THE ECONOMIC IMPACT OF EDUCATION AND VOCATIONAL TRAINING IN THE CURRENT GLOBAL CONTEXT: A COMPARATIVE ANALYSIS – EUROPE VS. USA

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Abstract: In the current global context, marked by accelerated digitalization, ecological transition, and structural labor market shifts, vocational education and training (VET) systems have become strategic levers for increasing economic competitiveness and workforce adaptability. This article provides a comparative analysis of the economic impact of VET systems in the European Union (EU) and the United States of America (USA), focusing on institutional frameworks, funding structures, labor market integration, and responses to recent crises such as the COVID-19 pandemic and the war in Ukraine. Using operational and financial indicators—such as participation rates across age groups, employment outcomes, investment volumes, and employer engagement—the study identifies significant differences: the EU emphasizes structural coherence, dual training systems, and public financing, while the USA model favors decentralization, flexibility, and strong private-sector involvement. The analysis reveals that VET contributes to increased productivity, higher employment rates, and reduced social inequalities, especially when aligned with digital and green skills development. Furthermore, the article highlights the need for adaptive policies that combine the EU's focus on equity and institutional integration with the USA's agility and innovation capacity. The conclusions suggest that transatlantic convergence could foster a resilient and inclusive global VET ecosystem, capable of responding to rapid economic and technological changes. Strategic investments, coordinated public–private partnerships, and digital infrastructure development emerge as key pillars for future-proof VET systems.

Keywords: vocational education and training, economic impact, European Union, United States, productivity, labor market, digital skills, comparative policy;

JEL Classification - A20

1. Introduction

In the current global context, shaped by the acceleration of digital transformation, the emergence of smart technologies, and ongoing demographic and climate challenges, vocational education and training (VET) have gained unprecedented economic and social importance. The capacity of countries to respond to labor market shifts, foster innovation, and reduce inequalities is largely dependent on the effectiveness of VET systems and the quality of human capital developed through them (Hanushek & Woessmann, 2015; Becker, 1993).

Vocational training is no longer perceived merely as an alternative to academic education, but rather as a strategic lever for economic development, contributing to increased productivity, reduced unemployment, and smoother transitions to green and digital economies (CEDEFOP, 2023; OECD, 2023). It also supports social inclusion and upskilling, offering adult learners pathways to professional reintegration and lifelong learning (Illeris, 2011; Gudănescu, 2008).

Both the European Union and the United States of America have recognized the strategic value of VET, yet their institutional models differ substantially. The EU promotes a dual system model, combining theoretical learning and in-company practice—especially effective in countries like Germany and Austria—while also emphasizing transnational cooperation via programs like Erasmus+ and the Pact for Skills (European Commission, 2021; CEDEFOP, 2022). In contrast, the U.S. approach is decentralized and market-driven, relying on regional community colleges, private certification providers, and corporate training initiatives (Symonds et al., 2011; LinkedIn Learning, 2023).

This paper aims to conduct a comparative analysis of the economic impact of VET systems in Europe and the USA, identifying their strengths and limitations, and evaluating how recent crises—such as the COVID-

19 pandemic and the war in Ukraine—have affected public investments, participation rates, and policy orientations. By correlating recent statistical indicators with key policy frameworks, the study seeks to identify best practices and formulate strategic recommendations that support a resilient and future-oriented VET ecosystem (World Economic Forum, 2023; Zamfir & Stoica, 2006).

2. Education and Vocational Training Europe vs SUA – comparative analysis

The initial education systems in Europe and the United States face a range of structural and functional challenges that impact the quality, equity, and relevance of education. In Europe, the main identified issues include inequalities in access to education, especially between urban and rural areas or among different social groups; a high early school dropout rate in certain member states; a weak correlation between the skills acquired in school and the demands of the labor market; chronic underfunding of the education system especially in emerging countries and difficulties related to digitalization, particularly in training teachers and equipping schools with adequate technology. In the United States, the education system is affected by significant disparities in funding and quality between school districts; the persistence of de facto educational segregation along racial and economic lines; an excessive focus on standardized testing, which limits the development of critical and creative skills; the high cost of higher education, which negatively impacts student motivation in earlier stages of education; and serious issues related to school safety. These common and specific challenges underline the need for deep and coherent reforms to ensure an inclusive, equitable, and future-oriented education system.

Vocational education and training (VET) stand at the core of economic and social adaptation strategies in response to structural transformations driven by digitalization, globalization, and ecological transition. However, the formulation of an effective VET policy requires a deep understanding of how this system influences human capital and the real economy. The differences between the European Union and the United States in terms of VET system architecture are relevant for comparative policy analysis, as they affect employment rates, productivity, and workforce adaptability.

In the European Union, in 2022, approximately 48.7% of upper secondary students were enrolled in vocational education programs (VET), according to CEDEFOP. However, this rate varies significantly across countries: Germany, Austria, the Czech Republic, and Finland exceed 65%, while other member states such as Spain and Ireland report participation below 30%. In parallel, in the United States, Career and Technical Education (CTE) programs serve around 12 million students annually, across high schools and community colleges, though participation is more fragmented and dependent on local initiatives and public–private partnerships.

In terms of adult education and continuous training, only 10.8% of European adults participated in such programs in 2022 (Eurostat), with significant disparities: over 20% in Nordic countries (Denmark, Sweden), compared to under 3% in Eastern Europe (Romania, Bulgaria). In the U.S., approximately 22% of adults are enrolled in non-university postsecondary education, yet the lack of a unified structure for providers and certifications reduces the long-term impact. The budgets allocated to VET differ considerably between the two regions.

In the EU, public spending on vocational education ranges between 0.4% and 0.8% of GDP, depending on the country (CEDEFOP, 2023). In the U.S., federal funding for CTE was only $1.4 billion in 2022 (under the Perkins Act), supplemented by state and local funds—still modest relative to the size of the system. Regarding private sector involvement, European companies contribute significantly to VET through dual systems. For example, in Germany, companies invest over €9 billion annually in apprenticeship training. In the U.S., large corporations often offer in-house training programs; according to a 2023 LinkedIn Learning report, 77% of American companies increased their training budgets, and Fortune 500 companies spend on average $1,300 per employee per year on training and development.

The essential research question formulated in this study is: To what extent do different levels of public funding and private engagement in VET generate comparable economic outcomes in terms of employability, productivity, and adaptability to technological change? This question is addressed through a multi-dimensional analysis:

- Operational dimension: number of participants and the characteristics of VET delivery systems.
- Economic dimension: government expenditures and private investments, impact on GDP and employment.
- Structural dimension: governance, institutional partnerships, and integration with labor markets.

Formulating the problem in this way allows not only for an evaluation of impact but also for an understanding of the underlying logic behind each system's efficiency. This approach serves as a foundation for identifying good practices and potential convergence areas between European and American VET models.

2.1. Operational and Financial Indicators of education and training systems in the EU and the USA

In the context of global economic transformations, vocational education and training (VET) play a crucial role in adapting the workforce to labor market demands. Discrepancies between VET systems in the European Union (EU) and the United States of America (USA) generate significant differences in terms of participation, funding, and private sector involvement. This section analyzes these aspects using recent statistical data about various aspects related to education and training systems. The rate of participation in educational system for Europe and USA are presented in the Table 1, below.

Participation Rates in VET – EU vs USA

Table 1: Participation in education – Age group 6–24 years (2022/2023)

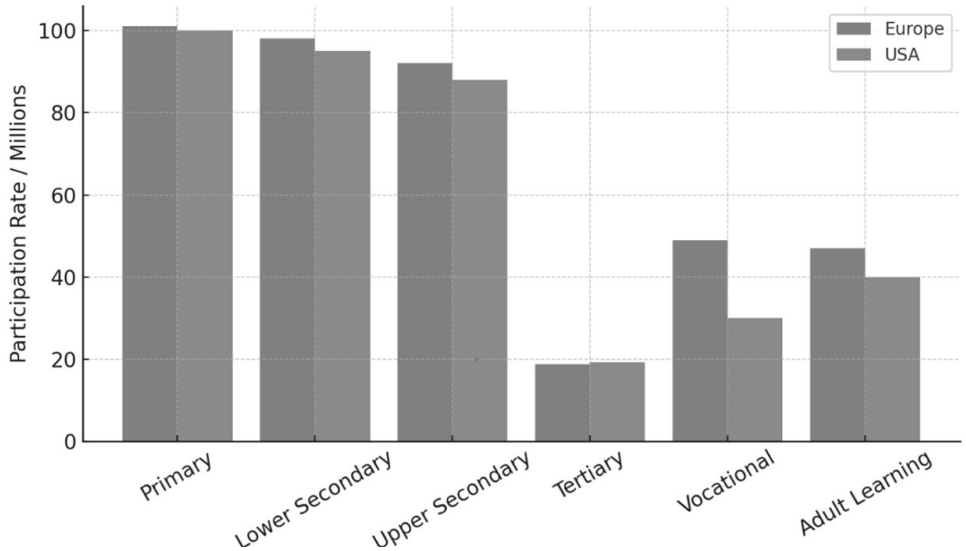
Indicator	Europe (EU-27)	USA
Primary education participation (ages 6–11)	98.5%	99.0%
Secondary education participation (ages 12–17)	95.2%	93.8%
Post-secondary/tertiary/postgraduate (ages 18–24)	34–38%	52–56%

***Source**: EUROSTAT, OECD, and U.S. NCES (National Center for Education Statistics), 2022, 2023*

The data in the table reflect an almost universal participation rate for children aged 6 to 17 in primary and secondary education in both the European Union (EU-27) and the United States of America (USA), indicating effective coverage of compulsory education. Relevant differences appear in the 18–24 age group, where participation in post-secondary education is significantly higher in the USA (52–56%) compared to the EU (34–38%).

This discrepancy can be explained by the extended accessibility of community colleges in the USA, the diversity of post-secondary training options, and the prevailing educational culture that encourages continued studies. In contrast, in Europe, early transition to the labor market and the indirect costs of tertiary education reduce participation in this age group, especially among youth from disadvantaged backgrounds. The gap points to a reform opportunity for European states to enhance flexibility and diversification in post-secondary educational pathways. As we can observe in the Figure 1, in both areas the first three levels of education are followed by the great majority of children, but the tertiary level is followed only by 20-30 percents of young people, increasing the percent of participants later during the career.

Figure 1: Comparative participation in different education levels (Europe vs USA 2020-2023)



Source: Eurostat, OECD, EducationData.org

Adult Participation and Institutional Structure in VET Systems – EU vs USA

Adult participation in CVET reveals a structural difference: while in Europe, participation is modest and directly correlated with education level, in the USA, even individuals with low levels of education take part in training programs in significant proportions, mainly training on the job. This reflects both the active training policies implemented by employers and the career culture oriented toward reskilling and adaptability. The data are presented in the Table 2.

Table 2. Adult Participation in Continuing Vocational Education and Training -2023

Indicator	Europe (EU-27)	USA
General participation (ages 25–64)	11%	28%
Participation of low-educated adults	4%	17%
Participation of highly educated adults	18%	38%

Source: Eurostat, OECD, and U.S. NCES (National Center for Education Statistics), 2023

The institutional structure shows (Table 3) that Europe prioritizes coherence between formal education and vocational training, through certificate recognition and integration into the ECTS credit system. In the USA, the focus is on quick outcomes, accessible formats, and diverse providers—without systemic integration, but with high adaptability.

Table 3. Institutional Structure and Types of Education Providers

Indicator	Europe (EU)	USA
Main providers	CVET centers, universities, NGOs	Community colleges, universities, companies
Link to higher education	Strong	Limited
Preferred formats	Face-to-face & blended	Online & community-based

Source: Eurostat, OECD, and U.S. NCES (National Center for Education Statistics), 2023

VET Financing and Economic Impact – EU vs USA

Public funding for VET varies significantly between the two regions. In the EU, public expenditure on education accounted for 4.7% of GDP in 2023. In the USA, public spending on education reached 5.44% of GDP in 2023. By category public or private expenditures, the share is presented in the Table 4., and the taxes for participation are

Table 4. Public and Private Funding for CVET

Indicator	Europe (EU)	USA
Public funding share	60–70%	30%
Private funding share	30–40%	70%
CVET tax credit	Present in some countries	Extensive (federal and state level)

Source: European Commission, Trading Economics, 2023

Funding systems reflect a different philosophy: in Europe, continuing training is seen as a public responsibility, supported by national and European funds. In contrast, the USA emphasizes individual responsibility and private sector involvement. This approach enhances efficiency, but may lead to exclusion for disadvantaged groups.

European Union and other countries: In 2023, public spending on education in the EU represented 4.7% of GDP. The pandemic and the military crisis caused a temporary reallocation of funds toward healthcare and economic support, impacting education investments. However, through the Next Generation EU program, the EU allocated over €800 billion for recovery, including for the modernization of education and training systems.

United States of America: In 2023, public education spending reached 5.44% of GDP. The federal government allocated additional resources to support schools in adapting to online learning and to mitigate learning loss due to the pandemic.

The Table 5 presents the level of employability in both studied areas, as opportunities after participation in VET.

Table 5. Impact of VET on Public and Private Economic Activity – Employability

Indicator	Europe (EU)	USA
Increase in employment opportunities after CVET participation	+9%	+15–20%
Internal career mobility	Medium	High

Source: Eurostat, OECD, and U.S. NCES (National Center for Education Statistics), 2023

The impact on employability is evident in both regions, but the USA offers greater career mobility, due to the rapid recognition of acquired competencies and opportunities for professional reskilling. Europe ensures stability, but sometimes struggles with flexibility and responsiveness to economic changes.

The Table 6 presents the level of implementation of digitalization and circular economy/green skills and so called green jobs on the labor market in both studied ares.

Table 6. Focus on Digital and Green Skills

Indicator	Europe (EU)	USA
Programs for digital skills	65%	75%
Green skills initiatives	Recently growing	Emerging

Source: Eurostat, OECD, and U.S. NCES (National Center for Education Statistics), 2023

Both regions prioritize digital skills, though the USA leads in program digitalization and implementation speed. Meanwhile, Europe is making significant progress in integrating green objectives into CVET, aligning with climate strategies, the circular economy, and the European Green Deal.

Table 7. Below, reveals a higher level of employer commitment in the United States toward professional training and employee skill development, both through CVET and direct on-the-job training. Europe faces challenges in standardizing these practices across member states, which affects the competitiveness and adaptability of the European labor market compared to the American one.

Table 7. Employers Involvement

Indicator	Europe (EU)	USA
Employers offering CVET	70%	94%
On-the-job training	45–55%	80%

Source: Eurostat, OECD, and U.S. NCES (National Center for Education Statistics), 2023

Employers' involvement is more extensive in the USA, where companies see continuing training as part of business and competitiveness strategies. In Europe, involvement is less uniform and often dependent on national policies and public funding support. This can affect the efficiency and adaptability of the labor force to market changes.

This analysis highlights the structural and financial differences between the EU and U.S. VET systems, emphasizing the need for tailored policies to maximize the efficiency and impact of these programs on the economy and society.

2.2. SWOT Analysis – VET in the European Union and the United States of America

Category	European Union (EU)	United States of America (USA)
Strengths	- Consolidated dual system with efficient school–company integration - High participation in some countries (>60%)	- Decentralized, flexible, and adaptable system - Strong private sector participation (77%) - High corporate training

	- Graduate employment rate: 76% - Support via EU funds (ESF+, Erasmus+) - CEDEFOP networks and the Pact for Skills	budgets: $1,300/year/employee - Industry-aligned vocational programs
Weaknesses	- Disparities among member states (<30% participation in some) - Underfunding in Eastern Europe (<0.4% of GDP) - Low public perception of academic education - Slow adaptation to digitalization	- Lack of a national certification framework - Low high school participation in CTE: 17% - Low federal funding ($1.4 billion) - Unequal access in rural areas
Opportunities	- Increased demand for digital/green skills - Expansion of partnerships with SMEs - Reforms via the EU Skills Agenda - Cross-border qualification recognition	- High demand for skilled workers - Expansion of re-skilling/up-skilling post-COVID - Regional public–private collaborations - Micro-certifications from Big Tech companies
Threats	- Ageing active population - Risk of institutional stagnation - Migration of skilled youth - Slow pace of digital adaptation	- Political gridlock on funding expansion - Lack of national certification recognition - High education costs - Global technological competition

Source: Author's own conception

3. Problem Solution

To address systemic differences and the impact of recent crises on vocational education and training (VET) in the European Union and the United States of America, an integrated approach is required—one that combines public policy interventions, institutional innovation, and strategic partnerships with the private sector. The proposed solutions must aim both at strengthening the components of initial education and expanding access to adult continuing training.

• Increasing public investment in VET

A first solution involves increasing national budgets dedicated to technical and vocational education. In the EU, countries with the best graduate employment outcomes (e.g., Germany, Austria) allocate over 0.7% of GDP exclusively to VET, while the EU average is 0.6% (CEDEFOP, 2023). In the USA, federal contribution remains modest ($1.4 billion in 2022), being unevenly complemented at the state level (BLS, 2023). There is a need to increase predictable funding for educational infrastructure and to support the digital and green transition in vocational curricula.

• Strengthening public–private partnerships

The second intervention line proposes expanding partnerships between training institutions and companies. In Germany, the dual system supports the training of over 1.3 million apprentices annually (CEDEFOP, 2022), 75% of which is funded by the private sector. In the USA, Fortune 500 companies invest on average $1,300 per employee per year in training (LinkedIn, 2023). These models should be replicated through tax incentives and clear regulations regarding apprenticeships and certifications.

• Digitalizing access to education and lifelong learning

The COVID-19 crisis accelerated the shift to digital education. Viable solutions include the development of integrated platforms for micro-certifications and modular learning. In the USA, Google and IBM already offer such programs free or at low cost. In the EU, the Digital Education Action Plan (2021–2027) aims to increase digital literacy across all forms of education (European Commission, 2021). This solution helps reduce geographical barriers and costs for participants.

• Aligning VET more closely with labor market demand

In both analyzed regions, there is a mismatch between the qualifications offered and the skills demanded by employers. CEDEFOP studies show that 45% of European employers have difficulty recruiting qualified workers (CEDEFOP, 2023). It is recommended to develop regional labor market observatories and to annually update VET programs based on predictive analysis of sectoral trends. The Table no.8 presents the financial solutions and resources for the funding of education and training systems in the studied global areas.

Table 8. Comparison of structural solutions applicable to VET in the EU and USA

Solution	European Union	United States of America
Public funding	0.6% of GDP on average; varies by country	$1.4 billion federal + state funds
Private sector involvement	Over €9 billion/year in Germany alone	$1,300/employee in large corporations
Digitalization	Digital Education Plan, Erasmus+, eTwinning	Online certifications by BigTech (Google, IBM)
Crisis response	Next Generation EU – €800 billion	Emergency Relief Funds (COVID)

Source: Data processed by the author

Recent crises—namely the COVID-19 pandemic and the war in Ukraine—have tested the resilience of both educational and vocational training systems. These events highlighted the urgent need for adaptability, digital transformation, and strategic investments in human capital development. In the European Union, programs such as *Next Generation EU* and the *Digital Education Action Plan* served as robust responses aimed at modernizing educational infrastructure and supporting continuous learning. In the United States, solutions emerged primarily from the private sector and regional initiatives, with an emphasis on micro-certifications and fast-track practical training.

The data presented in this research support the hypothesis that the success of a VET (Vocational Education and Training) system depends on four essential factors:

1. Predictable and sustainable public funding, aligned with the needs of the real economy.
2. Functional partnerships with the private sector, ensuring curriculum relevance and job market integration.
3. Accessible digital infrastructure, enabling flexible and lifelong learning.
4. Dynamic mechanisms for adapting to changing skill demands, including during times of crisis.

Therefore, a convergence of the two models, within a framework of transatlantic cooperation, could be envisaged—one that combines the rigor of European standards with American agility and pragmatism. Such an approach could foster the development of a global vocational training ecosystem, capable of coherently responding to the economic, technological, and social challenges of the 21st century.

In the medium and long term, investments in technical and vocational education should no longer be seen as costs, but rather as accelerators of sustainable economic growth, social inclusion, and strategic resilience. In this sense, the formulation and implementation of evidence-based educational policies, with the support of all relevant stakeholders, becomes a shared priority for both regions.

Conclusions

The present article, entitled *"The Economic Impact of Education and Vocational Training in the Current Global Context: A Comparative Analysis – Europe vs USA,"* demonstrates, through a well-documented and multidimensional approach, the strategic role of education and vocational training (VET) in enhancing economic competitiveness, promoting social inclusion, and facilitating the transition to a green and digital economy.

The comparison of institutional models, financing levels, and VET policy efficiency in the European Union and the United States has revealed both points of convergence and relevant contrasts:

- The European model is based on structural coherence, stable public–private partnerships, and integration within the formal education system, especially through dual systems. While it offers balanced outcomes in terms of equity and stability, it can be hindered by slow adaptability and inter-state disparities.

- The American model promotes flexibility, decentralization, and rapid innovation, often driven by private initiatives and a strong culture of lifelong learning. However, it suffers from a lack of unified frameworks and unequal access based on region and socioeconomic status.

As a synthesis, the United States shows significantly higher adult participation in continuing vocational education and training (CVET) than the European Union, with 28% vs. 11% overall participation, and a stronger inclusion of low-educated adults (17% vs. 4%). This reflects a more dynamic reskilling culture in the US, supported by employer-led initiatives and flexible learning formats.

Funding models differ fundamentally: the EU relies on public financing (60–70%), while the US is primarily privately funded (70%), with extensive tax incentives available.

In terms of institutional structure, the EU uses a more integrated approach (CVET centers, universities), while the US benefits from decentralized, flexible systems (community colleges, online platforms). Employers in the US are more engaged, with 94% offering CVET compared to ~70% in the EU, and on-the-job training is more prevalent.

While both regions prioritize digital skills, the US leads in implementation (75% vs. 65% of programs). The EU is advancing more rapidly in green skills integration, aligned with its climate strategies.

In conclusion, the EU emphasizes equity and systemic cohesion, while the US model is more market-driven and ROI-focused, offering faster adaptation to labor market changes.

Taking into consideration recent global crises—the COVID-19 pandemic and the conflict in Ukraine—both systems have come under pressure but responded in different ways. Europe mobilized massive public resources (*Next Generation EU*), whereas the USA saw a faster private-sector response, emphasizing digital learning and micro-certifications.

The analysis highlighted that the economic impact of VET manifests across three key dimensions:

- Increased productivity, by aligning workforce skills with the real needs of the economy.

- Reduced unemployment and higher employability, especially among youth and adults undergoing professional retraining.

- Lower social inequality, by facilitating access to lifelong learning and developing alternative qualification pathways.

Strengthening the role of VET as a driver of economic transformation requires an integrated vision and inter-institutional coordination. It is essential to develop a hybrid model that combines Europe's quality and equity standards with the pragmatism and dynamism of the United States.

In conclusion, education and vocational training are no longer just sectoral policies, but strategic investments in a nation's economic and social future. Both the EU and the USA must reinforce their commitment to VET through sustainable funding, strategic partnerships, and the integration of new technologies into education systems to build a resilient, competitive, and equitable workforce.

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