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BUILD UP Skills – REbooting the GReek national platform and UPdating the national roadmap.

BUS-REGRoUP

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Report on the priorities for training of the building workforce

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BUILD UP Skills – REbooting the GReek national platform and UPdating the national roadmap – BUS-REGRoUP

BUS-REGROUP aims to support the revitalisation of the Greek **National Qualification Platform (NQP)** created in the first phase of the **BUILD UP Skills** initiative (project **BUS-GR**), further expanding its scope by involving new stakeholders.

Then the **Status Quo Analysis** and the **National Roadmap** will be updated to reflect the new realities of the building sector in Greece, addressing the skills development activities related to digital technologies, smart buildings, resource efficiency, circularity, integration of renewable energy technologies, industrialised deep renovation, LCCAs, etc. As the focus is on all relevant skills needed to enable the EU Renovation Wave, the mainstreaming of NZEBs, and the inclusion of resource efficiency considerations, the Status Quo Analysis and the National Roadmap will be updated for 'blue-collar' professionals and upgraded with new content in order to map the skills needs of 'white-collar' professions (i.e., architects, designers, engineers, building managers, etc.), thus reflecting the needs of the entire building value chain.

The **Status Quo Analysis** will compile all the necessary information on the current situation of the national building sector regarding continuing VET, energy performance and contribution to the 2030 targets, as well as existing barriers and gaps, as a basis for an informed discussion among the stakeholders. The **National Roadmap** will provide a set of priority measures for the various professions to meet the defined targets, an action plan for these measures until 2030, an identification of actors and resources needed to drive the implementation, and measures to monitor the progress of the proposed activities.

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Further information

More details on BUILD UP Skills can be found at <u>www.build-up.ec.europa.eu</u>

More details on the LIFE CET programme can be found at https://cinea.ec.europa.eu/programmes/life_en

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1. Introduction

1.1. Prioritization of qualifications and skill development

The Status Quo Analysis brings to light a notable requirement in Greece for the comprehensive training of professionals engaged in blue- and white-collar roles within the building construction sector. This necessity stems from the escalating demands associated with the construction of new buildings designed for zero or nearly zero energy consumption, as well as the imperative need for energy upgrades in existing structures.

In response to this discerned need, the following sections delve into the identification and prioritization of the new skill sets those professionals in both blue- and white-collar positions should acquire. The goal is to establish a strategic prioritization framework that can guide the development of tailored educational programs. These programs are envisioned to equip professionals with the knowledge and expertise needed to effectively contribute to the construction of energy-efficient buildings and the revitalization of existing structures to meet contemporary energy standards.

Furthermore, the analysis underscores the critical role that a well-trained workforce plays in addressing the evolving challenges and opportunities within the building construction sector. As technological advancements and sustainable practices continue to shape the industry landscape, ensuring that professionals are equipped with the latest skills becomes paramount. Thus, the emphasis on skill prioritization aims not only to meet current demands but also to future-proof the workforce, fostering a resilient and adaptive industry in the face of dynamic changes.

1.2. Recording, evaluation and prioritization of the required skills

Building upon the initial identification of essential skills from the Status Quo analysis, a detailed process was undertaken to delineate the specific new skills required for different categories of employees within the dynamic field of building construction. This meticulous endeavor took into account the intricacies inherent in their respective roles, recognizing the diverse nature of tasks and challenges that emerge in various work contexts.

In this comprehensive exploration, two distinct questionnaires were meticulously crafted—one finely tuned for blue-collar workers and another tailored to address the needs of white-collar professionals. These carefully curated surveys were then disseminated among the esteemed members of the National Qualification Platform, seeking their valuable insights and expertise.

The objective underlying the distribution of these questionnaires was twofold. Firstly, it aimed to garner a comprehensive understanding of the skill priorities perceived by industry stakeholders, reflecting the nuances of both blue- and white-collar roles. Secondly, and perhaps more crucially, the intention was to assess and rank the priority levels for the development of specific educational programs, each aligned with the identified skills.

To facilitate this evaluation, a structured scoring system was employed, as presented in the detailed table below. The scoring mechanism not only sought to quantify the urgency of skill development but also served as a qualitative tool, allowing for nuanced insights into the industry's evolving educational needs. Through this intricate process, the aim was to lay the foundation for informed decision-making

in the formulation of educational programs, ensuring they precisely meet the demands of the evolving landscape within the building construction sector.

The skill rating method that employed involves a systematic approach to gauging skills by calculating averages from various answers provided in that distributed questionnaires. The questionnaires were designed specifically tailored to assess the skills deemed essential for blue- and white-collar workers in the building industry and Include questions that cover a range of skills relevant to their roles. The survey was organized into categories using the profession as guideline and used a common scale include 1 to 5, with higher values indicating higher importance. For each specific skill, were calculated the average rating by summing up the individual ratings and dividing by the total number of respondents. This skill rating method helps objectively assess and prioritize the importance of various skills required for blue- and white-collar workers in the building industry.

Skill Rating	Priority	Color Scale
0-1	Very Low	
1,01-2	Low	
2,01-3	Medium	
3,01-4	High	
4,01-5	Very High	

Table 1.1: Rating scale for the prioritization of the new skills

In order to mitigate any potential skewness that may influence the prioritization outcome and to bolster the overall reliability of the responses obtained, it is imperative to emphasize that each participant involved in the National Qualifications Platform (NQP) took the initiative to solely fill out the questionnaire pertaining to the building construction professions that held the highest degree of relevance for their individual experiences and expertise. This meticulous approach ensures that the prioritization process remains free from external biases and accurately reflects the nuanced perspectives of each participant within the realm of building construction.

2. Priority ranking of required skills for "white-collar" workers

The questionnaire designed for "white-collar" workers in the buildings construction industry was distributed via email to 25 members affiliated with the National Qualifications Platform (NQP). The primary objective was to identify emerging skill requirements and to prioritize specific training needs for various professions within the sector. However, initial responses to the questionnaire were limited, prompting the implementation of telephone communications to motivate NQP members to complete it. Ultimately, a total of 7 questionnaires were successfully completed, comprehensively covering all the white-collar professions under scrutiny.

The following table delineates the essential new skills for "white–collar" workers in the construction industry, arranged in descending order of priority. This prioritization is intended to guide and inform the training initiatives tailored to each specific profession within the sector.

A/A	Profession	Skills – Knowledge	Rating	Priority
		Knowledge of the energy performance of buildings and characteristics of existing technologies/materials that contribute to the energy efficient design of new buildings (energy study)	4,57	Very High
	Civil EngineerKnowledge concerning the energy behaviour of buildings and characteristics of existing technologies/materials that contribute to the optimal energy upgrade of existing buildings (energy upgrade proposals)Civil EngineerKnowledge of the energy performance of buildings / common problems in the construction of the building envelope that affect energy efficiency and methods of effective solutionsSkills related to the design and implementation of damp proofing / thermal insulation / building envelope transpiration systems, including the avoidance of the properties, potential uses and application of prefabricated and/or industrial elements for the construction of the building envelope in the context of radical renovation projectsSkills related to the design and supervision of the construction of bioclimatic buildings	buildings and characteristics of existing technologies/materials that contribute to the optimal energy upgrade of existing buildings	4,86	Very High
1		/ common problems in the construction of the building envelope that affect energy efficiency and	4,57	Very High
		damp proofing / thermal insulation / building envelope transpiration systems, including the	4,29	Very High
		3,86	High	
			4,14	Very High

Table 2.1: Prioritization of the skills required for "white-collar" workers in buildings

A/A	Profession	Skills – Knowledge	Rating	Priority
		Skills related to the design and supervision of the construction of passive buildings	3,71	High
		Knowledge of the properties and correct application of high energy performance systems and materials used in ZEB and nZEB buildings	4,57	Very High
		Knowledge of the ZEB and nZEB building certification schemes and the requirements they place on building construction/renovation	4,29	Very High
		Knowledge of the characteristics/properties of environmentally friendly materials and the Environmental Footprint of materials	4,43	Very High
		Skills for the design of new buildings / renovation of existing buildings considering the overall assessment of the environmental footprint of the construction	4,57	Very High
		Skills on the proper management and recycling of waste/ surplus materials	4,00	High
		Skills on reusing materials	4,29	Very High
		Ability to read/understand BIM information and use it	4,43	Very High
		Capacity to feed information/update BIM systems	4,43	Very High
		Knowledge of the institutional framework governing the maintenance and repair of historic and listed buildings	4,43	Very High
		Knowledge concerning the construction of historical and listed buildings and the possibilities of their energy upgrade through thermal insulation of the building shell	4,14	Very High
2	Architect	Knowledge of the energy performance of buildings and characteristics of existing technologies/ materials that contribute to the energy efficient design of new buildings (energy study)	4,86	Very High

A/A	Profession	Skills – Knowledge	Rating	Priority
		Knowledge concerning the energy behaviour of buildings and characteristics of existing technologies/materials that contribute to the optimal energy upgrade of existing buildings (energy upgrade proposals)	4,71	Very High
		Knowledge of the energy performance of buildings / common problems in the construction of the building envelope that affect energy efficiency and methods of effective solutions	4,57	Very High
		Skills related to the design and implementation of damp proofing / thermal insulation / building envelope transpiration systems, including the avoidance of thermal bridges	4,29	Very High
		Knowledge of the properties, potential uses and application of prefabricated and/or industrial elements for the construction of the building envelope in the context of radical renovation projects	4,57	Very High
		Skills related to the design and supervision of the construction of bioclimatic buildings	4,71	Very High
		Skills related to the design and supervision of the construction of passive buildings	4,57	Very High
		Knowledge of the properties and correct application of high energy performance systems and materials used in ZEB and nZEB buildings	4,43	Very High
		Knowledge of the ZEB and nZEB building certification schemes and the requirements they place on building construction/renovation	4,57	Very High
		Knowledge of the characteristics/properties of environmentally friendly materials and the Environmental Footprint of materials	4,00	High
		Skills for the design of new buildings / renovation of existing buildings considering the overall assessment of the environmental footprint of the construction	4,14	Very High
		Skills on the proper management and recycling of waste/ surplus materials	3,43	High

A/A	Profession	Skills – Knowledge	Rating	Priority
		Skills on reusing materials	3,86	High
		Ability to read/understand BIM information and use it	4,29	Very High
		Capacity to feed information/update BIM systems	4,14	Very High
		Knowledge of the institutional framework governing the maintenance and repair of historic and listed buildings	4,57	Very High
		Knowledge concerning the construction of historical and listed buildings and the possibilities of their energy upgrade through thermal insulation of the building shell	4,57	Very High
	and cha technolo energy e study)Knowled building technolo optimal (energyMechanical EngineerKnowled building HVAC in ventilati methodSkills rel heating, Skills rel	Knowledge of the energy performance of buildings and characteristics of existing technologies/materials that contribute to the energy efficient design of new buildings (energy study)	4,71	Very High
		Knowledge concerning the energy behavior of buildings and characteristics of existing technologies/materials that contribute to the optimal energy upgrade of existing buildings (energy upgrade proposals)	4,71	Very High
3		Knowledge concerning the energy behavior of buildings / common problems in the building's HVAC installations (heating, cooling, hot water, ventilation) that affect energy efficiency and methods for their effective treatment	4,57	Very High
		Skills related to the design and implementation of heating/cooling/CHP and ventilation systems	4,14	Very High
		Skills related to the integration of renewable energy technologies in buildings (PV, solar thermal, etc.)	4,57	Very High
		Knowledge of the properties and correct application of high energy performance systems and materials used in ZEB and nZEB buildings	4,71	Very High

A/A	Profession	Skills – Knowledge	Rating	Priority
		Knowledge of the ZEB and nZEB building certification schemes and the requirements they impose on the construction/renovation of buildings	4,14	Very High
		Knowledge of the technical characteristics and the correct way to install new highly efficient heating/cooling/CHP systems	4,71	Very High
		Skills related to the integration of renewable energy technologies in buildings (PV, solar thermal, etc.)	4,29	Very High
		Skills related to energy storage for the creation of energy self-sufficient buildings	4,00	High
		Knowledge of the new European regulations on heating/cooling/CHP systems and the requirements for the installation of new systems	4,29	Very High
		Knowledge of the properties and applications of new technologies and high energy performance systems	4,29	Very High
		Knowledge related to the common problems of existing heating/cooling/CHP systems that negatively affect their energy efficiency and efficient ways of dealing with them	4,57	Very High
		Skills related to upgrading the energy efficiency of existing heating/cooling/CHP systems (e.g. through control systems, partial load handling, low temperature operation, improvement of terminal units and distribution networks, etc.)	4,43	Very High
		Skills related to the use of solar thermal systems to produce CHP and/or for the support of the heating system	4,43	Very High
		Skills related to the use of solar air conditioning technologies for heating/cooling buildings	4,14	Very High
		Skills related to the optimal use of biomass systems for heating and DHW production in buildings	4,14	Very High
		Skills related to the utilization of combined heat and power systems	3,86	High

A/A	Profession	Skills – Knowledge	Rating	Priority
		Skills related to the use of district heating/cooling systems at block level	3,71	High
		Knowledge of environmentally friendly materials/systems and the Environmental Footprint of materials/systems	4,29	Very High
		Skills for the design of new buildings/renovation of existing buildings considering the overall assessment of the environmental footprint of the construction	3,86	High
		Skills on the proper management and recycling of waste/ surplus materials	4,00	High
		Skills on the possibilities of reusing materials	4,43	Very High
		Ability to read/understand BIM information and use it	4,71	Very High
		Capacity to feed information/update BIM systems	4,43	Very High
		Knowledge related to the properties and proper installation of automatic control systems for heating/cooling/CHP systems (such as temperature compensation, legacy autonomy technologies, smart thermostats, etc.)	4,14	Very High
		Skills related to the installation and regulation of automatic control and energy management systems in energy efficient buildings	3,86	High
		Skills related to energy storage in buildings and smart energy management	4,14	Very High
4	Electrical Engineer	Knowledge of the energy performance of buildings and characteristics of existing technologies/materials that contribute to the energy efficient design of new buildings (energy study)	4,29	Very High
		Knowledge concerning the energy behavior of buildings and characteristics of existing technologies/materials that contribute to the	4,14	Very High

A/A	Profession	Skills – Knowledge	Rating	Priority
		optimal energy upgrade of existing buildings (energy upgrade proposals)		
		Knowledge concerning the energy behaviour of buildings/common problems in the building's HVAC installations (heating, cooling, hot water, ventilation) that affect energy efficiency and methods for their effective treatment	4,29	Very High
		Skills related to the design and implementation of heating/cooling/CHP and ventilation systems	3,71	High
		Skills related to the integration of renewable energy technologies in buildings (PV, solar thermal, etc.)	4,00	High
		Knowledge of the properties and correct application of high energy performance systems and materials used in ZEB and nZEB buildings	4,43	Very High
		Knowledge of the ZEB and NZEB building certification schemes and the requirements they impose on the construction/renovation of buildings	4,00	High
		Knowledge of the technical characteristics and the correct way to install new highly efficient heating/cooling/CHP systems	4,00	High
		Skills related to the integration of renewable energy technologies in buildings (PV, solar thermal, etc.)	4,14	Very High
		Skills related to energy storage for the creation of energy self-sufficient buildings	3,57	High
		Knowledge of the new European regulations on heating/cooling/CHP systems and the requirements for the installation of new systems	4,57	Very High
		Knowledge of the properties and application of new technologies and high energy performance systems	4,86	Very High
		Knowledge related to the common problems of existing heating/cooling/CHP systems that negatively affect their energy efficiency and efficient ways of dealing with them	4,29	Very High

A/A	Profession	Skills – Knowledge	Rating	Priority
		Skills related to upgrading the energy efficiency of existing heating/cooling/CHP systems (e.g. through control systems, partial load handling, low temperature operation, improvement of terminal units and distribution networks, etc.)	4,14	Very High
		Skills related to the use of solar thermal systems to produce CHP and/or for the support of the heating system	3,71	High
		Skills related to the use of solar air conditioning technologies for heating/cooling buildings	3,14	High
		Skills related to the optimal use of biomass systems for heating and DHW production in buildings	3,14	High
		Skills related to the utilization of combined heat and power systems	3,57	High
		Skills related to the use of district heating/cooling systems at block level	3,29	High
		Knowledge of environmentally friendly materials/ systems and the environmental footprint of materials/ systems	4,14	Very High
		Skills for the design of new buildings/renovation of existing buildings considering the overall assessment of the environmental footprint of the construction	3,86	High
		Skills on the proper management and recycling of waste/ surplus materials	3,43	High
		Skills on reusing materials	3,14	High
		Ability to read/understand BIM information and use it	3,43	High
		Capacity to feed information/update BIM systems	3,71	High
		Knowledge related to the properties and proper installation of automatic control systems for heating/cooling/CHP systems (such as temperature compensation, legacy autonomy technologies, smart thermostats, etc.)	4,29	Very High

A/A	Profession	Skills – Knowledge	Rating	Priority
		Skills related to the installation and regulation of automatic control and energy management systems in energy efficient buildings	4,29	Very High
		Skills related to energy storage in buildings and smart energy management	4,14	Very High
		Knowledge of the energy performance of buildings and characteristics of existing technologies/ materials that contribute to the energy efficient design of new buildings (energy study)	3,43	High
		Knowledge concerning the energy behaviour of buildings and characteristics of existing technologies/ materials that contribute to the optimal energy upgrade of existing buildings (energy upgrade proposals)	3,43	High
	Rural and Surveying Engineer	Knowledge concerning the energy performance of buildings/common problems in the construction of the building envelope that affect energy efficiency and methods of effective solutions	3,29	High
5	/ Spatial Planning, Urban Planning and Development	Skills related to the design and implementation of damp proofing/thermal insulation/building envelope transpiration systems, including the avoidance of thermal bridges	3,29	High High
	Engineer / Environmental Engineer	Knowledge of the properties, potential uses and application of prefabricated and/or industrial elements for the construction of the building envelope in the context of radical renovation projects	3,86	High
		Knowledge of the properties and correct application of high energy performance systems and materials used in ZEB and NZEB buildings	3,86	High
		Knowledge of the ZEB and NZEB building certification schemes and the requirements they impose on the construction/renovation of buildings	3,29	High
		Knowledge about environmentally friendly materials and the Environmental Footprint of materials	4,43	Very High

A/A	Profession	Skills – Knowledge	Rating	Priority
		Skills for the design of new buildings/renovation of existing buildings considering the overall assessment of the environmental footprint of the construction	3,71	High
		Skills on the proper management and recycling of waste/ surplus materials	4,14	Very High
		Skills on reusing materials	4,14	Very High
		Ability to read/understand BIM information and use it	4,29	Very High
		Capacity to feed information/update BIM systems	4,00	High
		Knowledge of the institutional framework governing the maintenance and repair of historic and listed buildings	3,57	High
		Skills related to the construction of historic and listed buildings and the possibilities of their energy upgrade through thermal insulation of the building envelope	3,29	High
		Knowledge of the energy performance of buildings and characteristics of existing technologies/materials that contribute to the energy efficient design of new buildings (energy study)	3,00	Medium
6	Chemical Engineer /	Knowledge concerning the energy behaviour of buildings and characteristics of existing technologies/ materials that contribute to the optimal energy upgrade of existing buildings (energy upgrade proposals)	3,43	High
	Naval Engineer	Knowledge concerning the energy behaviour of buildings/common problems in the building's HVAC installations (heating, cooling, hot water, ventilation) that affect energy efficiency and methods for their effective treatment	3,14	High
		Skills related to the design and implementation of heating/cooling/CHP and ventilation systems	3,43	High

A/A	Profession	Skills – Knowledge	Rating	Priority
		Skills related to the integration of renewable energy technologies in buildings	3,00	Medium
		Knowledge of the properties and correct application of high energy performance systems and materials used in ZEB and nZEB buildings	3,14	High
		Knowledge of the ZEB and nZEB building certification schemes and the requirements they impose on the construction/renovation of buildings	3,14	High
		Knowledge of the technical characteristics and the correct way to install new highly efficient heating/cooling/CHP systems	3,43	High
		Skills related to the integration of renewable energy technologies in buildings (PV, solar thermal, etc.)	3,00	Medium
		Skills related to energy storage for the creation of energy self-sufficient buildings	3,43	High
		Knowledge of the new European regulations on heating/cooling/CHP systems and the requirements for the installation of new systems	4,43	Very High
		Knowledge of the properties and application of new technologies and high energy performance systems	4,14	Very High
		Skills related to the common problems of existing heating/cooling/CHP systems that negatively affect their energy efficiency and efficient ways of dealing with them	3,43	High
		Skills related to upgrading the energy efficiency of existing heating/cooling/CHP systems (e.g. through control systems, partial load handling, low temperature operation, improvement of terminal units and distribution networks, etc.)	3,71	High
		Skills related to the use of solar thermal systems to produce CHP and/or for the support of the heating system	3,71	High

A/A	Profession	Skills – Knowledge	Rating	Priority
		Skills related to the use of solar air conditioning technologies for heating/cooling buildings	3,57	High
		Skills related to the optimal use of biomass systems for heating and DHW production in buildings	3,71	High
		Skills related to the utilization of combined heat and power systems	3,29	High
		Skills related to the use of district heating/cooling systems at block level	3,29	High
		Knowledge of environmentally friendly materials/ systems and the environmental footprint of materials/systems	3,86	High
		Skills for the design of new buildings / renovation of existing buildings considering the overall assessment of the environmental footprint of the construction	3,29	High
		Skills on the proper management and recycling of waste/ surplus materials	4,00	High
		Skills on reusing materials	4,00	High
		Ability to read/understand BIM information and use it	4,14	Very High
		Capacity to feed information/update BIM systems	4,00	High
		Knowledge related to the properties and proper installation of automatic control systems for heating/ cooling/CHP systems (temperature compensation, legacy autonomy technologies, smart thermostats, etc.)	3,29	High
		Skills related to the installation and regulation of automatic control and energy management systems in energy efficient buildings	3,14	High
		Skills related to energy storage in buildings and smart energy management	3,43	High
7	Other engineering	Knowledge of the energy performance of buildings and characteristics of existing technologies/	3,00	Medium

A/A	Professi	on	Skills – Knowledge	Rating	Priority
	specialties cannot classified	that be	materials that contribute to the energy efficient design of new buildings		
	elsewhere	Knowledge concerning the energy behaviour of buildings and characteristics of existing technologies/materials that contribute to the optimal energy upgrade of existing buildings (energy upgrade proposals)	3,29	High	
			Knowledge concerning the energy performance of buildings/common problems in the construction of the building envelope that affect energy efficiency and methods of effective solutions	3,00	Medium
			Skills related to the design and implementation of damp proofing/thermal insulation/building envelope transpiration systems, including the avoidance of thermal bridges	3,29	High
			Knowledge of the properties and correct application of high energy performance systems and materials used in ZEB and nZEB buildings	3,14	High
			Knowledge of the ZEB and nZEB building certification schemes and the requirements they impose on the construction/renovation of buildings	3,29	High
			Knowledge about environmentally friendly materials and the Environmental Footprint of materials	4,14	Very High
		Skills for the design of new buildings/renovation of existing buildings considering the overall assessment of the environmental footprint of the construction	3,71	High	
			Skills on the proper management and recycling of waste/ surplus materials	3,86	High
			Skills on reusing materials	3,71	High
			Ability to read/understand BIM information and use it	4,14	Very High
			Capacity to feed information/update BIM systems	4,00	High

3. Priority ranking of required skills for "blue–collar" workers

The questionnaire developed for "blue-collar" workers was distributed via email to 25 members of the National Qualification Platform (NQP) (project partners included) in order to identify new required skills for blue-collar workers in the building construction industry and to prioritize the training needs for each profession. Initially, due to low response to the request for filling-up the questionnaire, telephone communications were conducted to assist and encourage the representatives of NQP members in the completion procedure.

Finally, 9 questionnaires were in total received, covering all the addressed "blue-collar" professions. Each member of the NQP and the projects partners filled only the columns related to the specialties for which, due to their role, they could provide a secure and objective opinion (for instance, the association of electrician installers completed the questionnaire only for the electrician trade specialty).

The table below presents the required new skills of "blue-collar" workers in the construction industry, in order of priority for training for each profession.

A/A	Profession	Skills	Rating	Priority
		Skills related to the properties and use of cold paints on the exterior of Buildings	5,00	Very High
		Skills related to the properties and use of thermal insulating paints	5,00	High
		Skills related to the Impact of painting materials on the Breathability and Waterproofing of Buildings	4,75	Very High
1	Oil-painting technician	Knowledge of environmentally friendly materials and the environmental footprint of materials	4,75	High Very High High
		Skills related to proper waste management/surplus material including tool cleaning	3,50	High
		Ability to read/understand BIM information and utilize It	3,50	High
		Skills for reusing materials	3,25	High
2		Skills related to the Energy Performance of Buildings / Common Problems in Masonry Construction Affecting Energy Efficiency	5,00	Very High
	Masonry technician	Skills related to Moisture-proofing / Thermal Insulation / Breathability / Waterproofing of Masonry	5,00	Very High

Table 2.2: Prioritization of the skills required for "blue-collar" workers in buildings

		Skills related to the Properties and Use of New Masonry Materials with High Energy Performance	5,00	Very High
		Knowledge of environmentally friendly Materials and their Environmental Footprint	4,50	Very High
		Skills related to the Properties, Exploitation Possibilities, and Application of Prefabricated or Industrial Masonry Elements for Deep Renovation of Buildings	4,25	Very High
		Skills related to Moisture-proofing / Thermal Insulation / Breathability / Waterproofing of Masonry in Historical and Preserved Buildings	4,25	Very High
		Skills related to the Construction Method of Masonry in Historical and Preserved Buildings	4,00	High
		Skills related to Proper Waste Management/Surplus Material including Tool Cleaning	3,50	High
		Skills for reusing materials	3,50	High
		Ability to read/understand BIM information and utilize It	3,25	High
		Knowledge of the Regulatory Framework Governing the Maintenance and Repair of Historical and Preserved Buildings	3,25	High
		Skills related to Energy Performance of Buildings / Common Construction Problems Affecting their Energy Efficiency	5,00	Very High
		Skills related to the characteristics of materials and systems used in nZEB and ZEB Buildings and correct implementation practices	5,00	Very High
	Supervisor of	Skills related to the Properties and Application of new materials and systems with High Energy Performance in Building Construction	4,75	Very High
3	Supervisor of construction project	Skills related to the characteristics and construction requirements of nZEB and ZEB Buildings	4,75	Very High
		Skills related to Optimal Project Planning regarding the Sequence of Implementing Energy Saving Measures to Avoid Faulty Workmanship that Negatively Affects the Energy Performance of the Building	4,50	Very High
		Knowledge of the requirements of Green Building Certifications	4,50	Very High

		Knowledge of environmentally friendly Materials/Systems and their Environmental Footprint	4,50	Very High
		Skills related to Green Building Certifications	4,25	Very High
		Skills related to proper waste management/surplus material including tool cleaning	4,25	Very High
		Ability to read/understand BIM information and utilize It	4,00	High
		Skills related to Existing Technologies of Modular and Industrial Solutions in Building Envelope Construction, their properties, and Correct Application	3,75	High
		Skills related to the construction method of historical and preserved Buildings and the Possibilities of their Energy Upgrade	3,75	High
		Skills for reusing materials	3,50	High
		Knowledge of the regulatory framework governing the maintenance and repair of Historical and Preserved Buildings	3,25	High
4		Skills for the correct application of external thermal insulation systems of the building envelope, considering the avoidance of thermal bridges, breathability, and airtightness of the building envelope	5,00	Very High
	Coating technician	Skills for the correct application of internal thermal insulation systems of the building envelope, considering the avoidance of thermal bridges, breathability, airtightness of the building envelope, and protection of thermal insulation from vapor condensation phenomena.	5,00	Very High
		Basic knowledge of building physics / common problems in the construction of plasters and thermal insulation affecting the energy performance of buildings and ways to address them	4,25	Very High
		Knowledge of the requirements for applying plasters and thermal insulations in nZEB and ZEB buildings	4,25	Very High

		Skills related to the construction methods of historical and preserved buildings as well as the possibilities for their energy upgrading through thermal insulation of the building envelope	4,25	Very High
		Skills related to the application of plasters and thermal insulations in existing technologies of modular and industrial solutions used in the construction of the building envelope	4,00	High
		Skills related to the thermal insulation of the building envelope of passive buildings	4,00	High
		Knowledge of environmentally friendly materials/systems and the environmental footprint of materials/systems.	3,75	High
		Skills related to Proper Waste Management/Surplus Material including Tool Cleaning	3,50	High
		Skills for reusing materials	3,25	High
		Skills related to the Construction Method of Historical and Preserved Buildings and the Possibilities of their Energy Upgrade	3,25	High
		Ability to read/understand BIM information and utilize It	3,00	Medium
		Skills related to the design representation of buildings constructed through modular and industrial solutions	5,00	Very High
5	Designer	Skills related to existing technologies of modular and industrial solutions in the construction of the building envelope, their properties, and the construction constraints they impose	4,67	Very High
		Ability to read/understand BIM information and utilize It	4,33	Very High
		Skills related to the ability to supply information/update BIM (Building Information Modeling) systems	4,33	Very High
6	Stone	Skills related to Moisture-proofing / Thermal Insulation / Breathability / Waterproofing of the Stone Building Envelope	5,00	Very High
	artisan/craftsman	Skills related to Moisture-proofing / Thermal Insulation / Breathability / Waterproofing of Stone Historical and Preserved Buildings	4,50	Very High

		Skills related to the Energy Performance of Stone Buildings / Common Problems in the Construction of the Building Envelope Affecting Energy Efficiency	4,25	Very High
		Skills related to the Properties, Exploitation Possibilities, and Application of Prefabricated or Industrial Elements for the Deep Renovation of Stone Buildings (e.g., Metallic or Reinforced Concrete)	4,00	High
		Knowledge of environmentally friendly materials and their environmental footprint	4,00	High
		Skills related to proper waste Management/Surplus Material including Tool Cleaning	3,50	High
		Skills for reusing materials	3,25	High
		Knowledge of the regulatory framework governing the maintenance and repair of historical and preserved buildings	3,25	High
		Ability to read/understand BIM information and utilize It	3,00	Medium
		Understanding of the energy performance of heating systems with a burner in buildings, as well as common installation and maintenance problems that affect their energy efficiency, and skills for addressing these issues	4,00	High
		Skills related to common problems in existing heating systems that negatively impact their energy efficiency and effective ways to address them	5,00	Very High
7	Burner/boiler installer – maintainer	Skills related to energy-saving interventions in existing and new heating systems with burners, such as load balancing and other measures	4,75	Very High
		Skills related to upgrading the energy efficiency of existing heating systems with burners, for example, through control systems, load balancing, operating at lower temperatures, and more	4,75	Very High
		Skills related to the properties and proper installation of control systems for heating systems with a burner (such as temperature compensation, retrofitting old systems with smart thermostats, etc.)	4,75	Very High

		Skills related to the installation and maintenance of heating systems with a burner in historic and preserved buildings, including the specific considerations for installation	4,75	Very High
		Skills related to the use of biomass burners	4,50	Very High
		Knowledge of the new European regulations regarding heating systems with burners and the requirements they impose for the installation of new systems or upgrades to existing ones	4,40	Very High
		Skills related to the utilization of solar thermal systems in both new and existing heating systems with a burner	4,40	Very High
		Skills related to the properties and application of new technologies and systems with high energy performance	4,20	Very High
		Knowledge of the new European regulations regarding heating systems with a burner and the requirements they impose for the installation of new systems	4,00	High
		Knowledge of the requirements of nZEB (nearly Zero Energy Buildings) and ZEB (Zero Energy Buildings) regarding the operation of heating systems	3,75	High
		Knowledge of the regulatory framework governing the maintenance and repair of historical and preserved buildings	3,75	High
		Ability to read/understand BIM information and utilize It	3,25	High
		Skills related to the properties and proper installation of new, high-energy efficiency windows and doors	5,00	Very High
8	Aluminium and metal constructor	Skills related to the proper installation of windows and doors in nZEB (Nearly Zero Energy Building) and ZEB (Zero Energy Building) buildings, including avoiding thermal bridges and ensuring air tightness	4,75	Very High
		Skills related to common problems in the construction and installation of windows and doors that negatively impact the energy efficiency of buildings, as well as skills for addressing these issues	4,50	Very High

		Knowledge of the regulatory framework governing the maintenance and repair of historical and preserved buildings	4,50	Very High
		Understanding of the impact of windows and doors on the energy performance of buildings	4,25	Very High
		Knowledge and understanding of certifications for windows and doors, as well as the requirements imposed by national and European regulations (e.g., CE, Energy Labeling Regulations, etc.)	4,25	Very High
		Knowledge and understanding of the technical specifications that windows and doors must meet to be installed in nZEB and ZEB buildings, including thermal transmittance values and air tightness classes, among others	4,25	Very High
		Knowledge of the requirements imposed by nZEB (Nearly Zero Energy Building) and ZEB (Zero Energy Building) certification schemes regarding the selection and installation of windows and doors (e.g., Passive House standards)	4,25	Very High
		Knowledge of environmentally friendly materials and their environmental footprint	4,00	High
		Skills related to the specifics of installing windows and doors in historical and preserved buildings	4,00	High
		Skills related to the proper management of waste and surplus material	3,75	High
		Skills for reusing materials	3,50	High
		Ability to read/understand BIM information and utilize It	3,50	High
		Skills related to the properties of thermal insulation materials and systems, as well as their proper installation in the building envelope	5,00	Very High
9	Insulation technician – insulator	Skills related to common problems in building envelope insulation that negatively impact the energy efficiency of buildings, as well as skills for addressing these issues	4,75	Very High
		Understanding of the impact of the building envelope on the energy performance of buildings	4,50	Very High

Knowledge and understanding of certifications for thermal insulation materials and systems, as well as the requirements imposed by national and European regulations (e.g., CE, Energy Labeling Regulations, etc.)4,25Very HighKnowledge and understanding of the requirements for building envelope insulation in nZEB (Nearly Zero Energy Building) and ZEB (Zero Energy Building) buildings4,25Very HighKnowledge and understanding of strict specifications for the installation of insulation in the building envelope of nZEB and ZEB buildings (e.g., avoiding thermal bridges, ensuring air tightness)4,25Very HighKnowledge of environmentally friendly materials and their environmental footprint4,25Very HighSkills related to the specifics of installing thermal insulation in the building envelope of heirdie deepere wherit it isVery High
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materials and their environmental footprint4,25HighSkills related to the specifics of installing thermal insulation in the building envelope of4,25Very High
thermal insulation in the building envelope of 4,25
historical and preserved buildings
Knowledge of the requirements imposed by nZEB (Nearly Zero Energy Building) and ZEB (Zero Energy Building) certification schemes regarding the installation of insulation in the building envelope (e.g., Passive House standards)4,00High
Skills related to the proper management of waste and surplus material3,75High
Ability to read/understand BIM information 3,75 High
Skills for reusing materials 3,50 High
Knowledge of the regulatory framework governing the maintenance and repair of historical and preserved buildings3,50High
Skills related to common problems in the installation and operation of heat pumps that negatively affect the energy efficiency of buildings, as well as skills for addressing these issuesSkills related to common problems in the installation and operation of heat pumps that negatively affect the energy efficiency of buildings, as well as skills for addressing theseSkillsVery High
10Installations - Ventilation & Air ConditioningSkills related to common problems in existing heating/cooling systems that negatively impact their energy efficiency and effective ways to address them5,00Very High
Understanding of the impact of heat pump systems on the energy efficiency of buildings 4,75 High

Skills related to the properties and technical characteristics of heat pumps, as well as their proper installation and configuration in buildings, especially concerning new technologies	4,75	Very High
Knowledge of the characteristics and proper installation of high-energy efficiency heat pump technologies	4,50	Very High
Skills related to upgrading the energy efficiency of existing heating/cooling systems (e.g., through control systems, load management, optimal temperature operation, etc.)	4,50	Very High
Knowledge of environmentally friendly systems and the environmental footprint of systems	4,50	Very High
Skills related to the properties and proper installation of heating/cooling system control systems	4,50	Very High
Skills related to the installation of heat pumps in historical and preserved buildings, including the specific considerations for their installation	4,50	Very High
Skills related to the properties and application of new technologies and systems with high energy performance	4,25	Very High
Knowledge and understanding of heat pump certifications, as well as the requirements imposed by national and European regulations (e.g., CE, Energy Labelling Regulations, etc.	4,00	High
Skills related to the proper management of waste and surplus material	4,00	High
Skills for reusing materials	4,00	High
Knowledge of the new European regulations regarding heating/cooling systems and the requirements they impose on the installation of new systems	3,80	High
Knowledge and understanding of heating/ cooling requirements in nZEB (Nearly Zero Energy Buildings) and ZEB (Zero Energy Buildings)	3,50	High
Ability to read/understand BIM information and utilize It	3,50	High

		Knowledge of the regulatory framework governing the maintenance and repair of historical and preserved buildings	3,50	High
		Knowledge of the new European regulations regarding heating/cooling systems and the requirements they impose on the installation of new/upgraded systems	3,40	High
		Skills related to the installation and configuration of building automation and energy management systems in high-energy performance buildings	4,80	Very High
		Skills related to the installation of photovoltaic elements in buildings	4,40	Very High
		Skills related to the upgrade/replacement of electrical installations in historical and preserved buildings	4,20	Very High
		Skills related to the installation of building security and surveillance systems in buildings	4,00	High
	Technician of indoor Electrical Installations	Knowledge of environmentally friendly materials/systems and the environmental footprint of materials/systems	4,00	High
11		Ability to read/understand BIM information and utilize It	4,00	High
		Skills related to the installation of RES (Renewable Energy Sources) in historical and preserved buildings	4,00	High
		Skills related to the installation of RES systems in buildings	3,80	High
		Knowledge of the regulatory framework governing the maintenance and repair of historical and preserved buildings	3,80	High
		Skills related to the installation of urban wind turbines on buildings.	3,60	High
		Skills related to the proper management of waste and surplus material	3,60	High
		Skills for reusing materials	3,40	High
12	Drywall/Plasterwork Technician	Skills related to common problems in insulating building envelopes with lightweight claddings, which negatively impact the energy efficiency of buildings, as well as skills to address these issues	4,67	Very High

		Skills related to the properties of thermal insulation materials and lightweight cladding systems, as well as their correct installation in the building envelope	4,67	Very High
		Skills related to the internal insulation of historic and heritage building envelopes with lightweight claddings	4,67	Very High
		Understanding of the impact of the building envelope on the energy performance of buildings.	4,33	Very High
		Knowledge of environmentally friendly materials/systems and the environmental footprint of materials/systems	4,33	Very High
		Skills related to the proper management of waste and surplus material	4,00	High
		Knowledge of the regulatory framework governing the maintenance and repair of historical and preserved buildings	4,00	High
		of certifications for thermal insulation materials and systems, as well as the requirements set by national and European regulations (e.g., CE, CENAC, etc.)	3,67	High
		Skills for reusing materials	3,33	High
		Ability to read/understand BIM information and utilize It	3,33	High
		Skills related to the properties of glass panels and their correct placement in window frames	5,00	Very High
13		Understanding of the impact of glass panels on the energy efficiency of buildings	4,67	Very High
	Glass Panel Technician	Skills related to common issues in the selection and installation of glass panels, which can negatively affect the energy performance of buildings, as well as skills to address these issues	4,67	Very High
		Skills related to the installation of glass panels in the windows of historic and heritage buildings	4,67	Very High
		Knowledge of energy-efficient glass panel technologies and familiarity with Smart Glass systems	4,33	Very High

		Knowledge and understanding of glass pane certifications as well as the requirements set by national and European regulations (e.g., CE, KENAK, etc.)	4,33	Very High
		Knowledge of environmentally friendly materials/systems and the environmental footprint of materials/systems	4,33	Very High
		Skills related to the proper management of waste and surplus material	4,00	High
		Knowledge of the regulatory framework governing the maintenance and repair of historical and preserved buildings	4,00	High
		Skills for reusing materials	3,67	High
		Skills related to the utilization of solar thermal systems for the production of DHW (Domestic Hot Water)	4,80	Very High
14		Skills related to common issues in the installation of hydraulic heat distribution networks, terminal units, and DHW production systems that negatively impact the energy efficiency of buildings, as well as skills to address these issues	4,75	Very High
		Skills related to energy-saving interventions in existing and new heat distribution network installations and terminal units	4,75	Very High
	Technician of Hydraulic	Skills related to the utilization of solar thermal systems in both new and existing heating systems	4,60	Very High
	Installations/Plumber	Skills related to the improvement of the energy efficiency of existing hydraulic heat distribution networks, terminal units, and DHW production systems	4,60	Very High
		Knowledge of new European regulations concerning heating, cooling, and DHW systems that use water as a heat transfer medium, as well as the requirements they impose on the installation of new or upgraded systems	4,40	Very High
		Skills related to common issues in the installation of hydraulic heat distribution networks, terminal units, and DHW production systems that negatively impact the energy efficiency of buildings, as well as skills to address these issues	4,40	Very High

		Skills related to the properties and proper installation of automatic control systems for heating/cooling/DHW systems (such as temperature compensation, autonomy technologies for older installations, smart thermostats, etc.)	4,40	Very High
		Understanding of the impact of hydraulic heat distribution networks (heating, cooling, DHW), the corresponding terminal units, and DHW production systems on the energy performance of buildings	4,20	Very High
		Skills related to the properties and application of new technologies and systems with high energy performance	4,20	Very High
		Skills related to the installation of hydraulic distribution networks for heat, terminal units, and domestic hot water production systems in historical and preserved buildings	4,20	Very High
		Knowledge of environmentally friendly materials and their environmental footprint	4,00	High
		Skills related to the proper management of waste and surplus material	3,80	High
		Knowledge of the regulatory framework governing the maintenance and repair of historical and preserved buildings	3,60	High
		Skills for reusing materials	3,40	High
		Ability to read/understand BIM information and utilize It	3,00	Medium
		Skills related to common problems in the construction of the building envelope of historical and preserved buildings, which negatively affect their energy performance, as well as skills for addressing them	5,00	Very High
15	Technician of restoration & maintenance of historic and traditional buildings	Knowledge of energy upgrading solutions for historical and preserved buildings, as well as the proper implementation of these solutions	5,00	Very High
		Understanding of the energy performance of historical and preserved buildings and the key parameters that affect it	4,67	Very High
		Knowledge of environmentally friendly materials and their environmental footprint	4,25	Very High
		Ability to read/understand BIM information and utilize It	3,75	High

		Knowledge of the regulatory framework governing the maintenance and repair of historical and preserved buildings	3,75	High
		Skills related to the proper management of waste and surplus material	3,50	High
		Skills for reusing materials	3,50	High
		Skills related to the installation and setting up of automatic control and energy management systems in historical and preserved buildings	2,75	Medium
	Mold and concrete injection technician	Skills related to common problems in the construction of structural elements of the building envelope made of concrete, which negatively affect the energy performance, as well as skills for addressing them	4,75	Very High
		Skills related to the correct thermal insulation and protection of the building envelope elements constructed of concrete.	4,50	Very High
		Understanding of the impact of concrete structural elements on the energy performance of buildings	3,75	High
16		Skills related to existing technologies of modular and industrial solutions in the construction of the building envelope, their properties, and the construction limitations they impose	3,67	High
		Knowledge of environmentally friendly materials and their environmental footprint	3,33	High
		Skills related to the proper management of waste and surplus material	3,33	High
		Ability to read/understand BIM information and utilize It	3,33	High
		Skills for reusing materials	3,00	Medium
17	Smart Buildings	Skills related to the installation and setting up of automatic control and energy management systems in buildings with high energy efficiency	5,00	Very High
	Programming Technician	Skills related to the peculiarities of construction and operation of historical and preserved buildings, in order to optimize their energy performance through smart energy management systems	4,50	Very High

		Ability to read/understand BIM information and utilize It	4,00	High
		Knowledge of the regulatory framework governing the maintenance and repair of historical and preserved buildings	3,50	High
		Skills related to interventions for energy saving in existing and new heating systems installations using gaseous fuels, such as dealing with partial loads, compensation, etc.	4,60	Very High
18		Understanding of the energy efficiency of gaseous fuel heating systems in buildings, common problems in installation and maintenance of these systems that affect their energy performance, and skills for addressing them	4,50	Very High
		Knowledge of new European regulations regarding heating systems with gaseous fuels and the requirements they set for the installation of new/upgrading existing systems	4,40	Very High
	Gas technician, Combustion gas technician	Skills related to the properties and application of new technologies and systems with high energy performance	4,40	Very High
		Skills for installing gaseous fuel systems in historical and preserved buildings	4,25	Very High
		Knowledge of environmentally friendly materials and their environmental footprint	3,50	High
		Skills related to the proper management of waste and surplus material	3,50	High
		Knowledge of the regulatory framework governing the maintenance and repair of historical and preserved buildings	3,50	High
		Skills for reusing materials	3,25	High
		Ability to read/understand BIM information and utilize It	3,25	High
19	Wood Technician/ Carpenter	Skills related to the properties and correct installation of new window and door technologies with high energy efficiency	5,00	Very High
		Skills related to common problems in the construction and installation of frames, which negatively affect the energy performance of buildings, and skills for addressing them	4,75	Very High
		Understanding of the impact of wooden roofs on the energy performance of buildings.	4,75	Very High

Skills related to common problems in the construction of wooden roofs that negatively affect the energy performance of buildings, and skills for addressing them	4,75	Very High
Skills related to energy-efficient construction of wooden roofs and the characteristics of materials to be used in them (e.g., thermal insulation materials)	4,75	Very High
Understanding of the impact of frames on the energy performance of buildings	4,50	Very High
Skills related to the installation of modern, energy-efficient wooden frames in historical and preserved buildings	4,25	Very High
Knowledge and understanding of frame certifications as well as the requirements set by national and European regulations (e.g., CE, KENAK, etc.)	4,00	High
Skills related to familiarity with green building certifications	4,00	High
Knowledge of environmentally friendly materials and their environmental footprint	4,00	High
Skills related to ecological certifications of raw materials from wood	3,75	High
Skills related to the proper management of waste and surplus material	3,50	High
Knowledge of the regulatory framework governing the maintenance and repair of historical and preserved buildings	3,50	High
Skills for reusing materials	3,25	High
Ability to read/understand BIM information and utilize It	3,00	Medium

4. Conclusions on the identified priorities for "blue-collar" and "white-collar" workers of the building sector

4.1. "White-collar" workers

As far as the examination of completed questionnaires focused on the "white-collar" workers is concerned, it reveals a prevailing and overarching demand for high-priority training across "white-collar" workers. The prioritization of new skills for "white-collar" workers in the building industry underscores a critical shift towards sustainable and energy-efficient practices. The assessment of skills and knowledge across various engineering professions reveals a consistent emphasis on addressing the energy performance of buildings and promoting environmentally conscious construction methods. The high ratings and priority assigned to skills related to energy-efficient design, renewable energy technologies integration, and awareness of environmental footprints highlight the industry's commitment to mitigating the impact of construction activities on the environment.

Civil engineers, architects, mechanical engineers, electrical engineers, and professionals in spatial planning and environmental engineering are all expected to possess a comprehensive understanding of energy-efficient technologies and materials. The focus on skills such as damp proofing, thermal insulation, and the use of prefabricated elements demonstrates a commitment to enhancing the energy performance of both new and existing buildings. Furthermore, proficiency in Building Information Modeling (BIM) systems and the ability to interpret and update BIM information reflect the industry's adoption of advanced technologies for efficient project management and sustainability assessment.

Additionally, the prioritization of skills related to waste management, recycling, and reuse of materials underscores a holistic approach to sustainability in construction. The consideration of historic and listed buildings, with an emphasis on their energy upgrade through thermal insulation, showcases a balance between preserving cultural heritage and implementing modern energy-efficient practices.

Overall, the prioritization of skills and knowledge in this context aligns with the global push towards sustainable development and the construction industry's role in mitigating climate change. The identified skills are not only critical for meeting regulatory requirements and certifications but also essential for fostering innovation and responsible practices in the evolving landscape of building design and construction. As the industry continues to evolve, these prioritized skills will serve as a foundation for professionals to contribute meaningfully to a more sustainable and energy-efficient built environment.

4.2. "Blue-collar" workers

The analysis of completed questionnaires targeting blue-collar technicians indicates that a high-priority training across all technician specialties has been emerged as required and horizontal. This need encompassed skills for utilizing environmentally friendly systems and materials, as well as considering the environmental impact of materials/systems in the construction of a building project.

Equally significant across almost all "blue-collar" specialties was the acquisition of skills for the proper use and placement of materials/systems to ensure the maximum energy efficiency. This priority intersects with the need to acquire skills related to the use of new materials/systems and addressing issues affecting the energy performance of existing buildings (essentially rectifying constructions that were not executed in the appropriate manner). Lastly, skills that demonstrated the lowest prioritization across almost all technician specialties in the construction industry were those related to the ability to read/understand BIM (Building Information Modelling) information and leveraging it within the framework of implementing a construction project. This observation seems rational, considering that BIM systems have only recently made their debut in the Greek construction industry, and their dissemination, especially among blue-collar technicians, is notably limited.