

We do it good, fast and cheap – you may choose any two . . . Strategies for Project Controlling

To meet the customers' needs, project managers have to balance costs, deadlines and system properties (scope and characteristics). As soon as the service performance falls below the planned values, it can become tricky to define a strategy to still meet the needs.

1. Contracts: Framework for Project Mgmt.

A contract between a customer and their contractor defines scope, duration, price and quality (e.g. expressed as RAMS-requirements). These values define the frame to carry out the project work.

The calculations of the contractor for planning are based on experience and assumptions, e.g. one labourer at work at a time.

2. Finding the right Strategy to take Control

1) Measuring the progress of work is the basis for project controlling. It is done repeatedly during the execution of the work. Comparing the actual values with the planned values at the current stage of the work reveals any discrepancies and puts the manager in a position to react. In short: **Only what gets measured can be managed!**

2) The extrapolation of the actual performance till the end of the work is called prognosis. The prognosis indicates the actual results at the end of the project when fulfilling the agreed scope by maintaining the measured performance. The prognosis either gives certainty to continue as before or it shows the need of action.

3) The most important part of project management is to take control of the operation. This is more accurately expressed by *steering a project*. Steering means to define a strategy to meet the expectations in the best way possible or to redefine the expectations and to discuss this strategy with the customer.

To find the best strategy, one may consider all possibilities to either abide by (meet) the expectations or not to. It is reasonable to make this consideration for the three relevant topics of the project: 1) system properties (scope and quality), 2) duration (deadlines) and 3) costs. This results in $2^3 = 8$ possibilities.

The analysis of the possibilities includes (test-)planning for time (duration and deadlines), costs and resources (human or machine). The goal of the analysis and the revised planning is to be able to make a recommendation for the decision makers.

4) The recommendation and the decisions depend on the priorities of both the customer and the

contractor: margin for increasing human resources, importance of the deadline(s), range of possibilities to either simplify the system or reduce quality requirements a.o.

These three steps can be carried out iteratively.

3. A poor Performance means serious Trouble

The following serves as an example to point out the process-steps in project controlling and to reveal the margin to take action (fig. 1, 2).

At the beginning		contract	reserve	planning
scope	e.g. [cm]	20		20
time	e.g. [min]	11	1	10
performance [cm/min*person]				2
money	e.g. [£]	22	2	20
	of which material			10
	labour		2	10
quality	[RAMS]	good		good

Fig. 1 Example for topics of a contract (scope, price and deadline) and *planning of the contractor for the complete work* (costs and durations a.o.).

Note the different points of view of customer and contractor, e.g. the contract defines a price and a deadline while the contractor calculates costs and durations. Thus, the calculations for planning (including reserves) and prognosis represent the contractors view only.

After 1 min		planned	measured	prognosis
scope	[cm]	2	1	20 cm
time	[min]	1	1	20 min
performance		2	1 cm/min	1
costs	[£]	11	11	30 £
	of which material	10	10	10 £
	labour	1	1	20 £
quality	[RAMS]	good	good	good

Fig. 2 Project controlling (example): Comparison of *planned values for the work so far and measured values and prognosis for the complete work* by extrapolating the actual progress till the end of the work.

In this example, the measured performance is poor (only 50 % of the planned value): After 10 % of the planned duration, only 5 % of the scope is completed instead of 10 % (see fig. 2).

Thus, by simply carrying on like this, the duration and the labour costs of the project will be double the value defined by planning and way over the values stated in the contract. Note, that the reserve the contractor planned for would be far too small to compensate the poor performance.

Dilemma: costs – deadlines - system properties

The dilemma of the situation described results from the need to both satisfy the customer and work as profitable as possible as a contractor (or at least to make sure to get a new chance in a future contract) within the "diabolical triangle of projects", i.e. 1) system properties, 2) time and 3) costs.

Note: In specialised literature, the system properties are sometimes distinguished according to scope and quality, making the triangle a square and increasing the number of possibilities will rise to compared to eight stated in paragraph 2. To keep things clear, fig. 3 and 4 show the eight possibilities representing the diabolical triangle of projects.

Analysis and revised Planning

1) Six strategies are basically pre-selectable for further considerations. Fig. 4 shows a summary of the results of the (test-)planning for the six possible strategies. See the appendix for combined diagrams of costs and resources as a function of time.

2) None of the strategies will meet the contractual agreement entirely – except for strategy No. 2. In this case, any cost overrun will be borne by the contractor: higher (internal) costs for the contractor, but same (external) price for the customer.

3) Two strategies simply are impossible under the given circumstances of a poor performance: to abide by both the expectations for costs (on the contractor's side) and the system properties (scope and quality) (No. 1 and 3).

Frame	costs	deadline	system
contract	22 £	11 min	reference
0 extrapolation	30 £	20 min	reference

Revised planning	costs	deadline	system
1		not possible	
2	power times 2 30 £	10.5 min	100 %
	power times 3 30 £	7.33 min	100 %
3		not possible	
4	20 £	10 min	50 %
5	20 £	10 min	50 %
6	25 £	8.0 min	75 %
	25 £	5.7 min	75 %
7	partial 20 £	10 min	50 %
	commissioning + 10 £	+ 10 min	+ 50 %
	= 30 £	= 20 min	100 %
8	25 £	15 min	75 %

Fig. 4 Summary of new planning figures for the eight strategies examined i.e. the six strategies basically possible within the diabolical triangle of projects in the case of a poor performance.

Note: In this example any concerns about the quality etc. are excluded. But the mechanism would be the same, because quality and costs are related to each other and the use of human (or machine) resources has an impact on the costs. Thus, to correct a poor quality, measures could include: working slower and more accurately, increasing the human resources or hiring more capable but more expensive experts.

	costs	deadlines	system	preselection / reaction	recommendation
1	abiding	abiding	abiding	none	
2	higher	abiding	abiding	more power (human or machine)	a) contractors' burden
3	abiding	later	abiding	none	
4	abiding	abiding	poorer	smaller system and/or reduced quality	
5	abiding	later	poorer	smaller system and/or reduced quality	
6	higher	abiding	poorer	more power and redesigned system	
7	higher	later	abiding	partial commissioning	b) shared burden
8	higher	later	poorer	combination power, redesign and partial commissioning	

Fig. 3 Eight strategies within the diabolical triangle of projects to react in case of poor performance.

4. Recommendation and a clever Way out

A clever way out for the contractor could be either:

- a) to meet the expectations entirely by using more human resources (or machine power),
and to keep the higher costs internal but having a good chance of making a profit next time. This strategy does not need to be agreed by the customer.
- b) to propose an agreement on a partial commissioning at the initial deadline and finishing the rest afterwards.
– because it might be easier to negotiate later deadlines of only a part of the system than speeding up the work and it is usually impossible to raise the price without being able to offer any improvement compared to the agreed frame.

Note: This strategy needs to be agreed by the customer.

Of course, any combination of the depicted strategies would be possible as well (e.g. last row in figures 3 and 4).

The revised planning becomes the new basis for the project controlling as the work goes on (for the rest of the 90 % of the initial duration or 95 % of the initial scope).

5. Supplementary Contracts as a Chance

What if the customer wants more, that is a wider scope, a faster delivery or a better quality? The negotiations about a supplementary contract for the additional scope of service may offer another way out of an uncomfortable situation for both the customer and the contractor.

It will be easier to negotiate an over-proportional better price to meet the higher interest of the customer than to simply try to hand over the internal problems.

Any supplementary contract becomes the new frame for the project controlling as the system characteristics (scope and quality) may have changed as well as the price and the deadline. Note: without a supplementary contract, the frame stays the same as the work goes on.

6. Appendix: Illustrations

Combined diagrams of costs and resources as a function of time for the eight strategies within the diabolical triangle of projects.

