# Managing projects in an uncertain and volatile world: engaging stakeholders, and building a systemic view of risk

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## ABSTRACT

*As evidenced through both a historical and contemporary number of over-runs managing projects can be a risky business. Managers are faced with effectively working with a multitude of parties, dealing with a wealth of interlocking uncertainties and frequently undertaking these activities within a compressed timeframe. This paper describes a risk management process developed to assist managers facing such situations. The process explicitly engages a range of stakeholders using a group support system and causal mapping process and provides not only a comprehensive appreciation of the risks identified but also a greater understanding of their subtleties. Using a real case the paper will describe the process and outcomes along with its implications, before reflecting on the insights, limitations and future research.*


**Keywords:** risk, scenario, planning, instability

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In both the public and private arenas large complex projects are frequently beset with significant problems causing them to both run over time and budget (Flyvberg et al 2003). This is evidenced in construction (Szyliowicz and Goetz 1995), transport systems (Transport Scotland 2011), defence (CPA 2012) and information technology (Flyvberg and Budzier 2011). In fact Morris and Hough (1987 pg 7) note "the track records of projects is fundamentally poor, particularly for the larger and more difficult ones". Project failure is therefore rife (Pinto and Mantel 1990).

One of the contributors to this complexity of managing large projects is the presence of an increasing number of stakeholders involved. Not only is this due to large turn-key projects typically involving a wide range of suppliers and sub-suppliers, but also the inclusion of consultants, joint venture partners, local/national governmental authorities and the general public (Williams 2002). Each of these stakeholder bodies has different power and interest bases (Ackermann and Eden 2011) and has its own understanding of the objectives of the project and how they tie in with their own core organizational goals. In addition, whilst stakeholders not only have different working cultures and language, but also different financial imperatives making effective collaborative working difficult.

Moreover, whilst there has been a plethora of tools and techniques developed to manage projects (for example Project Risk Registers, critical path analysis) these, as yet, do not appear to have eradicated the cost overruns as unforeseen events continue to occur. Good risk management can help, however there appears (from both the literature and practice) to be a predisposition to focus on technical and financial risks rather than take a wider, more comprehensive view (Ackermann et al 2007). Analysis on projects that have experienced considerable overruns have found the risks relating to suppliers, customers, contractors, force majeure events, etc often cause the problems (Ackermann et al 2007) – touching on the point above regarding the multiplicity of stakeholders.

Another significant factor is that many of the techniques take a very discrete view in terms of analysing and managing risk. For example, project risk registers work on the underlying assumption that risks exist independent from one another (Morris and Pinto, 2004). However, this assumption does not work in practice and researchers (for example Williams; 2000; Williams et al (1997)) now argue that risks have significant implications for one another rendering management more difficult. A particular instance of such integration is the identification of feedback loops comprising risks generating dynamics that once in place are hard to resolve (Cooper 1994; Williams 1995). This view is well articulated by work by Eden et al. (2005) who describe the non-linear growth as 'amoebic'.

It is therefore important to recognise that new approaches for managing projects taking account of multiple perspectives (both in terms of the wide consideration of risks and their management), broad comprehensive surfacing of risks (going beyond the financial and technical), and an appreciation of both the systemicity and dynamism are necessary, particularly in today's world of tightening economic conditions, increasing volatility and progressively complex projects. This paper describes the use of an approach that aims to alleviate, at least to some extent, these considerations, and one that has been applied in practice and is supported by a multi-disciplinary body of knowledge. The paper thus commences with a brief introduction to a case study where the approach has been used, before examining the basis for the approach, and finishing with conclusions, limitations and next steps/future work.

## CASE STUDY

The power station providing most of the energy for the Shetland Islands, a small group of islands at the northern end of Scotland, required replacement (due partly to age and partly to the changes in emissions regulations). The design of the new power station would be informed by an analysis of Shetland's energy requirements and the availability of other generation options to meet this demand. Moreover, as part of Scotland and the UK's wish to move to an increase in renewables (to help manage climate change), as well as recognise the rising fuel prices (experienced particularly in Shetland due to its remote location), there was a desire to use renewables to meet a greater proportion

of energy demand and reduce reliance on fossil fuels. However, connection of new renewables is constrained by the capacity of the existing electricity grid and lack of a grid connection to the mainland. Thus, Scottish Hydro Electric Power Distribution (SHEPD) designed the Northern Isles New Energy Solutions (NINES) project to trial a range of smart grid innovations to reduce capacity constraints and increase exploitation of renewable energy resources, while maintaining energy security – 'keeping the lights on'. The project outcomes would therefore inform the design of the new power station.

The NINES project thus assesses the potential of different generation portfolios combined with smart grid technologies to meet current and future demand. This requires understanding the area's energy demands ranging from domestic use to public services, e.g. hospitals, factories and refineries. In addition, it is important to understand the network implications of the generation options which differ in terms of voltage variance, reliability of supply and transmission formats. Finally, there is an imperative to build longevity into the solution – as the option chosen will have to operate for at least 20 years and therefore needs to be robust against a range of different uncertain and shifting futures.

SHEPD invited academics with competences in electrical/power engineering, economics and risk to be involved in the NINES project. The authors of this paper were involved in the risk identification and risk management element of the project. The particular objective was to identify, quantify and work through the implications of risks pertaining to the NINES project with regards to the different design options as well as taking note of the wider environment as seen by key stakeholders. Moreover, a key research aim was the desire to integrate qualitative strategic risk with probabilistic operational risk, in order to consider how these can be integrated into a single integrated framework. Inputs to the integrated risk model would be existing data/documentation, and extensive stakeholder discussions elicited through workshops and semi-structured interviews.

The project kicked off with a series of three risk workshops. The first workshop involved the NINES team (University researchers and energy company project managers), the second involved Shetland islanders (including councillors, wind farm owners, etc.) and the last involved technical members

from the energy company. Each workshop involved between 8-16 people ensuring a wide range of perspectives were incorporated as well as gaining buy in and ownership.

## THE PROCESS

As the above discussion regarding project risk illustrates it is very difficult to manage wicked or complex problems (Rittel and Weber 1973, Ackoff 1981) and therefore finding a manageable process that is not unwieldy is paramount. Thus the process design for this research project was based on an existing body of work which focused on the use of Group Support Systems - GSS (Jessup and Valacich 1993). These systems provide greater productivity through the ability to contribute simultaneously to the group work; through gathering views, causal relationships and preferences. In addition, these systems also support anonymity and thus reduce the conformity pressures that participants experience when being identified with specific contributions. Moreover the particular software used – Group Explorer – enabled structuring of contributions, management of complexity, and an enhanced understanding of the systemic situation through building a causal model amenable to analysis (Ackermann 2012). In addition, Group Explorer enabled participants to negotiate effective management options (Eden and Ackermann 2010; Ackermann and Eden 2010).

The workshops followed mostly the same design, namely the generation of risks, consideration of the relationships between risks (risk systemicity) and the identification of priorities. Group Explorer (GE) ensured that this material could be captured in a relatively short period of time (each workshop was between 4-5 hours in duration). Participants were provided with consoles through which they could enter risk statements, links between the risks, and priorities. In addition, a public screen provided the facility to display the collation of all of the views and facilitated continual amendment and development of the emerging picture. In addition the facilitator had access to a third computer which displayed participant activity allowing her to see which participants were actively contributing, what was being contributed, and whether there was universal agreement for priorities.

The key stages in the process were as follows:

(i) The elicitation of risks as perceived by the workshop participants. An objective of the elicitation process was for participants to consider a wide range of risks, going beyond technical risks to consider political, environmental, strategic etc. Inclusion of stakeholders from all parts of the project, each with their own specific concerns, helped to achieve this objective. Participants were paired, allocated a laptop computer, asked to consider risks that may be associated with the NINES project and type these into GE. Each risk not only appeared on a participant console but also on the public screen allowing participants to 'piggy back' off each other and trigger as comprehensive a range of risks as possible (see figure 1). The process enabled fast elicitation of risks as multiple participants could contribute at the same time. To support this activity the facilitator attempted to cluster the risks into themes – allowing participants to cognitively manage the growing body of material rather than face overload. The clusters also enabled a quick overview of the themes to be conducted allowing participants to see what had been generated and hopefully prompting further contributions as missing areas became obvious.

Figure 1 about here – photo of group working

(ii) Structuring and linking of the risks. Once participants had exhausted their reservoir of risks, the process moved on to explore how the risks impacted one another. This part of the process allows consideration of the systemicity of the risks (Howick et al, 2006, Ackermann et al 2007, Williams et al, 1997) reflecting that risks do not occur in isolation from one another. For example, it is often the interaction between different types of risk that can cause the most damage to a project (Eden et al, 2000; Williams et al, 1997 and Eden et al 2005). A risk event in one area/category may cause, or contribute to the likelihood of a risk event somewhere else. Thus, risks can be seen as a network of interrelated possible events, which may be referred to as 'risk systemicity'. Risks are linked to one another through use of arrows where an arrow from Risk A to Risk B means that 'Risk A may lead to Risk B'. As risks are linked to one another, a 'risk map' is created (an example of this can be seen in Figure 2 below). This not only enabled the group to move from a fairly divergent set of views to a more convergent set but also triggered the generation of new material as the rationale for the links was explicated.

Figure 2 about here

(iii) Prioritisation of risks. In each of the workshops, the facilitator identified (based on the links produced during (ii) above) those risks which were both substantially impacted by, and had an impact on, the other risks in the map. These risks were then focussed on during the next part of the workshop – namely asking the participants to prioritise these 'key' risks with respect to likely probability and impact using GE. Again, this activity was predominantly carried out in pairs, enabling discussion amongst each pair of participants in addition to discussion between the different pairs when the final prioritisation was displayed on the public screen. This discussion not only enabled participants to explain their own reason for prioritisation, but also allowed them to consider other peoples' views, thus broadening their understanding of the perspectives of other stakeholders. This prioritisation was undertaken by asking participants to rate the selected 'key' risk statements on a scale of 0 to 100. 0 related to the risk which they believed would have the least impact on the project if it occurred whereas 100 related to the risk which they believed could have the greatest impact on the project if it occurred. A second prioritisation activity was also carried out. Participants were asked to consider those risks which they believed were most probable to occur in the short term i.e. the next 6 months and those risks that they believed were most probable to occur in the long-term i.e. by 2013 when the final portfolio of energy sources was to be confirmed to the regulator. This stage of the process enabled the identification of those risks that needed most attention and thus required careful management.

(iv) Enhancing the risk map after the workshop. Participants were given the opportunity to add to or amend the risk map after the workshop. Workbooks displaying themed views from the risk map were sent to participants to provide them with the opportunity to add further risks, or to add or amend links between the risks. The reason for this activity was partly the limited time available in the workshops and thus the appreciation that participants may wish to include further material after leaving the workshop. A second reason for doing this was to promote the risk map as a dynamic tool which can be updated as new knowledge becomes available.

(v) Feedback on the process. Interviews with individual participants were carried out following two of the workshops (they were not used following the first workshop with the NINES team as this was seen as a pilot workshop), partly as an additional way of gaining further material as a part of step (iv), but also to gain feedback on the process. This feedback was of particular importance in order to enhance the process for the second tranche of workshops to be carried out in 2012.

(vi) Analysis of the resultant material. Once the three workshop maps had been augmented with the material generated during the interviews, the three models were analysed to determine their constituent properties (Eden and Ackermann 1998). Each model was considered separately as their idiographic properties provided important insights in relation to managing the messy complex situation. Moreover as the workshops were being conducted to inform the client (rather than participants working to determine a single unified representation) as there was no demand to integrate the models – the client preferred to keep the insights located with each workshop as the particular mix of participants provided valuable contextual information. However, it was possible to gain some form of triangulation as insights that emerged across all three workshops gained greater salience.

An initial examination was the statement to link ratio as this provides some insights into the perceived systemicity of the network. The three workshops revealed statement link ratios of 145:150, 207:290, 156:197 highlighting the paucity of links elicited in the first workshop (as a pilot workshop more time had been concentrated on considering themes, however this activity was changed for the later workshops) but also illustrating a correlation between number of participants and material generated (there were more participants in the second workshop than the first and third explaining the greater number of statements and links). Following this initial review, two analyses which concentrated on identifying significant (in terms of examining the extensiveness of each statement's impact both locally and globally on the model's structure) risk statements were run as part of the process of identifying emergent themes (Eden et al, 19xx). A final examination focused on determining whether there were any feedback loops suggesting dynamic behaviour (Sterman, 2000).

## CONCLUSIONS, LIMITATIONS AND NEXT STEPS

The risk workshop process presented above has been tested on 3 workshops and has proved valuable to the client organisation. However, it is appreciated that 3 is a small number and refinement to the process will be needed based on the experience to date. Nevertheless, the organisation has benefited in a number of ways:

The workshops are an interactive process and thus focus the attention of the participants. They stimulate active participation, increase understanding of the numerous risks and their ramifications, and help build up a more *comprehensive* view of the NINES project

The workshop process offers a different way in which to consider risk assessment and management. The maps represent scenarios that demonstrate the systemicity of risk, rather than considering risks in isolation from one another and thus potentially missing impacts that may occur due to the *interaction between risks*.

The process is *inclusive* by bringing together the perspectives of multiple stakeholders in the project. This also encourages cross disciplinary learning through an appreciation of how risks from each part of the project impact one another. This provides participants with a *holistic* view of the risks in the project.

A key value added to the organisation has been *an improvement on traditional methods* through the extension of its risk assessment process beyond the organization's standard business risk register. As in many businesses the risk register does not take such a comprehensive view of risk and does not involve as many perspectives. It is also normally not a dynamic process, enabling risk systemicity and its evolving nature to be tracked over the life of a project.

Initial feedback, gathered from participants, confirmed many of the benefits discussed above. Feedback suggested that participants valued each aspect of the process discussed above, as seen through the following quotes:

- ***Comprehensive***: "Covered lots of potential risks that we hadn't thought about before."

- ***Interaction between risks***: "Given the diversity of group, I was impressed how some of the risks tied into each other in both the same and other areas. The cross-links were interesting. I was interested in links that come into my area."
- ***Inclusive****:* "I was very impressed – it got the views of a lot of people and was structured"
- ***Holistic*****:** "Got the big picture… rather than looking only at your own area of responsibility."
- ***Improvement on traditional methods:*** "The traditional method almost tries to get to answers first, as risks are based on experience and previous knowledge…. However the workshop approach takes a different view by focussing on links and thus picked up on a number of things behind (traditional) risks that wouldn't have been thought about. We wouldn't have seen these links in the traditional method as you 'go where you know'. Also it is like-minded/similar people that prepare the risk assessment each time. However with workshop a wider group of people involved and thus takes you in a different direction."

**Limitations**

Although a number of benefits have been identified from the workshop process, it is recognised that there are some limitations. Each of these limitations will need careful consideration and undertaking further workshops will help to improve the process.

Identified limitations are as follows:

- The workshops are good at providing buy-in and ownership for those that participate in them. However, if the output from the process is required to be reported to other parts of an organisation, then people may find it difficult to gain a full appreciation of the contents of the maps – they are too overwhelming. People have reported that they prefer multiple risks reported as lists. Thus when reporting the outcome of the NINES workshops a mixture of maps and lists were used with the lists comprising the key themes that surfaced from the

workshops, enabling some level of the systemicity of the risk structure being retained in the reporting process. This issue of determining an accessible representation of the complexity of the risk network is an area that will benefit from further work.

- The ideal situation would be to include all key stakeholders in the workshop process. However, practically, there is always going to be some key participants missing. For example, in the NINES project it was not possible to include the regulator and a key supplier in the process. In addition, some members of the group that were to be a part of the process were not able to make the arranged dates due to diary restrictions. The process needs to consider how their perspectives can be taken into account and how they can gain buy-in to the process, particularly in light of the point made above.
- When gaining feedback from participants, one person noted that they felt that more time could have been spent eliciting risks. Workshop participants are often very busy people, who can only give the process a restricted amount of time. The 4-5 hours for the NINES workshops meant that the balance of time between eliciting, linking and prioritising risks had to be carefully planned. More time spent on eliciting risks may provide a richer and wider set of risks, but this leaves less time for linking the risks and thus not fully capturing the extent of the systemicity in the risks. The balance of time between each activity is crucial and it is anticipated that this will be fine-tuned as further workshops are undertaken.
- Participants were sent workbooks after the workshops so that they did not feel that the time spent eliciting or linking risks was restricted. However, minimal material was returned from this activity. When in a workshop, participants dedicate their time to the task in hand, however outside this event, the task was not given their full attention, with other work taking priority. One reason for this may be that as the workbooks were a new process to the participants, they did not regard them as an embedded part of their organisation's processes and thus did not spend a great deal of time on considering risks beyond the scope of the workshop. Whereas, if an organisation was to fully adopt and embed the process, further

priority may be given to this part of the process. This will be an interesting area to monitor going forward in the project.

**Next Steps**

As previously mentioned, 3 workshops have been carried out with key stakeholders in the NINES project. However, it is intended to carry out a second tranche of workshops with the same stakeholders 12 months later. These workshops will consider how risk priorities have changed over time – taking account of the dynamic nature of risks and their interrelationships.

Additional work will also be carried out with respect to the technical risks highlighted during the workshops. Time will be spent understanding their probability of occurrence and likely impact with the intention of feeding additional information into the risk model. As a part of this activity existing recorded data will be used in addition to eliciting subjective judgement from experts.

Thus the workshops and workshop processes have provided a powerful starting point in terms of thinking about the risks of the project, and a good basis upon which to ensure that the changing nature of both technical/operational risks and strategic risks are considered throughout the life of the project.

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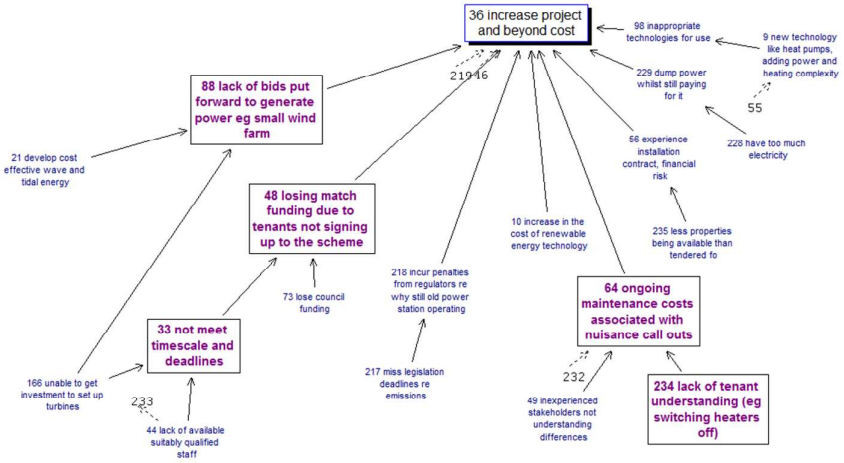
Figure 1: Example of a group using the Group Support System to surface and review risks

Figure 2: a small segment of a map




Note: The numbers preceding each risk event are reference tags used to facilitate manipulation of the data.

Legend: the statements boxed and shadowed are outcomes, statements in bold with boxes are key issues, the remaining statements are additional information. Numbers attached with dotted arrows represent additional material.