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An attempt to apply management methods to the cost optimisation of modular construction

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Summary

Nowadays, many management methods are used in the implementation of investment processes. Their common attribute is optimising the total cost of implementing an investment project by reducing all types of costs at each stage of the process. This is particularly important if the investment process is very complex since it is implemented according to the idea of modular construction. The aim of this study is to identify those modern management methods that improve the investment process by leading to the optimisation of the costs involved. These methods refer to the management process of the investment project (Agile Scrum Method, Kanban Method, Lean Construction Method) or directly to the management of the costs generated by the project (Activity-Based Costing). Together these methods will contribute to optimising the total cost of the project. Moreover, their applicability means they can be directly implemented or modified in any investment project that utilises modular construction. The features of the mentioned methods were identified and adapted to the specificity and requirements of the investment process in modular construction using the desk research method. As a result, it has been noticed that the use of management methods such as Agile Scrum, Lean Construction and ABC are crucial in the implementation of modular construction projects due to their ability to streamline processes, increase cost and time efficiency, and enable flexibility in the event of changing requirements.

Keywords

modular construction • cost optimisation • Activity-Based Costing • Lean Construction Method • Agile Scrum Method

1. Introduction

The concept of modular construction usually refers in the subject literature to a construction method that involves building with prefabricated modules or units. The modules are usually manufactured off-site in a controlled factory environment and then transported to the construction site for final assembly. As a result, it is possible to follow the idea of modular construction, which increases the efficiency, speed and cost-effectiveness of the entire construction process. Achieving the aforementioned performance is seen as a potential benefit of reducing the costs of the investment process. However, the usual methods of assessing the benefits of the modular construction idea boil down to considering mainly the costs of materials, labour and transport when comparing the various options available – which can undoubtedly assist in the process of reducing the cost of investment implementation. However, many cost categories that are difficult to quantify in the investment process, whose value is diluted in the total costs or not included in them, but intuitively indicated as important from the point of view of the implementation of the overall process, are often overlooked [Blismas et al. 2006] These include categories of indirect costs, which cover all costs related to the implementation or modernisation of methods of management and organisation of the investment realisation process. Nowadays, many management methods are used in the implementation of investment processes. Their common attribute is optimising the total cost of implementing an investment project by reducing all types of costs at each stage of the process. This is particularly important if the investment process is very complex because it is implemented in relation to the idea of modular construction. The aim of this study is to identify modern management methods, which improve the investment process by leading to the optimization of the costs involved. These methods refer to the management process of the investment project (Agile Scrum Method, Kanban Method, Lean Construction Method) or directly to the management of the costs generated by the project (Activity-Based Costing). Together these methods will contribute to optimising the total cost of the project. Moreover, their applicability means they can be directly implemented or modified in any investment project that utilises modular construction. The features of the mentioned methods were identified and adapted to the specificity and requirements of the investment process in modular construction using the desk research method.

2. Basic principles of modular construction as a premise for cost optimisation of an investment project

Modular construction, regardless of its purpose and use, refers to a construction method that involves building a structure using prefabricated modules or units. These modules are manufactured off-site in a controlled factory environment and then transported to the construction site for final assembly. The general premise and rationale behind the implementation of modular construction is to increase the efficiency, speed and cost-effectiveness of the construction process – which can directly be seen as a need

to optimise, and in many cases reduce, the costs that fundamentally shape the bottom line of a construction project [Lopez and Froese 2016]. Furthermore, increasing the efficiency, speed and cost-effectiveness of the construction process is a set of criteria whose importance is particularly emphasised when comparing modular construction with so-called traditional construction.

The following key aspects of modular construction need to be implemented to achieve the optimum performance of the construction process [Endzelis and Daukšys 2018]:

- Standardised modules. Modular construction usually involves the use of standardised modules, which are designed to not only fit together seamlessly, but allow spatial arrangements to be configured according to changing needs. The changing needs will be a key determinant here, influenced by various parameters, i.e., decline/increase in demand for the services offered in the facility, decline/increase in the price of the facility's operation, decline/increase in interest in the location of the facility, etc. The modules subject to standardisation can be walls, floors, ceilings and even entire rooms. Standardisation, as is rightly assumed due to the repeatability of processes and thus a decrease in unit costs, allows for more efficient production, transport and assembly.
- Factory production. Standardised modules are produced under factory conditions where environmental conditions are controlled and quality monitoring can be strictly executed. Both standardisation, automation of the production process and a controlled environment help to ensure constant and high-quality production. The reason for this is that the comprehensive control of the production process makes it possible to limit the production of defective components, which if used in the construction process, would require corrections, rectification of defects, etc. at a later stage. Maintaining a qualitatively correct construction process eliminates the possible increase in costs at the next stage, i.e. at assembly – and thus reduces the overall level of investment costs.
- Transport and assembly. The finished standardised modules are transported to the construction site by a fleet of transport vehicles, which can also be subject to cost optimisation. On-site assembly involves, in technical terms, joining modules together using connectors, cranes or other methods to form the final structure. Whereas in the management sense, it is a multi-stage process, in which stages should be identified and assigned a set of tasks logically following one another.
- Design flexibility. Standardised modular construction should not restrict architectural creativity. It should be possible to adapt the modules to specific design requirements, but also to aesthetic preferences and the changing needs of the client over time. Flexibility in this respect should enable a wide range of module applications, as well as the reduction of construction and operating costs, but should not compromise the quality of architectural design.
- Implementing the concept of sustainability. One aspect integrally related to the implementation of the concept of modular construction in the building industry is

the introduction of sustainable practices on a socio-economic level. The concept of modular construction is based on the principles of sustainable development given the need to reduce the consumption of dwindling natural resources and the negative impact of a predatory economy on climate change. In principle, the concept of modular construction promotes resource efficiency, waste reduction, and recycling. At the design stage it takes into account the need to design modular buildings to be energy efficient, and to utilise human and environmentally friendly materials and systems [Matuszko et al. 2018]. This involves finding a balance between the higher costs generated by the special design and material solutions that are applied in the concept of sustainability and the assumption of cost reduction of modular construction. In this case, optimisation boils down to taking into account the superiority of the overriding objective, which is the need to implement sustainability principles.

The above principles suggest that the idea behind modular construction is to streamline the construction process by improving quality and making the investment process faster and more efficient compared to traditional construction methods [Hořínková 2021]. The model implementation of the principles of modular construction achieves several quantifiable benefits of a quantitative and qualitative nature, such as [Łukasik 2015]:

- Time and cost saving by increasing the speed and efficiency of the investment process. Modular construction significantly reduces construction time compared to on-site construction. It achieves benefits in terms of time and cost savings, as the modules are manufactured in parallel with site preparation and other development work, so the total time taken to complete a project can be significantly reduced, thereby lowering the overall cost of the investment. In addition, the controlled production environment helps to minimise material wastage and optimise productivity by managing the investment process in stages.
- Cost control and cost reduction. In general, the concept of modular constructions follows cost optimisation by implementing the basic principles of process management in the financial management of an investment project. These principles include the division of the entire investment process into stages, in which the implementation of management methods to the specificities of the investment implementation process using modular constructions is crucial. The most important management stages in this process will include:
  - identifying the costs associated with the process of constructing and assembling the modules,
  - measuring all costs associated with the implementation of the process (direct, indirect; material, labour, and many others),
  - cost control to maintain cost levels,
  - managing costs to reduce them if necessary or possible,
  - drawing conclusions for the future, with the aim of using the experience gained to optimise the costs of the next investment.

Deliberate implementation of the above process can ultimately result in the use of modular construction being more cost-effective than traditional construction. It is indisputable that a streamlined production process reduces material wastage and the ability to work on multiple modules in parallel reduces labour costs. In addition, the controlled environment of module production minimises the risk of delays related to a factor of great relevance in construction, i.e. inclement weather and consequent additional costs resulting from delays.

- Quality increase through its control and process consistency. Factory production of the modules enables stringent quality control measures. Additionally, skilled workers and automated systems ensure a uniform output and adherence to the precise standards contained in the project specification. What's more, the standardised nature of modular construction promotes a higher quality outcome compared to on-site construction, where variables such as weather and the individual, and varying skills of workers can compromise quality. Factory production of modules supports building standards and drives consistent compliance with building regulations, ensuring a high level of quality and safety in all processes. This level of consistency can be harder to achieve in traditional construction, where factors such as different skill levels and varying acceptance of the standards regime by workers on site can affect quality.
- Reducing the negative impact of the construction process on the surroundings. Since much of the construction process takes place under factory conditions, disturbances and inconveniences on the site are minimised. This can prove particularly beneficial in sensitive locations such as urban areas, hospitals or educational institutions. Noise, dust and traffic disturbances are significantly reduced, resulting in a more efficient and environmentally friendly construction process.
- Investment prospects thanks to the flexibility of modular construction. Modular construction offers design flexibility and customisation options. Modules can be easily modified, reconfigured, or added to existing structures, allowing for future expansion or adaptation. This adaptability is particularly beneficial in sectors such as education, healthcare, and commercial buildings, where needs may fluctuate over time due to changing factors, such as demographics. The flexibility to reconfigure a modular building also allows it to efficiently manage its operating costs in the future by reducing the space or expanding it – depending on actual needs.
- Sustainability and environmental benefits. Modular construction can be more environmentally friendly than traditional construction, providing a controlled module production environment that optimises resource use and reduces material waste. But, even more important is the fact that full recycling of modules can be applied, i.e. modules can be reused and repurposed, contributing greatly to sustainability efforts.

The mentioned benefits of using modular construction that have financial and non-financial dimensions render the idea of modular construction an attractive option for various construction projects, offering fast project implementation, cost savings,

quality control, and flexibility, while being environmentally friendly [Subramanya et al. 2020] However, such benefits can be achieved through the implementation of management methods that focus on managing costs and related categories.

3. Main areas and rules for cost optimisation in modular construction

Cost optimisation in modular construction can be achieved by employing several strategies and approaches. These strategies fall into two main areas, namely methods of:

1. project management,
2. management accounting for cost accounts.

The nature, scale, and specificity of the investment implemented under the idea of modular construction will determine which method is chosen for project management, but, due to the adaptive nature of management methods, the ability of the project manager to appropriately select a method for the parameters of the investment will also be important. In this case, not only the individual preferences of the manager will be relevant, but also knowledge of the specificities of the investment and construction process, whether carried out traditionally or modularly, so that the advantages and disadvantages of both methods can be identified [Krzeszowski 2015].

Regardless of which design management method is chosen for the implementation of modular construction projects, it is necessary to introduce a few universal rules, the application of which will increase the efficiency of the investment:

- Careful project management in order to avoid delays and related excess costs. It therefore becomes necessary to monitor the progress of the project and identify potential problems at an early stage to be able to react quickly.
- Using standardised module designs that can be reused several times, rather than creating a custom solution for each subsequent project. Furthermore, the use of ready-made design templates to minimise the need to customise and design from scratch.
- Examining and developing processes through regular analysis of the progress of the investment process and identifying areas where improvements and savings can be made.
- Relationship management, which will lead to the establishment of partnerships with local companies and suppliers, in order to obtain not only favourable pricing terms, but to ensure flexibility of supply in the future. It is also recommended to consider partnerships with companies involved in the design, manufacture or assembly of modules.
- Investing in modern production technologies that can increase the efficiency and quality of module production. Implementing automation can help reduce labour costs. Consequently, investing in research and development (R&D) to become more competitive in the market.

- Efficient logistics achieved through optimised logistics processes to reduce the costs for transport and storage of modules. Planning of module deliveries and assembly to avoid delays and thus excess costs.
- Ongoing training of employees on safety, quality and efficiency of work, which can help avoid organisational problems and reduce losses.
- Conscious support for sustainability by investing in energy-efficient solutions and using sustainable materials and technologies that can save money in the long term.

The final approach to cost reduction in modular construction will depend on the individual project, location, and specific factors. It is important to conduct careful cost analyses and constantly seek improvements to remain competitive in the market.

4. Project management methods in modular construction

Modern project management methods are evolving alongside technological advancements and changing business needs. Many of them have an applied nature, but the specificity of each project will determine the choice of method to maximise the end result. Moreover, in many cases, the complexity of an investment project requires elements of several methods to be applied simultaneously, creating a kind of hybrid. Hybrid methods are therefore the answer to solving the diverse problems that may arise during extensive investment projects. In modular construction, it will usually be necessary to use different project management methods or only selected elements, because the essence of this concept is flexibility, understood as adapting to variable conditions that allow the project to be carried out using optimal resources. Currently commonly used management methods such as Agile Scrum and Lean Construction are among the methods that can be successfully applied in modular construction projects.

The Agile Scrum method, although usually associated with the IT industry, can be successfully applied in a variety of areas, including modular construction. The core of the method is the defined and separated framework of scopes of work (Scrum) which constitutes the project execution process [Leow et al. 2017]. The work in this framework is divided into so-called Sprints that usually last between 2 and 4 weeks, allowing the process to be monitored and anomalies to be caught and, above all, to successively deliver value, i.e. deliverables, during the process.

The concept of Scrum provides a flexible approach that can be effective in modular construction projects, especially if the process is complex and dynamic. It allows rapid delivery of modules, responding to changes and monitoring the progress of the project during iteration, understood as the repetition of activities in the process. The stages of a modular construction project in which the Agile method may be particularly suitable are [Korpivaara et al. 2021]:

- Planning. Scrum enables effective project planning and management by dividing the work into smaller, manageable parts, the aforementioned Sprints. The aim of each Sprint is to deliver a specific value to the client, which is particularly important in modular construction, where individual modules must be delivered on schedule.

- Adaptive solutions to complex problems. Modular construction often involves complex problems that require flexible and adaptive solutions. Scrum, as an Agile project management framework, helps teams structure and manage their work with a set of values, principles, and practices.
- Cooperation and communication. Scrum promotes close collaboration between team members as well as frequent communication with the client. In modular construction, where experts from many different disciplines need to work together (e.g. architects, engineers, labourers), effective communication is crucial to the success of a project. However, introducing Scrum into an organisation requires a change in organisational culture and may take time and commitment from all team members.
- Constant improvement. Scrum encourages constant improvement through regular retrospectives and adaptation to changing conditions. In modular construction, where technologies and techniques change frequently, this culture of constant learning and improvement is essential.

The Agile Scrum method, like any modern management method, has many advantages as well as disadvantages, which consequently influence its continuous evolution. The main advantages that determine its popularity in project management include:

- The role of communication. The emphasis on communication generates constant access to feedback from the developer or client, which helps the team to understand the needs and adjust actions accordingly. This allows design errors to be eliminated at early stages.
- Reactivity and flexibility. In the Agile method, it is recommended to discuss and solve problems in daily meetings, known as 'stand-up meetings' or 'dailies', which are a key element of Scrum. This allows teams to respond quickly to challenges and adapt to changing conditions.
- Sharing responsibility. The model of dividing tasks between teams and setting deadlines, or the idea of Sprints, allows more tasks to be completed in a shorter time, with everyone taking responsibility for their performance. This maintains a high level of motivation.

On the other hand, those using the Agile Scrum method consider the following to be disadvantages:

- Human factor barrier. The method is demanding in terms of the professionalism of the team. It brings tangible benefits provided a qualified, experienced, and committed personnel is employed. In addition, the method requires team members to be very independent in making sometimes difficult decisions.
- Time pressure. Short deadlines for Sprints carry the risk of delays. In the event of illness or holiday of any staff member during the project, short deadlines can lead to delays that generate costs.

- Limited variability. Significant or constant changes introduced to a project can lead to its gradual increase in scope. This phenomenon, known as 'creeping scope' or 'scope creep', can cause delays and budget overruns.

Despite the above challenges, Agile Scrum is still a very effective project management method with many benefits - hence its growing popularity [Schwaber and Sutherland 2020]. It also allows for the incorporation of additional management tools, which is why it most often becomes a complex hybrid in practice, built according to individual needs.

The Lean Construction project management method is an approach based on the principles of the Lean management method, which have been adapted to the construction industry, including modular construction [Salem et al. 2006]. The general approach in the Lean method is to deliver high-quality products to customers by the simplest methods possible. Thus, the goal of the Lean Construction method is to eliminate waste (Waste Reduction) in the construction process, optimise construction processes to deliver maximum value at minimum cost and increase project efficiency. Waste in construction can include delays, excess workers, excess materials and excess traffic [Salem et al. 2005]. In modular construction, the elimination of waste can mean more efficient module production, and reduced delivery times and costs. In the context of modular construction, several key aspects of the Lean Construction method should be identified:

- Flow Management. Lean Construction promotes a smooth workflow that minimises delays and downtime. In the context of modular construction, this means that module production should be optimised and the process of assembling and installing modules should be as smooth and uninterrupted as possible.
- Employee Involvement. In Lean Construction, employees are actively involved in the project management process. Collaboration between different teams and joint problem-solving is encouraged. In modular construction, where cooperation between module production and assembly is crucial, employee involvement is particularly important.
- Pull Planning. It is a method that involves planning work from the end to the beginning, on the basis of the actual needs of the project. In the case of modular construction, this means planning module delivery and assembly based on project deadlines and requirements.
- Overproduction Reduction. The Lean Construction method pays attention to avoiding the overdevelopment of processes or production. In the case of modular construction, this means producing modules only when they are actually needed in order to avoid stockpiling and reduce costs.
- Continuous Improvement. Lean Construction promotes continuous process improvement. In modular construction, this means monitoring and analysing project performance and identifying areas for improvement.
- Waste Reduction. The Lean Construction method focuses on reducing different types of 'waste', including excess work, excess movement, excess delays and lack

of coordination. In modular construction, the elimination of these types of waste/excess is a key objective.

The Lean Construction project management method can help to increase efficiency, reduce costs, and improve quality in modular construction projects. However, it is important to adapt these principles to the individual project situation and to involve all stakeholders in the drive to improve construction processes. Conversely, the choice of the appropriate project management method in modular construction itself depends on a number of factors: the specificity of the project, its scale, scope, available resources, and other constraints. It is worth considering hybrid approaches or adapting the method to the specific needs of the project. In any case, the key issue is to effectively manage the schedule, cost, and quality of the project, while taking into account the unique challenges of modular construction. Therefore, it is worth supplementing the base management methods with domain-specific methods.

5. Activity-Based Costing (ABC) in the accounting management of modular construction projects

Next to the strictly managerial methods necessary for the proper management of the investment process, it is essential to correctly record economic events, analyse the effects of these events and draw conclusions for the future. To this end, parallel bookkeeping is necessary in accordance with legal requirements, but in order to achieve the goals assumed in Agile Scrum or Lean Construction methods, it is also necessary to expand the accounting records with methods from the field of management accounting [Nóżka 2015]. However, due to the complex nature of the investment process in modular construction, traditional cost accounting is becoming an insufficient analytical method. It is becoming imperative to turn to modern analytical methods, among which the Activity-Based Costing method is the most widely recognised – its application in modular construction projects will not pose any problems, as it has a universal character. In principle, activity-based costing is used to provide information for planning, management, control, and direction of the enterprise in order to improve processes, products and services, eliminate losses, and achieve the operational and strategic objectives of the enterprise [Sobańska et al. 2006]. In the management dimension, the activity-based costing method allows a more accurate allocation of costs to products or services by identifying and assigning costs to specific activities that are necessary in the production of goods or provision of services [2015 et al. 2015]. Therefore, it can be successfully applied to the cost analysis of a capital project, and especially if it is complex in nature, such as projects implemented in modular construction mode.

The implementation of the activity-based costing method takes place in stages, among which [Nowak and Wierzbinski 2010]:

1. Stage I: Identification of activities. The first step involves a precise identification of all the activities necessary in the process of manufacturing products or providing services. This is the most important stage in the implementation of activity-based

costing, as it determines both the subsequent phases and the final outcome of the calculation. It should also be taken into account that cost information in traditional financial and accounting systems is presented in two sets: by type (broken down into wages, depreciation, energy, materials, etc.) and by an entity (by plant, departments, divisions, brigades, etc.). Whereas, in the activity-based costing system, cost information has to be collected in the cross-section of processes and activities and not in the cross-section of types and entities, so it is necessary to transform the cost information from the financial and accounting system in such a way that it is possible to analyse costs from the perspective of processes and activities. Economic process analysis should be applied to isolate processes or activities. It consists of a systematic consideration of the activities required to produce goods or services.

2. Stage II: Determining the costs of the activities. The costs associated with each activity should then be identified. This can include both direct costs and indirect costs involved in the activity.
3. Stage III: Allocation of costs to products/services. The costs of activities are allocated to products or services according to how much each activity is required to produce or provide. This means that costs are allocated based on the actual consumption of resources by each product or service.
4. Stage IV: Use of activity indicators. The ABC method uses activity indicators (e.g. number of orders, number of working hours, amount of raw materials used, etc.) to assign costs to products or services. This provides more precise information on the products or services that generate the highest costs and those that generate the lowest costs.
5. Stage V: Outcome analysis. Once costs have been allocated to products or services, a performance analysis can be done to better understand which products or services are more costly and why. This enables more pertinent management decisions to be taken, such as reducing production costs, pricing products or investing in more profitable areas of the business.

In the context of modular construction, the ABC method can be used to precisely allocate indirect costs to the production of individual modules or stages of the construction process. To this end, the following three areas of activity should be identified in accordance with the method's assumptions. This involves, in the next step, a detailed breakdown of all activities related to the construction process, the specificity, scale, and sources of financing of which will determine their scope, nature, number, and size of the costs assigned to them:

1. Identification of activities. The first step is to identify all the activities involved in the modular construction process. These may include activities related to module design, material procurement, module production, transport of modules to the construction site, module assembly, and many others.
2. Assigning costs to activities. Costs are then attributed to activities based on resource consumption. For example, material costs can be assigned to the module produc-

tion activity, while fuel and transport costs can be assigned to the module transport activity.

3. Allocation of costs to cost objects. In the final step, the costs of the activities are assigned to cost objects (in this case modules or construction projects) based on their utilisation rate.

Thanks to the Activity-Based Costing method, it is ultimately possible to accurately determine the indirect costs for the production of individual modules or the implementation of a selected stage of construction, which will allow accurate decisions to be taken regarding the optimisation of total investment costs through modular construction. The knowledge obtained through an activity-based cost estimation will allow accurate management decisions to be taken regarding pricing policy, relations with contractors/subcontractors, etc. [Świeboda 2017]. This will determine the competitive position in the market, as a correctly priced total investment cost will facilitate the negotiation of contract terms. However, the implementation of the Activity-Based Costing method can be complicated and time-consuming (especially for large projects whose size will have an impact) and the benefits should outweigh the implementation costs [Leszczynski 2011]. As there are many benefits, the method enjoys increasingly widespread use, because in the conditions of the variability of price-setting parameters in the economy, the information load carried by the effects of implementing the method is invaluable. The method allows – which should be considered in terms of its advantages – first of all [Sadowska 2015]:

- obtaining more accurate information on costs, as the main parameter reducing the overall profitability of an investment project,
- understanding the causes of costs, allowing us to eliminate them if possible,
- conducting in-depth analytical research, which provides a starting point for implementing innovative solutions to develop the project or to defend against threats to project execution,
- providing the basis for strategic decisions on production policy, the provision of services, and the structuring of 'production-related' activities,
- flexibility – relates costs not only to products, but also to other calculation objects, e.g. processes, market segments, and areas of responsibility. Hence the growing interest in the method, as only skills limit the scope of application of the method in the practice of economic life.

6. Conclusions

With the aim of optimising the costs of implementing the investment process in modular construction – the use of management methods such as Agile Scrum, Lean Construction and Activity-Based Costing is indispensable. Several reasons that contribute to this are listed below:

- Complexity of modular projects. Modular construction projects are often complex due to the multiple process elements that need to be synchronised and integrated. Management methods help to organise the work and structure the processes, which is crucial in projects of this scale and complexity.
- Dynamic changes in customer requirements. The Agile Scrum method is particularly suitable for projects where client requirements may change over the course of the project. The flexibility of Scrum allows the team to adapt to new client needs and deliver value as the work progresses.
- Minimising waste. Lean Construction is a method that focuses on eliminating waste and mismanagement in the construction process. In a modular construction project, where each component is manufactured separately, the elimination of waste is crucial for cost and time efficiency.
- Accurate cost allocation. The Activity-Based Costing method allows more accurate management of the project budget and enables precise monitoring of costs.
- Synchronisation and coordination. Management methods help to administer tasks, deadlines and resources. In the case of modular construction, where different modules have to be manufactured and assembled simultaneously, coordination and synchronisation are key to avoiding delays and problems in the project.
- Quality control. Quality management is important in modular construction to ensure that each module meets the design requirements. Management methods, such as Agile, allow for regular quality checks and testing to help ensure that the modules produced are in line with customer expectations.

In summary, the use of management methods such as Agile Scrum, Lean Construction and Activity-Based Costing can become crucial in the execution of modular construction projects due to their potential to streamline processes, increase cost and time efficiencies, and allow flexibility for changing requirements. By implementing these methods, construction companies can manage modular construction projects more effectively.

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