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A Transdisciplinary Perspective on the Sustainability of Portuguese Social Security

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Abstract: *The sustainability of social security, including the Portuguese, is a complex social problem of contemporary society that requires an integrated and transdisciplinary study of several sectors of society, particularly child support, late births in adult population, increase in life expectancy of the elderly, and immigrants, among others. This paper sought to give a transdisciplinary (TD) approach to the sustainability challenges of Portuguese social security through the Interpretive Structural Modeling (ISM) method. This might ensure a dignified retirement for the current elderly and future generations both Portuguese and immigrants.*

Keywords: *Child support, Increase in life expectancy of the elderly, Interpretive Structural Modeling (ISM) method, Late birth rates, Sustainability of Portuguese social security.*

1. Introduction

Disciplinary approaches have proven to be limited in solving complex problems, namely in the prediction and management of the sustainable development of contemporary societies (Mokiy and Lukyanova, 2022). For example, the sustainability of the social security is a complex problem that involves the intersections between child support, late births in adult population, increase in life expectancy of the elderly, among others. This complex problem can be addressed through the transdisciplinary perspective proposed by Basarab Nicolescu (2010). It is based on the connection between Subject and Object, where the Subject has potentially different levels of perception and, correspondingly, the Object has different levels of Reality, in a multidimensional structure of reality. If perception of the Subject on the social problem expands, then the levels of Reality of the Object increase too, that might lead to an integrated solution of the complex social problem. Another perspective that will be addressed in this paper is that of Edgar Morin (2003) on the interdependence between the different variables on the sustainability of the social security, including child support, late births, life expectancy of the elderly, among others. In fact, in accordance with the Article 12 of the Transdisciplinarity Charter (Nicolescu, 2010a, p.1): "*The development of a transdisciplinary economy is based on the postulate that the economy must serve the human being and not the reverse*". Thus, we aim to have a global perception of the sustainability of the social security, namely the Portuguese, that is included in the 17 Sustainable Development Goals of the 2030 United Nations Agenda (Guterres, 2022).

2. Methods

There are several factors contributing to the Portuguese social security challenge. The complexity and interdependence of this topics fall under the so-called risk management heading that require a complex approach (Motocu, 2016). One of the topics related to the sustainability of Portuguese social security is the need to support children either those who are homeless (orphans, victims of abuse) or those whose parents leave behind in search of jobs elsewhere with nowhere to stay. In fact, there are thousands of destitute children all over the world (orphans, refugees from wars and natural disasters) who need urgent support from specific organizations, such as UNICEF. They are also children whose parents leave them on the street in search of work elsewhere to meet their families´needs; These children have no place to stay and often depend on the school as the only place where they can have only one meal per day and find social, psychological support. They too need a strong financial support from Portuguese social security.

The Portuguese social security challenge is also due to late birth rate and the need to provide young people with better and more stable jobs that might allow them to have children earlier, and thus contribute to the birth rate of the country where they live. Indeed, the problem of late births is something crucial for the sustainability of social security, as young people sometimes have to migrate to find better jobs both to help themselves and also to support their family members. However, they do not give their home land discounts from their jobs (Andregg, 2018). Also, the increase in life expectancy of elderly is due to their associated medical care, such as in cases of cancer (palliative patients) or neurological patients (Alzheimer´s disease). These might contribute to the expense of Portuguese social security (Soeiro, 2010). For example, the aging phenomenon is advancing faster in the world and this picture becomes clearer when we look at the estimated data, that show that from 2019 to 2050, the number of 85 years old population increased exponentially from 12.5 million to 26.8 (Eurostat, 2020). The average life expectancy in the world is 75 years for women and 70 years for men. In Europe, the data show that it is 81 years for women and 75 years for men. The Portuguese data show that it is 83.37 years for women and 77.67 years for men (INE, 2022). According to the Portuguese National Institute of Statistics (INE), on average, we live about 80 years and seven months, with differences between sex and the regions of the countries of the world. The data presented in the latest analysis conducted on the 2019-2021 triennium show that there was a decline in average life expectancy, compared to the previous three years (2018-2020), for men with about 4.8 months and for women with 3.6 months. The Covid-19 pandemic was pointed out as the main factor. Older adults were considered as the highest risk group for mortality, mental health, poor quality of life worldwide, including Portugal (Ferreira et al., 2021). Thus, World Health Organization (WHO) (2016&2020), points to aging as one of society's great challenges and it is imperative to think of solutions that can improve the quality of life of this population. The retirement moment is one of the social changes that occur in the aging process, and this can lead to the elderly feeling socially devalued (Osório and Pinto, 2007). WHO recommended (2015) that one of the fundamental elements for health promotion and maintenance is for countries to invest in public policies and practices that optimize health determinants, for improving the quality of life of the aged and overcoming their problems. For this, it is necessary to implement health programs that focus on the development, or improvement, of individuals´potentialities and capacities, aiming at greater independence, autonomy, social participation, and quality of life. These might contribute to minimize the expenses of social security. Thus, based on some studies carried out by several Portuguese researchers related to these three variables, namely child support, late birth in the adult population, increased life expectancy of the elderly, we present here a transdisciplinary perspective on the sustainability of Portuguese social security.

3. RESULTS

3.1 Child Support

Regarding studies on the need for supporting children, those who are homeless (orphans or victims of abuse) in Portugal, we are going to look at the Technical Volunteer Work of Refúgio Aboim Ascensão, coordinated by Luís Villas Boas. Luís Villas Boas provided an institution where many hundreds of children (under the age of 6) who are in social danger or who are already victimized are first received temporarily. Here, they receive clinical-therapeutic support and subsequent socio-legal orientation for them to be adopted into Portuguese families (Boas, 2023). Also, there are children whose parents leave them in search of job elsewhere with no place to stay. The school is the only place where such kids find effective support, namely through the SASE Program (SSAS - School Social Action Service). The program is a Socio-Educational Support structure that aims to solve socio-familial, economic and cultural problems that make it difficult for children and young people to access compulsory education or present some difficulty in the learning process. The SSAS Program is supported by private Portuguese Banks and the Portuguese Social Security (Anonymous, 2023).

3.2 Late Birth Rates

For studies on birth rates in Portugal, we want to highlight the work carried out by Maria Filomena Mendes and her research group (Mendes et al., 2016). The work was supported by the Francisco Manuel dos Santos Foundation, where the variables of births and fertility were analyzed in Portugal. This study shows that Portugal currently has one of the lowest fertility levels in Europe and all over the world, with the Synthetic Fertility Index (SFI) – the average number of children per woman – recorded in 2013 and 2014 just being 1.2. A value below 1.5 is considered critical for the sustainability of any population (Tomé, 2015). The average age at which women currently have children in Portugal is 31.5 years old,

and around 4.3 % of Portuguese women have their first child after the age of 40, while the EU average is 3.4% (Pedersen, 2019). There are several factors that contribute to this result, namely the contractual precariousness of young people looking for their first job, who postpone leaving home after the age of 30 years old. Many highly qualified young Portuguese people, such as nurses, doctors, engineers, have emigrated in search of better employment conditions, particularly for financial and professional fulfillment (Leiria and Martins, 2022). In fact, career progress that might allow financial independence and personal fulfillment takes several years to be achieved in Portugal, particularly at higher levels of education. This is also a factor that influences the postponing of motherhood and fatherhood to later times. But, advancement in age decreases fertility in both men and women, as shown by several clinical studies.

This makes it very difficult for advanced couples to have their first biological child (Cambiaghi, 2019). This is why currently they are different reproductive and new fertility patterns in Portugal (Ajzen and Klobas, 2013). Demographically, the sharp decline in fertility is the result of a decrease in the number of children that couples decide to have together, as well as the increase in the age at which couples decide to have their first child. It should be added that the expense associated with having children, whether financial and personal time, among others, also influences the decision of Portuguese people regarding the number of children to have (Mendes, 2012). This situation is transversal to most EU countries. This means that the number of births is lesser than the number of deaths, and Portugal currently has low number men in the active workforce and low number of childbearing age women. So, it means that there might arise some challenges for the sustainability of Portuguese social security in the future (Kohler at al., 2006).

3.3 Increase in Life Expectancy of the Elderly

Societies worldwide have seen a significant change in their demographics, including Portugal. Due to changes in their economics and social level, in the last 50 years (Padeiro, 2021), Portugal is considered as one of the European countries with the most aged people (Statista, 2022). As an example, we can identify two sectors that are contributing greatly in response to these demographic changes. In education we have the University of the Third Age (UTA), a lifelong education project, which helps people to acquire new knowledge in a pleasant environment (Gunder, 2014). They have the purpose of promoting active, positive aging, encouraging participation in community life, and preserving vitality (Formosa, 2019). UTAs have been playing an important role in the aging process, and Portugal is the country with the largest network of UTA; it has 330 institutions, 7 thousand volunteer teachers and more than 45 thousand seniors (Jacob, 2020). With these changes at a global level, tourism has also been adapting, particularly in the creation of more and more programs aimed at senior tourism health and wellness tourism; Senior tourists tend to prefer longer trips and within their own country (Eurostat, 2021). Lifestyle-related health problems, such as stress-induced diseases, cardiovascular or physical ailments, are pointed out as reasons for choosing this type of tourism by these individuals (Smith et al, 2011). In addition, tourism has become a culturally accepted way of seeking happiness, well-being, and a better quality of life (Burroughs and Rindfleisch, 2002). The European Commission has developed European Innovation Partnership in Active and Healthy Ageing, an initiative to promote innovation and digital transformation in the field of active and healthy aging. It is a partnership that aims to stimulate research in the field and bring together EU key actors to address the challenges of active aging (European Commission, 2021). With this initiative, the Portuguese Network for Active and Healthy Aging — RePEnSA, was created in Portugal; it is a national network of reference centers for active and healthy aging, which presents a set of measures to be implemented by 2030, one of these measures is the encouragement of Senior Entrepreneurship, focusing on supporting over 60-year-old citizens trying to start their own business (Agência Lusa, 2021).

The Portuguese Psychologists Order (OPP) is also aware of this phenomenon and has been strengthening psychologists' role in the intervention with this population. In 2015, a document was released with specific guidelines on the importance of the psychologists´role, presenting indications of how technicians can empower themselves to help promote an active, healthy and socially engaged lifestyle, as well as the importance of mental health in this specific population (OPP, 2015). Another contribution is the program National Strategy for Active and Healthy Aging 2017-2025, which presents a plan of guidelines for proving the importance of Psychogerontology as a specialty (OPP, 2017). In 2019, OPP launched the *"Pro-Aging Communities"* campaign and created a seal awarded to municipalities that implement policies, programs, strategic plans and practices with a commitment to promoting healthy and positive aging throughout life. As Calha (2014, p.35) points out despite calls

from the World Health Organization regarding the *"adoption of policies that promote active aging as a way to increase the quality of life of the elderly population […] it is recognized that there is a set of vulnerabilities that affects senior citizens and hinders active aging"*. These include the state of health and social isolation in which many of these people find themselves. Thus, it becomes fundamental to find a path to successful aging, in which each individual is provided with the necessary resources that allow him/her to realize his/her personal expression of aging in general, and so contribute to minimize the expenses of Portuguese social security.

4. DISCUSSION

The study of sustainability of Portuguese social security is a complex subject that cuts several areas of study, namely, late birth rate, resources available, immigrants, unemployment, life expectancy of elderly, among others (Lagoa and Barradas, 2019). It needs both a theoretical and practical approach in order to match the real needs of people (Nicolescu et al., 2008). Thus, a general large survey was carried out in Portugal between 2011 and 2014 (Schmidt et al., 2018). Some more specific studies were also carried out on the sustainability challenges of Portuguese social security for child support, late births of adult population, and increase in life expectancy of the elderly in Portugal. An example is the work of Amílcar Moreira and his research group, supported by Francisco Manuel dos Santos Foundation (Moreira et al., 2019). It shows that the decrease of the young active population accompanied by the increase in life expectancy of elderly people, constitutes a financial and social challenge for the sustainability of Portuguese social security. This study describes how the reform current value and the number of years deducted throughout one´s working life are considered based on the social solidarity between current young people who sustain the reforms of the retired elderly. It is assumed that future generations will also support the current young working age population.

Another study in the intersection of child support, late birth rate, increase in life expectancy of the elderly and the sustainability of social security in Portugal was carried out by Michael Lopes (2014). He highlights the history and mode of operation of the Portuguese social security system, namely, the Basic Law of the Social Security System. It refers to the total expenses with retirement reforms, disability and survival pensions, among others, to ensure that all Portuguese population has the basic conditions for survival. However, due to the decrease in the number of the working-age population and the increase in the life expectancy of the elderly, it is suggested in some studies on the sustainability of social security that there be increase in the value contributions, the reduction of value in future reforms and pensions, and increase of the retirement age from the current 66 years to 70 years, in Portugal. But, this last solution poses some challenges to the so-called “fast-wearing” professions, such as sportsmen, soldiers, health professionals, among others whose effective performance is not compatible with advanced age. Thus, it is suggested to adopt the Swedish reform system, based on the Three Pillar Theory (Carneiro et al., 2012).

In this regard, Joana de Oliveira noted that the Three Pillar Theory originated in Switzerland consisting of three complementary ways used to calculate the retirement reform; the contributions of the State, companies and private savings (Oliveira, 2012). As for the first type, there is a mandatory regime of discounts made by workers for Portuguese Social Security, while the second case refers to a voluntary and a capitalization regime. The third type encompasses private insurance, retirement savings, among others, with the overall objective to admit a maximum and a minimum amount relative to the discounts made during one´s professional life, in order to attribute a retirement monetary value that might meet all the needs of the elderly. Those professionals with higher wages when still working could have cash back the surplus into a personal private fund, so as not to be disadvantaged when they fully retire. While workers, with more modest wages, should have family incentives, provided by governments for them in order to enjoy essential goods when they retire, such as medication, social services, among others.

5. THE SUSTAINABILITY CHALLENGES OF PORTUGUESE SOCIAL SECURITY AND THE INTERPRETIVE STRUCTURAL MODELING (ISM) METHOD

The main objective of this paper is to give a transdisciplinary (TD) integrated approach to the sustainability challenges of Portuguese social security (Warfield, 1974). Thus, eight factors (parameters) contributed to understand the complexity of the theme of this paper and drawn in **Figure 1**.These eight parameters were also used as input for Interpretive Structural Modeling (ISM) method and the formation of digraph drawn in **Figure 2** (Harary et al., 1965).

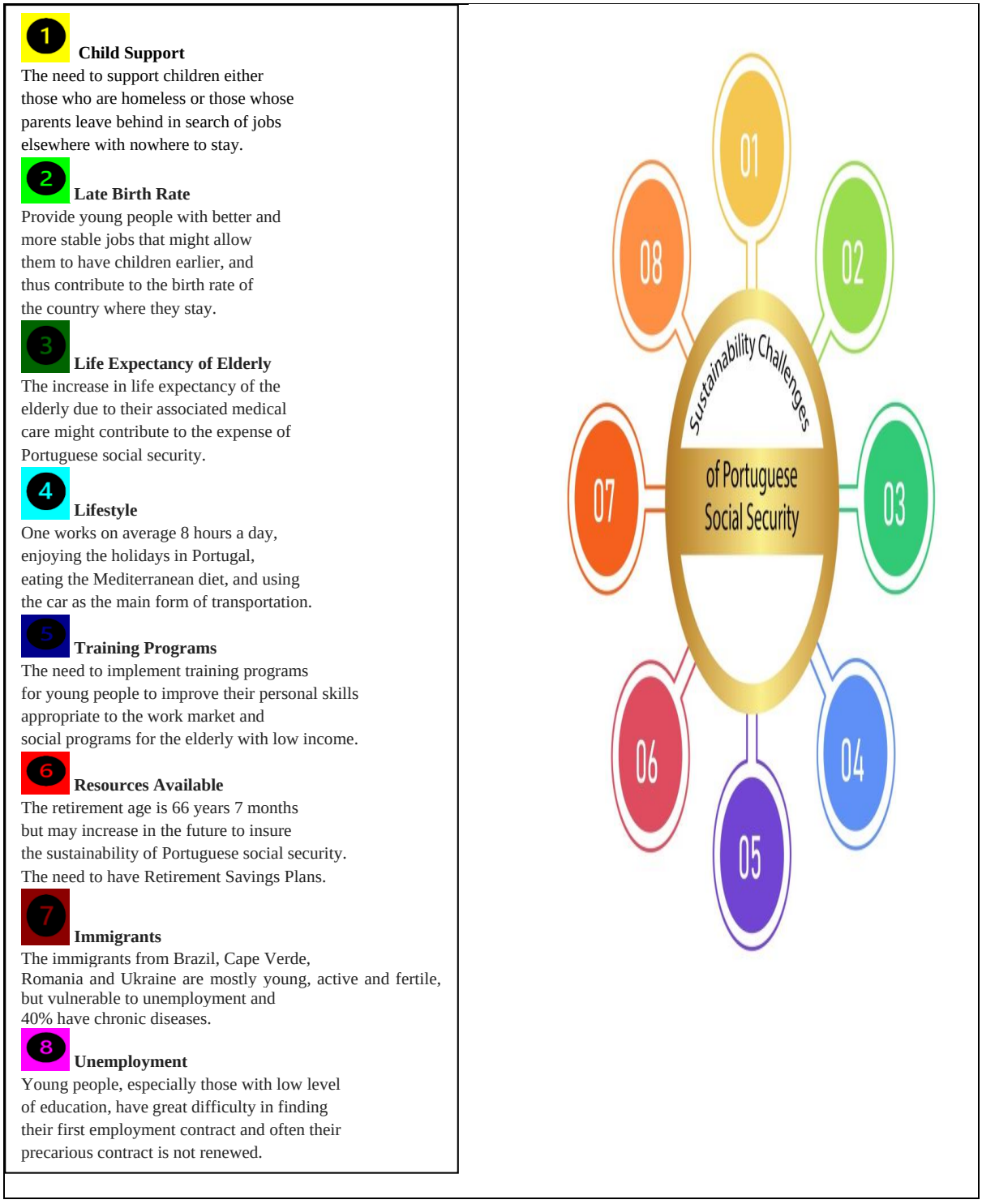

Figure 1. *Sustainability Challenges of Portuguese Social Security*

Interpretative Structural Modeling (ISM) is a transdisciplinary tool used to understand complex situations, namely to study the sustainability challenges of the Portuguese social security (Ertas et al., 2023&2023a). Thus, a diagraph was drawn in Figure 2, where we can see that Level IV, life expectancy of elderly (measure 3) is at the bottom dictating the performance of the sustainability of Portuguese social security, and so it is the most critical factor which needs to be analyzed before other factors, as the other factors at the higher level depend on them, such as child support (measure 1) and resources available (measure 6). The Level III has two main parameters, immigrants (measure 7) and unemployment (measure 8) that should be analyzed before child support (measure 1), late birth rate (measure 2), training programs (measure 2), resources available (measure 6) and lifestyle (measure 4), but after life expectancy of elderly (measure 3). In linking Level IV and Level III, we could have the following key idea: the increase in life expectancy of the elderly is connected with unemployment and

the immigration flow. The need to give a work contract to immigrants might contribute positively to the financial situation of Portuguese social security, and thus much more resources available to take care for the elderly may arise. Furthermore, in the last couple of years, the media have reported that for every 10 births, 1 is to immigrant women, and thus contribute to the number of children be higher than the number of elderly. The Level II, lifestyle (measure 4) has six paths, namely unemployment (measure 8), immigrants (measure 7) and child support (measure 1), late birth rate (measure 2), resources available (measure 6), training programs (measure 5) which means that lifestyle might suffer a strong impact from all these parameters. For example, when a worker becomes unemployed and/or has a precarious contract, so his/her lifestyle could be changed drastically which might contribute to young people postponing the desire to have children until later. It should be noted that the lifestyle might benefit greatly from a good performance of Level III and Level IV. For example, there is experimental evidence that the increased of life expectancy of elderly may be linked to the Mediterranean diet characteristic of the Portuguese lifestyle. In Level I, four main parameters, child support (measure 1), late birth rate (measure 2), training programs (measure 5) and resources available (measure 6) are at the top of the digraph and it is the most complex one due to its various interactions with itself and with level II. In Figure 2, we can have the following insight: the need to implement training programs might provide young people with better and more stable jobs, and thus allow them to have children earlier, as well as to have more resources available for child support.

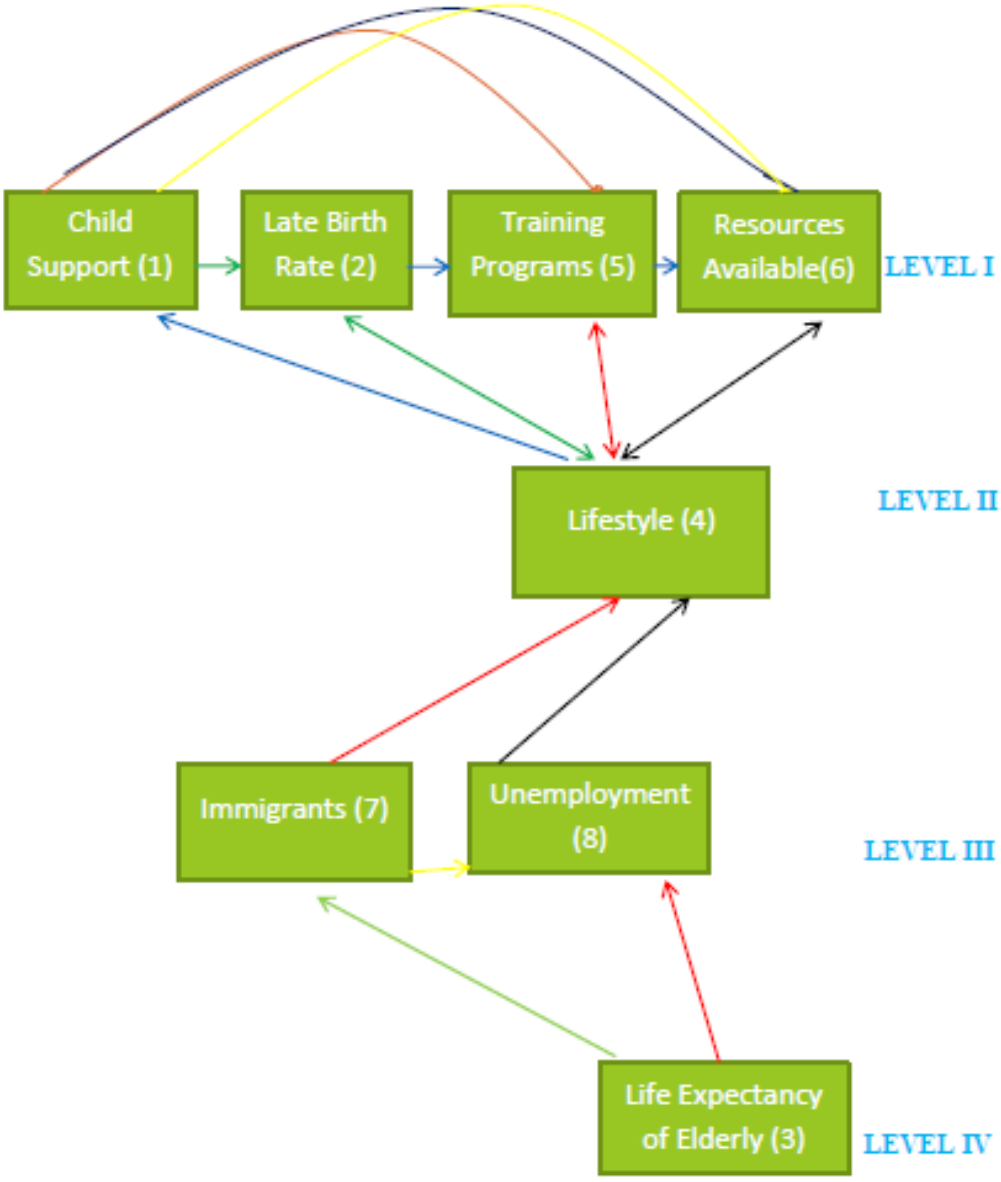

Figure 2. *Digraph of Sustainability Challenges of Portuguese Social Security*

Furthermore, the digraph shown in Figure 2 can be used to measure the complexity of the sustainability of Portuguese social security using the Cyclomatic Complexity Measure (M) (Ertas and Gulbulak, 2021). This is calculated mathematically by M = B – N + 2P where E=the number of edges of the graph, N=the number of nodes of the graph, R=the number of connected componentes, and thus the cyclomatic complexity M of the digraph given in Figure 2 is M = 15 – 8 + 2x1 = 9. The M value is 9, less than 10, which means that the sustainability of Portuguese social security is not considered complex, but it is complicated because it has a high level of difficulty to design.

As shown in Figure 2, the sustainability of Portuguese social security contains a hierarchy: Parameter 3 (life expectancy of elderly) is the source element since it has only outgoing paths. It follows the parameters 7 (immigrants) and 8 (unemployment) that have both ingoing and outgoing paths, and they make the linkage between parameter 3 (life expectancy of elderly) and parameter 4 (lifestyle). It follows that parameter 4 makes the connection with parameters 1, 2, 5 and 6 representing the linear map of the sustainability of Portuguese social security. For its side, MICMAC (Matrice d´Impacts Croisés Multiplication Appliquée á un Classement) chart could also provide complementary insights into the importance and interdependence among parameters affecting the sustainability of Portuguese social security (McCabe, 1976). It will not be drawn in this paper for simplicity.

6. CONCLUSIONS

As we have seen in this paper, the sustainability challenges of Portuguese social security is a complex problem that requires a set of adequate solutions that might allow us to have an integrated overview for this social problem of contemporary societies. For this, the Interpretive Structural Modeling (ISM) method was used as an effective transdisciplinary tool that might help to provide a strong support for children, stable jobs for young people and conditions for the adult population to have children earlier, as well as ensure a dignified retirement for the current elderly and future generations both Portuguese and immigrants (Tate et al., 2006).

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