Patterns of transition from the educational system to the labor market – analysis in a European context

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Abstract*. This paper analyses the process of transition of young people from the education system to the labour market and the influence of tertiary education on this transition. The research identifies behavioural patterns of European countries from the perspective of the transition process, a process with a multifactorial character, influenced by the interdependence between education, labour market requirements, government policies and individual characteristics of young people. The variables used in the analysis cover two aspects: the employment status of young individuals in the labour market and the employment situation of those with tertiary education. The information was obtained from the Eurostat database, reflecting the latest available year (either 2021 or 2022) and encompassing all Member States of the European Union. By employing Cluster Analysis and Principal Components Analysis, distinctive behavioural patterns among European countries in the transition of young tertiary education graduates to the labour market were discerned, considering variables such as: employment of young people, employment of tertiary-educated, unemployment rate, graduates and employment in Business Administration, Health and IT, NEETs rate and early leavers from education. These findings offer valuable insights for decision-makers aiming to enhance education and training systems, tailor study programs to meet labour market needs, and formulate support measures for young individuals navigating the transition process. The uniqueness of this research lies in its innovative multi-criteria approach to examining the transition process, achieved through the careful selection of indicators.*

Keywords*: labour market, tertiary education, transition from education to labour market, European countries, cluster analysis*
JEL classification*: C38, I23, J21*

1. Introduction

The transition from education to the labour market is a crucial and complex moment for young people, with a significant impact on their career path and further development. This transition is a multifaced process, influenced by the interdependence between education, labor market requirements, government policies and individual characteristics of young people. An exhaustive comprehension and examination of this process is imperative for identifying factors that impact the smoothness or challenges

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of the school-to-work transition. It also aids in the formulation of effective strategies to support and enhance this crucial phase.

Over the past few decades, the transition from school to the labour market has become increasingly complex and challenging. Substantial shifts in economic, technological, and social aspects have brought significant changes in employers' requirements and labour market structure, leading to changes in the types of jobs available and in the skills needed to fill them. At the same time, tertiary education has become increasingly accessible and indispensable to ensure better opportunities on the labour market. Thus, the interrelation among education, the transition from school to work, and occupational success has become increasingly important.

This paper aims to analyse the transition of young individuals from school to the labour market and the influence of tertiary education on this transition, with a focus on the European context in 2021-2022. Employing an approach grounded in empirical data and statistical-econometric analysis, various aspects are examined, including the employment rates of young graduates, gender-based segmentation, regional variations, and determinants of occupational success. Behavioural patterns of European countries in the context of this transition process are identified through this analysis.

The paper begins with a literature review, examining key studies that have investigated how highly educated young individuals have responded to the labour market requirements. The second section outlines the research methodology, detailing the statistical variables analysed and the sources from which data were retrieved. The third section encompasses the two stages of analysis, presenting the primary results: a depiction of the status of young individuals and tertiary graduates in the European labour market, along with the identification of patterns in European countries pertaining to the transition of young individuals into the labour market. The paper concludes by summarizing the key main findings and the implications for decision makers.

2. Literature review

The transition from school to work refers to the period during which a person leaves the education system and starts working (Ng and Feldman, 2007). This moment of transition can significantly influence an individual's subsequent path in terms of employment, career development and social integration, which is why research into school-to-work transition has attracted the attention of experts from various disciplines such as sociology, economics, psychology and education. This transition is considered an important stage in the development and transition of individuals into adulthood (Grosemans et al., 2020). Successful transitions from school to work are critical to developing effectiveness, coping skills, and identity for developing adults in the age range from late adolescence to late 20s (Arnett, 2000). Moreover, this first major career transition sets a pattern for future career changes, impacting long-term career sustainability and sustainability (Akkermans et al., 2021).

In addition to the economic benefits, a successful school-to-work transition has significant social implications. Young people who integrate adequately into the labour market develop a sense of independence, autonomy and self-confidence (Lancee and Radl, 2015), can contribute to increased personal satisfaction, well-being and quality of life in general, can increase social and community cohesion, reducing the risk of social exclusion and marginalisation (Eurofound, 2016). Studies consistently show that a poor start in the labour market can have a detrimental and long-lasting impact on future career development and subsequent life outcomes (Baert et al., 2013).

From an economic perspective, successful school-to-work transition plays a crucial role and serves as a prerequisite for increasing organizational productivity, economic development, and implementing sustainable government welfare policies (Cefalo et al., 2020). This involves harmonizing skills and knowledge acquired during education with the demands and opportunities of the changing labour market (OECD, 2017).

Young people need more time to establish their professional identity and define their career paths, especially in developed countries (Pastore et al., 2021). While this trend reflects positive societal changes,

such as higher tertiary enrolment rates, a longer duration of this period also raises new challenges with implications for policy-making, with large shares of young people looking for decent and fulfilling jobs. The longer time needed for younger generations to become fully independent may financially overburden older generations for longer periods, especially in southern European countries (Carcillo et al., 2015; Pastore et al., 2021).

Wells and Florea (2015) conducted an analysis of the different trajectories of young graduates from the education system to the labor market, in order to identify obstacles to this transition, from the perspective of young graduates. The transition from school to the labor market is a process of "overlapping activities", in which young people's affiliations to the education system and the labor market are intertwined. In recent years, there has been an increasing tendency for young people to work even while enrolled in school, thus getting in touch with the demands of the labor market earlier and gaining work experience that will improve their professional future. In 2019, almost half of students enrolled in short-term bachelor's programs in the USA (46.7%) were working (Korhonen, 2024). An EU report shows that in 2021, 23% of EU young people aged 15-29 enrolled in education were also employed (Eurostat, 2022). Wells and Florea (2015) showed that students consider that there are certain difficulties in the transition process from school to work, regarding the optimal time to look for a job, identifying and securing job offers that are in line with their qualifications and skills, or how they can overcome the minimum experience barrier in the field of the job offered, imposed by the employer (Wells and Florea, 2015). A PWC report (2015) specifies several skills that future graduates should have to facilitate the transition and meet the demands of the constantly changing labor market: the ability to analyze data, to find solutions to various business-related challenges, creative thinking, persuasive communication skills, relationship and leadership, adequate knowledge about how the world works. Tertiary education systems must also enable future graduates to acquire basic and transversal skills for a good adaptation to the demands of the labor market, any form of flexible employment (part-time or seasonal) - even in fields that are different from the field of study - can improve the professional experience of young people, in order to acquire the skills required by employers (Wells and Florea, 2015). Dorsett and Lucchiano (2014) analyzed the process of transition from the educational system to the labor market for young people in the UK, concluding that there are certain key risk characteristics that young people may have at the age of 16, which may be associated with a high risk of their trajectory after this age, from leaving the education system to entering the labor market, such as: pregnancy/motherhood at too young an age, a low level of education, a low level of self-confidence, a disadvantaged family environment.

While efforts are being made to create an integrated European labour market and reduce socio-economic inequalities, European Union (EU) Member States still face significant differences in labour market opportunities. These differences become even more evident when we analyse the transition of young people from school to work in relation to the concept of NEETs, an expression of young people's economic and social vulnerability. However, the reasons for the existence of significant cross-country differences in NEETs rates have been difficult to investigate, due to differences in the definition of the concept and heterogeneity of this group (Assmann and Broschinski, 2021). The widespread spread of NEETs is an alarming social problem, as it predisposes young people to long-term unemployment and social exclusion. The differences between countries concern not only the level of NEETs but also the structure/composition of NEETs. Northern European countries, including Luxembourg, the Netherlands and Switzerland, have the lowest overall NEET rate and are characterised by very low unemployment rates, but also by the highest rates of disability NEETs, explained by generous and inefficient disability benefit schemes. High levels of NEETs with caring responsibilities are found in countries with a lack of family-related services, in combination with poorly formalised long-term care, mainly in Central Eastern European countries. High proportions of discouraged unemployed and NEETs are found in countries most affected by the crisis and with high labour market rigidities, low occupational specificity and lack of active labour market policies, mainly in Southern and Central and Eastern European countries. The share of NEETs has increased in many European countries in recent years, with Greece having the second highest share of NEETs, surpassing Italy

by only 0.2% (Quintano et al., 2018). Finally, NEETs have a significant negative impact on economic growth and the balance of countries' well-being.

The period of transition of young people from school to work has become more difficult to study lately due to the much more varied options young people have during school and the increasing overlaps between school and work. Today, young people change jobs more often and it takes longer to establish themselves in the labour market, either by choice or necessity. It has become more common for tertiary students to work part-time or seasonally to supplement their income, or for young people in employment to return to education or training to improve their qualifications. Many young adults face the dilemma of whether to continue their education or seek part-time employment (Groves et al., 2023). While some students may prefer support from teachers in the form of e-educational resources and online learning tools, others may be more inclined towards opportunities that allow them to work and earn money, as well as gain practical experience in their chosen field. However, pressure to enter the workforce or leave part-time can also negatively impact young adults' ability to access quality education and healthcare (Harackiewicz et al., 2016).

Research has identified significant variations in youth employment rates between countries and regions, as well as individual and socio-economic characteristics. Thus, the level of education of young people has been identified as an important factor in determining the employment rate (Apunyo et al., 2022), with young people with higher education levels having better chances to get a job and integrate more easily into the labour market (Ross and Svajlenka, 2016). Other relevant factors in determining the employment rate of young people include previous work experience, competences and skills acquired during school or training, and access to employment opportunities and job support services (Pettinger, 2019). Socio-economic characteristics of young people, such as ethnic origin, socio-economic family status and regional context, can also play a significant role in determining employment rates (Akosah-Twumasi et al., 2018). As regards trends in youth employment rates, the literature highlights that they can be influenced by macroeconomic factors such as economic fluctuations and business cycles. The ILO (2023) correlates periods of economic growth with an increase in youth employment, while periods of recession or economic instability correlate with low youth employment rates.

Tertiary education provided by universities and other tertiary education institutions is considered to play a key role in society, promoting innovation, enhancing economic development and growth and generally fostering citizens' well-being. Research predicts that in the coming years there will be an increased demand for highly qualified people. As a result of technological progress, the skills and education required for well-paid jobs have increased significantly, while jobs requiring a lower level of education offer fewer opportunities for career advancement and are paid less (Brown and Loprest, 2018). Influenced by digital technology, workplaces are becoming more flexible and complex. This has led to an increase in employers looking for staff with the capabilities to manage complex information, think autonomously, be creative, use resources intelligently and efficiently, and communicate effectively (Martinez, 2019). Yue and Zhao note significant variations between countries in employment outcomes and graduate skills development in 2020, suggesting the need for policy interventions to improve alignment between higher education and labour market requirements. Their study presents a comparative analysis of tertiary education graduates in Europe, examining the labour market outcomes of early university graduates in seven European countries. The effectiveness of higher education systems is assessed in terms of employability and skills acquisition. New workers are more likely to migrate to metropolitan areas, with the exception of Italy, as metropolitan regions offer more opportunities for career development for new graduates. Having a science qualification significantly increases the chances of getting a job in the basic field by 413% and a professional job by 163%, while having a social science qualification increases the chances of getting a job in the bohemian creative field by 24.6% and decreases the chances of getting a job in the basic creative field by 1.6%. The higher education system plays an important role in training workers in the long term, as a significant proportion of new employees have university degrees. A report by the Organisation for Economic Co-operation and Development (OECD, 2020) highlighted that tertiary education graduates in Europe have lower unemployment and higher employment compared to those with at most secondary education,

suggesting that a high level of education facilitates the transition to employment. Tertiary education offers significant opportunities in finding employment. Graduates with a higher education degree are endowed with specialised knowledge and skills relevant to the labour market, which makes them more attractive to employers. Tertiary education also facilitates the development of practical skills and provides access to contact networks and networking opportunities, which increases the chances of success in seeking and obtaining a suitable job. Marginson (2016) shows that education policies and systems in each country can significantly influence graduate outcomes in labour market integration. It is important that politicians and policymakers develop appropriate strategies and interventions that support a successful transition for tertiary education graduates in each country.

3. Methodology and data

In order to understand the dynamics and effects of the transition process of young people from school to the labor market, a series of statistical indicators were selected to provide information about the success or difficulties of young people in accessing and settling in the labor market, as well as about the alignment between education and employers' needs. The indicators used in the analysis cover two aspects: youth employment in the labour market and tertiary education for graduates (employment rates, youth unemployment rate, employment situation, distribution of tertiary education graduates by different sectors, NEETs rate). The analysis of these indicators provides a relevant perspective for the design of policies and interventions aimed at supporting a more effective and successful school-to-work transition, thereby promoting sustainable socio-economic development and well-being of young people. Initially, graduates from all fields of study were included in the exploratory analysis; however, only the fields of IT, Health Sciences, and Business Administration made a significant contribution to the formation of the clusters necessary for identifying patterns in the transition from education to the labor market. The data were taken from Eurostat's database, correspond to the most recent available year (2021 or 2022) and refer to all EU countries[4].

The analysis was carried out in two stages: • in the first stage, a statistical analysis was carried out in territorial and temporal profile of the mentioned indicators, in order to characterize the situation of young people and higher education graduates on the labor market in European countries; • in the second stage, with the help of Cluster Analysis and Analysis in Main Components, patterns of behavior of European countries regarding the transition of young tertiary education graduates to the labor market were identified. More specifically, a series of variables that can influence young people's transition from the education system to the labor market were considered, such as the share of graduates in different fields of study, the NEETs rate, the school dropout rate, the overall employment rate and employment rates by sector, the overall unemployment rate, the youth unemployment rate, the youth employment rate, and the employment rate among individuals with higher education. Using the Principal Component Analysis, the complexity of the dataset was reduced, and its most significant features were extracted to identify the factors with the greatest influence on the school-to-work transition. Through Cluster Analysis, groups of European countries with similar characteristics were identified, as well as groups of countries exhibiting similar behaviors in terms of how the transition from the educational system to the labor market is achieved. In this way, several patterns of this transition process were identified.

By applying cluster analysis methods, European countries were grouped into distinct categories or patterns, according to certain relevant characteristics and variables. Thus, common patterns and trends have been identified that can provide a more detailed understanding of how different socio-economic and political contexts influence young people's school-to-work transition. Specifically, the Ward Method and

[4] https://ec.europa.eu/eurostat/data/database; https://doi.org/10.2908/EDUC_UOE_ENRT03; https://doi.org/10.2908/LFSA_EGAN22D; https://doi.org/10.2908/EDAT_LFSE_18; https://doi.org/10.2908/LFSI_EMP_A; https://doi.org/10.2908/TPS00203; https://doi.org/10.2908/EDAT_LFSE_14

the K-Means Clustering Method were applied to identify homogeneous groups of countries, based on the concept of minimizing intercluster variation and maximizing variation between clusters.

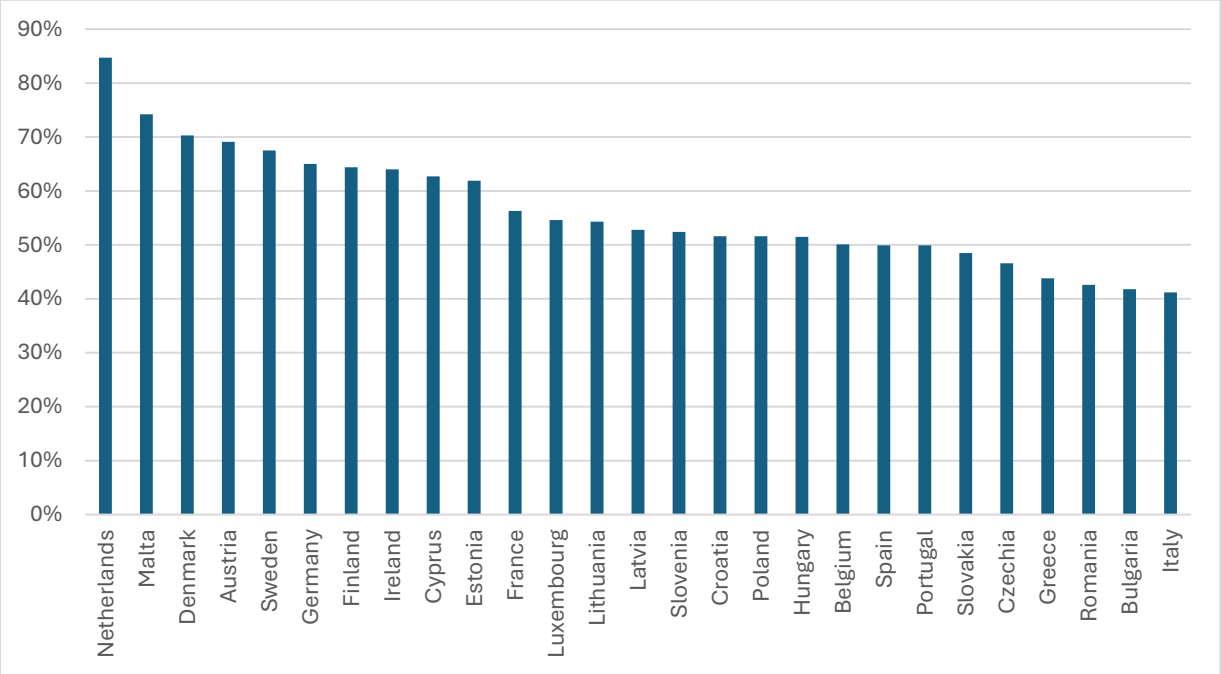
In order to better understand and detail the relationship between tertiary educational attainment and employment in the main fields in Europe, Principal Component Analysis (PCA) was applied to identify complex variables in the form of main components that explain most of the variation in data. The advantage is to reduce complexity and focus on key aspects of the transition from the education system to the labour market, to reveal complex relationships between education level, qualifications and sector of activity and to identify the factors that have the greatest influence on the transition.

4. Research results and comments

4.1. The situation of young people and graduates on the labor market in European countries

In 2022, the EU-wide employment rate for young people aged 15-29 was 55.5% in 2022, 0.7 percentage points higher than in 2012. The highest values were recorded in the Netherlands, Malta, Denmark, Austria and Sweden (between 84% and 65%). Four EU-27 Member States recorded low employment rates, below 45%, with Italy recording the lowest level (41.2%) (Figure 1).

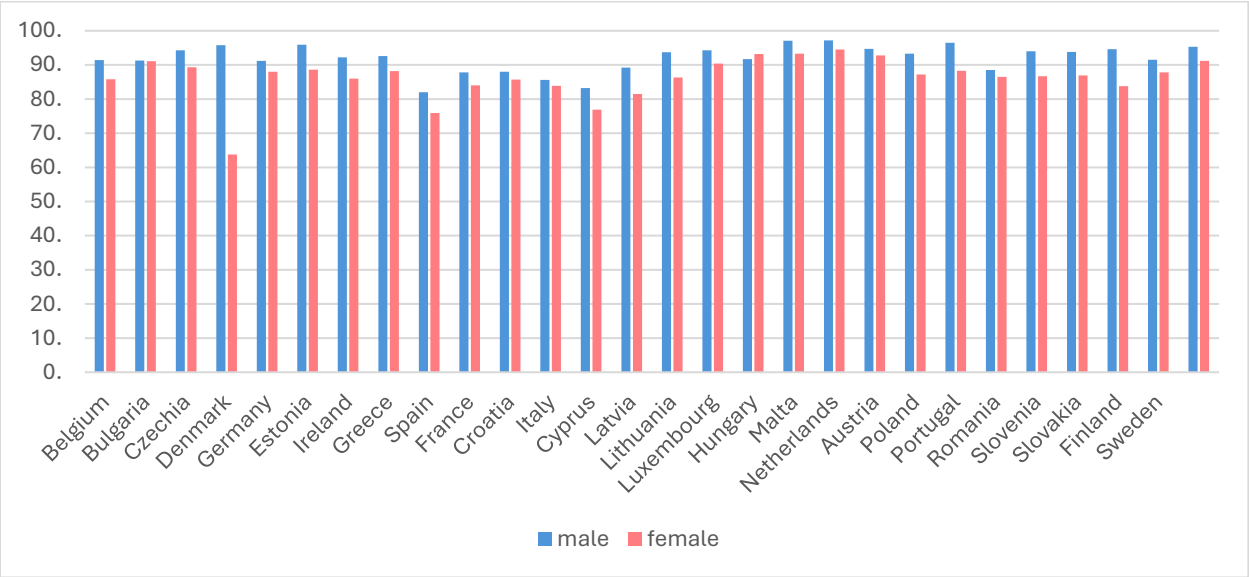
Figure 1. Employment rate of young people aged 15-29, EU-27, 2022 (%)



Source: Eurostat (2023b), own processing.

As regards the share of young employed persons (15-29 years) with tertiary education, it is higher for women than for men in all European countries analysed. Of the 27 EU countries, 13 exceeded the EU average of the total share of employed persons aged 15-29 (31.8%) and only five countries (Denmark, Hungary, Germany, Finland and Romania) had values lower than the EU average for both sexes (Figure 2).

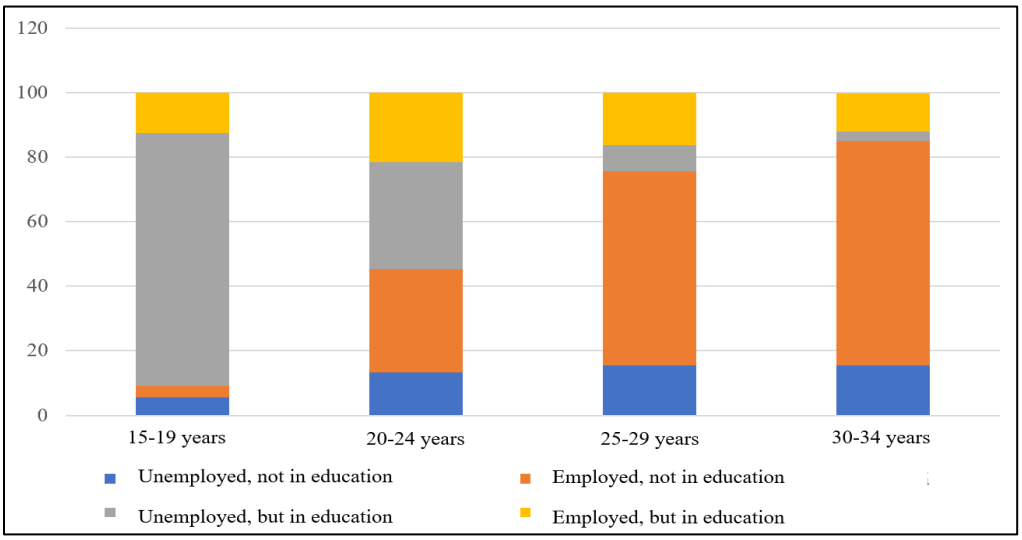
Figure 2. Share of employed persons aged 15–29 with tertiary education by sex, EU-27, 2022 (%)



Source: Eurostat (2023b), own processing.

In Figure 3, the transition from education to work is illustrated by indicating both employment status and education or training status for young people aged 15-34 by 5-year age group. In this graph, the analysis was supplemented with the 30-34 age group to observe the complete transition and the long-term outcomes of the educational pathway and labor market integration, as well as to capture young people who complete their studies later. Thus, the status of employee (but without being in education and training) increases with age, while the opposite is true for education (without being employed, but in education and training), where the share decreases considerably with age. In addition, in 2022, 12.4% of young people aged 15-19 in the EU were both employed and in education and therefore experienced a more flexible transition from education to work. The share increased to 21.4% among those aged 20-24, and then decreased for older age groups (16.2% among those aged 25-29 and 11.9% among those aged 30-34).

Figure 3. Employment, education and training situation of young people by age group, EU 2022 (%)

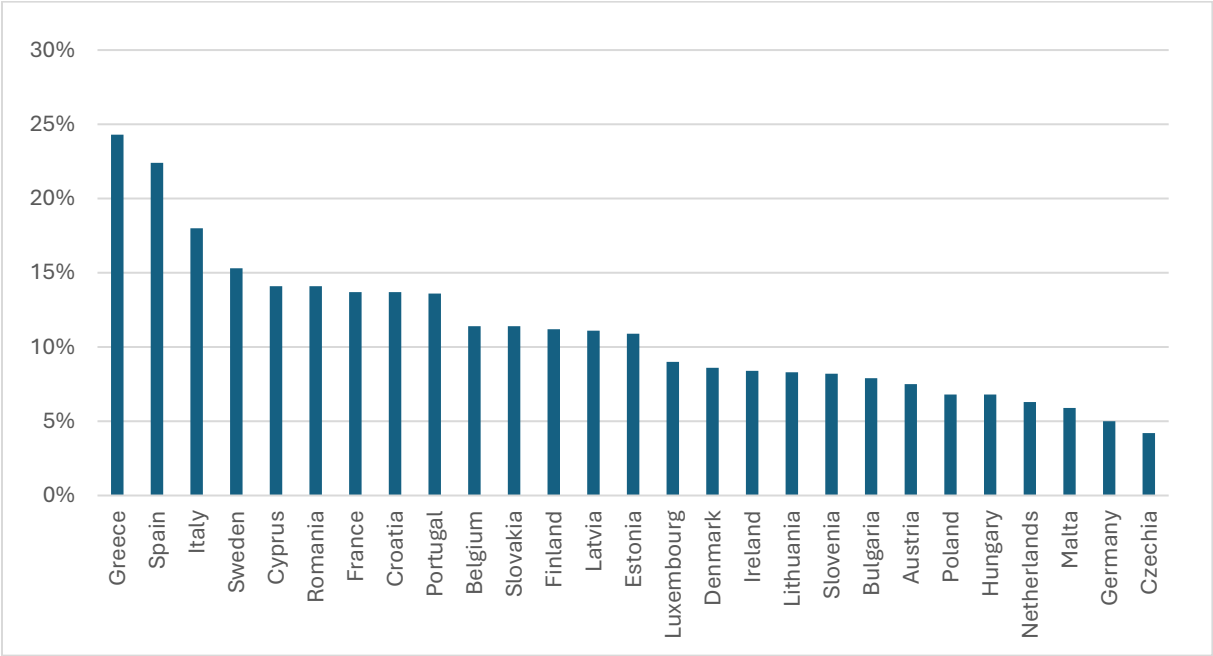


Source: Eurostat (2023b), own processing.

In 2022, 11.7% of people aged 15-29 in the EU were neither employed nor in vocational education and training (NEETs), a share that ranged from 4.2% in the Netherlands to 19.8% in Romania and is higher for women than men. In this regard, the European Union has set an EU-wide target stipulating that the share of young people not in employment, education or training should be less than 9% by 2030. However, there are differences between Member States, as 9 of the countries have already reached the 2030 target already in 2022.

In terms of youth unemployment, the total average rate across the EU was 11.3% in 2022. Among EU countries, the lowest indicator values were recorded in Czechia (4.2%), Germany (5%) and Malta (5.9%), and the highest rates in Greece (24.3%), Spain (22.4%) and Italy (18%). (Figure 4).

Figure 4. EU-27 15–29 unemployed rate, 2022 (%)

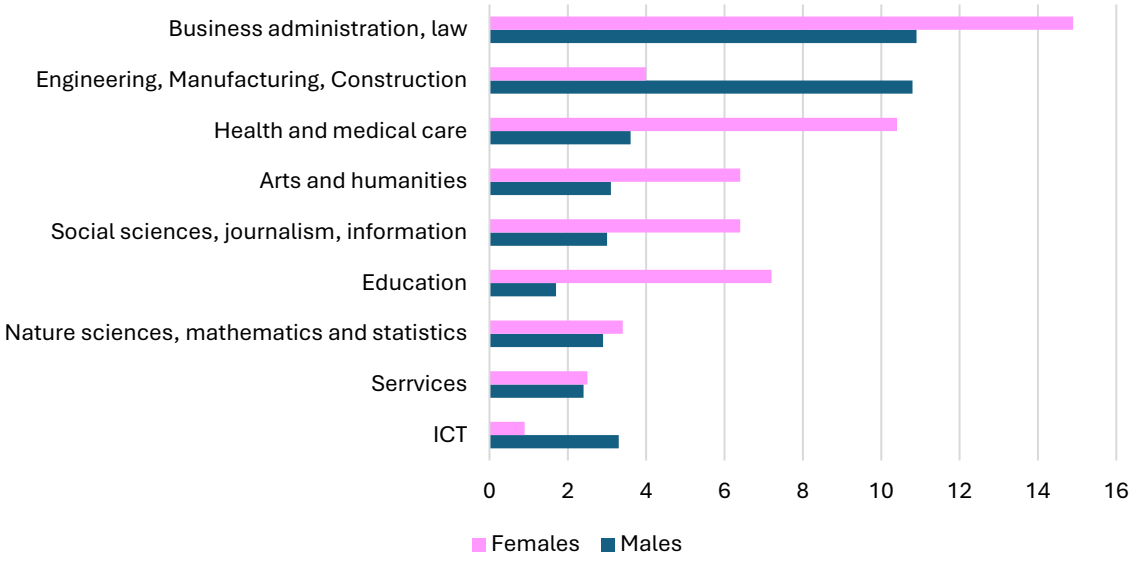


Source: Eurostat (2023a), own processing.

Regarding the distribution of tertiary education graduates by fields of study, at EU level, the most preferred areas are business administration and law (25.8%), engineering, manufacturing and construction (14.8%), health and healthcare (14%). At the opposite pole – with the lowest shares of graduates – is information and communication technology, as well as services (with less than 5%). Within the EU, more than half of all tertiary education graduates in 2021 were women (57.1%). Women make up the majority in the total number of graduates in their most preferred field of study (Business Administration and Law), as well as in Health and Nursing. In contrast, in the second most common field of education (engineering, manufacturing and construction), the share of men was almost 3 times higher than that of women. A predominance of men was also manifested in the field of information and communication technology (Figure 5).

As dynamics, between 2015 and 2021, the field of business administration and law showed the largest expansion in the number of graduates (an increase of 1.4 percentage points), while in the field of engineering, production and construction there was the largest decrease in the number of graduates (by 1.2 percentage points).

Figure 5. Tertiary educational attainment distribution in the EU by gender and field of study, 2021 (%)



Source: Eurostat (2023b), own processing.

From 2015 to 2021, the most significant changes across European countries occurred in the academic fields of business administration and law, and education. Thus, the largest decrease is recorded in education in Luxembourg (by 10.8 percentage points). Cyprus, on the other hand, saw the largest increase in education graduates at 7.7 percentage points, followed by Bulgaria with an increase of 5.9 p.p. In the case of business and law in EU countries, the largest decrease was recorded in Croatia (9.1 p.p.), and the largest increases were in Luxembourg (8.8 p.p.), followed by Denmark (4.9 p.p.).

4.2. Patterns in European countries regarding the transition of young people to the labour market

Cluster analysis by European countries

Analyzing patterns in the transition from school to the labor market provides a valuable framework for understanding the varied experiences and pathways young people navigate during this pivotal stage of life. By grouping countries into distinct categories based on key characteristics, we can uncover shared patterns and trends, offering deeper insights into how different socio-economic and political contexts shape the transition from education to employment.

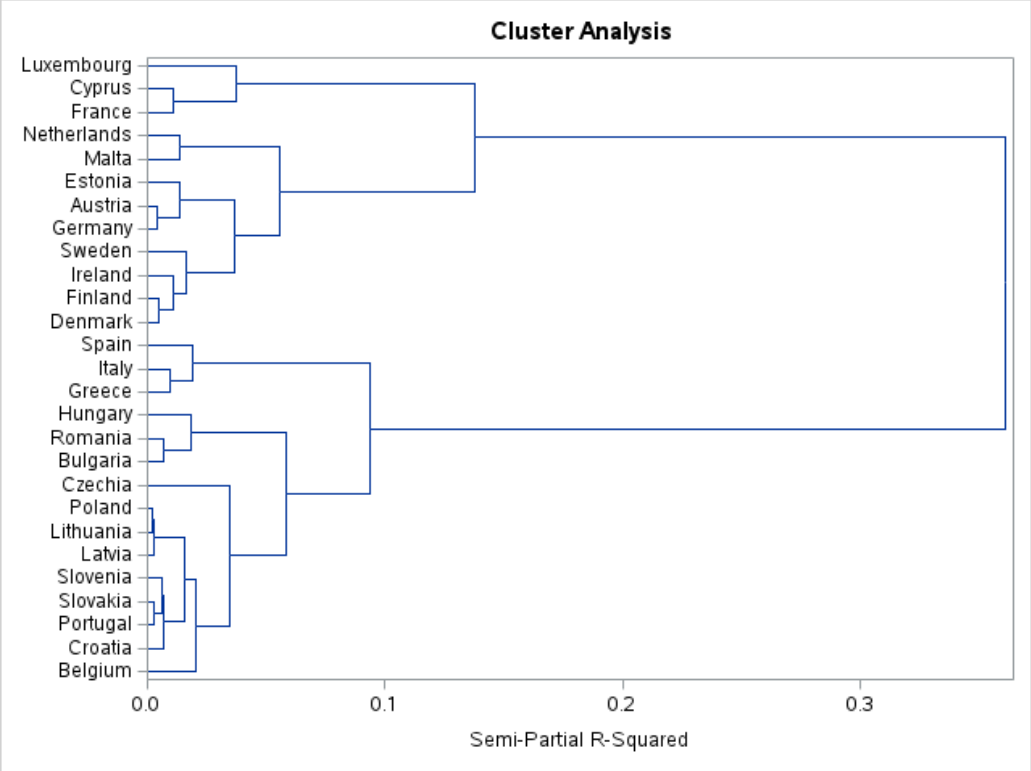
To achieve this, a cluster analysis was conducted on European Union countries to identify groups based on variables such as employment rates, educational attainment, access to training and professional development opportunities, support policies for school-to-work transitions, and other relevant factors. This grouping offers meaningful insights into the elements that influence transitions in specific countries or regions for the year 2021/2022.

Ward's method was employed in SAS Studio to determine the optimal number of clusters for dividing EU countries. The results, shown in Figure 6, suggest that the most appropriate approach is to form four distinct groups.

To evaluate the significance of the variables included in the analysis for clustering into four groups, a one-way analysis of variance (ANOVA) was conducted. The results indicate that three variables are not significant at a 0.05 significance level: the percentage of graduates in health-related fields, the percentage of individuals employed in business administration, and the percentage of early school leavers (Table 1).

By calculating the mean values of the significant variables for the four clusters (Table 2), four typologies can be identified regarding the transition of graduates to the labor market in European countries.

Figure 6. Dendogram (Classification Tree)



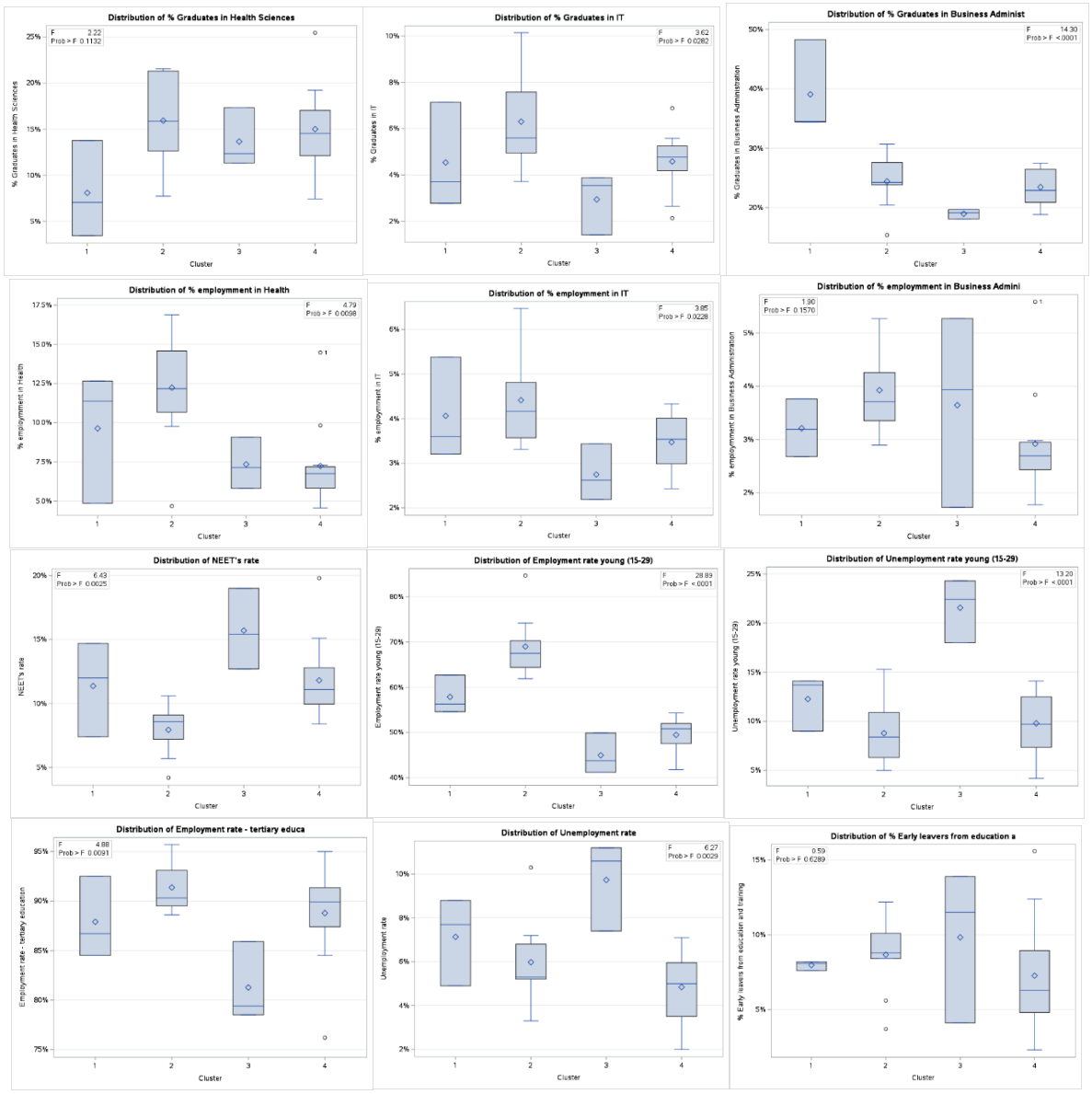
Source: own processing in SAS Studio.

Balanced Transition Cluster: Countries in Cluster 1 (Luxembourg, Cyprus, and France) have a very low percentage of graduates in health-related fields (an average of 8%) and IT (an average of 4.5%) but a high percentage of employees in business administration (an average of 39%) compared to other European states. The share of people employed in health (an average of 9.6%) and IT (an average of 4%) is moderate compared to other countries.

Youth employment rates average 57.8%, and employment rates for university graduates average 87.9%, among the highest compared to other clusters. The average unemployment rates for young people (12%), overall (7%), and NEET rates (11.3%) are moderate compared to the averages of other clusters.

Regarding the transition of young graduates to the labor market in these countries, it can be observed that this process is well-balanced. In all three countries, adaptability and qualifications are key to labor market success, with a balance maintained between the flexibility employers require and the protection provided to employees. Education and continuous training play a vital role in preparing a workforce capable of meeting the demands of a dynamic economy.

Table 1. ANOVA for Testing Significant Variables in Group Division



Source: own processing in SAS Studio.

Advanced Integration and Opportunities: Countries in Cluster 2 (Netherlands, Malta, Estonia, Austria, Germany, Sweden, Ireland, Finland, Denmark) stand out with high proportions of graduates in health-related fields (15.9% on average), business administration (24.4%), and IT (6.3%) compared to other European countries. Similarly, the share of people employed in health (12.2%), IT (4.4%), and business administration (3.9%) is significantly higher than in other clusters.

Youth employment rates in these countries average 69%, while employment among university graduates reaches 91.3%, ranking them among the highest in Europe. Furthermore, they have the lowest average rates of youth unemployment (8.7%) and NEETs (7.9%) across all clusters. However, the overall unemployment rate (5.9%) is slightly higher than in Cluster 4.

Table 2. Table "Cluster Means"

Cluster	Nb. Obs	Variable	Mean	Std Dev	N
1	3	% Graduates in Health Sciences	0.0809423	0.0523570	3
		% Graduates in IT	0.0453961	0.0229667	3
		% Graduates in Business Administration	0.3907580	0.0798762	3
		% employment in Health	0.0963465	0.0417937	3
		% employment in IT	0.0406288	0.0115728	3
		% employment in Business Administration	0.0321196	0.0054272	3
		NEET's rate	0.1136667	0.0369098	3
		Employment rate young (15-29)	0.5786667	0.0427122	3
		Unemployment rate young (15-29)	0.1226667	0.0283608	3
		Employment rate - tertiary education	0.8790000	0.0413280	3
		Unemployment rate	0.0713333	0.0201080	3
		% Early leavers from education	0.0796667	0.0032146	3
2	9	% Graduates in Health Sciences	0.1592374	0.0493789	9
		% Graduates in IT	0.0630406	0.0203528	9
		% Graduates in Business Administration	0.2441187	0.0446619	9
		% employment in Health	0.1223308	0.0364997	9
		% employment in IT	0.0441371	0.0104007	9
		% employment in Business Administration	0.0392702	0.0076689	9
		NEET's rate	0.0794444	0.0198186	9
		Employment rate young (15-29)	0.6901111	0.0698256	9
		Unemployment rate young (15-29)	0.0878889	0.0322895	9
		Employment rate - tertiary education	0.9136667	0.0240260	9
		Unemployment rate	0.0597778	0.0200111	9
		% Early leavers from education	0.0866667	0.0262440	9
3	3	% Graduates in Health Sciences	0.1366426	0.0320683	3
		% Graduates in IT	0.0294675	0.0133525	3
		% Graduates in Business Administration	0.1896889	0.0080257	3
		% employment in Health	0.0734350	0.0164436	3
		% employment in IT	0.0274620	0.0063478	3
		% employment in Business Administration	0.0364452	0.0179140	3
		NEET's rate	0.1570000	0.0316070	3
		Employment rate young (15-29)	0.4496667	0.0446580	3
		Unemployment rate young (15-29)	0.2156667	0.0323161	3
		Employment rate - tertiary education	0.8126667	0.0403774	3
		Unemployment rate	0.0973333	0.0204287	3
		% Early leavers from education	0.0983333	0.0510816	3
4	12	% Graduates in Health Sciences	0.1500609	0.0462104	12
		% Graduates in IT	0.0458481	0.0126514	12
		% Graduates in Business Administration	0.2344813	0.0310121	12
		% employment in Health	0.0724166	0.0263901	12
		% employment in IT	0.0347118	0.0061824	12
		% employment in Business Administration	0.0292017	0.0097756	12
		NEET's rate	0.1180833	0.0316270	12
		Employment rate young (15-29)	0.4947500	0.0395408	12
		Unemployment rate young (15-29)	0.0979167	0.0320127	12
		Employment rate - tertiary education	0.8878333	0.0477890	12
		Unemployment rate	0.0484167	0.0156754	12
		% Early leavers from education	0.0726667	0.0377728	12

Source: own processing in SAS Studio.

In these countries, the transition of young people to the labor market is highly efficient and rapid, positioning them as examples of best practices. Effective policies supporting youth integration into the workforce, including training programs, internships, and lifelong learning opportunities, contribute to their success. These nations also benefit from dynamic economies characterized by innovation and diversification, offering young people a wide range of career opportunities. This integrated approach facilitates a seamless and successful transition for young people entering the labor market.

Challenges and Barriers: Countries in Cluster 3 (Spain, Italy, and Greece) have an average percentage of graduates in health-related fields (13.66%), while the average percentages of IT graduates (2.9%) and business administration graduates (18.9%) are the lowest among all clusters. Similarly, the share of people employed in health (7.3%), IT (2.7%), and business administration (3.6%) is also the smallest compared to other European countries.

Youth employment rates in these countries average 44%, and employment among university graduates stands at 81%, placing them at the lowest levels among all clusters. In contrast, they record the highest average rates of youth unemployment (21.5%), NEETs (15.7%), and overall unemployment (9.7%) compared to other groups.

In Spain, Italy, and Greece, the transition of young people to the labor market is marked by significant challenges, reflecting weaker integration into the workforce. These countries face issues such as high youth unemployment, less dynamic economies, and educational systems often misaligned with labor market demands. Additionally, factors like economic instability and uncertainty exacerbate difficulties in ensuring an effective transition, limiting young people's employment opportunities and professional advancement prospects.

Emerging Challenges and Opportunities: Countries in Cluster 4 (Hungary, Romania, Bulgaria, Czechia, Poland, Lithuania, Latvia, Slovenia, Slovakia, Portugal, Croatia, Belgium) have a high percentage of graduates in health-related fields (15% on average) and business administration (23.4% on average), while the percentage of IT graduates (4.6% on average) is moderate compared to other European countries.

However, the share of people employed in health (7.2%), IT (3.4%), and business administration (2.9%) is among the lowest across Europe. Youth employment rates average 49%, and employment among university graduates stands at 88%. While these figures indicate a relatively poor situation, they are slightly better—particularly for higher-education graduates—compared to Cluster 3.

In terms of youth unemployment (9.8%), NEET rates (11.8%), and overall unemployment (4.8%), Cluster 4 countries record some of the lowest averages compared to other clusters.

This suggests that while these countries face challenges in integrating young people into the labor market, particularly in terms of overall employment rates, they perform better in providing opportunities for higher-education graduates. Investments in education and targeted employment policies could further enhance their ability to support young people in navigating the transition to the labor market effectively.

Analysis of the relationship between education level and employment population

The next phase of the research focused on analysing the relationship between tertiary educational attainment and employment in Europe's main fields, based on the same variables recorded for all EU countries in 2021/2022. Through Principal Component Analysis (PCA), the main components that explain most of the variation in data have been identified, allowing us to focus on key aspects of the transition from education to the labour market and to reveal a number of complex relationships between education level, qualifications and sector. Thus, we can identify the factors that have the greatest influence on the transition of the young population from school to the labor market. The analysis resulted in the existence of three main components, which, cumulatively, retain 66.73% of the total change in data (Table 3, figure 7).

The first component could be named the employment component, being determined positively by the percentage of people employed in IT, health, and business administration, youth employment rates, and employment rates for those with tertiary education. Negatively, it is influenced by the NEET rate and the youth unemployment rate.

The second component could be named the graduates component, being positively influenced by the proportion of graduates in health fields, and negatively by the proportion of graduates in IT and business administration. This component is also positively influenced by the youth unemployment rate and the overall unemployment rate.

Table 3. Table "Eigenvalues of the Correlation Matrix"

Eigenvalues of the Correlation Matrix				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	4.10661474	1.64054314	0.3422	0.3422
2	2.46607161	1.03172878	0.2055	0.5477
3	1.43434283		0.1195	0.6673

Source: own processing in SAS Studio.

The third component could be named the early school-leaving component, being determined by the percentage of early school leavers and the overall unemployment rate, indicating a strong correlation between these two variables. Additionally, it is positively correlated with the percentage of IT graduates, possibly reflecting a strategy by these countries to reorient the labor market towards high-demand sectors that appeal strongly to young people.

Table 4. Table "Eigenvectors"

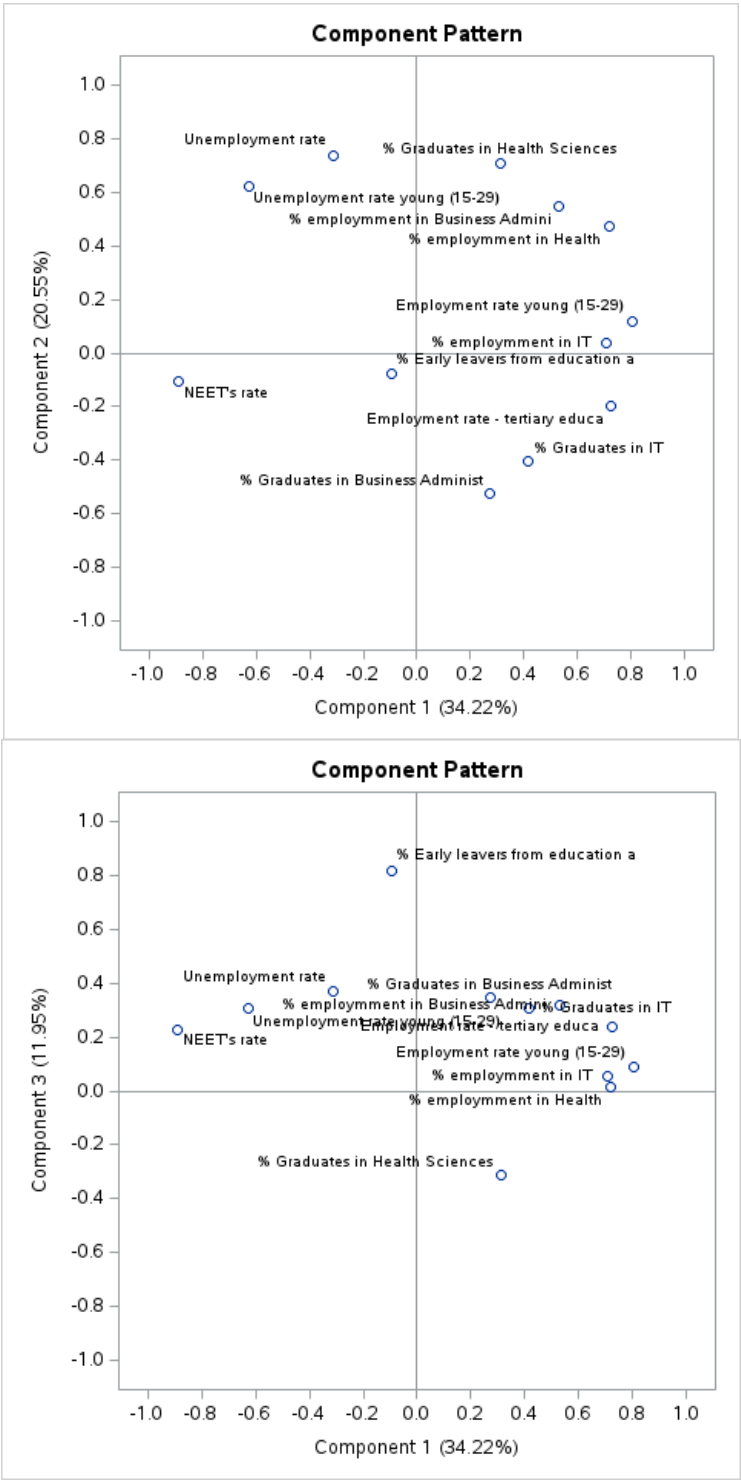
	Prin1	**Prin2**	**Prin3**
% Graduates in Health Sciences	0.154084	0.451922	-.261610
% Graduates in IT	0.206136	-.255833	0.256755
% Graduates in Business Administration	0.133846	-.332190	0.288496
% employment in Health	0.354176	0.299562	0.014089
% employment in IT	0.348048	0.024994	0.045642
% employment in Business Administration	0.262285	0.349118	0.266176
NEET's rate	-.438156	-.066533	0.191067
Employment rate young (15-29)	0.397511	0.076510	0.073144
Unemployment rate young (15-29)	-.309660	0.397398	0.257142
Employment rate - tertiary education	0.358957	-.126361	0.198993
Unemployment rate	-.153625	0.470220	0.308951
% Early leavers from education and training	-.046306	-.049413	0.682824

Source: own processing in SAS Studio.

Figure 8 provides a graphical representation of the countries projected onto the principal component planes, highlighting the clusters of countries identified in the previous chapter. From this graph, it is evident that when projected onto the plane determined by the first two principal components, the countries are well separated. Countries in Cluster 4 have above-average values for the employment component, those in Cluster 2 show average or above-average values for the graduates' component and below-average values for the employment component, while countries in Cluster 1 have below-average values for the graduates' component. Countries in Cluster 3, on the other hand, have values around the average for both the employment and graduates' components. The third component does not distinctly separate the three groups,

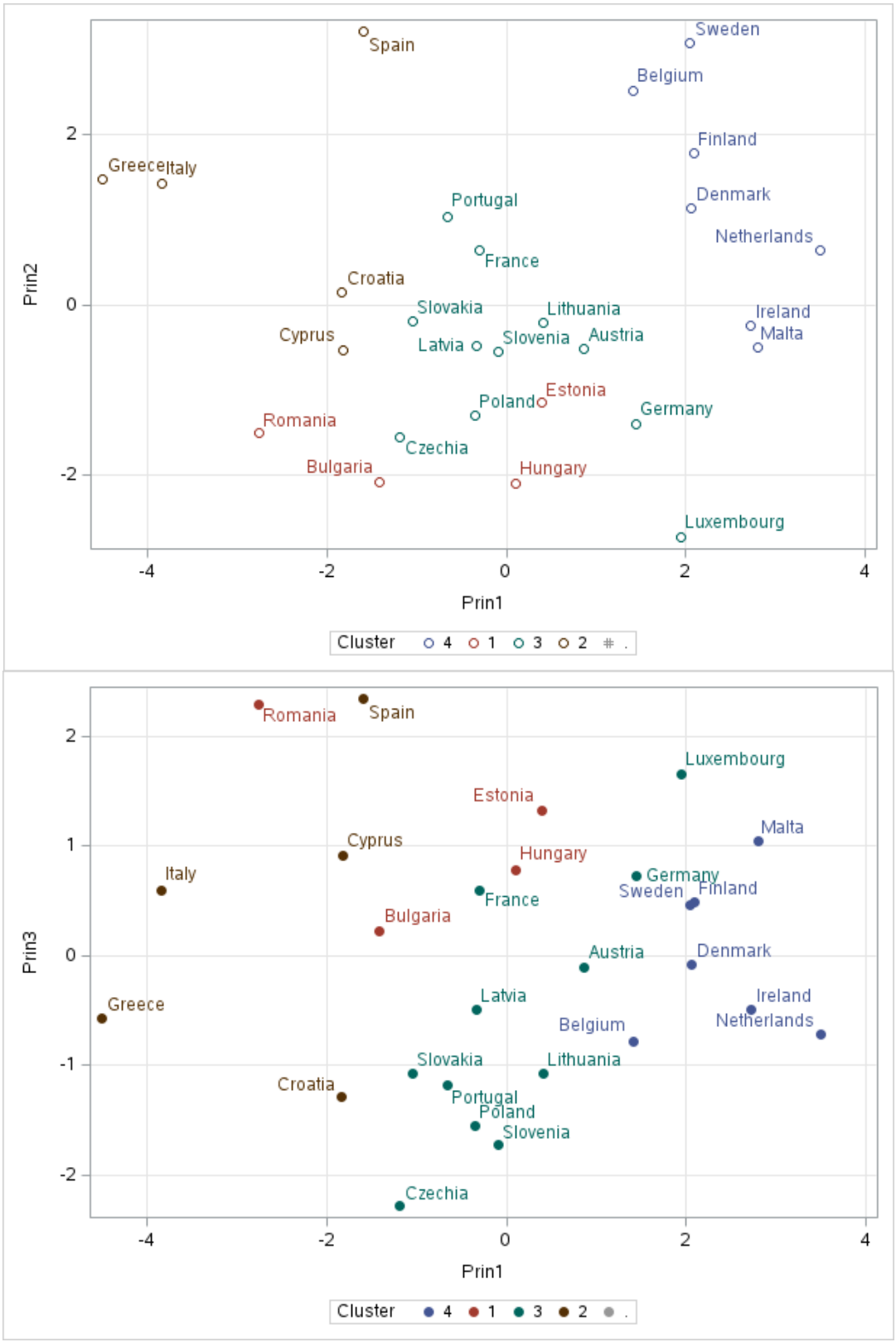
a conclusion also reached in the previous section (the variable for early school leavers does not effectively distinguish the clusters).

Figure 7. "Component Pattern" chart



Source: own processing in SAS Studio.

Figure 8. Component Scores



Source: own processing in SAS Studio.

5. Conclusion

From literature research, but also from current research, it appears that there is a strong correlation between the level of education and the chances of getting a job. The youth employment rate in Europe has a general upward trend, indicating an improvement in young people's access to employment. However, there are still significant differences between European countries, with certain countries - such as Greece, Spain and Italy - recording high youth unemployment rates. Worryingly, there is also the persistence of a high level of the rate of young people belonging to the NEETs category. In order to reduce the level of this indicator, European countries must focus on several aspects, such as improving education and training systems, facilitating school-to-work transition through traineeship and internship programmes, encouraging entrepreneurship and supporting innovation, developing the labour market by creating new jobs and promoting gender equality in access to job opportunities.

Following the analysis, it was concluded that in 2021/2022 the European countries have experienced four transition patterns for young people moving from school to work: I) Balanced Transition Pattern, found in Luxembourg, Cyprus, and France, is characterized by a high proportion of graduates in Business-Administration, as well as high youth employment rates and high employment rates among individuals with higher education. Countries in this group have successfully implemented a transition based on adaptability and the importance of young people's skills being aligned with employers' requirements. II) Advanced Integration and Opportunities Pattern, observed in developed countries such as the Netherlands, Austria, Germany, Sweden, Ireland, Finland, and Denmark, is marked by high proportions of graduates across all considered fields of study, as well as high employment rates in these fields. These countries exhibit the lowest youth unemployment and NEET rates. In these countries, the transition of young people to the labor market is highly efficient and rapid, based on effective youth support policies and facilitation of their labor market integration through training programs, internships, and lifelong learning opportunities. III) Challenges and Barriers Transition Pattern, identified in Southern European countries, is characterized by the lowest proportions of graduates in IT and Business Administration, low youth employment rates, and low employment rates among individuals with tertiary education, alongside the highest unemployment rates. This transition pattern is marked by weaker integration of young people into the labor market, a greater mismatch between the educational system and labor market requirements, in the context of less dynamic economies with higher levels of instability. IV) Emerging Challenges and Opportunities Transition Pattern was found in less developed, emerging economies, many from the former Eastern Bloc. This pattern is characterized by relatively high shares of graduates in healthcare and Business-Administration, fields that, however, face low employment rates. These countries face difficulties in integrating young people into the labor market but perform better in terms of offering opportunities for young people to pursue higher education. Investments in education and targeted employment policies could further enhance their ability to support young people in navigating the transition to the labor market effectively. We mention that among all the fields of study of the graduates initially included in the analysis, some – such as Engineering, Production and Construction, Arts and Humanities, Education, etc. – had a limited, insignificant contribution to the formation of the clusters. Therefore, in identifying transition patterns from education to the labor market, the fields considered were IT, Health Sciences, and Business Administration with respect to the graduates, all the other variables being general. The research can also be conducted in the future for other time periods to determine whether significant changes have occurred in the transition patterns from school to the labor market in European countries and to identify the responsible factors.

In order to facilitate the transition from education to the labour market, European countries can adopt a range of solutions and policies aimed at supporting young people in their integration into the labour market. Vocational guidance and counselling is an essential first step, providing them with adequate support and information for career choices and training. At the same time, close collaboration between the education sector and the private sector is essential. Through partnerships and exchanges of experience, a better alignment of the educational offer with the requirements of the labour market can be achieved, thus ensuring

relevant training for young people. Financial support and subsidies are other measures governments can implement to encourage young people to access higher education or start their own business. These measures reduce financial barriers and facilitate school-to-work transitions.

By implementing these solutions and policies, European countries can create an enabling environment for school-to-work transition, facilitating young people's access to the labour market and supporting them in developing a successful career.

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