White Paper on method development

How to plan efficiently in an environment dominated by uncertainty

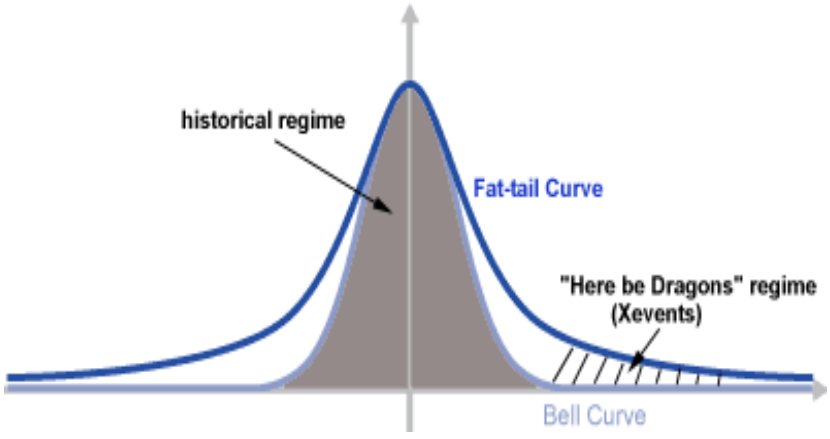
Uncertainties Are Increasing

Increasing complexity and the greater rate of change in the global economic system is creating a challenging planning environment dominated by uncertainty. The systemic nature of the global environment is so complex that it is un realistic to assume we will have sufficient information to reduce uncertainty Traditional planning methods are not powerful enough for this environment

While organizational planners are wise to focus on the 'most probable' future, one that produces maximum return for their investment, the risk posed to these organizations of extreme events can be of such a magnitude that it is equally important to plan for 'less probable' extreme events.

Figure 1: Events that shape our environment are the tails of the probability distribution. (The number of these "Dragons" is increasing.)

Leaders in all walks of life have to make decisions every day, and we need new planning tools that help them take these decisions. The increasing number of unknown unknowns is not a valid excuse for avoiding these planning challenges.



The Xevents project is studying the twin challenge of increasing complexity and systemic risk from a very particular perspective. We focus on extreme events, events having low likelihood of occurrence but potentially large impacts, as a planning instrument. We claim that by focusing attention on extreme environments shaped by the relevant uncertainties, we are able to define borders of the *Space of Uncertainty,* the area that defines the requirements for systemic resilience.

The methodology that the Xevent project employs for this Xevents environment is based on concepts developed by Michael Raynor (Strategy Paradox 2008) and on the research of Professor Ahti Salo's team from Aalto University (www.rpm.tkk.fi).

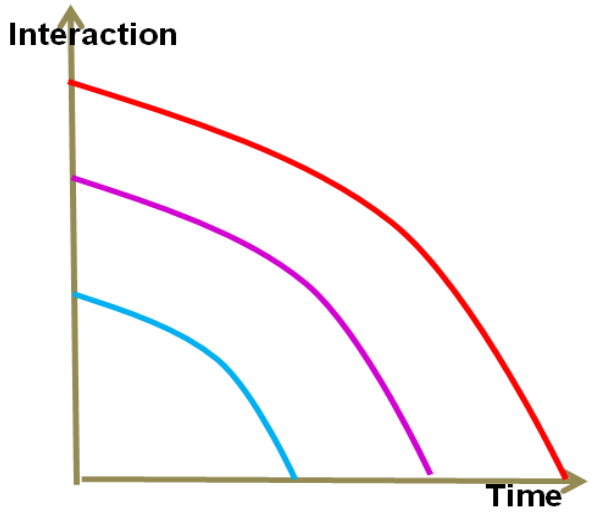


Figure 2: The Space of Uncertainty method is developed for the situation in which we have a lot of interaction with the operating environment and the time frame is long (red area). If the interaction with the environment is limited and the consequences are known (blue area), planning should be focused on the analysis of historical data and efficient implementation of plans. Weak signals detection and fast adaptation of existing plans is a valid planning strategy in the (lilac) area, where increasing interaction is generating a dynamic environment and the planning horizon is medium term.

The choice of planning method is always dependent on the context and environment (Figure 2). The method we describe is designed for long-term planning in systemic environments.

Space of Uncertainty (SoU)

Design Principles

Planning for "unknown unknowns" is in principle a challenge for the imagination; we have to extend our understanding by pushing the borders of our existing thinking outward from our current perception of what is relevant, what is logical, what is causal. These creativity requirements do not exclude the need for systematic procedures. Just the opposite, in fact.

We apply four design principles in our SoU method (please find detailed methodological background in Attachment)

1. In order to define the borders of uncertainty, we focus on extremes; low probability events/drivers and descriptions of environments defined by the extreme ends of uncertainties. Detailed step by step descriptions are given below.

2. We process a large number of options, which is why we transform qualitative descriptions to quantitative ones.

3. Scanning and assessing uncertainties requires the contribution of a large number of diverse experts and stakeholders. Our methods are web-based and participatory.

4. The final evaluation requires a face-to-face elaboration of decision makers in a workshop.

5. The ultimate goal of long-term planning is to support decision making in the short-term. .Thus it is important to create and evaluate options and incorporate these into our planning such that we can prepare for / or benefit from the extreme events.

Our development work is defined by leading design challenges; the tools to be developed should be pragmatic, generic and easy to apply in everyday planning work by either public or private sector organizations.

The Process Step-by-step

Step 1: Key uncertainties

The process begins by scanning uncertainties and defining the *key* uncertainties. We have developed a web-questionnaire tool for this purpose. First, we ask participants to share their ideas about the uncertainties with us. Second, participants assess their own ideas and a list of potential uncertainties is derived from our Global Economic System 2030 scenarios.

Step 2: Environments shaped by extreme states of uncertainties

We then take a closer look at the 6-10 Key Uncertainties. Participants in the process describe the extreme ends of each of the uncertainties. In these theoretical descriptions all the operating environment is defined by the uncertainty. This task can be either web-facilitated or conducted in a workshop.

Step 3: Success strategies

Some player/agent is the best, even under the extreme circumstances defined in the previous step. Here we analyse the specific features of this environment and define what agent(s) will succeed in this type of environment. What sorts of capabilities are needed and what is typical for the operations of the most successful player/agent in this environment. Now we focus on the organization itself. What are the development actions that should be initiated in order to create the required capabilities? The list of development actions is the input for the next phase. This task can be either web-aided or conducted in a workshop..

AN EXAMPLE:
A steel company was assessing investment alternatives in the Russian market. Uncertainties are prominent.

1st They defined key uncertainties (the decision making structure as one of them).

2nd The extreme environments are described for the decision making are; very centralized decision making (internal conflicts are increasing, state controlled by a strong police and well equipped army or laissez-faire society (where market forces will attract 70% of the rural population to the 30 cities with more than 1 mill. population.

3rd Successful steel companies that operate In the extreme environments defined by highly centralized decision making are partnering with the police and the army and developing them mobile, easy to transport and fast to erect barracks, logistic centers, hospitals. In the world of fast urbanization, the fastest growing steel companies are producing small steel houses, that non-skilled family can put together by themselves in a couple of days.

4th The above actions and others listed were assessed by their feasibility in different environments and in this case especially the fit to the current product development strategy.

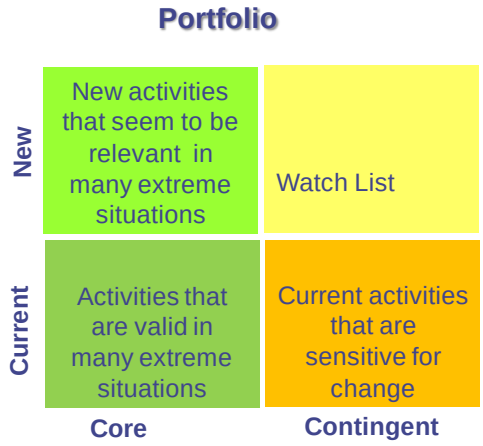
5th One of the core development actions listed was an additional investment of the small fast to erect workshop concept that was already included to the development plans.

Step 4: Multicriteria action assessment

The development actions are assessed with regard to (context dependent) multiple WHAT on a qualitative or a quantitative scale. The main criteria measure how an action contributes to building success in each of the extreme environments. Other criteria may measure, for instance, current feasibility of an action idea, fit to the existing capabilities, the investment required or value for existing operations. Depending on the context, some of these assessments can be carried out by analysts. For instance, action ideas that seem to be valid under many different extreme futures should receive a high assessment in all these futures. Additional items for assessment can obtained by a web-questionnaire or in a workshop.

Step 5: Resilient portfolio

The RPM method is used to identify those portfolios that i) satisfy the relevant constraints (e,g,, the feasibility or fit with current strategy, limited number of actions that can be pursued) and ii) optimally help to build success across the possible extreme futures, i.e., builds resilience.



List of potential actions derived from uncertainty > leading criteria: resilience and fit with current development activities

Since there is incomplete information on the model parameters (futures' likelihoods, actions benefits, or importance of the assessment criteria) there are usually multiple efficient portfolios. However, we can often identify i) core actions that are included in all efficient portfolios (help build success in all extreme futures) and should therefore be pursued and ii) contingent actions that are included only in some extreme futures and iii) actions that are not included in an efficient portfolios.

Method Development – Call for Piloting Partners

The Xevents project is a methodological project and our main task is to develop both theoretical models and pragmatic tools for understanding and planning for extreme events in human society. The development work of the Space of Uncertainty toolset is based upon previous work of the Xevents team members. In addition, during 2010 we have developed (Juuso – how??? What is the additional element we are bringing to the table now? I have some ideas, but let us discuss)…. Piloting is an essential element of the methodological development. We will conduct 4 to 6 kinds of pilots with our partners by the end of March 2011.

The outcome of the methodology development is two-fold: the scientific part of the work is reported in two scientific articles and the pragmatic toolset in the "Planning for Uncertainty" handbook to be published by the end of March 2011.

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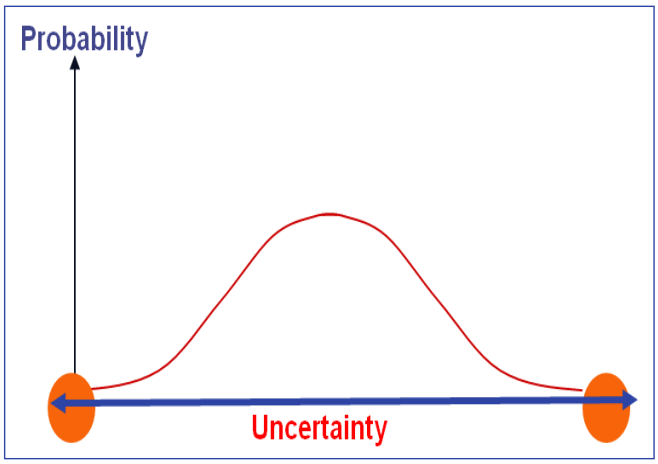
ATTACHMENT

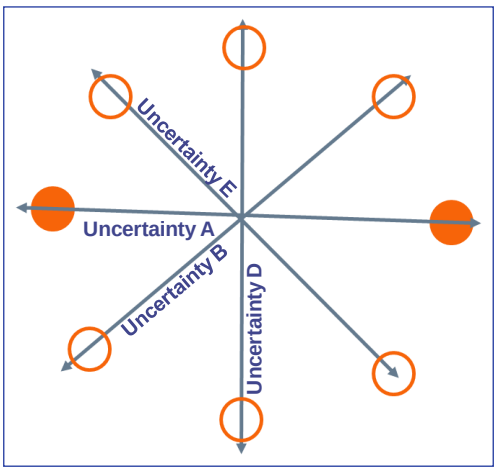
Space of Uncertainty Methodoogies

The Space of Uncertainty tool set applies two methodologies: cognitive processing of extremes of uncertainties and multiple criteria portfolio modeling.

Extremes of uncertainties (EoU)

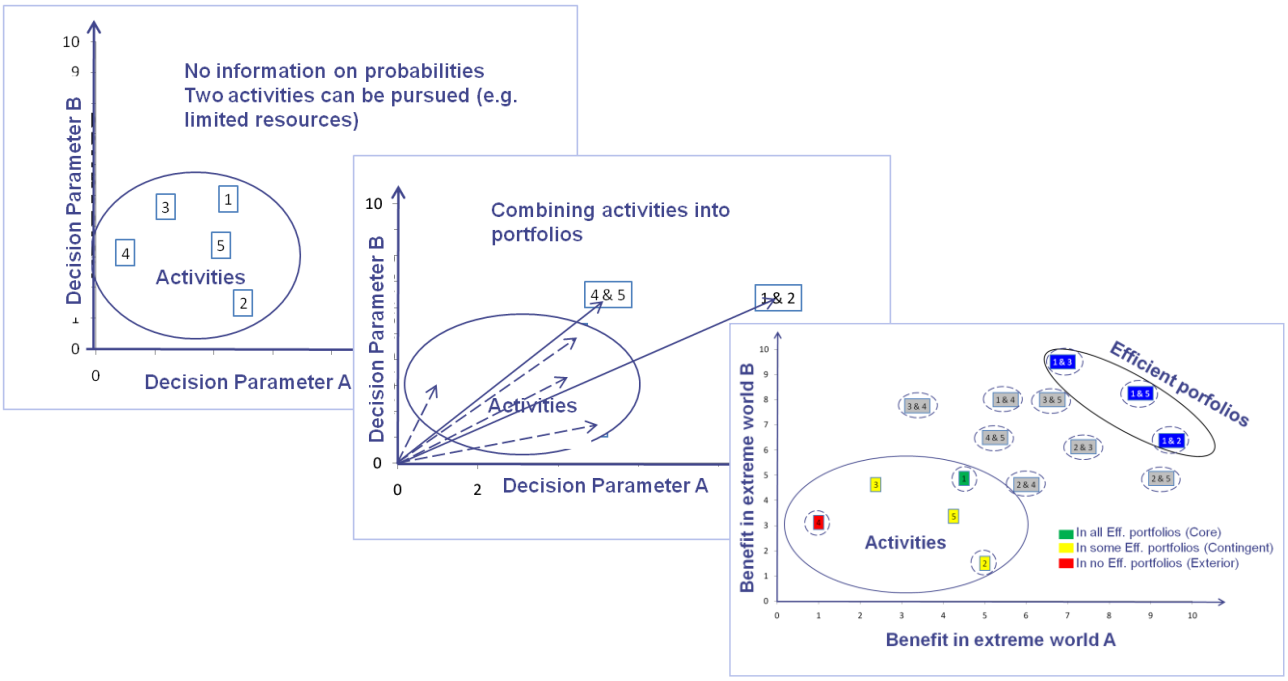
Extremes of Uncertainties (EoU)The key constraint for studying unknown is our existing cognitive structure. Our perception of the operating environment is the driving force that shapes it, and causalities are based on past experience. It seems logical to expect events to occur as they have happened in the past. In order to deal with true uncertainty, we have to apply techniques that force us to elaborate environments that do not behave according to preexisting rationales. The technique uses existing mental models of uncertainties as a starting point. Participants in the planning process then stretching uncertainties to their low probability extremes. The theoretical extreme situations are then used as a basis for designing potential actions.





RPM-methodology

Robust Portfolio Modeling (RPM) is a decision support methodology for analyzing multiple criteria portfolio problems. It uses standard decision analysis models (e.g. multi attribute utility/value theory) to capture the benefits of different option and option portfolios (i.e. option combinations), but admits incomplete information about the parameters (e.g., criteria importance weights, probabilities, diverse views of multiple stakeholders). Based on combinatorial optimization techniques the RPM identifies those feasible option portfolios (i.e., that satisfy relevant portfolio constraints regarding limited resources) and are efficient, in the sense no other feasible portfolio offer more benefit in light of the incomplete information. Based on the identification of efficient portfolios, the options can be classified into i) core options included in all efficient portfolios, ii) contingent options that are included in some but not all efficient portfolios and exterior options included in none of the efficient portfolios.


No information on probabilities
Two activities can be pursued (e.g. limited resources)
Decision Parameter B
Decision Parameter A
Activities
1
2
3
4
5
Combining activities into portfolios
4 & 5
1 & 2
Efficient portfolios
Benefit in extreme world B
Benefit in extreme world A
In all Eff. portfolios (Core)
In some Eff. portfolios (Contingent)
In no Eff. portfolios (Exterior)