

PLENARY REPORT**TECHNOLOGY PROJECTS, AN ORDEAL OR CHALLENGE FOR
PUBLIC ADMINISTRATION****Jan Brinks***NHL University of applied sciences, Thorbecke Academy***Abstract**

Great goals require great plans and big investments. Many technology projects however seem not to live up to their initial expectations, be it infrastructure projects, ICT projects or the like. If the public is asked to give an opinion on such projects, probably the most frequently registered answer would be that those kinds of projects mostly turn out to be more expensive and more time-consuming than planned and frequently have adverse effects. They seem hampered by unexpected or unforeseen events causing delays in the time schedule and/or overruns of the costs involved. In this paper the question will be addressed why and how this can happen and what can be done about it.

Keywords: technology projects, policy analysis, participatory policymaking, risk, decision making.

INTRODUCTION

Reading the papers or watching the television, there seems to be something wrong in the way technology projects are planned and implemented. Projects tend to more costly than planned, exceed their time limits or have adverse effects. At least that seems to be the way the average civilian perceives it, in my opinion. Nevertheless the problems we are facing in today's world ask for even bigger and more encompassing plans in the face of climate change, CO₂-reduction, infrastructure etcetera. The question is, however, if our public administrations are up to it to make the most effective, efficient en legitimate decisions.

THE STATE OF AFFAIRS

In a study of 258 infrastructure projects in the field of traffic infrastructure in 20 countries, Flyvbjerg (Flyvbjerg, 2003) concluded amongst others that costs are overrun in 86% of the projects. The real costs tend to be more than a quarter (28%) higher than the estimated costs. The percentage of cost overruns does differ according to countries, where Europe and North America seem to have the best track record. In the 70 year time period studied, there seems to be no significant improvement in estimating costs.

These findings on cost overruns are corroborated in a study of twenty years of public procurement in the United Kingdom (Mott MacDonald, 2002). The projects vary from building projects to ICT projects. The study mentions an 'optimism bias' with regard to costs and duration of the investigated projects. In contrary to Flyvbjerg there seems to be some learning effect over years.

Using the same database of 258 projects Flyvbjerg concludes that cost overruns are dependent on the length of the implementation stage. An increase of about 5% per year is estimated. No compelling differences were found with regard to project size or between public or private ownership. It is concluded (Flyvbjerg, 2004, p16) that: "... every effort should be made to conduct preparation, planning, authorization and ex ante evaluation in such a way that problems are negotiated and eliminated that may otherwise resurface as delays during implementation."

POLICY DECISIONS THE STANDARD WAY

The typical way to go about in making rational decisions on technology projects can be seen in figure 1. After the issue is put on the political agenda and an initial idea has been

formulated, the problem is analysed. Usually this is called the policy analysis stage with its own sub stages.

In the first stage of policy analyses ideas are brought forward on the current situation, what problems might arise when the current situation is not dealt with and what the desired situation should look like. More in detail the question will be answered which problem will be solved under which specific constraints and with which objectives.

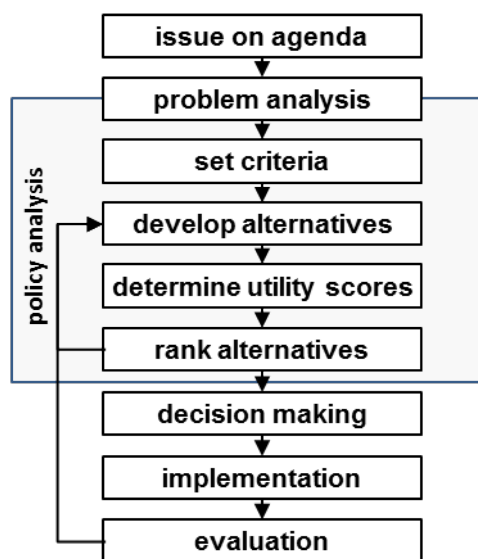


Figure 1: Stages in the policy process

In the next sub stage decision criteria are formulated in line with the objectives describing the desired situation. They typically reflect the main factors (effects) that should play a role in making a decision. In some cases (part of) the criteria are mandatory (e.g. environmental assessments).

In the third sub stage alternatives to reach the desired situation are developed. This will mostly involve a null alternative (autonomous development of the present situation) and one or more alternative ways to reach the desired situation. Sometimes one of the alternatives has to be the least environmental impacting or the safest alternative.

In the next step utility scores for alternatives on each criterion will be determined. In a model based approach a causal model is developed to account for changes in the criteria. This, however, is not always found in practice, where also partial models are used

(Monnikhof, 2006). Dependent on the form of analysis, criteria can be weighed, reflecting the importance they have in decision making. In this analysis stage several analytical methods are in use, dependent on the type of decision and the available utility scores. Whatever method is chosen, the base is always an impact matrix. The ways to analyse such a matrix vary from visual representation (scorecard method) to multi criteria methods (evaluation matrices, impact assessments) or cost-benefit analysis.

Typically all the methods will lead to a ranking of alternatives. Before a decision is made it is good practice to analyse the robustness of the ranking.

Finally the policy analysis stage is left and a decision is made, mostly for the alternative with the best ranking. This alternative is subsequently implemented and evaluated.

Both the evaluation stage and the ranking stage can lead to reconsidering the existent alternatives and possibly the development of new alternatives. However, in the latter case this will be ‘after the fact’.

The process to reach an optimal decision seems straightforward and simple. Why is it than, that in many projects costs are overrun, there sometimes is of civil protest or initial time schedules are not held? To put it another way, what are pitfalls in this policy process or more specific in policy analysis?

UNCERTAINTY AND RISK

An important assumption in the rational approach is that (scientific) knowledge is the key to solving problems. Apart from the question if every future can be known, the fact has to be recognised that knowledge is never one hundred percent certain. Decisions on technology projects have to be made in a complex and uncertain environment leading to risk-taking and the question of how to manage risks.

Walker (Walker, 2003) mentions two ways of looking at the nature of uncertainty. On the one hand there is epemistic uncertainty relating to an imperfect knowledge base. This type of uncertainty could be reduced by more empirical research. On the other hand he speaks of variability uncertainty pertaining to natural, behavioural and societal variability. In

addition ‘technological surprise’ (favourable or unfavourable) is introduced as an extra as source of variability. Variability uncertainty is associated with the variability of external inputs in a model-based approach. One way to go about in handling this kind of uncertainties is devising proper scenario’s on future development.

The level of uncertainty, on a scale ranging from determination to indeterminacy (total ignorance), can be divided in three levels: statistical uncertainty, scenario uncertainty and recognised ignorance.

The main locations of uncertainty (Walker, 2003) can be illustrated by figure 2. For the sake argument uncertainties with regard to instrumentation of the model as well as estimation activities are left out.

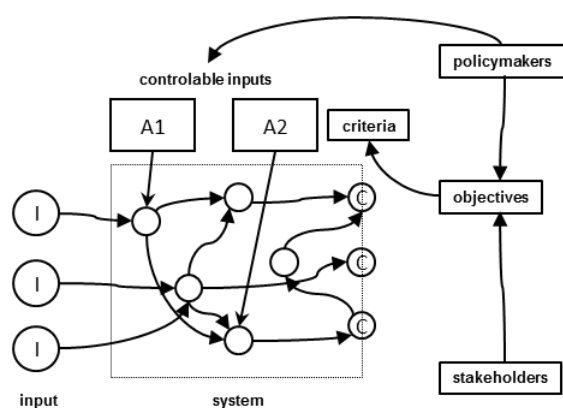


Figure 2: Simple problem diagram (adapted from De Haan, 2009, p. 48)

The first source of uncertainty has to do with how the *boundaries of the system* are set. The main question is what has to, or can be, included in the model as a representation of the real world. This type of uncertainty can be pinpointed to problem framing in the problem analysis stage. It is typically a problem in the process of formulating objectives and of defining criteria. The worst case would be, having a perfect answer to the wrong question.

A second source of uncertainty is located within *the model itself*. The model can contain structural uncertainties, that is uncertainty about relations and elements.

A third type is called *input uncertainty*. This type concerns the behaviour of external driving forces especially those which are not under control of policymakers. A different

behaviour of driving forces can even lead to a different structure of the model.

The last type is *model outcome* uncertainty, measured in the criteris, which is in essence an accumulation of all uncertainties. This type of uncertainty determine the actual risks in decision making.

METHOD OF ANALYSES

Even if the problem is well defined, the question of the analyses method used for the final ranking remains. Which method will be used is amongst others determined by the type of effects aimed at in the criteria. Two types of effects can be distinguished, physical effects (quantity effects) or welfare effects. The first type of effects compares to what usually is called output effects. The second type tries to estimate outcome effects in terms of added welfare (Ecorys, 2008) and is typical for cost benefit analysis. Cost benefit analysis, being popular, or even mandatory for all kinds of decisions nowadays, can lead to overemphasising welfare effects to the detriment of effects that cannot be measured in financial terms. This may introduce a bias in decision-making with accompanying risks.

FLAWS IN THE POLICY PROCESS

One of the stages in the policy process leading to uncertainties, as could be seen, is the problem analysis stage. Priemus (2010) mentions six pitfalls in the process of which at least three are of paramount importance to the way the problem is defined in the initial stages of the decision-making process:

- Absence of or improper problem analysis;
- Absent or improper programme of functional requirements;
- Ambiguities about the scope of the project.

This problem with ‘missing’ knowledge can be described as ‘premature closure’ (Monnikhof, 2006). The reason mostly is the eagerness to reduce complexity in early stages of problem analysis. There are two possible explanations:

- Policy designers or analysts are inherently integer but do a less than optimal job in

gathering and handling 'missing' knowledge;

- Policy designers or analysts are deceivers and present biased information to have a desirable alternative chosen or get a project on the way as soon as possible.

Most of the publications referenced in this paper seem to adhere to the first explanation. They perceive uncertainty and the accompanying risk as technical or 'physically given attribute' (Bradbury, 1989). In her opinion two dimensions, the political and ethical are omitted from this viewpoint. This may in the end lead to solving the wrong policy problem. Next to this the concept of risk as a social construct is stipulated. How is dealt with risks and the uncertainties underlying them is a matter of value systems of the groups involved in policy design and analysis.

This view is underpinned by Flyvbjerg (Flyvbjerg 2002). The compelling argument is that over time the cost overruns are far from zero at average, hence there must be systematic bias. He mentions two possible explanations: the economical and the political. The economical explanation stresses economic self-interest (getting projects started to be in business) or public interest (saving public money) as drives to underestimate costs and overestimate benefits. The political explanation explains cost underestimation in terms of (political) interests and power dictating policy analyses and subsequent decision-making. A frequently heard argument is that of the 'Everything-Goes-According-to-Plan' type.

The problem, apart from motives, seems to be a matter of gathering and handling information. It has to do with getting all the right information to properly frame a problem on the one hand and on the other hand be open about the information that is available. This is underpinned by the three other pitfalls Priemus (Priemus, 2010) mentions:

- Alternatives of stakeholders, that were not involved initially, popping up at the end of the policy analysis stage;

- Flawed process architecture especially with regard to involving stakeholders;
- Dissemination of contested information.

DEALING WITH PITFALLS

The causes that are mentioned with regard to cost overruns deal for a great part with three flaws:

- incomplete or inadequate preparation of decision-making, leading to 'unexpected' events causing delays or extra costs;
- biased estimates in the analyses stage, causing cost overruns or overestimating benefits;
- suboptimal project management.

One of the characteristics of the rational or 'engineering' method of policy design is that 'the best' option is sought after. If this option falls short of its expectations there is no way to fall back on other initially possible options (futures). Things can only be mitigated 'after the fact'. This could be characterised as blueprint-planning instead of open planning advocated in the remainder of this paper.

There are two ways to go about.

If the 'best option path' will or has to be followed, the initial stages of the problem analysis stage (the problem framing) can be handled in a participatory way. In terms of *participatory policymaking* the framing of the problem can be enhanced by involving all stakeholders, meaning the involvement of all actors that are somehow related to the problem. The argument is that at least some of the 'unexpected' consequences of developed alternatives can be dealt with before a decision is made, by fine-tuning objectives and criteria and properly set boundaries to the model. One could call this a modified engineering approach. The ultimate goal still is the construction of a best possible model representing the real world, leading to the best alternative. In addition, estimates could be made more accurate by looking at past experiences using the reference class forecasting method of estimating costs (Flyvbjerg, 2002).

One step further is considering suboptimal or stepwise solutions being robust to different

futures. This will lead to others forms of policymaking. Monnikhof (Monnikhof, 2006) stipulates that policy analysis as a means to inform decision-makers is influenced by four (interdependent) factors:

- The kind of problem may require its own analytical approach;
- In connection with the kind problem other forms of policy process may be required (e.g. network approaches, round models);
- The policy style may differ amongst problems and cultural ties of decision-makers (pro-active versus reactive or consensus versus hierarchy);
- The value systems in order, in terms of what is considered as 'good' decision-making.

Whichever road is taken in designing and implementing policies there should be proper project management based on an assessment framework for evaluating and managing risks at every crossing of a stage boundary within the project (Tweede Kamer, 2004-2005). This leaves the opportunity to take go no-go decisions at the beginning of the new stage of the project and leaves the possibility of redefining the business case.

Well known, process oriented models for project management are Prince II or DSDMS.

CONCLUSION

Risk in terms of uncertainty can from a statistical stance be looked upon as random or systematic error or bias. Random biases make our predictions less accurate, but typically are expected to have a zero mean over many technology projects. This does not mean, however, that efforts in building better models and developing more accurate estimation procedures should be disregarded. In individual cases the results of inadequate models or estimation procedures could be quite severe.

Despite of better modelling we must in every case pay due attention to three crucial aspects: problem framing, information management and project management.

Problem framing can achieved in different ways (policy processes). So we should not just adhere to methods that will only lead to a

model-based approach of policy analyses. There should be an open mind to other approaches.

By information management I mean using a broad perspective in the initial stages of project planning. The focus must not only be on what the technological solutions are but also on what the societal implications will be. This means that in the early stages of problem analysis there should be a kind of open debate on interests involved and the consequences these interests have.

Technology projects are projects and should be managed as projects, incorporating a proper assessment framework to evaluate and manage risks.

Thus initiating technology projects does not have to be an ordeal because the decision in the end is always debated. The challenge lies in placing an open debate into the problem analysis stage, and be willing to also consider sub optimal decisions.

This notion may hopefully lead to new avenues for educating students in public administration in the ten years to come.

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