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Assessing Greece's social vulnerability patterns in times of perma-crisis (2008–2022)

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Introduction: The study aims to map and analyse the development of social vulnerability patterns in Greece through a perma-crisis context (economic crisis, austerity, covid-19, energy, and inflation crisis) over the period 2008–2022.

Methods: The paper rests on the construction of a composite index of four key pillars of social vulnerability (employment, living conditions, health, and education) consisting of 15 selected variables obtained from the official Eurostat datasets and using PCA analysis.

Results: Our findings show that social vulnerability patterns in Greece demonstrate a considerable shift during the stated period where certain social groups (i.e., NEETs and precarious workers) seem to suffer the most. The first pattern (2008–2016) is largely characterized by the intensity and severity of the economic crisis and austerity measures, which contributed to the exacerbation of social vulnerability. The second pattern (2017–2022) presents a gradual decline mainly due to the recovery of the economy and a decrease in unemployment rates featuring a strong tendency to reach the pre-crisis levels in the years to come.

Discussion: The high levels of social vulnerability leading to social exclusion, poverty, and the widening of inequalities, impede the country's resilience and recovery efforts and undermine social cohesion.

KEYWORDS

social vulnerability, multidimensional crisis, austerity, index, inequalities, social cohesion, public policy, Greece

Introduction

Undoubtedly, social vulnerability is a complex and multi-parametric issue. Although definitional approaches and perspectives still vary, the notions of vulnerability and social vulnerability are positioned in a variegated terrain of academic debate. With the field afflicted by a lack of definitional clarity, inconsistent use of the term, and ill-suited methodologies, social vulnerability is often perceived as consequential of the intricate character of social systems (Tapsell et al., 2010). In this context, vulnerability generally focuses on the susceptibility of people to hazards and their capacity to cope with and recover from the effects of those. Correspondingly, social vulnerability refers to the intrinsic features of a group or individual that affect their capacity to forestall, confront, withstand, or recover from the effects of a hazard (Burton et al., 2018; Cutter and Emrich, 2006; Cutter and Finch, 2007; Eakin and Luers, 2006; Kelly and Adger, 2000). A crucial building block is the role of risk factors. Therefore, geographic, temporal, and spatial shifts in social vulnerability require different approaches, strategies, and actions from researchers and policy-makers. Acknowledging that the theoretical discourse on social vulnerability has

been long-standing, multifaceted, and conceptually rich due to its interdisciplinary and malleable character, it has not yet crystallized into a unified concept with well-defined boundaries and characteristics. Instead, it has been approached fragmentally, often resulting in confusion and a lack of comprehensive understanding.

In the era of perma-crisis (namely the multiple and consequent crises, from the 2008 credit crunch crisis and the resulting recession under the austerity doctrine to the onset of the refugee-migrant crisis in 2015, the COVID-19 crisis, and the current energy and inflation crisis), socio-economic problems and inequalities further strained social cohesion of modern societies, especially those of Europe's Southern periphery. For example, the implementation of rigorous fiscal measures in the context of rescue packages induced major effects on the economy, employment, and labor market increasing the unemployment rates for the youth, deregulating the labor market, and widening inequalities (Papadakis et al., 2017). With an eye to case selection, the following considerations were central. First, Greece's continued economic under-performance and stunted growth of the previous period prompted a parallel crisis of social characteristics that reduced its capacity to respond adequately and promptly as a result of the state's chronic structural, operational, and administrative pathologies and economic problems (e.g., closed economy). While economic indicators have been in the spotlight of incessant academic study, the field of social vulnerability remained somewhat untouched drawing little attention and systematic research over the stated period. Contrary to expectations that the economic crisis would have spawned a proliferation of studies addressing the issue of social vulnerability, the existing literature is fraught mostly with analyses of individual sectors (e.g., employment, disposable income, education) commonly treated in isolation and not as an aggregate of factors and conditions contributing to such complex phenomenon.

Our analysis begins in 2008, marking the end of Greece's period of economic prosperity. Despite initial assurances, Greece's vulnerability was exposed by the global financial crisis and its sovereign debt crisis had profound and lasting effects on its economy, governance and society characterized by a sharp GDP contraction, soaring unemployment, increased poverty and widening inequality (Katsikas, 2018; Meghir et al., 2017). The country's reliance on borrowing to finance deficits became unsustainable while austerity measures included deep cuts to public spending, pensions, and wages (Reinhart and Trebesch, 2015). Greece's post-2008 perma-crisis was exacerbated by several factors. Internally, unsustainable public debt stemming from excessive public spending and structural weaknesses in governance and public sector (i.e., tax evasion, bureaucracy, corruption) hindered effective crisis management and reform implementation. Externally, the global financial crisis, Eurozone debt crisis, and later the pandemic and energy crises increased pressures and prolonged Greece's economic hardships (Hardouvelis et al., 2024; Hardouvelis and Vayanos, 2023; Lavdas, 2018; Featherstone, 2011).

Despite the challenges of addressing all public policies implemented during the stated period, it is essential to highlight key developments. In the employment sector, austerity measures aimed to reduce unemployment and increase flexibility. While these measures initially achieved some goals, they increased precarious employment, in-work poverty and job insecurity (Papadakis et al., 2021; Katsikas, 2018). Although the post-crisis economic climate and European programs like SURE have improved the employment condition, in-work poverty remains a persistent issue (Schwarz, 2023). To

mitigate poverty and social exclusion, the Greek government introduced social programs like the Social Solidarity Income in 2017 (Giannitsis and Zografakis, 2016). However, the cumulative impact of austerity measures exacerbated social vulnerability particularly for the middle and low income groups. This led to increased material deprivation, housing insecurity, and widespread poverty (Matsaganis, 2013). In healthcare, despite the introduction of programs such as the universal health coverage in 2016, significant spending cuts made during the crisis deteriorated public service provision and increased unmet healthcare needs especially among the poor and disabled (Rotarou and Sakellariou, 2019; Economou et al., 2015). Finally, education policies were significantly impacted due to lack of funding and cost-cutting. While several efforts made to address issues such as school dropout rates (Tsolou and Babalis, 2020; Nikolaou et al., 2018) through programs to improve access to education for disadvantaged groups, youth disengagement from education, training and employment (NEETs) remained a critical challenge (Papadakis et al., 2021; Papadakis et al., 2017). From a political perspective, our study seeks to contribute to the academic debate and nascent literature on social vulnerability in Greece in two novel ways, by introducing a new methodological tool (index) to measure social vulnerability and providing interpretative clarity. To fill the knowledge gap in the existing scholarship, firstly, our study builds on previous research (Melidis and Tzagkarakis, 2022) and constructs a composite index that will enable us to advance our analysis with more sophisticated tools. Secondly, applying the index to our case we aim to group the determinants and conditions shaping this multifaceted issue and explain the emerging patterns and dynamics of the crisis period. In the absence of systematized past efforts and in-depth research on social vulnerability, our study seeks to provide a deeper understanding of the current state of play in a largely under-explored case such as Greece.

Our methodology hinges on the use of hierarchical models by selecting and organizing 15 variables into 4 pillars (a. employment, b. living conditions, c. health, d. education), and utilizing data sourced from the official Eurostat datasets over the period 2008–2022. For validating and measuring the reliability and internal consistency of the index we applied the method of Cronbach's Alpha and for the categorization and weighting process the Principal Component Analysis (PCA), and the Analytical Hierarchy Process (AHP). The input parameters of our composite index were based on data consistency and representativeness, and a robust set of variables that can be monitored over time. It is interesting to note that the entire approach would be more to structure our knowledge and identify potential profiles of certain social groups and concede gaps therein than of single individuals who were exposed to the risks of the perma-crisis cycle.

Conclusively, our findings demonstrate two patterns from 2008 to 2022 with persistent inequalities. The first pattern (2008–2016) shows that social vulnerability is commensurate with the acrimony of the crisis. Unlike, the second pattern (2017–2022) presents a moderate de-escalation as a result of the recovery of the economy and reduction in unemployment rates with a propensity to continue in the future. The youth (NEETs) appear to be the most vulnerable group in this research owing to a rather disjointed labor market with precarious employment, a higher risk of in-work poverty, and social exclusion. The remainder of the paper is structured as follows: First, we provide a thumbnail sketch of the conceptualization and genealogy of social vulnerability along with previous research. Then, we develop the

methodology, analyze data results, discuss Greece's social vulnerability patterns, and juxtapose research findings with the existing scholarship. Finally, we provide the conclusions, research implications, and new avenues for future research.

Defining social vulnerability

The study of vulnerability has seen great development and expansion over the last 50 years initially in the environment and then in human and social sciences (Spini and Widmer, 2023; Ranci, 2010; Tapsell et al., 2010). The term traces its roots back to climate studies, food security, and natural hazards literature and conveys the idea of susceptibility to harm or damage or the potential to suffer loss or harm (Drakes and Tate, 2022; Fekete, 2019; Burton et al., 2018; Fatemi et al., 2017; Eakin and Luers, 2006; Kelly and Adger, 2000). From the relative non-existence of the term in the mid-1980s to today's inflationary and multi-purpose use in scholarship, vulnerability yields a sizeable terminological and conceptual diversity that moves across several disciplines (i.e., environmental and climate studies, anthropology, geography, economics, health, psychology, sociology, development, and security) and groups (i.e., academia, research groups, disaster and risk management agencies, development corporations, climate change organizations). Vulnerability is generally seen as a feature of individuals or groups of people that highlights differences within societies without being a permanent and absolute quality but is determined by a combination of factors (Cutter and Finch, 2007). As such, it can be potentially experienced by anyone at any given time due to structural factors, social conditions, and variations in the cultural, demographic, socioeconomic, governance, institutional, and environmental patterns of a system (Oris et al., 2016). Given the vibrant environments, vulnerability is not a static but dynamic concept that varies considerably across social and geographic space and time. Notably, it has been defined at will by diverse actors causing ambiguity and inconsistency in its use and meaning with its analytical approach requiring further elucidation (Zimmermann, 2017). Because of its positioning in a rather fragmentary field and unsettled debate, the lack of a widely agreed-upon definition bears serious interpretative hurdles. For clarity, we will count here on Chambers (1989, p. 1) definition, "*Vulnerability refers to exposure to contingencies and stress, and difficulty in coping with them. Vulnerability has thus two sides: an external side of risks, shocks, and stress to which an individual or household is subject; and an internal side which is defencelessness, meaning a lack of means to cope without damaging loss. Loss can take many forms becoming or being physically weaker, economically impoverished, socially dependent, humiliated or psychologically harmed.*"

Among the most common features of vulnerable populations identified in the existing literature are poverty, minority (ethnic and national, i.e., Roma, LGBTQ+), migration (refugees, asylum seekers, migrants, and internally displaced), liberty status (prisoners and detainees), socio-economic class/caste, race/ethnicity, religion, gender, age, seniority (babies, infants, children, adolescents, pregnant-, working-women, and the elderly), employment, financial situation (homeless, persons living in poverty), lack of mobility and accessibility, deprivation, isolation, health, disability, language/literacy, technological systems (people dependent on systems over which they have no control), housing type and tenure (renter or owner), family structure (large, single-parent families), lack of social support from

social networks, discrimination, stigmatization, victimization, foreign citizens and travelers (Ippolito and Sanchez, 2015; Blaikie et al., 1994).

Broadly, the debate over definitions of vulnerability stems predominantly from three schools of thought generating a range of analyses, methodologies, and various normative inferences. These are (i) Risk/Hazard or Biophysical Approaches, (ii) Political Economy and Political Ecology, and (iii) Ecological Resilience. Here our focus is on social vulnerability as a dimension of vulnerability related to Political Economy and less so on Political Ecology. Particularly, the former centers on the structural perspective of economic, social, political, institutional, and contextual factors as well as cross-scalar interplays, and multiple and concurrent stressors (i.e., negative situations such as social exclusion) that result in vulnerability through differing exposure to hazards (Burton et al., 2018; Sen, 1981). The latter considers how the above factors impact vulnerability to hazards. For both, failures of economic and political systems may engender inequality, marginalization, social exclusion, and constraints on individual actions (Blaikie et al., 1994).

Much of the literature indicates that social vulnerability pertains to the incapacity of individuals, people, organizations, and societies to foresee, cope with, resist, and recover from adverse impacts derived from manifold stressors (natural or human-caused disasters) (Cutter and Emrich, 2006; Wisner et al., 2004; Kelly and Adger, 2000; Blaikie et al., 1994). These impacts are partly associated with features that are intrinsic in social interactions, institutions, communities, systems of beliefs, and cultural values. Importantly, the different faces of social vulnerability are discerned in the context of a social construct as a by-product of social inequalities and historic patterns of social relations, power asymmetries, social dynamics, and social problems (Fordham et al., 2013). From this perspective, social inequality aims to posit individuals or groups of people into a frame of disadvantaged. Eloquently, Sen (1981) asserted that social vulnerability may depend on the lack of resources and the intricacy encountered in turning available resources into opportunities. The latter appears to explicate the existence of high poverty levels in rich societies. In a narrow sense, social vulnerability points to the resource allocation problem among antagonizing individuals and groups on the grounds of their dwelling, work, and entitlements (assets).

A better understanding of social vulnerability requires a deeper view of circumstances and conditions. For example, it is not income or disability in isolation that generates vulnerability but it is also the society's failure to discern such a condition that can disintegrate the social fabric (Wisner et al., 2004). By focusing on the "social" aspect, the central point becomes the relationships of individuals or groups of people with society and the societal and physical environment people live in (Tapsell et al., 2010). In this setting, Fekete (2008, p. 394) argues that "*social vulnerability is often hidden, complex and nested in various human aspects and contingencies bound to different levels of society.*" Through this lens, several factors (e.g., pre-existing socioeconomic structures; proneness to harm, defencelessness; and uneven access to resources) can influence the capacity of those being affected to respond to varying conditions adaptively. At the level of the individual, social vulnerability constitutes merely a risk that can be viewed as a function and exposure to a hazard. At the level of society, social vulnerability acknowledges that individual risks are not evenly dispersed and that this risk unevenness is not simply ascribed to a hazard, but to inequalities and conditions occurring in daily life—preceding the inception of a certain high-risk event such as an economic crisis (Bara, 2010).

Although all individuals and groups of people are exposed to risks from diverse sources, some can be at greater risk. In this regard, risk is built into social processes, policies, institutions, and relationships and social vulnerability fits well within the context of a stratified society in which people lacking the means and resources may be unable to respond adequately and promptly (Fordham et al., 2013).

Aside from risk profiles, the concept of social vulnerability also involves the character of risks. In this context, there seems to be a transition from conditions where the link between causes and outcomes was eminent to a situation marked by unanticipated and differing extents of exposure to potential harm contingent on a composite group of risk factors. Simply put, the diffusion of new social risks may uncover the uncertain access to basic means (salary) and/or the frailty of social networks (family and community) (Hanlon et al., 2024). Evenly, the scarcity of resources and social disorganization at high levels may compromise daily life steadiness. As Ranci (2010, p. 18) argues “[Social vulnerability] it takes the form of a life situation in which autonomy and the capacity of individuals and families for self-determination are threatened by the introduction of uncertainty into the main systems of social integration. The instability of the social position does in fact translate into a reduction of opportunities in life and of possibilities for choice. It is characterized not so much by the scarcity of resources tout court, as by the instability of the mechanisms used to obtain them.” The above also speaks to the malaise of modern societies with the development of new social risks in the last decades such as labor market flexibilization, family discontinuities, insufficient social integration, economic precariousness, unemployment, in-work poverty, social exclusion, marginalization, lack of access to healthcare services, housing deprivation, income insecurity, persistent and increasing gender inequalities, stereotypes, and age-based dependency (Limanté and Tereškinas, 2022).

Previous research

Various studies have noted considerable changes in the structure and level of poverty and income distribution in Greece (Petraikos et al., 2023; Andriopoulou et al., 2019). These are reported in a significant deterioration of the position of different socio-economic groups, a dramatic rise in economic disparities and material deprivation, and worsening living conditions (Hardouvelis et al., 2024; Andriopoulou et al., 2018; Matsaganis, 2013). With successive governments prioritizing the country’s fiscal consolidation and economic recovery, a parallel social crisis unfolded which was often off the radar of the bailout programs. Consequences of the social crisis were the downsizing of social services and slashing of social policies and benefits, the impoverishment of the middle class, the rising cost and lowering of living standards for large parts of the population, particularly for the most vulnerable ones, such as children, young people, women, migrants, the elderly, poor and disabled (Giakoumatos and Loukas, 2019). Evidence of this view can be found in the Eurostat and ELSTAT datasets in which Greece over this period has shown one of the highest rates *per capita* in the EU in the categories of unemployment, income inequality, people at risk of poverty or social exclusion, material, and social deprivation.

Long before the advent of the crisis, Economou et al. (2015) asserted that Greece’s National Health System (ESY) suffered from several inefficiencies being largely unprepared to cope with austerity budgets, the provision of high-quality health services, and the

wellbeing of citizens. Accumulated problems such as outdated organizational and administrative structures, lack of coordination and planning, ineffective gatekeeping, and fragmented financing mechanisms along with limited managerial capacity and misallocation of human and economic resources in a highly centralized decision-making system limited significantly its ability to respond adequately and meet the health needs of the population. According to Karanikolos and Kentikelenis (2016), healthcare experienced significant cuts and compromised access to and provision of services thus failing to live up to its pledge of universal health coverage with an increase in the health inequality gap. In a similar vein, Rotarou and Sakellariou (2019) investigated unmet health needs for people with and without disabilities and their access to healthcare with the former reporting higher unmet healthcare needs and more barriers linked to a lower socio-economic status.

Other studies focused on the gender gap, unemployment dynamics, and inequalities in Greece’s labor market (Martín et al., 2020). Among those, Karamessini (2013) assessed the labor market effects of the crisis and the gendered division of paid work demonstrating more detrimental impacts on men rather than women with a significant erosion of the male-breadwinner model and a suspension of women’s progress toward gender equality in paid work. In their more recent work, Karamessini et al. (2019) assessed the individual-level factors affecting youth unemployment and inactivity and Symeonaki et al. (2019) investigating early job insecurity and its evolution over time showed considerable gender-based differences in labor force participation. It is worth mentioning that youth unemployment has been historically high and considered a major concern for policymakers. According to Eurostat, youth unemployment reached a record high of 59.20% in December 2013 and a record low of 21.90% in December 2008. In the opinion of Matsaganis (2015), the causes should be sought in a broad nexus of factors such as the adverse macroeconomic conditions, the internal devaluation and deregulation of market institutions, the skills mismatches induced by issues on the demand and the supply side, the poor functioning of the educational system at all levels and its poor design for the needs of a dynamic economy. For other academics (Ioakimidis and Papakonstantinou, 2017; Papadakis et al., 2017; Drakaki et al., 2022) socio-economic factors such as the lack of a modern educational model, and vocational training, low income, family status, and individual condition have all amplified proclivities of a retarded youth autonomy leading to high levels of youth unemployment. Likewise, the disconnection of employment with education and training systems hindered their social mobility generating phenomena of social marginalization, exclusion, and intergenerational transmission of poverty.

Methodology

The study harnesses the structure and properties of hierarchical models and builds a composite index to measure social vulnerability (Mah et al., 2023; Spielman et al., 2020). Importantly, we acknowledge that although composite indicators contain data, they might omit significant perspectives and details that are difficult to manifest in statistical and numerical forms (Schneiderbauer et al., 2017). In principle, hierarchical models often use several indicators (i.e., 10–20), gathered into pillars that are within the same dimension. Following, the pillars are gathered to generate the index (see Figure 1; Tate, 2012).

To create our model, we utilized four specific hierarchical dimensions of variables. The variables were selected based on their representativeness and relevance to vulnerability while employed as a common measurement-recording method to ensure consistency. These variables are highly associated with the most significant social vulnerability issues while being concurrently recorded in a standardized manner by Eurostat, addressing potential measurement biases, ensuring uniform definitions and recording practices across all variables (Spicker, 2014). All datasets undergo rigorous validation processes to ensure accuracy and reliability (European Commission, 2024). Also, it should be clarified that only those variables with consistent data coverage across the full study period were considered to provide robustness in longitudinal comparisons. To mitigate biases related to missing data, incomplete variables over the selected period were excluded from the analysis. Furthermore, the selected variables were critical for our index in shaping the conditions for a holistic measurement of vulnerability across its different dimensions. This strengthens our confidence that our database does not contain any systematic bias. Moreover, to ensure transparency and consistency, the data for each dimension of social vulnerability were sourced from the official Eurostat¹ datasets (secondary data) as one of the most reliable data pools.

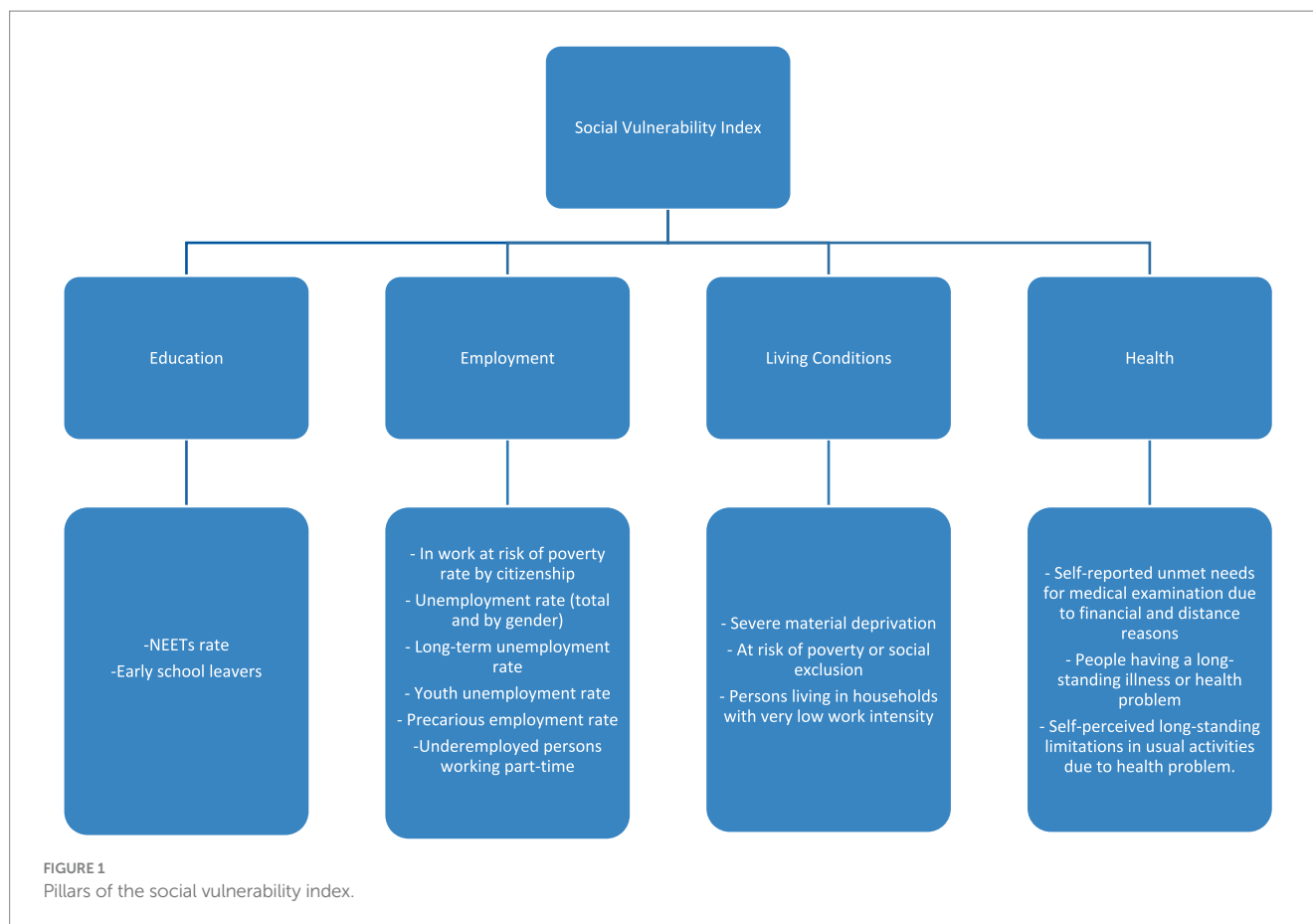
Particularly, the four pillars are as follows: a. employment, b. living conditions, c. health, d. education. Although there is no universally accepted definition in the literature that includes specific variables, the study focused on these four pillars as they adequately represent

vulnerable situations. Employment constitutes the fundamental parameter of socialization for every individual and the process that enables survival and improvement of living conditions. Any disruption in employment, both as a right and as a social integration process, can lead to vulnerability (Eurofound, 2002). The variables used to form the employment dimension are: a. In-work at risk of poverty rate by citizenship, b. Unemployment rate, c. Long-term unemployment rate, d. Youth unemployment rate, e. Precarious employment rate, f. rate of underemployed persons working part-time. The second dimension pertains to living conditions. These variables highlight the extent of citizens' vulnerability, encompassing the measurement of social risks they face, such as poverty and social exclusion, and include: a. Severe material deprivation, b. At risk of poverty or social exclusion (before and after social transfers), c. Persons living in households with very low work intensity. Importantly, all variables were weighted by gender (male–female).

Another key pillar of vulnerability is that of health. Its disruption can be attributed either to physical incapacity or to discrimination stemming from the inability to access healthcare services due to financial problems (Rohde et al., 2017). Therefore, the inclusion of such variables addresses one of the most crucial risk factors for both the quality of life and the survival of vulnerable citizens. The variables involve: a. Self-reported unmet needs for medical examination due to financial and distance reasons, b. People having a long-standing illness or health problem, c. Poor self-perceived health in lower income quintiles, d. Self-perceived long-standing limitations in usual activities due to a health problem. The fourth pillar of the index is education which plays a pivotal role in reducing social vulnerability by offering individuals and communities a pathway to empowerment, resilience, and well-being. Education equips individuals with the necessary knowledge and skills that can contribute to reducing vulnerability by granting economic opportunities and more equal societies. In this pillar only two variables are noticed: a. NEETs rate and b. Early school leavers rate.

Prior to the analysis, all data were cleaned and standardized to ensure comparability. The statistical package SPSS V.25 was used to conduct all statistical analyses. To create the composite indicator/index of social vulnerability, weights were assigned to each dimension and its corresponding variables. The weighting process was conducted through Principal Component Analysis (PCA) and Analytical Hierarchy Process (AHP). Specifically, Principal Component Analysis (PCA) was employed to identify clusters of correlated variables, reduce dimensionality and capture the key contributors to social vulnerability. To determine the relative importance of each variable in reflecting social vulnerability, the Analytical Hierarchy Process (AHP) was used to assign weights. Conducting PCA and Factor Analysis amalgamated the correlated indicators to create a composite indicator aimed at encapsulating the shared information among those indicators as comprehensively as feasible. Each factor identifies the cluster of indicators most strongly correlated with it. Consequently, the resultant index is no longer contingent on the dataset's dimensionality but rather aligns with the statistical dimensions of the data. In this approach, weighting—based on the variance—was primarily utilized to address the redundancy among two or more interrelated indicators rather than serving as a measure of an indicator's significance. The primary objective was to ensure that each dimension's contribution to the composite indicator/index was proportional to its importance in social vulnerability. PCA showed how different variables change and relate to each other (OECD, 2008). Factor Analysis exhibited that the index is

1 The codes of the Eurostat datasets that were used in our model are the following: hlth_silc_08, hlth_silc_11, hlth_silc_07 for the health pillar, ilc_peps01n, ilc_mdsc11, ilc_lvhl11n for the living conditions pillar, edat_lfse_20, edat_lfse_14 for the education pillar and ilc_iw15, une_rt_a, une_ltu_a, une_rt_a, lfsa_qoe_4ax1r2, lfsa_sup_age and lfsa_epgaed for the employment pillar. The data for the health pillar were sourced from the following Eurostat databases: https://ec.europa.eu/eurostat/databrowser/product/page/HLTH_SILC_08__custom_3748553, https://ec.europa.eu/eurostat/databrowser/view/HLTH_SILC_11/default/table?lang=en, https://ec.europa.eu/eurostat/databrowser/view/hlth_silc_07/default/table?lang=en&category=hlth.hlth_state.hlth_fal. The data for the living conditions pillar were sourced from the following Eurostat databases: https://ec.europa.eu/eurostat/databrowser/view/ILC_PEPS01N__custom_6444563/default/table?lang=en, https://ec.europa.eu/eurostat/databrowser/view/ILC_MDSD11__custom_7435338/default/table?lang=en, https://ec.europa.eu/eurostat/databrowser/view/ilc_lvhl11n/default/table?lang=en. The data for the education pillar were sourced from the following Eurostat databases: https://ec.europa.eu/eurostat/databrowser/view/EDAT_LFSE_20__custom_511924/default/table?lang=en, https://ec.europa.eu/eurostat/databrowser/view/EDAT_LFSE_14__custom_748415/bookmark/table?lang=en&bookmarkId=8fb218ca-bef6-49c6-808d-974d463af203. The data for the employment pillar were sourced from the following Eurostat databases: https://ec.europa.eu/eurostat/databrowser/view/ilc_iw15/default/table?lang=en, https://ec.europa.eu/eurostat/databrowser/view/UNE_RT_A/default/table?lang=en, https://ec.europa.eu/eurostat/databrowser/view/UNE_LTU_A/default/table?lang=en, https://ec.europa.eu/eurostat/databrowser/view/UNE_RT_A/default/table?lang=en, https://ec.europa.eu/eurostat/databrowser/view/lfsa_qoe_4ax1r2/default/table?lang=en, https://ec.europa.eu/eurostat/databrowser/view/lfsi_sup_a/default/table?lang=en.



consistent as the initial eigenvalues' variance is above 50% (57.37%, see Table A1). Cronbach's Alpha is 89.1% which attests to the high reliability of the index (see Table A2).

On the other hand, our model encountered some limitations. Firstly, missing values regarding specific variables (e.g., material deprivation and non-participation in childhood education) over certain years from the Eurostat dataset was a barrier in the screening process, especially for the stated period (2008–2022). To ensure the consistency and robustness of our index, these were excluded. Secondly, the use of different measurement methods of specific variables in the Eurostat and other databases (e.g., ILO, OECD) related to social vulnerability hampered the use of pertinent variables in a greater sample as the accuracy and suitability of the model would be seriously compromised. Thirdly, variables with similar (or even overlapping) meanings (i.e., material deprivation vs. severe material deprivation) that would render their differentiation challenging in the model led us to choose those with a better fit into the model and more clarity in their use. Fourthly, in light of data variability and variable review, meaning that some variables were periodically subject to revisions by Eurostat at face/numerical value, we provided all the updates to our sample to avoid any divergence that could undermine our model's quality standards.

Data analysis

The index analysis highlights the persistence of socio-economic problems in Greece over the past 15 years. As evident in Figure 2, social

vulnerability was already at high levels (21.76%) before the outbreak of the economic crisis (2008–2009). In the first years of the economic crisis (2010–2013), a dramatic increase in social vulnerability was observed, as it rose from 24.7% in 2010 to 32.76% in 2012 and then culminated in 2013 at 34.22%. This increase reflects the exacerbation of economic difficulties. Subsequently, social vulnerability remained at very high levels during the years 2012–2017 with minor variations. However, from 2017 to 2022, a gradual decrease is noted, although far from the low levels of 2008–2009. This decrease indicates a significant de-escalation, in which economic and social issues are seemingly reduced, and economic growth is slowly recovering, despite the obstacles posed by the COVID-19 pandemic between 2020 and 2022.

The employment pillar points to severe problems in Greece's labor market before-and their exacerbation during the crisis. Important differences also lie within the selected variables about the challenges faced by the vulnerable groups (see Table 1). It appears that migrants compared to native-born face a higher risk of in-work poverty. General unemployment skyrocketed after 2010 but followed a downward trend from 2016 onwards; nevertheless, it has not yet reached the 2008 low levels. Long-term unemployment, which was at 3.7% in 2008, increased to 17.5% in 2014 and then gradually fell to 7.7% in 2022. Nevertheless, it remains considerably higher compared to 2008, leading us to claim that the pandemic did not have such a strong impact. A similar trend is observed in youth unemployment (aged 16–25) which entails the serious problem of integrating young individuals into the labor market. Only in 2022, youth unemployment shows a tendency to gradually return to the 2008 levels. Precarious

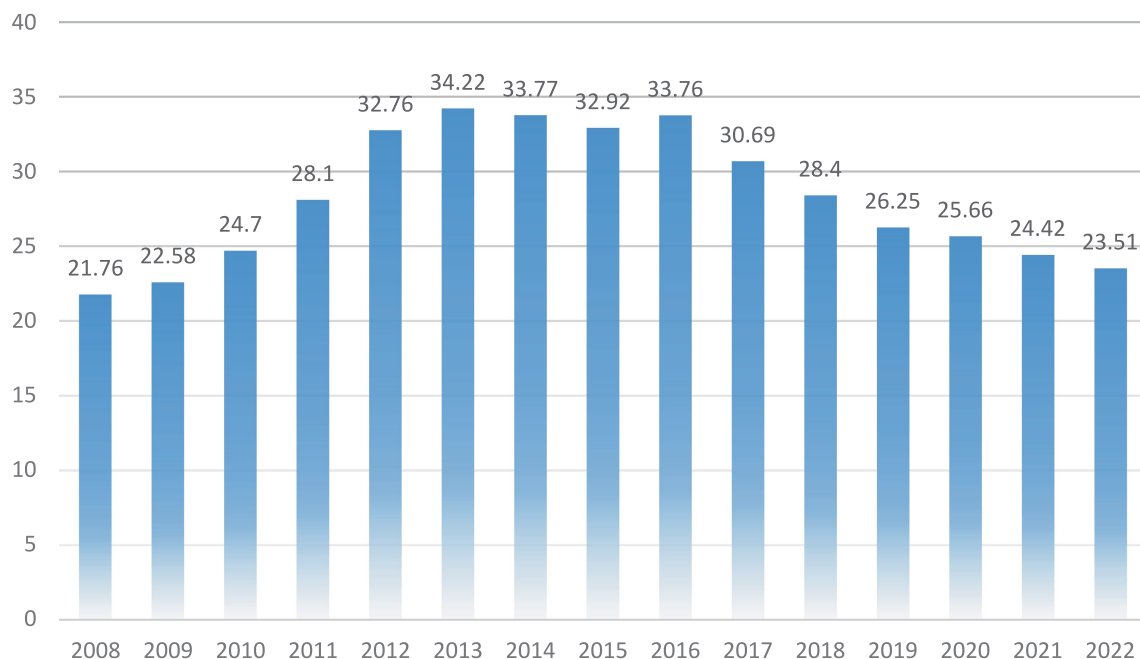


FIGURE 2 Social vulnerability index in Greece. Authors' Compiled Data from the Eurostat Datasets (<https://ec.europa.eu/eurostat/data/database>).

TABLE 1 Employment pillar of social vulnerability.

	In-work at risk of poverty (natives)	In-work at risk of poverty (foreigners)	Unemployment rate	Long-term unemployment	Youth unemployment	Precarious employment	Underemployed working part-time
2008	13.5	24.8	7.8	3.7	21.7	1.3	1.6
2009	12.6	28.3	9.8	3.6	26.1	1.3	1.6
2010	12.0	34.3	12.9	5.2	33.6	1.5	1.9
2011	10.6	29.4	18.1	8.8	45.2	1.7	2.2
2012	13.5	32.7	24.8	13.1	55.9	1.8	2.7
2013	11.5	32.7	27.8	16.7	59.2	1.8	3.0
2014	12.0	32.4	26.6	17.5	53.0	1.8	3.4
2015	12.1	31.5	25.0	16.4	50.3	1.7	3.5
2016	13.0	28.0	23.9	15.4	48.2	1.6	3.9
2017	11.7	27.9	21.8	14.3	44.5	1.5	3.8
2018	9.7	27.0	19.7	12.5	41.2	1.3	3.6
2019	9.4	21.9	17.9	11.3	37.5	0.8	3.5
2020	9.4	19.5	17.6	10.5	38.0	1.0	3.0
2021	10.7	21.7	14.7	9.2	35.5	1.0	2.8
2022	10.0	20.9	12.5	7.7	31.5	1.1	2.6

Authors' Compiled Data from the Eurostat Datasets (<https://ec.europa.eu/eurostat/data/database>).

employment also seems to have increased following a gradual decline post-2016. Finally, the rate of underemployed working part-time rose significantly, however, it showed a drop after 2016 (up until 2022).

The living conditions pillar manifests the level of difficulty in meeting basic daily needs. As shown in Table 2, severe material deprivation, which reflects the inability to satisfy significant living needs, dramatically increased after 2009, rising from 11.0 to 22.4% in 2016. This was followed by a gradual reduction until 2022. A

substantial portion of the Greek population was already at risk of poverty and social exclusion prior to the outbreak of the economic crisis. This risk escalated dramatically up until 2016 and recorded a steady decline from 2017 to 2022. Finally, the number of citizens living in households with very low work intensity experienced a dramatic increase after 2010, reaching a high of 19.2% in 2016. Similar to other variables, there seems to be a decreasing trend up until 2022, yet the rates are considerably higher in the years preceding the economic crisis.

TABLE 2 Living conditions pillar of social vulnerability.

	Severe material deprivation	At risk of poverty or social exclusion	Persons living in households with very low work intensity
2008	11.2	28.1	9.0
2009	11.0	27.6	8.1
2010	11.6	27.7	8.7
2011	15.2	31.0	13.6
2012	19.5	34.6	16.6
2013	20.3	35.7	19.2
2014	21.5	36.0	19.0
2015	22.2	35.7	18.6
2016	22.4	35.6	19.2
2017	21.1	34.8	17.5
2018	16.7	31.8	16.4
2019	16.2	30.0	15.6
2020	16.6	28.8	14.2
2021	13.9	28.3	14.5
2022	13.9	26.3	14.5

Authors' Compiled Data from the Eurostat Datasets (<https://ec.europa.eu/eurostat/data/database>).

TABLE 3 Health pillar of social vulnerability.

	Self-reported unmet needs for medical examination	People having a long-standing illness or health problem	Some or severe self-perceived long-standing limitations in usual activities due to health problem
2008	5.4	22.1	19.7
2009	5.5	22.0	18.7
2010	5.5	22.6	18.7
2011	7.5	23.2	20.0
2012	8.0	23.7	22.6
2013	9.0	23.7	23.0
2014	10.9	23.9	24.0
2015	12.3	24.0	24.8
2016	13.1	24.0	24.7
2017	10.0	23.7	24.3
2018	8.8	23.4	23.8
2019	8.1	23.7	23.1
2020	6.5	23.7	23.5
2021	6.4	24.3	23.3
2022	9.0	24.9	22.2

Authors' Compiled Data from the Eurostat Datasets (<https://ec.europa.eu/eurostat/data/database>).

Healthcare is another worrying issue for many people in the country (see Table 3). Over the crisis period, there has been a dramatic increase in the number of people who were unable to afford medical examinations due to financial problems. The percentage of those facing chronic health problems increased slightly during the pandemic and stood at the same high levels up to 2022, while the percentage of those facing some or severe long-standing limitations due to health problems remarkably augmented.

In the education pillar (see Table 4), some differences are noted in comparison to the other three pillars of social vulnerability. The percentage of NEETs seems to follow the same trend as the data shown above, with a dramatic increase. For instance, it has nearly doubled from 11.4% in 2008 to 20.4% in 2013. Subsequently, a gradual decrease is evident, reaching 10.6% in 2022, comparatively lower than the 2008 levels. On the other hand, early school leavers show an inverse trajectory during the financial crisis with a significant decrease up to 2021 and an uptick only in the last year (2022).

TABLE 4 Education pillar of social vulnerability.

	NEETs rate 15–24	Early school leavers
2008	11.4	14.4
2009	12.4	14.2
2010	14.8	13.5
2011	17.4	12.9
2012	20.2	11.3
2013	20.4	10.1
2014	19.1	9.0
2015	17.2	7.9
2016	15.8	6.2
2017	15.3	6.0
2018	14.1	4.7
2019	12.5	4.1
2020	13.2	3.8
2021	11.0	3.2
2022	10.6	4.1

Authors' Compiled Data from the Eurostat Datasets (<https://ec.europa.eu/eurostat/data/database>).

Discussion

Our analysis has demonstrated the unfolding of two different patterns, the first (2008–2016) with a rapid increase in social vulnerability due to economic and austerity problems, and the second (2017–2022) with a gradual decline as a result of the economic recovery and decrease in unemployment. It becomes evident that the deepening or relaxation of social vulnerability in Greece seems to be associated with the intensity and sharpness of the crisis. Despite the improvement of the state of play in the key determinants of social vulnerability, our research findings clearly show that key challenges remain in all fields of society, namely employment, health, education, and living conditions. Interestingly, this pervasiveness shows the complexity of this social phenomenon and its profound ramifications for the society.

Importantly, we notice that the different aspects and facets of social vulnerability tend to affect each other and result in the reproduction of social inequalities. For instance, within the context of rather disjointed labor, it may be assumed that the educational capital (combined with the deficits of the educational system) affects to a certain degree the employment prospects of young people in Greece while in several cases over-determines the chances of becoming precarious workers. The latter seems to have a tremendous impact on their life chances, given that the emerging, expanded, and (often) forced, newly built work “normality” with the frequent violation of the labor rights of precariously working young people and consequently the serious impact on labor relations look to result in a reconstruction of “work ethics,” with (irregular) labor norms prevailing (Papadakis et al., 2021). Consequently, this appears to induce serious implications on the living conditions and the individual well-being of people, essentially turning it into a precarious framework of biography. This view also resonates with Ranci's position (Ranci, 2010, p. 18) that the autonomy and ability of persons may be compounded by the uncertainty and variability in social integration systems that provide stability and support. We may argue that such fluidity in social

position can reduce their ability to choose freely and seek out future opportunities. The above also poses an evident threat to social cohesion and fabric.

Regarding NEETs, namely the “young people, aged 15–24, who are not in employment, education or training” (Eurofound, 2012, p. 20) and subsequently are “absents” from both the labor market and education as well as the key social institutions, our data agree with the standpoint that “the negative effects of the delayed entry or early exclusion from the labour market are not limited to the early stages of working life but are extended to the future, as they shape reduced prospects for integration, career development, a satisfactory salary and consequently undermine life-chances” (Drakaki et al., 2022:124). In this regard, the vicious circle of youth unemployment, social vulnerability, and risk of poverty and social exclusion is continued (i.e., temporary workers are almost three times more likely to become poor—see Papadakis et al., 2021, p. 34). Despite the declining rates of school dropouts, the domestic education system reflects an ailing sector that contributes to future (work) precariousness in terms of how well Greek students and young people are prepared for real-life challenges and future success. Indicative of the chronic problems is for example the low performance of 15-year-old Greek students on the Programme for International Student Assessment (PISA) tests (OECD, 2023a,b). Arguably, such a condition not only impedes social integration, mobility, and transition into the labor market but also calls for reviewing Greece's education policies and practices.

Thereafter, our findings show signs of maintaining or amplifying poverty levels (Petraikos et al., 2023; Melidis and Tzagkarakis, 2022; Andriopoulou et al., 2018; Matsaganis, 2013), where income inequalities, long-standing health problems along with factors such as severe material deprivation and very low work intensity may push individuals (males and females) or social groups to the fringes. It is telling that (work) precariousness and inequalities seem to be greater for foreign workers than for native-born raising plausible questions about managing human capital effectively. We tend to agree with the literature that the spreading of new social risks as reflections of domestic peculiarities and market rigidities such as unstable access to fundamental means (low salaries and limited economic resources) and the fragility of social structures (education systems) may unsettle daily life regularity and induce corrosive effects on the country's competitiveness and economic recovery (Ranci, 2010). Hence, a decline in living conditions, an increase in income insecurity, and the ensuing economic hardship can feed into the vulnerability cycle and increase dependency and continuous support from the state to meet the increasing personal and health needs. In this respect, the shifts identified in the life cycle combined with lower living standards can generate power asymmetries and different social dynamics (Fordham et al., 2013). All the abovementioned seem to result in a gradually expanded devaluation of political institutions and pose a serious confidence crisis in conjunction with the ongoing de-escalation of public trust, especially among young people (Papadakis et al., 2021, p. 44–45).

Conclusion

In attempting to unravel the puzzle of social vulnerability in a rather troubled period marked by economic and socio-political adversities, our research has demonstrated that despite its improving trend as a consequence of the country's economic recovery and

declining unemployment rates, it remains at considerably high levels denoting that various problems persist to date. High social vulnerability levels are not only alarming for certain social groups (i.e., NEETs), as they increase the possibility of widening inequalities (i.e., social exclusion, marginalization, in-work poverty), delaying or even obstructing social mobility but also put at risk the functionality of the society raising confidence issues. The erosion of trust among social groups, particularly during times of hardship, can undermine the legitimacy of state institutions and hinder effective public policy implementation. This instability can create a vicious cycle, exacerbating socio-economic problems and further eroding trust. Consequently, the capacity of governments to commit to and implement much-needed reforms in critical domains becomes a crucial aspect. National governments may face various challenges, including intense social pressure, reform resistance, lack of political will, internal divisions (i.e., coherence, coalition government), political prioritization, and managerial incompetence. These factors can significantly impede their ability to implement necessary reforms and meet societal needs. Greece offers a stark example of these difficulties. Despite various policy efforts (i.e., SURE, social solidarity income, universal health coverage), progress in key areas like employment, living conditions, health and education has been slow. While social vulnerability seems to wane, the complex landscape and numerous challenges cast doubt on the sustainability of the progress.

Research findings do not make a distinction between genders as they are all deemed equally in jeopardy and traditional socially vulnerable groups (i.e., migrants, foreign workers, people with disabilities) seem to be carriers of the same degree of vulnerability. From this perspective, it may be assumed that the maintenance of high social vulnerability levels can weaken social cohesion and undermine the efforts toward a more economically stable and socially sustainable setting. Our findings also suggest that its broader dynamics appear to be concomitant with the level of intensity and sharpness of the crisis. It can be, by no means, argued that the current picture will not be reversed in case of another, not currently identifiable, disruptive event (i.e., economic regression). It remains at least an open question whether this improving trend will be lasting in the following years. Even though social vulnerability has been commonly asserted to be an extensively researched policy theme across different disciplines and groups, the research on Greece shows great potentialities but does not fully corroborate the above view. By contrast, the analysis of social vulnerability in our study has amply demonstrated that, at *prima facie*, is no longer a black box in need of conceptual, interpretative, and empirically-tested approaches. A clear benefit is that it can be viewed as a springboard that can aid in explicating the “nuts and bolts” of this multifaceted issue. Concurrently, due to its intrusive character, it speaks openly to other cognate domains such as social and welfare policies, and forges links for a more thorough discussion of the spillover effects.

The main implications of our research are partitioned in several ways. Initially, the performance of social vulnerability in a volatile financial environment with doubtful outlooks indicates that closer cooperation between public and private stakeholders to contain its dynamics is deemed essential. The intensity of social vulnerability also shows the short circuit of Greece’s centralized state and its chronic structural and administrative ailments to alleviate vulnerable groups. Such a picture uncovers the precarity of income sources, the fragility

of social networks, and the prevalence of structural inequalities. Concurrently, Greece’s worrying demographics (i.e., an aging population, low birth rate, and youth unemployment) necessitate wider adjustments in the domestic welfare and social policy structures. Hence, the redesign and/or restructuring of relevant structures and policies to tackle vulnerability will need to be accompanied by empowering lower levels of governance such as local authorities while providing the mapping tools to identify those in need in their jurisdiction for immediate actions. In this context, the respective public policies need to be more targeted and better prepared for phenomena that one might mistakenly consider rare. While such phenomena are expected to intensify in the future, to this end, we advocate that the development of an evidence-based social vulnerability index contributes significantly to more evidence-informed policy-making in the field of social vulnerability. Along these lines, the suggested index can be monitored over time and become a prominent tool for policy-makers and researchers in their quest to explain accurately social vulnerability and develop a policy toolkit that will guide their decision-making (i.e., seeking ways to reduce socio-economic inequalities and strengthen social cohesion). Subsequently, our analysis calls for more systematic empirical research and testing in Greece where social vulnerability has been a less attention-grabbing and under-explored issue compared to other sectors (i.e., economy). In response to the counterargument that our understanding of social vulnerability could be eclectic and partial based on solely quantitative measurements, we acknowledge that qualitative work requires ample resources and at least this sort of research in practice has some intrinsic limitations in numbers which may cloud the issue of representativeness. This is not to say that the employment of qualitative methods (e.g., interviews) would not be beneficial but rather the opposite. The use of mixed methods would cast light on hidden aspects and other underlying factors that are not covered in the model thus strengthening the methodology and inferences. Within this framework, the abovementioned open new avenues for future research. This would call for the application of more cross-case and/or cross-sectional studies; expand research to other domains such as housing (at the national level); and conduct relevant surveys at the EU (supranational) level that could contribute to the development of Social Vulnerability Observatory, based on a composite social vulnerability index which could be included in the EU 2030 Strategy.

Data availability statement

The original contributions presented in the study are included in the article/[Supplementary material](#), further inquiries can be directed to the corresponding author.

Author contributions

MM: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. ST: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft,

Writing – review & editing. NP: Investigation, Writing – original draft, Writing – review & editing.

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Conflict of interest

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

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpos.2024.1480799/full#supplementary-material>

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Appendix

TABLE A1 Total variance explained.

Cronbach's alpha	No. of items
0.891	15

TABLE A2 Reliability statistics.

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	9.181	57.378	57.378	9.181	57.378	57.378	7.983	49.896	49.896
2	4.840	30.251	87.630	4.840	30.251	87.630	6.037	37.733	87.630
3	0.836	5.224	92.853						
4	0.502	3.136	95.989						
5	0.264	1.652	97.641						
6	0.153	0.956	98.597						
7	0.090	0.563	99.160						
8	0.060	0.372	99.532						
9	0.031	0.191	99.723						
10	0.029	0.181	99.904						
11	0.010	0.063	99.968						
12	0.004	0.027	99.995						
13	0.001	0.004	99.999						
14	0.000	0.001	100.000						
15	3.189E-16	1.993E-15	100.000						
16	-1.544E-16	-9.649E-16	100.000						

Extraction method: principal component analysis.