**PRACTICAL - 3**

**AIM:** Study cost-benefit evaluation Techniques and apply for project Selection

**Scenario:** Assume you are a project manager in a technology company, and your organization is considering two potential projects: **Airbnb System** and **Farfetch E-commerce System**. Both projects have different scopes, costs, and expected benefits.

**Task:**

1. Study cost-benefit evaluation Techniques
2. Conduct a cost-benefit analysis for both projects by using techniques such as Return on Investment (ROI) and Net Present Value (NPV) to evaluate and compare the projects.
3. Make a recommendation on which project should be selected based on the analysis.

**Solution :**

**Team Details :**

| **Sr. No.** | **Name** | **Enrollment No.** |
| --- | --- | --- |
| **Team Leader** | **Gati Shah** | **202203103510261** |
| **Team Member 1** | **Fenil Shilodre** | **202203103510041** |
| **Team Member 2** | **Angat Shah** | **202203103510097** |
| **Team Member 3** | **Yash Patel** | **202203103510228** |
| **Team Member 4** | **Sarth Chaudhari** | **202303103510106** |

**Cost-Benefit Evaluation Techniques :**

**Cost-Benefit Evaluation Techniques** are used to evaluate projects based on their expected benefits and associated costs. These techniques help in decision-making, especially when choosing between multiple potential projects. Below are the common techniques used in cost-benefit analysis:

**1.** **Net Profit**

Net Profit is the total benefit of a project after subtracting the total costs. This is used for a quick comparison of profitability but does not account for the timing of cash flows.

**2. Payback Period**

The Payback Period indicates the time taken for the initial investment to be recovered from the cash inflows. Shorter payback periods are generally more desirable.

**3. Return on Investment (ROI)**

ROI measures the profitability of a project relative to its cost. It is calculated as the ratio of the net profit to the total investment :

**ROI =**

A higher ROI indicates a more profitable project.

**4. Net Present Value (NPV)**

The NPV measures the profitability of a project by considering the time value of money. It discounts future cash flows to the present time and subtracts the initial investment. The formula is :

NPV =

Where :

*  = Cash flow in year 
*  = Discount rate
*  = Time period
* **I0** = Initial investment

The project with a higher NPV is considered more beneficial.

**5. Internal Rate of Return (IRR)**

IRR is the discount rate that makes the NPV of a project equal to zero. It represents the expected rate of return from the project. A higher IRR compared to the required rate of return makes the project attractive.

**IRR** =

**Cost-Benefit Analysis :**

***Project A : Airbnb System***

Initial Cost : $1,500,000

Expected Annual Benefits : Varying yearly cash flows

Project Lifespan : 5 years

**Table :**

| **Year** | **Cash Flow (Project A)** |
| --- | --- |
| 0 | -1,500,000 |
| 1 | 300,000 |
| 2 | 800,000 |
| 3 | 1,200,000 |
| 4 | 1,500,000 |
| 5 | 2,000,000 |
| **Net Profit** | **4,300,000** |

***Project B : Farfetch E-commerce System***

Initial Cost : $1,200,000

Expected Annual Benefits : Varying yearly cash flows

Project Lifespan : 5 years

**Table :**

| **Year** | **Cash Flow (Project A)** |
| --- | --- |
| 0 | -1,200,000 |
| 1 | 500,000 |
| 2 | 1,200,000 |
| 3 | 2,000,000 |
| 4 | 3,500,000 |
| 5 | 4,500,000 |
| **Net Profit** | **9,200,000** |

**ROI Calculation :**

***Project A*** *:* ***Airbnb System***

* **Net profit**

= $300,000 + $800,000 + $1,200,000 + $1,500,000 + $2,000,000 - $1,500,000

= $4,300,000

* **Total Investment** = $1,500,000 (Initial Investment)
* **Average Annual Profit** = = $860,000
* **ROI =**

**=**

**= 57.33%**

***Project B*** *:* ***Farfetch E-commerce System***

* **Net profit**

= $500,000 + $1,200,000 + $2,000,000 + $3,500,000 + $4,500,000 - $2,000,000

= $9,200,000

* **Total Investment** = $2,000,000 (Initial Investment)
* **Average Annual Profit** = = $1,840,000
* **ROI =**

**=**

**= 92%**

Recommendation : **Project B** offers a significantly higher return on investment, making it the more favorable option for maximizing profits.

**NPV Calculation:**

***Project A : Airbnb System***

| **Year** | **Cash Flow** | **Discount Factor (10%)** | **Discounted Cash Flow** |
| --- | --- | --- | --- |
| 0 | -1,500,000 | 1.0000 | -1,500,000 |
| 1 | 300,000 | 0.9091 | 272,727 |
| 2 | 800,000 | 0.8264 | 661,120 |
| 3 | 1,200,000 | 0.7513 | 901,560 |
| 4 | 1,500,000 | 0.6830 | 1,024,500 |
| 5 | 2,000,000 | 0.6209 | 1,241,800 |

* **NPV =** (-1,500,000 + 272,727 + 661,120 + 901,560 + 1,024,500 + 1,241,800)

= **$601,707**

***Project B : Farfetch E-commerce System***

| **Year** | **Cash Flow** | **Discount Factor (10%)** | **Discounted Cash Flow** |
| --- | --- | --- | --- |
| 0 | -2,000,000 | 1.0000 | -2,000,000 |
| 1 | 500,000 | 0.9091 | 454,545 |
| 2 | 1,200,000 | 0.8264 | 991,680 |
| 3 | 2,000,000 | 0.7513 | 1,502,600 |
| 4 | 3,500,000 | 0.6830 | 2,390,500 |
| 5 | 4,500,000 | 0.6209 | 2,795,050 |

* **NPV =** (-2,000,000 + 454,545 + 991,680 + 1,502,600 + 2,390,500 + 2,795,050)

= **$4,134,375**

Recommendation : Since **Project B** has a much higher NPV, it indicates that this project will generate more value in today’s terms. Therefore, **Project B** is the more favorable investment option.

**IRR Calculation :**

***Project A : Airbnb System***

| **Year** | **Cash Inflow** | **Discount Factor (10%)** | **Present Value (10%)** | **Discount Factor (12%)** | **Present Value (12%)** |
| --- | --- | --- | --- | --- | --- |
| 0 | -1,500,000 | 1.0000 | -1,500,000 | 1.0000 | -1,500,000 |
| 1 | 300,000 | 0.9091 | 272,727 | 0.8929 | 267,870 |
| 2 | 800,000 | 0.8264 | 661,120 | 0.7972 | 637,760 |
| 3 | 1,200,000 | 0.7513 | 901,560 | 0.7118 | 854,160 |
| 4 | 1,500,000 | 0.6830 | 1,024,500 | 0.6355 | 953,250 |
| 5 | 2,000,000 | 0.6209 | 1,241,800 | 0.5674 | 1,134,800 |
| NPV | | **2,601,707** | | **2,347,840** | |

* **IRR** =

= 10 +

= 10 +

= **20.50 %**

***Project B : Farfetch E-commerce System***

| **Year** | **Cash Inflow** | **Discount Factor (10%)** | **Present Value (10%)** | **Discount Factor (12%)** | **Present Value (12%)** |
| --- | --- | --- | --- | --- | --- |
| 0 | -2,000,000 | 1.0000 | -2,000,000 | 1.0000 | -2,000,000 |
| 1 | 500,000 | 0.9091 | 454,545 | 0.8929 | 446,450 |
| 2 | 1,200,000 | 0.8264 | 991,680 | 0.7972 | 956,640 |
| 3 | 2,000,000 | 0.7513 | 1,502,600 | 0.7118 | 1,423,600 |
| 4 | 3,500,000 | 0.6830 | 2,390,500 | 0.6355 | 2,224,250 |
| 5 | 4,500,000 | 0.6209 | 2,795,050 | 0.5674 | 2,535,300 |
| NPV | | **6,134,375** | | **5,586,240** | |

* **IRR** =

= 10 +

= 10 +

= **32.38 %**

Based on the **ROI** and **NPV** analysis, **Project B (Farfetch E-commerce System)** is the more profitable and valuable investment, with a significantly higher ROI of 92% and an NPV of $4,134,375. Therefore, **Project B** should be preferred over **Project A (Airbnb System)**, which has a lower ROI of 57.33% and an NPV of $601,707.