PROVING THE VALUE OF PROJECT MANAGEMENT

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Channel Four's Kevin Macleod places some emphasis on the importance of project management in his assessment of the people in his programme who undertake 'Grand Designs,' attributing overrun and cost control failures in part to the absence of this ability. But given there is no real comparison, how can we be sure that project management (PM) makes any actual difference?

The Government recommends the use of the NEC3 (now NEC4) 'new engineering contract, engineering construction contract' for its projects, and while it is not always used, the reasoning behind the recommendation of the NEC contract suite is the presence of clause 31 and 32 the 'planning and tracking programme' clauses, and also clause 16 the 'early warning' clause. Sometimes referred to as the 'project management' contract, the NEC contract seeks to ensure that some key project management activities take place. And these are: that a planned programme plan is developed, deals with the common causes of delays through key coordination of activities and tasks between client and contractor, and that it is shared and regularly updated with both progress and changes. Also that 'early warnings' (we might regard these are the 'known risks') are communicated between client and contractor to catch 'other risks' to the smooth delivery of the works. Early warnings are generally acknowledged to be best carried out through the use of a shared risk log.

Ok, so a Government recommended 'project management' contract makes for some powerful support for the importance of PM. Projects are regularly described as being unique. And, in scientific terms, to be sure there's a positive difference between doing PM and not adopting common PM approaches would need researchers to compare one project that didn't (the control) and one project that did (the intervention). Even then, were the PM project to perform better, this could easily be a matter of chance. Raising the question that perhaps the reason for the PM invention project doing better, is itself due to the particular skills of the PM person him or herself. For University researchers like myself at Leeds Beckett University, this presents a research design challenge. Ideally we would need a set of common projects, some of which used identifiable PM skills and some of which did not. Last year such an opportunity presented itself. So we crunched some numbers. The results are intriguing and crucially they represent a statistically significant outcome.

This is what we did: we took a set of similar projects delivered by one construction company over a period of time. This is called a longitudinal study. Some were delivered by specialist engineers who had been part of a successful group of companies all doing the same work in the United Kingdom, Europe and U.S.A. This is important, because the projects had to be similar enough to be comparable. We were able to collate accurate data on cost performance and schedule performance on 120 projects (n = 120). This is a large sample size for this kind of study. If we collected enough samples then this would allow us to determine whether PM makes a difference generally, and not as a result of chance alone.

This use of the logic functionality of project planning software is key; that is because such a plan allows for the modelling and analysis of what is likely to delay the smooth delivery of the work, by showing the 'critical path' and allowing the project team to avoid problems and predict points of potential delay even before they get to them. In short, the PM will be able to predict what ordering of work will be important, spot where time efficiencies can be made, by doing things in parallel, or doing them in a different way, and also it will allow him or her to predict the risk points and mitigate against them happening. Looking forward and anticipating problems, than avoiding them, might be called the essence of project management.

So now we have two comparable sets of projects, all similar, some of which use planning and risk mitigation (because they are part of a team that have been recently trained to use key PM methods), and some of which cannot do that because they haven't had that training, and so the model plan of the work doesn't exist, or it is not put together in a way that allows for modelling and prediction.

Here are the results (***fig: i)*** This is a box-plot, whisker graph. Group 2 includes the group of projects that used PM approaches. There is a range of performance outcomes, as you would expect; all projects, even when similar, have unique challenges that make them unique and different from the last one. When separated, they can be compared with the control Group 1 in the chart. The Box-whisker shape shows the projects in each sample, grouped in vertical 25% blocks. The thick line in the middle is the mean average for the group.

*Fig: **i***

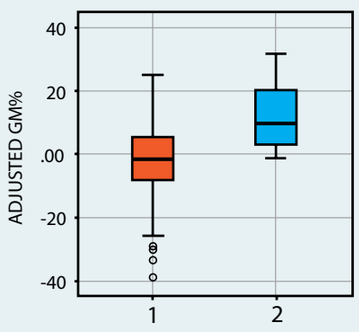
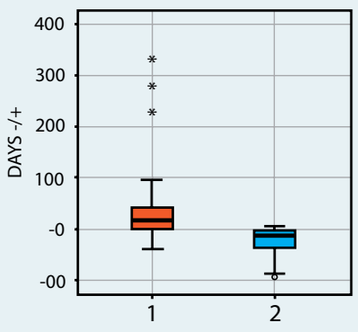


*Fig: **ii***



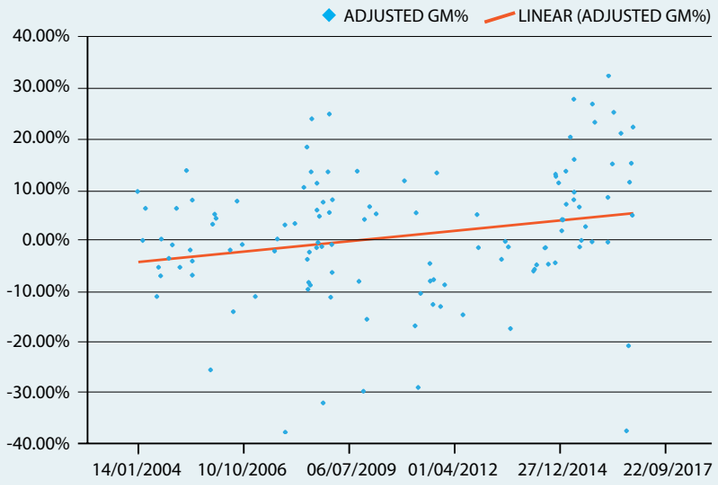
Here the PM group can be seen to outperform the Non-PM control group 9% to 3% on Gross Margin % (GM%). The boxes above and below the thick Mean Average line in the middle, represent the 25% grouping of the sample, 25% above and 25% below.

The 'whiskers' the thin lines above and below the 'boxes' represent the remaining 25% of top and bottom performing samples in each group. This shows that although some do make money, a lot of non-PM projects are losing money for the company. Of course in practice these losses are made up for by the better performing Group 2 PM projects, but it makes sober reading! Of course, it is reasonable to expect that some projects turn out to be particularly problematic. Nevertheless, all but one of the seriously cost overrunning projects are in the non-PM Group 1! The dots trailing off to the bottom of the Group 1 data-set are individual projects that the statistical software thought were outliers to the main data set and deserved highlighting separately. All these really poorly performing projects are in the non-PM Group 1 sample.

What is also important about the data-set is that there are a couple of easy ways to measure and compare project performance. Each project can be evaluated against the estimator's forecast of predicted margin and predicted delivery date. So the 'bid' made on each project forms a baseline from which we can measure performance. Final outturn dates and costs are recorded by the group of companies in a common finance IT system.

There's more. The data-set also allowed us to compare the outturn delivery dates, and so the projects' time performance. Delivering projects to the forecasted end milestone can be quite important to most clients!

Trend Graph: project by Gross Margin % performance actual agianst planned forecast at bid (linear trend also shown)



The Group 2 PM projects ***(fig: ii)***, were all delivered on time and most of them earlier, ('0' or less than target date) with a mean average across the sample of 10 days early against forecast.

In contrast the non-PM projects were, not quite all, but mostly later than forecast, and some were terribly late! Up to a 100 days for the worse 25% grouping, and some even worse outliers. Simple differentiators of PM approaches separated the two sample groups. The presence of a logic linked project plan was at the heart of it. This 'model' of the intended plan allows the PM to manage the project, to predict and spot risks, see opportunities and mitigate those risks.

So what, specifically, did the PM team do differently? Well they had a 'proper' plan showing tasks that can be carried out in parallel. In contrast the non-PM sample, where they had a plan, used preferential (bad) logic and a staircase list of 'things to do' in a rough order, as demonstrated in ***fig: A*** below.

The plan for the PM-group 2 was also intelligible to a non-expert. It was readable. And so risks were spotted and these PM group project managers were able to talk about things they had done to avoid risks, and exploit opportunities; ***fig: B*** shows a mocked up example.

Fig: B shows how the complexity of the logic linked plan can be accurately modelled, and how the schedule can be improved and costs along with it. Consequently they were getting better at it over time. The ***trend graph*** to the left shows these improvements on time of gross margin, over time on the full sample of projects.

Hopefully you are convinced? Project Management, done well makes a measurable difference. We did some other statistical testing of the sample and found it to less than 1% likely that the results were down to chance alone. Our full paper can be found published in the academic conference proceedings of the SEEDS International Conference 2017, and is called: 'Measuring the impact of Key Planning Principles on 'Gross Margin.'

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Fig: ***A.*** Sub-Optimal WBS and bad Logic linked plan

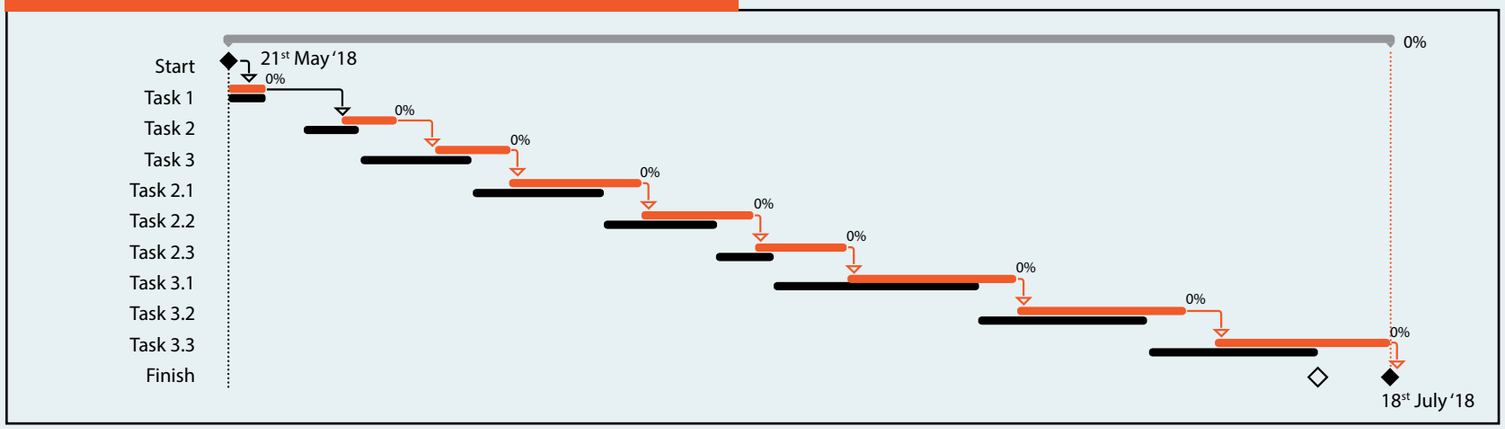

Fig: ***B.*** A correctly linked plan with the recommended WBS.