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Project Management in Construction: International Methodologies and Approaches for Ukraine's Reconstruction

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Abstract

The global construction industry is entering a transformative era, marked by the introduction of new technologies and sustainability requirements, as well as the expansion of the circle of stakeholders and their interests, allowing for improved connectivity and optimal processes of decision-making in planning and budgeting of the project. The right choice of methodologies and approaches in project management becomes a crucial factor in any construction project's success. Thus, investigating current practices and trends of project management in construction becomes highly relevant task. Based on the method of bibliographic analysis, backed with the elements of grounded theory, the article presents an attempt to systematize current trends and challenges in the field of project management in construction, determined by the evolution of construction industry. The findings demonstrate the shift towards collaborative design and Agile paradigm in project management in construction, which enables overcoming challenging implications of fast dynamics of construction industry environment. The novelty of the study lies in practical comparison of project management methodologies in construction industry based on the specifics and environment of projects.

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1. Introduction

The reconstruction of Ukraine after the end of the war will require significant efforts. Already now, construction companies are actively studying the issue of participation in infrastructure projects, in the construction of highways, industrial and energy facilities, residential complexes and shopping centers. For the high-quality reconstruction of Ukraine, it is necessary to focus on the best international standards, ensure transparency of processes and maintain a high level of construction quality. In addition, the construction industry in post-war Ukraine can become one of the most important drivers of economic growth, which also corresponds to global trends.

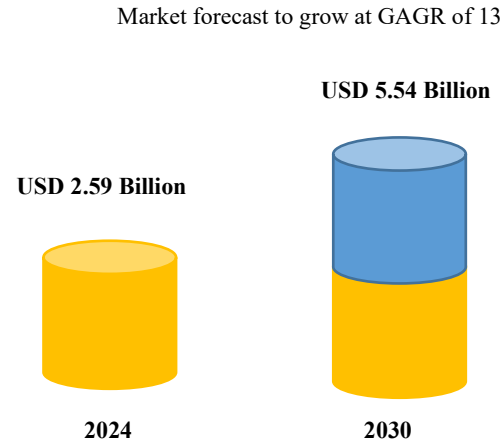
The construction business is characterized with a significant impact on the global economy, shaping the infrastructure that sustains contemporary civilization. However, this critical sector has been dealing with a number of long-standing issues. A troubling element is the construction industry's slowness in innovation and technology adoption. According to a European Commission assessment, construction has the lowest R&D spending of any of the 15 major industries. Investment is mostly directed at software solutions, ignoring key areas such as project management approaches (Casini, 2021). The worrying figure that 70% of construction projects worldwide exceed their budgets and 61% are delayed highlights the need for reform (Omotayo et al., 2024). These inefficiencies have an economic impact since the building sector contributes significantly to GDP and employment creation in most nations.

Efficient techniques of project management are crucially essential in the construction industry. They allow successfully managing risks, allocating resources, establishing scopes, and setting clear objectives. But problems might occur at any stage of the process. The terms "successful" and "failure" are frequently used when a building project is finished, despite the fact that success is not a binary notion and should be evaluated from the perspective of the relative satisfaction of clients' hierarchy. Since there are risks and uncertainties involved in accomplishing project goals, it is essential to identify possible threats and opportunities and analyze how they may affect project goals. A construction project often involves several important stakeholders who are connected to the final product, which complicates the traditional economic methodology of projects assessment (Ahmed & Mohammed, 2019). The 'product' of the project will be evaluated by all of the stakeholders, while each of them has own expectations and degree of interest, thus it is necessary to analyze the relative uncertainties associated with each of them independently (Mashali et al., 2023).

Moreover, since environmental and social concerns get more attention, the global construction sector is experiencing increasing pressure to adopt sustainable methods. Stakeholders in the construction industry are actively seeking methods to reduce their negative effects on the environment and society (Misnan et al., 2024). Among the challenges faced by construction project managers, there are cost constraints, a lack of expertise and training, resistance to change, and the complexity of sustainability measures. Implementing sustainable building methods, suited to the circumstances of construction companies, implies an understanding of these issues and paying close attention to them.

Also, digital tools make sound impact on practices, techniques, and strategies of project management in the sector of construction. A paradigm change in construction management has been linked to the introduction of BIM (Parsamehr et al., 2022). The market for building project management software is changing quickly due to shifting supply and demand patterns. These insights give businesses useful information they can use to plan, make investments, and take advantage of new possibilities. In 2024, the market for construction project management software was valued at USD 2.59 billion, up from USD 2.28 billion in 2023. By 2030, it is anticipated to have grown to USD 5.54 billion at CAGR of 13.48% (Figure 1).

Figure 1. Market growth for construction project management software



Source: Construction Project Management Software Market by Deployment (2024)

However, digital solutions, in particular, BIM, will enable successful project management practice only under conditions of existence of effective project management paradigm, tailored for specific types of construction project, its scope, stakeholders, resources, and expected results. This necessitates consideration of methods, approaches, and tools of project management in construction within a systemic paradigm.

2. Literature Review

Overall, fundamental components of project management include integrating, tracking, and controlling the contributions to the project and their output, as well as evaluating and choosing options in order to satisfy the customer with the project's conclusion (Mubarak, 2024). The PMI (Project Management Institute) definition, which is closely related to the project life cycle, emphasizes the accomplishment of predefined project objectives, which often include scope, quality, time, cost, and participant satisfaction (Lock, 2016). Along the way to completion, a building project passes through several stages. Usually, a project starts as an idea or concept and progresses via feasibility studies, implementation, and final completion.

In their study, Oyekunle et al. (2024) examine how well sixty PMBoK techniques can reduce construction disputes and improve project outcomes in the UK's construction sector, which makes a substantial contribution to the GDP of the country. The authors conducted a survey of project managers with at least two years of experience. Eighty-one percent of the twenty-seven project managers in the cohort were polled. In order to assess the extent and comprehend the range and impacts of various management approaches, descriptive and inferential statistics as well as SPSS were used to analyse the common industry practices and their relationship to project success. The results show that project management techniques are widely used by construction project managers in the UK. The most commonly used practice was progress reports, while bidders' conferences were the least used. Construction project performance has been found to be significantly impacted by critical areas including scope, schedule, cost, and integrated management. Furthermore, the data indicates a greater knowledge and utilization rate of project management tools, methods, and methodologies among project managers who reported successful project results during the previous two years.

Demirkesen and Ozarhan (2017) examine how different integration management components affect the performance of construction project managers and quantify the connection between integration management and those components. While time, quality, cost, safety, and, naturally, client satisfaction represents the dimensions of project management performance, the suggested components of integration management are the creation of a project charter, knowledge and process, staff integration, supply chain integration, as well as integration of changes.

According to some experts (Jang et al., 2022), project performance is directly impacted by integration management effectiveness. Effective project management frequently determines how effectively a project is finished. To put it another way, a project that has effective integration management will usually be finished safely, on time, under budget, and to the client's satisfaction. In order to improve construction efficiency, integration management encompasses all aspects of a project and is essential for developing an appropriate framework for monitoring significant stakeholder requirements. Recent technological developments have

made it easier to manage the integration of projects. For instance, teams may access information on a single, centralized platform using XYZ BIM. Real-time updates facilitate collaboration between office and onsite personnel, combining crucial data for more efficient project execution (Cha & Jiang, 2021).

Recently, increasingly more attention is paid to sustainability-related aspects of project management in construction.

Taking into account weak scope definition, unsettled communication patterns, resource mismanagement, and regulatory impediments, Shah et al. (2023) study examines literature from credible journals during the past ten years and identifies these as the main obstacles to project success. According to the authors, specific goals like waste reduction, water conservation, energy efficiency, and social responsibility must be established in order to accomplish sustainable building projects. According to their results, combining sustainable materials, overall green building design, waste management, water conservation, biodiversity promotion, smart technology, and performance monitoring systems is another way to integrate project management with sustainability. It is asserted that building projects may succeed while guaranteeing environmental responsibility, social equality, and economic viability by implementing sustainable methods and efficient project management techniques.

However, Abdelkhalik and Azmy (2022) correctly state that most significant project management frameworks, such as ISO 21500:2012, PMBoK, the Individual Competence Baseline (ICB), and others, do not explicitly or methodically address sustainability and environmental issues. Using Egypt's green construction situation as a case study, the authors attempt to identify the major barriers to adopting sustainability in the building sector. Furthermore, by applying project management best practices to overcome the key impediments to the green building project movement, the authors aimed to investigate project management' role in the success of green building efforts. The findings indicated that there are not many management techniques that deal with environmentally friendly building projects. Furthermore, the process of managing green buildings lacks a well-defined framework. Additionally, managing and implementing green buildings is made more challenging by the unclear roles that stakeholders in green building initiatives play. The greatest approaches and techniques in project management, however, could get beyond a few specific barriers.

According to Madan and Sahai (2019), the PMBoK's environment management knowledge domain should incorporate lifetime analysis and ecosystem service value. However, other authors rightly claim that sustainability in project management means more than just observing environmental regulations (He & Chen, 2021). It includes incorporating sustainable practices into all project' stages, from planning to the very completion. Project managers should assess resource usage from sustainability viewpoint, make all efforts to reduce environmental effects, promote social justice, and enable long-term financial

sustainability. Project management sustainability implies implementing strategies that benefit stakeholders and the environment in the long run.

Zhang et al. (2019) illustrates the 'matrix' of stages and difficulties of the project lifecycle that are part of project management. Stakeholder misalignment results from unclear beginning objectives and scope. Inadequate feasibility analysis results in resource shortages and irrational ambitions. Costs and delays are increased by planning scope creep. Conflicts arise when project length and resource requirements are underestimated (Mubarak, 2024). For a project to be successful, proactive planning, communication, stakeholder participation, risk management, and ongoing monitoring are essential.

While the literature presents detailed, evidence-baked, and valuable investigations within the area of project management in construction, they are rather scattered and devoted to specific narrow issues. The aim of the current article is to systematize and outline core approaches, visions, and methodologies in project management within the construction industry, with the identification of existing prospective trends.

3. Methodology

The research was carried out within a constructivist paradigm, attempting to 'extract' clear trends from the broad array of existing studies, data, practices, and cases within contemporary construction industry. At the first stage of research, core vectors for further study were distinguished based on grounded theory elements. Coding and subsequent categorization allowed formulating key areas for research – dynamics and uncertainty, stakeholders issues, sustainability, digital transformation in construction, Agile, integrated project management. On the next stage, bibliographic analysis with the elements of case study was conducted, which allowed describing the landscape of project management in today construction industry, reveal its trends, and outline direction for further research. The search for literature sources was carried out in Google Scholar, JSTOR, ScienceDirect, Emerald Insight, IEEE Xplore, as well as specialized databases for construction research - ASCE, ProQuest.

4. Findings and Discussion

The development of this subject of study and its promotion as a professional specialty in project-oriented sectors, including the construction sector, have been greatly aided by project management standards like PMBoK. The traditional process-based methodology has been replaced with a performance-based approach in the most recent edition of PMBOK, the seventh edition, which has been launched with significant improvements. The goal of the Faraji et al. (2022) study was to examine the most recent version of the PMBoK and how it may be used and modified to the unique features of the construction sector. The findings illustrate the potential relevance of performance domains in building projects, as well as the compatibility of project management concepts. They also show that the

construction industry has unique characteristics in the form of four distinct project types (housing construction, engineering construction, building construction, and industrial construction) with distinct phases in the typical lifecycle. The following is a summary of how the eight PMBoK 7th edition performance domains are interpreted in connection to building projects (Faraji et al., 2022).

1. Stakeholders. Compared to projects in other sectors, construction projects involve a larger number of stakeholders, particularly in the external sector. Internal stakeholders in construction projects typically comprise the classic triangle of client, consultant/architect, and contractor/constructor, however other parties may also be important stakeholders, such as an insurance company or financier. The local population, government agencies, regulatory bodies, different non-governmental groups, environmental activists, and numerous other organizations and authorities can all be considered external stakeholders in a building project. Any project planning must include the responsibilities of these stakeholders, who may have direct or indirect, favourable or unfavourable effects on the project.

2. Team. In contrast to other projects like ICT, the development of industrial products, or research projects, the nature of a construction project, which culminates in actual buildings and constructions through the completion of studies in various areas of expertise, makes teamwork entirely different. It is true that several teams may develop and disband throughout the course of a building project; additionally, it is not uncommon for multiple separate teams to form simultaneously, each of which has its own project manager inside the company. This reality leads to the problem that each party involved in a building project is typically a subset of a larger organization with intricate bureaucracy. As a result, the formation of a cohesive team in building projects leads to several challenges and complications, which are typically resolved by contract law instruments and strategies. As a result, the team structure in a construction project is heavily influenced by the project delivery system type, such as design-building, engineering-procurement-construction (EPC), finance-based methods (like build-operate-transfer (BOT)), conventional methods, or other workable contractual approaches. It is important to note that integrated project delivery (IPD) methods, which are enabled using building information modelling (BIM) technology, offer the maximum degree of teamwork in a focused way and form in construction projects. The construction sector is undergoing a transformation in project planning and execution thanks to BIM and AI. For instance, BIM technology was used during the construction of China's tallest skyscraper, the Shanghai Tower, which reduced material waste by 32% and resulted in considerable cost savings (Nguyen, 2024).

3. Life cycle. Although there are some minor variations amongst various project types in this respect, construction projects typically follow a normal sequence of phases, from fundamental research and designs to construction and operation. Like the project team, the project delivery system has a significant impact on how the life cycle and stages of a construction project are designed and formed. The finance-based techniques, such as BOT contracts, have exaggerated

conditions since the operation phase, which was previously thought to be outside the project boundaries, now fully falls inside the project scope and contractual activities. The 2021 version of the PMBOK's value creation outlook through project management is very effective for construction projects because it emphasizes the operation phase's role as the last ring in the project's added value chain and will support the expeditious completion of phases to meet the customer's intended value. This valuable viewpoint is one approach to introducing more agile, sector-specific principles into the construction industry.

4. Planning. For a building project, it is essential to precisely write the gap-bridging plan between the desired situation (to be) and the actual state (as is) as soon as possible. A construction project involves a lot of consumable and inconsumable resources, such as labor, equipment, materials, land, and, of course, money and time. It is crucial to devote a significant amount of time to project planning in order to use and deploy these expensive resources in an efficient and fruitful way. On the other hand, the project planning considerations need to incorporate important aspects including risks, quality, and project control. In light of climate change and global warming, environmental concerns must be a significant component of the feasibility study during the pre-project stage, particularly for engineering projects like dams, as well as industrial projects, which may have a significant impact on the environment and the natural world. Due to the importance of the planning phase in building projects, both the public and private sectors must primarily use the services of consulting third parties to complete the fundamental planning.

5. Project Work. The project's building phase might be considered the most important stage in the construction business as it consumes the most money and time. Almost all construction projects are implemented using a combination of traditional sequential phases that are arranged according to the plans: facility design and drawing preparation, resource and product procurement, site preparation, and building erection through material addition. Prefabrication, robots, augmented reality, drones, IoT, wearable safety gear, remote site control, and other recent advancements have had a significant influence on building processes and practices. The other important factors in the construction phase include knowledge management, health, safety, and the environment (HSE), project contract management, quality control, and the management of different working groups, whether they are in-house teams or subcontractors.

6. Delivery. In a construction project, the process of delivering the product to the client may end up becoming the project itself! It is important to note that most building projects deal with a hierarchy of goals. During a certain time frame included in the contract, the contractor will remain accountable for the facilities' performance and the quality of the finished product. For this reason, several procedures and tests, such as pre-commissioning/cold tests, commissioning/hot tests, start-up of the created facilities, etc., should be passed during the handover phase of industrial projects to the owner to guarantee final acceptance. Resolving

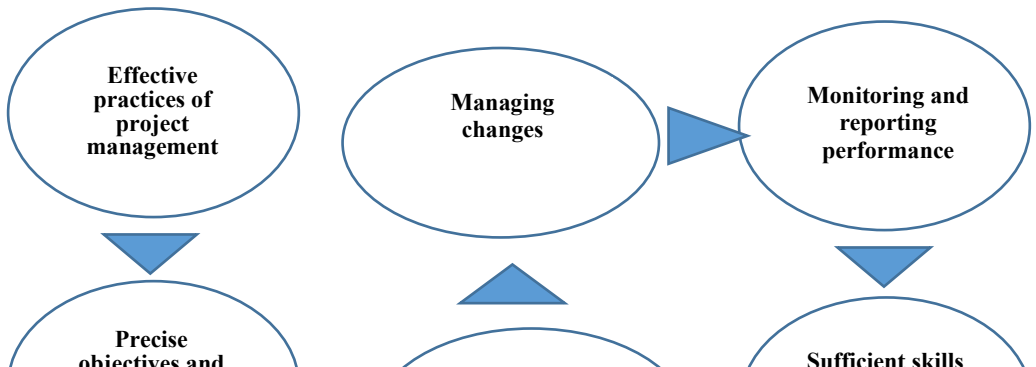
interface problems and battery limit limits should be the client's next priority if they have many contracts with various contractors.

7. Measurement. In construction projects, control activities including budget and schedule monitoring and daily work supervision to guarantee adherence to laws and regulations are an integral component of the daily responsibilities. Although testing to verify the acceptance indices is simple and evaluating finished work is not a difficult operation in construction, control is essential for the portions of the work that will be covered if future access to them is denied. It is important to note that contemporary technology, such as drones, sensors, cameras, image processing, etc., are used on construction sites in order to maintain constant control over the job being done. Additionally, it is typical practice these days to use a variety of technologies, including web apps, to communicate project status to important stakeholders.

8. Uncertainty. The management of uncertainties may be regarded as one of the primary axial operations in the construction business since they can significantly impair the goals of building projects. Risks in the construction sector can be assessed from a variety of perspectives, such as those of the government, the client, and the contractor; at different organizational levels, such as owners, senior managers, and construction sites; and in a number of domains, such as economic, social, political, and technical, all of which have both national and international perspectives. Drilling, digging, and excavation are examples of projects where the very nature of the task itself creates ambiguity, making risk management even more crucial because the project's goals are quite nebulous and there may be hidden impediments beneath the surface.

Successful project management practices imply presence of a matrix of elements (see Figure 2), the interconnection of which evidently means that imbalances and lack of efficiency in one of them will negatively affect the whole system of project management processes.

Figure 2. Effective project management practices within construction project



Source: Mubarak (2024)

The addition of a sustainability component makes this plan much more complex. In order to minimize negative effects on the environment and maximize beneficial effects on the economy and society, sustainable construction project management combines sustainable building materials, sustainable construction development practices, and sustainable management practices (Ershadi & Goodarzi, 2021; Johnson et al., 2020). In turn, Wang (2021) emphasizes that businesses looking for stability and investment attractiveness must implement sustainable building project management, which implies integrating sustainable development concepts into project management. Inadequate comprehension of the possible implications, a lack of collaboration between construction practitioners, research institutions, and environmental organizations, as well as unsystematic nature of approach to achieving sustainability goals represent significant obstacles that could be detrimental for the integration of sustainability in construction project management (Fathalizadeh et al., 2021).

Achieving sustainability of construction projects can be difficult due to a lack of information, inadequate planning, resource limitations, and conflicting objectives. Rapid pace of building, financial limitations, and leadership support

represent further challenges. Moreover, tracking of progress is hampered by inadequate monitoring. Adoption is hampered by a lack of knowledge, the availability of sustainable technology, and unwillingness to change (Alaloul et al., 2023). Planning, communication, resource allocation, stakeholder participation, and strong leadership are all necessary for holistic sustainability.

It should be noted that Integrated Project Management (IPM) is a groundbreaking method of handling building projects. Construction companies may increase productivity, cut expenses, and enhance project quality by considering a project as a cohesive whole rather than as separate parts. IPM is a welcome change in an industry where delays and overruns are all too typical, opening the door to more successful and seamless construction (Fewings & Henjewele, 2019). Table 1 provides description of core elements of IPM in construction.

Table 1. Key components of IPM in construction

Component	**Description**
Technology and Software Unification	Technology integration is one of the pillars of IPM. In addition to offering a visual depiction of the building project, tools such as BIM provide real-time updates and collaboration. There is less likelihood of misunderstandings or out-of-date information because everyone has access to the same, current data.
Collaborative Planning	Every stakeholder collaborates to develop a single strategy from the very beginning of the project. This implies that each team (such as design or procurement) works together from the beginning to ensure that all goals are in line, rather than operating alone.
Integrated Contracts	Conventional contracts are frequently a cause of conflict, particularly when project scopes alter. All significant parties are involved in integrated contracts, which set common goals, risks, and rewards. Instead of encouraging rivalry, this kind of contract encourages collaboration.
Non-discrete Monitoring and Feedback	IPM gives preference to ongoing monitoring rather than waiting for a project phase to finish before evaluating. Loops of frequent feedback ensure quick finding and fixing problems, preventing significant obstacles later on.

Source: Fewings and Henjewele (2019)

In a VUCA world, the construction sector must continuously adapt, in order to survive and grow. This is also highly relevant in the post-war landscape of construction. The construction sector has enormous hurdles in the aftermath of the long-running war. Years of conflict have destroyed infrastructure, including residential neighborhoods, key infrastructure such as dams and water stations, and industrial zones. Reconstruction efforts are impeded by finance shortages and complicated security issues, which exacerbate the VUCA environment.

In this way, it is especially important that Lean Construction provides a holistic approach, which gives the possibility of addressing the sector's difficulties. Thanks to applying Lean concepts, the construction sector can increase productivity, promote innovation, and create a more sustainable future. One of the possible solutions to appropriate issues is Lean Construction. Lean thinking, defined as maximizing customer value while avoiding waste of resources, time, energy, and effort, is consistent with the construction industry's aims of innovation, competitiveness, and sustainability (Mavridou et al., 2022). Lean concepts streamline operations and decrease waste, resulting in increased production while also promoting a culture of non-discrete innovation and improvement. Lean's emphasis on efficiency contributes to improved budget and schedule management. Furthermore, Lean encourages stakeholders to collaborate throughout the project's lifespan (Villanueva, 2023).

Collaborative delivery techniques in construction projects enable occurrence of a new operational environment that encourages effective communication and cooperation among project stakeholders. Collaborative projects and accompanying management solutions are still a relatively new issue, hence specific aspects such as project manager talents in such projects have gotten little attention. Moradi et al. (2020) used a human behavioral approach to evaluate project managers' abilities in collaborative construction projects in Finland, with project managers' daily work acting as the key source of understanding important competences. To collect data from the case projects, we used a web-based questionnaire and semi-structured interviews. The acquired data was used to analyze project managers' behaviors and identify distinct competencies. The study's findings identify eleven important competencies for project managers in collaborative projects, including group skills, language proficiency, leveraging diversity, relationship building, maintaining order, and achievement orientation.

Moradi et al. (2020) attempts to distinguish between the abilities necessary for project managers in construction projects of traditional and collaborative nature. While managerial abilities for traditional construction projects imply the importance of systems and procedures, recognized competencies for collaborative building projects focus on human concerns and management. According to the authors, project managers in collaborative building projects handle people rather than processes and technology. Thus, in collaborative construction projects, behavioral skills relating to human concerns are of fundamental significance, while in construction projects of traditional nature, the essential competences are around systems and techniques.

However, in today 'era of turbulence', even Lean paradigm appears not quite sufficient. More flexible approach is needed – Agile. Agile methodology is quickly changing the construction industry by offering a more flexible, client-focused and efficient approach to project management. This revolutionary system is currently making considerable advances into construction, tackling its particular issues via adaptation, openness, and continual improvement. The capacity to

manage shifting priorities (70%), project visibility (65%), and business/IT alignment (65%) are the top three advantages of agile project techniques in the construction sector, according to a report by Finances Online (*101 Essential Project Management Software Statistics*, 2024).

The foundation of agile construction management is agile software development, which places an emphasis on adaptability, teamwork, and incremental delivery. Agile projects are broken up into brief iterations, often lasting one to four weeks, during which the team works on a list of features or tasks that have been prioritized. At the conclusion of each iteration, the team evaluates the client's or stakeholders' input and progress, modifying the plan as necessary (Kashikar et al., 2016). Agile construction management seeks to minimize waste and uncertainty while providing value to the client more quickly and often (Blokdyk, 2021).

It is all the more important taking into account that the global supply chain disruptions that began during the pandemic and later – war in Ukraine and Middle East armed conflicts impacted the construction industry. Project planning and budgeting are severely hampered by fluctuating material prices and delivery delays. For instance, between 2020 and 2021, steel prices rose by more than 200%, and 71% of contractors said that lengthier lead times or material shortages caused project delays (Nguyen, 2024). Construction companies need to be flexible, welcoming change and constantly modifying their tactics in order to prosper in this fast-paced world.

Upholding a customer-centric approach throughout the project lifetime is a fundamental tenet of Agile techniques. This calls for constant communication with the customer to guarantee that all the requirements and opinions are taken into consideration while making decisions. Companies may better align themselves with the vision and expectations of their clients by including them in building projects. The final product will meet or surpass client expectations because to this practice's flexibility in allowing alterations or revisions depending on consumer input (Blokdyk, 2021). In such initiatives, the practice of daily sprints for improved communication is typically implemented. Team members share their progress plans for the day and any challenges they may encounter during brief, targeted sessions known as daily stand-ups. This procedure guarantees that everyone is 'on the same page' and informed of the project's progress while also encouraging candid communication and teamwork. Daily sprints reduce delays and increase project efficiency by assisting in the early identification and resolution of problems.

Regular retrospectives represent a crucial component of continual development. At the conclusion of each sprint or project phase, regular retrospectives are sessions to discuss what worked, what may be improved, and how to apply these changes in subsequent sprints. By fostering a culture of ongoing learning and development, this approach enables teams to modify their procedures, equipment, and conduct in response to real-world project experiences. In order to

find inefficiencies, learn from errors, and improve team cohesiveness and performance over time, retrospectives are essential (Chathuranga et al., 2023).

Large-scale residential or commercial building projects, where collaboration between several teams and stakeholders is essential, are a great fit for Agile (Jethva & Skibniewski, 2022). While allowing for modifications based on real-time feedback, the agile methodology guarantees that each step proceeds without hiccups. Agile is especially helpful in commercial facilities where customer demands may change, such office complexes or retail malls.

Metrics like historical cycle time and throughput statistics are essential for forecasting and building process optimization. By emphasizing opportunities for improvement, throughput data - the pace at which jobs are finished - helps determine how efficient certain stages of construction work are. Similar to this, historical cycle time - that is, the amount of time needed to do activities or project stages in the past - offers important information for project planning and estimation in the future. With the use of these metrics, construction teams can increase the accuracy of their resource allocation and scheduling, streamline their operations, and make data-driven choices, all of which contribute to more predictable and successful project results.

A case study was suggested by Moreno et al. (2024). The 14-story building construction project, with three basement levels, situated in Guadalajara, Mexico, was the subject of the case study. Forty-eight replies were gathered from a survey that was first offered to 58 construction enterprises that were physically situated within the Guadalajara City, Mexico, metropolitan region. Senior managers and directors were the survey's target audience, guaranteeing that the information was obtained from people with substantial decision-making power and industry knowledge. Following the collection of survey data, a thorough case study in Mexico was conducted using the Agile approach, especially using the Scrum framework. The case study aimed at considering Agile Methodology and Projectification framework's first project phase. Using cooperative and iterative methods, it entailed rethinking the conventional stages of aligning concepts, volumetric evaluation, time analysis, and cost projections. The process promoted dynamic changes in labor expenses, subcontracts, purchases, supplier negotiations, direct and indirect costs, and profit evaluations by including continuous improvement and modification based on Agile principles (Rana et al., 2021). One of the most important conclusions described in the case was that inadequate project designs and modifications to the project's scope represent major obstacles to attaining proper project planning, highlighting the necessity of better management techniques in the building sector (Moreno et al., 2024).

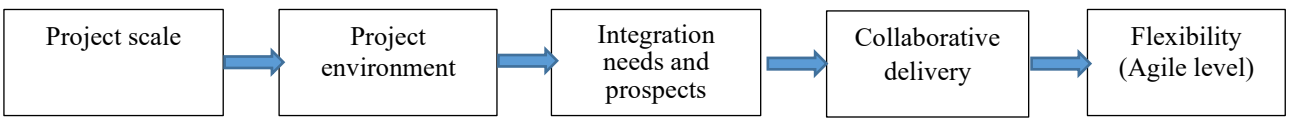
The nature of the project, the surrounding environment, the attributes of the building item, etc., must be taken into consideration at the same time. Sobieraj et al. (2021) specifically examine Polish construction managers' methods and preferences regarding the use of PMBoK and PRINCE2, as the two most widely used project management (PM) standards and techniques. The empirical survey,

which covered 192 Polish SME enterprises from the Polish construction sector, was conducted in a group of managers and construction professionals. With an emphasis on latent variables such as PM flexibility, rigidity, knowledge, and control, the results highlight the factors that might influence the management approach choice. The key findings imply that PRINCE2 is more likely to be associated with rigidity and control, whereas PMBoK is more likely to be associated with flexibility and knowledge. At the same time, as Sobieraj et al. (2021) point out, this does not mean that PMBoK is superior in comparison with PRINCE2. Simply said, a variety of other elements, like the project's scale, the environmental circumstances, the size of the organization executing the project, etc., may influence the choice of approach. Therefore, it could be advisable to use the PRINCE2 technique in some situations (such as for larger and more complicated projects, etc.). Similarly, traditional 'waterfall' approach can be more suitable for some projects in construction than Agile.

The success or failure of any building project is crucially influenced by the delivery mechanism used. Traditional distribution systems are being challenged by changing business conditions, new needs, and technological advances. As a result, there have been a number of developments, including the introduction of new ones in which collaboration among project stakeholders is critical (e.g., project partnership, integrated project delivery, and project alliance) (Omotayo et al., 2024). For the benefit of the project, these new collaborative delivery techniques in construction offer a new operational project environment that can encourage cooperation (sharing information) and collaboration (working together) among various project stakeholders.

Thus, the logic of the estimation regarding expediency to apply a concrete PM methodology/concept implies the following sequence of preliminary assessment (see Fig. 3):

Fig. 3. Logic of the estimating expediency to apply a concrete PM methodology/concept in the construction project



Source: developed by the author

In particular, the following elements and environments can be considered using the above estimation model:

- Mechanisms of interaction between the state, municipalities and business in the implementation of projects.

- Public-private partnership in the construction sector.

- State reconstruction programs and their integration with business interests

Within public-private partnerships in construction sector, collaborative delivery represents the optimal way of PM, allowing balancing the interests of state, businesses, and local bodies/communities.

The sector is anticipated to be dominated in the upcoming ten years by key trends including digitization, prefabricated and modular building, and more automation. More intricate architectural designs will be made possible by these developments, which should also increase efficiency and lower costs. But at the same time, it implies new challenges for project management construction, making it the most crucial element for projects' success.

For Ukraine, within the current situation of war and low predictability of safety situation at least in the short-term perspective, Agile construction approach seems the most suitable vector of construction projects development and implementation. This approach would allow quick taking into account any changes in the project environment and make necessary adjustments. Moreover, this would allow considering community interests and their dynamics.

5. Conclusions

Although it is still playing a vital role in the expansion of the world economy, the sector of construction today sees a wide range of possibilities and problems, which arose because of new developments. The construction industry is evolving into a more complex landscape with numerous stakeholders and sustainability agenda. Also, the regulatory environment has changed significantly in recent years due to rising environmental concerns, safety requirements, and technological developments. Reducing the environmental effect, enhancing workers' safety, and guaranteeing the structural excellence and energy efficiency of buildings are frequently the main goals of new regulatory norms. Additionally, as it was shown above, the construction business has to deal with the intricacies of market swings, such as material prices and economic uncertainty, which have a direct influence on project planning and execution. Construction is being redefined by breakthrough technology, necessitating a reform of project management methodologies (in particular, 3D and 4D printing technology has advanced from prototyping to real construction, allowing for the on-site printing of intricate building structures and transforming conventional building techniques while also suggesting a high degree of flexibility in project management procedures).

Rigid workflows that give preference to predetermined designs and set strict timetables historically have been the foundation of the construction business. However, in today's VUCA climate, there is a noticeable shift toward flexible cooperative techniques, especially Agile. Although waterfall method works well for smaller projects, it is practically unable to cope with the growing complexity of contemporary building. Since Agile is iterative, it provides flexibility, allowing clients, architects, and contractors to work closely together and 'change course' as necessary. For instance, Agile allows for design adaptation without completely halting the project if sustainability becomes a larger priority in the middle of the project. Delineating the future of the construction industry and, consequently, the future of project management techniques and approaches depends heavily on this fusion of innovations and sustainable approaches. Thus, further detailed studies are needed, with the aim of developing new models of project management, based on consideration the whole complexity of influencing factors.

REFERENCES

101 Essential Project Management Software Statistics 2024: Market share & data analysis. (2024). *FinancesOnline*. https://financesonline.com/project-management-software-statistics/

Abdelkhalik, H. F., & Azmy, H. H. (2022). The role of project management in the success of green building projects: Egypt as a case study. *Journal of Engineering and Applied Science, 69,* 61. https://doi.org/10.1186/s44147-022-00112-5

Ahmed, M. N., & Mohammed, S. R. (2019). Developing a risk management framework in construction project based on agile management approach. *Civil Engineering Journal, 5*(3), 608–615. https://gigvvy.com/journals/ijase/articles/ijase-202103-19-1-001

Alaloul, W., Tayeh, B., & Musarat, M. (2023). Sustainable construction of future: Opportunities and challenges for green and buildings. *MDPI AG*.

Blokdyk, G. (2021). *Agile construction*. 5STARCooks.

Casini, M. (2021). *Construction 4.0: Advanced technology, tools and materials for the digital transformation of the construction industry*. Woodhead Publishing.

Cha, H., & Jiang, S. (2021). BIM in the construction industry. *MDPI AG*.

Chathuranga, S., Jayasinghe, S., Antucheviciene, J., Wickramarachchi, R., Udayanga, N., & Weerakkody, W. A. S. (2023). Practices driving the adoption of agile project management methodologies in the design stage of building construction projects. *Buildings, 13*(4), 1079. https://doi.org/10.3390/buildings13041079

Construction Project Management Software Market by Deployment. (2024, October). *Research and Markets*. https://www.researchandmarkets.com/report/construction-project-management-software

Demirkesen, S., & Ozarhan, B. (2017). Impact of integration management on construction project management performance. *International Journal of*

Project Management, 35(8), 1639–1654. https://doi.org/10.1016/j.ijproman.2017.09.008

Ershadi, M., & Goodarzi, F. (2021). Core capabilities for achieving sustainable construction project management. *Sustainable Production and Consumption, 28,* 1396–1410. https://doi.org/10.1016/j.spc.2021.08.020

Faraji, A., Rashidi, M., Perera, S., & Samali, B. (2022). Applicability-compatibility analysis of PMBOK seventh edition from the perspective of the construction industry distinctive peculiarities. *Buildings, 12*(2), 210. https://doi.org/10.3390/buildings12020210

Fathalizadeh, A., Hosseini, M., Silvius, A., Rahimian, A., Martek, I., & Edwards, D. (2021). Barriers impeding sustainable project management: A social network analysis of the Iranian construction sector. *Journal of Cleaner Production, 318,* 128405. https://doi.org/10.1016/j.jclepro.2021.128405

Fewings, P., & Henjewele, C. (2019). *Construction project management: An integrated approach*. Routledge.

He, Z., & Chen, H. (2021). Critical factors for practicing sustainable construction projects in environmentally fragile regions based on interpretive structural modelling and cross-impact matrix multiplication applied to classification: A case study in China. *Sustainable Cities and Society, 74,* 103238. https://doi.org/10.1016/j.scs.2021.103238

Jang, Y., Lee, J.-M., & Son, J. (2022). Development and application of an integrated management system for off-site construction projects. *Buildings, 12*(7), 1063. https://doi.org/10.3390/buildings12071063

Jethva, S. S., & Skibniewski, M. J. (2022). Agile project management for design-build construction projects: A case study. *International Journal of Applied Science and Engineering, 19*(1), 1–11. https://gigvvy.com/journals/ijase/articles/ijase-202103-19-1-001

Johnson, F., Karlsson, I., Rootzén, J., Ahlbäck, A., & Gustavsson, M. (2020). The framing of a sustainable development goals assessment in decarbonizing the construction industry – Avoiding "greenwashing." *Renewable and Sustainable Energy Reviews, 131,* 110029. https://doi.org/10.1016/j.rser.2020.110029

Kashikar, A., Mehta, D., Motichandani, B., & Dasika, C. (2016). A case study on agile and lean project management in construction industry. *IOSR Journal of Mechanical and Civil Engineering, 13*(4), 31–39. https://doi.org/10.9790/1684-1304013139

Lock, D. (2016). *Project management in construction*. Routledge.

Madan, M., & Sahai, A. (2019). Introduction of environment management knowledge area in PMBoK: A preliminary study. *Balkans Journal of Emerging Trends in Social Sciences, 2*(2), 124–133. https://doi.org/10.31410/Balkans.JETSS.2019.2.2.124-133

Mashali, A., Elbeltagi, E., Motawa, I., & Elshikh, M. (2023). Stakeholder management challenges in mega construction projects: Critical success factors. *Journal of Engineering, Design and Technology, 21*(2), 358–375. https://doi.org/10.1108/JEDT-09-2021-0483

Mavridou, T., Doulos, L., & Nanos, N. (2022). Lean thinking into the modular construction of industrial buildings: Identifying the role of daylight. *IOP*

Conference Series: Earth and Environmental Science, 1099, 012020. https://doi.org/10.1088/1755-1315/1099/1/012020

Misnan, M., Ismail, Z., & Yan, T. (2024). Construction project management issues and development in current for future construction project: Challenges and prospects in sustainable project management. *International Journal of Research and Innovation in Social Science, 8*(2), 1997–2011. https://doi.org/10.47772/IJRISS.2024.802141

Moradi, S., Kahkonen, K., & Aaltonen, K. (2020). Project managers' competencies in collaborative construction projects. *Buildings, 10*(3), 50. https://doi.org/10.3390/buildings10030050

Moreno, F., Forcael, E., Romo, R., Orozco, F., Moroni, G., & Baesler, F. (2024). Agile project management in the pre-construction stage: Facing the challenges of projectification in the construction industry. *Buildings, 14*(11), 3551. https://doi.org/10.3390/buildings14113551

Mubarak, S. (2024). *Project management in the construction industry: From concept to completion*. Wiley.

Nguyen, N. (2024, December 25). State of construction 2025: Trends and challenges. *LinkedIn*. https://nilead.com/article/state-of-construction-2024-trends-and-challenges

Omotayo, T., Egbelakin, T., Ogunmakinde, O., & Sojobi, A. (2024). *Innovations, disruptions and future trends in the global construction industry*. Routledge.

Oyekunle, D., Abbey, T., & Ibeh, F. (2024). Project management dynamics: Shaping success in UK construction projects. *Open Journal of Business and Management, 12,* 2099–2117. https://doi.org/10.4236/ojbm.2024.124108

Parsamehr, M., Perera, U., Dodanwala, T., & Kaluthantirige, P. (2022). A review of construction management challenges and BIM-based solutions: Perspectives from the schedule, cost, quality, and safety management. *Asian Journal of Civil Engineering, 24*(2), 333–348. https://doi.org/10.1007/s42107-022-00501-4

Rana, J., Brahmbhatt, K., & Pitroda, J. (2021). Agile application in construction industry. *International Journal of Engineering Sciences & Research Technology, 10*(3), 91–99. https://doi.org/10.29121/ijesrt.v10.i3.2021.13

Shah, F., Bhatti, O., & Ahmed, S. (2023). Project management practices in construction projects and their roles in achieving sustainability: A comprehensive review. *Engineering Proceedings, 44*(2), 13. https://doi.org/10.3390/engproc2023044002

Sobieraj, J., Metelski, D., & Nowak, P. (2021). PMBoK vs. PRINCE2 in the context of Polish construction projects: Structural equation modelling approach. *Archives of Civil Engineering, 67*(2), 551–579. https://doi.org/10.24425/ace.2021.137185

Villanueva, M. (2023, October 9). 7 challenges that the construction industry faces and how lean construction can help. *LinkedIn*. https://www.linkedin.com/pulse/7-challenges-construction-industry-faces-how-lean-can-villanueva-tjpkf/

Wang, W. (2021). The concept of sustainable construction project management in international practice. *Environment, Development and Sustainability, 23*(8),

12248–12265. https://doi.org/10.1007/s10668-021-01333-z

Zhang, Y., Wang, H., Gao, W., Wang, F., Zhou, N., Kammen, D. M., & Ying, X. (2019). A survey of the status and challenges of green building development in various countries. *Sustainability, 11*(19), 5385. https://doi.org/10.3390/su11195385