Nature of the problem	Clearly defined.	Ill-defined; often disagreement between key stakeholders on the nature and definition of the problem.
Nature of the solution	A relatively limited number of potential solutions.	A significant number of potential solutions with often with disagreement between stakeholders as to the preferred solution.
Stakeholders	A relatively limited number of stakeholders.	A significant number of diverse stakeholders; probable disagreement between them as to the definition of the problem & the preferred solution.
Relationship to environment	Environment within which the project takes place is understood and relatively stable.	Environment is dynamic; and programme objectives need to be managed in the context of the changing environment within which the organization operates.
Resources	Resources to deliver the project can be reasonably estimated in advance.	Resources are constrained and limited; there is competition for resources between projects.

What is project life cycle?

Project Life Cycle

The **Project Life Cycle** refers to a series of activities which are necessary to fulfill project goals or objectives. Projects vary in size and complexity, but, no matter how large or small, all projects can be mapped to the following life cycle structure:

- Starting the project
- Organizing and preparing
- Carrying out project work
- Closing the project

CF_2 is the period two net cash inflow,
CF_3 is the period three net cash inflow, and so on ...

But the problem is, we cannot isolate the variable **r** (=internal rate of return) on one side of the above equation. However, there are alternative procedures which can be followed to find IRR. The simplest of them is described below:

1. Guess the value of r and calculate the NPV of the project at that value.
2. If NPV is close to zero then IRR is equal to r.
3. If NPV is greater than 0 then increase r and jump to step 5.
4. If NPV is smaller than 0 then decrease r and jump to step 5.
5. Recalculate NPV using the new value of r and go back to step 2.

Example

Find the IRR of an investment having initial cash outflow of $213,000. The cash inflows during the first, second, third and fourth years are expected to be $65,200, $96,000, $73,100 and $55,400 respectively.

Solution
Assume that r is 10%.
NPV at 10% discount rate = $18,372
Since NPV is greater than zero we have to increase discount rate, thus
NPV at 13% discount rate = $4,521
But it is still greater than zero we have to further increase the discount rate, thus
NPV at 14% discount rate = $204
NPV at 15% discount rate = ($3,975)
Since NPV is fairly close to zero at 14% value of r, therefore
IRR ≈ 14%

Profitability Index

Profitability index is an investment appraisal technique calculated by dividing the present value of future cash flows of a project by the initial investment required for the project.

Formula:

$$\text{Profitability Index} = \frac{\text{Present Value of Future Cash Flows}}{\text{Initial Investment Required}}$$