Capital appraisal methods

Financial Management Summary of Capital Appraisal Methods QUESTION 1 Cardex Plc is considering investing in two new capital projects at different manufacturing locations.

Each project entails the purchase of a range of new production machines, which would improve output volume and quality of products. Both of these projects are divisible (ie. It is possible to undertake a fraction of a total project.

) Cardex Plc has only been able to negotiate a long term loan for, at 11% interest, to invest in new capital projects. The estimated net cash flows for each of the two projects are as follows : | Project X | Project Y | | |€m |€m | | Initial capital expenditure | 70 | 80 | | Net Cash Inflows Year 1 | 20 | 30 | | 2 | 35 | 45 | | 3 | 20 | 25 | | 4 | 20 | 20 | | Estimated resale value end of year 4 | 10 | 10 | Notes: (1)The companies weighted average cost of capital is 8%, after the introduction of the new loan. (2)Present value €1 received at the end of each year is as follows : | | 8% | 10% | 15% | 20% | 25% | | Year 1 | 0. 926 | 0. 909 | 0. 870 | 0. 833 | 0. 800 | | Year 2 | 0.

57 | 0. 826 | 0. 756 | 0. 694 | 0. 640 | | Year 3 | 0. 794 | 0. 753 | 0. 658 | 0.

579 | 0. 512 | | Year 4 | 0. 735 | 0. 683 | 0.

572 | 0. 482 | 0. 409 | | Year 5 | 0. 681 | 0.

621 | 0. 497 | 0. 402 | 0. 328 | You are required to: (a)Calculate for each project:- (i)Discounted payback period in years. (ii)Net Present Value (NPV).

(iii)Internal Rate of return (IRR). b)Discuss the advantages and disadvantages of each of the three capital evaluation methods. Based on the above three methods, discuss which ONE project you would recommend for acceptance, incorporating the reasons for your decision. (c)Projects X and Y are divisible (ie. It is possible to undertake a fraction of a total project.), and the business wishes to use all the €120 million loan on the two projects.

Calculate : (1) The optimal investment policy. (2) The resulting total NPV from your investment policy. If projects X and Y were indivisible projects, explain how this would affect your decision above. CAPITAL APPRAISAL TECHNIQUES SOLUTION – Cardex Plc Question. Part (a) NET PRESENT VALUE . PROJECT X Net Year | Cash flow | 8% Discount | NPV | 20% Discount Factor | NPV | | | | Factor | | | | | | | | | | | | 0 |(70) | 1. 000 |(70) | 1.

000 |(70) | | 1 | 20 | 0. 926 | 18. 52 | 0. 833 | 16. 66 | | 2 | 35 | 0.

857 | 30. 00 | 0. 694 | 24. 29 | | 3 | 20 | 0. 794 | 15. 88 | 0. 579 | 11.

58 | | 4 | 20 | 0. 735 | 14. 70 | 0.

482 | 9. 64 | | 4 | 10 | 0. 735 | 7. 5 | 0. 482 | 4.

82 | | | | | | _____ | | ___ | | | | | 16. 45 | |(3. 01) | SO N. P. V.

OF PROJECT X at 8% = €16. 45m Discounted Payback at 8% = 3 years + 5. 6/14. 70 years = 3. 38 years INTERNAL RATE OF RETURN FOR PROJECT X 16. 45m(3. 01)m 8%20% 16. 45 + 3.

01 = 19. 46 8% – 20% = 12% IF 19. 46 = 12% 1% = 19.

46 = 1. 622 12 (16. 45 = 16. 45 = 10. 14% or 10% 1. 622 (IRR PROJECT X = 8% + 10% = 18% NET PRESENT VALUE PROJECT Y Year | Net Cash Flow | 8% Discount | NPV | 20% Discount | NPV | | | | Factor | | Factor | | | | | | | | | | 0 | (80) | 1.

000 |(80) | 1. 000 |(80) | | 1 | 30 | 0. 926 | 27. 78 | 0. 833 | 24. 99 | | 2 | 45 | 0. 857 | 38.

57 | 0. 694 | 31. 23 | | 3 | 25 | 0. 794 | 19. 85 | 0. 579 | 14. 48 | | 4 | 20 | 0.

735 | 14. 70 | 0. 482 | 9. 4 | | 4 | 10 | 0. 735 | 7.

35 | 0. 482 | 4. 82 | | | | | _____ | | _____ | | | | | 28. 25 | | 5. 16 | SO NPV OF PROJECT Y at 8% = €28. 25m Discounted Payback period = 2 years + 13. 65/19.

85 = 2. 69 years INTERNAL RATE OF RETURN FOR PROJECT Y 28. 25 5. 16 8%20% 28. 25 – 5. 16 = 23.

09 8% – 20%= 12% IF 23. 09 = 12% 1% = 23. 09 = 1. 924 12 SO5. 16 = 5.

16= 2. 68% or 3% 1. 924 (IRR PROJECT Y = 20% + 3% = 23% Part (b) SUMMARY | PROJECT X | PROJECT Y | | | | | | 1.

Discounted Payback | 3. 38 years | 2. 69 years | | 2. NPV at 8% |? 16. 45m |? 28. 25m | | 3. IRR | 18% | 23% | (CHOOSE PROJECT Y REASONS: It has highest NPV. Consequently it increases the Balance Sheet by highest value.

Project Y has the highest IRR. It also has the shortest Discounted Payback period of 2. 69 years Critical evaluation required for each of the three

models. Part (c) Optimal investment policy. Project Investment 8% Cost – Ranking.

Cost NPV Benefit Ratio. €M €M X 70 16. 45 0. 235 2. Y 80 28. 25 0. 3530 1.

Note . Cost Benefit Ratio = NPV Cost of Capital Resulting NPV from optimal investment policy. Project Ranking Benefit/ Cost Initial outlay Resultant NPV Ratio €M €M Y 1st 0. 353 80 28. 25 X 2nd 0.

235 40 9. 40 ————- ————- 120 MAX. 37. 65 ————- ———— Proportion of Project X undertaken = 40/70 * 100% = 57. 14 % Resultant NPV for Project X = 57.

145 * ? 16. 45M = ? 9. 40M