

THE IMPORTANCE OF HUMAN RESOURCE QUALITY IN THE TRANSITION PROCESS TOWARDS A GREEN ECONOMY

MUNGIU-PUPĂZAN MARIANA CLAUDIA

ASSOC. PROF. PHD, “CONSTANTIN BRÂNCUȘI” UNIVERSITY OF TG-JIU

e-mail:claudia.mungiu@gmail.com

Abstract

The transition to a green economy represents a complex process of economic, technological and social transformation, aimed at reducing the impact on the environment, using resources efficiently and promoting sustainable development. Within this process, the quality of human resources is an essential factor for the success and sustainability of economic changes. The paper analyzes the role of education, continuous professional training and the development of green and digital skills in adapting the workforce to the new requirements of the economy. The paper highlights the transformations produced on the labor market, the emergence of new occupations, the change in the skills required in existing professions and the need to retrain people affected by the restructuring of traditional sectors. It also analyzes the role of human resources management, the importance of investments in human capital and the need for a just transition that reduces the risk of social exclusion and structural unemployment. The paper highlights the fact that green technologies cannot be effectively exploited without the existence of a well-trained, adaptable and capable workforce of responding to technological and economic changes. In conclusion, the development of green and digital skills, together with investments in education and lifelong learning, are fundamental conditions for building a competitive, inclusive and sustainable economy.

Keywords: green economy, human resources, green skills, sustainable development, education, vocational training, labor market, just transition, digitalization.

Classification JEL: J24, Q01, Q52, Q56, O33

1. Introduction

The transition to a green economy represents one of the most important economic, social and technological challenges of the 21st century. Climate change, environmental degradation, depletion of certain natural resources and the need to reduce greenhouse gas emissions have led states, international organizations and the business community to pay increasing attention to sustainable development. In this context, the green economy not only involves transforming production and consumption models, but also profoundly changing the way in which the workforce is trained, used and valued.

Human resources constitute one of the main components of the competitiveness of an economy. In the context of the green transition, its importance increases, as new technologies, production processes and business models require different skills than those used in the traditional economy. Employees must be able to use modern technologies, understand the principles of energy efficiency and environmental protection, and adapt quickly to changes in the labor market[1].

According to the International Labour Organization, the transition to green economies and societies can generate numerous job opportunities, but also involves the transformation or disappearance of existing occupations. Therefore, skills development and investment in education and training become essential for the green transition to be fair and inclusive.

The purpose of this paper is to analyze the importance of human resource quality in the transition process towards a green economy, highlighting the role of education, vocational training, green skills, digitalization and employee adaptability. The paper also aims to highlight the main challenges faced by public organizations and institutions in developing a workforce prepared for the green economy.

2. The concept of green economy and its characteristics

The concept of a green economy has gained particular importance in recent decades, in the context of concerns about sustainable development and climate change. The United Nations Environment Programme defines a green economy as an economy that leads to improved human well-being and social equity, while significantly reducing environmental risks and ecological deficit.

The green economy involves the transition from an economic model based largely on the intensive consumption of resources and fossil fuels to one oriented towards efficiency, pollution reduction, responsible use of resources and the development of clean technologies. This category includes areas such as renewable energy, energy efficiency, the circular economy, sustainable transport, ecological agriculture, green buildings and sustainable waste management.

The green transition has important effects on all sectors of the economy. Some traditional activities are forced to reduce their impact on the environment, while other sectors are developing rapidly. For example, the increase in investment in solar and wind energy determines the emergence of new jobs and new professional specializations. At the same time, reducing dependence on fossil fuels can affect regions and communities that are economically dependent on traditional industries [2].

The transition to a green economy is therefore not exclusively a technological or environmental issue. It also represents a transformation of the labor market. Its success depends largely on the ability of people and organizations to adapt to the new conditions.

Human resources – strategic factor of the green transition

Human resources represent the totality of knowledge, skills, experience, creativity and work capacity possessed by people who work in an organization or in an economy. In the contemporary economy, human capital is considered an essential factor of development and competitiveness [11]. In the green transition process, the quality of human resources becomes all the more important as the implementation of sustainable solutions requires the existence of people capable of designing, implementing and using them. Green technologies, no matter how efficient they are, cannot produce the expected results without qualified personnel.

A first aspect of the quality of human resources is the level of education. A population with a high level of education has a greater capacity to understand economic and technological changes and to adapt to them. At the same time, education contributes to the development of critical thinking, creativity and problem-solving skills.

A second element is continuous professional training. The green transition determines the emergence of new technologies and procedures, which means that the professional training acquired at the beginning of a career is no longer sufficient for the entire period of activity. Employees must regularly participate in advanced training and retraining courses. Another essential element is adaptability. In the conditions of rapid changes in the labor market, employees must be willing and able to learn new things, use digital technologies and change their working methods.

Green skills and labor market transformation

A central concept in the transition to a green economy is that of “green skills”. These are the knowledge, skills, values and attitudes needed to support the development of a resource-efficient and environmentally sustainable economy.

Green skills can be found in both emerging and traditional professions. For example, engineers may need skills in designing energy-efficient systems, construction specialists need to know energy-efficient building standards, and industrial workers need to be familiar with reducing material and energy consumption.

In this context, the labour market can be broadly divided into three categories of occupations. The first category is represented by directly “green” jobs, such as renewable energy installation technicians, waste management specialists or energy efficiency experts. The second

category comprises existing professions that are transformed by the introduction of sustainable technologies and practices. The third category includes occupations that may be negatively affected by the transition, in particular those associated with carbon-intensive activities.

This transformation creates both opportunities and risks. If workers have access to education and training, they can move into growing sectors. Conversely, a lack of skills can lead to structural unemployment and widening economic disparities between regions and social groups.

The International Labour Organization stresses the need for a just transition, in which affected workers and communities are supported through employment policies, social protection, social dialogue and skills development.

The role of education and vocational training

Education is one of the most important conditions for achieving the transition to a green economy. Educational institutions must adapt their curricula to the new demands of the labor market and integrate sustainability issues into different fields of specialization. Universities and higher education institutions have an important role in training the specialists needed for the green economy. Fields such as engineering, economics, management, agriculture, architecture, computer science and environmental sciences must increasingly include elements related to sustainable development.

Vocational and technical education must also respond to the demands generated by the development of green industries. It is necessary to train technicians and specialists capable of working with photovoltaic installations, energy efficiency systems, electric vehicles, recycling technologies and low-emission industrial processes [11].

Continuing professional training is equally important. Companies must invest in employee development, and the state must create programs through which people affected by economic transformations can acquire new skills.

In this sense, the concept of "lifelong learning" or lifelong learning becomes fundamental. A competitive employee in the green economy is one who constantly updates his knowledge and is able to adapt to changes.

Digitalization and the skills needed for the green economy

The green transition is closely linked to the digital transformation. Digital technologies allow for monitoring energy consumption, optimizing industrial processes, reducing resource use and developing more efficient business models.

Artificial intelligence, data analytics, the internet of things and automation can help identify ways in which organizations can reduce their consumption and environmental impact. For example, sensors and smart systems can monitor the energy consumption of buildings and automatically adjust heating, lighting or air conditioning.

Therefore, employees in the green economy need not only green skills, but also digital skills. The combination of the two categories of skills becomes an important competitive advantage [7].

Digitalization can also contribute to the development of flexible working and the reduction of certain types of travel, but it can also generate risks. The automation of some activities can lead to the disappearance of some jobs, which emphasizes the need for retraining and professional development.

Organizations need to adopt a strategic approach to skills development. It is not enough to purchase modern technologies; it is necessary to train the employees who will use these technologies and integrate them into an organizational culture oriented towards sustainability.

Artificial intelligence and the future of the labor market

Artificial intelligence is one of the main technologies that will transform the labor market in the coming decades. The rapid development of ai-based systems, including those capable of generating text, images, code, and complex analysis, will change the way many professional activities are performed. However, the impact of ai should not be viewed exclusively in terms of

job loss, but rather in terms of job transformation and the emergence of new professional opportunities [1].

One of the main consequences of the development of artificial intelligence will be the automation of certain repetitive and standardized tasks. Administrative activities, data entry and processing, certain industrial operations, customer service, and some analytical activities can increasingly be performed with the help of automated systems. In this context, some occupations will be diminished, and certain traditional skills will become less in demand.

At the same time, artificial intelligence can generate new jobs and new specializations. The development and use of these technologies require specialists in artificial intelligence, data analysis, cybersecurity, software development, automated systems management and technology ethics. Moreover, professions will emerge that are currently difficult to predict, as was the case with previous technological transformations [7].

An important aspect is the changing relationship between the employee and technology. In many situations, AI will not completely replace the employee, but will take over certain tasks, allowing them to focus on activities that require creativity, critical thinking, communication, empathy and decision-making. Thus, professional competitiveness will increasingly depend on the ability of people to collaborate effectively with artificial intelligence systems.

This transformation emphasizes the importance of education and lifelong learning. Employees need to develop both digital skills and cognitive and social skills. Adaptability, creativity, problem solving, critical thinking and communication will become increasingly important skills in an economy where repetitive tasks are progressively taken over by technology.

Artificial intelligence can also play an important role in the transition to a green economy. Intelligent systems can help optimise energy consumption, monitor emissions, manage resources efficiently, develop smart energy grids and optimise industrial processes. The combination of green skills, digital skills and AI knowledge can therefore become a major asset for the workforce of the future. However, the widespread use of AI also brings risks. There is a potential for increasing inequalities between people with advanced digital skills and those without access to adequate education and training. Workers in certain sectors may also be more vulnerable to automation than others. For this reason, public policies need to focus on skills development, reskilling and protecting vulnerable people.

The role of organizations and human resource management

Human resource management plays a decisive role in preparing organizations for the green economy. Human resource departments must identify the necessary skills and develop recruitment, training and motivation strategies adapted to the new realities [10].

Recruitment must target not only professional experience, but also the ability of candidates to learn and adapt. Organizations can increasingly attach importance to skills related to sustainability, energy efficiency, environmental protection and the use of digital technologies.

Employee training must be correlated with the organization's sustainability objectives. For example, a company that wants to significantly reduce energy consumption must train its employees on the efficient use of equipment and on identifying sources of waste.

Another important aspect is employee motivation. Organizations can stimulate sustainable behaviors through reward systems, professional recognition, and involvement in social and environmental responsibility projects. At the same time, the organizational culture must support the principles of sustainable development. Employees must understand that environmental protection is not only the responsibility of management or a specialized department, but a shared responsibility [11].

Just transition and social inclusion

One of the most important aspects of the transition to the green economy is its fairness. Structural changes can affect workers, economic sectors and regions differently.

Regions dependent on carbon-intensive activities can be more vulnerable to the decarbonisation process. The closure or restructuring of activities can lead to job losses and reduced incomes. For this reason, public policies must include support measures for the workers affected.

Retraining is one of the main solutions. A worker who loses his or her job in a traditional sector must be able to acquire the skills needed to take up a job in a developing sector.

It is also important that the opportunities generated by the green economy are accessible to as many people as possible. Young people, women, low-skilled people and workers in vulnerable regions must have access to training and retraining programmes [6].

The concept of a just transition demonstrates that environmental protection and economic development must be linked to social protection. A green economy cannot be considered fully sustainable if it generates social exclusion or increases inequalities.

Outlook for Romania

For Romania, the transition to a green economy represents both a challenge and an opportunity for development. The country has significant potential in the fields of renewable energy, agriculture, energy efficiency, the circular economy and digitalization.

However, harnessing this potential requires a well-trained human resource. The education system must be more closely linked to the needs of the economy, and vocational training programs must take into account the transformations brought about by the green transition.

Romanian companies must, in turn, invest in employee skills and adopt long-term human resource development strategies. Partnerships between universities, companies, public authorities and professional organizations can help reduce the skills gap.

Public policies also play an important role. Investments in education, research, infrastructure and vocational training can contribute to creating a workforce prepared for new economic requirements. In Romania, the development of green skills can also represent a way to increase economic competitiveness. Companies with well-trained employees can more easily adopt modern technologies, reduce costs and respond to increasingly strict requirements regarding environmental protection.

3. Conclusions

The transition to a green economy is a complex process, involving technological, economic, social and institutional changes. Although green technologies and infrastructure investments are indispensable, they are not sufficient to achieve a sustainable transformation. The human factor is the element that can ensure the efficient use of new technologies and the adaptation of organizations to economic changes.

The quality of human resources is determined by the level of education, professional skills, adaptability, creativity and availability for continuous learning. In the green economy, these characteristics become all the more important as new professions emerge, existing occupations are transformed and employers' requirements change.

Vocational education and training must adapt to these transformations by introducing green and digital skills. At the same time, organizations must develop human resource management strategies that include recruiting, developing and motivating employees in the spirit of sustainability.

The concept of just transition also plays an important role. The transformation of the economy must be carried out in such a way that individuals and communities affected by the restructuring of traditional sectors benefit from a secondary component of the green transition, as one of its fundamental conditions. A well-trained workforce can transform the challenges of the ecological transition into opportunities for innovation, competitiveness and sustainable economic development. For Romania, the development of green and digital skills can represent a strategic advantage and contribute to building a more competitive economy, retraining and integration into the labor market.

In conclusion, investment in human resources should not be seen as a secondary component of the green transition, but as one of its fundamental conditions. A well-trained workforce can transform the challenges of the ecological transition into opportunities for innovation, competitiveness and sustainable economic development. For Romania, the development of green and digital skills can represent a strategic advantage and contribute to building a more competitive, resilient and sustainable economy.

Artificial intelligence will profoundly transform the labor market, but the extent of its effects will depend on how society adapts. Investments in education, vocational training and the development of digital and green skills will be essential for AI to contribute to increasing productivity and creating sustainable professional opportunities. In this sense, the quality of human resources will be one of the main factors that will determine whether technological transformation will lead to exclusion and job losses or, on the contrary, to increasing productivity, the emergence of new professions and the development of a more competitive and sustainable economy.

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