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Restoration manager: Adapting project delivery methods for the restoration of architectural heritage

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Abstract

The restoration of architectural heritage is a complex process and presents intricate and formidable challenges. The project delivery method plays a pivotal role for the success of the restoration process. There exists a diverse array of project delivery methods, each characterized by its distinct set of advantages and disadvantages. In the context of architectural heritage restoration, given its distinct characteristics, these advantages and disadvantages encompass a wide spectrum. Current project delivery methods, while effective for certain contexts, often fall short in addressing the unique requisites of restoration projects. Acknowledging this inadequacy, this article undertakes a research that includes a literature review that not only examines prevailing project delivery methods but also articulates the need for a tailored framework within the restoration field. This article is produced from the doctoral thesis titled "Development of a Sustainable Integrated Management System for the Conservation of Architectural Heritage", which is in the process of preparation. In the light of the results of the survey which is conducted within the scope of the first author's doctoral study in order to examine the project delivery approach preferred among the participants that are working in the field of the conservation of architectural heritage, a project delivery method called "Restoration Manager", which has been precisely prepared to meet the requirements inherent in restoration initiatives, is presented. This comprehensive project delivery method seeks to fill the void by addressing the distinct needs and challenges encountered in restoration projects. The essence of this work is to create an appropriate project delivery system that adapts to the nuances of the restoration works, and through this project delivery framework, the restoration processes and outcomes will successfully be completed.

1. Introduction

The construction industry is a complex and challenging field that requires careful planning and execution to ensure successful project delivery [1]. Project delivery methods (PDMs) define the roles and responsibilities of the parties involved in a project and also form an execution framework in terms of the sequencing of design, procurement, and construction [2]. These PDMs may be expressed as the methods delineating the interactions and obligations among involved stakeholders while detailing the procedures for meeting their respective responsibilities. In construction, a project delivery method may be defined as “a process by which various stakeholders like building owners, occupants, architects, engineers, constructors work together to deliver a building; it is generally distinguished by two key characteristics such as the contractual relationships between project stakeholders and their engagement in the project.” [3].

Project delivery methods are an essential aspect of construction works that can significantly impact the success of a project. Studies by Hong et al. [4]; Ojiako et al. [5]; and Oyetunji and Anderson [2], suggest that selecting an appropriate project delivery method improves project performance and the reasonable choice of a proper project delivery method is one of the key links to project success.

The construction industry is dynamic and constantly evolving, and project managers face the challenge of selecting the most appropriate project delivery method (PDM) for successful project completion. The choice of PDM significantly impacts key performance indicators such as cost, schedule, quality, project execution, and safety [6]. The appropriate project delivery method (PDM) is seen as a vital factor to ensure good

performance of construction project by Noor et al. [7]. He also states that numerous researches have been conducted to develop a structured and descriptive decision-making framework for selecting an appropriate PDM for decades.

Kubba [8] states that there is a wide range of construction project delivery systems. Similarly, Khan indicates there are many project delivery methods to match the variety of projects in today's competitive construction market, but at the same time, reminds that tailoring your choice to the individual project's specifications and circumstances can help ensure success [9].

The literature reviews unveil that various types of project delivery methods (PDMs) adopted within the construction industry can be categorized based on the fundamental concept of PDM. These categories include segmented, integrated, packaged, and collaborative approaches [10-11]. The segmented delivery approach, commonly known as Design-Bid-Build (DBB) or the traditional delivery method, stands out as the most widely used PDM for construction projects [12-13]. In contrast, the global construction industry occasionally employs alternative project delivery methods such as Design-Build (DB), construction management at risk (CMR), construction management agency (CMA), construction management multiprime (CMMP), Public-Private Partnership (PPP), and Integrated Project Delivery (IPD) [14-15].

The characteristics and functions of these PDMs are outlined based on the project's organizational structure in terms of roles and relationships, contractual framework defining assignments and responsibilities, and operational systems including working methods and strategies. It's essential to note that each PDM comes with distinct success factors, strengths, and weaknesses, significantly influenced by the specific characteristics of the project and the overall nature of the construction industry [16].

The distinction between construction works and the restoration of architectural heritage transcends the mere dichotomy of building a new versus preserving what already exists [17]. While both endeavours fall within the realm of the built environment, their underlying principles, goals, and processes diverge significantly. One of the most prominent disparities rests in the fundamental objectives each pursuit seeks to achieve. Construction work revolves around the genesis of novel edifices, manifesting as the creation of skyscrapers, residential complexes, bridges, and other modern architectural marvels. In these projects, innovation, functionality, and contemporary design often take precedence. Conversely, the restoration of architectural heritage takes on a profoundly different mission. This intricate process embarks on a journey to safeguard historical, cultural, and architectural legacies, ensuring they endure for generations to come. A prime illustration of this contrast emerges when considering the restoration of an architectural heritage; its timeworn façade, intricate detailing, and historical significance demand meticulous efforts to revive its original splendour, often requiring the use of traditional construction methods and the expertise of skilled artisans. The restoration of architectural heritage encompasses a broad spectrum, ranging from locally significant structures to those globally recognized and listed as World Heritage. Adhering to the principles outlined in the Venice Charter, each cultural property necessitates evaluation within its unique context. It is imperative to recognize that even regional restoration initiatives, when considered part of a larger cultural narrative, should align with international conservation conventions, and adhere to ICOMOS principles under the auspices of UNESCO.

Thus, construction and restoration, owing to their intrinsic dissimilarities, necessitate distinct approaches when it comes to project delivery methods. As Kubba emphasizes [18] that since each construction project is different, the project delivery system should be tailored to the individual requirements of that unique project, and the divergence in operational requisites of construction and restoration also mandates a tailored approach of project delivery method for project execution.

In this article, the aim is comprehensively exploring project delivery methods, examining their mechanics, advantages, and limitations. Among these methodologies, the traditional Design-Bid-Build (DBB) framework [19], Design-Build (DB) which integrates design and construction to overcome some of the hurdles [20] and one of the alternative delivery methods that is rapidly growing in popularity Construction Manager at Risk (CMAR) [21] will be focused. Additionally, as traditional project delivery systems used in the general construction sectors have many constraints [22], Integrated Project Delivery (IPD) which is an integrated delivery approach to the planning, design, and construction of civil engineering projects [23] and "an approach to enhance project implementation" [24], along with other innovative approaches.

Although Jackson [25] identifies three primary project delivery methods, design-bid-build, construction management, and design-build, which significantly differ in five key aspects namely the number of contracts the owner executes, the roles and relationships of these parties, the project stage at which the contractor becomes engaged, the potential for overlapping design and construction, and the entity responsible for ensuring the adequacy of plans and specifications, the study not only focused on those three project delivery methods, but also integrated project delivery (IPD) and some other methods such as CM Multi-Prime (CMMP) [26] and an innovative procurement technique job order contracting (JOC) [27] were also taken into consideration.

The core of this research revolves around the introduction of an approach tailored for restoration endeavours and adapted from the current project delivery methods, named as the Restoration manager delivery method. Recognizing the intricate and complex nuances in this realm, this method seeks to address the challenges and necessities associated with the restoration of architectural heritage.

The research commences with a review of the existing literature on project delivery methods. It subsequently delves into an evaluation of the inadequacies and limitations inherent in current delivery methods in the context of restoration projects. Following an analysis of

survey results related to this topic, the study takes an approach that involves the adaptation of project delivery methods specifically tailored to the requirements of restoration projects.

The principal objective of this research is to enhance the effectiveness of restoration processes by addressing the limitations associated with traditional project delivery approaches in the context of architectural heritage restoration, ultimately improving project success rates. By establishing a tailored project delivery method, the study aims to augment the effectiveness of restoration processes, thereby contributing to the realization of successful outcomes. A successful restoration is a complex undertaking that involves a meticulous consideration of various criteria, i.e. historical authenticity is paramount, preservation of cultural value ensures that the restored heritage site not only maintains but enhances its cultural significance. Structural integrity is also fundamental, guaranteeing stability and safety for the structure's prolonged existence. Thorough documentation and research inform decision-making, while community engagement fosters a sense of ownership and aligns the project with community values. Sustainability is integral, promoting long-term economic, social and ecological balance. And compliance with standards ensures the restoration's quality and adherence to conservation guidelines. By meticulously addressing these criteria, a successful restoration goes beyond physical repairs, contributing to the holistic and sustainable conservation of cultural heritage.

2. Method

A two-phase approach was employed to conduct this research. The first phase encompassed a comprehensive literature review, while the second phase involved data collection through a questionnaire survey targeting professionals and researchers, followed by data analysis.

In the initial phase, the literature review focused on identifying relevant studies related to project delivery methods. The review entailed a thorough search of online databases, including Emerald Insight, Elsevier, ScienceDirect, EBSCO, Scopus, JStor, Taylor & Francis, Proquest, Wiley Online Library, TRDizin, and Semantic Scholar. The search was guided by specific keywords, such as project delivery methods, PDM, project delivery systems, construction, restoration, architectural heritage, built environment, Design-Bid-Build (DBB), Design-Build (DB), construction management, CM at risk (CMAR), CM multi-prime (CMMP), integrated project delivery (IPD), and job offer contracting (JOC). The scope of the search was limited to articles published from 1990 to the search date, and the findings indicated the critical significance of seven project delivery methods in successfully implementing organizational change.

The second phase involved data collection through a survey distributed to professionals and researchers working in the restoration of architectural heritage field. The survey was conducted as part of the doctoral research, titled "Development of a Sustainable Integrated Management System for the Conservation of Architectural Heritage," at Hacı Bayram Veli University. Its primary aim was to gain insight into the management landscape within the field of architectural heritage restoration. Respondents were selected from various backgrounds, including academics, government authorities, professionals from both the public and private sectors, and graduates of restoration programs. The survey was administered online via surveyhero.com, with the goal of broadening participation. The survey targeted individuals involved in various aspects of architectural heritage restoration, comprise a sample of 103 participants.

Employing a self-administered online survey as the framework, the questionnaire included five sections: introduction, explanation of survey content, participant information, questions, and conclusion. The survey, administered through a self-administered online link sent via email, was designed to be completed within 5 to 15 minutes. Launched on September 10, 2019, and accessible for three months. The survey employed in this study was structured into five sections, including an introduction, an explanation of the survey's content, participant information, a section containing questions, and a conclusion. The questions section comprised a total of 17 questions under five separate section headings, with some questions offering an "other" option to facilitate diverse responses. The survey underwent pretesting with 15 experts before launching. Feedback obtained during pretesting have guided final revisions under the supervision of the advisor. In summary, the survey framework, encompassing elements such as purpose, sample, structure, mode, time period, average time and pretesting, provides a foundational guide for comprehending the preferences and situation in the architectural heritage restoration field.

Since the survey was designed as part of a doctoral study titled "Development of a Sustainable Integrated Management System for the Conservation of Architectural Heritage," only the relatable survey data for this research has been incorporated into this study. Alongside the general information about the survey participants, the preferences for project delivery methods were assessed by posing the question, "In your opinion, which project delivery method is most suitable for the restoration of architectural heritage?". To ensure a common understanding among all respondents, the question was accompanied by concise explanations of the given options.

To ensure content validity, the survey questions were carefully constructed to avoid ambiguity, and the instrument underwent a pilot pretesting study to establish validity and reliability. Senior academics researching in the restoration of architectural heritage provided valuable feedback to enhance the instrument's face validity, relevance, and clarity. The data collection instrument deployed for the pilot study was administered prior to the main study to confirm the reliability of the data.

In the data analysis phase, responses from the survey were analysed using descriptive statistics in the form of percentages and tables. The analyses were conducted using Microsoft Excel as Microsoft Excel has been considered as one of the important tools for data analysis [28], thus it was employed for data processing in this

study. Tables obtained from these data were used to enhance data evaluation.

This study adopted a quantitative approach, specifically a descriptive survey research design which aims to answer research questions about the current state of affairs, identify factors and relationships among them [29]. The design was chosen to collect information from respondents regarding their preferences for project delivery methods. The research falls into the categories of exploratory and descriptive research, with a primary focus on formulating a project delivery method tailored for restoration work practices, aligning it more appropriately with the exploratory study category [30-32]. Conformity with the relevant regulations for the ethical aspects of the research and data collection instruments used in the study is approved by Hacı Bayram Veli University Ethics Committee.

2.1. Literature review

Over the years, various project delivery methods have been developed to meet the unique needs of different construction projects. As the construction industry is constantly advancing, the project managers face the challenge of selecting the most appropriate project delivery method (PDM) for successful project completion. Although the progression of project delivery methods in the construction industry has been relatively slow compared to the industry's overall development [6], different project delivery methods have emerged over the years, each with its own set of characteristics with advantages and disadvantages.

The traditional Design-Bid-Build (DBB) method, where the design and construction phases are separate, has been widely used in the past, however, this method has limitations in terms of speed, price certainty, flexibility, and risk allocation [33]. As a result, alternative project delivery methods (APDM) such as Design-Build (DB), Construction Management at Risk (CMR) and Integrated Project Delivery (IPD) have gained popularity [34]. The term Alternative Project Delivery Methods (APDM) encompasses non-traditional construction contracting approaches. These approaches involve the contractor's involvement in design either as an advisor or fully responsible for it. Selection of the contractor depends on qualifications or best value which is a procurement strategy that considers a combination of factors, including cost, qualifications, expertise, and reputation, to select a contractor or service provider that offers the most advantageous overall value for a project. The range of APDMs comprises methods like Design-Build (DB), Construction Manager at Risk (CMAR), Integrated Project Delivery (IPD), and many others [21,22].

Design-Bid-Build (DBB) is the traditional project delivery method used in the construction industry. This method involves three separate phases: design, bidding, and construction [6]. In the design phase, the owner hires an architect or engineer to design the project. Once the design is complete, the owner puts the project out to bid, and contractors submit their bids. In the bidding phase, the owner solicits bids from contractors to construct the project. Finally, in the construction phase, the contractor with the lowest bid is awarded the contract and construction phase begins [35]. Design-Bid-Build involves a sequential process where the owner contracts with a designer/architect to develop the project's design, followed by a bidding process to select a contractor for construction [33]. DBB has been the dominant delivery method for many years, but it has certain limitations, such as limited collaboration and integration among project stakeholders [36].

The second project delivery method that is examined is Design-Build (DB). The DB method involves the integration of design and construction under a single contract, with a single entity responsible for both aspects. This method offers several advantages, including reduced project delivery time, cost savings, increased constructability, and innovation [33]. However, it may not be suitable for all types of construction projects, and careful consideration of key factors such as complexity, risk allocation, and quality standards are necessary [34]. DB promotes collaboration and integration among project stakeholders, leading to potential benefits such as improved project performance and reduced disputes [36]. Design-Build is a project delivery method that combines the design and construction phases into a single contract, and it can be summarized as a project delivery method that involves the owner hiring a single entity to design and construct the project [35].

Another PDM is Construction Management at Risk (CMAR) method. CMAR is a delivery method in which the construction manager is involved during the design phase of the project, assuming the responsibilities of both a project coordinator and a general contractor. This method emphasizes collaboration, trust, commitment, and co-learning. CMAR offers benefits such as early cost estimation, value engineering, and improved constructability [6]. However, it requires effective coordination and communication among project stakeholders to ensure successful project delivery. Construction Manager at Risk (CM at Risk) is a project delivery method that involves the owner hiring a construction manager during the design phase to provide input on constructability, cost, and schedule. The construction manager then provides a guaranteed maximum price (GMP) for the project and assumes the risk for delivering the project within that price [35]. This method is often used for large, complex projects, where the owner wants to reduce the risk of delays and cost overruns. Construction Management at Risk is also used for projects where the owner wants to have more control over the construction process [37]. The CM is responsible for managing the construction process, including scheduling, budgeting, and subcontracting. The CM also provides pre-construction services, such as constructability reviews, value engineering, and cost estimating. The CMAR method allows for early collaboration between the owner, designer, and contractor, which can result in a more efficient and cost-effective project delivery [38,39].

Integrated Project Delivery (IPD) is the last project delivery method examined in this study. Integrated Project Delivery (IPD) is a collaborative approach to construction project management that has gained popularity in recent years [40]. It is a method of project

delivery that involves the owner, architect, contractor, and other stakeholders working together from the beginning of the project to the end [41]. The goal of IPD is to create a more efficient and effective construction process that results in a better end-product [42]. Integrated Project Delivery is often used for complex projects, where the owner wants to reduce the risk of delays and cost overruns or to have more control over the construction process. In this method, the team works together to develop a project plan that meets the owner's needs and budget. The team members are incentivized to work together to achieve the project goals, and any savings are shared among the team members [43]. Integrated Project Delivery (IPD) emphasizes collaboration, shared risk and reward, and a focus on project outcomes rather than individual interests [44]. This method has been shown to improve project performance, reduce conflicts, and enhance project outcomes. However, its successful implementation requires a high level of trust, open communication, and a shared vision among project participants [45].

The project delivery method, referred to as Construction Management Agent (CMA), involves the selection of an architect or engineer for project design, while concurrently choosing a construction manager to serve as the client's representative, offering administrative and management services. While the CMA assists in the design phase, it does not retain subcontracts or offer bonding for the project's construction. The selection of a CMA is based on their qualifications and prior experience, particularly their credentials and previous work as suggested by Gould [46].

Construction management multi-prime projects (CMMP), often referred to as multi-prime (MP) contracts, are characterized by the owner taking on the role of a general contractor. Under this contractual arrangement, the owner enters into contracts with each member of the design team and primary trade contractors, encompassing services ranging from general construction to earthwork, structural, mechanical, and electrical work. The owner assumes responsibility for the comprehensive management of both the project schedule and budget, as indicated by [26].

Job order contracting (JOC) represents an innovative procurement approach designed to enhance the efficiency of facility maintenance, repair, and minor construction activities. Its primary objective is to significantly reduce the time required for engineering and procurement by awarding a competitively bid, firm-fixed-price, indefinite-quantity, multitask contract to a single general contractor. This contract includes detailed task specifications. The utilization of a job order contract (JOC) eliminates the need for separate actions related to design, specification, and construction contracts. Pre-priced units of work are incorporated to streamline the process. The contracts are awarded through competitive procedures, and once awarded, the contractor receives individual task orders, also referred to as delivery orders, based on their continued high-performance levels [27].

Thus, the literature review highlights the importance of considering project-specific factors when selecting a project delivery method and provides an analysis of project delivery methods, highlighting their characteristics. Burjan mentions [47] that “there is more than one solution for almost every project”, thus the adaptation of a project delivery method, which presents advantages compared to other existing project delivery approaches, may provide an enhanced solution for addressing restoration efforts concerning architectural heritage. Presently, the advantages and disadvantages of the project delivery methods need to be delineated to facilitate the determination of a more suitable approach for the restoration of architectural heritage.

Design-Bid-Build (DBB) is a traditional project delivery method where the owner contracts with separate entities for the design and construction phases of the project. The advantages of DBB include clear separation of responsibilities meaning the roles and responsibilities of each party are clearly defined. The architect/engineer is responsible for the design, and the contractor is responsible for construction. The competitive bidding for construction contracts and cost certainity is another advantage as the design is completed before bidding, the owner knows the project's cost upfront. DBB also have the ability to obtain multiple design options and as the design phase is separate from the construction phase, allowing for thorough design review and quality control [35,48].

However, DBB has some disadvantages, such as a lack of collaboration between the design and construction teams, potential delays due to the sequential nature of the process and longer project duration as the design phase must be completed before construction can begin, and limited flexibility for making changes during construction as changes during the construction phase can be costly and time-consuming because they require design modifications [35,49].

Design-Build (DB) is a project delivery method where the owner contracts with a single entity that is responsible for both the design and construction of the project. The advantages of DB include improved collaboration between the design and construction teams, faster project delivery, and the ability to make changes more easily during construction [49]. DB also allows for greater innovation and creativity in the design process [50]. DB also provides a single point of responsibility for the entire project, reducing the owner's administrative burden, time and cost savings as design and construction can overlap and risks are managed more effectively because the design-builder is responsible for managing all project risks [51]. However, DB may have some disadvantages, such as potential conflicts of interest between the design and construction teams, limited owner control over the design process, and the potential for cost overruns if changes are made during construction [48]. Also, there may be less owner control because the design-builder handles both design and construction, there may be a risk of design-builder to cut corners to reduce costs and limited competition because there may be fewer qualified firms that can bid for the project as the design and construction are bundled together.

Construction Management at Risk (CMAR) is a project delivery method where the owner contracts with a construction manager who is responsible for managing

the project from design through construction. The advantages of CMAR include early involvement of the construction manager in the design process, improved coordination between the design and construction teams, and the ability to obtain cost and schedule guarantees from the construction manager [49]. CMAR also allows for greater flexibility in making changes during construction [52]. CMAR can also provide early cost input, cost input during the design phase, helping to keep the project within budget; better risk management as CMAR assumes the risk of construction at a guaranteed maximum price, protecting the owner and more quality control as it may provide constructability reviews during the design phase, improving the quality of the project [53]. However, it may have some disadvantages, such as potential conflicts of interest between the construction manager and subcontractors, potential delays if the construction manager is not involved early enough in the design process, cost uncertainty as the final cost is not known until the design is complete and the guaranteed maximum price is established. There will be also less competitive bidding because the selection of the CMAR is based on qualifications rather than low bid, which may result in higher costs. And lastly, there may be the potential for cost overruns if changes are made during construction [53-54].

As the Integrated Project Delivery (IPD) being a collaborative project delivery method where the owner, architect, and contractor work together as a team from the beginning of the project, the advantages of IPD include improved collaboration and communication between all project stakeholders, early involvement of the contractor in the design process, the efficiency on the use of resources, reducing waste and improving project performance and the ability to make informed decisions based on shared knowledge and expertise. IPD also allows for greater innovation and creativity in the design process and risks to be shared among all project participants, promoting a focus on project success rather than individual success [55-57]. However, IPD may have some disadvantages, such as potential conflicts of interest between project stakeholders, potential delays if the team does not work well together, and the need for a high level of trust and cooperation among all parties involved. IPD may also reflect disadvantages due to the complex contracts as IPD requires complex contracts that define the relationships and risk-sharing among all participants; a high level of trust and collaboration among all participants, which may be difficult to achieve and lastly, as IPD is a newer delivery method and is less proven than more traditional methods [57-58].

Job Order Contract (JOC) is a project delivery method that involves the use of pre-established unit prices for various construction tasks. It is often used for smaller projects or projects with a repetitive nature, such as maintenance and repair work. One of the main advantages of JOC is its flexibility and efficiency in handling multiple small-scale projects simultaneously [59]. JOC allows for quick project initiation and completion, as the unit prices and terms are already established, reducing the need for extensive negotiation and contract development. This method also promotes cost transparency and accountability, as the unit prices are predetermined and easily verifiable [59]. However, one of the disadvantages of JOC is the potential for cost overruns if the scope of work exceeds the estimated quantities or if unforeseen conditions arise during the project [59]. Additionally, JOC may not be suitable for complex or large-scale projects that require extensive coordination and management.

Construction Management Agent (CMA) is a project delivery method where a construction management firm acts as an agent on behalf of the owner. The construction manager provides expertise in project planning, coordination, and oversight, while the owner retains control over the design and construction process. One of the advantages of CMA is the early involvement of the construction manager, which allows for better coordination and integration of the project team [60]. The construction manager can provide valuable input during the design phase, helping to identify potential constructability issues and value engineering opportunities [60]. CMA also allows for greater flexibility in the selection of subcontractors and suppliers, as the owner has direct control over the procurement process [60]. However, one of the disadvantages of CMA is the potential for conflicts of interest, as the construction manager may have relationships with certain subcontractors or suppliers that could influence the selection process [60]. Additionally, CMA requires a high level of owner involvement and decision-making, which may not be suitable for all owners.

Construction Management Multi-Prime Projects (CMMP) is a project delivery method where the owner contracts directly with multiple prime contractors for different portions of the project. Each prime contractor is responsible for managing their own subcontractors and suppliers. CMMP allows for greater control and flexibility for the owner, as they have direct relationships with each prime contractor [61]. This method also promotes competition among the prime contractors, potentially leading to cost savings and improved quality [61]. CMMP can be particularly beneficial for complex projects that require specialized expertise, as the owner can select prime contractors based on their specific qualifications and experience [61]. However, one of the disadvantages of CMMP is the potential for coordination challenges and conflicts among the different prime contractors [61]. Effective communication and collaboration among the prime contractors are essential to ensure the successful completion of the project. Additionally, CMMP requires a high level of owner involvement and oversight to manage the multiple contracts and ensure that the project objectives are met [61].

In conclusion, each project delivery method has its own advantages and disadvantages. DBB provides clear separation of responsibilities but lacks collaboration, while DB allows for improved collaboration but may have conflicts of interest. CMAR offers early involvement of the construction manager but may have conflicts and potential delays. IPD promotes collaboration and innovation but requires a high level of trust and cooperation. JOC offers flexibility and efficiency for smaller projects but may not be suitable for complex or large-scale projects. CMA allows for early involvement of

the construction manager and greater control over the procurement process but may have conflicts of interest and require high owner involvement. CMMP provides control and flexibility for the owner but requires effective coordination among multiple prime contractors and high owner oversight.

The selection of the most appropriate project delivery method should be based on the specific requirements and characteristics of the project. According to Mohd Noor et al. [8], the process of selecting a Project Delivery Method (PDM) typically entails the elimination of methods that are unrelated or unsuitable until a viable alternative delivery method remains. Nevertheless, as emphasized by Masterman [62], it is imperative to give due consideration to the principles of decision-making prior to evaluating and refining the framework for PDM selection.

2.2. Restoration manager project delivery method

The choice of a construction project's delivery system frequently relies on the project management team's past encounters. This pattern can result in a problematic cycle where recurring challenges like cost and schedule overruns persist across successive projects. From the perspective of Pöyhönen et al., there's a noticeable absence of comprehension about the development of a project delivery system to effectively address these recurring issues [63]. Within the realm of design and construction, property owners seek to recognize, manage, and alleviate project risks through the determination of timely and budget-conscious project delivery methods. The project delivery approach is an all-encompassing procedure involving designers, constructors, and diverse consultants who collectively offer design and construction services to bring forth a finished project for the proprietor [64].

Project delivery is a form of working relationship that defines roles and responsibilities [65]. According to American Institute of Architects, delivery refers to the method for assigning responsibility for providing a service. The main criteria for measuring the success of any project delivery methods are cost, quality, time, safety and how the project ultimately meets its intended purpose [66].

According to Migliaccio et. al. [64], project delivery method is a comprehensive process by which designers, constructors, and various consultants provide services for design and construction to deliver a complete project to the owner. Project delivery process issues include organisational and contractual arrangements, compensation for services, management of project, risk, application of appropriate technology, and information, systems, and management, and control of resources [67]. with the increasing complexity and evolution of the construction projects, project managers realized that there was a need for a structured mechanism or tool to assist them in choosing the most suitable delivery method for a specific construction project [68] and determining a project delivery method that matches the characteristics of a construction project is a critical step that affects the success or failure of a project [69].

The suitability of the project delivery method selected for a project greatly influences the efficiency with which the project is executed and thus constitutes a critical success factor [2]. While there is not a single perfect delivery method for every project [65], the attributes are listed as project delivery method; owner's commitment; project team procurement; contractual conditions and level of integration in the delivery process for project success [70].

Subsequent to the literature survey, a comprehensive review revealed the identification of five principal aspects deemed critical for a successful project delivery method, encompassing the allocation of roles and responsibilities, the design phase associated with the restoration process, aspects related to the selection of contractors, the level of collaboration among project stakeholders and the effective management of changes and issues during the restoration process. The criteria that were chosen to define a successful project delivery method included early assignment of roles and responsibilities, the early engagement of stakeholders during the design phase, the facilitation of contractor selection with a focus on the constraints such as cost, time and quality and increasing the competitiveness during the restoration process, a high degree of collaboration and communication among stakeholders, and the effective management of changes and issues during the restoration process.

In seeking balance between the advantages and disadvantages associated with existing project delivery methods, an adapted delivery approach was selected among them and tailored for restoration of architectural heritage. This approach, known as the restoration manager project delivery method, was devised to harness the strengths while minimizing the shortcomings. It is crucial, at this juncture, to establish a comprehensive definition of the restoration manager project delivery method.

The Restoration manager (RM) project delivery method assumes responsibility for the restoration of architectural heritage, primarily focusing on strategic restoration goals and objectives such as to preserve and transfer the cultural heritage with its original values to today's humanity and future generations. This role guarantees successful restoration implementation, management, monitoring, and control throughout the restoration management processes. The restoration manager oversees the preparation and approval of the initiation document after the pre-project/initiation phase, ensuring a smooth transition to the implementation phase post-planning stage following the guidelines of the restoration handbook which is a unifying and integrative document that includes all other management plans, describing how the restoration process will be implemented, monitored, controlled, and finalized. The restoration manager makes restoration decisions within constraints and tolerances, resolves conflicts, approves crucial project documents, and plays a pivotal role in achieving project success. This role encompasses resource management, conflict resolution, approvals of informational documents, responsibility for restoration outputs like projects, designs, and

procurement, periodic progress updates to the owner, and maintaining effective communication.

In accordance with the restoration project validated and approved by the decision makers, the restoration manager proposes and executes restoration plans, coordinates the daily activities and resource allocation within their team, takes appropriate measures when challenges arise, manages stakeholder expectations, and conducts comprehensive risk management in the realm of restoration. In essence, the Restoration manager plays a central role in decision-making and acts as a linchpin for project success, ensuring that restoration activities adhere to their intended objectives while efficiently managing resources, risks, and communication.

The restoration manager approach is structured around the distinct life cycle phases encompassing the entire restoration process. Contracts between the owner and the restoration manager, the planning and design team, contractors, sub-contractors, and other essential stakeholders or groups required for executing the restoration process are kept separate. This separation minimizes unnecessary interactions but reinforces focusing solely on necessary engagement and data sharing.

During the initiation phase, roles and responsibilities for the restoration process are determined in accordance with the restoration project validated and approved by the decision makers. Information is initially collected and synthesized within a Restoration Initiation Request Document, where vital topics are deliberated between the owner and stakeholders, leading to decision-making and endorsement of key matters. This initial overview of the whole restoration project evaluates both the restoration management system and approach, detailing the organizational structure and foundational elements of the management system. Consequently, the restoration pre-project/initiation phase unveils the project's objectives, expected outcomes, and key results. The Restoration Initiation Request Document formalizes the restoration project, followed by the decision to procure or internally assign a restoration manager. The employment of the restoration manager is contingent upon owner approval of the document. During the pre-project/initiation phase, the restoration manager identifies constraints, tolerances, and defines restoration goals, recognizing that poorly selected aims can result in data gaps and increased risks. This phase plays a pivotal role in eliminating complexities from the restoration process, underscoring the importance of active engagement by the restoration manager and other stakeholders. Toward the phase's culmination, the restoration manager compiles the restoration initiation document, which, upon owner approval, marks the official commencement of the restoration process. This document encompasses an executive summary, the project's purpose or rationale, a general description, stipulated requirements, project objectives, associated success criteria, constraints, assumptions, and risks, restoration outputs, main milestones, budget summary, stakeholder list, information about the restoration manager, the restoration manager's roles and responsibilities, and an owner's approval section.

Upon completing these tasks, the planning and design phase initiates. Guided by the counsel of the restoration manager, the restoration support unit, slated to serve as designers during the restoration journey, is selected through a competitive bidding process or procurement. Following the engagement of the restoration support unit, a meeting convenes involving the owner, restoration manager, and restoration support unit to set the stage for the preparation of the restoration handbook. The Restoration Handbook serves dual purposes: firstly, it acts as a regular communication reference for stakeholders, updated periodically to reflect ongoing developments throughout the restoration process; secondly, it standardizes various reports and documents, fostering consensus on restoration outputs and procedures among all stakeholders. This comprehensive document amalgamates all management plans that detail the execution, monitoring, control, and culmination of the restoration process.

Upon completing these requisite procedures and securing the restoration handbook, inclusive of management plans and relevant outputs, the phase of contractor selection and mobilization ensues. In brief, the tender was advertised for potential bidders or invitations sent for the shortlisted ones after the design phase was finalized. The ultimate choice of contractor often hinged on the total construction cost, favouring the selection of the lowest bid contractor for project execution during this phase. Historically, a conspicuous lack of integration between designers and contractors prevailed. Designers were prohibited from engaging in construction methods, while contractors were exempt from design responsibilities. This dearth of interaction stemmed from the traditional, sequential construction process characterized by compartmentalized entities throughout the design and construction phases, ultimately culminating in recurring claims, disputes among project stakeholders, and instances of cost and time overruns.

However, the intervention of the restoration manager reshapes this landscape. The restoration manager effectively integrates the owner, restoration support unit, related stakeholders, and contractors. This integration entails the restoration support unit's active involvement in restoration decision-making processes and ensures the contractor's alignment with design responsibilities. Amplified stakeholder interaction yields diminished recurrence of claims, disputes, and constraint issues.

This method facilitates robust team integration, with the restoration manager fostering collaboration between the restoration support unit, related stakeholders, and contractors in the early planning and design stage. Drawing on the restoration manager's expertise, valuable input enhances the precision of cost estimation, scheduling, and document preparation for the owner and restoration support unit, ultimately contributing to well-informed execution of the restoration process. Moreover, the method cultivates a more favourable relationship between the contractor and the restoration manager in a consultant role, with this rapport taking root prior to the execution phase—similar to the integrated relationship forged between the restoration manager and the

restoration support unit before the planning and design phase. To ensure a harmonious contractor-restoration support unit alliance, the restoration manager should integrate both parties as early as the mobilization phase.

The process of monitoring and control ensures proactive or remedial measures are enacted based on restoration management plans. This involves establishing priorities to discern between tasks encountering issues during preservation and those proceeding smoothly, then allocating resources and efforts accordingly. The restoration manager undertakes vigilant oversight, tracking process shifts and overall performance while attending to project constraints. This entails data processing and report generation for dissemination among stakeholders.

In the closing phase, the restoration manager compiles a comprehensive report encompassing various aspects. This report must incorporate elements such as the evaluation of process efficiency, organizational structure, all restoration management plans, acceptance logs, an assessment of the restoration support unit, contractors, subcontractors, lessons learned, and recommendations for the post-restoration period.

In summary, the restoration manager project delivery method embodies the advantages of existing methods while mitigating their weaknesses. This is achieved through the clear definition of roles and responsibilities early in the process, early engagement of stakeholders in the design phase, increased emphasis on and competitiveness in contractor selection, enhanced collaboration achieved by mitigating conflicts and promoting stakeholder interests, as well as facilitating better communication among them. Furthermore, it entails the augmentation of flexibility during the execution of the restoration project while effectively managing changes and issues.

The restoration manager is a highly collaborative project delivery method that focuses on quality and project success. The stakeholders like the owner, restoration support unit, related stakeholders, contractors and subcontractors, all work together in collaboration, aligning their goals and incentives for a better restoration outcome.

Restoration manager's strong focus on collaboration, early involvement, and shared risk/reward align well with the goals of achieving the highest quality in heritage restoration projects. By addressing the challenges through improvements in promoting a collaborative culture, clear contracts, effective communication, project management tools, and quality assurance protocols, restoration manager project delivery method can offer a more comprehensive approach to ensuring the successful restoration process.

These characteristics make restoration manager project delivery method also ideal for complex and challenging projects such as the restoration of architectural heritage works.

3. Results

The online survey conducted for the first author's doctoral study titled "Development of a Sustainable Integrated Management System for the Conservation of Architectural Heritage" at Ankara Hacı Bayram Veli University, Department of Conservation of Cultural Property, was answered by the participants.

The questionnaire used in this study is consisting of five sections and includes of introduction, explanation of the survey content, survey participant information, questions section and conclusion section. The questions section has seventeen questions under five separate chapters. Some questions included an option as “other” so that reflecting different views was allowed. The first questions were demographics questions. Then the question reflecting the preference of the project delivery methods in the survey is “Which project delivery method do you think is more suitable for the restoration of architectural heritage?” and the answers given were examined statistically.

47 of participants (45.63%) had a master's degree, 34 of participants (33.01%) had a bachelor’s degree, 13 of the participants (12.62%) had a doctorate or higher degree, and 9 of the participants had an associate degree (% 8.74) (Table 1).

Table 1. Graduation status of the participants.

Graduation status	N	%
Master’s Degree	47	45.63
Bachelor’s Degree	34	33.01
PhD and above	13	12.62
Associate’s Degree	9	8.74
Total	103	100.00

51 of participants (49.51%) are architecture graduates, 22 of participants are engineering graduates (21.36%), 10 of participants are graduates of vocational high school (9.71%), 9 of participants are fine arts graduates (8%, 74), 6 of participants are graduated from social sciences (5.83%), and 5 of participants (4.85%) are graduated from other departments (Table 2).

Table 2. Departments from which the participants graduated.

Departments	N	%
Architecture	51	49.51
Engineering	22	21.36
Vocational School	10	9.71
Fine Arts	9	8.74
Social Sciences	6	5.83
Other	5	4.85
Total	103	100.00

46 of the participants were from the private sector (44.66%), 36 of them were from the public sector (34.95%), 16 of them were academicians (15.53%), and 5 of them were other (4.85%) (Table 3).

Table 3. The professions of the participants.

Professions	N	%
Private Sector	46	44.66%
Public Sector	36	34.95%
Academics	16	15.53%
Other	5	4.85%
Total	103	100.00%

While 33 of the participants have more than 15 years of experience (32.04%), 29 of them have 1 to 5 years of

experience (28.16%), 26 of them have 6 to 10 years of experience (25.24%) and 15 of them stated that they have 11 to 15 years of experience (14.56%) in restoration of architectural heritage field (Table 4).

Table 4. Experience of the participants in restoration of architectural heritage field.

Experience	N	%
More than 15 Years	33	32.04
1-5 Years	29	28.16
6-10 Years	26	25.24
11-15 Years	15	14.56
Total	103	100.00

The answers given to the question of "Which project delivery method do you think is more suitable for the restoration of architectural heritage?" are given in Table 5.

Table 5. The preferences of the participants about project delivery methods.

Preferences	N	%
Restoration Manager	43	41.75
Design-Bid-Build	23	22.33
Design-Build	22	21.36
Other	9	8.74
No Answer	6	5.83
Total	103	100.00

When the preferences of the participants about project delivery methods for the restoration of architectural heritage are examined, 43 of the participants think restoration manager method (41.75%) is more suitable for restoration of architectural heritage, 23 of them preferred design-bid-build (22.33%), 22 of them preferred design-build (21%, 36), 9 (8.74%) preferred other methods and 6 of the participants (5.83%) did not prefer to answer the question.

It is seen that the Restoration Manager Method is the first choice among all the participants, while the Design-Bid-Build and Design-Build methods are less preferred.

14 of participants who are associate and bachelor's degree think both the Restoration Manager and the Design-Build method are suitable for restoration of architectural heritage equally. On the other hand, 29 of participants with a master's degree or higher think that the Restoration Manager method is suitable for restoration of architectural heritage (Table 6).

Table 6. Project delivery method preferences of the participants according to their graduation status.

Contract Preferences	Associate and Bachelor's (%)	Master's and Above (%)
Restoration Manager	14 (13.59)	29 (28.16)
Design-Bid-Build	10 (9.71)	13 (12.62)
Design-Build	14 (13.59)	8 (7.77)
Other	6 (5.83)	3 (2.91)
No Answer	1 (0.97)	5 (4.85)

It can be observed that the preference percentage of the Restoration Manager method preferred by those having a master's degree or higher is more than the sum of the two options preferred by those having associate and bachelor's degrees. Also, the Restoration Manager method was preferred twice as much as the other closest preferences of the participants having a master's degree or higher.

24 of the architecture graduates (23.30%) and 13 of the graduates from other departments (12.62%) preferred the Restoration Manager method, 9 of the engineering graduates (8.74%) think that the Design-Bid-Build method is more suitable for restoration of architectural heritage (Table 7).

Table 7. Project delivery method preferences of the participants according to their graduation schools.

Project Delivery	Architecture (%)	Engineering (%)	Other (%)
Restoration Manager	24 (23,30)	6 (5.83)	13 (12.62)
Design – Bid - Build	8 (7.77)	9 (8.74)	6 (5.83)
Design-Build	12 (11.65)	5 (4.85)	5 (4.85)
Other	6 (5.83)	1 (0.97)	2 (1.94)
No answer	1 (0.97)	1 (0.97)	4 (3.88)

Restoration Manager, which is the method preferred by the majority of graduates of architecture and other departments, was preferred more than 4 times (35.92% vs. 8.74%) of the majority of engineering graduates.

9 of the academicians (8.74%) and 21 of the private sector employees (20.39%) think that the Restoration Manager method is suitable for restoration of architectural heritage. On the other side, 14 of the participants from the public sector (13.59%) prefer the Design-Bid-Build method (Table 8).

Table 8. Project delivery method preferences of the participants according to their professions.

Project Delivery	Academician (%)	Public (%)	Private sector (%)	Other (%)
Restoration Manager	9 (8.74)	11 (10,68)	21 (20.39)	2 (1.94)
Design-Bid-Build	2 (1.94)	14 (13.59)	7 (6.80)	0 (0.00)
Design-Build	4 (3.88)	6 (5.83)	11 (10,68)	1 (0.97)
Other	1 (0.97)	2 (1.94)	4 (3.88)	2 (1.94)
No Answer	0 (0.00)	3 (2.91)	3 (2.91)	0 (0.00)

It is observed that 20 of the 36 participants working in the public sector are engineering graduates. The Restoration Manager, which is preferred by the majority of academicians and those working in the private sector, was chosen more than twice the majority of the public sector participants (29.13% vs. 13.59%).

12 of the participants with 1-5 years of experience (8.74%), 14 of the participants with 6-10 years of experience (13.59%), 6 of the participants with 11-15 years of experience (5.83%) and 11 of the participants with more than 15 years of experience (10.68%) prefer the Restoration Manager delivery method (Table 9).

It is observed that all participating groups preferred the Restoration Manager method. The 41.38% of participants with 1-5 years of experience, 53.85% of the participants with experience between 6 to 10 years, 40% of the participants with 11-15 years of experience and

33,33% of the participants having 15 years or over experience have chosen this approach as a more suitable delivery method for restoration of architectural heritage.

Table 9. Project delivery method preferences of the participants according to their experience.

Project Delivery	1-5 years (%)	6-10 years (%)	11-15 years (%)	over 15 years (%)
Restoration Manager	12 (11.65)	14 (13.59)	6 (5.83)	11 (10.68)
Design-Bid-Build	4 (3,88)	7 (6.80)	6 (5.83)	6 (5.83)
Design-Build	10 (9.71)	5 (4.85)	1 (0.97)	6 (5.83)
Other	1 (0.97)	0 (0.00)	0 (0,00)	8 (7.77)
No Answer	2 (1.94)	0 (0.00)	2 (1.94)	2 (1.94)

4. Discussion

Upon a thorough examination and comparative analysis of the project delivery methods, the survey results have been presented. The online survey, conducted as part of the doctoral study on the development of a sustainable integrated management system for the conservation of architectural heritage, garnered responses from a diverse participant pool. The study's demographic insights revealed a mix of participants with different educational qualifications, ranging from bachelor's to doctoral degrees, representing various disciplines such as architecture, engineering, and fine arts. Moreover, respondents hailed from different sectors, including the private and public sectors, academia, and other domains. The stratification of participants based on their professional backgrounds provided a rich dataset for analysis.

One of the standout findings was the overwhelming preference for the Restoration Manager method among the participants. This discovery held true across educational categories, professional sectors, and experience levels. The breakdown of preferences based on educational attainment demonstrated intriguing patterns, with master's degree holders or higher exhibiting a notably stronger inclination toward the Restoration Manager method. Further dissection of preferences within professional sectors illuminated distinctive trends. Academicians and private sector employees predominantly favoured the Restoration Manager method, while a noteworthy proportion of public sector participants leaned toward the Design-Bid-Build method. This nuanced understanding suggests that contextual factors, such as the nature of work in different sectors, play a pivotal role in shaping preferences. The examination of preferences based on the participants' years of experience in the field added another layer of insight. The Restoration Manager method emerged as the preferred choice across all experience brackets, challenging assumptions about the influence of experience on project delivery method preferences.

As a result, the survey outcomes not only shed light on the prevalent preferences for project delivery methods in architectural heritage restoration but also provided a deeper understanding of how these preferences vary across educational, professional, and experiential dimensions. The findings offer valuable implications for both academia and practice, emphasizing the need for tailored project delivery approaches that align with the diverse needs and contexts of architectural heritage conservation.

Accordingly, the selection of characteristics and attributes has been conducted, emphasizing the capacity to enhance the restoration of architectural heritage. Subsequently, this section is dedicated to a comprehensive discussion of the study, with a particular focus on the potential implementation of the restoration manager project delivery method.

Design phase is a pivotal aspect throughout restoration works. In the Design-Bid-Build approach, design authority primarily lies with the owner and their selected architect. However, once the project is contracted to the contractor, making design alterations becomes less flexible and feasible. Conversely, the Design-Build method consolidates design control within the design-build entity, facilitating adaptability during the restoration works. While the owner maintains substantial design influence, the construction manager's input during the design phase is valuable in the CMAR method, where the construction manager bears the contractor responsibilities. Integrated project delivery embraces collaborative design decisions among key stakeholders, offering enhanced flexibility [35,71].

The Integrated Project Delivery (IPD) method is a project procurement approach that has been recognized for its ability to facilitate superior project performance [72]. It is a contractual agreement that establishes a common set of terms, expectations, and project goals among the project participants [73]. IPD has been positively linked with sustainability in design and construction [74]. One of the key benefits of IPD is its impact on design flexibility. By involving key stakeholders early in the project, IPD allows for greater collaboration and communication, which leads to more flexible design solutions [75].

In DBB, the designer is responsible for creating the design documents, and the contractor is responsible for executing the construction based on those documents. The roles and responsibilities are clearly defined, but there may be limited collaboration between the designer and the contractor. However, DB fosters collaboration and teamwork between the designers and contractors. The roles and responsibilities are more integrated, allowing for innovation and efficiency [76]. The construction manager acts as an advisor to the owner and coordinates the construction activities and the roles and responsibilities are shared between the owner, designer, and construction manager in CMAR [77]. In IDP, the roles and responsibilities are shared among all team members, promoting transparency and collaboration and this method emphasizes early involvement and integration of all stakeholders [78].

In IPD, the roles and responsibilities of the contractor are redefined. The contractor becomes an integral part of the project team, working closely with the owner and other stakeholders from the early stages of the project [79]. This increased involvement allows the contractor to

contribute their expertise and insights, leading to more efficient and successful project delivery.

CMA, CMMP, and JOC are other project delivery methods in construction management, each with its own roles and responsibilities. CMA involves the construction manager acting as an advisor to the owner, CMMP involves the owner directly contracting with multiple prime contractors, and JOC involves a long-term contract with a construction contractor for smaller projects [80]. Comparing these methods, DBB and CMAR have more defined roles and responsibilities, but may lack collaboration and innovation, while DB and IDP promote collaboration and teamwork, leading to better project outcomes [81].

Zhang et al. [82] highlighted that the conventional DBB method does not support effective communication and collaboration among designers, builders, and owners, leading to project cost growth and delays. This suggests that DBB may have limitations in promoting collaboration and communication compared to other delivery methods. Furthermore, Hasanzadeh et al. [84] found that CMAR outperformed DBB in terms of design satisfaction and construction satisfaction, while DB projects had lower schedule growth compared to DBB projects. These results indicate that CMAR and DB may have advantages in facilitating collaboration and communication, leading to improved project performance.

Effective communication and collaboration constitute vital feature of successful restoration projects. Design-Bid-Build's communication between owner, designer, and contractor can be fragmented due to separate contracts. In the Design-Build approach, close collaboration between design and construction teams is innate due to their unified identity. CMAR's inclusion of the construction manager from early phases fosters collaboration, while Integrated project delivery embodies a pure collaborative model [45,57].

Collaboration and communication are essential components of IPD. The method encourages close collaboration among all project participants, including the owner, architect, contractor, and other key stakeholders [75]. This collaborative approach fosters a culture of trust and mutual benefit, leading to improved project outcomes [84]. Effective communication is crucial in IPD to ensure that all parties are aligned and working towards the same project goals [85].

A study by Suratkon et al. [49] compared the characteristics of procurement methods in Malaysia and found that the DB method fulfils almost all the characteristics under six categories, indicating its high level of flexibility. Similarly, Gabel et al. [86] found that changes related to unforeseen conditions had a greater impact on project cost, and such changes were more commonly experienced in DBB projects compared to DB or CMAR delivery methods. This implies that DB and CMAR may have better change management strategies and flexibility in dealing with unforeseen conditions. Overall, DB and CMAR methods may offer better flexibility and change management practices compared to DBB, however, further research is needed to explore the specific strategies and mechanisms to enhance flexibility and change management.

Considering risk allocation, Design-Bid-Build places substantial risks on the owner, whereas in the Design-Build approach, the design-build entity shoulders these risks. Construction managers assume execution risks in CMAR, whereas Integrated project delivery, characterized by contractual alignment among the owner, constructor, and designer, distributes risks across participants [67].

So, analyzing the restoration manager approach in terms of design control, its distinctive feature lies in the early integration of the restoration manager with the restoration support unit and contractors, enhancing the ease and flexibility of design control. Regarding communication and collaboration within the restoration manager method, it actively fosters engagement and cooperation among all stakeholders, recognizing their inclusion as a valuable asset. Analysing risk allocation and distribution, the restoration manager method exhibits characteristics parallel to a method integrated into a comprehensive restoration management system. Risks are allocated among stakeholders, including the owner as the decision-maker, the restoration manager as a consultant, the restoration support unit as the designer, and the contractor as the executor of restoration activities. Addressing quality of applications intended to safeguard the originality and integrity of the architectural heritage, the restoration manager method stands as effective. This is evidenced by the heightened project quality attributed to the early engagement of the restoration manager, an expert in architectural heritage restoration, who actively contributes to the design phase alongside the restoration support unit and to the execution phase alongside the contractor.

The restoration manager method proves to be an effective approach for restoration projects due to the enhanced design control, improved communication and collaboration, optimized risk allocation, expertise-driven decision-making and quality.

The early integration of the restoration manager with the restoration support unit and contractors facilitates design control and allows for necessary adjustments and refinements. Flexibility is thus offered as required. Heightened communication and collaboration among all stakeholders engaged in the restoration project is encouraged by the restoration manager method. This inclusive approach recognizes the value of input from various parties, contributing to comprehensive project development.

Within an integrated restoration management framework, the restoration manager method allocates risks among stakeholders, including the owner, restoration manager, restoration support unit, and contractor. This approach of collective responsibility contributes to a more balanced risk management strategy.

The involvement of a restoration manager, possessing expertise in architectural heritage restoration, enriches the decision-making process. Their consultative role, in conjunction with collaboration with the restoration support unit and the contractor, ensures well-informed choices that enhance project outcomes.

Commencing from the project's outset, the engagement of the restoration manager, coupled with

their expertise on the restoration of architectural heritage, significantly amplifies the emphasis on project quality that restoration implementations increase in compliance with conservation principles. By assisting the restoration support unit during the design phase and the contractor during the execution phase, the restoration manager method contributes to upholding high standards in the final project.

5. Conclusion

In conclusion, project delivery methods hold significant importance in determining the success of construction projects. Although many options, ranging from traditional to integrated approaches, exists within the realm of PDMs, yet no single method can be universally deemed perfect due to the inherent uniqueness of each project. Within the specific context of restoration of architectural heritage, the imperative for developing a tailored project delivery method becomes evident, aimed at optimizing project success. The conceptualization and development of the restoration manager delivery method stemmed from a comprehensive assessment of existing conditions, facilitated by an in-depth literature review and an inclusive survey. This approach emerged as a result of examining the prevailing limitations and strengths of conventional methods. Through careful design and consideration, the restoration manager delivery method was constructed to address the specific demands of architectural heritage restoration projects.

In restoration manager project delivery method, design control is central, ensuring that restoration efforts are in line with strategic restoration goals. Communication and collaboration are key elements, as the restoration manager oversees the restoration processes executed by the contractor, effectively managing stakeholder expectations and resource allocation, all while conducting comprehensive risk and quality management. Roles and responsibilities are clearly defined during the initiation phase, enhancing the efficiency of the restoration process. Stakeholders come together to deliberate key issues, leading to informed decision-making. This phase sets the foundation for the entire restoration project, establishing objectives, expected outcomes, and key results. The restoration manager method emphasizes a separation of contracts to minimize unnecessary interactions and maintain a focus on essential engagement and data sharing. This approach significantly reduces potential complexities during the restoration process. In the planning and design phase, competitive bidding or procurement selects the restoration support unit. The Restoration Handbook becomes a vital document, serving as a communication reference and standardizing reports and documents. It fosters consensus among stakeholders regarding restoration outputs and procedures. The restoration manager, however, introduces integration, bringing designers and contractors together, reducing claims, disputes, and constraint issues. Expertise-driven decision-making and quality assurance are integral, with the restoration manager facilitating collaboration between all stakeholders. Early involvement ensures well-informed execution of the restoration process. The monitoring and control phase includes proactive and remedial measures based on restoration management plans. The restoration manager provides oversight, tracks process shifts, and generates reports for all stakeholders. The final phase involves comprehensive reporting, evaluating process efficiency, organizational structure, and lessons learned. The restoration manager project delivery method combines the strengths of existing methods while mitigating their weaknesses through early engagement, increased competitiveness in contractor selection, collaboration, clear communication, and quality control and assurance protocols. Thus the restoration manager project delivery method represents an innovative project delivery approach so that implementing this method increases the likelihood of achieving successful architectural heritage restoration.

The validation of the method was carried out by engaging professionals from diverse backgrounds, professions, and experiences within the restoration field with a survey. The response was encouraging, with participants consistently indicating a preference for the restoration manager method over alternatives. This endorsement underscores the method's viability and alignment with the unique demands of architectural heritage restoration.

The study of the Restoration Manager Project Delivery Method (RM) also has its limits and potential areas for further exploration.

Firstly, the study primarily focuses on the restoration manager method in the context of the restoration of architectural heritage works. While it demonstrates the method's effectiveness in this specific area, its applicability to other types of construction projects remains to be explored. The limits of its generalizability to diverse project types, scales, and geographical regions need further investigation. The restoration manager method's suitability in different cultural and regional contexts also remains a topic for further study. In addition, Cultural variations in project management practices, legal frameworks, and stakeholder dynamics may impact the method's effectiveness. Another limit and potential of the study is on long term outcomes. This study primarily focuses on the restoration manager method during the restoration process. However, a comprehensive assessment of its long-term outcomes on the preservation of architectural heritage, durability, and ongoing maintenance should be explored in future research. Adding to that, in-depth case studies across diverse restoration projects would provide a more comprehensive understanding of the method's limits and potential variations in its application.

The exploration of project delivery methods remains an ongoing pursuit, and this study's findings and methodologies are poised to contribute to further inquiries. By shedding light on the restoration manager method, this study aims to guide and inform fellow researchers and practitioners, empowering them to make informed decisions in selecting project delivery methods within the architectural heritage restoration.

The restoration manager method operates within specific legal and regulatory frameworks. An in-depth examination of how these frameworks influence the

method's implementation and how they may vary across different regions is an opportunity for future research.

And lastly, the scalability of the method to large or complex restoration projects remains to be thoroughly assessed. Investigating the method's performance and adaptability in projects of varying scales and complexities is an essential area of research. While the study sheds light on the restoration manager method's potential, it serves as a foundation for further research that can delve into its broader applicability, effectiveness in different contexts, and long-term outcomes. Addressing these limits and exploring these areas will contribute to a more comprehensive understanding of the restoration manager method's potential and challenges.

The study of the restoration manager project delivery method (RM) not only enriches the understanding of an approach to architectural heritage restoration but also presents significant contributions to the academic field and professional practice. Academically, it lays the foundation for in-depth research on the broader applicability of the restoration manager across diverse projects and cultural contexts, fostering a more comprehensive understanding of project delivery methods. Additionally, it calls for future studies, opening paths for comparative analyses. Professionally, the restoration manager method introduces a collaborative culture, clearer contracts, effective communication and collaboration, and enhanced project management, helping to have improved restoration practices and successful project outcomes.

As this study concludes, it is an aspiration that this research serves as a foundational steppingstone for future investigations into the domain of project delivery methods. Further research in this area can explore the specific mechanisms and strategies employed within the restoration manager method, as well as its applicability and effectiveness in different restoration projects. Additionally, the method's potential for adaptation in various cultural and geographical contexts could be a valuable subject for future studies. Future studies can explore the perspectives of owners, contractors, restoration experts, and other project participants to gain a well-rounded view of the method's challenges and benefits.

Author contributions

Mehmet Emre Aktuna: Conceptualization, Methodology, Investigation, Writing-Original draft preparation. **Bekir Eskici:** Data curation, Validation, Reviewing and Editing

Conflicts of interest

The authors declare no conflicts of interest.

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