

## Question 13.

**You are the project manager of a team of software specialists working on a project to produce a piece of application software in the field of project management. Give some examples of things that might go wrong on such a project and the sorts of trade-offs you might have to make.**

As project managers, we manage budget, schedule and specification. Some of the things that might go wrong would include:

☐ The project could be delayed (schedule). In this case a possible trade-off may involve the project manager responding by contracting out, at a higher cost (budget), some of the code writing to shorten the duration of that activity. Additionally, the project manager could respond by negotiating for the removal of some of the less-important program capabilities (specification), that is, reducing the project scope.

☐ The project could exceed its budget. Here, the project manager could again trade off removal of some of the less important program capabilities (specification) , that is, reducing the project scope, in order to maintain budget. Another trade-off could include eliminating any overtime on the project so as not to incur additional cost. Contractors may also be an attractive trade-off if contractor rates are less than full-time employee rates and if contractors can be quickly brought up to speed on the project.

## Case: HandStar, Inc.

### Question 1: Which projects would you recommend Handstar pursue based on the NPV approach?

The spreadsheet below summarizes the NPV calculations for the six projects assuming the development costs are incurred at the end of year zero and each product has a three-year life. Since the six projects require a total of 13,025 development hours and only 10,000 hours are available, one or more projects will need to be postponed or eliminated from further consideration. If we start with the project with the highest NPV, the Browser project would be selected first requiring 1,875 hours of development time. Next, the Trip Planner would be selected requiring an additional 6,250 hours of development time. The project with the next highest NPV is the Spreadsheet project. However, this project requires 2,500 hours and only 1,875 hours are available after selecting the Browser and Trip Planner projects. The project with the next highest NPV is the Calendar/Email project which requires 1,250 hours of development time leaving 625 hours available. Of the remaining projects, the Portfolio Tracker requires too many hours while the Expense Report project can be completed with the hours available. Thus, Browser, Trip Planner, Calendar/Email, and the Expense Report projects would be selected based on the NPV approach. This gives a total NPV of \$6,779,899+\$2,944,043+\$1,575,155+\$607,862=\$11,906,959.

Note: Though it does not follow the NPV approach strictly, if the trip planner is skipped (despite being the second greatest NPV) it will give us enough hours to do ALL of the remaining projects. This gives us a total NPV of \$1,575,155+\$607,862+\$1,218,324+\$2,501,025+\$6,779,899=\$12,682,265.

	A	B	C	D	E	F	G
1	Discount Rate	12%					
2	Hourly Rate	\$ 52.00					
3							
4		Calendar/	Expense	Portfolio			Trip
5		Email	Report	Tracker	Spreadsheet	Browser	Planner
6	Growth Rate	-10%	5%	5%	10%	15%	5%
7	Development Time	1250	400	750	2500	1875	6250
8	Development Cost	\$ 65,000	\$ 20,800	\$ 39,000	\$ 130,000	\$ 97,500	\$ 325,000
9							
10	Year 0 Cash Flows	\$ (65,000)	\$ (20,800)	\$ (39,000)	\$ (130,000)	\$ (97,500)	\$ (325,000)
11	Year 1 Cash Flows	\$ 750,000	\$ 250,000	\$ 500,000	\$ 1,000,000	\$ 2,500,000	\$ 1,300,000
12	Year 2 Cash Flows	\$ 675,000	\$ 262,500	\$ 525,000	\$ 1,100,000	\$ 2,875,000	\$ 1,365,000
13	Year 3 Cash Flows	\$ 607,500	\$ 275,625	\$ 551,250	\$ 1,210,000	\$ 3,306,250	\$ 1,433,250
14							
15	NPV	\$ 1,575,155	\$ 607,862	\$ 1,218,324	\$ 2,501,025	\$ 6,779,899	\$ 2,944,043
16							
17		=B10+NPV(\$B\$1,B11:B13)					
18							

**Case: HandStar, Inc. Question 2: Assume the founders weigh a project's NPV twice as much as both obtaining/retaining a leadership position and use of the Internet. Use the weighted factor scoring method to rank these projects. Which projects would you recommend Handstar pursue?**

Data is available for the six projects on these three criteria. Based on the information given in the question, we will assign a weight of 0.5 to NPV and 0.25 to both obtaining/retaining a leadership position and use of the Internet. In terms of scoring the options on NPV, a score of 1 was assigned to the projects with NPVs less-than-or-equal-to 1.1 million dollars. Likewise, a score of 2 was assigned to projects with NPVs that were greater than 1.1 million dollars but less-than-or-equal-to 2.5 million dollars. Projects with NPVs greater than 2.5 million dollars were assigned a score of 3. For the other two criteria, projects with low probabilities were assigned a score of 1, moderate probabilities a score of 2, and high probabilities a score of 3. A spreadsheet for calculating the weighted scores is shown below. The only change over NPV is that now the portfolio tracker ranks higher than the calendar/email.

	NPV	Leadership	Internet	Score
Weight	0.5	0.25	0.25	
Calendar/Email	2	2	2	2
Expense Report	1	3	1	1.5
Portfolio Tracker	2	3	2	2.25
Spreadsheet	3	2	1	2.25
Browser	3	1	3	2.5
Trip Planner	3	1	3	2.5
<b>NPV</b>	<b>Rank</b>			
>2,500,000	3			
>1,100,000<2,500,000	2			
<1,100,000	1			
<b>Leadership</b>				
Likely	3			
Moderate	2			
Less	1			
<b>Internet</b>				
Likely	3			
Moderate	2			
Less	1			

**Case: HandStar, Inc. Question 3: In your opinion, is hiring an additional software development engineer justified?**

After selecting the Browser, Trip Planner, Calendar/Email, and the Expense Report projects, a total of 225 hours would be available. Hiring an additional software engineer would increase the number of

available hours to 2,725. Since the Spreadsheet project has a higher NPV and higher score than the Expense report project it would be the next project to select. Given that the NPV of the project exceeds the \$133,000 (\$52/hour 2500 hours/year) incremental cost of the new software development engineer, hiring an additional software engineer is justified. Indeed, the Expense Report's NPV in excess of \$500,000 would appear to justify hiring a second software development engineer as well.