

# Project Initiation: Feasibility and Project Authorization

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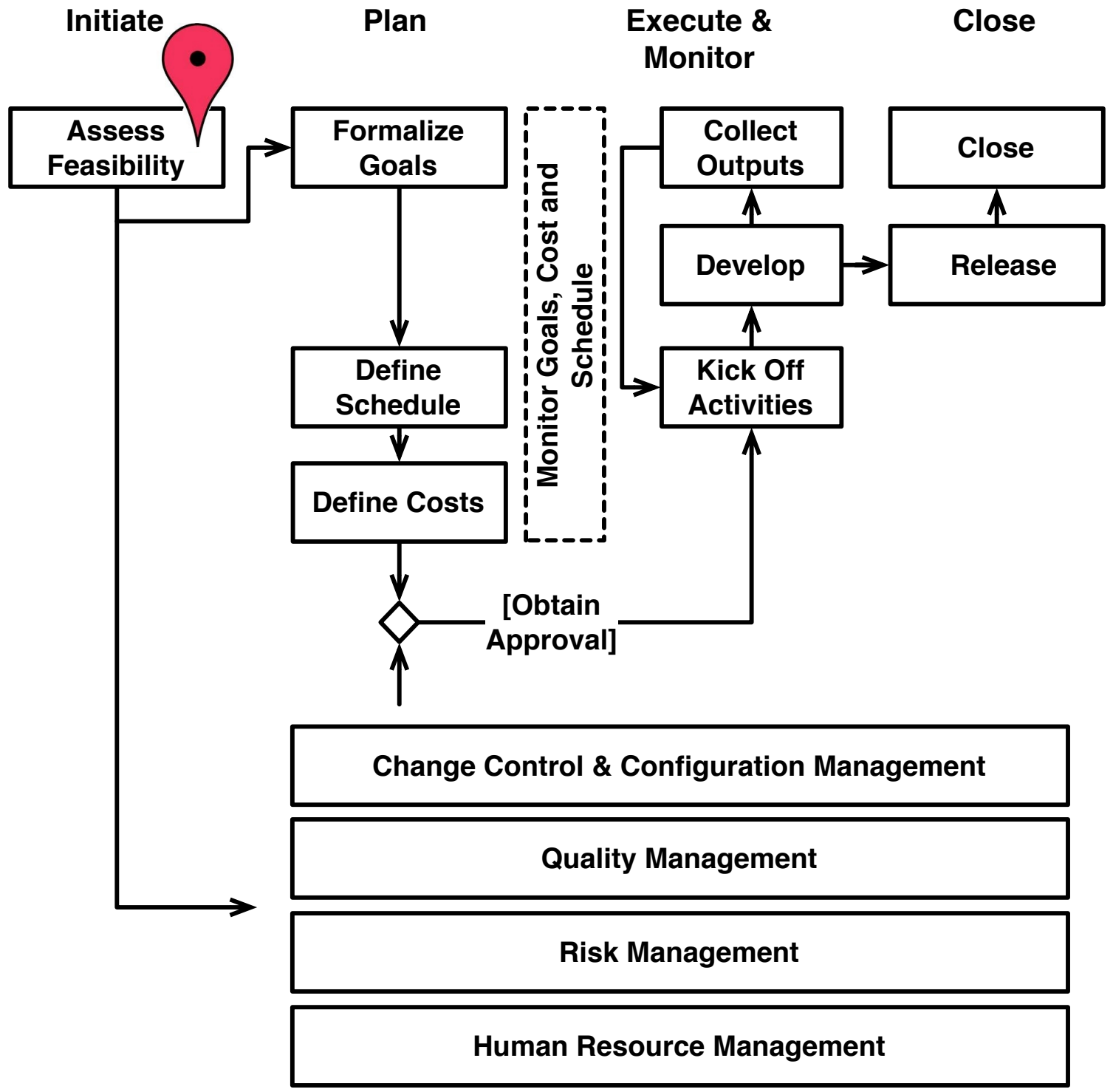
Initiating a project

# Goals of this Unit

- Learning qualitative and quantitative techniques to select among different projects
- Learning qualitative and quantitative techniques to choose the best alternative among different implementations of the same project
- Understanding how to write a Feasibility Study
- Choosing between internal development or external development (make or buy)

# How does a project start?

- Initiation by some stakeholder (a company, a potential customer, ...) driven by a need (market, social, legal, technological advance, ...)
- Boundaries and process not always clear or very formalized
- First activities performed to:
  - Agree on the goals (scope)
  - Understand value and risks (for the performing organization and for the other stakeholders)
  - Choose a project approach



# Project Value and Risks

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# Project Value and Risks

- Two main characteristics determine whether a project is worth starting:
  - The **value** generated by the project
  - The **risks** associated to the project
- The meaning of value and risk depend upon many factors
- Value and risks can be assessed qualitatively or quantitatively
- Sound assessments are difficult, given the unpredictability of projects (and of the world)
- Garbage in = Garbage out

# Project Value and Risks

- Project Value:
  - Direct and indirect value generated by the project
  - Sustainability of the project outputs
  - Alignment with strategic objectives of an organization
- Project Risks
  - Resource availability
  - Timing
  - Technical difficulties and uncertainties

# Value: Direct and Indirect Value

- **Direct and Indirect Value** measures the positive and negative outcomes of a project and its outputs
- Some metrics to consider include:
  - Revenues, both direct and indirect
  - Social and environmental impact
  - Image and publicity
  - Know-how acquired
- Direct and indirect value are strictly related to the business model and to the sustainability of the project outputs (see next slide)



# Value: Sustainability

- **Sustainability** refers to the capacity of sustaining the project and its outputs after the project end
- Taking into account the operational costs of a project's outputs and the way in which the project outputs will survive after a project end is an important consideration to understand whether a project is worth starting.
- Often overlooked, especially when project execution generates revenues

# Value: Alignment with the Strategic Objectives

- The **alignment with the strategic objectives** measures how important and relevant a project is for the performing organization
- Priority, resource assigned, internal support, opportunities for the project team after the project end are all affected by how strategic a project is for an organization

# Risks: Resource Availability

- Projects require the **availability of human, financial, and technical resources** in specific time-frames
- Although it might be difficult to preempt the resources in advance, a check on the projects needs is a good sanity-check
- Some aspects to consider include: the required resource, current load and availability, projections on future load and availability, priority and importance of the project

# Risks: Timing

- Many projects have **specific time-windows for the delivery of their outputs**
- Deliver too early or too late and the outputs of the project might be useless
- Consider, for instance, the race of competing firms in delivering similar products

# Risks: Technical Difficulty and Uncertainty

- The success of many projects relies on the **actual capability of solving various technical challenges**, when the time comes
- Understanding what these challenges are is an important factor in determining the risks associated to a project

# Techniques to Assess Value and Risks

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# Payback Period

The payback period is the time taken to gain a financial return equal to the original investments

- Measured in months or years
- When using the payback period the projects/options that minimize the payback period are chosen in favor of the others

# Example

	Project A	Project B	Project C
Year 0	€ (50,000.00)	€ (20,000.00)	€ (15,000.00)
Year 1	€ 30,000.00	€ (10,000.00)	€ 15,000.00
Year 2	€ 30,000.00	€ 10,000.00	€ 1,000.00
Year 3	€ 1,000.00	€ 60,000.00	
Year 4	€ 1,000.00	€ 50,000.00	
Expenses	€ (50,000.00)	€ (30,000.00)	€ (15,000.00)
Gains	€ 62,000.00	€ 120,000.00	€ 16,000.00
Profit	€ 12,000.00	€ 90,000.00	€ 1,000.00
Payback	2 years	3 years	1 year

Remark: accounting style notation.

Negative numbers in red and in parentheses



# Discussion

- **Advantages**

- Simple, readily available data
- It reduces exposure to risk
- Particularly effective in high-technology/fashion projects
- It favors shorter term benefits

- **Disadvantages**

- Difficult to use on longer term projects
- Based only on cash flows
- Does not quantify exposure to risk
- Does not look at total gains

# Payback Weaknesses

- Different projects might have the same the same payback period, but different profiles in returning of the investments
- These profiles are not taken into account by the technique but could make the different between two projects

# Payback Weaknesses

**Same payback period, but  
Project A gets more money first  
(and reduces risks)**

<b>Year</b>	<b>Project A</b>	<b>Project B</b>
Year 0	€ (10,000.00)	€ (10,000.00)
Year 1	€ (5,000.00)	€ (5,000.00)
Year 2	€ 10,000.00	€ 5,000.00
Year 3	€ 5,000.00	€ 10,000.00

# Payback Weaknesses

**Different payback periods,  
Project A earlier but gets  
less money**

<b>Year</b>	<b>Project A</b>	<b>Project B</b>
Year 0	€ (10,000.00)	€ (10,000.00)
Year 1	€ (5,000.00)	€ (5,000.00)
Year 2	€ 5,000.00	€ 5,000.00
Year 3	€ 5,000.00	€ 11,000.00
Year 4	€ 20,000.00	

# Return on Investment (ROI)

ROI calculates the average annual profit and transforms it into a percentage of the total investments

$\text{Profit} = \text{Returns} - \text{Investments}$

$\text{Annual Profit} = \text{Profit} / \text{Duration}$

$\text{ROI} = \text{Annual Profit} / \text{Investments}$

- When using ROI, choose the project with the highest ROI

# Example

Suppose we have the following projections for a project we need to decide whether to start or not

	Project A	Project B	Project C
Year 0	€ (50,000.00)	€ (20,000.00)	€ (15,000.00)
Year 1	€ 30,000.00	€ (10,000.00)	€ 15,000.00
Year 2	€ 30,000.00	€ 10,000.00	€ 1,000.00
Year 3	€ 1,000.00	€ 60,000.00	
Year 4	€ 1,000.00	€ 50,000.00	

# Example

- **Project A**

- Profit =  $62000 - 50000 = 12000$
- Annual Profit =  $12000 / 4 = 3000$
- ROI =  $3000 / 50000 = 6\%$

- **Project B**

- Profit =  $120000 - 30000 = 90000$
- Annual Profit =  $90000 / 4 = 22500$
- ROI =  $22500 / 30000 = 75\%$

- **Project C**

- Profit =  $16000 - 15000 = 1000$
- Annual Profit =  $1000 / 2 = 500$
- ROI =  $500 / 15000 = 3\%$

**SOLUTION:** Project B (highest ROI)

# Discounted Cash Flows/Inflation

- The value of money decreases over the years (inflation!) according to the inverse compound interests formula

$$\text{Discount Factor} = \frac{1}{(1 + i)^n}$$

- Thus, giving it the money we invest **now** the same weight of money we will get in five year is over optimistic
- DCF (Discounted Cash Flows) are techniques that take into account inflation
- Curiosity: where does inflation comes from?  
Answer: Debasement  
A nice reference: <http://en.wikipedia.org/wiki/Inflation>



# Net Present Value

Net Present Value discounts sums in the future in order to provide a more realistic comparison between presents investments and future gains

# Net Present Value Example

**Hypothesis**  
**Discount Rate: 10%**  
**(this is “i”)**

$$\text{Discount Factor} = \frac{1}{(1 + i)^n}$$

Year (n)	Cash Flow	Discount Factor	Present Value
0	€ (35,000.00)	1.00	€ (35,000.00)
1	€ 10,000.00	0.91	€ 9,090.91
2	€ 15,000.00	0.83	€ 12,396.69
3	€ 20,000.00	0.75	€ 15,026.30
<b>Expenditure</b>	<b>€ (35,000.00)</b>		<b>€ (35,000.00)</b>
<b>Gains</b>	<b>€ 45,000.00</b>		<b>€ 36,513.90</b>
<b>Profit</b>	<b>€ 10,000.00</b>		<b>€ 1,513.90</b>

# Net Present Value: Discussion

- Advantages
  - More accurate profit-loss data
- Disadvantages
  - It uses a fixed discount rate (may be unrealistic)
  - It favors shorter terms projects

# Score Matrices

- The financial methods (Payback, ROI, NPV) look only at some of the financial data
- Scoring matrices allow one to take into account other factors
- They are based on a standardized set of criteria and weights, which highlight the relevant features of a project
- A **qualitative** evaluation of how a project scores with respect to each criteria positions the project on a scale and helps compare it with past or competing projects

# Score Matrix Example

Factor	Value	Weight	SUM	Comment
The project aligns with the strategic objectives	YES	2	2	
The project has a profit > 20%	NO	4	0	
Payback period < 2 years	YES	5	5	
Enlarges the customer base	YES	2	2	
The project requires a standard technology	NO	3	0	
The quality constraints are simple to meet	YES	1	1	
The timing is not too tight	NO	4	0	
We have skilled personnel to do the work	YES	5	5	

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- Value can be binary (YES/NO) or a number (e.g. from 1 to 5) and measures how well the project meets the requirement
- The weight measures how important a factor is for the decision

# Discussion

- **Advantages**

- Simple
- It encourages standardization and more objectivity in decision making
- It helps discuss and evaluate the project characteristics
- It widens the range of evaluation
- Not biased toward shorter term projects

- **Disadvantages**

- A simple model may encourage development of long and useless lists
- Different factors have same importance (unless the weight matrix is used)

# Caveat

- Not all score matrices are equally good.
- The following is an example of a bad matrix.  
Why?

Factor	Value	Weight	SUM	Comment
The project has a profit > 20%	YES	3	3	
The project is highly risky	NO	3	0	
			<b>3</b>	

A positive factor (first row) and a negative factor (second row) influence in the same way the matrix  
As a consequence an highly risky project is preferred over a project which is not very risky

**SOLUTION**

# Caveat

Make sure the questions either all positively influence or all negatively influence the decision or use scores with different signs!



# SWOT analysis

- Technique credited to Albert Humphrey
  - Systematic analysis of:
    - Strengths
    - Weaknesses
    - Opportunities
    - Threats
- ... to understand the feasibility of a project and/or come out with achievable project goals
- Often presented as a 2x2 matrix, with each cell listing all elements of a given type (see next slide)

# SWOT ANALYSIS



Source: [http://en.wikipedia.org/wiki/File:SWOT\\_en.svg](http://en.wikipedia.org/wiki/File:SWOT_en.svg) (cc license)

# SWOT: Some factors to consider

- **Strengths:**

- Competences
- Selling points
- ...

- **Opportunities:**

- Market and Industry trends
- Weaknesses of competitors

- **Weaknesses:**

- Disadvantages
- Methodology
- Timing
- Capability Gaps

- **Threats:**

- Market and Industry trends
- Competing technologies
- Sustainability

# Stakeholder Analysis

- Goal: understanding who are the project stakeholders and the influence they have on the project
- Different techniques available
- One technique organizes stakeholders in a 2x2 matrix in which:
  - one dimension measures the **power** a stakeholder can exert (low or high)
  - the other dimension measures the **interest** a stakeholder has in a project (negative or positive)
- This allows to define specific management policies for the different stakeholders

# Assessing Sustainability

- The analysis is meant to understand the operational costs of a project's output
- Sometimes a specific project activity. A preliminary sustainability analysis, however, can help choose among different project implementations
- Some aspects to consider include the **business model** and the **break-even point**

# The Feasibility Study

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# Feasibility Study

- The feasibility study is the document that allows to formally authorize a project and to link it to the organization's goals
  - Wide range of outputs: from a few to hundreds of pages (according to complexity and formality)
  - The feasibility study can be thought of as a project in the small, drafting the main information we will define in more details during the project
  - Basis for project selection: Management must choose what projects to activate.

# Goals of a Feasibility Study

- Identify:
  - the project goals
  - the project constraints
- Assess value and risks (using the techniques above)
- Ensure the project lines up with
  - the customer objectives
  - the performing organization objectives
- Demonstrate that the project goals
  - can be achieved respecting the quality, cost, and time constraints



# Feasibility Document: Structure

- A **statement of work**, which describes what the project will accomplish.
- The **business objectives (value)** of the project or its outputs and information about the business model, if relevant.
- A **summary of the project budget**, which forecasts expenses and incomes.
- A **summary of the project milestones**, that is, a rough schedule of the project identifying the most important events.
- An **analysis of the stakeholders**.
- The **project risks**.
- Possible **alternatives** to the project, such as a **make or buy** decision.
- An **evaluation** of the project and of the alternatives, using the techniques described above.

# Feasibility: Additional Considerations

- The feasibility document has a value for:
  - The **client**, since it helps understand the way forward and what are the short and long term perspectives
  - The **performing organization**, since it helps understand whether it makes sense to move on with a project
  - The **project manager**, since it helps understand whether the project will be in the manager's **comfort** zone or not (and take an informed decision on whether the project is worth taking or not)

# The Project Approval Process

- The process which brings to the project approval is more or less structured according to the practices of the performing organization
- It is organized in the following steps:
  - Upon receiving a request, identify a (preliminary) project manager
  - The project manager prepares a feasibility study which is agreed with the customer and key stakeholders
  - The project manager submits the document for authorization
  - The document is analyzed and a formal decision is taken
  - The project manager is appointed and the project moves to the planning phase