez Ángel et al., 2022).

Intensive internet usage can expose individuals to new social and cultural contexts, facilitating greater emotional and social awareness. Digital platforms, such as social media or online forums, offer opportunities to practice communication, empathy, and relationship-building skills, which are essential aspects of socio-emotional development (Waytz & Gray, 2018). Additionally, digital platforms can provide emotional support networks that may enhance self-regulation, self-confidence, and the ability to navigate social challenges (Hodges et al., 2020). This is particularly important to face the labour market challenges, as such digital tools have the power to increase individuals' self-efficacy and confidence and assist in building the capacity to confront situations by providing resources, coping mechanisms, and communities that offer guidance and emotional support (Pretorius et al., 2019). Online learning platforms, for instance, encourage individuals to develop problem-solving and critical thinking skills, while providing a sense of accomplishment and progress (Abuhassna et al., 2020).

While internet access provides a means for individuals to acquire and refine digital competence and subsequent key socio-emotional skills, it is the purposeful use of the internet, such as engaging with educational content, learning to use software tools, or participating in online collaboration, that fosters the development of these competencies (Gutiérrez Ángel et al., 2022).

The ability to face challenges, solve problems, and deal with stressful situations effectively (i.e., the capacity to confront situations) is particularly important for NEETs when navigating the barriers to employment and education (Luthans et al., 2006). Also important is the ability to regulate impulsive behaviours, resist distractions, and maintain focus on long-term goals, which means having the capacity for self-control (Duckworth et al., 2019). In the context of NEETs, self-control is crucial for staying motivated and engaged in the job-search process. Without sufficient self-control, NEETs may experience difficulty in following through with tasks, delaying gratification, and adhering to structured programmes like job training or career development activities (Mawn et al., 2017).

The internet, while a potential source of distraction, can also be used as a tool for improving self-control. For instance, online goal-setting tools and productivity apps can help individuals track their progress, stay motivated, and delay immediate gratification for long-term benefits. Studies show that individuals with higher self-control are more likely to use the internet productively, while those with lower self-control may engage in distracting activities that detract from their labour market engagement (Kuss & Griffiths, 2017).

The potential of online tools for positive socio-emotional development and, consequently, for individuals to be better equipped to face labour market demands is clear. Excessive internet usage may, however, also result in negative social-emotional outcomes, such as social isolation, addiction, and reduced face-to-face interactions, which can hinder the development of empathy, social skills, and emotional intelligence (Klimenko et al., 2021; Kuss & Griffiths, 2017).

In sum, while the intensity of internet usage can enhance socio-emotional skills, this effect depends on how and for what purpose the internet is used and the territorial and socio-cultural context in which individuals live (Tomczyk, 2024). In more urbanised areas, greater access to high-speed internet, educational facilities,

and employment opportunities may enable individuals to use the internet more effectively (Tomczyk, 2024; van Deursen & van Dijk, 2014), thereby enhancing their capacity to confront situations and increase their chances of successful labour market participation (Charles et al., 2022). In contrast, rural areas may experience more significant barriers to digital engagement, potentially dampening the positive impact of self-control (Simões & Marta, 2024; Tomczyk, 2024).

2.4. The Present Study

Overall, the interaction between digital competencies, socio-emotional skills, and internet usage plays a crucial role in determining the engagement of rural and non-rural NEETs with the labour market. Digital competencies are foundational to overcoming barriers to employment (Charles et al., 2022; Tomczyk, 2024), while socio-emotional skills facilitate more effective engagement with labour market institutions (Wheeler, 2016). Intensity of internet usage can have both positive (Waytz & Gray, 2018) and negative (Klimenko et al., 2021) consequences on these skills, depending on how the internet is used. Furthermore, self-control and the capacity to confront situations are critical for ensuring that digital tools are used productively and effectively in navigating labour market challenges (Duckworth et al., 2019; Kuss & Griffiths, 2017). Finally, the degree of urbanisation of the place of residence may play a significant role in determining how these factors influence labour market participation, with rural areas facing additional challenges in fully benefiting from digital tools (Simões & Marta, 2024; Tomczyk, 2024). By filling the identified gaps in the literature regarding NYNA NEETs, digital competencies, internet use, and the role of urbanisation, our article provides an important contribution to the field. Further, addressing these disparities will be key to enabling rural NYNA NEETs to actively participate in the labour market.

Consistent with the framework mentioned above, we consider the following relationships and corresponding hypotheses:

1. Socio-emotional skills and intensity of internet use: It is suggested that a balanced approach to internet usage may be key. On the positive side, using the internet for online learning or career development can help NEETs strengthen socio-emotional capacities relevant to facing labour market challenges. Thus, we hypothesise: There is a significant relationship between the *intensity of use* and *socio-emotional skills* (H1).
2. Socio-emotional skills and capacity to front situations: It is suggested that increased capacity to front situations is associated with increased levels of socio-emotional skills. Thus we hypothesise: There is a significant relationship between *capacity to front situations* and *socio-emotional skills* (H2).
3. Socio-emotional skills and trait self-control: We hypothesise that higher levels of trait self-control are associated with increased socio-emotional skills. Thus, there is a significant relationship between *trait self-control* and *socio-emotional skills* (H3).
4. Socio-emotional skills and digital competencies: The main thesis we want to demonstrate is that NYNA individuals with higher digital competencies are likely to be more confident and effective in social interactions, which is crucial for building relationships with PES and engaging in job search processes. Thus, we hypothesise: There is a significant relationship between *digital competencies* and *socio-emotional skills* (H4).
5. Trait self-control and capacity to front situations—mediators: We investigate the mediating effects that *digital competencies* might have on *socio-emotional skills* via *trait self-control* and *capacity to front situations*. To do so, we hypothesise:

H5a: trait self-control presents a mediating role between digital competencies and socio-emotional skills.

H5b: The capacity to front situations presents a mediating role between digital competencies and socio-emotional skills.

6. Urban vs rural: Since the place where the individuals grew up can strongly affect their cognitive and non-cognitive skills' development, this article has also included the rural group variable (0 for urban and 1 for rural) as a treating construct for moderating effect to evaluate eventual significant differences in the two clusters. Based on this, we hypothesise: The area of residence significantly affects the relationships with *socio-emotional skills* (H6).

3. Data Collection and Methodology

3.1. Data Collection

Data for the analysis come from a survey conducted within the activities of the EEA grant project TRACK-IN—Public Employment Services Tracking Effectiveness in Supporting Rural NEETs. The project started in 2021 and involved the following countries: Bulgaria, Estonia, Italy, Lithuania, Portugal, and Spain. The survey was conducted between November 2022 and January 2023. Although the target population was initially only rural NEETs aged between 25 and 29 years old, it was subsequently extended to include young people living in urban areas of the same age. The questionnaire was administered with the help of PES, social networks, and some influencers. It involved, therefore, mainly, but not only, those registered with the PES. The software used for questionnaire administration was Qualtrics. Before starting the survey, respondents gave their consent to the treatment of the data provided. However, the statistical team conducting the survey ensured the anonymisation of the responses. Indeed, personal information allowing the identification of the respondents was removed from the dataset and replaced by a progressive number. In total, 4,273 NEETs participated. Almost all of them were registered with the PES (96%).

Young people in the 25–29 age class were also identified as NYNA to indicate this specific stage of the individuals' life, where young people usually have already completed their education and approached the labour market. In this age class, being NEET is a more critical situation compared to young people aged under 25, because it is usually associated with people who have already experienced failures in approaching the labour market (exception made, of course, for those remaining for longer in education). Research shows that repeated failures in the job search during this period strongly predispose them to the inactivity trap or long-term unemployment (Caroleo et al., 2020; Pastore et al., 2021).

In this article, we restricted the analysis to the Mediterranean countries of Italy, Portugal, and Spain, with a total of 2,618 NEETs. The reasons for this focus are the low response rate of the other countries and the higher homogeneity of Italy, Portugal and Spain compared to them. They come mainly from Spain (75%), followed by Italy (18%) and Portugal (7%). The majority of them can be defined as "pure NEETs," in the sense that they declared they were unemployed or inactive for discouragement (77%); 17% of them defined themselves as caregivers, while the residual 6% were almost equally divided between those who declared having health problems (2.86%) and those who were engaged in no paid work. There is a slight prevalence of women (59%) in comparison with men (41%).

The countries included in the analysis all had a significant share of NEETs. Indeed, at the EU-27 level, the share of the NEETs in 2023 was 11.2%. In the countries analysed, it ranged from 16.1% in Italy to 8.9% of Portugal, with Spain staying in the middle with 12.3%. Table 1 shows the distribution of participants across rural and urban areas by country.

Table 1. Participants distribution across rural and urban areas by country.

Country	Group 1 (Urban = 0)	Group 2 (Rural = 1)
Italy	187	282
Portugal	106	69
Spain	982	992
	1275	1343

The questionnaire included many sections. Besides one on socio-demographics and another investigating respondents' interaction with the PES, other sections analysed their expectations for the future, attitudes, beliefs, and feelings. Finally, another section aimed at studying the respondents' digital competencies; the intensity of internet use and the main reason for this use. Based on these latter questions, we developed our framework of analysis, synthesised in Table 2.

3.2. Methodology and Data Analysis

This study utilises the PLS-SEM algorithm to analyse both structural (inner) and measurement (outer) models (Hair et al., 2021b; Sarstedt et al., 2022). The outer model investigates the relationships between manifest variables (MVs) and their associated latent variables (LVs), while the inner model focuses on the interactions among the LVs. PLS-SEM is represented by a set of matrix equations derived from a specific path diagram that depicts the relationships across various dimensions. This approach provides a systematic framework for examining relationships between multiple constructs, even in complex models, and for exploring connections among LVs. PLS-SEM considers a different approach from the covariance-based SEM-LISREL and was selected for this study due to its compatibility with the research problem, hypothesis, and predictive focus, making it a dependable method for the proposed analysis (Hair et al., 2021a). In PLS-SEM, a normalisation process is essential to convert indicators into dimensionless values, as the dimensions involve different units and scales. Among the available normalisation techniques, this study adopts the min-max normalisation method, as proposed by Khalid et al. (2020) and Mazziotta and Pareto (2018).

Social scientists often develop statistical models under the assumption that the effect of an independent (exogenous) variable on a dependent (endogenous) variable remains constant. Actually, PLS-SEM can evaluate differences to differences in the assumed causal-effect network linking the LVs or differences at the structural level: this involves differences in the magnitude of the structural coefficients (i.e., the path coefficients).

An important analytical task in studying path models is examining "moderating effects" (also known as "interaction analysis"). These effects represent the influence of a third variable on the relationship between an independent and a dependent variable. Basically, moderating effects can be analysed using two primary approaches, depending on the nature of the moderator variable: group comparisons (or multi-group analysis), in which categorical variables (like gender) can be used to identify two or more clusters, and moderator constructs (or moderating effects), in which the moderator indicator is treated as a latent variable.

An additional relevant PLS-SEM feature refers to the "mediation analysis," in which a (mediator) construct intervenes between two other constructs. The evaluation of indirect paths (that originate from the possible causal relationships between the manifest variables and various LVs not directly connected and that can impact the PLS-SEM EFFICIENCY)—or indirect effects—can reveal useful insights to verify the relationships in the PLS-SEM (Quintano & Mazzocchi, 2020). In general, a crucial difference between interaction and mediation analysis is that the moderator variable does not depend on the exogenous construct, while—with mediation—there is a direct effect between the exogenous construct and the mediator construct (Hair et al., 2021b; Memon et al., 2019).

Table 2 presents the dimensions involved in the current analysis, their descriptions, and their usage in PLS-SEM. Several dimensions (see the table footnotes) initially included in the PLS-SEM were excluded from the subsequent analysis due to weaknesses related to the model assessment.

Table 2. Latent constructs, variables composing these constructs, codes, and description.

Latent construct	Variables code	Description
DIGITAL COMPETENCIES (Exogenous)	easy_info_online* compare_websites*	Easy for me to find information online *** Usually I compare websites ***
	easy_info_job_opp*	It is easy for me to find information about job opportunities ***
	course_info_online	I should pass a course on how to search for information on the internet ***
	diff_keywords**	It is difficult for me to decide which keywords are best for finding information on the internet ***
	diff_true_info**	Sometimes, it is hard for me to verify information ***
INTENSITY OF USE (Endogenous)	internet use reason*	Reasons you use internet***
	internetuse*	How long a day do you use internet in minutes? ***
	internetacc*	Can you use internet on the mobile phone? (yes, no)
	Phone*	Do you have a mobile phone? (yes, no)
	giga	Can you use mobile data unlimited? (yes, no)
	snetwork	Account on social network (yes, no)
CAPACITY TO FRONT SITUATIONS (Endogenous)	engage	I can always solve complex problems if I try hard enough ***
	obstacle	If someone objects to me, I can find the means and ways to achieve what I want***
	focus_obj	It's easy for me to stick around and achieve my goals ***
	unexpect_events	I am convinced that I can effectively cope with unexpected events ***
	manage_unexpect	Due to my ingenuity, I can behave in unforeseen situations ***
	manage_diffic	When faced with difficulties, I can remain calm, because I can count on my abilities to cope ***
	problem_solution	When I run into a problem, I can usually find a solution***
	manage_anything	I can usually deal with everything that happens***

Table 2. (Cont.) Latent constructs, variables composing these constructs, codes, and description.

Latent construct	Variables code	Description
TRAIT SELF CONTROL (Endogenous)	fear_to_fail**	I'm afraid of failure ***
	lack_trust**	I don't trust the system ***
	inferiority**	I feel inferior to the others ***
	fault**	I feel guilty ***
	forget**	I forget what I have to do ***
	unable_job**	I feel like I can't find a job ***
	post_pone**	I procrastinate on important decisions and tasks ***
SOCIO-EMOTIONAL SKILLS (Endogenous)	my_comp	The competencies I have are attractive in the labour market ***
	my_network	I have a network of contacts that I can use to get a new job ***

Notes: *This indicator was discarded from the subsequent analysis because it demonstrated weaknesses associated with the model evaluation; ** this indicator was reversed since it was originally inversely polarised; *** the question statements are answered on a five-point Likert-type scale; depending on the question, the following options were given to the respondents: 1 = *completely disagree*, 5 = *completely agree*; 1 = *it does not matter at all*, 5 = *very important*; 1 = *very bad*, 5 = *very good*.

In the PLS-SEM, the path diagram establishes the theoretical framework and identifies the constructs considered in the PLS-SEM analysis: one exogenous determinant and four endogenous variables, among which attention is paid to the effects on the socio-emotional skills. Since PLS-SEM lacks a universal fitting function for quality assessment, evaluating the model using various fit indices is crucial. Figure 1 shows the path diagram.

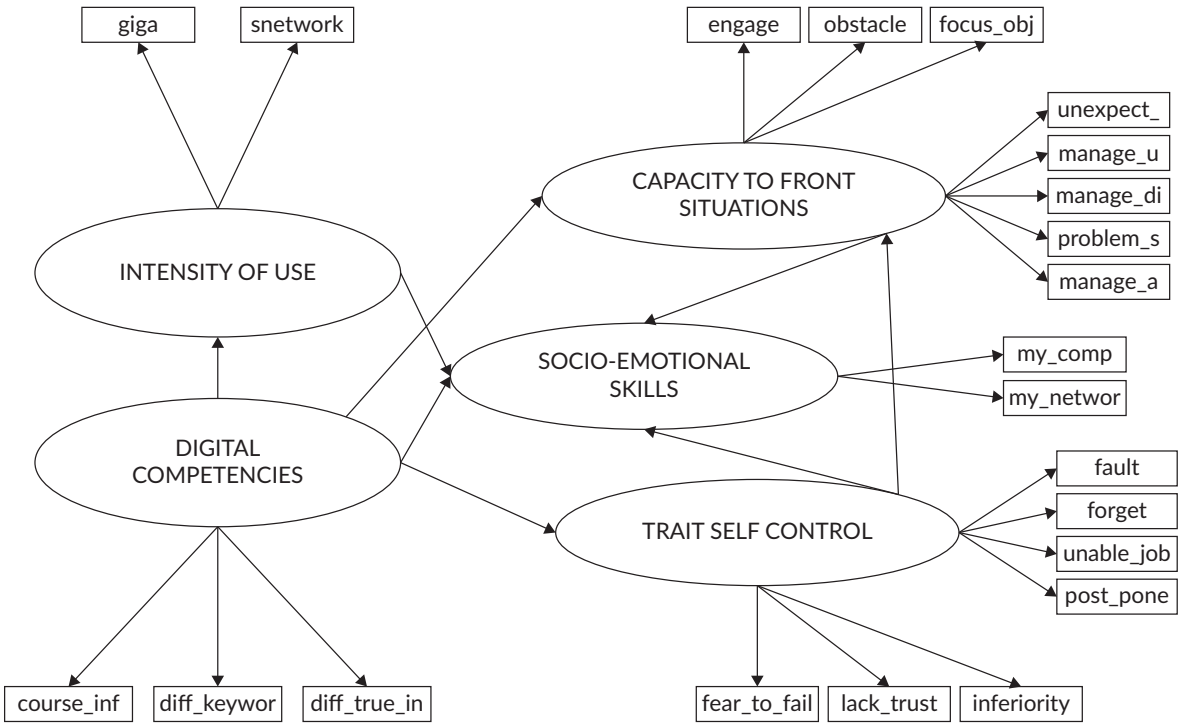

Figure 1. Path diagram: PLS-SEM path modeling (PM).

As previously mentioned, each PLS-SEM consists of two components: the measurement (outer) model, which explores the relationship between manifest variables and their associated LVs, and the structural (inner) model, which looks at the relationships between the LVs themselves (Kaplan, 2009). Specific validations are required to identify systematic structures in complex systems with numerous variables. Since PLS-SEM lacks a global fit function for evaluating its goodness, assessing the model using several fit indices is important. Table 3 outlines checks for the homogeneity and unidimensionality of the constructs based on three main indices: Cronbach's α, Dillon-Goldstein's ρ (or Jöreskog's ρ, also known as composite reliability ρ), and PCA eigenvalues. These measures confirm the validity of the model assumptions. Moreover, Table 2 shows the average variance extracted (AVE) to assess convergent validity, with the AVE for each construct exceeding 0.50, indicating that each construct accounts for at least half of the variability in its observed variables. Table 2 also displays the outer estimations, where all loadings are positive and statistically significant. Several variables initially included in the model were excluded from the analysis due to insignificant loadings. Additionally, to ensure consistency with the other indicators in the measurement model, the manifest indicators for trait self-control had their original scale reversed (Ringle & Sarstedt, 2016). The relative goodness of fit index (GoF) is 0.25 (Tenenhaus et al., 2005). The cross-loadings—that reflect the loadings of indicators with their respective constructs to confirm that the shared variance between a construct and its indicators exceeds that with other constructs—present satisfactory results, which have not been reported in the current article but are available on request. For additional insights on the usage of cross-loadings and different approaches to discriminant validity metric measures, see, among others Hair et al. (2021b), Henseler et al. (2015), Mazzocchi et al. (2024), and Radomir and Moisescu (2019).

Table 3. Block unidimensionality, overall model quality, and outer estimations.

Latent variable	Dimensions	Cronbach's alpha; D.G. rho (PCA); Eigenvalues; Average variance extracted (AVE)	Loadings	Standard error	Confidence interval (95%)
DIGITAL COMPETENCIES (Exogenous)	course_info_online	0.806; 0.886; 2.164, 0.499; 0.336; 0.717	0.810	0.135	(0.362; 0.995)
	diff_keywords		0.868	0.181	(0.08; 0.936)
	diff_true_info		0.862	0.021	(0.766; 0.848)
INTENSITY OF USE (Endogenous)	Giga	0.066; 0.682; 1.034, 0.966; 0.515	0.876	0.013	(0.831; 0.891)
	Snetwork		0.511	0.015	(0.829; 0.891)
CAPACITY TO FRONT SITUATIONS (Endogenous)	Engage	0.885; 0.910; 4.481, 0.840, 0.629, 0.543, 0.467, 0.400, 0.342, 0.298; 0.559	0.630	0.033	(0.681; 0.847)
	Obstacle		0.633	0.028	(0.744; 0.878)
	focus_obj		0.665	0.021	(0.583; 0.675)
	unexpect_events		0.825	0.017	(0.594; 0.663)
	manage_unexpect		0.819	0.017	(0.630; 0.700)
	manage_diffic		0.814	0.011	(0.802; 0.847)
	problem_solution		0.797	0.010	(0.794; 0.835)
	manage_anything		0.765	0.010	(0.789; 0.837)

Table 3. (Cont.) Block unidimensionality, overall model quality, and outer estimations.

Latent variable	Dimensions	Cronbach's alpha; D.G. rho (PCA); Eigenvalues; Average variance extracted (AVE)	Loadings	Standard error	Confidence interval (95%)
TRAIT SELF CONTROL (Endogenous)	fear_to_fail	0.839; 0.880; 3.596, 0.914, 0.664, 0.580, 0.492, 0.401, 0.353; 0.507	0.754	0.012	(0.761; 0.819)
	lack_trust		0.521	0.011	(0.734; 0.791)
	Inferiority		0.818	0.015	(0.721; 0.787)
	Fault		0.793	0.023	(0.464; 0.556)
	Forget		0.659	0.009	(0.799; 0.837)
	unable_job		0.708	0.011	(0.770; 0.821)
	Exogenous		0.695	0.018	(0.610; 0.697)
SOCIO-EMOTIONAL SKILLS (Endogenous)	my_comp	0.425; 0.777; 1.270, 0.730; 0.634	0.759	0.013	(0.685; 0.737)
	my_network		0.658	0.015	(0.660; 0.721)

As for structural coefficients, Table 4 shows the results for assessing the significance of the path coefficients.

Table 4. Inner estimations: Path coefficients and multigroup comparison.

Structural effects	Global model Path coefficient	Group 1 Path coefficient (Urban = 0)	Group 2 Path coefficient (Rural = 1)
Effects on INTENSITY OF USE			
DIGITAL COMPETENCIES	0.039	0.031	0.054
CAPACITY TO FRONT SITUATIONS	0.034	0.093	−0.008
TRAIT SELF CONTROL	−0.026	−0.029	−0.051
Effects on CAPACITY TO FRONT SITUATIONS: DIGITAL COMPETENCIES	−0.106	−0.086	−0.116
Effects on TRAIT SELF CONTROL: DIGITAL COMPETENCIES	0.059	−0.053	0.142**
Effects on SOCIO-EMOTIONAL SKILLS			
DIGITAL COMPETENCIES	0.122*	0.129	0.119
INTENSITY OF USE	0.077*	0.006	0.123**
CAPACITY TO FRONT SITUATIONS	0.166*	0.129	0.205**
TRAIT SELF CONTROL	−0.212*	−0.226	−0.0188

Notes: *The coefficient is significant at the 0.01 level; ** the difference between the path coefficients in Group 1 and Group 2 is significant at 0.1.

According to the results presented in Table 4, concerning the section "effects on *socio-emotional skills*," the evidence suggests that, in the global model, three path coefficients—*digital competencies*, *intensity of use*, and *capacity to front situations*—are positive and statistically significant. Therefore, when evaluating improvements in the indicators within these latent blocks, this positive relationship supports the model's validity in tracking the level of *socio-emotional skills*. The *trait self-control* construct has a significant and negative impact on the *socio-emotional skills*. This negative relationship was expected, considering that this

latent construct includes indicators that were originally inversely polarised because they negatively impacted *socio-emotional skills*. These indicators were then reversed so as not to affect the validity of the PLS-SEM model. *Socio-emotional skills* include two control variables, *my_comp* and *my_network*, and both positively affect this endogenous construct, and their positive correlations confirm the consistency of the analysis.

Assuming that several relationships in the *socio-emotional skills* might depend on people living in urban rather than rural areas, this article examines whether the relationships in a structural model differ across multiple groups, based explicitly on the *rural* variable. Therefore, *rurality* was investigated as a moderator variable in structural relationships. Concerning this kind of heterogeneity investigation, PLS-SEM offers several approaches, and the main methods consider permutation and bootstrapping approaches. The latter is considered in the current research, assuming that a significance level (alpha) of 0.1 is enough to display significant differences in path coefficients. Table 3, in addition to the whole sample (Global) results, shows the path coefficients for 'Group 1' and 'Group 2.' The results indicate that the path coefficients are significantly different between the two groups (at the 10% level) when considering the direct effects on *socio-emotional skills* of *intensity of use* and *capacity to front situations*, meaning that the *rural* moderator variable reveals significant differences in NEETs' behaviours in rural and urban areas.

In order to analyse indirect effects in addition to direct effects, the mediational hypothesis is that the *capacity to front situations* and *trait self-control* might mediate the relationship between *digital competencies* and *socio-emotional skills*. In SEM, there are several methods to test whether a mediating variable significantly mediates the relationship between an independent variable (IV) and a dependent variable (DV), and some of them refer to the Sobel Index (Sobel, 1987), the Delta Index, and Bootstrapping (Mehmetoglu & Venturini, 2021). Table 5 shows that the indirect effect *digital competencies* and *socio-emotional skills* via the *capacity to front situations* is −0.018 and the three procedures—Sobel, Delta, and Bootstrapping—for testing the significance of this indirect effect show that it is statistically significant. The approaches of Baron and Kenny (1986) and Zhao et al. (2010) to testing mediation confirm that *capacity to front situations* partially mediates the effect of *digital competencies* on *socio-emotional skills*. Specifically, the ratio of the indirect effect to the total effect (RIT) value is equal to 0.018/0.104 = 0.170, meaning that about 17.0% of the effect of *digital competencies* on *socio-emotional skills* is mediated by the *capacity to front situations*.

In the same way, Table 5 shows that the indirect effect of *digital competencies* and *socio-emotional skills* via *trait self-control* is statistically significant and equal to −0.013, with about 11.0% of the effect of *digital competencies* on *socio-emotional skills* being mediated by *trait self-control*.

Table 5. Significance testing of (standardised) indirect effect.

Statistics	Sobel	Delta	Bootstrap	RI: Indirect effect/Total effect Ratio of the indirect effect to the direct effect (RID)
Capacity to front situations				
Indirect effect	−0.018*	−0.018*	−0.018*	0.170
Standard error	0.004	0.004	0.004	0.145
Trait self-control				
Indirect effect	−0.013*	−0.013*	−0.013*	0.114
Standard error	0.004	0.004	0.004	0.103

Note: *The coefficient is significant at the 0.01 level.

4. Discussion

This study aimed to investigate the relationships between various factors, including digital competencies, intensity of internet usage, capacity to front situations, trait self-control, and their effects on socio-emotional skills. The investigation of the interaction between these factors is critical in navigating labour market challenges (Tomczyk, 2024; Wheeler, 2016). Digital competencies are foundational to overcoming barriers to employment (Charles et al., 2022; Tomczyk, 2024), while socio-emotional skills facilitate more effective engagement with labour market institutions (Wheeler, 2016); and the intensity of internet usage influences these competencies and skills in both positive (Waytz & Gray, 2018) and negative ways (Klimenko et al., 2021). Furthermore, self-control and the capacity to confront situations are critical for ensuring that digital tools are used productively and effectively in navigating labour market challenges (Duckworth et al., 2019; Kuss & Griffiths, 2017). Finally, determining engagement with the labour market refers to the crucial role of belonging to rural and non-rural NEETs (Simões & Marta, 2024; Tomczyk, 2024). Building upon this literature, suggesting a potential relationship between digital competencies, socio-emotional skills, intensity of internet usage, self-control and the capacity to front situations, and considering NEETs in urban and rural areas, the authors established six hypotheses and used the PLS-SEM algorithm to test them (Hair et al., 2021b; Sarstedt et al., 2022).

The path diagram established a clear theoretical framework and examined one exogenous determinant (*digital competencies*) and four endogenous variables (*intensity of use*, *capacity to front situations*, *trait self-control*, and *socio-emotional skills*) with a particular focus on socio-emotional skills. Since PLS-SEM does not provide a universal global fit function, we used multiple fit indices to evaluate model quality, including Cronbach's α, Dillon-Goldstein's ρ, and AVE, which confirmed the model's validity. The high AVE values for each construct indicate that the LVs explained more than half of the variance in their observed variables, further supporting the construct validity of the model. The measurement model showed strong reliability, with all manifest variable loadings being positive and statistically significant. This was confirmed by the cross-loadings, which demonstrated that the shared variance between a construct and its indicators exceeded the variance shared with other constructs, indicating adequate discriminant validity. Below, each hypothesis is addressed based on the findings of the PLS-SEM analysis.

Firstly, it was hypothesised that there is a significant relationship between the *intensity of use* and the *socio-emotional skills* (H1). The results from the PLS-SEM analysis confirm that the *intensity of use* has a positive and statistically significant relationship with *socio-emotional skills*. This supports H1, suggesting that increased internet usage is associated with higher levels of socio-emotional skills. This finding aligns with previous research that has highlighted the role of digital engagement in fostering social and emotional development, particularly in contexts where individuals actively engage with online platforms to develop communication, collaboration, and problem-solving skills (Waytz & Gray, 2018).

Secondly, there was the suggestion that there is a significant relationship between *capacity to front situations* and *socio-emotional skills* (H2). H2 is also supported by the data. The path analysis revealed a positive and significant relationship between the *capacity to front situations* and *socio-emotional skills*. As such, individuals who are better equipped to face challenging situations tend to exhibit stronger socio-emotional skills. This result underscores the importance of coping strategies and emotional regulation as key components of socio-emotional development, which are crucial for managing interpersonal interactions and handling stress effectively.

Third, it was hypothesised that there is a significant relationship between *trait self-control* and *socio-emotional skills* (H3). Results indicate that *trait self-control* has a significant negative relationship with *socio-emotional skills*, which might initially seem counterintuitive. However, this negative relationship was expected due to the nature of the self-control indicators, which were originally reversed to align with the model. The reverse scoring was necessary because these indicators, when not reversed, negatively impacted socio-emotional skills. Therefore, while the relationship is negative, it reflects a methodological adjustment rather than a fundamental contradiction to the hypothesis. In this context, lower self-control appears to correlate with higher socio-emotional skills, aligning with theoretical perspectives suggesting that certain aspects of self-control might hinder emotional and social development (Stavrova et al., 2022).

Fourthly, a test was carried out to discover if there is a significant relationship between *digital competencies* and *socio-emotional skills* (H4). H4 is strongly supported, as *digital competencies* were found to have a significant and positive relationship with *socio-emotional skills*. This indicates that individuals with higher levels of *digital competencies*, including the ability to navigate digital environments effectively, are more likely to possess enhanced *socio-emotional skills*. This finding is in line with studies suggesting that digital literacy contributes to the development of essential emotional and social capabilities, such as communication, empathy, and self-regulation, which are increasingly important in the digital age (Waytz & Gray, 2018).

The following two hypotheses focused on the mediating role of trait self-control and capacity to front situations: H5a (*trait self-control* presents a mediating role between *digital competencies* and *socio-emotional skills*) and H5b (the *capacity to front situations* presents a mediating role between *digital competencies* and *socio-emotional skills*).

For H5a, the mediational analysis confirmed that *trait self-control* partially mediates the relationship between *digital competencies* and *socio-emotional skills*. The indirect effect of *digital competencies* on *socio-emotional skills* through *trait self-control* was statistically significant, with approximately 11.0% of the effect mediated by *self-control*. This suggests that self-control plays an important role in how digital competencies influence socio-emotional outcomes, as individuals with higher digital competencies might develop better self-regulation abilities that, in turn, positively impact their socio-emotional skills.

H5b is also supported, with *capacity to front situations* found to partially mediate the relationship between *digital competencies* and *socio-emotional skills*. The indirect effect via this mediator was statistically significant, accounting for about 17.0% of the total effect. This highlights the importance of coping mechanisms in mediating the impact of digital competencies on socio-emotional skills. In other words, individuals who possess stronger digital competencies may be better able to confront and manage challenging situations, which in turn enhances their socio-emotional skills.

Finally, it was hypothesised that the area of residence significantly affects the relationships with *socio-emotional skills* (H6). H6 was partially supported by the findings. The moderation analysis revealed significant differences in path coefficients between individuals living in rural and urban areas, specifically concerning the effects of *intensity of use* and *capacity to front situations* on *socio-emotional skills*. This indicates that the area of residence—rural versus urban—moderates the relationship between these variables and socio-emotional outcomes. Rural NYNA NEETs exhibited different patterns of socio-emotional skill development compared to urban NYNA NEETs, which suggests that regional factors such as access to

resources, social support, and educational opportunities may play a critical role in shaping socio-emotional development. The significant differences found in the path coefficients support the need for tailored interventions that consider geographic and contextual factors.

In sum, the findings of this study provide robust support for the hypotheses related to the relationships between digital competencies, internet usage, self-control, capacity to front situations, and socio-emotional skills. The structural model used in this study highlights how NYNA NEETs with higher digital competencies tend to be more confident and effective in social interactions, which is crucial for building institutional relationships within the labour market and engaging in job search processes. The mediating roles of trait self-control and capacity to front situations were confirmed, further enhancing our understanding of how digital competencies influence socio-emotional development. Additionally, the moderation effect of rurality underscores the importance of considering geographic context when designing interventions aimed at improving socio-emotional skills. The study demonstrates that rural and urban NYNA NEETs face distinct challenges in terms of the relationships between these factors. Rural NYNA NEETs appear to experience more significant hurdles in fully utilising digital tools, likely due to geographic and infrastructural limitations. This disparity underlines the necessity of tailored interventions for rural youth to help them bridge the digital divide and develop the socio-emotional abilities needed to participate in the labour market effectively.

4.1. Implications for Research, Practice, and Policymaking

This article contributes to the literature on NEETs by showing how digital competencies and socio-emotional skills, influenced by internet usage, can shape labour market outcomes. It underscores the importance of addressing the unique challenges faced by rural NEETs and advocates a balanced approach to internet usage that fosters both technical and socio-emotional growth. Rural NEETs face more barriers, which suggests that geographic location is a significant moderating factor in labour market engagement and that rural youth may need additional support to fully benefit from digital tools and socio-emotional skill development. Importantly, the proposed model in this article presents itself as the first to study the association between digital and socio-emotional skills in a particular segment of the population, such as NYNA NEETs, showing the effect of the degree of urbanisation on this relationship.

Our findings offer valuable guidance for future research and practical applications in educational and social interventions aimed at improving socio-emotional skills. Policies aimed at improving labour market participation among NEETs should focus on enhancing digital competencies and socio-emotional skills, especially for rural youth. Interventions should consider not only improving internet access but also fostering self-control and the ability to manage demanding situations to help NEETs navigate the labour market successfully. This seems to be even more relevant for territories facing significant obstacles in ensuring that young people are equipped with the necessary skills to engage with emerging societal demands, such as Southern European countries like Italy, Spain, and Portugal (European Investment Bank, 2021). To bridge the rural-urban divide, public policies should promote capacity-building programmes and tailored support mechanisms that ensure NEETs in remote areas can fully participate in the constantly evolving labour market.

Finally, the variables explored in this study—digital competencies, trait self-control, capacity to front situations, intensity of internet use, and socio-emotional skills—are highly relevant for PES. These constructs

can inform tailored support strategies, diagnostic tools, and individualised intervention plans. For instance, assessing digital competencies and socio-emotional skills could help PES professionals better understand the readiness and support needs of NEET youth, allowing for more personalised vocational guidance or digital training programmes. Moreover, trait self-control and the capacity to front situations may help identify behavioural or motivational barriers that impact employability, particularly in long-term disengaged youth.

4.2. Limitations

Regarding the limitations of this study, firstly it is important to note that the sample sizes across the participating countries varied significantly, which makes it more difficult to draw broad conclusions. Secondly, due to the very small sample sizes in some of the participating countries, we were unable to perform country comparisons, despite recognizing that the socio-economic circumstances of NYNA NEETs are likely to vary significantly across different countries. Finally, due to the difficulty in accessing the target group, we had to employ non-probability sampling techniques.

5. Conclusion

Overall, this study contributes to the growing body of research on the complex interplay between digital engagement, emotional regulation, and socio-emotional development. It demonstrates that high digital competencies are positively related to socio-emotional skills, which are crucial for labour market engagement. Digital tools can enhance social interactions, especially when used for productive purposes like online learning. Our findings also highlight the mediating role of trait self-control and capacity to front situations in the relationship between digital competencies and socio-emotional skills. This implies that developing these intermediary traits is essential for NYNA NEETs to use digital tools productively and build the necessary socio-emotional skills for job market success. Moreover, the study shows that rural NYNA NEETs face distinct challenges in leveraging digital competencies and socio-emotional skills compared to their non-rural counterparts. These differences highlight the need for targeted and region-specific interventions that consider infrastructural, educational, and social inequalities to address the specific barriers faced by rural youth, such as access to digital tools and the development of socio-emotional skills (Simões & Marta, 2024; Tomczyk, 2024).

In conclusion, this study provides strong evidence supporting the importance of digital competencies in enhancing socio-emotional skills, with the capacity to front situations and trait self-control serving as key mediators in these relationships. Moreover, it emphasises their crucial role in a successful labour market engagement among NYNA NEETs, pointing out the distinct challenges of rural and non-rural NYNA NEETs.

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Conflict of Interests

The authors declare no conflict of interests.

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