

RE-ENGINEERING OF THE PROJECT PLANNING PROCESS

Current Status of Project Planning in a Swedish Construction Company

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ABSTRACT: This paper describes the current status of the project planning process in the Swedish construction company Skanska Syd AB. The purpose of the study is to identify and analyse important aspects of potential improvements of project planning. The study shows that re-engineering of the project planning process involves five improvement areas of concern; distinct demands, adequate education and support, quality assurance of the planning process, integrated project management systems, and experiential feed-back.

KEYWORDS: Computer support, education, feed-back, integrated systems, project management, planning, scheduling, support, quality assurance.

1 INTRODUCTION

The use of computers in the Swedish building sector is gradually increasing but is still low compared to other industrial sectors. Building companies use computer systems for accounting, cost estimation, invoicing and administration, but the use of computer supported planning systems is not very common. Swedish contractors are, after several years of recession in the building sector, now putting great efforts into reaching a more efficient production. The main purpose is to decrease cost levels by shortening the production time. This will lead to a greater demand for efficient project planning systems. Computer supported project management can be a decisive instrument in the competition between companies.

The research is based upon a case study at Skanska Syd AB. 17 project managers involved in 8 construction projects have participated in the study. The studied company, Skanska Syd AB, is a regional general contractor with capacity to carry out contracts of all sizes and types. The company is a subsidiary to the large Swedish construction and real estate group Skanska. The Skanska group operates world wide, with home markets in Sweden, Denmark, Finland and the United States. In recent years a process of continuous improvement, "Think Total Time", has been carried out within Skanska. Improved project planning is one of several issues in this process. This study is carried out in close collaboration between the Department of Construction Management, Lund University, and Skanska Syd AB. The paper is based upon three separate poll surveys, twenty interviews and on-site studies.

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The purpose of the study is to describe the present status of the planning process in the Swedish construction company Skanska Syd AB. The result will be used within the company to form future strategies for re-engineering of the project planning process and the use of project management software.

2 CURRENT STATUS OF PROJECT PLANNING AND SCHEDULING

2.1 Attitudes Towards Planning and Scheduling

Why do we plan how a project is to be done? Why do we plan what resources are to be used? Why do we make schedules? A majority of project managers and their superiors give imprecise answers and find it difficult to account for their reasons for planning. Is it due to demands from company management, clients, project staff or out of their own interest to complete the project?

The apprehension of planning as an important tool for effective project management is shattered among project managers as well as superior managers. Most project managers consider planning as being too time-consuming. A majority of the project managers make project schedules in order to get a rough picture of how to organise different activities and what resources are needed. It is hard to see the advantages of more planning and the surplus value it involves is unclear. Some of the project managers show a good understanding and attitude towards planning and its importance to the management of a project. But in general, planning has low status among the majority of project and company managers.

This study, as well as previous studies, confirms a positive attitude towards computers, not only among project managers but at all levels within the company. Construction site studies have however shown that the strong interest mainly refers to computers in general rather than computer-aided planning.

2.2 Schedules and Reports

Most project managers using project management software still think and work manually. They produce a number of schedules of different levels of details with no mutual connection, although all are schedules of the same project. Project managers find it difficult to see various schedules as different reports from the same project model. As a result, different plans have no internal connection and do not interact.

The frequency and quality of planning outputs vary among project managers in the case study projects. The following figures of outputs were recognised.

Schedule/Report	Before project kick-off	During the project	Reviewed frequently	Rescheduled frequently
Project Schedule	100 %	100 %	12 %	12 %
Production Schedule	75 %	100 %	75 %	25 %
Detailed 3-week Schedule	50 %	100 %	75 %	75 %

Detailed Operational Instructions	25 %	50 %	12 %	0 %
Purchase Schedule	50 %	62 %	12 %	12 %
Resource Histogram	25 %	38 %	0 %	0 %
Cumulative Man Hour Curve	12 %	38 %	0 %	0 %
Equipment and Machine Schedule	25 %	38 %	12 %	12 %
Material Delivery Schedule	0 %	12 %	12 %	12 %

TAB. 1: Frequency of Planning Outputs.

The percentages show that all project managers do a standard set of three schedules, project schedule, production schedule and detailed 3-week schedule. These schedules are normally, but not always, made before project kick-off. Most of the project managers review these three schedules frequently to monitor the project progress during the production. When reviewing the project, the progress of each activity is estimated. The progress of the project as a whole, is however not estimated, nor the consequences this may have on completion. Very few project managers reschedule their projects on regular basis.

Planning outputs, such as schedules and reports, do not always serve as a foundation for decisions and communications. Schedules with limited information are dutifully made up by tradition rather than to monitor the project. "Indeed, we have schedules, but they are only schedules....". The majority of project managers does not take full advantage of the schedules in order to forecast future problems and to avoid or limit the effect of these.

2.3 Planning Work Methods

Very few of the project managers use their project management software as a powerful planning tool. The software packages are mainly used to create layout of schedules. The actual planning and project analysis is carried out manually by the project manager and the results are only partly documented as input to the management software. In the group of project managers who have computers, 25% plan manually without using project management software at all. None of the project managers use Work Breakdown Structure, What-if analysis, Earned Value, Risk Analysis or other sophisticated planning techniques. The Critical Path Method is seldom used even though the majority of the project managers are familiar with this method.

3 REASONS BEHIND THE CURRENT STATUS OF PROJECT PLANNING

The description of the current status follows the frame of reference in figure 1. The frame of reference describes the project planning process in relation to the company line organisation. Further on, the company management influence and control over the planning process of the project are described.

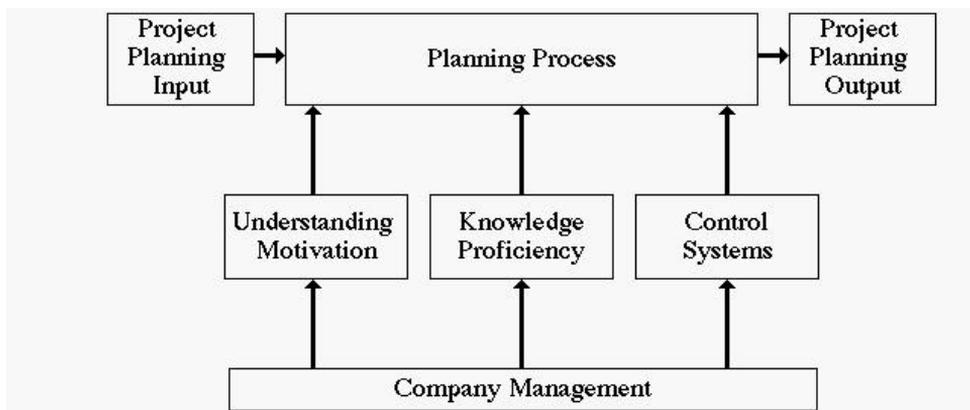


FIG. 1: Frame of Reference. Company influence and control on project planning output.

3.1 Understanding and Motivation

The study shows lack of understanding among many of the project managers of the role, purpose and surplus value of project planning. This lack of understanding leads to shortage in motivation regarding project planning and scheduling.

In the process of continuous improvement within the company there has been drives for improved project management and planning, but the efforts have not yet reached the proclaimed aims. The company demands on project managers are generally unclear. This fact is particularly obvious when it comes to project planning. The knowledge and interest in planning among superior managers monitors to a large extent the quantity and quality at which project planning is conducted by project managers.

3.2 Knowledge and Proficiency

Proficiency is accomplished through experience. Knowledge depends to a larger extent on educational quantity and quality. Planning competence consists of knowledge and proficiency in the four areas described below.

3.2.1 Production

The level of technical knowledge is high among project managers. In general, project managers possess good insights in production methods, technical matters of machines, equipment and materials in their own field of experience. Production competence is however deficient in the fields of different sub-contractors, i.e. electrical and ventilation. Since the project managers usually schedule the work of sub-contractors, this lack of competence often leads to misunderstandings and delays.

A carefully prepared schedule involves at least brief considerations of laws, regulations and the conditions of contracts. Many project managers show weaknesses in these domains.

3.2.2 Planning Theory

Within the group of project managers, almost 50 % have taken part of some internal company planning education. The majority of project managers has had some kind of planning education in high school or at university. The level of knowledge regarding planning theory among the project managers, as measured by a diagnostic test, is shown below.

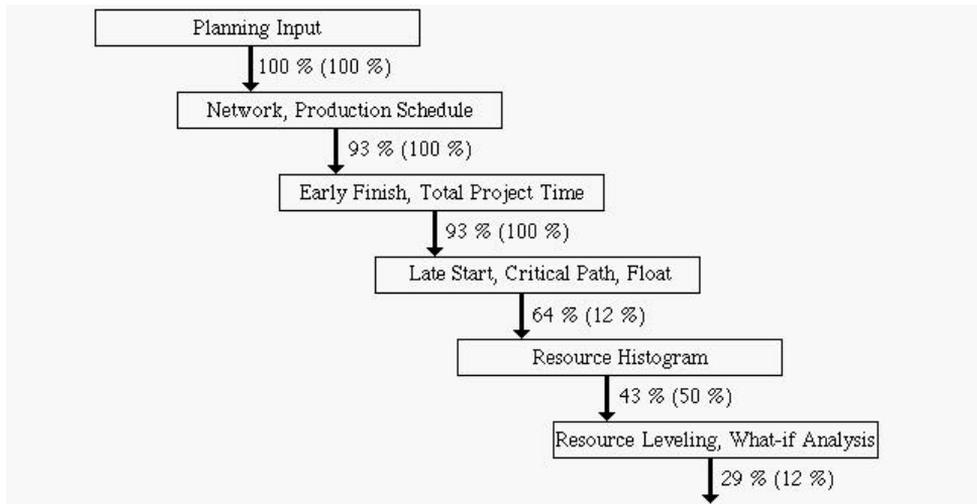


FIG. 2: Results from diagnostic test and actual planning in construction projects. Percentages specify the cumulative share of project managers who passed each moment. Percentages within brackets specify the actual planning done in each project.

The actual planning carried out in the construction projects sometimes shows higher percentages than planning skills according to the test. This is due to good communication between project managers working in the same project. When it comes to Critical Path Method, Resource Levelling and What-if Analysis, project managers turn out to possess higher planning skills than, according to their judgement, the actual planning requires.

Furthermore, construction site studies show that there exists a considerably lower understanding and proficiency in reviewing and rescheduling compared to the making of schedules.

3.2.3 Computer Aids

Irrespective of personal level of computer knowledge, the interest and attitudes towards education and computer support are generally positive. The study shows the following figures of how project managers generally learn how to handle software packages.

- Self-taught, in spare time 36 %
- Self-taught, at work 29 %
- Colleague, at work 21 %

- Courses 14 %

A learning process where project managers learn software packages on their own by trial and error, often in their spare time, is a slow process where project managers are unable to get the full potential out of their software package. The attitude among 90 % of project managers is that they would use computers more frequently if given the chance to be part of adequate education.

Project managers show great variation in terms of computer maturity, from the literal beginner to more advanced users. A subjective estimate gives the following levels of computer maturity:

- Beginner 30 % (are unfamiliar with how to operate Windows)
- Certain Proficiency 15 % (controls the basics of Windows)
- High Proficiency 55 % (controls the basics of Windows as well as the management software)

Among the beginners as well as the group with certain computer proficiency, there are difficulties in understanding the surplus value of project management software to support the production. Knowledge and proficiency within computer supported planning is lower than the average computer maturity. Project managers who use computer support (75 % of all), do not use the full capacity of the planning software packages.

3.2.4 Communication

The planning process is very much a matter of communication. In a planning situation the project manager collects and puts together information from personnel involved in the project and combines it with his own experience. Project managers seldom possess competence within production as well as planning theory and the ability to handle project management software packages. A highly communicative team, where individual skills complement each other, has thus the greatest possibility of solving its designated tasks. The fact that planning is mainly done manually by the project manager has a restraining influence on the communication of project information. Communication between individuals is important to overcome individual flaws in competence. Another reason for communication is the transmission of project information among project personnel. In this case the schedules and reports works as information platforms and the communication is executed in order to convey decisions.

There exists gaps of communication within the company. One of the two major gaps is between project managers stationed at constructions sites and project managers and/or superior managers stationed at offices. The other major gap exists between managers on different levels and workers.

3.3 Control Systems

The company control systems are constituted by the technical and administrative systems, computer-aided or not, which support and control operations. The control systems also embrace management philosophies, policies, routines, regulations and instructions that are established within the company.

3.3.1 Computer Supply

The company's computer supply usually suffices the needs of today's project management software packages. A few project managers have a computer with insufficient power.

3.3.2 Project Management Software

The majority of project managers are dissatisfied with the project management software package provided by the company. 75 % are of the opinion that the package provided is too complex for their scheduling needs. 50 % of all project managers think the package provided is too complicated and many choose to make layouts of schedules with packages intended for other purposes, i.e. spread-sheets.

50 % of all project managers find the interface of the provided package unfamiliar and user-unfriendly and some choose other packages with approximately the same complexity. The study shows that, within the company, the following software packages are used for scheduling.

- PowerProject 54 % (provided by the company for project scheduling)
- Microsoft Project 19 %
- Excel 27 %

Observations during the study show that the actual use of the functions in management software differs from what project managers proclaim to be important functions of planning, according to the poll survey. Construction site studies show that time is the one most important project factor to deal with in a project management software package. Resources such as personnel, machinery, materials and costs, have a lower priority. Links and calendars are of interest only to a few of the project managers.

3.3.3 Other Software Packages

No integration between planning and other computer-aided control systems exists today. Various studies and tests take place within the company in order to integrate planning with cost control, as well as with estimation. A module for machine scheduling, which connects to an existing management software package, has newly been developed internally.

3.3.4 Quality System

Traditionally, the company has focused on product quality. The present quality system includes aspects of process quality but planning is left unconsidered. There are no company

definitions or policies regarding planning or expected planning results. Delays are not considered as quality deviations. In some of the observed construction projects, the specific quality plan regulates that certain schedules shall be made, but includes nothing about its contents or level of details. It is up to each project manager to decide to which extent and how planning will be carried out. There exists a certain trade-specific terminology, which however means different things to different people. The terminology focuses on different plans but not on their actual contents.

3.3.5 Support

A support organisation for planning, as well as computer-aids connected to these, does not exist within the company.

3.3.6 Experiential Feed-Back

The company has no system for structured feed-back of experiences within project planning. Individual experiences are made continually, but stay with the individual. The fact that the actual planning is manually done and insufficiently documented along with deficient project reviews results in a poor basis for project feed-back.

3.4 Input

The company has an indirect control of the project through the planning process and a direct control through the input of set tasks, responsibilities and resources (see figure 1). These project specific inputs, given at the beginning and throughout the project, provide the foundations and requirements for planning. Since the project manager uses the provided foundations, in terms of contract documents, drawings, estimations etc., it is of major importance that this information is as complete and adapted to the production as possible. This is not always the case. Unclear tasks and responsibilities, inadequate and insufficient resources, delayed drawings, non-adapted tender estimations, delayed answers from clients and so on are the reality in many construction projects.

4 CONCLUSIONS

The project planning process of the company has a potential for improvement. Project managers will gain from clear demands from the company management. With appropriate education and support, the company will gain more competent project managers and more effective IT-investments. Control systems such as quality assurance of the planning process, integrated computer systems for project management, and a system for experiential feed-back will improve planning outputs. Project inputs such as well-defined tasks, responsibilities and appropriate resources will increase the chances for successful projects.

Re-engineering of the project planning process within the company contributes to the following potential results.

A more efficient production through:

- better allocation of resources

- lower costs of defects
- faster distribution of information
- better cost control
- improved cash management
- more precise updates and forecasts
- a higher degree of structured feed-back
- more precise risk analysis.

Increased client benefits through:

- shorter production time
- constant high product quality.

What levels of performance does the company need today and in the future and how does the company reach these levels? These questions will be studied and reported later on.

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