Report on the DIGIGREEN Project: Addressing Workforce Competences in European Manufacturing

I. Executive Summary

The DIGIGREEN project (Project Number: 2021-1-RO01-KA220-VET-000028028) represents a strategic European initiative designed to address the pressing need for updated workforce competencies in the manufacturing sector. Funded by the Erasmus+ program, this project focuses on facilitating the industry's transition from traditional to digital and green fabrication processes. Its core innovation lies in the development of a flexible, short-term training system that utilizes micro-courses and webinars delivered via a transnational e-learning platform. This model is a direct response to the dynamic and complex demands of the modern industrial labor market. By providing targeted training, DIGIGREEN aims to enhance the skills of both blue-collar and white-collar workers, thereby improving operational efficiencies and reinforcing the competitiveness of European businesses.

The project’s impact is multifaceted and extends beyond mere skills development. It is strategically aligned with key European Union policy objectives, including the European Green Deal and the goal of revitalizing the manufacturing industry. Through a collaborative consortium of universities, vocational training providers, and industry associations, DIGIGREEN has created a new framework for training and assessment that is both technically robust and pedagogically innovative. This framework, which includes a focus on the most common manufacturing processes, is poised to serve as a blueprint for future initiatives, ensuring that the European workforce remains adaptable and resilient in the face of rapid technological and environmental changes. The project's emphasis on micro-credentials and the use of the European Credit Transfer and Accumulation System (EVCET) ensures that the acquired skills are transparent, verifiable, and portable across national borders, thereby strengthening the entire European Vocational Education and Training (VET) landscape.

II. Introduction to the DIGIGREEN Initiative

1.1 Project Clarification and Contextualization

Before delving into the specifics of the DIGIGREEN project, it is essential to clarify its identity and purpose, as the name is shared with or is similar to other initiatives. This report focuses exclusively on the DIGIGREEN project with the Erasmus+ project number 2021-1-RO01-KA220-VET-000028028, which is dedicated to the manufacturing sector. This initiative is distinct from other projects and organizations that, while related to digital or green transitions, operate in entirely different fields.

For instance, the DigiGreeNPost project (Project Number: 101055901) is a separate Erasmus+ initiative aimed at upskilling employees specifically in the postal industry. Its consortium includes major postal operators like Posta Romana and Hellenic Post. Similarly, Digital Green is a non-profit organization that leverages an AI-powered assistant, FarmerChat, to provide agricultural advice to small-scale farmers in countries such as India, Kenya, and Nigeria. The project found at

digigreen.ba is a program called SEDEP, which is co-financed by the German Federal Ministry for Economic Cooperation and Development and the Government of Switzerland, and is focused on the economy of Bosnia and Herzegovina. The deliberate naming convention used in these EU-funded initiatives highlights a thematic consistency but necessitates careful distinction to ensure an accurate understanding of their respective scopes and goals.
The DIGIGREEN manufacturing project addresses the continuous need for updated competencies within the manufacturing workforce, which is crucial for the European market to remain competitive. The project's foundation is built on the long-term strategic objective of the EU to revitalize its manufacturing industry. Although a goal of having the industry represent 20% of the EU's GDP by 2020 has passed, the underlying imperative to modernize the sector remains a long-term strategic priority. This project is not a mere reaction to a single, past deadline but rather a component of a much larger, ongoing commitment to fundamental economic and industrial transformation. It directly aligns with the broader Erasmus+ program's objectives of promoting lifelong learning, digital integration in education, and open access to educational resources.

III. Project Objectives, Design, and Deliverables

2.1 A Two-Pronged Approach to Innovation

The DIGIGREEN project is founded on a dual-innovation model that addresses both the content of training and the methodology of its delivery. The project has two distinct connections to innovation: first, it proposes an innovative system for training, and second, it provides a solution for the manufacturing innovation process itself, which is the transition from traditional to digital and green production. This approach recognizes that the rapid evolution of manufacturing requires not only a new set of skills but also an entirely new and flexible way of imparting them. By simultaneously pioneering a new pedagogical framework and addressing a major industrial challenge, the project is designed to serve as a proof-of-concept for a new educational paradigm within the VET sector, focusing on responsiveness and adaptability.

2.2 The Innovative Training Framework: Micro-Learning and Webinars

A central element of the project's design is its innovative training system, which consists of a blend of micro-courses and webinars. This model was developed in response to the identified need for short-term training sessions that are accessible and have a low impact on industrial operations. The structure of the training is modular, allowing for a new design of the training and assessment framework. This pedagogical choice minimizes the disruption that would be caused by traditional, long-form training programs, making upskilling a practical and viable option for a workforce with limited time. This approach to training implicitly acknowledges that lifelong learning in the 21st century must be flexible and integrated into the daily lives of workers.

2.3 Curriculum and Competence Framework

The DIGIGREEN curriculum is systematically organized to ensure a comprehensive approach to skills development. It is structured around three core Competence Units (CU) or Units of Learning Outcomes (ULOs): Digital

transformation in fabrication and logistics, Greening fabrication, and Transversal/Soft Skills. The training modules are meticulously designed for both white-collar and blue-collar workers, with each module identifying the necessary knowledge, skills, autonomy, and responsibility required for the respective roles.

The inclusion of "Transversal/Soft Skills" is particularly significant. It demonstrates that the project's vision extends beyond mere technical proficiency. The project's designers recognize that a successful transition to a modern manufacturing environment requires a workforce equipped not only with digital and green skills but also with collaborative, problem-solving, and adaptive abilities. This holistic approach prepares workers not just for a new process but for a new work culture, fostering a more resilient and adaptable workforce.

2.4 The Central E-Learning Platform

The primary deliverable of the DIGIGREEN project is the creation and implementation of a European virtual learning platform for the manufacturing sector. This platform is designed to serve as the central hub for all the project's educational resources, including micro-courses and webinars. A key feature of the platform is its multilingual capability, supporting content in English, Portuguese, Romanian, and Slovenian. This design choice is a direct reflection of the project’s transnational scope and a strategic move to ensure broad accessibility across different EU member states. By providing content in multiple languages, the project maximizes its reach and potential impact, fostering a common, pan-European approach to industrial upskilling and reducing fragmentation in the VET landscape.

The following table provides a clear overview of the project's core objectives and its corresponding deliverables.

Core Objective	Primary Deliverable
Transition from traditional to digital and green manufacturing	Training and Assessment Frame Design
Develop a new, flexible training system	Micro-courses and Webinars
Improve digital education and open access to resources	European e-learning Platform
Increase VET flexibility and lifelong learning opportunities	Digital and Transversal Skills Development
Ensure high transparency and cross-border recognition of skills	Learning Outcome Descriptions with EVCET points

IV. Workforce Skills and Industrial Processes

3.1 Addressing the "7Ps" of Manufacturing Processes

A key component of the DIGIGREEN project's practicality is its direct focus on the most common manufacturing processes, referred to as the "7Ps" in the project's context. These include Machining, Forming, Joining, Injection Moulding, Additive Manufacturing, Surface Conditioning, and Information Circulation. This application of the "7Ps" framework demonstrates a deep,

practical understanding of the industrial sector. The project is not offering a generic course on digitalization; instead, it provides specific, process-oriented training that is directly relevant to the daily operations of a factory. The inclusion of "Information circulation" alongside physical processes highlights the project's recognition of the increasing importance of data management, cybersecurity, and digital integration in modern manufacturing. By addressing these processes, the training ensures that a trainee who completes the program will be qualified to work in multiple positions within a factory and across various industrial sectors.
The following table maps the training curriculum to these specific manufacturing processes, providing a clear illustration of the program's technical focus.

Manufacturing Process ("7P")	Relevant Competence Unit	Training Module Focus (Example)
Machining	Digital Transformation	Digital twin simulation, CNC automation
Forming	Greening Fabrication	Eco-friendly materials and processes
Joining	Digital & Green Fabrication	Automated robotic joining, eco-friendly welding techniques
Injection Moulding	Greening Fabrication	Sustainable polymer usage, waste reduction
Additive Manufacturing	Digital Transformation	Advanced CAD/CAM software, rapid prototyping
Surface Conditioning	Greening Fabrication	Low-carbon surface treatments, eco-labeling
Information Circulation	Digital & Transversal Skills	Data management, logistics digitalization, cybersecurity for manufacturing networks

3.2 Tailored Training for White and Blue-Collar Workers

The DIGIGREEN project employs a tiered approach to training that is customized for different levels of the workforce. The program is specifically designed to cater to the distinct needs of both "white-collar" and "blue-collar" workers. The training structure is organized in a modular approach, with content for blue-collar workers aligned with the European Qualifications Framework (EQF) up to Level 4, while the content for white-collar workers corresponds to EQF Levels 5 to 7. This differentiated strategy is crucial for a successful industrial transition. It addresses the practical skills required on the

factory floor and the strategic, management, and logistical competencies needed for supervisory and professional roles. This comprehensive, vertically integrated training model ensures a synchronized upskilling effort across the entire organizational structure, which is essential for managing large-scale technological change.

3.3 The Role of Micro-credentials and ECTS (EVCET)

The project's new training and assessment framework utilizes micro-credentials and allocates European Credit Transfer and Accumulation System (EVCET) points. ECTS, of which EVCET is a variation, is a standardized system for comparing academic credits across European higher education. The application of this system to vocational training represents a paradigm-shifting innovation. It ensures that the short-term training provided is transparent and recognized across Europe, directly contributing to the project's goal of assuring "high transparency of competencies for the manufacturing sector". This legitimizes and formalizes lifelong learning for the workforce, providing verifiable and portable qualifications for skills acquired outside of traditional degree programs. This serves to increase worker mobility and employability while strengthening the VET sector by linking it to a widely accepted European educational framework. This approach is a powerful tool for bridging the gap between industry needs and educational offerings.

V. Project Implementation and Stakeholder Synergy

4.1 The Transnational Consortium

The successful implementation of the DIGIGREEN project is a result of a highly collaborative transnational consortium. The partnership includes a diverse group of stakeholders, such as universities (Universidade de Lisboa, Univerza V Ljubljani, University of Craiova), VET providers (Danmar Computers, Asociata De Sudura din Romania), and industry-related associations (European Federation For Welding Joining And Cutting). The composition of this consortium is a strategic asset. It combines academic research, practical vocational training expertise, and direct industry knowledge. This multi-stakeholder model ensures that the training content is not just theoretically sound but also directly relevant to real-world industrial needs and practical applications. The partnership structure is what allows the project to involve different stakeholders in the creation and delivery of learning practices, thereby making the e-learning more responsive to new sector challenges.

4.2 Work-Based Learning and Practical Application

The training methodology of the DIGIGREEN project places a strong emphasis on work-based learning. The program is designed to be delivered "inside the company" with the involvement of trainers from a variety of institutions, including universities and training centers. This model is a pragmatic response to the challenges of traditional, off-site training for the industrial workforce. By integrating learning directly into the workplace, it enables the immediate application of new skills, which reinforces knowledge retention and demonstrates a clear return on investment for participating companies. This approach effectively blurs the line between education and employment, creating a continuous cycle of professional development that is essential for a dynamic and innovative workforce.

VI. Strategic Impact and Future Outlook

5.1 Contribution to European Industrial Policy

The DIGIGREEN project’s impact is felt at local, national, and European levels. Its objectives are directly intertwined with and contribute to the European Union's broader strategic goals. The project is designed to help achieve the EU's objective of "restoring the manufacturing industry" and serves as a strong answer to the European effort in the development of digital education. Furthermore, the project's commitment to "employ the best green practices while promoting this value in all training content" aligns it squarely with the objectives of the European Green Deal. The project is a practical example of how targeted, grassroots-level initiatives can contribute to systemic, transnational policy frameworks, making the EU economy more resilient, competitive, and sustainable.

5.2 Enhancing VET and Lifelong Learning

The project is poised to leave a lasting legacy by enhancing the role of Vocational Education and Training in the EU. It is designed to "increase the flexibility of opportunities in VET" and to improve the digital and transversal skills of teachers and trainees in a lifelong learning context. This emphasis on flexibility and continuous learning signals a shift in VET's function, positioning it not as a one-time qualification for young workers but as a continuous, adaptable resource for the entire workforce. This model is critical for addressing skills gaps as they emerge, fostering a culture of continuous upskilling that is vital for economic resilience in a rapidly changing world.

5.3 Potential for Scalability and Transferability

The DIGIGREEN project's long-term value lies in its potential for scalability and transferability. The creation of a replicable training framework—comprising micro-courses, webinars, and a multilingual e-learning platform—is a deliberate design choice to ensure its impact extends beyond the project's formal conclusion. The lessons learned are meant to be transferred to the national level and shared through the exchange of best practices. The project’s true value is not just in the number of workers trained but in the "guideline" it establishes for future initiatives. This makes it a highly valuable and sustainable model for tackling competence gaps across various sectors within the EU and beyond, solidifying its place as a critical case study in modern educational innovation.