Cost escalation in construction

Cost escalation within the construction industry has seldomly escaped the notice of mainstream media in recent times. Delays, budget overruns and project abandonments all form the basis of well publicised reports on construction projects that failed to adhere to original budgets. This paper will highlight some of the central factors that contribute to cost escalation in construction ventures. Special attention will be given to the consequences of flaws in the designing process, underlying inflation and errors made by consultants. Empirical evidence will be employed to identify types of projects that may be prone to higher than expected cost outturn.

Design issues can easily add to the cost of construction. For instance, as explained by Chancery Group (2017) if a design fault such as a frame being under-specified is only recognised at the construction stage then that part of the process will come to a halt and likely not resume until clarity from the engineer is obtained (ChanceryGroup, 2017). Aside from frank miscalculations, poor design of the overall project can lead to the total expenditure of the project to escalate exponentially. An example of which being " George's Park in Lozells, Birmingham was laid out in the 1970s in a design that encouraged crime and anti-social behaviour and made it into a place actively avoided by local residents. It was redeveloped at a cost of £1. 2 million" (Commission for Architecture and the Built Environment, 2016).

A significant proportion of grand scale projects that had significant overspend was attributed to errors in the pricing stage by consultants. The tendency for " optimum bias", which can be defined as " the tendency of individuals to expect better than average outcomes from their actions. In the context of rail infrastructure projects, optimism bias can lead to underestimation of project duration, overestimation of its benefits and underestimation of its total cost” (UK Department for Transport, n. d.). This widely recognised phenomenon has caused significant underbudgeting due to its prevalence in well publicised construction projects. The scale of the effects of optimum bias can be very significant as found in a “ study conducted by Merrow, McDonnell includes 52 Megaprojects from different regions around the world and their budgets between $0. 5 and $30 billion (in 1984 value US dollars). The results show that only 4 projects met their cost goals, while the rest accrued average cost overruns of 88%” (Aljohani, Ahiaga-Dagbui, & Moore, 2017). Optimum bias is universally recognised as “ the UK Treasury now requires that all ministries develop and implement procedures for megaprojects that will curb so-called “ optimism bias”. Funding will be unavailable for projects that do not take into account such bias, and methods have been developed for doing this” (UK Department for Transport, 2006). Predetermining a mark-up to the estimated price can help insulate from underestimations, further, instructing a second independent consultant can help to diversify estimates and highlight excessively low figures.

Due to financial gain, it is conceivable that consultants intentionally mislead clients due to ulterior motives. This strategy could be deployed at the funding stage so that costs of the project appear much less than they actually are. This is intuitive as higher quotations may discourage and preclude clients from going forward with the project due to the magnitude of cost. By embellishing the price estimate, the consultant may feel that it is more likely that the client will agree to pursue the project. Other errors may be due to poor judgement or a combination of the two. For example, the cost of nuclear plant Hinkley C. “ Under an agreement between the Government and EDF Energy, ironed out in 2013, Hinkley is guaranteed to earn £92. 50 for every megawatt-hour (MWh) of energy produced through a combination of wholesale market prices and a levy on consumer energy bills. At the time Government said this would require top-up payments totalling £6bn via energy bills to meet the “ strike price” but falling market prices have widened the forecast gap every year since then.” (TheTelegraph Online, 2017). If the price of power day ahead and system imbalance price is to remain significantly below the £92. 50 per MWh then the cost of the project will be contingent on energy market forces and has potential to escalate markedly. Should power prices fall, then the strike price could be perceived as a poor judgement call which caused the overall outlay on this project to be significantly higher, which causes the taxpayer to absorb pricing risk and to consequently subsidise the plant at low power price outturns. This adds to the cost of the build cost to the UK taxpayer.

The cost of construction is, in part, a function of the market prices for raw commodities used by the builders. Should the price of commodities such as base metals or cement increase then this will need to be factored into pricing models so that the costs are distributed between stakeholders rather than being borne by one single entity. Inflation is a factor until prices are contractually agreed. Some of the key factors that influence the underlying price change of primary commodities is changes in demand forces whether this be locally or globally, the availability of a specific resource and foreign exchange movements for imported goods. To mitigate the impact of inflationary pressures on construction costs, contracts with inflation provisions are readily available. These “ apply indices, agree a weighting of resources at the outset and calculate a single index for each valuation. This has a distorting effect on longer contracts, though, where the resources used at the beginning differ from those used towards the end” (RoyalInstitute of Chartered Surveyors, 2018). The contracts should make explicit exactly how inflation will be managed during the delivery period so that each party is aware of their risk exposure to price fluctuations.

Irrespective of who is burdened by the inflation risk, increases in raw commodities can contribute to a higher delivery of the project. Other construction issues may be entangled with inflation risk too. If a project is scheduled to commence in an area where a large-scale project is underway then there may be a shortage of labour as the local pool of skilled workers is depleted. This could lead to remitting higher labour costs than would be customary under usual conditions in a bid to draw labour from other areas. This poses as an example of interwoven inflation and construction issues conflating to rise the overall cost of construction. Extreme weather is a further source of construction risk to price increases, contingency plans to avoid delays are central to curtailing the risk of budget overruns as explained by Flyvbjerg, et al. (2004) “ after the decision to build a project, it is of crucial importance that the project organisation and project management are set up and operated in ways that minimise the risk of delays. If those responsible for a project fail to do this, the evidence indicate that the financiers–be they tax payers or private investors–are likely to be severely penalised in terms of cost escalations of a magnitude that could threaten project viability” (Flyvbjerg, et al. 2004).

A further source of cost increases is the risk of the client changing requirements during the design or construction stages of the project. This could be due to a series of events such as legislative changes, funding issues, indecision or disorganisation. At the design stage this will likely extend the time spent designing the project which adds to cost, moreover, at the construction stage the loss of time and the extent of wasted materials and man hours can be substantial. Securing a budget is also a pivotable factor in cost increases from changes to the design or delivery of a project. If a lender reneges on a credit extension to support the project, then this can cause significant issues and may necessitate changes to the project that are purely made in the interests of decreasing expenditure. Flyvbjerg, et al. (2004) conducted an empirical study and found that the incidence of cost overrun occurs frequently in larger infrastructure ventures such as bridges and tunnels. However, they find that statistically significant differences in cost overruns in larger projects relative to smaller scale operations are not observable. This conclusion comes with the caveat that rail and road ventures are except from this rule as they experienced a significant uplift in costs regardless of the scale of the venture. They posit that “ For all project types, our data do not support that bigger projects have a larger risk of cost escalation than do smaller ones; the risk of cost escalation is high for all project sizes and types” (Flyvbjerg, et al. 2004).

There are several predictable sources of inflation that seeps into the construction supply chain as outlined in this paper. From empirical observation the industry has changed behaviours in response from previous failings in delivering on budget. A prominent example being that provisions to mitigate optimism bias need to be in place for the UK treasury to consider financing a large-scale prospect. Other sources of inflation are driven by developments that are exogenous to the specific construction firm such as international shortages in material or increased competition in local labour due to the activity of other construction companies in the area. Clients changing direction of a project after it is already underway prove to be another source of delays and financial waste. Balance of evidence from existing literature shows that large scale projects and public infrastructure ventures such as rail, tunnels and bridges are prone to breaking budgets.

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