

Assessing the Economic value of 3D Geo-information

Cost-Benefit Analysis Engaging Decision Makers

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Agenda

- Cost-benefit analysis
 - What is cost-benefit analysis?
 - How do we use it?
- Engaging Decision Makers

Cost-Benefit Analysis (CBA)

- A formal discipline used to help assess the **business case for investment** in a project or proposal
- Means of **objective comparison between projects** with different costs, benefits and duration

Assessing the costs

The relatively easy bit

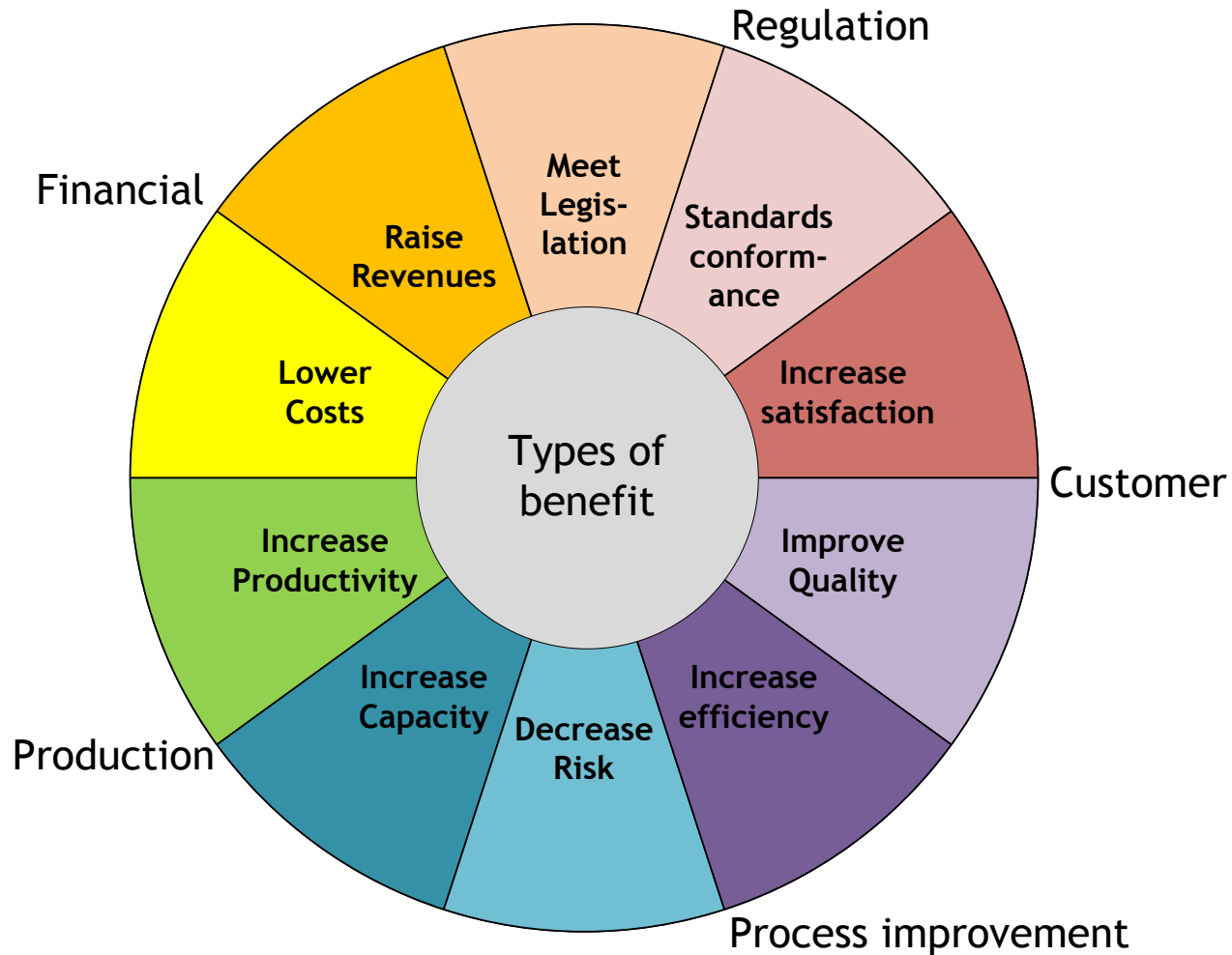
Costs

- Important to include all elements, some often forgotten costs are:
 - Preparing the business case
 - Procurement
 - Project management
 - Business process re-engineering
 - Transitional costs (i.e. parallel running of old and new systems)
 - On-going cost implications (i.e. staff costs and consumables)
 - Data integration
 - Training and re-skilling
 - Marketing

Costs in our Use Cases

- Costs presented today are illustrative
 - We should not be too concerned about the details for the purposes of the workshop
 - The values can be changed in the Financial Model
- In the area of 3D geo-information there are many competing methods:
 - Photogrammetry v LiDAR
 - StreetView v Drones v Obliques
- Costs should be re-assessed for any business case

Benefits categorisation



Benefits - examples

- Conform with legislation
 - Avoiding fines for non-compliance (noise regulation)
- Standards conformance
 - Reduced data duplication from sharing standard 3D datasets
- Increased customer satisfaction
 - Reduced citizen time interacting with officials
- Improved decision making
 - Less time compiling information to support decision makers
 - Reduced senior management time

Benefits - more examples

- Improved quality
 - Increase in crime conviction rates by police officers having information on “dark spaces” available on mobile devices
- Increased efficiency
 - Reduction in number of processes from shared services
 - Optimised routes for de-icing roads in winter
- Risk reduction
 - Re-insurance of assets to reduce hazard clustering

Financial Model

CBA and DCF

- A hallmark of Cost-Benefit Analysis (CBA) is that:
 - flows of benefits and flows of costs over time (which tend to occur at different points in time) are expressed on a common basis in terms of their “present value”
- Main tool used for CBA is the Discounted Cash Flow (DCF)
 - **Discounting** - technique used to compare benefits and costs that occur in different time periods
 - **Cash Flow** - net inflow and outflow of money
 - **Discounted Cash Flow**- technique of valuing money to be received or spent in the future in terms of what it is worth today

Time Value of Money

$$PV = \sum_{t=1}^{t=T} \frac{X_t}{(1+r)^t}$$

Where:

- PV = the present value of the benefit or cost occurring in a future year;
- r = the discount rate;
- t = the number of years into the future the benefit or cost occurs after the base date of analysis;
- X_t = the benefit or cost in year t ;
- T = the life of the scheme.

Net Present Value and Internal Rate of Return

- **Net Present Value (NPV)** - the difference between the present value of benefits and the present value of costs
- **Benefit- Cost Ratio** - the ratio of discounted benefits to discounted costs
- **Payback Period** - time after the project start when cumulative discounted benefits equal cumulative discounted costs

- NPV is expressed in monetary units

Simple DCF

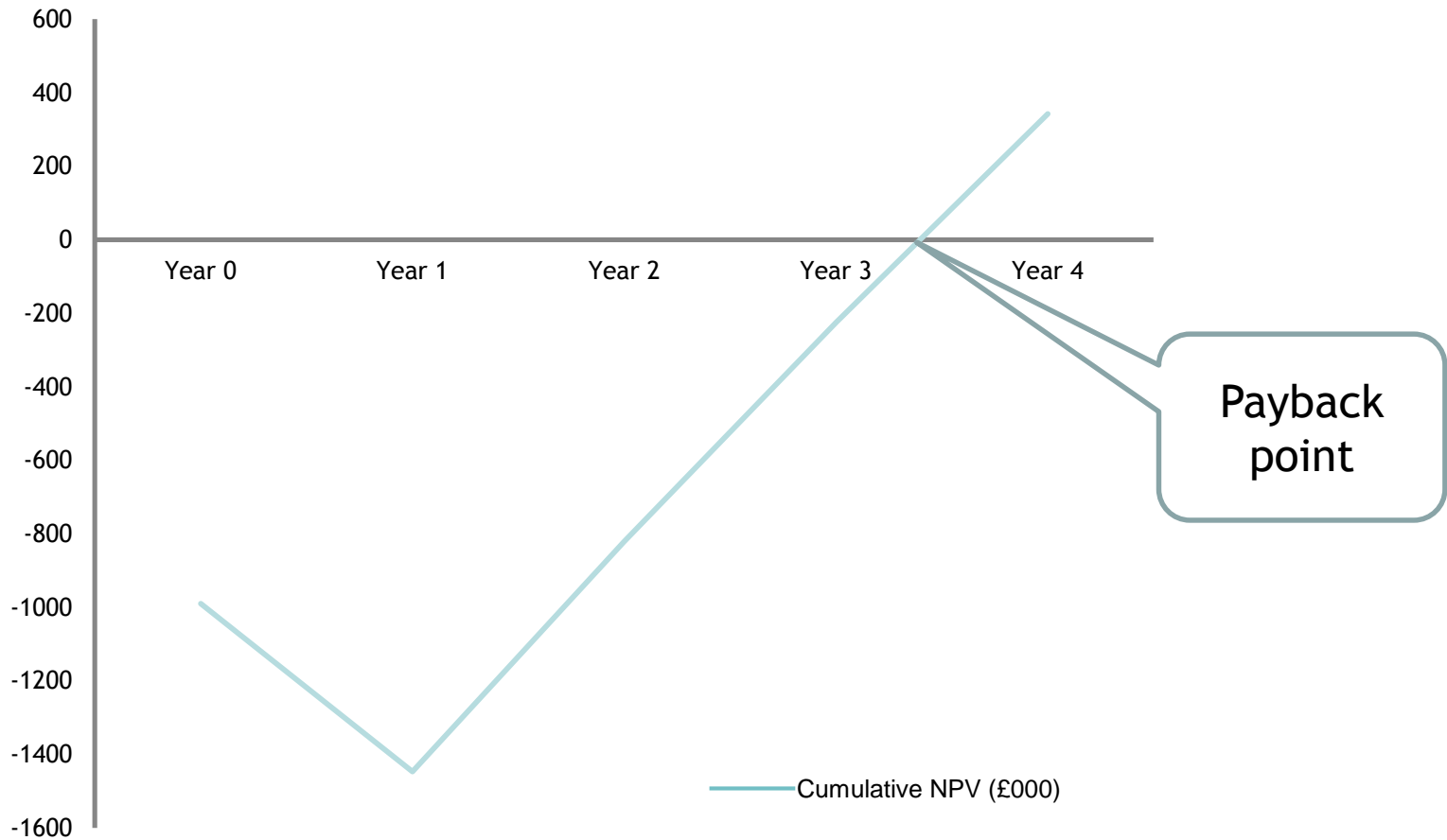
	Year 0	Year 1	Year 2	Year 3	Year 4	Total
Project Cost (£000)	-900	-700	0	0	0	-1,600
Contingency(10%)	-90	-70	0	0	0	-160
Support Costs (£000)	0	-110	-110	-110	-110	-440
Total Benefits (£000)	0	400	800	800	800	2,800
Net Cost (£000)	-990	-480	690	690	690	600
Discount Rate (5%)	1.000	0.952	0.907	0.864	0.823	
NPV (£000)	-990	-457	626	596	568	343
Cumulative NPV (£000)	-990	-1,447	-821	-225	343	



Cumulative Net Present Value (NPV) = £343,000

Internal Rate of Return = 14% (increase discount rate until NPV = £0)

Simple DCF - Payback point



Sensitivity Analysis

- Tests the range of possible values for the cost-benefit by taking a “pessimistic” and optimistic view of the largest variables
 - Largest variable likely to be data acquisition costs
 - Estimates of benefits maybe too high or low
 - Vary these by suggested 10% up and down
 - Costs currently assume open data policy
 - Financial model includes option to add revenues

Engagement with Decision Makers

Framework for a Successful Communication Strategy

- 1) Articulating key priorities and imperatives
- 2) Defining and understanding key audiences
 - customer value propositions
- 3) Selecting and building distinctive messages (Storytelling)
- 4) Delivering messages through the right channels and at the right time
- 5) Assessing the impact of the message
- 6) Continuously Refining the Approach

Source: **Matt Hirschland Ph.D** (Director of Communications, University Corporation for Atmospheric Research, UCAR)

Elevator Pitch



Two key elements:

1. Pain statement - what problem are you trying to solve
2. Value proposition - how will your venture solve the problem

Four tests:

1. Succinct
2. Easy to understand
3. Greed inducing (efficiency producing)
4. Irrefutable

<http://www.youtube.com/watch?v=Tq0tan49rmc>

Preparation

- Time spent of reconnaissance is seldom wasted
 - Spend time with key users, make sure they are “on-board”
 - Often leaders with little time will follow the lead of trusted advisors
- Understand your audience
 - They will focus on the financial analysis
 - What are the other “hot buttons and red flags”
- Keep it short
 - Remember the elevator pitch
- Focus on no more than three compelling arguments
 - Test your arguments by thinking of potential objections
- Solid evidence
 - Make sure the numbers are defensible

Interpreting the Signals

- During a presentation
 - Listen carefully to any feedback, do not “push back” defensively or aggressively
 - Watch the body language, particularly the Chief Financial Officer
 - Interventions are usually good - they exhibit engagement
 - come prepared with backup material to answer objections
 - Never overstay your welcome
- After the presentation
 - Immediately debrief with colleagues present
 - What went well, what didn't
 - Negative feedback is better than no feedback at all
 - Respond to questions that have been asked ASAP

“Rome was not built in a day”

- Your first attempt will not always be successful in securing the commitment to investment
- Consider: does your message fit with the audiences view of the world
 - If so, you maybe “preaching to the converted”
 - If not, you need to repeat the message many times gradually nudging their “frame of reference” towards what you propose
- If your message comes back to you from another then:
 - Don’t say “that was my idea”
 - Celebrate (quietly)

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