



Professionalising site managers and team leaders in the specific management of building renovation sites in Europe

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IO1: Transnational model for the positioning, support and professionalisation of site managers and team leaders for building renovation sites

IO1-A1. In-depth analysis of the technical, organisational and normative specificities of building renovation sites which affect the evolution of the functions of site managers and team leaders on these sites in the partner countries.

IO1-A2. Identification, in each partner country, of the specific skills expected of site managers and team leaders by companies specialising in building renovation.

IO1 Transnational Report (Activities 1 and 2)



Erasmus+

Drafted by PEDMEDE



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Executive summary

RenovUP focusses on the formative exploitation of learning in work situations within companies, for site managers and team leaders. This form of learning constitutes a key element in the professionalization that is expected by the industry, and which will ultimately upgrade the two roles as central in the renovation sector.

The current report has been prepared within the framework of the Erasmus+ project: RenovUP - Professionalising site managers and team leaders in the specific management of building renovation sites in Europe, and under Intellectual Output 01: Transnational model for the positioning, support and professionalisation of site managers and team leaders for building renovation sites.

The outputs that were prepared and presented in the report include:

- An in-depth analysis of the technical, organisational, and normative specificities of building renovation sites which affect the evolution of the functions of site managers and team leaders.
- An identification of the specific skills expected of site managers and team leaders by companies specializing in building renovation.

According to the desk research and experts' observations, there appears to be an agreement among the five partner countries regarding the expected role and profile of site managers and team leaders. Despite some minor differentiation, both profiles seem to face similar challenges, ranging from managerial to technical with the most characteristic being:

- Building energy efficiency linked to new technologies and materials
- Waste management as a result of Circular Economy
- Health and safety procedures for accident and risk prevention
- Skills and competences linked to digitalization

With these challenges framing the current training provision, the partners' research indicates that regardless the level and the extent of operation of the two profiles in a renovation site, the same skills are expected to be applied. The professionalization paths that are to be created will constitute a key to success as they will require workers to be adaptable and agile, to deal with any work situation. The way that these professionalization paths would change to match company and professionals' need, will depend on the observation and analysis of the workplace itself and the everyday situations that the professionals are called to respond and manage.

To this end, some of the recommendations collected from the RenovUP's research for the development of the planned training paths include:

- The professionalization paths to be designed must be in the form of real cases from the working environment, in alignment with all functions of the two profiles
- Real cases from the working environment should rely on actual demonstrations
- Standard modules based solemnly on theory, should be avoided

Sommaire (Executive summary, FR)

RenovUp se concentre sur l'exploitation formative de l'apprentissage en situation de travail pour les chefs de chantier et les chefs d'équipe sur les chantiers de rénovation des bâtiments. Cette forme d'apprentissage constitue un élément clé de la professionnalisation attendue par le secteur de la construction, ce qui contribuera à revaloriser ces deux fonctions sur les chantiers concernés.

Le présent rapport a été préparé dans le cadre du projet Erasmus+ RenovUp - Professionnalisation des chefs de chantier et des chefs d'équipe dans la gestion spécifique des chantiers de rénovation de bâtiments en Europe. Il s'agit de la production intellectuelle O1 : Modèle transnational pour le positionnement, le soutien et la professionnalisation des chefs de chantier et des chefs d'équipe pour les chantiers de rénovation de bâtiments.

Les résultats contenus dans le rapport comprennent :

- Une analyse approfondie des spécificités techniques, organisationnelles et normatives des chantiers de rénovation de bâtiments qui affectent l'évolution des fonctions des chefs de chantier et des chefs d'équipe.
- Une identification des compétences spécifiques attendues des chefs de chantier et des chefs d'équipe par les entreprises spécialisées dans la rénovation de bâtiments.

D'après les recherches documentaires et les observations des experts, il semble y avoir un accord entre les cinq pays partenaires (Espagne, France, Grèce, Italie et Pologne) concernant le rôle et le profil attendus des chefs de chantier et des chefs d'équipe sur les chantiers concernés. En effet, les deux profils semblent être confrontés à des défis similaires dans les pays du partenariat, les plus caractéristiques étant :

- l'efficacité énergétique des bâtiments liée aux nouvelles technologies et aux nouveaux matériaux,
- la gestion des déchets dans le cadre de l'économie circulaire,
- les normes de santé et de sécurité pour la prévention des accidents et des risques professionnels,
- les aptitudes, savoirs et compétences liées à la numérisation.

Les parcours de professionnalisation seront donc développés en fonction des besoins des entreprises qui demandent l'intégration de l'observation et de l'analyse des situations de travail gérées au quotidien par les chefs de chantier et des chefs d'équipe concernés.

Les recommandations recueillies dans le cadre de RenovUp pour le développement des parcours de formation prévus :

- Les parcours de professionnalisation à concevoir doivent se présenter sous la forme de cas réels issus de l'environnement de travail, en adéquation avec l'ensemble des fonctions des deux profils professionnels.
- Les cas réels, en tant que situations d'apprentissage, doivent s'appuyer sur des contextes professionnels réellement vécus par les apprenants (en situations de travail en entreprise ou en atelier d'école).
- Les modules standards, basés uniquement sur les volets théoriques, sont à éviter.

Σύνοψη (Executive summary, EL)

Το RenovUp επικεντρώνεται στη μάθηση, διαμορφωμένη σε πραγματικές καταστάσεις, οι οποίες λαμβάνουν χώρα σε ένα εργασιακό περιβάλλον, για υπεύθυνους εργοταξίων και team leaders. Αυτή η μορφή μάθησης αποτελεί βασικό στοιχείο για τον επαγγελματισμό (professionalization) η οποία αναμένεται από τη βιομηχανία και που θα αναβαθμίσει τελικά τους δύο ρόλους ως κεντρικούς στον τομέα της ανακαίνισης.

Η παρούσα έκθεση εκπονήθηκε στο πλαίσιο του έργου RenovUp, με τίτλο Ανάπτυξη ικανοτήτων managers εργοταξίων και team leaders για τη διαχείριση έργων ανακαίνισης κτιρίων στην Ευρώπη και στο πλαίσιο του Intellectual Output 01: Διακρατικό μοντέλο για την τοποθέτηση, υποστήριξη και επαγγελματισμό της τοποθεσίας διευθυντές και επικεφαλής ομάδων για χώρους ανακαίνισης κτιρίων.

Τα αποτελέσματα που παρουσιάζονται στην έκθεση περιλαμβάνουν:

- Μια εις βάθος ανάλυση των τεχνικών, οργανωτικών και κανονιστικών ιδιαιτεροτήτων των χώρων ανακαίνισης κτιρίων που επηρεάζουν την εξέλιξη των λειτουργιών των διαχειριστών του χώρου και των ηγετών ομάδων.
- Προσδιορισμό των ειδικών δεξιοτήτων που αναμένονται από τους διαχειριστές του χώρου και τους ηγέτες ομάδων από εταιρείες που ειδικεύονται στην ανακαίνιση κτιρίων.

Σύμφωνα με την έρευνα και τις παρατηρήσεις των εμπειρογνομόνων, φαίνεται να υπάρχει συμφωνία μεταξύ των πέντε χωρών εταίρων σχετικά με τον αναμενόμενο ρόλο και το προφίλ των managers εργοταξίων και των team leaders. Με εξαίρεση κάποιες μικρές διαφοροποιήσεις, και τα δύο προφίλ φαίνεται να αντιμετωπίζουν παρόμοιες προκλήσεις, που κυμαίνονται από διευθυντικές έως τεχνικές με το πιο χαρακτηριστικό να είναι:

- Ενεργειακή απόδοση κτιρίου η οποία συνδέεται με νέες τεχνολογίες και υλικά
- Διαχείριση αποβλήτων ως αποτέλεσμα της Κυκλικής Οικονομίας
- Διαδικασίες υγείας και ασφάλειας για την πρόληψη ατυχημάτων και κινδύνων
- Δεξιότητες και ικανότητες που συνδέονται με την ψηφιοποίηση

Η έρευνα των εταίρων δείχνει ότι ανεξάρτητα από το επίπεδο των δύο προφίλ σε έναν χώρο ανακαίνισης, απαιτούνται οι ίδιες δεξιότητες. Τα μονοπάτια επαγγελματισμού που πρόκειται να δημιουργηθούν θα αποτελέσουν το κλειδί της επιτυχίας, καθώς θα απαιτούν από τους εργαζόμενους να είναι προσαρμοστικοί και ευέλικτοι ώστε να αντιμετωπίζουν οποιαδήποτε εργασιακή κατάσταση. Ο τρόπος με τον οποίο αυτοί οι δρόμοι θα ταιριάζουν με τις ανάγκες της εταιρείας, θα εξαρτηθεί από την παρατήρηση και ανάλυση του ίδιου του χώρου εργασίας και των καθημερινών καταστάσεων που καλούνται να ανταποκριθούν και να διαχειριστούν οι επαγγελματίες.

Για το σκοπό αυτό, ορισμένες από τις συστάσεις που συλλέχθηκαν από την έρευνα του RenovUP για την ανάπτυξη των προγραμματισμένων μονοπατιών εκπαίδευσης περιλαμβάνουν:

- Οι διαδρομές εκπαίδευσης που θα σχεδιαστούν, πρέπει να έχουν τη μορφή πραγματικών περιπτώσεων από το περιβάλλον εργασίας, σε ευθυγράμμιση με όλες τις δραστηριότητες των δύο προφίλ
- Οι πραγματικές περιπτώσεις από το εργασιακό περιβάλλον θα πρέπει να βασίζονται σε πραγματικές καταστάσεις
- Εκπαιδευτικές ενότητες που βασίζονται μονάχα στη θεωρία, θα πρέπει να αποφεύγονται

Sommario esecutivo (Executive summary, IT)

RenovUP si concentra sulla valorizzazione formativa dell'apprendimento in situazioni di lavoro all'interno delle aziende, per i capi cantiere e i capisquadra. Questa forma di apprendimento costituisce un elemento chiave nella professionalizzazione attesa dall'industria, e che finirà per riqualificare i due ruoli come centrali nel settore della ristrutturazione.

La presente relazione è stata preparata nell'ambito del progetto Erasmus+: RenovUP - Professionalising site managers and team leaders in the specific management of building renovation sites in Europe, e nell'ambito dell'Intellectual Output 01: Transnational model for the positioning, support and professionalisation of site managers and team leaders for building renovation sites.

I risultati che sono stati preparati e presentati nel rapporto includono:

- Un'analisi approfondita delle specificità tecniche, organizzative e normative dei cantieri di ristrutturazione edilizia che influenzano l'evoluzione delle funzioni dei capicantiere e dei capi squadra.
- Un'identificazione delle competenze specifiche che le imprese specializzate in ristrutturazioni edilizie si aspettano dai capi cantiere e dai capisquadra.

Secondo la ricerca effettuata e dalle osservazioni degli esperti, sembra esserci un accordo tra i cinque paesi partner per quanto riguarda il ruolo e il profilo atteso dai capicantiere e dai capisquadra. Nonostante alcune piccole differenziazioni, entrambi i profili sembrano affrontare sfide simili, che vanno da quelle manageriali a quelle tecniche, le più importanti delle quali sono:

- Efficienza energetica degli edifici legata alle nuove tecnologie e materiali
- Gestione dei rifiuti come risultato dell'economia circolare
- Procedure di salute e sicurezza per la prevenzione degli incidenti e dei rischi
- Capacità e competenze legate alla digitalizzazione

Le sfide elencate sono linee guida per l'attuale offerta formativa. La ricerca indica che, indipendentemente dal livello e dall'ambito di attività delle persone che rappresentano i due profili professionali ci si aspetta da loro competenze simili nel cantiere. I percorsi di professionalizzazione da creare costituiranno una chiave di successo, poiché richiederanno ai lavoratori di essere adattabili e agili, per affrontare qualsiasi situazione lavorativa. Il modo in cui questi percorsi di professionalizzazione si modificheranno per adattarsi alle necessità dell'azienda e dei professionisti, dipenderà dall'osservazione e dall'analisi del luogo di lavoro stesso e delle situazioni quotidiane che i professionisti sono chiamati a rispondere e a gestire.

A tal fine, alcune delle raccomandazioni raccolte dalla ricerca del RenovUP per lo sviluppo dei percorsi formativi previsti sono:

- I percorsi di professionalizzazione da progettare devono avere la forma di casi reali dall'ambiente di lavoro, in allineamento con tutte le funzioni dei due profili
- I casi reali dell'ambiente di lavoro devono basarsi su dimostrazioni reali
- Moduli standard basati solennemente sulla teoria, dovrebbero essere evitati.

Resumen Ejecutivo (Executive summary, ES)

RenovUP se centra en la explotación formativa del aprendizaje de los/as encargados/as y los/as capataces de obra en situaciones de trabajo reales en empresa. Esta forma de aprendizaje constituye un elemento esencial en la profesionalización que requiere la industria, la cual actualizará definitivamente las dos figuras profesionales, con carácter prioritario en el sector de la rehabilitación.

El actual informe se ha realizado en el marco del Proyecto europeo Erasmus+ RenovUP- Profesionalizando a los/as encargados/as y los/as capataces en la gestión específica de las obras de rehabilitación en Europa, y dentro del Resultado Intelectual 01: Modelo transnacional para el posicionamiento, soporte y profesionalización de los/as encargados/as y los/as capataces en las obras de rehabilitación de edificios.

Los resultados obtenidos y que se presentan en este informe incluye:

- Un análisis profundo de las características normativas, organizativas y técnicas de las obras de rehabilitación de edificios que afectan a la evolución de las funciones de los/as encargados/as y los/as capataces de obra.
- Una identificación de las capacidades específicas que las empresas especializadas en la rehabilitación de edificios requieren a los/as encargados/as y los/as capataces de obra.

Conforme al análisis documental y a las observaciones de los expertos, parece que existe un acuerdo entre los cinco países en cuanto al papel y perfil de los/as encargados/as y los/as capataces de obra. A parte de algunas diferencias menores, ambos perfiles parecen enfrentarse a los mismos retos, tanto a nivel de gestión como a nivel técnico, siendo los principales:

- La eficiencia energética de los edificios ligada a las nuevas tecnologías y materiales.
- La gestión de los residuos como resultado de la Economía Circular.
- Los procedimientos de Seguridad y Salud para prevenir riesgos y accidentes.
- Las capacidades y competencias ligadas a la digitalización.

Ante estos retos enmarcando la actual oferta formativa, la investigación realizada por los socios evidencia que, a pesar de ser dos niveles profesionales diferentes con sus propias áreas operativas en las obras de rehabilitación, se espera de ambos que prácticamente tengan las mismas capacidades profesionales. Los itinerarios de profesionalización que se van a desarrollar constituirán la clave del éxito, en la medida que cada vez se requerirán más trabajadores versátiles, ágiles para afrontar cualquier situación de trabajo. La manera en que estos itinerarios formativos cambiarán para emparejar empresa y necesidad de profesionales, dependerá de la observación y el análisis de la zona de trabajo en sí misma y de las situaciones diarias que deben gestionar estas/os profesionales.

Para lograr este fin, la investigación de RenovUP aporta algunas recomendaciones para el desarrollo de los itinerarios formativos a desarrollar, tales como:

- Los itinerarios de profesionalización a diseñar han de basarse en casos reales relacionados con el entorno de trabajo, conforme a las funciones de los dos perfiles.
- Los casos reales procedentes del entorno de trabajo dependerán de demostraciones reales.
- Deberían evitarse los módulos estándar basados exclusivamente en la teoría.

Podsumowanie wykonawcze (Executive summary, PL)

Projekt RenovUp koncentruje się na procesach uczenia się kierowników budów i brygadzystów w sytuacjach pracy. Ta forma uczenia się stanowi kluczowy element profesjonalizacji w branży budowlanej i przyczyni się do awansu wymienionych dwu grup pracowników do miana kluczowych dla sektora renowacji.

Niniejszy raport został przygotowany w ramach programu ERASMUS+, projekt RenovUp, Profesjonalizacja kierowników budowy i liderów zespołów w zakresie zarządzania placami renowacji budynków w Europie, pakiet prac 01: Międzynarodowy model wsparcia rozwoju zawodowego kierowników budów oraz brygadzystów remontujących obiekty budowlane. Prace zrealizowane w ramach pakietu oraz zaprezentowane w raporcie obejmują:

- analizę technicznej, organizacyjnej i prawnej specyfiki projektów renowacji obiektów budowlanych, które wpływają na rozwój funkcji kierowników budów oraz brygadzystów/ liderów zespołów wykonawczych;
- identyfikację specyficznych umiejętności oczekiwanych od kierowników budów i brygadzystów.

Zgodnie z wynikami badań (desk research, wywiady z ekspertami) przeprowadzonymi w ramach projektu RenovUp, wydaje się, że w pięciu krajach partnerskich panuje zbieżność poglądów, co do bieżących potrzeb i wyzwań sektora renowacji budynków oraz co do ról pełnionych przez kierowników budów i brygadzystów. Pomimo pewnego zróżnicowania, przed pracownikami obydwu profili stoją podobne wyzwania, od menadżerskich po techniczne, z których najbardziej charakterystyczne to:

- Efektywność energetyczna budynku związana z nowymi technologiami i materiałami;
- Gospodarka odpadami, jako rezultat gospodarki o obiegu zamkniętym;
- Procedury bezpieczeństwa i higieny pracy w zakresie zapobiegania wypadkom i ryzyku;
- Umiejętności i kompetencje związane z cyfryzacją.

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Wymienione wyzwania stanowią wytyczne dla aktualnej oferty szkoleniowej. Badania wskazują, że niezależnie od poziomu i zakresu działania osób reprezentujących obydwie badane profile zawodowe, na placu budowy (renowacji) oczekuje się od nich podobnych umiejętności. Ścieżki rozwoju zawodowego/profesjonalizacji (będące przedmiotem dalszych prac w ramach projektu RenovUp) są kluczem do sukcesu. Powinny kształtować zdolności adaptacyjne aktualnych lub przyszłych kierowników budów i brygadzystów. Ścieżki te powinny być elastyczne, dopasowane do potrzeb konkretnego przedsiębiorstwa oraz konkretnych pracowników, a kierunki ich modyfikacji powinny wynikać z obserwacji i analiz samego miejsca pracy oraz codziennych sytuacji, za które kierownicy budów i brygadziści ponoszą odpowiedzialność.

Zalecenia dotyczące projektowanych ścieżek szkoleniowych obejmują między innymi:

- Potrzebę oparcia na rzeczywistych przypadkach – sytuacjach w środowisku pracy, odpowiadających funkcjom pełnionym przez kierowników budów oraz brygadzystów;
- Szerokie wykorzystanie metod demonstracyjnych;
- Unikanie standardowego podejścia modułowego, które nie gwarantuje indywidualizacji procesów szkoleniowych.

1. Aim of IO1 Transnational Report (activities 1 and 2)

The RenovUp project was born by observations made by professionals in the construction industry who identified that the current training facilities for site managers and team leaders do not adequately account for the specificities of building renovation works.

Five partner countries dealing with the same needs: France, Italy, Greece, Spain & Poland have come together in order to reorient this training offer in terms of objectives, content, and learning methods, in order to enable the targeted learners to strengthen their capacity to better understand the renovation as a whole and achieve a high professionalization level.

To this end, the RenovUp project expects to achieve the following results and outputs:

- Development and implementation of individualised and modular training courses that are based on components such as training in work situations, training in training centres, and distance learning, and which can be integrated into a lifelong professionalization approach
- Development of a systematized approach to training trainers in the observation and analysis of work situations
- Installation of formal recognition procedures for newly acquired skills on a long-term basis.
- Long-term enrichment of the training offerings of the organizations involved in the project
- Implementation of pragmatic and sustainable work-based learning promotion strategies and practices

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Within this framework, the RenovUp partners proceeded (IO1) to implementing an in-depth analysis of the technical, organisational and normative specificities of building renovation sites which affect the evolution of the functions of site managers and team leaders. Following the analysis, the next step was to identify, in each partner country, the specific skills expected of site managers and team leaders by companies specialising in building renovation.

Having successfully completed the research activities, the aim of the current report is to present all the findings achieved within IO1 (activities 1 and 2):

- Synthesis of the desk research findings and comment on their outcomes
- Synthesis of the field research findings and quote the most significant results
- Conclusions and recommendations that will be linked to the RenovUp training design.

The report's results will be used to the next phase of the project and more specifically in the designing of a set of professionalization modules for site managers and team leaders, wishing to improve their skills in the management of renovation sites.

2. Transnational desk research: Methodology

In the context of the desk research, the partners were asked to conduct in-depth analysis of the technical, organisational and normative specificities of building renovation sites which affect the evolution of the functions of site managers and team leaders on these sites in the partner countries. They were also called to identify the specific skills expected of site managers and team leaders by companies specialising in building renovation.

First of all, they defined the role of the site manager and team leader in these projects, as well as the legislative framework in which they operate. Next, through desk research they were called to identify the challenges that team leaders face when it comes to satisfying with circular economy and energy saving needs. These challenges or barriers appear in various levels: technical, managerial, organizational, legal, health and safety related. Moreover, they identified the skills that are needed or are expected to be needed in the future. Finally, the partners presented the training provision in their countries. According to these findings, as well as further research, the partners presented their recommendations for training paths.

To achieve these results, each project partner carried out, between October 2020 and March 2021, its own desk research, based on the analysis of available resources produced by transnational, national and governmental institutions, professional organisations, statistical offices and training providers, such as:

- National sources provided by construction sector observatories, professional federations and research institutes (literature review of reports and policy papers),
- EU sources selection (Cedefop skills panorama, ECSO, EU Building Stock Observatory, EU Energy Poverty Observatory),
- Registers & directories of educational & training actions.

The desk research made it possible to find concrete answers to the following questions, split into two parts (descriptive and analytical).

Descriptive part:

- (1) Definition of 'building renovation sites' in each national context
- (2) National Legislative framework and policies related to Renovation of Buildings.
- (3) Definition of the specific role and profile of site managers and team leaders in building renovation projects in each national context (today and in the future).
- (4) Identification of technical challenges and barriers faced for site managers and team leaders related to building renovation sites, including skills needs related to energy saving and circular economy (today and in the future).
- (5) Identification of legal and normative challenges and barriers faced for site managers and team leaders related to building renovation sites.
- (6) Identification of managerial/ organizational challenges and barriers faced for site managers and team leaders related to building renovation sites, including digital skills today and in the future.
- (7) Identification of skills needs of site managers and team leaders in building renovation sites related to health and safety rules on worksite (today and in the future).

- (8) Existing training provision in relative areas/ State-of-the-art training programmes in building renovation sites.

Analytical part:

- (9) Potential impact of the national legislative framework, technical & normative, as well as managerial and organisational challenges and barriers on the role and functions of worksite managers and team leaders in building renovation in the partner country concerned.
- (10) Recommendations for the training paths to be developed in line with the work situations of site managers and team leaders concerned, as well as with the skills needs identified further to the desk research.

All findings were validated and enriched between February and April 2021 by 6 to 10 experts in each partner country, gathered in national advisory/focus groups. Their opinions and conclusions are also included in this Report. These experts, who numbered more than 40 in total, were representatives of social partners, specialists in certification and recognition of qualifications, company managers, training engineers or trainers who had to train middle managers on building renovation sites.

3. Key findings reached through the desk research

In the context of the RenovUp project, the partners were called to conduct desk research to discover the main developments in the field of renovations and what are the main factors affecting the job of the team leaders and site managers.

First of all, they needed to define the basic terms being discussed which are the renovation projects and describe the two professions as they appear in their countries. This allowed for a common ground of discussion to be created as a term could be interpreted differently from country to country. Next, the partners tried to discover the challenges that team leaders and site managers face during the last years and therefor make their suggestions for a training program that addresses the needs that arise from the development of the sector.

The research indicated that in **France, Greece and Poland**, there are **clear definitions in the legislation as to what constitutes a renovation project**, even though there are not described through the same methodology. In **Italy and Spain**, **there seems to be no clear definition that describes “renovation”**; however, **the partners were able to identify the type of building intervention to match this term and therefore continue the research.**

In addition, the partners were able to determine what the primary drivers are that have encouraged the implementation of renovation projects in recent years. The primary motivator is the **need for energy and economic efficiency**, to which the Renovation Wave has played a critical role as a catalyst for most countries, with the exception of France, by serving as a significant economic stimulus. Towards this end, the partner countries have developed national plans and established objectives addressing the issue of energy efficiency in building construction. A second important driver is the **need for the restoration and preservation of heritage and traditional buildings**, as all partner countries have significant numbers of old buildings.

All countries have been working towards developing the renovation sector nationally in accordance with the latest EU laws and policies. Among them, some distinguishing characteristics that have a significant impact not only on the development of the renovation sector, but also on the roles and responsibilities of site managers and project managers include the Italian government's policy, which has instituted tax breaks for owners who renovate their properties and improve their energy efficiency. Another concerns the Polish ministry's decision to make the use of BIM technology mandatory in all public works projects by the year 2025, which is set to take effect in the upcoming year.

As a general observation, the roles of the site manager and the team leader seem to be quite the same in the five partner countries. In general, the **team leader is a person responsible of a team of workers with a specific purpose and task at each time.** (S)he holds **technical knowledge** on the project that his/her team has undertaken and is responsible to **guide** them and deliver a specific result.

From his/her part, the **site manager organizes the site in its entirety, the phases of the project and therefore could coordinate more than one team leaders.** Even though **technical knowledge** is useful and sometimes required, his/ her role is **primarily managerial in nature.**

Aside from these broad classifications, we can discern some distinctions between them. In Greece, it is described that the relationship between the site manager and the team leader is sometimes

reverse. In France, the balance between the technical and the managerial skills of the site manager seems to be in favor of the managerial. In Italy, it is more common for these two roles to overlap because companies have a limited number of employees, despite the fact that the differences between the two profiles are clear. In Poland the site manager is a regulated profession, whereas the team leader is the most capable of the workers of his/her team and functions as the foreman.

In recent years, the majority of EU countries have taken steps to improve the energy efficiency of their buildings as well as the long-term viability of the construction industry as a whole. This means **new legal procedures arise from national laws and action plans, that need to be met with**. Also, **energy efficiency of the buildings means that the team leaders and site managers must get familiar with new technologies and materials**. This creates a new market as more and more clients seek out renovation options in order to improve the energy efficiency of their properties, obtain building certificates that are becoming mandatory, as is the case in Greece, or take advantage of tax breaks, as is the case in Italy. Therefore, energy efficiency is the main field from which new challenges derive, at a technical, legal and organizational level.

Waste management is also a challenge that affects most of the countries. The regulation for the promotion of Circular Economy imposes a slew of new legal obligations on contractors and site managers, all of which must be carefully planned and implemented. **Technical knowledge for the various materials and their recycling potential is also necessary to be obtained**.

In Italy, a major problem reported concerns that the roles of the team leader and the site manager are **not clearly defined** on the job site and are frequently diminished by the supervisors and employers. Furthermore, we can see that the problem of **immigration of young employees** is a common issue in both Greece and Poland. Furthermore, the necessity of **digitalization and integration of new technologies**, such as BIM and the use of prefabricated elements, constitutes a significant challenge in those two countries as well as in Spain, whereas France appears to be the country with the fewest difficulties.

It goes without saying that **new technical aspects of projects** that arise as a result of the circular economy and the energy efficiency policy, will **raise new questions about health and safety**. More specifically, despite the fact that workers entering the construction industry in Italy are required to participate in mandatory health and safety training programs, this is not always the case in practice. When it comes to accident and risk prevention, the Greek procedure tends to be more bureaucratic and ineffective as an overall tool. Furthermore, the Spanish partners emphasized the significance of demolition projects, which present difficulties on all levels, including technical, legal, organizational, and safety.

It stands to reason that there are numerous training requirements for the two professions that are not being met satisfactorily by the existing educational infrastructure, which is primarily due to the form and structure of those programs rather than the content of those programs. Therefore, there is agreement among the RenovUp partners that **a training program designed for the professionalization and upskilling of site managers and team leaders on renovation projects, should be individualized, with ad hoc courses and practical on - the - job training. Recognition of learning outcomes should be included**, not only to serve as a motivational tool, but also to improve the mobility of the employees involved.

Noteworthy is that the legislative environment at the national level is shifting in favor of environmental policy and sustainable growth, as well as in accordance with technological advancement and the specificities of each country's environment and culture. This will have an effect on the work being done on the renovation projects.

In France, waste management, health and safety rules are considered to be the most important challenges while Greece is more focused on energy consumption and efficiency. Italy is more concerned about the organizational and managerial changes on the worksite, but it agrees with Poland and Greece on the issue of BIM technology and how it is going to be smoothly integrated on the job.

As a key input from the desk research and the experts' validation, the partners have made recommendations about the RenovUp training program and its content. Its analysis is thoroughly presented in Chapter 5 of this report, in alignment with the adequate input received from the interviewed experts, presented in the following Chapter.

In the following sections, a summary of the validated desk research finding is presented per topic and per country. The analytic versions of the National Reports can be found in the respective Annexes 8.1 to 8.2.

3.1. Definition of 'building renovation sites' in each national context

France

French definition of a renovation site: Derived from the Latin word *hereditas* (in French, the legacy of the father), heritage refers to the property inherited from the ascendants, gathered and preserved to be passed on to future generations. To ensure this conservation is the very object of the **protection** of the built heritage (belonging to historical monuments or not).

Renovation refers to the operations by which a building or one of its components has its condition improved, using new, modern materials, replacing damaged or obsolete parts. A renovation is sometimes part of a conversion or restructuring plan.

The definition of renovation differs from that of **restoration**, which is understood in the French context as a restoration to the initial state, and **rehabilitation**, which aims to reopen a closed place, or still open but more to the standards of the day.

However, rehabilitation and restoration can be considered as special forms of renovation.

The renovation can range from the sole renovation of the facade of a building (public or private) to its complete renovation.

Types of renovation:

- Overall
- Thermal insulation
- Extension and expanding of a floor

Greece

- ❖ With the National Law: N. 4685/2020, "Radical renovation of a building or building unit" (large-scale renovation) is considered: the renovation in which the total cost of the renovation of the building or building unit, or their technical systems, exceeds twenty-five percent (25%) of the value of the building or the building unit, excluding the value of the land on which the building is constructed.
The value of the building or building unit constitutes the key aspect for the characterization of a renovation as radical (large-scale) or small-scale.
- ❖ National Law: N.4495/2017 adequately includes all small-scale renovation works' categories.

Both laws, as referred above, are based on the central National Building Regulation Law: N. 4067/2012 which indicate all general details about the renovation and reconstruction of buildings. In this law, particular attention is drawn to listed buildings.

Further details in regard to "Determining the way of calculating the value of the building or the building unit for the characterization of a renovation as radical is included in the Ministerial Decision: YPEN / DEPEA / 6949/72 / 28.01.2019).

Italy

In Italy, the term building renovation is generally used to indicate the set of building works intended to renovate, modify or repair a building structure.

In the Italian legislative context, depending on the type of intervention that one intends to carry out, there are precise indications and procedures to be respected, which differ according to the ultimate aim of the intervention itself. In terms of urban planning, construction, function and structure, there are substantial differences between *renovation and restoration work*, which should be carefully considered before starting any work.

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According to Article 3 of the Consolidation Act DPR 380/01, there are five categories of building interventions.

- routine maintenance;
- extraordinary maintenance;
- new construction;
- restoration and renovation;
- building renovation;

Restoration and renovation

Restoration is the type of renovation work that involves the radical and complete transformation of the components of the entire building, with a change in typological qualification, an increase in the number of building units and the alteration of the original typological-distribution system and architectural features.

The demolition and reconstruction of the structure is also considered as renovation, but only when the parameters of the new building remain the same as those of the previous structure in volumetric terms.

In contrast to renovation, restoration is a term that is used more for the renovation of buildings that have historical-artistic value and/or are under cultural heritage protection and can be used

to make major changes to the structure of the building in question, but without altering its volume.

Validation Experts input: In Italy, the term renovation classifies all work that does not concern new buildings without any distinction between "traditional" and "energy efficiency" renovation.

Spain

As a rule, the term **restoration** is applied to intervention in protected buildings, to refer to the total or partial recovery of the original state of a property, maintaining the building typologies and historical construction techniques as the basis of the recovery that you want to carry out.

On the other hand, the term **rehabilitation** is used in relation to the existing building stock of buildings, not listed. According to the Technical Building Code (CTE), shall apply **rehabilitation works** those which aim at achieving any of the following results:

a) **Structural adaptation:** works that provide the building with conditions of constructive safety, stability and mechanical resistance.

b) **Functional adaptation:** works to provide, to the building, better conditions with respect to the basic requirements: removal of barriers, promoting accessibility, etc.

c) **Remodelling of a building:** if aims at modifying the surface area intended for housing or to modify the number of these, or the remodelling of a building without housing for the purpose of creating them.

It will be understood that a work is of **integral rehabilitation** when its object is actions tending to all the purposes described in this section

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Poland

Polish construction law does not distinguish between construction site and renovation site (Law of 7 July 1994 on construction; Journal of Laws of 2020, item 1333, Art.3): the construction site is to be understood as 'the space in which the construction works are carried out together with the space occupied by the facilities of the construction facilities'.

In defining the 'construction site', the Law refers to construction works in general, which include:

- construction, as 'execution of a work in a specific place, as well as reconstruction, extension';
- conversion as 'the execution of works resulting in a change in the performance or technical characteristics of an existing building, with the exception of characteristic parameters such as volume, built-up area, height, length, width or number of storeys';
- **renovation**, as 'the execution in an existing building of works consisting in the restoration of the original state and not forming ongoing maintenance, it is possible to use of construction products other than those used in the original state'.

Renovation is therefore a specific type of construction work. Consequently, the above definition of the construction site also applies to renovation site. Thus, **in Polish legal conditions, the terms "construction site" and "renovation site" are not distinguished**

3.2. National Legislative frameworks and policies related to Renovation of Buildings

France

The law of August 4th, 1962 (known as the “**Malraux Law**”) facilitates the restoration of real estate and introduces the notion of safeguarded sectors. Delimited by ministerial decree, it ensures the safeguarding and development of coherent urban complexes.

Regarding the **thermal regulation of existing buildings**, the objective of this work is to improve the performance of the building by implementing new products and more efficient equipment. The regulatory measures are different depending on the size of the work undertaken.

The **global thermal renovation «RT global»** is defined by the **decree of June 13th, 2008** relating to the energy performance of existing buildings of Net Surface greater than 1,000 m².

For all other renovation cases, the **thermal regulation «element by element» defined by the decree of May 3rd, 2007 and modified by the decree of March 22nd, 2017** applies.

In addition to these regulations, the Energy Transition for Green Growth Act of 2015 (ETGGA) created an obligation to install thermal insulation during building major renovations, such as facade or roof repairs. Moreover, launched in 2013, the **Energy Renovation Plan for Housing (ERPH)** sets out the expected annual targets for the massive renovation of the existing building stock, with several priorities, including the fight against energy poverty. At the national level, the building sector accounts for 24% of greenhouse gas (GHG) emissions and 44% of final energy consumption. The national goal of dividing GHG emissions by four in 2050 requires massive renovation of the existing building stock. Thus, the ERPH aims to:

- Fight against energy poverty.
- Inform and guide individuals on home renovation opportunities.
- Structure the economic chain of renovation, which is highly job-creating.

The **law of August 17th, 2015 on the energy transition for green growth** (also known as LETGG or «Energy-Climate Law») sets as objectives both the reduction of energy consumption and the use of low-carbon and diversified sources of mixed energies.

The **law of July 7th, 2016**, on the freedom of creation, architecture and heritage, modernizes the modalities of protection of heritage.

Validation Experts input: The experts pointed out that there is new legislation in preparation, specifically a new bill to combat climate change and strengthen resilience to its effects (including several articles on energy renovation).

Greece

Regarding Renovation policies in the country, three different phases have been identified in accordance with the latest National Energy and Climate Plan.

The first one, covered the year 2020, where all regulatory aspects necessary for the required mechanisms and structures were developed. The second – acceleration phase (period 2020-2040), encompasses a further development of technological innovation of products and techniques, which are set to a gradual cost reduction of energy efficiency measures and a proper understanding of the additional gains of a total renovation. Finally, during the third phase, or “stability” phase (period 2040- 2050), the energy market of building renovation is anticipated to become mature enough to include mobilization of investments from the private sector as well (e.g., through Public Private Partnerships).

Further to the above, within the framework of the European “Renovation Wave”, Greece, via the Recovery Fund, has launched the program "Save II". The new program will not only have the dimension of energy saving, but also that of energy autonomy, through the production and storage of energy and the management of energy with "smart" systems.

Furthermore, with the “Long-Term Strategy for the Renovation of the Building Stock”, in the context of the implementation of the European Directive on the Energy Efficiency of Buildings (OEAK - 2010/31 / EU) and the implementation of the European Energy Efficiency Directive (2012/27 / EU), special emphasis is given to the building upgrade from residential and commercial buildings, public and private, with the aim of converting them into a high-energy and carbon-free building stock by 2050, facilitating the cost-effective conversion of existing buildings into buildings with almost zero energy consumption.

Validation Experts input: The experts paid special focus on preservable buildings as Greece has a great number of them. If a building is characterized as preservable any renovation interventions need permission from competent authorities.

Italy

As of 2018, there is an obligation to transmit information to the National Agency for New Technologies (ENEA), to monitor and assess the energy savings achieved with the implementation of building renovation work.

A 2019 JRC (**Joint Research Centre**) study "Accelerating energy renovation investments in buildings. Financial and fiscal instruments across the EU", analyses the main incentive measures dedicated to buildings in the Member States and investigates new private financial products currently in place to stimulate more investments in energy efficiency in residential, commercial and public buildings.

In order to boost the economy, following the Covid-19 pandemic, which saw a sharp downturn in the economy due also to a long lockdown period and consequently the temporary closure of many construction sites, the Government decided to use the tax deduction mechanism – Ecobonus-, applied to energy efficiency and anti-seismic interventions, raising the deduction rate to 110% of the expenditure incurred and, at the same time, halving the number of annual instalments over which the deduction is spread, from ten to five.

Validation Experts input: The experts focused their attention on the current legislation in Italy, namely the Decree of 6 August 2020 concerning the benefits in case of seismic and energy improvement of existing buildings.

Spain

The Spanish Ministry for Sustainable Development promotes and regulates the building quality on a basic basis in order to respond to the growing social demand in this area and to the requirements of related national and European policies, also contributing to the improvement of the competitiveness of the sector, through the promotion of innovation both in new building works and in the rehabilitation of the existing building stock.

The Spanish legislative framework has undergone many changes in recent years that affect construction activity and, consequently, rehabilitation. The following compilation of regulations clearly defines the concepts to take into account for the development of rehabilitation projects.

The Law 38/1999 of 5 November on Construction Planning (LOE) is the cornerstone for the process of construction and rehabilitation of buildings.

Another very important norm is the Technical Building Code, which is the regulatory framework where all the requirements to be met by rehabilitated buildings on safety and habitability are established, which were established in the law previously seen. It is better known as CTE and was approved by Royal Decree 314/2006.

In December 2019, a new revision of the Basic Document DB HE for Energy Saving of the Technical Building Code (CTE) was carried out, which completes the gradual process of approaching the definition of a building with almost zero energy consumption.

Another important normative is the Law 8/2013, of June 26, on urban rehabilitation, regeneration and renovation, which points to the need to preserve buildings and monuments, but providing them with increasingly high performance.

The Royal Decree Law 7/2015 approved the revised text of the Land Law and Urban Rehabilitation, bringing together into a single standard all the provisions on the floor, rehabilitation and urban regeneration, clarifying and harmonizing all its terminology and legal precepts.

It is also necessary to take into account in the rehabilitation of buildings:

- The Law of Common Telecommunications Infrastructures, according to Royal Decree-Law 1/1998, of February 27, in its Regulations, approved by Royal Decree 401/2003 of April 4, and by Order CTE / 1296/2003, of 14 of May.
- The Energy Efficiency Certificate. Through Royal Decree 47/2007.
- The Electrotechnical Regulation for low voltage, Royal Decree 842/2002.

SOME POLICIES IN PROGRESS FOR THE REHABILITATION OF BUILDINGS

National Integrated Energy and Climate Plan (PNIEC) 2021-2030. The next PNIEC 2021-2030 establishes as a goal for 2030 that renewable energies represent 42% of final energy consumption in Spain

Aid Program for Energy Rehabilitation Actions in Existing Buildings (PREE), established by Royal Decree 737/2020, of August 4, which regulates the aid program for energy rehabilitation actions in existing buildings.

The Spanish Government will allocate 5.3 billion euros to aid to rehabilitate buildings and homes .

It is estimated that these grants could create around 400,000 jobs, providing a significant boost to the construction sector.

Validation Experts input: The experts stressed the need to urge the legal rehabilitation of the term "RESIDUO" in rehabilitation/construction, for the urgent implementation and advancement of both "green construction" and the circular economy in the sector.

Poland

Renovation, as one of the types of construction works, is governed by the Act of 7 July 1994 (OSH), which governs activities involving the design, construction, maintenance, and demolition of buildings and lays down the rules for the operation of public administrations in these fields. The implementing rules on OSH in construction sites place direct supervision of OSH in the workplaces in the hands of the manager and the master of construction (usually called a foreman) – according to the scope of duties.

Furthermore, some indicative policies worth to present include:

- ❖ Important amendment to the Regulation on the technical conditions to be met by buildings and their location (OJ 2020 item 1608): the new conditions in force from the beginning of 2021 concern increased thermal insulation requirements for building partitions and the fulfilment of specific building demand indicators for non-renewable primary energy (so-called EP). This is related to the implementation in Poland of an EU programme to gradually reduce energy consumption in construction and minimize heat loss due to poorly insulated buildings.
- ❖ Building Information Modelling methodology - BIM (in public procurement) - in 2020 the project "Digitization of the construction process in Poland" aimed at disseminating BIM elements on the Polish construction market was completed. The project implemented by the Ministry of Development and PwC developed i.e., concept of the BIM IT platform and a package of documents supporting the implementation of the BIM methodology.
- ❖ National Smart Specialisations (KIS) - a strategic national document to address the priorities of the Europe 2020 Strategy (support for investment in smart specialisations is also planned in the next EU financial perspective for 2021-2027).

Since 03.2017, the Sectoral Competence Council (SRK) for the Construction sector has been operating in Poland. The Council provides a forum for the exchange of experience between formal, non-formal and informal education, research entities and construction entrepreneurs involving social dialogue institutions (trade unions and employers' organisations), professional self-government and other stakeholders working for the development of the construction sector by raising awareness of its qualifications and professional needs.

In order to identify key competences within the different sectoral determinants of the SRK-Bud, four contexts of impact were identified for the different phases of the investment process, including context D) Development trends and innovative technologies in construction (e.g. green construction or the production of energy-efficient buildings).

Validation Experts input: The experts underlined the role of national and regional chambers of professional self-government in the qualification and certification of persons performing

independent technical functions. The chambers conduct the qualification procedure, examination, and keep a register of members of the professional self-government.

3.3. Definition of the specific role and profile of site managers and team leaders in building renovation projects in each national context (today and in the future).

France

There are three site management positions in France:

- **Team Leader**, very qualified and close to the field, is the leader of a small group of companions. He is in charge, with his team whose activities he organizes, of missions such as built a part of a building or put back into service a faulty installation.
- **Site Manager** supervises all site production staff, determines with team leaders the tasks assigned to them to complete the project. The human aspect of this position is essential: this very good technician, attentive to quality and deadlines, must know how to lead and animate a team.
- **Operational Supervisor** supervises one or more site managers. In addition to his hierarchical responsibilities, he ensures the financial management of the site, organizes supplies. Creative on a technical level, he dialogues with the master developer and architect as well as with the other partners of the act of building. He knows how to decide and delegate.

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Specificities of site managers specialised in building renovation:

- Knowledge of how to identify and categorize renovation projects and, within this framework, knowledge too of how to identify and categorize the buildings to be renovated: year of construction, type of materials, mode of construction.
- Knowledge of how to manage renovation projects of different sizes, different budgets, with constraints specific to each building (mastery of technical and organizational quality standards).
- Knowledge of how to prepare and optimize the opening of a renovation project: choice of materials and delivery schedule.
- Be versatile to understand the profile, size and complexity of renovation projects.
- Ability to combine the constraints of old buildings with new requirements: being sensitive to the preservation of the original aspects of buildings (aesthetic and artistic dimensions), ability to find compromises between old and modern techniques (standards, materials, environmental compliance, etc.).
- Ability to analyse his/her environment to identify the constraints to be considered: adapting to unforeseen events, weather, management of the complexity of cultures, of experiences and jobs in the specific context of renovation projects, failure or delay in delivery of materials, etc.
- Relational ability to communicate with specialists from different trades working on renovation projects and to positively manage complex relationships with subcontractors.
- Ability to organize the flow of information on the renovation site, with a focus on specific points for this type of site.

- Sensitivity to cost control (equipment cost slippage is common).
- Ability to manage several projects simultaneously, each with its own characteristics (nature of the project, heterogeneity of teams and subcontractors, considering specific constraints, etc.).
- Ability to be a proposal force for the organization of projects: choice of teams, materials, and equipment to use, etc. in a “non-standard” environment.
- Ability to secure the buildings to be renovated and make them accessible by setting up the necessary precautions to preserve the building on the one hand and the teams on the other hand during interventions.
- Ability to implement sustainability standards in a renovated building: analysis of the thermal, seismic, and acoustic properties of older buildings for their upgrading.
- Ability to organize waste management and resource savings on site with re-use of materials.
- Manage the closure of renovation sites.

Specificities of team leaders specialized in building renovation:

- Ability to combine the skills of multiple building trades, as well as to diagnose the works regarding the buildings to be renovated, to select the materials to be used.
- Ability to preserve original building features and use old techniques to recover original aspects.
- Situational analysis ability and ability to adapt and manage unforeseen events (weather, worker reactions, delivery delays, technical constraints not initially identified, etc.).
- Ability to manage workers who speak different languages, come from different cultures and have different work and life experiences.
- Permanent adaptability: carrying out tests to obtain the same colours, testing several techniques to mount scaffolding, insert new in old, difficult to do, while preserving it (be as discreet as possible, particularly regarding the interventions for electrical installations, heating, etc.).
- A certain versatility in the profile of construction sites and renovations.
- Ability to mix old and new techniques, be open to innovation while respecting the old.
- Place his/her intervention in an eco-responsible approach.
- Respect and enforce waste management and resource savings on site.
- Respect and enforce the constraints of each trade.
- Monitor facility safety and diagnose malfunctions (scaffolding, safety equipment, co-crew behaviour, etc.).
- Understand specific manufacturing processes (e.g. mouldings, insulation associated with a stone facade, electrical installations in “non-standard” contexts, etc.)

Validation Experts input: According to the experts, the content of the activities of site managers and team leaders varies according to different company profiles and the territories where these renovation companies are located. Furthermore, if renovation also includes historic buildings, it will be necessary to look at the specificities of the restoration of these buildings and the impact of these specificities on the functions of the site foremen and team leaders concerned.

Greece

Team Leader: (S)he ensures the timely completion of the project, within the budget framework, and the achievement of its objectives. They supervise the project, manage the team, ensure the use of the most efficient resources and ensure that all stakeholders are satisfied. In more analysis,

(s)he is responsible for the planning of the activities, the scheduling, and the control of a construction project. The Team Leader is responsible to know what work needs to be done, when it needs to be done, by whom it needs to be done, in how much time, at what cost and at what quality level. (S)he is the one to calculate the impact on the implementation of the project of various factors, such as bad weather, machine failures, staff strikes, etc. and holds the responsibility to make those corrective actions that will allow the project to complete within the available timeframes, at the estimated cost and at the desired quality level.

Site Manager: The Site Manager is usually under the guidance of the Team Leader and responsible to supervise the rest of the engineering team in the construction project (mechanical, installation, application). (S)he is usually a civil engineer.

Such people are usually called to coordinate, supervise, and schedule the activities of workers engaged in the construction and repair of buildings and structures.

Some indicative tasks include:

- Reading specifications to determine construction requirements and planning procedures.
- Organizing and coordinating the material and human resources required to complete jobs.
- Examining and inspecting work progress.
- Examining equipment and construction sites to ensure that health and safety requirements are met.
- Supervising construction sites and coordinating work with other construction projects.
- Supervising the activities of building trades workers, laborers, and other construction workers

Validation Experts input: The experts added that the role and profile of team leaders is relevant to the type and the size of renovation project. Also, materials used in renovation projects should be adapted to the climate of the area. Thus, team leaders must hold knowledge about the characteristics of various materials and make the proper choices. They suggested that “Special repair methodologies according to the type of the building” should be added as necessary knowledge and skills for both team leaders and site managers.

Italy

In Italy, given the historical moment, it is very difficult to make the distinction between the figure of the site manager and the team. Sometimes the two roles coincide with the same person who is often the owner of the company. In the most structured companies where these two figures are present, we can define them as follows.

Site Manager: The site manager can be a specialised worker or a site technician, whose main responsibility is to coordinate the workers on a construction site. He/she is a professional figure who is in charge of planning, organising, directing and controlling everything on the construction site, assessing projects from when they start to when they are completed, respecting all deadlines and safety regulations.

Team Leader: The team leader is a worker who, due to specific professional competences, supervises the work activity and ensures the implementation of the directives received and checks their correct execution by the workers. He/she gives orders during the work, assigns tasks to the staff and is the one who ensures the correct and safe execution of the whole work.

The following are the skills and abilities that the site manager and team leader should have:

Skills and capabilities of the site manager:

- Ability to coordinate activities and tasks.
- Knowledge of labour law and the collective labour agreement and that applied by the company.
- Knowing how to allocate tasks according to workers' competences
- Knowing how to manage and maximise human and instrumental resources
- Knowing how to analyse costs
- Knowing how to choose the most suitable machines and equipment
- Knowing how to properly manage construction site schedules and deviations from the timetable.
- Communication and interpersonal skills
- Knowledge of occupational safety legislation and its enforcement
- Knowledge of site waste management (recycling, reuse and landfill)
- Technical knowledge for quality control of staff work
- Transversal knowledge about new green materials, their use and application
- knowledge of the use of new technological and digital tools
- Managing emergency situations

Leader skills and abilities of the team leader:

- Knowledge of occupational health and safety regulations and their application
- Relational skills between the procedures to be implemented and the human resources available.
- Knowledge of how to monitor work carried out
- Ability to prevent problems
- Problem solving skills
- Transversal knowledge about new green materials, their use and application
- Knowledge of the use of new technological and digital tools
- Managing emergency situations

Validation Experts input: For the experts, the role of site and team leaders is central and of great importance. Their attention was drawn to the evolution of construction sites, new materials, new technologies and digitalization which have created a smart construction site which requires the acquisition of new skills. In this context, site managers and team leaders are increasingly assuming a key role for companies and therefore need to update their skills through appropriate training. They should therefore have more digital skills for a smart site future as well as green and managerial skills. They should be able to manage deviations from the programme and know and apply new materials. This also applies to small sites where the employer plays several roles at the same time. In this case it is the employer himself who will have to keep up to date.

Spain

TEAM LEADER

General Criteria: This professional group includes workers who, depending on others with higher qualifications, carry out tasks that require advanced technical and practical knowledge of the trade or profession, since they carry out their functions with a certain autonomy. Coordinate or track small groups of less skilled and less experienced workers.

Training: For the adequate performance of the activities framed in this professional group, it is recommended to have completed studies equivalent to Compulsory Secondary Education or the intermediate level of Professional Training, or knowledge acquired through extensive experience in the trade or profession.

Tasks: The following list of activities will be understood as belonging to this group, by way of example and not exhaustiveness:

- Technical management, design and planning area
- Production area and similar activities
- Transversal services area

SITE MANAGER

General Criteria: The personnel included in this professional group carry out tasks that require initiative. They can carry out certain planning, organization and supervision functions of the activities of a group of less qualified workers, bearing, under their supervision, their responsibility. They have specific technical knowledge in their area and sufficient criteria to follow up the tasks according to the objectives set by higher professional groups. They solve the most common incidents that arise in their work, although they may require consultation with superiors to solve others that transcend their work area or that require more complex specific knowledge.

Training: For the adequate performance of the activities framed in this professional group, a level of training equivalent to Baccaureate or higher degree of Vocational Training is recommended, or similar knowledge acquired through experience in the trade or profession.

Tasks: The following list of activities will be understood as belonging to this group, by way of example and not exhaustiveness:

- Technical management, design and planning area
- Production area and similar activities
- Cross-cutting services area

WHAT THE LABOR MARKET REQUESTS

In **job offers**, the requirements that are often requested when an experienced site manager is required to coordinate building rehabilitation and renovation works are the following:

Job Description

- Execution of all types of rehabilitation works
- Subcontractor management
- Management of own personnel
- Own machinery management
- Purchase of materials
- Rental of tools and machinery
- Layouts and measurements

Requirements

- Minimum demonstrable experience of 3 to 5 years.
- Middle Grade Studies Building and Civil Works
- Experience in leading teams, both from the company itself and subcontracted.
- Ability to interpret plans and stake out on site.

- Knowledge of building and civil works.
- Management of computer tools in the sector.
- Driving license.
- Initiative.
- Control of materials and machinery.
- Plan work, track the plan and meet timelines.
- Enforce H&S regulations. H&S 60 h is requested.
- Coordination of work with different industrial and b hired.
- Proposal of procedures, materials, and techniques. Advice to operators.
- Calculation of materials and measurement of the work carried out.
- Supervision and verification of work processes and results. QA.

Validation Experts input:

According to the experts, in the hiring requirements of the manager in building sites, the following should be added:

- Handling multimedia tools (photography, video, and video conferencing)
- Experience and knowledge in insulation works, waterproofing and structures
- Ability to interpret technical instructions for "special materials" (special sealants, mortars, new technologies).

Poland

The site manager (construction manager) in Poland:

- has independent technical functions in construction, defined and characterized by the Construction Law, requiring permission (rights);
- is a regulated profession operating on the Polish labour market (according to the classification of professions and specialties for the labour market – occupation No. 132301).

The Construction Law Act defines the following participants in the construction process and their responsibilities: investor, investor supervisor, designer and construction manager (where a building permit is required) or works manager (in the case of works not requiring a building permit). To the basic duties of the construction manager / works manager should be i.e: Acquisition of the construction site from the investor; Record-keeping of construction; Ensuring the geodesic delimitation of the site and organising the construction and directing the construction in a manner consistent with the design or with the building permit and with the regulations (including health and safety).

The main rights and obligations of the construction manager are the same as those of the works manager. However, the construction manager directs the entire site, while the works manager only has a section for which the construction manager does not have professional permission. The manager of the works is only responsible for works within the scope of his powers, e.g. sanitary, electrical, etc.

The construction manager is responsible for the construction processes. He must have the ability to assess technical phenomena, solve architectural or technical and organizational issues. Without it, it is impossible to start any action requiring a building permit.

The competences of the construction manager (as a profession operating on the Polish labour market) and his professional tasks are identified and described in the IoZ (2018) There are:

- Three professional competences:
 - Supervising and coordinating the execution of construction works;
 - Keeping construction documentation;
 - Cooperation with the investor, building supervision authorities and other public administration offices.
- Social competence, including:
 - Professional and civil liability for the consequences of one's own actions and decisions taken as a construction manager.
 - Making independent decisions on issues related to the management of the construction site.
 - Evaluating his own activities and evaluating the persons he directs in the field of construction work.
 - compliance with building and safety regulations.
 - Improving professional competence in the context of legal changes and new technological and organisational solutions in construction.
 - Compliance with the professional ethics of construction workers.
- Ten professional tasks:
 - Z1) Receiving and securing the construction site.
 - Z2) Conducting, verifying and developing construction documentation.
 - Z3) Planning and management of the construction site.
 - Z4) Coordinating tasks to prevent and ensure health risks.
 - Z5) Halting construction works if a hazard is detected.
 - Z6) Executing recommendations entered in the construction log.
 - Z7) Reporting for receipt of works that are disappearing or covered.
 - Z8) Preparation of post-work documentation.
 - Z9) Reporting of works for collection.
 - Z10) Participating in reception activities and ensuring the removal of possible defects.

Construction masters colloquially called foreman/ team leaders

The master of construction should not be confused about the person with the title of the master obtained in the chamber of crafts. This is a naming convergence. A construction master is a person who is at the head of a team and often works with employees, so in practice he/she is called a foreman.

The performance of the work of a master of construction (foreman/ team leader) does not involve formal requirements or entitlements in Poland. It is a function that requires experience and high professional competence (professionalism building authority in the team) and appropriate social like communication and organizational skills. Construction masters are responsible for the implementation of plans and supervision of groups/brigades of workers performing construction works in a specific field (e.g. masons, installers, electricians, etc.). The main duties of this employee include:

- organization and coordination of the work of subordinate employees,
- accounting of employees from hours worked,

- coordination and arrangement of works with management,
- control over the entrusted property of the company
- control of compliance with health and safety rules.

Usually, for a position of foreman/team leader are selected people who have a minimum of technical secondary education and professional experience in a similar position. Such a worker should be characterized by: availability, honesty and ability to organize the work of the brigade.

Validation Experts input: With regard to the specific roles of the site manager carrying out the renovation work, the following were emphasized:

- management in surprising, unforeseen situations,
- the ability to reconcile old and new technologies and materials,
- the ability to minimize interference with the functioning of the renovated building (e.g. managing the supply of materials or the export of waste without the need for storage).

Conclusion: Looking for common professional characteristics

Having presented the specific characteristics of the two profiles in each country, we identify similarities and differences, useful for the further elaboration of a transnational professionalization model.

Site manager and team leader responsibilities appear to be similar across all five partner countries, on the whole. It's common knowledge that the person in charge of leading a group of employees has a specific purpose and task to complete at any given time. It is his/her job to guide and deliver a specific result for the project that his/her team has undertaken. The site manager, on the other hand, organizes the site as a whole, including all of the project phases, and can thus coordinate efforts between multiple team leaders. The manager's role is primarily managerial in nature, despite the fact that technical knowledge is useful and sometimes required.

In addition to these broad classifications, there are some **differences** between them that deserve mention. **People in Greece say that site manager-to-team-leader relationships are sometimes skewed. In France, the site manager's technical and managerial skills seem to be evenly distributed.** Despite the obvious differences between the two profiles, **these roles tend to overlap more in Italy** because companies only have a limited number of employees. **Poland has a regulated profession for site managers while the team leader is the most capable member of his or her team and serves as the foreman in that situation.**

Common characteristics identified

Team Leaders

- Ability to combine the skills of multiple building trades, as well as to diagnose the works regarding the buildings to be renovated, to select the materials to be used.
- Ability to preserve original building features and use old techniques to recover original aspects.
- Knowledge of occupational health and safety regulations and their application
- Relational skills between the procedures to be implemented and the human resources available.
- Problem solving skills
- Transversal knowledge about new green materials, their use and application

- Knowledge of the use of new technological and digital tools
- Control over the entrusted property of the company

Site Managers

- Knowledge of how to identify and categorize renovation projects.
- Ability to combine the constraints of old buildings with new requirements: being sensitive to the preservation of the original aspects of buildings (aesthetic and artistic dimensions), ability to find compromises between old and modern techniques (standards, materials, environmental compliance, etc.).
- Ability to organize the flow of information on the renovation site, with a focus on specific points for this type of site.
- Sensitivity to cost control (equipment cost slippage is common).
- Ability to organize waste management and resource savings on site with re-use of materials.
- Supervising construction sites and coordinating work with other construction projects.
- Supervising the activities of building trades workers, laborers, and other construction workers
- Knowledge of labour law and the collective labour agreement and that applied by the company.
- Team Management
- Time Management
- Communication and interpersonal skills
- Knowledge of occupational safety legislation and its enforcement
- Knowledge of site waste management (recycling, reuse, and landfill)
- Technical knowledge for quality control

3.4. Identification of technical challenges and barriers faced for site managers and team leaders related to building renovation sites, including skills needs related to energy saving and circular economy (today and in the future).

France

The challenges faced by site managers and team leaders on building renovation sites in France:

(1) A comprehensive approach to building from a sustainable construction perspective

To meet customers' expectations and keep their trust, companies and craftsmen must be able to propose a global analysis, integrating the cross-cutting dimension of the energy performance of buildings: improvement of the insulation of the envelope, energy efficiency of technical equipment, use of renewable energy and building maintenance.

(2) Control of energy performance of existing buildings

The objective is to contribute to reducing the average consumption of the housing stock and to have, by 2050. In this context, the entire **social housing** stock will have to be renovated eventually.

(3) Site waste management

Prevention, on-site sorting, recycling, reuse are all levers that contribute to the establishment of a circular economy for a more efficient use of resources.

There are scenarios for setting up an organisation for the efficient management of building waste in a circular economy, promoted by professional organisations in the construction and waste sector.

(4) Control of work to improve indoor air quality

The development of buildings with high environmental and energy performance sets a double challenge: to reduce energy consumption and greenhouse gas emissions, by limiting losses related to ventilation, while maintaining good indoor air quality. Coordinating the work to achieve good indoor air quality, consistent with the overall sustainable construction approach, is another challenge for site managers and team leaders working on building renovation projects.

Validation Experts input: The experts mentioned some additional challenges that need to be taken into consideration:

- Organisation of work related to the accessibility of old premises and, more generally, the adaptation of old buildings to ageing audiences
- Ability to monitor the safety of installations as an element of situational analysis.
- Health and safety on renovation sites: also integrate it into the situational analysis, as a challenge, a source of savings and modernity for the company
- Management of the obsolescence of installations and infrastructures. On the one hand, there is renovation, and on the other hand, new installations age and pollute even more than old ones.
- Taking account of territorial specificities:
 - The challenges can change with the territories, climatic conditions, choices made by local actors, etc.
 - Favour short supply circuits for renovation sites - work on new processes and new supply circuits to reduce the carbon impact and transport costs.
- Reconciling traditional technical skills with the need to use more environmentally friendly materials, while respecting the aesthetics and character of old buildings.

Greece

Greek buildings lag significantly behind in terms of their energy behavior. The introduction of **thermal insulation** is the most effective way to improve this situation, despite the difficulties encountered by the regulation in its implementation. To this end, renovation, and reconstruction of the existing building stock, calls for an update in the current skills set of the staff.

Despite this necessity, the incomplete regulatory framework and the absence of an implementation monitoring mechanism are the main problems relating to the **promotion of RES**, while the need to obtain education/training and to adapt to the technical requirements remains critical.

Furthermore, another technical skills gap surrounds the **use of BIM** (Building Information Modelling). According to Greek legislation, while BIM can be implemented in public construction project plans, there are no further requirements or guidance in place that ensure its application in practice.

In addition, another challenge concerns the **CDW management** in the country. It is identified that Greece (and the respective Greek construction industry) lacks the necessary readiness to respond

to the skills needs resulted from the transition to a circular economy. Currently, it seems that the VET system is not yet fit for addressing such training needs.

Finally, another challenge includes the emergence of new materials and techniques.

In general view, Greece has lagged in terms of qualification certification in the update of skills of its construction workers, thus degrading its workforce in Europe.

Validation Experts input: The experts agreed with the findings and added the aspects below:

Bioclimatic intervention should include not only insulation but also shades and proper choice of materials. Concerning the use of **RES**, the **aesthetic approach** should also be considered, as well as the **building life cycle**.

Regarding **BIM**, the Ministry is currently preparing an Action Plan regarding the actions required at institutional and all other levels. The Plan will focus on all areas and target groups and will aim to prepare the public and private sectors to adopt the use of BIM, and to equip their constructions with all the necessary supplies.

Italy

In Italy, the obstacles faced concern that employees are not aware of their role. The challenges facing these figures is therefore to make their skills known to others and to stand out from other workers.

Validation Experts input: Site managers and team leaders are disappearing due to the strong presence of micro enterprises all over the country today. In addition, the most qualified workers are sometimes not allowed to emerge; the older worker tries to belittle the younger, more qualified one. Therefore, one of the barriers to overcome is not to be intimidated by older workers and the challenge is to become aware of one's own role and skills and thus to stand out from other workers.

Spain

Energy efficiency, circular economy, and waste management, have a more or less defined regulatory framework and the middle managers of the building renovation works have to handle competences and skills such as those indicated below:

Regarding ENERGY EFFICIENCY:

- Being able to control the execution of the elements that influence the energy performance of the building using the appropriate technology.
- Being able to analyse the thermal behaviour of the building in terms of energy efficiency and the recognition of pathologies, identifying the phases to develop in the rehabilitation of the building envelope.
- Being able to monitor the construction of efficient facades from the energy point of view according to the technical specifications of the project.
- Be able to control the installation of thermal insulation systems.
- Be able to control the waterproofing and insulation of underground roofs, walls and floors.

On CIRCULAR ECONOMY issues:

- Being able to implement the circular economy and environmental protection solutions in all phases of construction and use of the building.

And in WASTE MANAGEMENT:

- Being able to monitor the waste chain in the construction and demolition phases, supervising all phases of the construction process.
- Being able to control the management or n of specific waste materials.

Poland

The new technical challenges facing the construction industry result, inter alia, from the so-called double transformation (green and digital). The most important of these are:

- New technologies and solutions such as **prefabrication** (prefabricated 3D technology), **modularisation** (off-site building),
- **Computerisation** of building management processes, especially BIM - Building Information Modelling (including different building life stages, construction or renovation costs, analysis of the impact of investments on man and the environment and efficient management of building operations), building software, data ecosystems, augmented reality, cloud-based technologies, etc.,
- **Energy efficiency of buildings** (including energy audits) –in Poland renovation works are focused on the energy performance of buildings very rarely, which is the result of the freedom of legislation in this regard,
- **In the case of old buildings, the problem often becomes the poor condition of their construction, which makes it impossible to take appropriate modernization measures – e.g. external walls do not maintain the additional weight of the insulation material, the roof does not allow the installation of photovoltaic installations or collectors, etc.**
- **Recycling** of building materials and management of waste in the circular and dangerous (e.g. asbestos),
- The use of drones and robots in construction, e.g. in the measurement, supervision and control of building managers and foreman,
- Advanced use of GPS (e.g. for the management of the construction transport fleet).

Validation Experts input: With regard to the specific roles of the site manager carrying out the renovation work, the following were emphasized by the experts:

- increasing requirements for thermal insulation also for existing buildings, which generate the need of use other materials/ technologies;
- technologies for combining "new" and "old" materials/technologies;
- dismantling/disposal of old installations.

Conclusion: Looking for common technical challenges and barriers to be faced by worksite managers and team leaders concerned

Having identified the technical challenges and barriers faced for site managers and team leaders in all partner countries, this section summarizes the common aspects met as the basis for the new

professionalization schemes that are to be designed providing an insight for the content and pedagogical methods to be used.

- ❖ **Building energy efficiency** necessitates familiarity with new technologies and materials for both team leaders and site managers. More and more customers are looking for renovation options to improve their properties' energy efficiency, creating in this way, a new market.
- ❖ **Waste management.** Contractors and site managers face a slew of new legal obligations as a result of the Circular Economy Promotion Regulation. Additionally, it is important to have a firm grasp on the recycling potential of different types of materials.
- ❖ **Health and safety.** H&S procedures for accident and risk prevention are sometimes inefficient and bureaucratic. However, in the case of demolition projects, H&S issues generate different difficulty levels both legal and technical.
- ❖ **Digitalization.** Construction and renovation costs, human and environmental impact analysis, and efficient management of building operations are just a few of the things that digitalization of building management processes, as well as building software, data ecosystems, augmented reality, cloud-based technologies, and so on.

3.5. Identification of legal and normative challenges and barriers faced for site managers and team leaders related to building renovation sites

France

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Actions to reduce energy consumption are the first challenges and the current regulations focus on this aspect. Thus, the challenges identified are:

- energy performance of the building
- the installation of appropriate energy-efficient equipment, control, and active management of such equipment
- equipment operating procedures
- adaptation of premises to energy-efficient use and behaviour of occupants.

At the same time, renovation companies must improve the skills of their teams and be recognized as Environmental Guarantor (EGR Qualification) enabling customers to identify companies and artisans with expertise in energy efficiency and/or renewable energy.

Validation Experts input: They experts believe that additional information from the Construction Quality Agency (<https://qualiteconstruction.com>) should be considered. The Construction Quality Agency publishes, among other things, "Building pathology sheets" and texts interpreting laws likely to affect the activities of foremen and other site managers (including renovation). It is a monitoring tool to follow developments in the renovation sector.

Greece

As already stated, the building sector is of the utmost importance for energy savings. Therefore, according to the Greek government, renovations of existing buildings will be essential in reaching the energy efficiency targets. Unfortunately, the legislation is quite complex and the need to assimilate all legislative changes is evident.

Furthermore, solid waste management remains a serious as the country relies on traditional techniques of landfilling and mechanical-biological treatment for waste disposal instead of modern techniques.

It is evident that despite the initiatives and the progress that is being made, as these initiatives are relatively new, construction workers are still to obtain such knowledge in order to keep up the progress made and be able to use it in their works. Therefore, the need for specialized training is immediate.

Skills such as:

- ensuring compliance with environmental legislation – national & European
- checking the compliance of the renovation project with the existing legislation
- ensuring compliance with all legal requirements
- contract management

are considered among the most crucial.

Validation Experts input: The experts focused on some important aspects such as:

- **Previous and upcoming use of the building:** when a building is turned to an office building, special legal regulations should be considered better.
- Preservation of **traditional buildings**.

Italy

The regulatory hurdles that site managers and team leaders must face are due to the new legislation on the so-called Ecobonus 110 which provides a tax deduction for both internal energy efficiency and seismic improvements.

According to Art. 7 of the Decree Law N.48/20, "Only certified installers may carry out the installation of building elements and technical building systems". This means that installers and construction workers must be certified for Ecobonus interventions.

Adequate competence is therefore a specific requirement for professionals who install components or lay materials that have a direct influence on the **energy efficiency** of the building. This opens up **an opportunity for operators in the sector to both raise the professional level of installers** and to guarantee the real performance of the equipment or material used to improve the energy efficiency of buildings.

Validation Experts input: According to experts, one of the difficulties faced by site managers and team leaders is related to bureaucracy and key points in the Ecobonus decree. Not all workers, including site managers and team leaders, are aware of the difficulties in applying this decree law, which only concerns seismic improvement and energy efficiency works. The challenge they face is to acquire the regulatory knowledge to be able to overcome the difficulties in applying the decree law.

Spain

The energy renovation of buildings is one of the pillars of the European Green Pact and the National Integrated Energy and Climate Plan and middle managers must know and enforce the current regulations related to this in order to collaborate in reducing the carbon footprint through

optimizing the energy efficiency of buildings and the use of alternative renewable energy sources. Nevertheless, there is a need to create a “complete” legislative framework.

Poland

First of all, there are new EU and national recommendations/directives/regulations on greening buildings, increasing energy efficiency that team leaders and site managers should be aware of.

Secondly, the scope of the exam entitling to act as construction manager is too narrow. Same applies for technicians and masters in construction professions, who usually act as foreman/master.

Finally, there is a lack of generally applicable qualification requirements for masters of construction. There are problems with the non-application in employment contracts of the position of "master of construction" (there is usually still "foreman", which causes problems with the lack of supervision security in the case of inspections).

Validation Experts input: The experts added as challenges:

- variable public procurement law and price condition as the most important and very often even the only one for the selection of the tender for the execution of works

3.6. Identification of managerial/ organizational challenges and barriers faced for site managers and team leaders related to building renovation sites, including digital skills today and in the future

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France

The personal skills Site Managers and Team Leaders need are:

- Taste of the challenge: to manage the constraint and perceive it as a potential field of initiative to find new solutions.
- Sensitivity to the comfort of the client/user, whoever he/she is (person in a retirement home, child in a nursery, person with reduced mobility, etc.).
- Good interpersonal skills in complex or even conflicting situations, ability to compromise and convince (teammates, customers, hierarchy).
- Ability to manage conflict (both with companions and with hierarchy), in connection with adaptability and open-mindedness
- Perseverance and a particularly developed sense of responsibility (indispensable to manage complex situations or a search for compromise between the «modern» technical/organizational constraints and the «old» realities which are constant on this type of site).
- Strong organizational skills.
- Willingness to progress in work and ability to derive personal satisfaction from it. Determination in the achievement of objectives, quality being a personal value.
- Open-mindedness and curiosity in the work.

Validation Experts input: The experts added **RGE Qualifications** as they lead to new markets in renovation. Furthermore, "**advisory relationship with customers**" was also deemed as important.

Finally, they added:

- Well-being at work
- The quality of work
- The preservation of the aesthetics of the buildings to be renovated

Greece

The challenges identified in a managerial/organizational level are not considered as new but rather as a list that should be continuously updated based on the technological and sectoral advances throughout the years. Therefore, such skills include:

- identifying customer needs
- communication with renovation staff
- preparation of documents for renovation projects
- budgeting
- cost management
- check of building permits
- renovation document file management
- communication with stakeholders
- public procurement
- timely response to unexpected events
- staff supervision
- contract management

Further to the above, digital skills constitute a separate point of consideration, for Greece.

Validation Experts input: The experts added:

- **Efficient communication with the owners of the buildings**
- Use of non-destructive tests to determine the condition of the load-bearing structure of the building.

Italy

The new contributions granted by the Italian State on energy renovation and seismic upgrading have opened up new working scenarios, creating new opportunities for work & development.

The skills that site managers and team leaders will need to acquire in the management and organisation of work on renovation and energy efficiency sites are:

- Knowing how to allocate tasks according to workers' competences
- Knowing how to manage and maximise human and instrumental resources
- Knowing how to analyse costs
- Knowing how to choose the most suitable machines and equipment
- Knowing how to appropriately manage construction site schedules and deviations from the timetable
- Communication and interpersonal skills
- Good interpersonal skills and ability to manage conflicts (both with peers and with the hierarchy), related to adaptability and open-mindedness.

Spain

The construction sector is facing the fourth industrial revolution, characterized by hyperconnectivity, Internet of Things, microfabrication with 3D printers, robotic manufacturing, Big Data. This new reality will require managers and team leaders to increase two aspects of their training and knowledge, which until now they were NOT needed:

DIGITAL SKILLS

- Being able to obtain the information and data necessary for the work to be done.
- Being able to communicate and collaborate with other people involved in the construction process and with their own colleagues.
- Being able to create, understand, control and analyse digital content in the construction field.
- Being able to protect personal data, as well as other data of a digital nature.

TECHNICAL COMPETENCES

In demolition or "semi-demolition"; since in rehabilitation this part is crucial, and needs to be reinforced, since most of the workers come mainly from the new construction works.

Poland

Challenges constitute:

- **The increasing number of subcontractors** associated with a given construction project (dipped liability in the chain of contractors)
- Building a team of responsible professionals in various fields who can undertake the renovation of the building
- **Movement of workers from the East** (language and technological barriers), largely without directional qualifications or experienced in working outdated methods and techniques (inefficient, not ecological) and oriented towards further **migration to the West**
- The drainage of professionals: around 70% of construction companies report problems in recruiting new and/or leaving existing employees (including professionals with construction rights, and 18% of cases involve managers).

Validation Experts input: One more challenge includes the complicated public procurement law

Conclusion: Looking for common managerial challenges

As a final brief of the managerial challenges identified in the five countries, it is notwithstanding, that the problems identified at the executive and organizational levels should be viewed more as an on-going process that is constantly being improved as new technologies and sectors emerge.

Guarding the common aspects for the upcoming transnational training contents of the RenovUp project, we have:

- Good interpersonal skills
- Conflict management
- Strong organizational skills
- Well-being at work
- The quality of work
- Broad multi-level communication skills

- Cost management
- Public procurement
- Team management
- Knowing how to choose the most suitable machines and equipment
- Communication and interpersonal skills
- Being able to protect personal data, as well as other data of a digital nature.

3.7. Identification of skills needs of site managers and team leaders in building renovation sites related to health and safety rules on worksite (today and in the future).

France

The desk research did not make it possible to accurately identify the expectations of companies regarding occupational safety and health, digital skills or skills in communication, conflict resolution or customer approach. This aspect was explored in the in-depth discussions, presented in the following Chapter.

Validation Experts input: The experts believe that companies experience safety as a regulatory constraint (an obligation). Indeed, risk prevention is not integrated into the global approach (especially in small companies), nor in the daily life of companies. A clear distinction must be made between what companies want in terms of skills and what needs to be promoted in addition, such as safety, so that companies understand the interest of the approach for their competitiveness. There is need for a new managerial approach in this area, to change the perception of health and safety by small businesses.

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Greece

In the construction sector, workplace accidents are often much more serious and even fatal, even if they are less usual, in accordance with the Hellenic Institute for Occupational Health and Safety. A key contributing factor to this is the fact that construction workers are often unskilled or lack the appropriate training to respond to changes that may occur at any time in the workplace.

In every construction project, every team leader must be fully aware of all the instructions, which will be included in the Safety Measures Diary of the project, and which will be passed to each employee.

Nevertheless, the Health and Safety Plan is still being treated in a faulty way, as a simple bureaucratic procedure and not as a tool, on which the prevention of workplace accidents could be based.

Therefore, in the skills needs focused for health & safety, it should first of all be included the wide understanding of the importance of health & safety rules and how they can practically be applied in a renovation project.

Following this crucial step, other focuses should be drawn to the development of skills in:

- **Electrical hazards:** Many facilities in Greece are temporary, usually outdoor and there is not appropriate training on how to deal with them safely

- **Confined spaces:** usually when the facility includes tanks, containers, wells, etc.

Validation Experts input: The experts added the skills below:

- Asbestos and hazardous material handling
- **Space management.** Team leaders and site managers must anticipate all potential risks arising from the movement and activities of individuals.

Italy

In Italy, the training for DLgs. 81/08 concerning the health and safety of workers is very much in demand; in fact, more training hours are dedicated to safety than to professional training. We can therefore say that most site managers and team leaders have more need for vocational training than for health and safety training.

Validation Experts input: In Italy, training in occupational health and safety is very important. All workers must complete obligatory training courses according to Decree 81/08 before starting work on a construction site. According to experts, all workers are competent to carry out all works safely. However, it is very important to keep up to date with the risks associated with new technologies and the use of new materials.

Spain

Regarding H&S at work, the respected training needs of these professional profiles are well identified within the framework of the VI Collective Agreement for Construction Work. Furthermore, FLC has already established numerous training programs regarding the topic.

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Validation Experts input: In this topic the experts added:

- Being able to recognize risks associated with the rehabilitation process, since in the initial process risks arise that cannot be previously assessed.
- Make appropriate decisions and/or measures for the assurance of safety and health.
- The site manager needs great knowledge in demolition or semi-demolition processes.

Poland

All persons who supervise health and safety must have up-to-date training in health and safety at work. Therefore, the permanent training needs should include periodically renewed **OSH** training, especially for managers (every 3 years) and workers performing dangerous work (at heights, at excavations), where the period of validity of the training must be reduced to 1 year. Training in fire control, evacuation and first aid should also be a part of the permanent training needs.

Conclusion: Very different situations from one country to another

Having concluded the identification of skills needs of the two professionals related to health and safety rules on worksite, it is easy to identify those different levels of competences and preparedness and understanding existing in the five countries with some such as Italy and Spain being more advanced and others like Greece being a bit behind.

The reason of such differences concentrates on the level of obligatory education and training provided to professionals, as well as the legal aspects linked to H&S and its mandatory compliance on construction sites.

3.8. Existing training provision in relative areas/ State-of-the-art training programmes in building renovation sites

The current section describes the existing training provision in the five partner countries, in topics linked to renovation. It is considered as a depiction of the status quo in terms of VET curricula, highlighting at the same time all possible omissions and needs. Analytical presentation of each country profile can be found in Annex 8.1.

France

The training offer to target audiences is relatively extensive. It is both **initial** and certifying (intended for young people and people undergoing vocational retraining) and **continuous** (intended for company employees and for people seeking vocational retraining).

Validation Experts input: The experts advised to analyse existing training courses that focus on individualized learning and mainly in work situations, the preliminary positioning modules and modular aspects of the professionalisation pathways (and which enable the student to move away from pre-established training programs towards individualized and supported professionalisation).

Greece

The existing training relative to building renovation is considered as outdated but in the process of curricula update. It includes both initial as well as continuous.

Italy

There are training options available to the target audiences offered by Formedil. Training programs concern both initial and continuous learning while reaching EQF levels 3-5 with the appropriate certification.

Validation Experts input: In Italy there is very little training for site managers and team leaders. According to the experts, it is necessary to create ad hoc modular courses that can also be carried out also on site.

Spain

The Organic Law 5/2002 on Qualifications and Vocational Training, in its Article 7, creates the National Catalogue of Professional Qualifications (CNCP), in order to facilitate the integrated nature and the adequacy between professional training and the labour market, as well as training throughout life, the mobility of workers and the unity of the labour market, which is valid and is applicable throughout the national territory.

The Professional Qualifications included in the National Catalogue of Professional Qualifications, corresponding to the professional field of construction, and specifically to the rehabilitation of buildings include a big variety of training for all professional levels.

Poland

The vocational education system in Poland provides for the division of professions into 32 sectors. One of them is the construction industry. It comprises a total of 22 professions (26 qualifications

in total), including 8 technical level– 4th level PRK (two-qualification professions) and 16 professions at the level of vocational school of the 1st degree (formerly a primary vocational school)– III level of the PRK (single-qualification professions). In all professions, graduates receive the results of education on OSH and social competences defined in the core curriculum for a given profession. In addition, in the professions at the technical level, graduates are equipped with knowledge and skills regarding the organization of the work of small teams, which form the basis for the future work of a construction manager or foreman.

The market offers a limited pool of training courses (continuing education) for foreman/team leaders in the area of renovation. They are most often **informal training by a particular employer** and there is a relatively small training offer on free market concerning management issues. **These are trainings dedicated to specific solutions/ technologies / products (and company of course).**

4. Key conclusions taken from the desk research

4.1. Potential impact of the national legislative framework, technical & normative, as well as managerial and organisational challenges and barriers on the role and functions of worksite managers and team leaders in building renovation in the partner country concerned.

France

Since 2007, the French legislative framework for the renovation of buildings has mainly focused on global thermal renovation, energy saving (energy transition), as well as waste management on-site. This has its impact on the organization of the worksites, on the priorities to be preferred and on the way in which teams must be made aware of its aspects.

Safety on the worksite is also highlighted. Vocational training schemes in France provide for a whole range of compulsory training in this field, some of which also concern site managers and team leaders:

- Occupational Safety and Health (initiation and maintenance modules)
- Working at heights on fixed and rolling scaffolding
- Etc.

In addition, the desk research pointed out that middle managers on renovation sites face priorities such as:

- Comprehensive approach on the worksite, including management of the several trades involved
- Management of interculturality on construction sites
- Search for compromises between the new standards (environment, security, organizational modalities, etc.) and the reality of old buildings.
- On-site communication and complex human resource management (companions, relationships with hierarchy and suppliers, etc.)
- Management of unforeseen events on renovation sites

Greece

Moving towards the next Multiannual Financial framework (2021-2027), Greece puts great emphasis on the Renovation Wave with strong focus on the renovation of the existing building stock.

What should be noted though is that the **primary focus seems to be the energy consumption**.

More specifically, according to the National Energy and Climate Plan (NECP), buildings in Greece are presently responsible for around 40.0% of energy consumption. Therefore, the need is mainly focused on the improvement of the energy efficiency of buildings.

Such target is seen to be able to **be satisfied via renovation and modernization**, as well as by adoption of corresponding measures for renewing the stock of end-of-lifecycle buildings.

Within the same spirit, **energy efficient and low-emission** heating systems are given great focus. The renovation or construction of smarter buildings, with improved insulation materials, inter alia, fully compliant with the principles of circular economy are seen as one of the main targets nationally.

Italy

For some years now, and especially since July 2020 with the introduction of the Ecobonus 110, the Italian legislative framework for building renovation has focused heavily on global thermal renovation, seismic improvement, energy saving and the renovation of building facades. This has an impact on the organisation of construction sites, the work to be carried out and the skills and responsibilities of workers, site managers and team leaders.

Consequently, the legislation on health and safety in the workplace also needs to be reviewed in the light of new technologies, new materials and new materials used. This is affecting the training offer of the building schools; in fact, they are gearing up to resume vocational training especially for the correct laying of coats in order to improve the skills of all workers. Having this in mind, the skills of team leaders and site managers have also been revised, especially with regard to green and digitalisation.

Validation Experts input: On the basis of the law decree concerning Ecobonus 110, according to the experts, team leaders and site managers can only overcome by acquiring or improving their skills both from a technical and managerial point of view. To do this, the experts have identified competences that these two figures must acquire within new training paths:

- BIM-based technologies
- new green materials & their application
- new working tools
- new risks identification
- Optimal site and teams' management
- costs of renovation
- time management

Spain

At present the educational competences on vocational training in Spain fall to the Ministry of Education. To advance in the qualification of managers and team leaders of the renovation sites,

the ministry should modify all those training programs that could be affected, facilitating from the base the acquisition of knowledge for its subsequent transfer to the construction sites.

On the other hand, at labour market level, the incorporation of these qualifications should be analysed in the framework of the General Agreement for the Construction sector, incorporating these skills in the currently existing professional categories.

The huge amount of new technical and legislative normative that is ongoing, required from managers and team leaders, both a continuous training, as well as a support from their companies (as they're training). This will require an effort from all, not only managers and team leaders, but also companies and training centres, coordinating both an immediate training process and another in the medium term.

Finally, just to mention that it should be interesting to unify in single document all regulations (present and future) regarding Passivhaus, green construction, energy rehabilitation, etc., in the same way that we have already unified in Spain the different construction standards under the CTE (Technical Building Code).

Validation Experts input:

According to the experts, the large number of new technical and legislative regulations that are underway will require both continuous training and support from their business.

Finally, in the field of Public Administrations, the need for qualified technicians could be introduced into the tender requirements, in the case mostly of an energy efficiency work. This would be achieved with legal amendments that would make such incorporation mandatory in the bidding processes of the AAPP.

Poland

For site managers, there are new roles related to participation in BIM integrated processes. These are BIM Coordinator, BIM Manager, BIM Leader, BIM Modeler. This applies in particular to companies wishing to provide services to public entities (2025 is projected as the year of mandatory implementation of BIM by public contracting authorities).

Also, new national and EU recommendations/requirements for increasing the energy efficiency of construction works, NZEB (near-zero energy consumption) force construction workers to educate and know both the guidelines/ recommendations/ legislation themselves, as well as technical, technological, and organisational solutions to meet the new standards.

Growing responsibility in the field of OSH for site managers is going to be a challenge too.

Finally, more and more organizational / managerial tasks are going to be needed as well as for training in this field, including soft training.

Validation Experts input: According to the experts, on the basis of their own research work in the construction sector, the SRK representatives proposed a list of potential future market qualifications:

- Planning and implementation of measures to prevent safety and health risks on site.
- Preparation of tender documentation for works (incl. financial aspects).

- Use of innovative materials and technologies for the revitalization of buildings.
- Use of innovative materials and technologies of thermo-modernization of buildings on existing warmings requiring improvement of insulation
- Use of innovative materials and technologies protecting buildings from overheating and/or limiting heat loss.
- Manage your building and smart building team using energy from building-integrated renewable sources and local accumulation systems.
- Use of computer simulation techniques, BIM technology in all phases of building design.
- Planning and organizing sustainable construction (energy-saving architectural design, high comfort and functionality of the building, minimal impact on the environment).
- Use of reuse technologies for materials and structural and insulation elements (recovery, including recycling) in construction.
- Circular management of construction waste.

4.2. Recommendations for the training paths to be developed in line with the work situations of site managers and team leaders concerned, as well as with the skills needs identified further to the desk research

France

The desk research carried out in France shows that the very approach to training for the target audiences must evolve, both with regard to site managers, team leaders and other audiences (in initial and continuing training):

- Training paths need to become even more individualized and grounded in work-based learning. Courses not related to work situations are less and less justified, even if theoretical contributions are still necessary.
- For training to become individualized, it is essential to provide, before entering training, positioning modules which will allow to reconcile the objectives of the courses with the knowledge and skills which the candidates already possess. Thus, it is necessary to move from training programs (already existing) to career paths (adapted to the profiles and expectations of the beneficiaries).
- Another strong assumption emerging from the desk research is the recognition (preferably formal) of learning outcomes. It aims, among other things, to gain greater recognition in the company and to advance to the wage level on the scale of qualifications provided for in collective agreements.

Regarding site managers and team leaders for building renovation firms, the areas of training which appear to be the least well covered are:

- Comprehensive and systemic approach to buildings to be renovated:
 - Building knowledge and diagnosis
 - Multi-crafts on renovation sites (understanding and managing the different trades)
 - Management of unforeseen even on complex worksites.

- Integration of new environmental standards into the constraints related to renovation projects:
 - Energy renovation and conservation (elimination of “thermal strainers”), use of renewable energies on old buildings
 - Use of circular economy rules (waste management and recycling, use of recycled materials, etc.)
 - Management of work to improve air quality in old buildings
- Health and safety management on renovation sites:
 - Control of installations, materials and equipment to ensure health and safety on the worksite, in accordance with national legislation (fixed and rolling scaffolding, guardrails, use of products that could damage health, compliance with the obligation to wear safety clothing, etc.)
 - Ensures the obligation of mandatory health and safety trainings on site for all
 - Enforce health and safety standards by workers on the renovation site, using the appropriate communication
- Communication on renovation worksites:
 - With companions/workers teams
 - With hierarchy
 - With external partners (customers, subcontractors, suppliers, control teams, etc.).

Validation Experts input:

The most frequent remarks and proposals:

- The training courses must have a deep territorial anchoring because the functions of site foremen and team leaders, approaches to these functions, as well as the materials and renovation methods change from one region (territory) to another. Modular training courses must take this into account (knowledge of the methods and materials used in the given territory).
- Learning by analysing situations experienced at work is most relevant, especially to learn the globality of situations, to learn how to deal with the unexpected on site, and to communicate better within teams and with the hierarchy.
- Inclusion of training in health and safety at work, considering the specificities (organisational and situational) of renovation sites, as part of a global approach on site. Promote health and safety not only as a regulatory constraint and an additional cost, but as an investment that avoids expenditure following on-site accidents.
- Impact of the life cycles of materials on the environment: during their installation, operation and destruction (link with the circular economy).
- Mastering the impact of techniques and materials in the given territory and climate (because a lot of poor workmanship comes from a bad use of materials and renovation techniques in a poorly mastered context). Impact of the life cycle of materials.

Greece

The shortage of skilled labour in the broad construction sector continues to be a major concern for Greece which during the latest years, has presented one of the **lowest rates of dedicated investment in education, skills and employability in the EU.**

As a response, the Greek government has planned to make a **direct link between vocational education, training and lifelong learning and the labour market**, by committing to invest more in creating skilled workers and craftsmen in the construction sector via also involving the social partners of the sector.

Within the above framework, recommendations for the necessary training paths to be followed for team leaders and site managers are the following:

- Integration of the latest environmental standards linked to renovation projects
- Energy renovation and energy saving
- Application of circular economy rules
- Knowledge of construction materials and how they can be recycled
- Application of health & safety management
- Global and systemic approach to buildings to be renovated:
- Project – Financial and Time Management
- Communication skills with all relevant stakeholders

Validation Experts input: The experts agreed with the findings and added:

- Renovation specific national certification concerned with BIM, energy saving, sustainable material and fabrication techniques.

Italy

The study carried out in Italy highlights the need to renew the training offer by creating ad hoc courses where hours of practical training and on-the-job training are favored.

For this reason, the training on offer should provide for more individualized training paths that are better anchored in work experience ("work-based learning"). It should provide for recognition of learning outcomes in order to achieve better recognition in the enterprise, to advance workers, site managers and team leaders and to improve European mobility.

Validation Experts input: Experts agree on the creation of modular training courses for site managers and team leaders. These courses should include hours of practical training and encourage work-based learning. These training courses should include the recognition of specific competences which could also be recognized at European level in order to facilitate the mobility of workers.

Spain

The introduction of regulations related to energy efficiency, circular economy, waste management, prevention of occupational risks, quality, and the environment, is generating the appearance of new competences that affect the person in charge of applying, coordinating, monitoring and control them in renovation works. Therefore, the training paths of these professionals should consider aspects such as:

- Control of the work process
- Analysis and control of the execution of shoring and demolitions, humidity, foundations and floors, walls, as well as wooden, reinforced concrete and steel structures,
- In conservation and restoration works, legislation and regulations, continuous coatings, ornamental elements

- Innovation in building structures.
- Innovation in building envelope, partitions, and finishes
- Acoustic conditioning
- Air conditioning
- Accessibility
- Energy efficiency
- Construction waste management
- BIM
- Drones
- Communication and conflict resolution skills

It is necessary to integrate in the practical training processes principles such as circular economy, use of new materials, H&S and energy efficiency.

The sector is facing the biggest change to date (change from new construction to rehabilitation, passivhaus, circular economy, new technologies, energy efficiency and legislative changes). Both the manager and the team leader will need great agility in handling new information and specific work data.

Validation Experts input:

A new training aspect should also be added for both profiles:

- Multimedia knowledge, video conference, online transmission of information packages (compress / decompress files).
- Management of office type packages (text editor, spreadsheets).

Poland

The recommendations are:

- Short practical training in workplaces (and during work) for active construction managers and construction masters (foreman/team leaders)
- On-line training (theoretical modules e.g., on legal framework, national and EU policy)
- Offer of so-called Additional Professional Skills (DUZ) for current students of SBI industry schools and technicians

Validation Experts input: The experts made a few additional comments:

- The most valuable are training courses finished by specific recognisable certificates/permissions (like certificates of Energy Regulatory Office, Office of Technical Inspection), sectoral certification is also valuable,
- Teachers for theoretical and practical vocational training, employed in vocational training schools, are required to improve their qualifications by participating in industry training in three-year cycles, 40 hours per cycle (organised by the head of school) - it could be a chance for RenovUp training offer.
- Other potentially interesting subjects of training offer for both site managers and team leaders:
 - negotiations with the client (investor),
 - training on changes in the law regulations applicable in the construction industry, incl. EU regulations.

Recommendations taken from the desk research for the development of the planned training paths at transnational level

As a final step before proceeding to the next methodological step of the field research, there are some recommendations gathered, which could be used as a guide for the development of the planned professionalisation training:

- There is a pressing need for training programs to become even more customized and work based.
- Prior to enrolling in training, positioning modules must be provided, allowing the course objectives to be reconciled with the information and abilities that candidates already possess.
- Recommendation for the creation of ad hoc recognized courses where practical training hours are preferred
- The training paths to be designed should teach professionals how to cope with unforeseen situations on-site and how to communicate more effectively with colleagues and clients.
- Renovation sites should be approached globally, with health and safety training taking into consideration the specifics of each site (both organizational and situational).
- The circular economy is an element that should be included in the upcoming training paths, as it is linked to the installation, operation, and destruction of materials' life cycles.

Having concluded the desk research and its validation by the experts, we proceed to the field research where these findings will be verified and expanded upon.

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5. Transnational field research: Methodology

After the desk research, each project partner proceeded in organizing interviews with renovation as well as VET experts to discuss the current status of renovation activities in their country, the profile of the team leader and site manager in terms of expected evolution and possible gaps of skills and competences as well as the level of professionalization expected by the companies and the methods they follow, to cover their staff' training needs.

The target set for each country, as stated in the RenovUp proposal, was up to fifteen (15) experts per country with at least five (5) more experts validating the results retrieved, online or face to face, following a questionnaire prepared in advance and validated in common. A guide for interviews was prepared by PEDMEDE, validated in common and distributed to the partners.

The questions were open and adjustable to the profile of interviewees (mainly company managers, but also experienced worksite supervisors and team leaders), contacted directly by the project partners. The interviewers were training experts either directly from the partner organisations or from training centres that offer professionalisation programmes addressing the target groups concerned by RenovUp. Each interview lasted from 1 ½ to 2 hours and was composed of two parts.

Part one: Analytic questions

- (1) Profile and activities of the companies having participated in the survey.
- (2) Essential and sustainable change observed at renovation worksites during the last years.
- (3) Role and profile of site managers and team leaders at renovation worksites observed through work situations.
- (4) Criteria of professional performance of site managers and team leaders listed by interviewees (when preparing, executing and checking the quality of renovation).
- (5) Managerial and organisational challenges/barriers and corresponding skills required from renovation site managers and team leaders, including digital competences today and in the future, with examples of concrete work situations.
- (6) Technical challenges/barriers and corresponding skills required from renovation site managers and team leaders, including energy saving and circular today and in the future, with examples of concrete work situations.
- (7) Legal and normative challenges/barriers and corresponding skills required from renovation site managers and team leaders, with examples of concrete work situations.
- (8) Health and safety challenges/barriers and corresponding skills required from renovation site managers and team leaders, today and in the future, with examples of concrete work situations.
- (9) Global opinion on the skills and competences of site managers and team leaders, necessary to face current and future challenges within their specific professional contexts. Identification of the most appropriate learning forms and training paths suggested by the interviewees.
- (10) Identification of the recruitment difficulties and methods practiced currently by the companies interviewed to find appropriate site managers and team leaders for renovation sites.
- (11) Identification of the ways in which the companies interviewed cover their training needs addressing site managers and team leaders, in line with current and future evolutions.
- (12) Identification of the main skills likely to be improved by site managers and team leaders concerned through their further (incl. in-job) training.

Part two: Synthesis questions

- (1) Identification of the work situations in which the role and functions of worksite managers and team leaders in building renovation evolve in the most significant way (in the partner country concerned).
- (2) Recommendations for the training paths to be developed in line with the work situations of site managers and team leaders concerned, as well as with the skills needs identified: Verification and further development of the hypotheses identified during the desk research.

The outputs of the field research were validated and enriched through national focus groups of 5 to 10 experts attending to 1 or 2 meeting(s) face-to-face or online. They were employers of buildings renovations works in the construction sector, VET representatives, site managers, team leaders and specialists in training engineering.

In the following part, a summary of the information collected is presented per country. The respective national reports can be found in Annexes 8.1 to 8.2.

6. Key findings reached through the field research

Despite the many variances between the interviewees, the partners indicate consistency in their national reports, as **each partner country experiences similar challenges and opportunities in the field of renovation and the required skills** that site managers and team leaders should obtain in order to fulfill companies' expected professionalization from them.

Since the very goal of the RenovUp program is to professionalize site managers and team leaders in the specific management of building renovation sites in Europe, the interviewees were called to answer what change they have observed at renovation worksites during the last years and, therefore, what is the context in which the RenovUp project should be placed.

Because the RenovUp's main goal is to design well-profiled professionalization paths for site managers and team leaders, interviewees were asked to describe what changes they've seen at renovation sites in recent years and, as a result, to lead the partnership to build up training schemes matching the market's expectations.

Within the framework of the new European initiatives and targets such as the Green Deal and the Renovation Wave, **new environmental criteria have been born in terms of energy efficiency, new materials as well as digitalized tools used in renovation works that appear to be the main drivers of change in the field of renovation works in all partner countries.** It was **unanimously noted** by all interviewees that **clients are increasingly becoming more demanding and informed about new materials and techniques regarding renovation works for their property leading to greater interaction with site managers and team leaders.**

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It seems that due to these changes the **overall function of the two profiles is being re-shaped** with partner countries focusing on different aspects. Indicatively, France, Italy and Poland put a lot of attention on safety regulations in worksites while, adequately, Greece and Spain on new waste management rules.

The next step was to define the new role of the site manager and team leader on the building renovation worksite and the respective skills needed in order to be able to perform their activities.

As a general observation, in all five countries, the site manager is described as the representative of the company on the site. **Site managers are the administrators who are in charge of organizing the entire site.** They **supervise the team leaders** and are in charge of the overall project's timeliness and smooth progress.

Team leaders on the other hand **are the leaders of the technical team.** They have to coordinate their team, supervise its work, assign tasks according to each workers' skills in order to optimize the efficiency of the group. Furthermore, they have to be experienced and skilled technicians themselves.

Regarding site managers, a **minor level of distinction is observed in terms of his/her responsibilities** as, rather than being only a managerial figure, site managers also appear to be involved in technical aspects of the work as well. Spain and Greece indicate that conducting quality control falls into their responsibility, while in Italy, (s)he is in charge of material and equipment delivery.

An important factor discussed in the interviews has also been the **correlation of the two roles** since in France, Spain, and Poland the two functions appear to overlap in small projects and businesses.

In accordance with the role of the site manager and the team leader, the interviewees from the companies were called to give their opinion on what is valued as criteria of good professional performance.

The findings in the five countries are quite **similar for site managers** and can be summarized in:

- good organizational and planning skills,
- ability to coordinate workers and
- having technical knowledge, sufficient to inspect the materials and equipment.

Additionally, **in France**, a quality that is particularly valued is the **ability to foresee hazards from the start of the project**. The **use of 3D tools** is also appreciated. **In Italy & Spain, knowledge, and ability to apply health and safety rules** is considered important, while **in Poland, the behavior of the site manager towards the workers, the clients and the company** is considered an essential skill.

The criteria for team leaders are also common:

- Technical responsibility of the site
- Team supervision
- Communication with the managers/clients
- Application of safety rules

Due to the role of the site managers and team leaders, managerial challenges are constant. Moreover, **digitalization is another driver of change bringing further challenges to the two roles as both site managers and team leaders are called to develop and evolve digital skills starting from horizontal** i.e., being able to prepare spread sheets **to specific** i.e., understand or use digital tools such as BIM.

The role of younger professionals in combination with the overall sector attractiveness was also a matter of discussion. In countries such as Greece and Poland the **mobility of skilled workers** has affected the renovation sector heavily as unskilled migrant workers came to fill the gap while younger generations tend to avoid the construction sector as a career path in favor of more managerial positions. On the other hand, **younger professionals** tend to be **more familiar with the latest trends** and requirements of the sector, but they lack experience, which is usually held by **older professionals** who, from their part, **lack the ability to change** the traditional norm of their work in the view of the latest developments of the industry.

When it comes to technical issues, **new materials and techniques are considered as a significant challenge for the two profiles**. The function of new materials extends from the point of their specific characteristics and their installation to their strength and recycling in all types of renovation works. All five countries emphasized on the need for both profiles to develop their knowledge and skills in regard to such materials which is also linked to the overall concept of circular economy that in countries such as Greece and Italy is not yet enhanced.

Within the rest of challenges discussed in the interviews, the new EU regulations as well as normative barriers related to the site managers and team leaders' work were also discussed. From its side, **Greece** reported that both team leaders and site managers are **not fully aware of the new EU directives and the challenges they bring to their modus operandi** while, Italy, Spain and Poland focused more on the constant changes of the regulations that creates frustration to site managers and tam leaders as they fail to keep up. France discussed the necessity of site managers as well as team leaders to be able to understand and then apply & comply with health and safety rules and focused on the role of the companies to assure that their staff is adequately informed.

Finally, on the very important issue of health and safety, the interviewees were called to answer about the difficulties that arise. France reported that the most dangerous situations that call for site managers and team leaders to be able to manage concern shoring and demolitions, while Greece such hazards are associated with electricity and confined spaces. In Italy, **health and safety regulations constitute a rather crucial aspect of the responsibilities of a site manager and a team leader**. Partners from Spain report a similar situation as in Italy while, positively enough, in Poland the findings indicate that health and safety rules are f respected without setting significant challenges. **As a general observation, both profiles need to know the current legislation and national health & safety regulations in order to be able to use them in the renovation site.**

Having covered different aspects of the two profiles, the interviewees discussed the demanded skills for the two profiles. To begin, it is necessary to state that amongst all countries there is a satisfying level of agreement on the necessity of skills that are linked to:

- safety and health management,
- financial and time management,
- organizational and technical specificities
- multi-level communication and team management

Moreover, France seems to also prioritize **soft skills** linked to the organization of responsibilities, the clarity of hierarchy leading to the reshape of the team leader to a more autonomous figure in the construction. On the other hand, Italy and Spain urge for **more technical skills** for both profiles. These vary from **knowledge about innovative and recyclable materials** to **digital and technological skills** also related to the use of tools such as BIM and AutoCAD. Poland and Greece weighed a lot on the use of such tools differentiating on the actual use needed by each profile.

Furthermore, the interviewees discussed about the methodologies used by companies for recruiting site managers and team leaders. All countries agree that **finding employees capable of undertaking the responsibilities of the two role is hard**. In France, Italy, and Spain the roles are filled mainly through **internal promotion**, while Greece and Poland further discussed the mobility of workforce, with Greece also adding the topic of relocation since workers tend to turn down a job offer if the work site requires them to relocate.

Moving further to the re-skilling and up-skilling of the targeted profiles, all countries agreed that **training schemes are rare in small companies**. Both site managers and team leaders usually get trained in informal ways and more specifically via **“learning by doing”** while watching more experienced employees in the field. In addition, some partners like Poland and Greece also point out the use of self-paced learning methods as a method of personal professional advancement

chosen by workers. Even though in all countries VET training schemes do exist, the **need for continuously updated curricula that contain a significant dedication of learning hours in practical experience and real working environment cases** constitutes the most obvious choice by all partner countries so that **a high professionalization level is achieved**.

The following chapters present in details the main findings, topic per topic and country per country.

6.1. Essential and sustainable change observed at renovation worksites during the last years

France

The main factors of evolution noted by the interviewees include:

- Thermal regulations,
- Appetite for thermal comfort,
- Knowledge of new technical solutions,
- Widening of the choice of materials,
- Regulations related to accessibility,
- Safety regulations
- Technical innovations,

The adequate changes identified include:

- Improved work quality as a result of machinery renewal: Businesses are upgrading their machinery and trucks in order to provide their employees with greater daily comfort.
- More attention to health and safety: developments in terms of protection, use of modern machines and facilities to reduce the number of accidents.

However,

- Need for better time management as haste leads to malfunctions and lowers the quality of work.
- Clients are increasingly aware of the new standards and are becoming more demanding.

Validation Experts input: The following points are further changes observed at renovation working sites:

- Increasing complexity of renovation worksites due to profound changes with multiple consequences, such as a focus on high value-added activities (design, management, supervision on renovation sites) and increased subcontracting of work execution activities.
- The emergence of new business segments, such as energy renovation and intelligent buildings.
- Increasing number of interim and non-skilled workers in companies.
- Increase in internal procedures both administrative and financial.
- Introduction of new processes as a result of the obligation to recycle waste.

Greece

The most important changes observed are:

- Site managers and team leaders' inability and lack of knowledge regarding the renovation of older and cultural buildings while maintaining cultural values within the framework of new techniques and materials.
- Some of the materials now used are not that durable than other traditional ones which usually leads team leaders to opt out for durability
- Technical barriers regarding the recycling of materials as there are still no concrete guidelines developed by the respective public authorities
- The clients/building owners are becoming informed and more demanding regarding issues and methods of renovation which provides them with a strong opinion regarding what works they would like in their space
- Costs have been significantly raised as different materials are used as well as new technologies

Validation Experts input: Both team leaders and site managers see recycling of materials and waste management as a topic that needs to be further developed in their organizations. In order to achieve this, the experts concentrated on the very essence of new materials and construction techniques: counter bricks, YTONG Blocks, and Bulk bricks are considered to be among the most important materials currently used in small-scale renovations across the country. More experienced professionals, on the other hand, are more likely to put off learning and adapting a new technique out of fear of being out of the loop due to a lack of knowledge, as well as to save money and time.

Italy

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Main factors that bring change:

- new technologies and new materials
- digitalisation
- dissemination of safety culture in the workplace

Respondents emphasized that technological skills are among the factors that have facilitated the evolution and change in the sector, and they emphasized the importance of digitalisation in their responses. This is due to the fact that the construction site is constantly updating and evolving, and as a result, workers who want to keep up with the pace must possess specific skills in these areas. Another factor that has contributed to the evolution of construction sites is the factor of safety: not only the knowledge of simple regulations, but also the dissemination of a safety culture among construction workers.

Overall, environmental awareness (reuse and recycling of waste materials, investment in environmentally sustainable materials, use of renewable energy) and continuous updating of workers' skills on new green materials and their environmental impact are the factors that contribute to long-term change on construction sites.

Validation Experts input: Experts added as a change the anti-Covid regulations which have introduced new safety procedures and new working methods slowing down work processes on construction sites and causing prices to rise.

Spain

A major change has been observed in Spain during the last 10 years as renovation works moved from conservation purposes to energy rehabilitation which greatly improves the quality, comfort and habitability of buildings. Energy rehabilitation is not about improving sustainability, but also about improving comfort and health.

Another factor that influences new rehabilitation work is the use of renewable energy systems (pellets, aerothermal, geothermal, and solar panels), which allows for the construction of more environmentally friendly structures.

A significant increase in the budgets allocated to rehabilitation projects has also occurred, as has a significant shift in the technology that is being used, such as ecological construction, energy reuse, PassivHaus and other green building technologies. The concept of circular economy is also a recent development.

There has also been a shift in the way buildings are being renovated, with the incorporation of new materials and installation systems related to thermal insulation being among those that have been observed. Additionally, all of the carcinogenic insulating materials that were previously used are now being replaced with safer alternatives.

Furthermore, site managers are less and less on site. The site manager keeps track of time and money for various sites, while greater responsibility has been transferred to the construction managers. The current trend is to use subcontractors who are specialized in a specific subject. The manager supervises the outcome of the work but do not have the knowledge for specialized work and do not conduct it either.

Poland

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Points of change observed:

- A work culture based on job security is being developed (in conjunction with the growing insurance system)
- The quality of works is increasing
- Execution of construction works based on many subcontractors
- New efficient technologies and modern materials, but also more expensive
- Building structures are generally lighter & less durable
- Renovations of older houses call for horizontal renovation works
- Poor practical preparation of new graduates
- Claims of young workers
- More and more women in construction professions

Validation Experts input:

The experts added the following:

- Customers in Poland are increasingly demanding and therefore more specialization is expected from site managers and team leaders
- Internationalization of the Polish construction industry
- Return to the use of prefabricated technology, which is rated as extremely simple and fast to implement

6.2. Specificity of role and profile of site managers and team leaders at renovation worksites observed through work situations

France

On small construction sites, the roles of site manager and team leader are frequently very similar in nature. Both must be well-organized, methodical, and orderly in their approach. When it comes to large sites, these functions are kept separate.

Site manager

(S)he is an organiser, an administrator and an operational person on the site, the right-hand man of the company manager. (S)he is in contact with the client, the architect and all professionals involved on the site.

(S)he has the status of a technician (middle management). (S)he manages 1 or 2 team leaders. He/she supervises the day-to-day running of the site and deals with 1st level problems (reported by the team leaders). He/she maintains the motivation of the teams despite the difficult site conditions, must have a very high technical level, know how to manage unexpected and recurrent situations on renovation sites, and ensure the management of the teams' skills at the right time on the site.

Before starting a project, he/she must have a theoretical knowledge of the project to better prepare it, and then mentally project himself/herself into its realization.

Main tasks and responsibilities:

- He/she intervenes from the outset to understand the site from the start (access to the entire file: planned works, orders, etc.). Visits the site also upstream to transmit all the information gathered from the manager, the client and the architect).
- He/she is responsible for optimising time by preparing the site properly.
- He/she follows the progress of the site, organises site meetings, manages the interface with the other trades without being the project manager.
- He/she is responsible for supervising and communicating with the teams on site, which is essential for the quality of the organisation and the work. Without good communication, there are malfunctions on the sites.
- He/she must ensure that his teams are safe.
- He/she is the link with the client.
- He/she is aware of the financial aspect and the fact that each decision, each problem has an impact on the profitability of the site.

Team leader

In the field, the team leader often works in pairs with a second in command. In addition, on small sites, they often have responsibilities as site managers. The team leader is the first level of responsibility and has the status of a highly qualified worker. The team leader is the operational reference for his team on the site, but he is not the one who manages the complex problems. Nevertheless, he must know how to manage his team and have good interpersonal skills (with his team and with customers).

Main roles:

- He/she participates in the technical responsibility of the site.
- He/she supervises the work of the team (up to 15 workers): he participates in the planning of tasks.
- He/she is responsible for reporting.
- He/she ensures communication with the managers.
- He/she ensures that safety rules are respected and applied (even if there are still too many omissions, especially for tasks of very short duration).

In addition, the more responsible and autonomous team leaders can manage orders and supplies.

Greece

Team Leader

- Time Management: Ensuring the timely completion of the renovation project, flexibility in unforeseen changes and issues risen.
- Overall Management: supervision of the project, the team, the (financial) resources and clients/building-space users
- Quality control: planning & scheduling of the activities, quality check in all activities, resources and staff involved in the renovation project what cost and at what quality level.

Site Manager

- Supervision of works of the renovation team (mechanical, installation, application)
- Communication: ability to successfully communicate with the team as well as the client-building users regarding renovation techniques and materials in order to balance what they want to achieve with what can be done in the renovation space, taking into account costs, efficiency and time.

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Italy

The role of the site manager today

- (S)he has a key role for production in construction: a construction company can only survive by having good site managers.
- (S)he is a professional figure who organises the daily activities and scheduling of works.
- (S)he is a good communicator with good technical knowledge: (S)he knows safety regulations, can intelligently assess economic issues, defines the workforce and manages the supply of materials and equipment for the work.

The role of the site manager in the future

- (S)he will have to play a central role in the construction industry, but as well (S)he will have a better knowledge of IT systems in order to be able to use drawing and accounting programmes and also BIM.
- (S)he should be a central figure for the new generations of workers.

Due to the evolution of the sites linked to environmental sustainability and the introduction of new technologies, the role of the team leader is shaped as such:

The role of the team leader today

- The team leader must know and intervene directly in all the work phases. (S)he must know how to distribute work activities correctly, considering workers' skills and workloads.
- (S)he must be a point of reference for the whole team: (S)he must be a leader.

The role of the team leader in the future

- (S)he will have to be more informed about materials, dry system technology and the use of IT tools.

Validation Experts input: About the role of site manager, the experts believe that the site manager must be a good communicator and have good interpersonal skills. For the future, the site manager should continue to have good interpersonal skills in order to manage relationships with all the figures on the site and to manage optimally the conflicts that can be generated; (S)he should be available to the continuous updating of his/her skills. For the experts, the site manager does not have to be a BIM expert but simply has to have the knowledge to be able to read and understand BIM files. This knowledge also depends on the degree of familiarity that the site manager has with the technology, so it would be necessary to adapt ad hoc training courses based on the administration of an entry questionnaire.

About the team leader, the experts stressed the importance of continuously updating the skills of the team leader (continuous training). As the construction site of the future will be a smart construction site, all workers involved must have digital skills and be able to read technical drawings. In addition, the team leader must have good coordination skills.

Spain

In a low-volume work, the manager and the foreman are hardly distinguished and, in general, the manager is responsible for everything; However, in a work of greater volume in the execution phase, there are more people in charge who are divided into roles, such as the project manager, the project manager and the head of each of the teams (foreman).

The site manager is the one who manages the entire site.

Functions of the site manager:

- Team Management
- Organization of and good professional knowledge on the pits. Avoid discontinuity of works, optimize yields, detect pathologies, prioritize tasks and duties,
- Interpret planning of the work (specification) and make sure works run in time at the required level of quality.
- Detection of pathologies in all types of materials. Consult with the technicians on how to proceed in each case.
- Knowledge of control tests that are carried out on different materials such as wood, concrete.
- Responsibility of quality and prevention: it controls that everything that is specified in the quality and prevention sheets is taken into consideration when the work is being carried out.

- Knowledge of all various applicable regulations. Urban regulations of each building, loading and unloading hours, waste management, discharges to public roads, treatment of dangerous substances are some examples.
- Prevention of occupational hazards.
- Good communication skills. Understanding of clients, adequate communication with those that are in his/her command and those that are superior to him/her (engineers, architects etc). Permanent communication with the project manager.
- Digital skills to transmit incidents in the shortest possible time.
- Logistics skills: Organize, order and control the receipt of orders for materials, optimize the cost of shipments, control delivery notes, check quality certificates, check condition of product / material / machinery delivered. Manage materials in terms of circular economy and cost minimization.
- Control of demolition, shoring and shoring processes.
- Readiness in unforeseen events that arise in the rehabilitation works.

Roles of team managers / foremen

- Coordination of the group of people they oversee. Assign tasks according to the competencies.
- Perform quality control of the work, monitor safety of equipment, measurements.
- Find solutions in case of encountering pathologies or unforeseen events, alongside with the site manager or directly with the technician.
- Communication with the work manager.

Poland

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The site manager has to face more organizational challenges (e.g., restrictions on the site space e.g. equipment maneuvering, material storage; noise restrictions at certain times of the day);

Both managers and foremen/ team leaders carrying out renovation work should have a special feature:

- Adaptability - the need to react quickly but also professionally to unforeseen situations / problems (e.g., wall play, structural violations, errors in installations);
- Readiness for unpredictable thing during the implementation of works, element of surprise, uncertainty accompanying work (above all, as to time, costs)
- The ability to reduce costs while maintaining the quality of the final product.
- Flexibility – ability to adapt to a changing situation, ability to cope with situations of constant uncertainty.
- Assertiveness, ability to negotiate with the client, argumentation and persuasion to change opinion (e.g., to choose a better technological solution or material for better efficiency);

Validation Experts input: The experts added the following:

- The specificity of the role of the site manager is due to the scope of the works and the size of the rebuilt object, in Poland these are so-called independent technical functions (requiring appropriate entitles), for which strict legal regulations on the scope of responsibilities and responsibilities apply;

- The responsibility of the site manager is very high, the manager is responsible for the entire construction, even for the designer's mistakes, over which he had no influence.

6.3. Criteria of professional performance of site managers and team leaders listed by interviewees (when preparing, executing and checking the quality of renovation).

France

Performance criteria for site managers:

- Ability to respect prices and deadlines.
- Anticipate material and equipment requirements.
- Anticipation of human resource needs according to the objectives and directives defined by the managers.
- Ability to project mentally and anticipate hazards, to organize before starting, to define who does what.
- Ability to validate with the client the work to be done before starting.
- Respect for the phasing of the work, in connection with interactivity on site.
- Ability to organize, control and give responsibility within a collective production framework.
- Good knowledge of and compliance with standards and regulations.
- Ability to impose cleanliness and safety on the site.
- High degree of adaptability to technical and organizational surprises induced by the renovation.
- Good interaction management.
- Ability to negotiate with suppliers.
- Commercial capacity.
- Ability to assess the financial impact of any action taken on site and of any decision taken.
- Awareness of the specificities of renovation sites: use 3D tools to show them to workers.
- Technical mastery and quality control: measurement indicator of a quality site = Zero after-sales service.

Performance criteria for team leaders:

- Maintaining cleanliness on site.
- Respecting safety standards on site.
- Management of technical surprises caused by the renovation.
- Ability to motivate staffs and create team cohesion.
- Good vision of the other trades and the different interactions.
- Professional curiosity (particularly useful on renovation sites).
- Ability to organize, control and give responsibility within the team.

Validation Experts input: Additionally, according to the experts, there has been a shift in the distribution of activities and skills between site managers and team leaders. The gap that separates the two functions is growing wider. The site manager must be proficient in using a

computer system to manage material orders, maintain a daily site journal, and organize safety meetings every morning, among other things. This is added to the daily routine, and performance means being able to articulate everything while not losing sight of the important things.

Greece

Team Leader

- Ability to assign tasks to team members.
- Ability to work within budgets and effectively manage team finances.
- Ability to monitor and evaluate the performance of the team.
- Ability to assure that work is done on schedule, at a high level, and in accordance with health and safety regulations.

Site Manager

- Ability to coordinate, supervise and schedule the activities of workers engaged in the construction and repair of buildings and structures.
- Ability to determine construction requirements and planning procedures.
- Ability to organize and coordinate the material and human resources required.
- Ability to examine equipment and construction sites to ensure that health and safety requirements are met.

Validation Experts input: The experts added two points on this topic:

- Team leader: Increased administrative knowledge: Focus on the necessary permits needed that guarantee that all building regulations are fulfilled, such as adding an addition to a house or tearing out and rearranging inner walls.
- Both roles: understanding the difference between renovating & remodeling: Remodeling is frequently the only option when a property is badly planned. Poor design is more common in older dwellings built before rigorous building standards were enacted.

Italy

Both site managers and team leaders are evaluated on many work aspects. The most important ones can be summarized as follows:

- Ability to assess the quality of work performed
- Logistical and organizational skills
- Ability to manage unforeseen events and keep the timing of work under control.
- Ability to read and understand technical documents.
- Communication skills.
- Ability to apply occupational health and safety legislation.

Spain

Site manager / Site preparation phase

- **Ensure safety conditions** of the work are adequate
- **Thorough planning of the work.** This includes coordination of the personnel, assign tasks, place orders, have the materials available on time.

- **Identify the right materials**, suitable for the specific case of rehabilitation. In a large work there will surely be a project manager, or a surveyor, or an architect, but in a small work a technical direction so high will not be available and the site manager needs to take these decisions.
- **Plan the assembly of auxiliary means** for the works. This entails the greatest risk for workers because there are jobs at height.

Site manager / In the execution phase

- **Ensures safety conditions** remain adequate.
- **In the case of demolition: important safety issues** are raised greater than before.
- **In medium or small works: plans in advance materials and equipment** to guarantee safety.
- **Controls and monitors each of the pits** that are in the work and assign tasks to the workers, taking into account the capacities of each one of them to optimize times, guarantee the quality of the work and minimize risks.
- **Problem solving.**
- **Proposes improvements at all times.**
- **Good communication skills.** The site manager must be capable of reporting problems that come up in the construction site.
- **In energy rehabilitation: knowledge about the insulation.**
- Ensures there are **no pending issues** and works in each stage of the project that could lead to repetition of works.

Site manager / In the quality control phase

- **Controls the quality of the service.**
- **Supervises the works** in accordance with the agreement with the technicians.
- Coordinates the **removal of those elements that are no longer needed** at the end of the project or at the end of each stage of the project.
- **Daily check that different standards are met.**

Team leaders / foremen

- Ensures that the officers and laborers are well equipped with personal protective equipment.
- Anticipates problems and communicates them to the site manager.
- Optimizes human resources. Coordinates operators according to their qualifications and skills.

Poland

Site managers are primarily managers, the measure of their professionalism is:

- Competence in the field of optimization in the layout: expenditure - time - quality of work, that is, ensuring a balance between the workload of the teams involved (working time), the quality of the work performed and remuneration,
- Safety during construction work,
- Credibility in the opinion of customers and employees,

- High sense of responsibility,
- Conduct in accordance with professional ethics (including professionalism, punctuality, punctuality),
- Organizational and negotiating competences - coordinating the work of the various teams involved in the renovation,
- Readiness to follow technical, technological, material news, but do not need to know everything; site manager should benefit from the experience and expertise of their foremen,
- Building a relationship of mutual respect and trust between management and employees.

Criteria for professionalism of **foreman / team leader** in construction sites:

- Professional experience (professionalism), arousing respect among colleagues, but also allowing to make current (often fast) decisions,
- Communication and ability to manage the team,
- Organizational skills,
- Application of the principles of professional ethics (the success of small companies is determined by "whispered advertising"),
- Tasks performed reliably, in accordance with the construction art,
- The quality of work at a high level, in accordance with the manufacturer's recommendations,
- Customer satisfaction with the work performed,
- Dealing with situations of surprise, acting under time pressure,
- Ability to argue, negotiate, convince (especially the client) based on professional experience, and sometimes contrary to the design or vision of the client.

Validation Experts input:

The experts added the following for both profiles:

- Readiness for continuous learning
- Customers often want to compare parameters and prices of different solutions, expect reliable and immediate advice

6.4. Managerial and organisational challenges/barriers and corresponding skills required from renovation site managers and team leaders, including digital competences today and in the future.

France

The main challenges related to the management and organization of construction sites concern the **anticipation and adaptation** of site managers and team leaders. Anticipation of the duration of each stage of the project. Adaptation and reactivity in relation to technical constraints and staff absence constraints.

Health and safety on site: The need to comply with all safety standards, which requires prior information.

Digital skills are increasingly necessary and used in site management, especially for organising joint work and sharing information.

The preparation of the work will have to be better organised and planned, especially by the team leaders: drawing up a very detailed and better controlled schedule, with forecasts of the human resources needed and the material supply requirements, as this avoids asking too many questions during the execution.

The biggest challenge: to achieve **zero defects**.

Work situations where difficulties are encountered

Difficult situations for site managers and team leaders:

- **Communication with clients:** lack of mastery of communication techniques. It is also a problem of posture: a major source of conflict in situations of contact with customers, especially when there is a difference (often seen on renovation sites) between the work prescribed and the work carried out.
- **Tensions in relationships** (with work supervisors, manufacturers, workshop managers, customers, etc.): in work situations, site managers and team leaders often pass the buck.
- **Managing work situations by being flexible and able to adapt to unexpected cases** (late delivery, absence of workers, etc.). For example, delays on sites generate pressure for team leaders (cascade of delays taken by all the trades). This phenomenon was accentuated during the COVID period and the shortage of materials.

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Difficult situations for site managers:

- **Managing the interactions between the different trades** and the problems of phasing between the different interventions. Impact on deadlines, which are increasingly constrained and require the industrialisation of certain processes in work situations.
- **Choosing right criteria and right moments to control production and to ensure quality and safety**, to question oneself, to ask for help, to anticipate and to adapt the production process to the quality requirements agreed with clients and with the hierarchy.

Difficult situations for team leaders:

- **Managing absences** (especially those that come at the last minute).
- **Management of high-risk professional situations** from a safety point of view
- **Management of unforeseen events on a daily basis**

Validation Experts input: When it comes to the challenges that must be overcome, experts believe that there is too much emphasis placed on new technologies and not enough on the reality on the ground. Workers, even in small businesses, become disempowered, refusing to make decisions or take risks, and instead delegating decision-making to site managers and team leaders.

Greece

Once more, the increased awareness of the clients regarding new renovation technologies and materials was stressed. This situation has generated some corresponding skills that lie within the managerial – organizational barriers as usually renovation workers are asked to explain simply matters that are too technical:

- General communication skills
- Successful identification of clients' needs
- Successful communication with stakeholders

Other skills also mentioned that lie in this category are:

- Cost and Financial Management
- Managerial and administrative check of the building – renovation site: permits, audits, documentation file
- Time management

Validation Experts input: The experts pointed to the need for increased digital skills and knowledge of systems such as AutoCAD and BIM. Even though not highly used in small scale renovations, they are considered as an asset especially for site managers.

Italy

Managerial/organizational challenges and barriers

- Regarding the barriers, the respondents highlighted the issue of the age and experience of team leaders and site managers and their **previous training experience**.
- **Unwillingness of young workers to become site managers or team leaders;** few are afraid to take on roles of responsibility, as the sector is unattractive and last choice for a career.
- The biggest barrier is due to the **difficulty of communication between designers and contractors with site managers and team leaders**.
- Concerning these challenges, interviewees pointed out that experienced site managers and team leaders will **have to learn new working methods and use digital tools**.
- Another very important challenge is to **open up to different cultures** and to the **inclusion of women on the site**.

Demanded skills

In terms of the managerial and organizational skills:

- Technical and logistical organization of work
- Knowledge of health and safety aspects in the workplace
- Management skills for respecting time and costs
- Communication skills
- Problem solving skills

Spain

The construction site has always been a difficult environment to work in when it comes to **technology**. Not only is there a digital challenge at the professional level, but also at the level of

the organization as a whole. The company is the first to be required to adapt to digitalization by digitizing its operations and requiring its employees to do the same.

The administrative workload is also enormously increased for both profiles. It calls for new challenges linked to administrative procedures but also managerial aspects such as procurement procedures, control schedules, control budgets and communicate with technicians.

The most demanded organizational and control competencies in renovation works are the following:

- Ability to know all stages of the work to be done
- Good communication and team leadership skills: be able to work with different teams, cultures and languages
- Knowledge of structure and safety prevention measures
- Ability to coordinate demolition works
- Ability to manage all project logistics

Poland

The following points were identified as managerial and organizational challenges and barriers:

- Logistics (ripping jobs and deliveries over time, avoiding downtime and long-term storage of materials and/or waste)
- Management of construction waste, segregation requirements
- Basic/unsophisticated digital competences
- Challenges related to the difficulties of working on a still operating facility/building: the need to reconcile renovation works with the day-to-day operation of the facility
- Securing property against damage resulting from ongoing work
- In larger companies: software supporting work management (e.g. MS project);
- The need to negotiate with employees who do not feel a sense of belonging to the company, due to financial reasons.
- The drainage of better qualified workers abroad is still ongoing
- Management of team working time
- Organizational problems are associated with a constant lack of professionals

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6.5. Identification of technical challenges/barriers and corresponding skills required from renovation site managers and team leaders, including energy saving and circular today and in the future.

France

Technical challenges and barriers

For some types of materials, **supply management has become very problematic** due to the pandemic. It is therefore important to anticipate technical solutions even before knowing the specific situations: this constitutes one of the major differences between renovation and new construction sites.

Environment and recycling of waste: waste management should be foreseen before the start of the renovation project. Furthermore, it is sometimes difficult for employees to work with environmentally friendly materials due to their **higher cost**.

Ways in which challenges are tackled

- Empower team leaders and site managers on waste management
- Train team leaders and site managers in the approval of asbestos work.

Greece

The fact remains that clients are becoming more aware of the latest technological advancements in the renovation industry, while team leaders and site managers must cope with the acquisition of new skills and competences by learning both theoretically and practically how to apply the new technical skills that have been developed.

Skills to be further developed

- Knowledge of materials for building reinforcements; walls, ceilings, roofs, floors
- Skills linked to heat control: heat insulation, burners
- Skills linked to automations
- Skills linked to new IT and technology systems: BIM, drones
- Skills linked to new materials for durability extending lifespan of the renovation project

Validation Experts input: Additional challenges worth to note:

- Prefabricated renovation of the building envelope without integration of functions and elements in the façade.
- Knowledge of deep renovation driven by seismic reinforcement and space extension.
- Increase of the real estate value of the building.

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Italy

Identified barriers

- difficulty in understanding the notion and spectre of circular economy
- lack of knowledge about the characteristics of bio-based materials
- lack of knowledge about the correct procedures regarding the installation of energy efficiency elements (especially thermal coats and windows)
- lack of knowledge about techniques for reusing waste materials

Identified challenges

- Inability to use green and eco-sustainable materials
- Inability to collect and properly dispose construction site waste

Skills to be developed

- Development of knowledge about using new eco-sustainable materials via practical training
- Communication skills to increase and foster collaboration between site managers and teams with technicians

- Digitalization of the warehouse to create a smarter construction site

Validation Experts input: The experts disagreed on the challenges identified as they believe that choosing the right materials is a team leader's or a site manager's responsibility but rather a task for the designers. Another point where experts disagreed has to do with the ability to propose practical solutions for the reuse of waste materials as it is challenging and therefore it is up to the technicians. Additionally, for the experts, overcoming the difficulties is not only a matter of knowing how to lay sustainable materials, but also of knowing their characteristics.

Spain

- **Energy Efficiency:** the issue of energy efficiency, causes managers to deal with a significant workload that is related with new materials, new placement procedures and application, new systems etc. and how to control it all. In order for a manager and a team leader / foreman to be able to make certain decisions that are relevant for these purposes in the rehabilitation works, they must have **knowledge of all types of materials**
- Construction is evolving towards **prefabricated construction**, which is going to affect the workforce.
- **Renewable energy.** The foremen will require additional training
- **Circular economy.** Employees must have specialized knowledge of hazardous waste in order to be effective. For example, in the case of asbestos, they must be aware of the proper methods for detecting its presence and implementing special procedures.

To address these challenges, companies agree that continuous information and training are essential.

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Other barriers that managers and team leaders / foremen face and that have been mentioned:

- Energy reuse technologies
- Energy production technologies
- Energy consumption reduction technologies
- How to apply the circular economy to construction
- Management of communication and computer tools
- More knowledge of PRL and structural assurance.
- More complex execution systems than conventional ones up to now.

Poland

The following points were identified as technical challenges and barriers:

- Solutions for greening buildings, i.e., thermo-modernizations, installation of photovoltaic panels, heat pumps
- Performing and repairing anti hydrate and anti-moisture insulation (vertical and horizontal), removal of mold and fungi
- Use of old technologies
- Challenges related to strengthening walls and ceilings
- Inability to use organic products
- Limited skills related to color selection and combination
- Limited skills related to the selection and installation of different types of lighting

- Challenges of ensuring proper acoustics
- Challenges related to so-called electromagnetic smog (installation of suitable nets, de-radiation)
- Limited knowledge related to new heat control technologies at home.

Validation Experts input: The experts added the following:

- Companies operating should be prepared for "green energy" investments and strengthen their technological background in order to be fully competitive in the market;
- The growing role of renewable energy generation, the rise in the popularity of passive buildings, the increase in the importance of photovoltaics and the increased implementation of investments with the greatest attention to possible low energy losses;
- The development of BUILDING INFORMATION Modeling (BIM) technology and the growing role of this software is a digital/technological challenge
- Designers/architects rather than site managers or team leaders, are responsible for proposing certain works using the materials and technologies indicated, so they are the ones often determining the energy efficiency of the investment

6.6. Identification of legal and normative challenges/barriers and corresponding skills required from renovation site managers and team leaders.

France

Major regulatory and normative challenges, under the supervision of company managers and works supervisors:

- Knowledge and application of health and safety rules on building renovation sites
- Compliance with the Unified Technical Documents (DTU) applicable to building renovation,
- Regularly following mandatory training courses on health and safety at work (working at height, scaffolding, proximity to electrical voltage, etc.),
- Knowledge and application of regulatory, technical and organizational standards related to waste management, including hazardous waste (asbestos),
- Adequate communication with the teams on site for the proper transmission of instructions, while ensuring that they are properly understood by the workers.

Greece

It is a general requirement for both team leaders and site managers to be aware of new EU laws and directives pertaining to the renovation wave, energy efficiency, the Green Deal, and other related topics. The vast majority of them are either unaware of or have not yet grasped the magnitude of the changes that will be implemented in the country's legal system.

Furthermore, green public procurement presents its own set of challenges, particularly in the context of public buildings and spaces.

Italy

Legal and normative challenges and barriers

- The constant evolution of regulations
- The variety of work situations: the construction is a dynamic place; organising a construction site in different places and contexts presents different problems, and consequently different regulatory criteria are followed.

Ways in which challenges and barriers are tackled

Legal and regulatory challenges and barriers for respondents are thus addressed and overcome:

- Increasing the continuous training of site staff on new regulations
- Acquiring skills to comply with energy saving regulations

Spain

Companies and their organizational structures in particular, are the ones who must deal with legal and normative changes that are occurring in terms of regulations. As a result, the company must first determine which rules are in effect, and then determine which job position is in question. It is the company that identifies the regulations and suggests which professionals are affected.

Poland

The following points were identified as legal and normative challenges and barriers:

- Increasing civil and criminal responsibility of managers resulting (managers are insured but the amount of the contribution is usually paid to the minimum)
- The complexity of health and safety regulations
- Formulation of contracts with the client/ investor
- Reception of completed works
- Public procurement law
- Legal aspects of the employment of employees.

Validation Experts input: The experts added the following input:

As far as foremen are concerned, they are unlikely to face such challenges

6.7. Identification of health and safety challenges/barriers and corresponding skills required from renovation site managers and team leaders, today and in the future.

France

The management of health and safety on renovation sites is fundamental. Acquiring and maintaining skills in this area is a major part of companies' professional development plans.

Safety-related skills, in particular, are not taught at the early stages of a career; rather, they are learned as one progresses through a company's ranks through professional experience.

The most common risks on renovation sites are related to shoring and demolition. To manage these risks, one needs to be able to understand the structure of the building and anticipate the associated risks.

In addition, communication skills are needed with the teams to impose the wearing of personal protective equipment. In this area, site managers and team leaders can rely on collaboration with organisations responsible for promoting health and safety at work on construction sites (OPPBTB and CARSAT).

Examples of work situations:

- Assembling scaffolding: it is necessary to anticipate the use of a crane if the scaffolding has to be moved.
- Ensure that basic hygiene conditions on site are guaranteed, starting with water points and toilets on site.
- Ensure safety guarantees for very short tasks: workers tend to be less sensitive to safety, sometimes with serious consequences. Team leaders deal with such situations on a daily basis.

Greece

In Greece, health and safety matters are usually overlooked.

There is the necessity for both team leaders and site managers to not only being trained in a theoretical level regarding health and safety, but to be able to practically develop necessary skills to act if needed. Such skills are:

- Wide understanding of the importance of health & safety rules & their practical application in a renovation project.
- Electrical hazards in outdoors facilities.
- Hazards resulting from confined spaces (suffocation, inhalation of dangerous toxic gases, drowning).

Validation Experts input: The experts recommended real-case simulations.

Italy

The interviewees underlined that in Italy site managers and team leaders are two figures who have many competences in the field of health and safety in the workplace due to the very strict legislation in force on these topics and to the sensitivity of employers who in some cases impose to follow training courses on health and safety.

The specific competences for the two profiles are the following:

- Knowledge and application of current legislation
- Knowledge of all site operations
- Skills for managing interference between contractors (coordination and cooperation between employers)
- Organizational ability to plan the different work phases.
- Ability to identify critical points and prevent them.

For work situations related to workers' health and safety legislation, they reported:

- Use of non-standard scaffolding.

- Work situations where workers have had to handle hazardous materials containing fibers (such as asbestos)
- Failure to use the PPE provided in different work situations.

Validation Experts input: For the experts, all the points indicated by the respondents can be translated into a single competence called knowing how to read and understand the operational safety plans (POS) and the risk assessment document (DVR).

Spain

The health and safety competencies required of site managers are very high. There is a legal minimum of 60 hours training and other more specific demands concerning work at height, demolition etc.

The VI Construction Agreement includes specific training in the prevention of occupational hazards for demolition and rehabilitation works.

With the incorporation of new technologies and materials, it has become obligatory that they know the risks derived from them and that they know how to adopt appropriate preventive measures. Moreover, site managers should get traffic training which develops knowledge regarding directing traffic inside and outside the construction site.

Furthermore, an important lack of first aid procedures has been identified which applies to all professional levels and which should be assured.

Poland

- Health and safety rules and regulations are generally known and respected (mainly due to compulsory cyclical training)
- There is a need for OSH training not only among workers, but also managers, who are more likely to supervise such activities as a formal necessity

6.8. Skills and competences of site managers and team leaders, necessary to face current and future challenges

France

Priorities identified:

- Site preparation in connection with the legislative aspects, coordination of the various trades/teams, self-control, anticipation, creation of one's own tools
- Methods of global organisation and quality control of renovation sites, based on the development of managerial, relational, organisational, logistical, regulatory and other skills and knowledge.
- Management of health and safety prevention at work on renovation sites, in relation to regulatory requirements, imperatives and the reality of the site.
- Management/implementation of energy renovation of old buildings, in relation to regulatory requirements, imperatives and the reality of the site.
- Management of the circular economy on renovation sites, in relation to regulatory requirements, imperatives and the reality of the site.

- Quality control by site managers and team leaders and reporting to the hierarchy
- Good communication skills within the teams

Validation Experts input: The experts made some additions on this topic, separately for team leaders and site managers, as follows:

Team leaders:

- They must gain in independence and autonomy, especially on small renovation sites, especially as regards the immediate resolution of difficulties on site, adapting solutions to situations
- They must work on their relationship with clients and local residents, providing solutions that meet expectations and avoid conflicts.

Site managers:

- They need to work on their ability to anticipate and adapt, especially if they have little experience in business.
- They need to learn about new technologies & new regulations.
- They must work on their ability to optimize processes, costs and control the progress of sites, as well as the consumption of materials.

They also think, there is a clear preference for work-based training, particularly at levels 4 and 5, which allows experience to be gained on site.

Greece

In order to face current and future challenges, site managers and team leaders need to acquire:

- Knowledge of new construction materials and how they can be recycled
- Application of health & safety management
- Knowledge of new building systems, i.e., BIM
- Project – Financial and Time Management
- Communication skills with all relevant stakeholders
- Integration of the latest environmental standards linked to renovation projects
- Energy renovation and energy saving
- Technical & Organizational skills
- Team spirit

Validation Experts input: The experts added:

- Green training for site managers
- Innovative training on energy-efficient building renovations for both site managers and team leaders
- Hands-on deep renovation practices for both site managers & team leaders

Italy

The skills that could be acquired and deepened by site managers and team leaders through continuous training are:

- Ability to read and understand the project.
- Ability to use the computer and graphics programmes to intervene directly on small jobs.
- Communication skills and techniques with other site figures.
- Management and logistics skills.
- Technical skills for digitization.
- Knowledge of new equipment and new materials and laying techniques.

Spain

Site manager

Site managers are close to the management level of a company and as its direct subordinate, they are in need to have a significant variety of skills linked to:

- Demolitions
- Measurements and stakeouts
- Structural reinforcements
- Shoring, placing overhangs etc.
- Interpretation of plans.
- New facilities to be installed, from sanitation to telecommunications
- Interaction with a lot of companies
- Computerized tools such as Word, Excel, AutoCAD etc.
- Building pathologies and new construction standards
- Prevention of occupational hazards

Team Leader / Foreman

- Leadership skills & team management
- Know how to direct the work.
- Be the best at the job and set an example for the rest of the team

Poland

Construction managers in Poland are well prepared to perform their functions on the construction site. This is mainly due to the learning path they have to take to become a manager. Thanks to paid contributions in the Regional Chambers of Civil Engineers, they have access to free thematic training (related to new technologies, solutions and regulations) and to the latest publications on industry trends and problems (national and regional);

Team leaders are often /selected by managers on the basis of observation of their work. To be a good foreman/team leader, no formal education is required – only experience and predisposition matter.

Validation Experts input: The experts added the following:

- In Poland, there is no need to collect certificates. In public, media space, the professional development of construction workers is not promoted. Therefore, there is no motivation other than internal/personal.
- In Poland, the most important "channel" of information about construction contractors (confirmation of their qualifications) is informal opinions

- The demand for renovation works on the Polish service market is so great that the lack of any confirmation of the qualifications of a potential contractor does not discourage the owners of apartments/houses from employing that person
- Employers fear the high level of mobility of workers

6.9. Recruitment difficulties and methods practiced currently by companies

France

The interviewees confirmed that recruitment for this type of profiles (site managers and team leaders) is done through internal promotion.

Other possible sources of recruitment are territorial work integration programmes or recruitment after periods of temporary employment.

It is difficult to find site managers and team leaders, beyond internal recruitment. Hence the strategy of hiring workers with potential, observing them, training them as they go along, offering them internal promotions later, is greatly preferred.

The construction sector still faces the **problem of attractiveness** and building renovation does not benefit from special promotion/recruitment campaigns. Moreover, there is not sufficient promotional strategy from the professional federations.

Validation Experts input: The experts confirm the difficulties of external recruitment. This is why internal recruitment is often preferred, especially because it gives some guarantee that the professional experience acquired is convincing.

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Greece

Due to the crisis, the **combination of work requirements and wages offered are not attractive to new employees.** Usually, companies ask for employees with high competencies but with disanalogous wages.

Another difficulty derives from the general **shortage of skilled labor** in the broad construction sector as brain drain hasn't ceased to exist in the country, worsening the ability to find skilled workers.

Additionally, many workers in the renovation sector, especially technical workers, have obtained their knowledge from **in-job training** which cannot be officially proven when applying for a position in a company and resulting in a loss-loss situation for both employee and the company.

Some other difficulties include the **unwillingness of the employees to relocate**, should the project(s) be situated in an area other than their place of residence.

Italy

Respondents indicated that recruitment is mostly done through either **internal promotion** (through professional development) or by searching among technical graduates, especially surveyors, with the **help of employment agencies.**

The difficulties reported for the recruitment of these two figures are due to the **difficulty of finding already qualified personnel interested** in the construction sector.

Furthermore, another challenge constitutes the decreased willingness of employees in **assuming roles of responsibility**.

A last difficulty constitutes the **lack of young people** who do not wish to take upon construction work positions.

Validation Experts input: Respondents indicated that very often recruitment also takes place by oral communication.

Spain

Construction companies recruit construction managers and foremen, either through **internal promotion**. Another path is through **outsourcing**.

The companies face great difficulties in finding good workers. Young workers have higher demands but do not meet with the companies' requirements. Older workers fulfill the companies' expectations better.

In order to recruit new young personnel in tasks of responsibility, the companies need to receive help for offset expenses linked to the dedicated time and costs for their training.

Poland

Finding new employees with the proper competences and experience is almost impossible, therefore employers prefer internal promotion; Any recruitment is usually carried out through private channels). Larger renovation companies benefit from foreign workers, while small recruit inexperienced native workers.

The majority of students and recent graduates wish to make a good living quickly, but they fail to realize that they need to possess specific skills. Moreover, school graduates often do have knowledge regarding trends in construction but lack basic knowledge in the field. Work-based learning could constitute a productive way to assist younger employees in obtaining practical knowledge quicker.

6.10. How do companies cover their training needs addressing site managers and team leaders, in line with current and future evolutions in renovations.

France

The companies describe the training and professional development for site managers and team leaders likely to suit the best to the particularities of renovation sites:

It is essential to base training on case studies, on a form of learning in project mode, taking into account real-life experiences (learning from situations).

For site workers, tailor-made training is needed, in the spirit of professionalizing support. The notion of modular, standard training must be gradually abandoned in favor of professionalizing, individualized support.

Standard training courses should be short and focused:

- specific modules at a rate of one to two days per year (updating of knowledge, possibly preceded and/or followed by self-training sections on virtual platforms)
- specific modules once or twice a month (acquisition of new knowledge, with upstream/downstream self-training sections on virtual platforms)
- avoid evening classes, as the job is physical and tiring.

The companies describe their practices to meet the professional development needs of site managers and team leaders in building renovation.

- Technical days organized by suppliers.
- The tutorial function carried out in the company with EQF level 4 apprentices (means of improving their skills - observe how the tutors/apprenticeship supervisors themselves learn through contact with the apprentices).
- Informal exchanges between colleagues, or with training center instructors (in the context of monitoring apprentices in companies).
- More traditional training actions (courses):
- Short modules (1 to 2 days) on advanced techniques or other specific issues (e.g., compulsory training in health and safety at work, FEEBAT).

Validation Experts input: The experts pointed out that in large companies, internal training is often organized, but small companies rarely use external training and prefer "on-the-job" training.

Greece

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The ways companies cover their training needs depend on the size of the company. Smaller or sometimes medium size companies do not have a HR or training department which are usually the ones that focus on the existing training needs.

Having this in mind, the methods used focus on:

- Self-paced learning methods by the interested parties themselves via seminars, articles, online videos or professional magazines
- Contracting a freelance trainer regarding a specific need of the company
- Selection among staff members, depending on their position and the need identified, and sending them to VET centers to obtain a certificate or a diploma
- The majority of employees do acquire new knowledge while on the renovation site from first-hand experience via observing other experienced workers – day – to – day training

Validation Experts input: The experts added the following point on this topic:

- Mentorship: The essence of decreasing costs by sending fewer employees for training and at second stage, them becoming mentors to their other colleagues and guide them on the job.

Italy

The training needs of site managers and team leaders with regard to the evolution of building renovation are covered through

- Refresher courses carried out within the building schools
- Courses organised by the main manufacturers of building materials and systems
- In-house site training organised with the support of the most experienced team leaders

Spain

Small-sized companies carry out ongoing training for their workers on site, by technicians with higher qualifications, or by specialized companies that provide a new construction system/material or installation during the working day. Occasionally, they send their workers to external training courses.

Larger companies, have internal training plans and usually make use of the continuous training credits granted annually by the Ministry of Labor to each company. This training is always carried out within the working day and in the companies' own facilities.

Poland

Both construction managers and foremen update their qualifications themselves; they learn, among other things, on the Internet, e.g. YouTube videos (they have the ability to critically analyze the offered training and webinars in terms of both content and their own needs – they do not waste time on poor quality training).

Whereas the regional chambers of civil engineers provide several dozen trainings per year for persons performing independent technical functions, including site managers, unfortunately there is a training gap for team leaders/ foremen. Foremen participate in organized training much less often; they develop their competences through practice at the workplace.

Only large companies send employees for training, because only those can afford it. In small service companies there is informal mentoring – less experienced people learn from the mentor who is usually the older employee having vast experience.

Validation Experts input: YouTube channels on construction topics support the development of knowledge and supplement information gaps in recorded materials. It constitutes a very important form of professional development of Polish construction workers, mainly foremen/team leaders like them because they are usually short, very specific and free;

6.11. Main skills likely to be improved by site managers and team leaders concerned through their further training

France

Priorities identified about the skills that should be improved:

- Site preparation, prior to its start, in connection with the legislative aspects on the theme "Who is responsible for what?" on the site, with the environment, the coordination of the various trades/teams, self-control, anticipation, creation of one's own tools (create and adapt one's own methodology according to the sites (systemic and global approach).
- Methods of global organisation and quality control of renovation sites, based on the development of managerial, relational, organisational, logistical, regulatory and other skills and knowledge. Objective: to avoid malfunctions and "non-quality" of processes and "saleable" productions.

- Management of health and safety prevention at work on renovation sites, in relation to regulatory requirements, imperatives and the reality of the site.
- Management/implementation of energy renovation of old buildings, in relation to regulatory requirements, imperatives and the reality of the site.
- Management of the circular economy on renovation sites, in relation to regulatory requirements, imperatives and the reality of the site. Fight against waste on site.
- Final quality control by site managers and team leaders and reporting to the hierarchy, based on verification, supervision and communication skills within the teams.

Validation Experts input: The experts added the following skills likely to be improved:

Team leaders:

- Technical management of the site
- Team management and work organisation
- Customer relations
- Control of the work done.

Worksite managers:

- Management of administrative tasks
- Use of IT tools, including BIM
- Monitoring and control of new technologies, regulations and organisations
- Optimisation of processes
- Control mechanisms and criteria.

Greece

The expectation is that the skills likely to be improved are:

- Knowledge of new construction materials and how they can be recycled.
- Application of health & safety management.
- Knowledge of new building systems, i.e., BIM
- Skills related to circular economy matters.

Validation Experts input: The experts added the following skills:

- Skills linked to prefabricated approaches – offsite construction
- Skills linked to aesthetic improvements of a building
- Skills linked to robotics and automation in construction

7. Transnational level conclusions and recommendations for the design of the planned professionalisation schemes based on concrete work situations

The previous sections presented in detail all input received during the desk and field research phase of the RenovUp project in the partner countries, related to the technical, organisational, and normative specificities of building renovation sites which affect the evolution of the functions of site managers and team leaders.

Following the analysis, this last Chapter operates as a guide for the upcoming RenovUp training schemes summarizing the most characteristic skills that came up as expected from both profiles who specialize in building renovation. Moreover, it also constitutes a handbook for the design of the expected trainings using the input received by the experts interviewed during the field research phase.

7.1. Skills' Identification concerning the RenovUp professionalisation paths:

Technical skills

- ❖ digital skills at the basic user level supporting the work of managers, including costing
- ❖ application of circular economy principles (waste management)
- ❖ application of new renovation techniques linked to energy efficiency
- ❖ use of renewable energy solutions
- ❖ Knowledge of new construction materials and how they can be recycled
- ❖ Application of health & safety procedures
- ❖ measurements and construction staking
- ❖ plan interpretation
- ❖ demolitions
- ❖ analysis and control of the execution of transfer beams and shoring
- ❖ pathological processes that occur in different structures
- ❖ innovation in building structures
- ❖ Knowledge and use of new material

Soft – transferable skills

- ❖ Multi-level communication skills with all relevant stakeholders and profiles
- ❖ Problem solving
- ❖ Team management
- ❖ Negotiation & conflict resolution
- ❖ Time management

Managerial & Organizational skills

- ❖ Management of a renovation project
- ❖ Knowledge of all relevant regulations & legislation
- ❖ control of the work process and the interrelationship among the construction trades

- ❖ quality and environmental control

7.2. Building up a new concept for professionalisation: learning *from* and learning *for* work situations

The input collected from the partner countries regarding the build-up of the RenovUp trainings is homogenous. The main points and suggestions gathered, are presented in the list below:

- ❖ **Standard modules are not considered as appropriate** for the two profiles, therefore training based only on theory must be avoided
- ❖ **The professionalization paths to be designed must be in the form of real cases from the working environment**, in alignment with all functions of the two profiles ranging from technical, managerial, and commercial to safety & financial. These functions constitute a lever for success, requiring adaptability and agility from the workers in order to be capable of dealing with unforeseen events.
- ❖ The real cases from the working environment should **rely on demonstrations** (e.g., presentation of models in different situations, presenting what happens under the influence of different phenomena)
- ❖ The training courses should **provide for orientation & specialization according to the profile and skills of each trainee**, taking into account his/her experience
- ❖ The appropriate **learning modality** urges for **flexible and continuous learning methods that call for blended learning which** focuses on visual and practical activities, as well as with **on-site practical training**, where new technologies, systems and materials are being introduced.
- ❖ The designed trainings should be **formal, evaluated & accredited**; their learning objectives should be clearly identified
- ❖ The designed trainings should be destined for to professionals holding a relevant background degree and industry experience.

8. Annexes

8.1. National Reports of the Desk Research findings

8.2. National Reports of the focus group(s)/ interviews findings