

Risk Reduction and Planning

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Risk Reduction Strategies


Risk Avoidance

-  Get rid of any impact

-  Make it impossible to happen

Risk Alleviation/Reduction

-  Don't try to remove all risk

-  Reduce impact or probability to an acceptable level

-  Buy information

Use Risk Transfer Strategies

Risk Transfer-Time

- ✍ Move the point in time when a hazard occurs

- ✍ Example

 - ✍ High level of requirements change

- ✍ Strategy

 - ✍ Incremental development and strong change control

Risk Transfer- Space

- ✍ Move the problem to a point where the impact is removed
- ✍ Example
 - ✍ Automation of a particularly complex credit agreement
- ✍ Strategy
 - ✍ Put in a trap and let the bank staff handle the problem
- ✍ Also termed “Transfer outside system boundary”

Risk Transfer to Someone Else

- ✍ Someone else takes the consequence of the risk or reduces the probability of the risk

- ✍ Example

 - ✍ Require AI component

 - ✍ We have NO AI experience

- ✍ Strategy

 - ✍ Employ specialist subcontractor

 - ✍ Impose penalty clause to transfer impact of non-delivery

Subcontracting

✍ Must be done for the right reasons

- Valid Reasons

✍ Specialist Application

Knows risks and can manage better

✍ Available off-the-shelf

✍ Isolated, unusual Software

Cohesive and well defined, beware if critical

Subcontracting

Poor Reasons

Tight Timescales

If you can't meet them?

It reduces the risk

No it changes and may increase it.

Failure will be someone else's fault

But you will be blamed.

Less Management Effort

Only if you want a real disaster

Mechanisms for Choosing Between Strategies

Mechanisms

- ✍ Risk Reduction Leverage
- ✍ Decision Theory
- ✍ Buying Information


Risk Reduction Leverage

$$RRL = \frac{R_{before} - R_{after}}{\text{Risk Reduction Cost}}$$

Risk Reduction Leverage Example

Hazard

 Interface Error

 1,000,000 units of loss

 Probability = 0.3

Risk

$$0.3 * 1,000,000 = 300,000$$

Option 1 for Risk Reduction

✍ Use Requirements and Design Interface Checker

✍ Cost 20,000

✍ Probability after of interface errors =0.1

✍ Resultant Risk = 1,000,000*0.1

$$RRL_1 = \frac{R_{before} - R_{after}}{\text{Cost of Reduction}} = \frac{300,000 - 100,000}{20,000} = 10$$

Option 2 for Risk Reduction

✍ Interface Testing

✍ Cost 150,000

✍ Probability after of interface errors 0.05

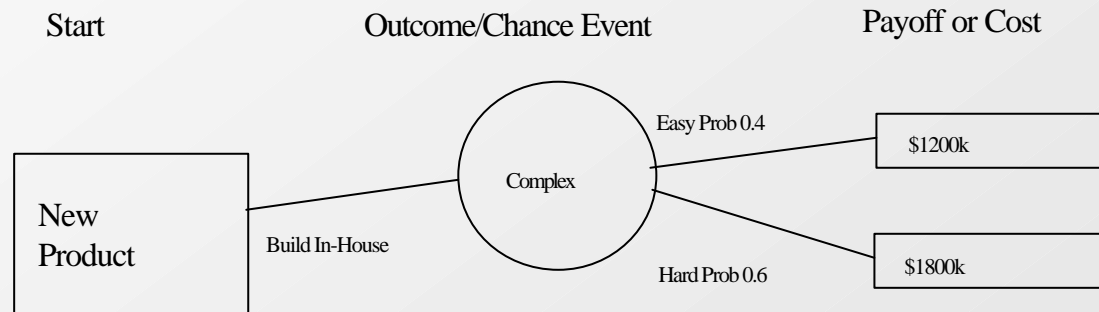
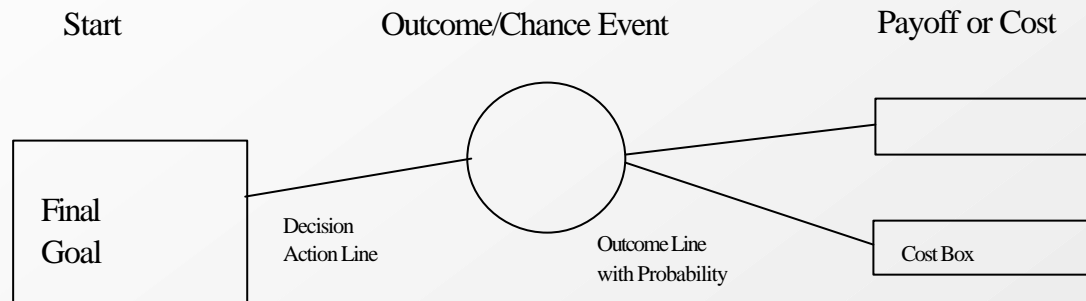
✍ Resultant risk = 1,000,000 * 0.05

$$RRL_2 = \frac{R_{before} - R_{after}}{Cost\ of\ Reduction} = \frac{300,000 - 50,000}{150,000} = 1.67$$

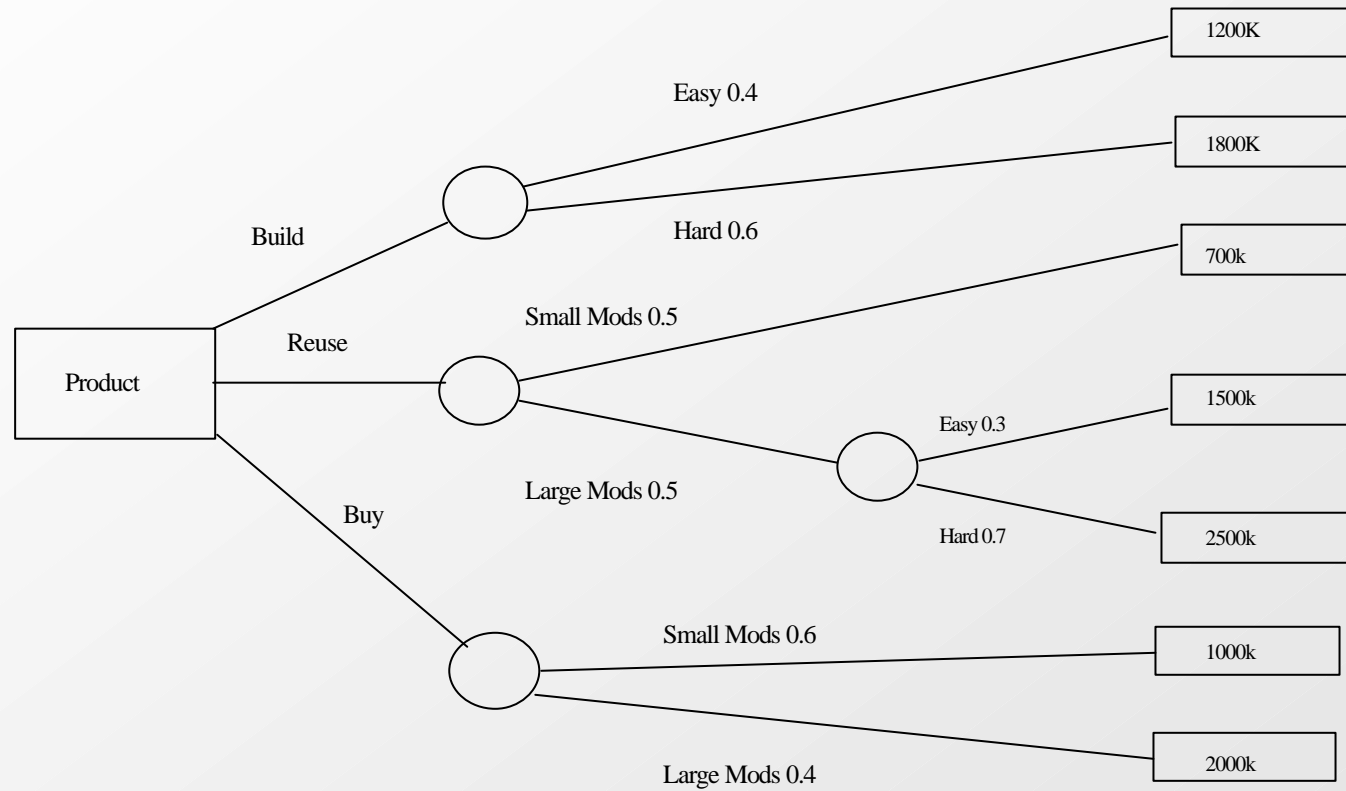
Decision Theory

- ✍ Not a guarantee of a perfect strategy
- ✍ Helps organise information and views
- ✍ Provides best possible logical decision
 - ✍ Value on the outcome of each option
- ✍ Allows comparison when
 - ✍ Conditions Uncertain

A Decision Tree



Full Example



Other Actions

- ✍ Must consider all actions
- ✍ For cost-benefit analysis
 - ✍ Expected payoff in long term
 - ✍ Need to assess “no-go” action
- ✍ Consider effect of buying information

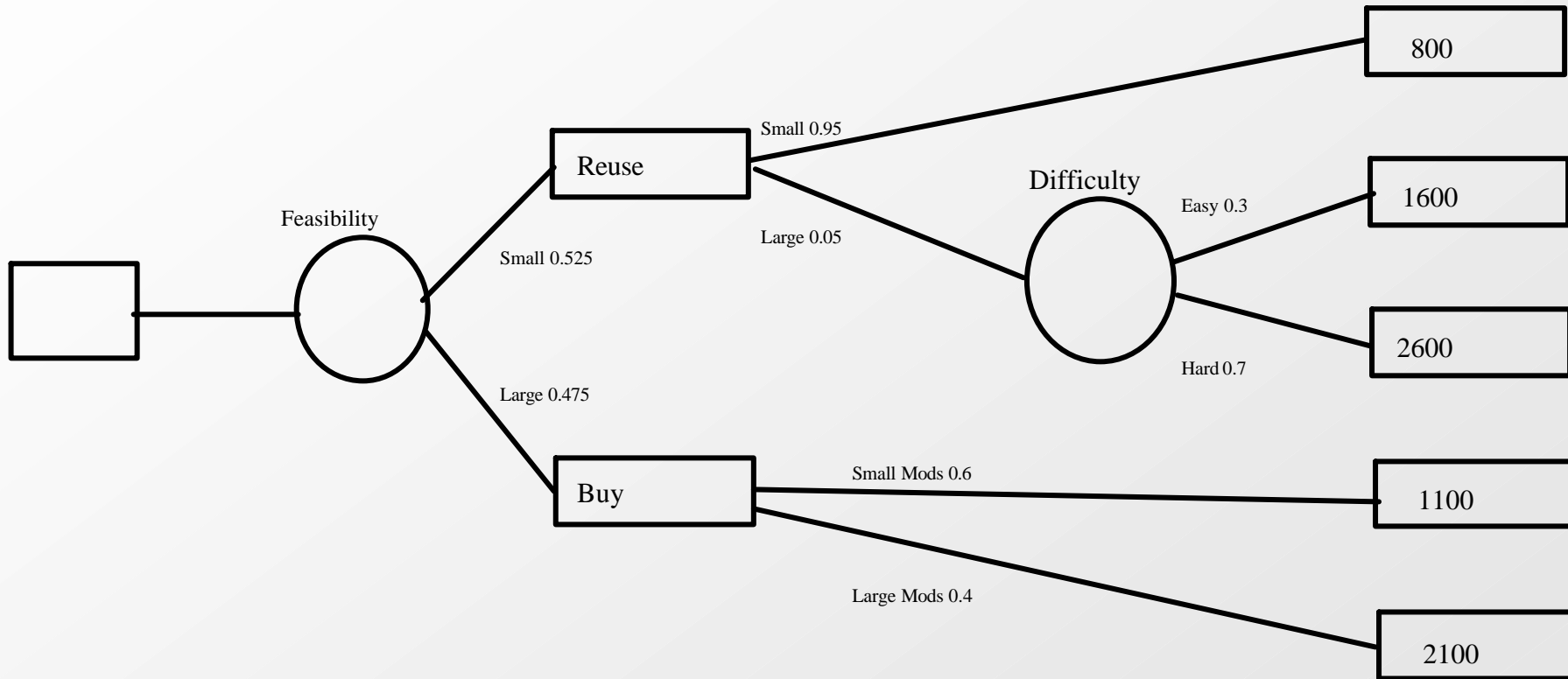
Buying Information

Feasibility study conclusions	Actual results	
	Small mods	Large mods
Small mods	0.95	0.05
Large mods	0.1	0.9

Probability of Small mods = $0.5 \times 0.95 + 0.5 \times 0.1 = 0.525$

Assume a cost of 100,000

Mixed Strategy



Cost of Composite Option 1171

Warning

- ✎ Decisions based on EMV assume
 - ✎ Loss or Gain not an issue for a single project, only overall
- ✎ Some losses so high they can't be ignored
 - ✎ Which do you prefer
 - ✎ Loss of £100,000 with probability of 0.001
 - ✎ Loss of £150 with probability of 1.0

Planning for Risk

Creating a Risk Action Plan

✍ For an identified risk

- ✍ Identify risk resolution actions

- ✍ Identify any hazards created by actions

- ✍ identify action or contingency plans for

 - ✍ Failure of Risk Resolution



 - ✍ If new hazards arise

Example Plan

Hazard

-  Memory insufficient due to software size being underestimated

Risk Reduction Strategy




-  Do early prototype
-  prioritise requirements

Constraints




-  Time and budget limits

Example plan continued

New hazards

- Prototype
 -  Time and effort needed
 -  Scale up problems
- Prioritise requirements
 -  Customer resistance

Additional Actions

-  Prioritise requirements internally
-  Use incremental development
-  Use earned value tracking

Responsible - Jane Smith

Contingency Plans

Risks

 Subject to plans but postponed action till later

Monitored against triggers or symptoms

 Part of a specific action plan against specific hazards

Triggers must be

 Early symptoms which leave time for avoidance

Contingency Plans

- ✍ Viable software projects depend on effective contingency plans
- ✍ Protect project envelope
 - Limited alternatives
 - Prioritise envelope parameters
 - Agree fallback positions
 - Do damage limitation

Contingency Plans

- ✍ Address hazards which are expected to materialise
 - Activated by unambiguous symptoms and triggers
 - Maximise advance warning
 - Give scope for alternatives
 - Detail and effort varies on
 - ✍ Type of hazard
 - ✍ Probability
 - ✍ Consequences

Contingency Plans

- ✍ Quantitative hazard triggers
- ✍ Job description of actionees, identify people on activation
- ✍ Preamble identifies tracking, operates throughout
- ✍ Plan body contains actions, operates when triggered

Outline Contingency Plan

- ✍ Nature of hazard/trigger
- ✍ Responsible parties
- ✍ Tracking method
- ✍ Actions to be taken
- ✍ Level of spend allowed
- ✍ Constraints
- ✍ Priorities

Example Contingency Plan


- ✍ Nature of Contingency
 - ✍ Schedule overrun of more than 1 week on version 2 of the interface
- ✍ Trigger
 - ✍ Slippage of greater than 1 week
- ✍ Responsible
 - ✍ Bill Smith, Jennifer Jones
- ✍ Tracking Method
 - ✍ Activity Network
 - ✍ Weekly Status Reports

Contingency Plan Cont.

Action

-  Investigate underlying cause of schedule slippage

Clearance Resource Allocation

-  Overtime as required for 2 weeks for Smith and Jones

Constraints

-  No impact on parallel activities

Priorities

-  Complete interfaces related to critical requirements

Risk Reassessment

- ✍ Periodic reassessment at major milestones
 - ✍ Phase Review
- ✍ Recovery from crisis
- ✍ Reassess hazard priorities
 - ✍ New hazards
 - ✍ Old hazards
- ✍ At all times monitor the behaviour of critical risks

Risk Register

- ✍ Log of all outstanding risks
 - Title
 - Description
 - Probability
 - Impact
 - ✍ Cost
 - ✍ Schedule
 - ✍ Quality
 - Resolution Action
 - Resolution Progress