

Strategic plan and R&D Portfolio Optimization

Referring to the firm BBB, assume to know the main information (in confidential way and only for internal use) regarding the new projects potentially available at the year 2018 in the Corporate Research. The manager of the Corporate Research has to discuss with the board about the budget for the new projects (zero-base budget). He knows that generally the 90% of this budget is allocated to projects already in the pipeline.

The following tables report the data of the projects in the pipeline (tab. 1) and the ones to be started in 2018 (tab 2 e 3).

The Corporate Research manager moreover knows:

- the board has identified as priority strategic technological areas A2, A3 and A5 for the years 2018-2030;
- area A4 is strictly interrelated and dependent to the area A3;
- area A7 is the one in which BBB has less experience.

Project n.	Probability of technical success	Attended NPV (mln €)	Time to be completed (years)	Technological Area
1	0.5	700	5	A3
2	0.4	850	8	A1
3	0.4	800	9	A1
4	0.3	1100	12	A5
5	0.5	600	6	A7
6	0.5	750	6	A7
7	0.7	500	2	A4
8	0.7	-200	2	A2
9	0.4	600	10	A9
10	0.3	1000	10	A3

Tab 1: Projects in pipeline

Project 1	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Years	1	2	3	4	5	6	7	8	9	10	11
Inv	5000000	3000000		3000000							
R&D Costs	250000	250000	250000	250000	200000	200000	200000	200000			
Other Costs	120000	120000	120000	100000	100000	100000	100000	100000	100000	100000	100000
Revenues Attended					1200000	1200000	1200000	2000000	2000000	3000000	3000000

Project 2	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
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Years	1	2	3	4	5	6	7	8	9	10	11
Inv	2500000	2500000									
R&D Costs	1300000	1300000	1300000								
Other Costs	300000	300000	300000	300000	300000	300000	300000				
Revenues Attended		2300000	2300000	2300000	2300000	2300000	2300000				

Project 3	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Years	1	2	3	4	5	6	7	8	9	10	11
Inv	1400000	2000000	2000000								
R&D Costs	4500000	4500000	4500000	4500000	4500000	4500000	4500000	4500000	4500000	4500000	4500000
Other Costs	2200000	220000	220000	220000	220000	120000	120000	120000	120000	120000	120000
Revenues Attended						12000000	12000000	12000000	12000000	12000000	12000000

Project 4	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Years	1	2	3	4	5	6	7	8	9	10	11
Inv	5000000										
R&D Costs	2300000	2300000	2000000	2000000	2000000	2000000					
Other Costs	500000	500000	500000	500000	500000	500000					
Revenues Attended				8000000	8000000	8000000					

Project 5	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Years	1	2	3	4	5	6	7	8	9	10	11
Inv	5000000										
R&D Costs	2300000	2300000	2000000	2000000	2000000	2000000					
Other Costs	500000	500000	500000	500000	500000	500000					
Revenues Attended				8000000	8000000	8000000					

Project 6	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Years	1	2	3	4	5	6	7	8	9	10	11
Inv	17000000	2000000	3000000								
R&D Costs	8900000	8900000	8900000	8900000							
Other Costs	340000	340000	340000	750000	750000	750000	750000	750000	750000		
Revenues Attended				24000000	20000000	14000000	13000000	13000000	13000000		

Project 7	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
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Years	1	2	3	4	5	6	7	8	9	10	11
Inv	3000000										
R&D Costs	25000	25000	25000								
Other Costs	2000	2000	2000	2000	2000	2000					
Revenues Attended		370000	370000	370000	370000	370000					

Project 8	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Years	1	2	3	4	5	6	7	8	9	10	11
Inv	2000000										
R&D Costs	1200000										
Other Costs	2000000	2000000	2000000	2000000							
Revenues Attended			950000	950000	1400000	1400000	1400000				

Project 9	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Years	1	2	3	4	5	6	7	8	9	10	11
Inv	11000000	5000000	1000000								
R&D Costs	3600000	3600000	3600000	3600000	3600000	10000000	10000000				
Other Costs	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
Revenues Attended					9000000	15000000	15000000	17000000	12000000	12000000	12000000

Tab 2: economic and financial data of the new projects, to be started in 2018¹

Project n.	Technological Areas	Revenues Oscillation	Costs Oscillation	Technical Risk
1	A2	± 5%	± 5%	0,5
2	A3	±10%	±10%	0,3
3	A7	± 20%	± 20%	0,3
4	A2	± 5%	± 5%	0,1
5	A1	± 3%	± 3%	0,1
6	A9	± 30%	± 30%	0,4
7	A1	± 5%	± 5%	0,2
8	A4	± 10%	± 10%	0,2
9	A7	± 8%	± 8%	0,4

Tab 3: other data of new the new projects, to be started in 2018

¹ For all the projects, depreciation and amortization are included in “R&D costs” or “Other Costs”