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Construction project management in Warsaw. Case study

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ABSTRACT

The main objectives of the present study were realized both as a result of the hundred diary of the subject literature and empirical research. It was pointed out that the areas affecting the effectiveness of construction projects from the perspective of their contractor. The project, investment or subcontractors may also be published on the basis of the project. Under such conditions, systematic and comprehensive analysis can be based on the resultant.

***Keywords*:** construction, project, management, information, modeling, analytics

1. INTRODUCTION

Design activities have been accompanying people for thousands of years. Its results may be not only a breakthrough from the perspective of societies or the economy, but also incremental for a single organization. When quoting examples of products resulting from project activities, the most frequently indicated are those of a material nature, eg: pyramids in Giza, sacral buildings (Kathedra in Ulm or St. Peter's Basilica in Rome), atomic bombs, hydrotechnical constructions (Three Gorges Dam or Hoover), skyscrapers (Burj Khalifa in Dubai or Petronas Towers in Kuala Lumpur), aircraft (Lockheed SR-71 Blackbird or Airbus A380), International Space Station.

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Design activity is one of the manifestations of striving for rationality. Of course, this form of work organization cannot be applied in every case, but its application area is constantly expanding. The pro-security activity provides primarily security: institutional (implementation 10 in the form of a so-called temporary organization), instrumental (using tools adapted to the implementation of projects) and methodical (using scientific standards and knowledge) (Figure 1).

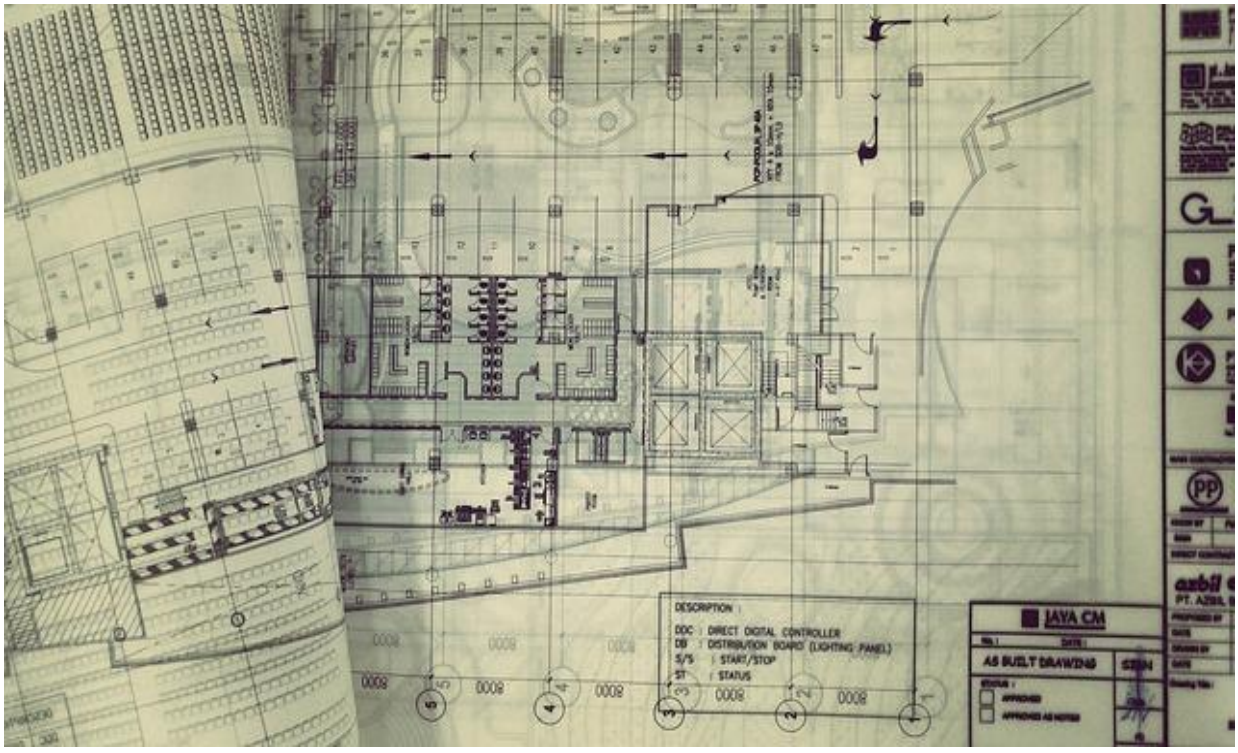

Figure 1. Picture allowed about project management

2. CONSTRUCTION ACTIVITIES A MANAGEMENT

It brings many benefits, including:

- monitoring the progress of work and expenditures and the results obtained as a result of using the account of responsibility (project as a center of responsibility performing the functions of a control and control instrument and motivating to achieve the assumed goals),
- an improvement in effectiveness as a result of analysis and assessment of projected outlays and results,
- the possibility of using concepts, methods or organizational techniques for project management, including taking into account the activities in conditions of risk and uncertainty,
- ensuring greater coordination of conducted works, which allows to reduce wastage or increase the resource efficiency (Figure 2) [1, 2].

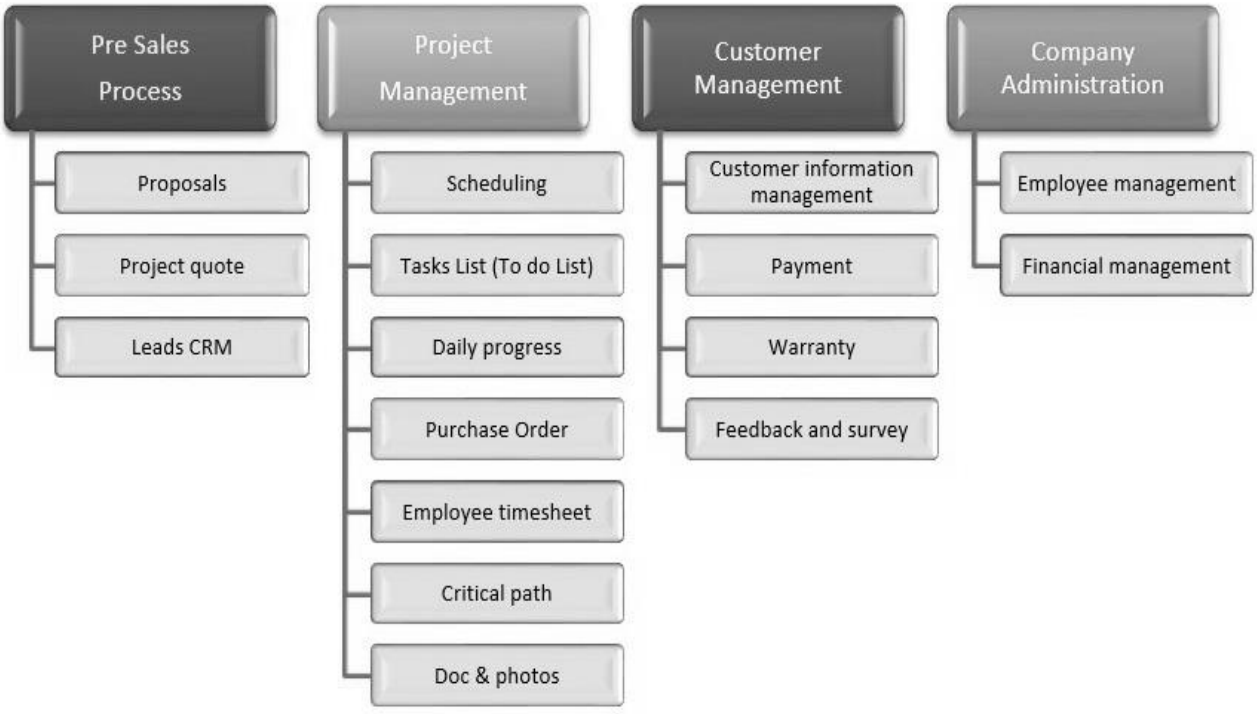

Figure 2. The chosen form of the construction process

The research problem undertaken in this study concerns the perfecting of selected elements of management systems supporting the optimization of the effectiveness of construction projects from the perspective of their contractor (construction company). Such objects belong to the so-called external projects, in the contractor's special order for the external entity - the client. The conditions of implementation are defined by a construction contract signed between an investor or an entity acting on its behalf and a contractor. This group does not include the so-called investment construction projects.

3. CONSTRUCTION PROJECT MANAGEMENT. CASE STUDY

The main objectives are defined key areas of impact on project effectiveness from the point of view of efficiency management (Figure 3) [3-6]:

3. 1. Estimating

An estimating tool is essential as construction project managers need to operate within the set budget to stay profitable. The construction business project management software should assist you to make higher price bids and bolster them with integrated scheduling and benchmarking. Besides, the estimating tool should integrate with your enterprise resource planning (ERP) system to enable you to deliver accurate estimates based on your company's timeline and capabilities.

Figure 3. Elementary construction project management

3. 2. Project Information Modeling

Most construction projects are complex, extend for lengthy periods, and involve a number of stakeholders. Over time, the data drawings and models of the project accumulate. You need to make good use of this increasing data repository during project implementation to find actionable insights. Project information modeling, also known as design data management, helps here as it provides built-in reporting and analytics tools to help you easily share business info and models between leadership, finance, and operations.

3. 3. Accounting and Cost Management

Most construction PM solutions offer basic benchmarking and budgeting functionality. Robust cost management modules include forecasting and estimating to give you a clear overview of project financials. This enables you to manage and track these details to avoid surprises. Cost management is an essential feature if your enterprise manages accounting in-house. Excel spreadsheets are a handicap here as you cannot share updated files with other users or access data from the field. The answer is to opt for a construction PM solution that provides accounting features that help you to track billing, invoicing, payroll, and budgets, and view your cash flow any time. In addition, you'll be able to choose various forecast methods based on item type utilizing performance goals and trends stored in the platform.

3. 4. Field Management

It's difficult for project managers to supervise field work at multiple locations. The software assists here by offering field execution and management tools to help you create and share daily task plans, communicate with team members, and collect the results data after each shift. Advanced solutions can even enable you to remain compliant by maintaining inspection forms, and streamlining the process for quality, safety, and equipment inspections.

3. 5. Actionable Analytics

Select a construction PM software that assists you to review data and get operable insights to enhance your processes. The tool should provide reporting functionalities that present insight into your asset utilization and productivity. You should be able to track resources and measure the value gained by monitoring processes using a cost and schedule method. This enables you to get strategic insight, and improve your performance and productivity. For instance, if you have worker shortage, you'd be able to spot it more quickly and take immediate action.

3. 6. Project Communication and Collaboration

A robust construction PM application assists you to collaborate with internal stakeholders as well as other project stakeholders. You can improve efficiency by collaborating efficiently with designers, subcontractors, owners and other involved entities, and capture all project info in a single pane of glass.

3. 7. Reporting and Dashboarding

Reporting tools offer data and insight on more than just profitability. They help you to take into account metrics such as partner/industry/contract diversification, executive level trend data, resource allocations, and more.

3. 8. Profitability

It is essential to understand true profitability as you can utilize the info to alter the course of a project, task, day, or month. Plus, it can provide you data based on your focus markets. Builders need to learn what kinds of projects are successful for them and which markets offer the best chances of making profits.

3. 9. Content Management

You can manage all project info in a single pane of glass by capturing all details in a single, secure platform. To start, it is easy to gather project documents, contracts, and drawings in a single repository. But you need to go beyond this and also collect images, safety data, COs, and RFIs in the solution, and share them effortlessly with involved parties.

3. 10. Time and Productivity Tracking

You'd be able to better understand profitability if you get accurate and regular field data. Therefore, the construction project management tool should allow you to capture field data easily. You can facilitate this by structuring the project and the related cost book in a manner that enables you to capture and measure granular data. Single buckets of time and resources will not provide useful data.

3. 11. Planning and Scheduling

Efficient scheduling ensures the project progresses as per the planned timeline. You should be able to task external entities with items to ensure the project is on track. Plus, the solution should be flexible to accommodate changes and modifications in project schedules and milestones downstream. Leverage the schedule properly to ensure all parties are accountable. Provide all project stakeholders visibility into the schedule to avoid misunderstanding and confusion.

3. 12. Integration

Seamless integration with other software systems offers numerous benefits. To start, you can eliminate the human element as well as the need for double entry, and facilitate data integrity. This enables you to reallocate resources more meaningfully and also obtain back office efficiencies. Second, you can bring data together externally and internally to enhance communication. This means you can give stakeholders the capability to see how the project is progressing schedule-wise and financially. Finally, you can provide management the ability to learn why a project is failing or succeeding at any point of time.

Project management available from any place and device. Thanks to it, you can complete projects on time, according to the assumed budget and specification. You will have full control and insight into the progress of work. You will increase the efficiency of project group collaboration and gain control over the resources and employees involved in the project (Figure 4) [7-9].

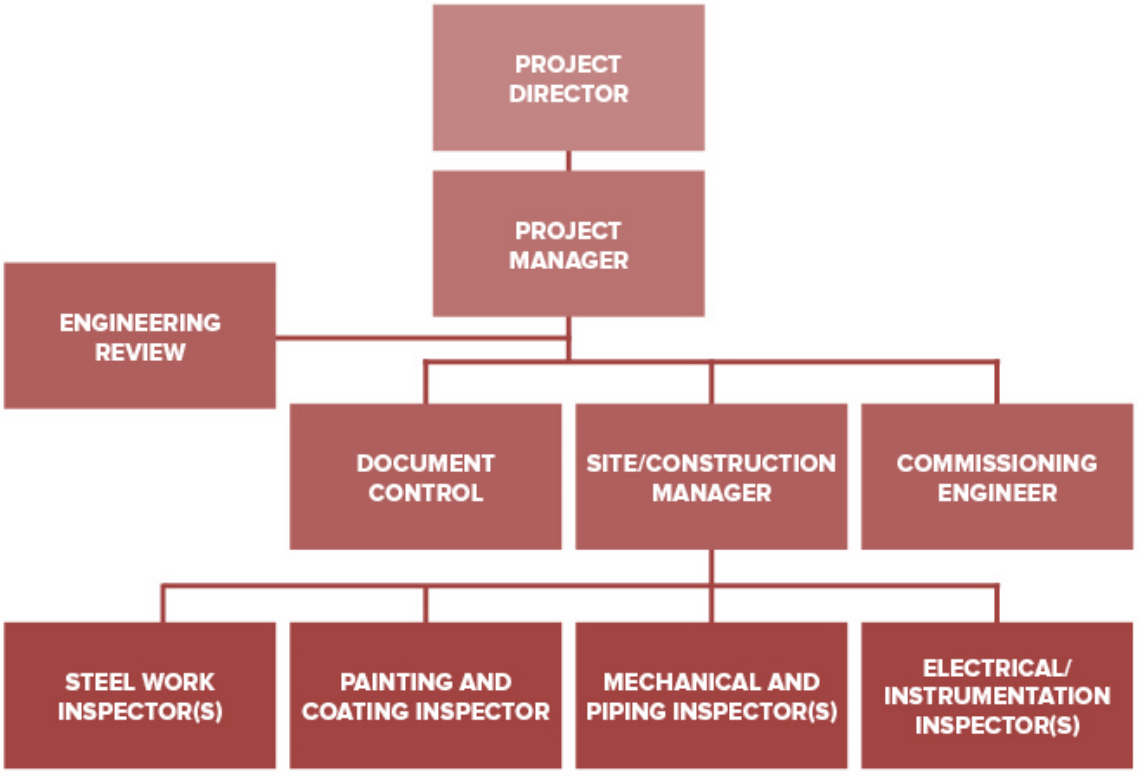

Figure 4. Project Planning – Linked Bar Charts and Procurement Programmes

4. OVERVIEW OF PROGRAMMING TECHNIQUES

The bar chart display was developed by Henry Gannt in 1915. Other systems, such as critical path analysis (CPA), precedence diagrams and line of balance came some forty years later [10]. The critical path method was developed by E.I. DuPont de Nemours & Co. in 1956. Further development work by Mouchley, Ketley and Walker in 1957 led to wider applications suitable for the industry. The onset of computers in the early 1960s led to analysis being undertaken by computers as a central analysis source [11, 12] The principles of network analysis are still included in construction management degree courses in order to develop an analytical approach to construction situations – long may this practice continue. Critical path software developed by Pertmaster/Primavera is still used – although only applicable to the large projects involving complex relationships. There was no evidence of it being used on the projects included in the building case studies [13]. The formation of a plan for scheduling is a huge benefit. As stated, this is a natural byproduct of the template. Once created, it is easily learned and followed allowing anybody to schedule an appointment simply by referencing the guideline. People can be taught quickly, it is easily understood so they can begin scheduling immediately. At the beginning of ever two week cycle, or at the first of the month in a thirty day cycle, employees will look to their weekly schedule template to begin planning their day to day activities around the times they have to work. Conventional scheduling strategies utilize a forty hour week, wherein each business day, or week day, is populated by a nine to five shift [14-28].

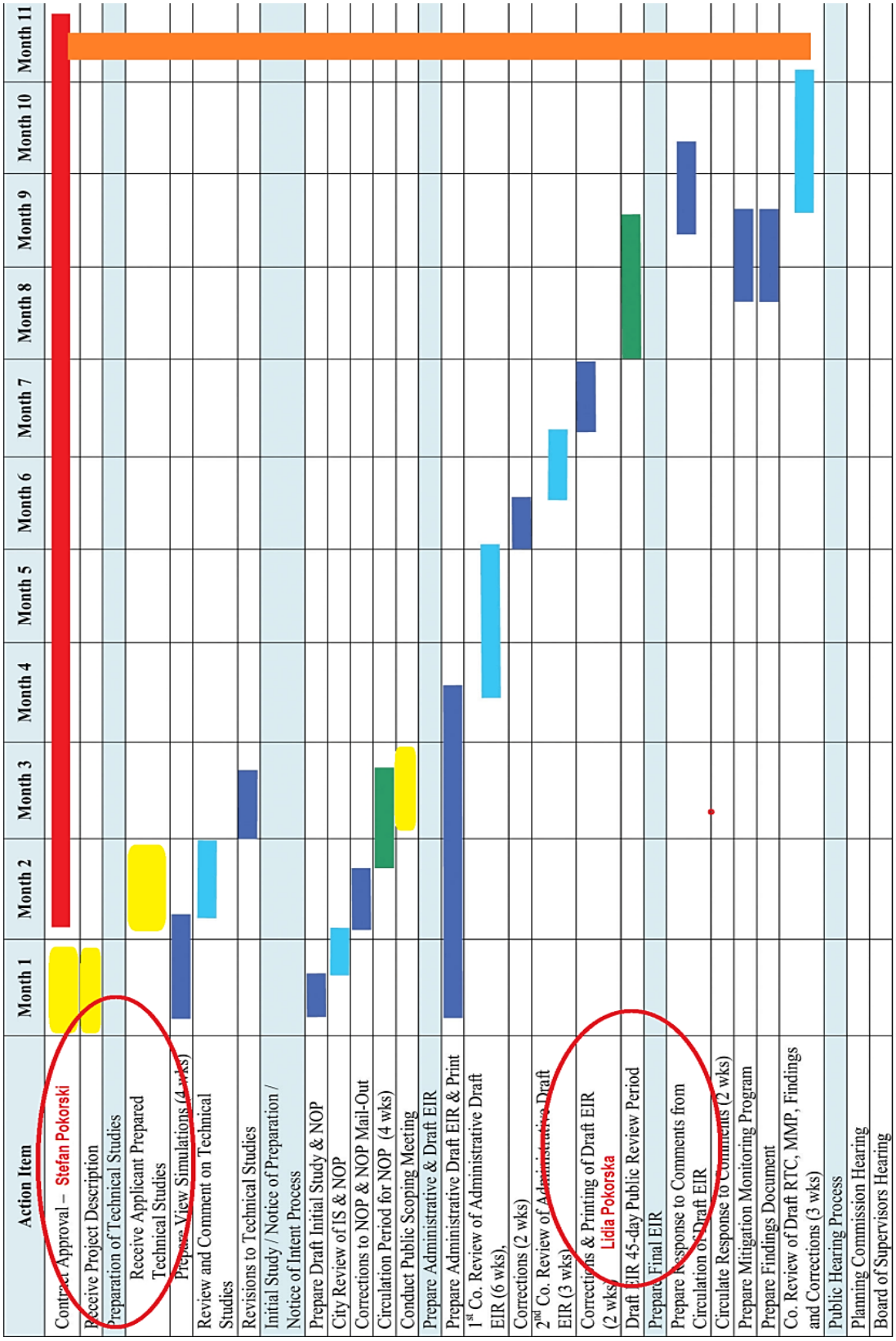

Figure 5. Role Approved and Corrector of Lidia and Stefan Pokorski

Figure 5 presents an important aspect of the management of the approving and correcting manager, which does not have a significant impact on the implementation of the implementation of a given project within the management in particular months.

6. CONCLUSIONS

On this basis, the following order can be obtained: Building projects are most often used in a variable, turbulent environment characterized by, inter alia, the highest level of risk and its shares in activities related to its operations, business operations, investing or subcontractors. Under such conditions, the systematic and comprehensive study of the effectiveness of project activities is one of the key challenges to optimize the relationship between the results obtained and the inputs used. The project, investment or subcontractors may also be published on the basis of the project. Under such conditions, systematic and comprehensive analysis can be based on the resultant.

The conducted research confirmed that the mentioned areas are integrated by the project leader (project team manager), who is directly responsible for optimizing the effectiveness of the construction project. In medium and large projects this function is separated from the direct responsibility for the implementation of tasks related to the construction technique. These are passed to construction managers. This is important due to the significant increase in tasks related to project management. In terms of efficiency optimization, the tasks of the project leader should belong first of all: development of the construction implementation strategy, supervision of all the implementation (production, invoicing, costs, economic and non-economic performance, etc.), integration of individual elements ventures, active interaction with the client (relationship management) or selection of key clients

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