Brigham Murdoch

Business Case

Executive Summary:

DVBac is considering one of three new products to bring to market. In addition, a product manager must be selected to oversee the project. This new product will expand DVBac's selection of products and create a new source of revenue for the company.

For this business case, we calculated an estimated value of each product's initial development cost by comparing each project to past projects. This estimate, along with each project's expected cash flows, was used to calculate NPV of all projects under consideration and selected the project with the highest NPV to recommend. The selected project is codenamed Snorkel, and has an NPV of $2,904,822. In addition, we conducted a sensitivity analysis of Snorkel based on alternative revenue growth rates. The initial growth rate was 12%. Our two additional calculations used growth rates of 6% and -5%. The NPV of these scenarios is $1,735,790 and -$95,554 respectively.

To select a manager for the new product, each candidate was evaluated based on a weighted set of criteria. These criteria and their weights where determined based on input from the company's key executives. The criteria where then used in a balanced score card to determine which candidate is the best fit for what the company needs in the new product manager. Through this we determined that Serge was the best candidate for the position.

- Serge was ranked highest in both experience and familiarity, the two criteria determined to be most important to ensure the project's success.
- Serge also scored well on most other criteria and had the lowest bonus to be paid if sales exceed expectations in the first year of $5,600.

Background:

DBVac is looking to expand its product lineup and increase its revenues by adding a new vacuum cleaner product to give our customers a wider selection of available products.

Three new vacuum concepts are being considered, codenamed Fin, Snorkel, and Facemask. Each product has unique characteristics that can make it a valuable addition to the DBVac family. The company only has the resources to bring one of these products to market. Furthermore, the product will need a qualified product manager to oversee its development and operations. Those considered for this position where Eunice Stark, Torsten McDuck, Veronica Abernathy, and Serge. These candidates were selected from among the available product managers at the company's disposal.

To determine which product will be most profitable for the company to pursue, past projects were compared to the proposed projects, then used in a weighted average calculation to estimate the initial production costs of the proposed projects. This estimate was then used to calculate the net present value (NPV) of each proposed project. To determine how poorer than expected

market conditions may affect the projects profitability, a sensitivity analysis regarding the project with the highest NPV was also conducted.

Selecting the appropriate manager entailed evaluation of key indicators based on input from various company executives. These indicators are:

1. Dust Factor. Each candidate was ranked on how closely related they are to CEO
2. Experience. Each candidate was ranked on how much experience they have with successful product development.
3. Bonus. We calculated the dollar amount of the bonus the candidate will receive if the new product's sales exceed estimates in the first year.
4. Likeability. Based on the number of votes each candidate got when DVBac last voted on its most popular employee.
5. Familiarity. Each candidate was ranked don how knowledgeable they are regarding the selected project's sub-niche and technology.
6. Trust. Based on the candidates score on their most recent annual trustworthiness test.

We then analyzed these factors through a balanced score card.

Analysis (Project Selection):

Sides of the potential projects were compared to past projects to determine how similar the cost of potential projects may be to past ones. Said past development projects are FarmBunny, RapidBunny, BunnyKing, and CozyCony. Their development costs are as seen below:

Previous Development Costs	
Model	**Cost**
FarmBunny	$2,700,000
RapidBunny	$4,200,000
BunnyKing	$4,600,000
CozyCony	$13,700,000

The probability of each potential project having a similar initial development cost to each past project has been listed in percentage form. This percentage was used for the weights of a weighted average to determine what we might expect each potential project's initial cost to be. Assuming the weights taken from each project indicate parts of the project will cost about as much as the same parts of the old projects from which the weights are taken, (and not that there is x% chance that a potential project will cost as much as a previous project), our calculation should give us a reasonable estimation of what each project will cost upfront.

These are the results of our estimated initial costs:

Fin			
Model	**Prob of Sim. (Weight)**	**Cost**	**Wtd. Value**
FarmBunny	30%	$2,700,000	$810,000
RapidBunny	38%	$4,200,000	$1,596,000
BunnyKing	5%	$4,600,000	$230,000
CozyCony	27%	$13,700,000	$3,699,000
		Initial Cost:	$6,335,000

Project Fin has the highest expected initial cost at $6,335,000.

Snorkel			
Model	**Prob of Sim. (Weight)**	**Cost**	**Wtd. Value**
FarmBunny	9%	$2,700,000	$243,000
RapidBunny	48%	$4,200,000	$2,016,000
BunnyKing	29%	$4,600,000	$1,334,000
CozyCony	14%	$13,700,000	$1,918,000
		Initial Cost:	$5,511,000

Project Snorkel has the lowest initial cost at $5,511,000.

Facemask			
Model	**Prob of Sim. (Weight)**	**Cost**	**Wtd. Value**
FarmBunny	2%	$2,700,000	$54,000
RapidBunny	39%	$4,200,000	$1,638,000
BunnyKing	45%	$4,600,000	$2,070,000
CozyCony	14%	$13,700,000	$1,918,000
		Initial Cost:	$5,680,000

And project Facemask lies in the middle with an initial cost of $5,680,000.

These estimates provide us with the initial investment upon which we can now base our calculation of NPV on.

Fin	Revenue Growth	19%	Repair Costs	27%	Recycling Returns	4%
	Year 0		Year 1		Year 2	
	($6,335,000)	Initial cost	$2,500,000	Revenue	$2,975,000	Revenue
			($800,000)	Training	($250,000)	Training
			($675,000)	Repair and Warranty	($803,250)	Repair and Warranty
			$27,000.00	Recycling Returns	$32,130.00	Recycling Returns
DISC Rate	10%					
CASHFLOW	($6,335,000)		$1,052,000		$1,953,880	
NPV	$1,228,820.42					

	Year 3		Year 4		Year 5		
$3,540,250	Revenue	$4,212,898	Revenue	$5,013,348	Revenue		
($250,000)	Training	($250,000)	Training	($250,000)	Training		
($1,200,000)	Rapairs Expansion						
($955,868)	Repair and Warranty	($1,137,482)	Repair and Warranty	($1,353,604)	Repair and Warranty		
$38,234.70	Recycling Returns	$45,499.29	Recycling Returns	$54,144.16	Recycling Returns		
$1,172,617		$2,870,914		$3,463,888		Profit	$4,178,300

We can see in this table that Fin's net present value is $1,228,820.

Snorkel	Revenue Growth	12%	Repair Costs	20%	Conficence of Grant	33%
	Year 0		Year 1		Year 2	
	($5,511,000)	Initial cost	$3,000,000	Revenue	$3,360,000	Revenue
			($950,000)	Training	($450,000)	Training
					$264,000	Approximated Grant
			($750,000)	Repairs Improvement		
			($600,000)	Repair and Warranty	($672,000)	Repair and Warranty
DISC Rate	10%					
CASHFLOW	($5,511,000)		$700,000		$2,502,000	
NPV	$2,904,822.31					

Grant Size	$800,000						
	Year 3		Year 4		Year 5		
$3,763,200	Revenue	$4,214,784	Revenue	$4,720,558	Revenue		
($450,000)	Training	($450,000)	Training	($450,000)	Training		
		($400,000)	Rapair Expansion				
($752,640)	Repair and Warranty	($842,957)	Repair and Warranty	($944,112)	Repair and Warranty		
$2,560,560		$2,521,827		$3,326,446		Profit	$6,099,834

Here we see Snorkel's NPV is $2,904,822.

Facemask	Revenue Growth	20%	Repair Costs	16%	Conficence of Grant	100%	Grant Size
	Year 0		Year 1		Year 2		
	($5,680,000)	Initial cost	$1,900,000	Revenue	$2,280,000	Revenue	$2,736,000
			($500,000)	Training	($240,000)	Training	($240,000)
					$800,000	Approximated Grant	
			($304,000)	Repair and Warranty	($364,800)	Repair and Warranty	($437,760)
DISC Rate	10%						
CASHFLOW	($5,680,000)		$1,096,000		$2,475,200		$2,058,240
NPV	$2,534,017.67						

Grant Size	$800,000						
Year 3		Year 4		Year 5			
$2,736,000	Revenue	$3,283,200	Revenue	$3,939,840	Revenue		
($240,000)	Training	($240,000)	Training	($240,000)	Training		
($437,760)	Repair and Warranty	($525,312)	Repair and Warranty	($630,374)	Repair and Warranty		
$2,058,240		$2,517,888		$3,069,466		Profit	$5,536,794

And finally, Facemask's NPV is $2,543,018.

The results of our analysis show that Snorkel has the highest NPV of $2,904,822, showing it's the best project for DBVac to pursue.

If a market downturn or other unexpected event happens, it will be helpful for DBVac to understand how the profitability of Snorkel will be affected. We have conducted a sensitivity analysis that shows other possible NPVs of Snorkel at different rates of revenue growth. These additional calculations will help us know what actions we may take to ensure the success of the project in adverse economic conditions. Our current expected revenue growth rate is 12% per year. We calculated two more scenarios for our sensitivity analysis. In the first, Snorkel's revenue growth rate was halved 6% per year, which we might expect in somewhat poor economic conditions. In the second, we lowered Snorkel's revenue growth rate to –5% per year, a possibility in extremely bad economic conditions. The results of this analysis are as follows:

Snorkel 1	Revenue Growth	12%	Repair Costs	20%	Confidence of Grant	33%
	Year 0		Year 1		Year 2	
	($5,511,000)	Initial cost	$3,000,000	Revenue	$3,360,000	Revenue
			($950,000)	Training	($450,000)	Training
					$264,000	Approximated Grant
			($750,000)	Repairs Improvement		
			($600,000)	Repair and Warranty	($672,000)	Repair and Warranty
DISC Rate	10%					
CASHFLOW	($5,511,000)		$700,000		$2,502,000	
NPV	$2,904,822.31					

Grant Size	$800,000						
Year 3		Year 4		Year 5			
$3,763,200	Revenue	$4,214,784	Revenue	$4,720,558	Revenue		
($450,000)	Training	($450,000)	Training	($450,000)	Training		
		($400,000)	Rapair Expansion				
($752,640)	Repair and Warranty	($842,957)	Repair and Warranty	($944,112)	Repair and Warranty		
$2,560,560		$2,521,827		$3,326,446		Profit	$6,099,834

Here we have our initial calculation with an NPV of $2,904,822.

Snorkel 2	Revenue Growth	6%	Repair Costs	20%	Confidence of Grant	33%
	Year 0		Year 1		Year 2	
	($5,511,000)	Initial cost	$3,000,000	Revenue	$3,180,000	Revenue
			($950,000)	Training	($450,000)	Training
					$264,000	Approximated Grant
			($750,000)	Repairs Improvement		
			($600,000)	Repair and Warranty	($636,000)	Repair and Warranty
DISC Rate	10%					
CASHFLOW	($5,511,000)		$700,000		$2,358,000	
NPV	$1,735,790.98					

Grant Size	$800,000						
Year 3		Year 4		Year 5			
$3,370,800	Revenue	$3,573,048	Revenue	$3,787,431	Revenue		
($450,000)	Training	($450,000)	Training	($450,000)	Training		
		($400,000)	Rapair Expansion				
($674,160)	Repair and Warranty	($714,610)	Repair and Warranty	($757,486)	Repair and Warranty		
$2,246,640		$2,008,438		$2,579,945		Profit	$4,382,023

This next table is the calculation at 6% revenue growth. The NPV has dropped to $1,735,790. While much lower than our initial NPV of $2,904,822, this NPV is still a respectable sum. This shows us Snorkel should still be a profitable investment even if its revenue growth rate is only half of what's expected.

Snorkel 3	Revenue Growth	-5%	Repair Costs	20%	Confidence of Grant	33%
	Year 0		Year 1		Year 2	
	($5,511,000)	Initial cost	$3,000,000	Revenue	$2,850,000	Revenue
			($950,000)	Training	($450,000)	Training
					$264,000	Approximated Grant
			($750,000)	Repairs Improvement		
			($600,000)	Repair and Warranty	($570,000)	Repair and Warranty
DISC Rate	10%					
CASHFLOW	($5,511,000)		$700,000		$2,094,000	
NPV	($95,554.58)					

Grant Size	$800,000						
Year 3		Year 4		Year 5			
$2,707,500	Revenue	$2,572,125	Revenue	$2,443,519	Revenue		
($450,000)	Training	($450,000)	Training	($450,000)	Training		
		($400,000)	Rapair Expansion				
($541,500)	Repair and Warranty	($514,425)	Repair and Warranty	($488,704)	Repair and Warranty		
$1,716,000		$1,207,700		$1,504,815		Profit	$1,711,515

The final table is our calculation with –5% revenue growth. This final scenario has an NPV of -$95,554. If our revenue growth shrinks at a rate of 5% over the next five years, this project would not be worth our time.

Analysis (Manager Selection):

In selecting a manager, several important criteria were identified.

Weights		
Criteria	**Weight**	**Deffinitions**
Dust Factor	4	How closely the candidate is related to the CEO.
Experience	10	Candidate's (positive) experience with product development.
Bonus	2	Dollar amount of bonus to be paid the proect exceeds sales expectatoins in year 1 (Lower is better).
Likeability	6	How well liked the candidate is by other employees.
Familiarity	8	How familiar the candidate is with the poject's sub-nich (technology).
Options for 6th		
Competitiveness	Not Chosen	The candidates drive to succeed when compeeting agianst others.
Trust	5	How trustworth the candidate is.
Soft Ball Ability	Not Chosen	How good they are at soft ball.

Each criterion has been given a specific weight based on the input of the company's executives. The first five criteria were essential to include as determined by the author's boss. The sixth is a measure of a candidate's overall trustworthiness, measured specifically by their most recent results on the company's annual trustworthiness quiz. It was included because of input from several executives specifically desiring someone they could trust in. While softball and competitiveness were both considered important indicators by multiple executives, priority was most often given to trust. DBvac wants someone who is reliable and will have the best interests of the company in mind. Trust can also be measured more objectively based on the company's annual trustworthiness test.

The most important criterion was experience. Almost all executives requested it and those who did gave it a high priority. The main reason is that an experienced manager will be best equipped to bring a product through development and ensure it is successful. Familiarity with the product was also given importance because the manager needs to understand the product they are making, though it wasn't requested as strongly as experience. Likeability was considered the next most wanted criterion; in the hopes it will boost morale. Trust was slightly less requested than likeability. While the dust factor was considered important, only a couple of executives

brought it up. Finally, a few concerns were raised about the bonus considering the company's tight budget.

After determining these weights, the candidates have been evaluated in each category based on information found from various sources within the company. The data was then normalized through z-transformation normalization. Finally, a balanced score card was used to calculate the total scores of all candidates using the weights presented earlier and the z-transformation we performed.

Criteria	Weight	Eunice Stark	Torsten McDuck	Veronica Abernathy	Serge	Mean	ST DEV
Dust Factor	4	3	4	2	1	2.5	1.12
z-Score		0.45	1.34	-0.45	-1.34		
Experience	10	2	1	3	4	2.5	1.12
z-Score		-0.45	-1.34	0.45	1.34		
Bonus	2	$7,520	$9,200	$8,240	$5,600	**Max Bonus:**	$9,200
Bonus-R		$1,680	$0	$960	$3,600	$1,560.00	$1,320.00
z-Score		0.09	-1.18	-0.45	1.55		
Likeability	6	82	23	3	60	42	30.85
z-Score		1.30	-0.62	-1.26	0.58		
Familiarity	8	1	3	2	4	2.5	1.12
z-Score		-1.34	0.45	-0.45	1.34		
Trust	5	73	62	88	77	75	9.30
z-Score		-0.22	-1.40	1.40	0.22		
Total		-6.53	-17.52	-2.40	26.45		

We've also included the calculations for bonuses below.

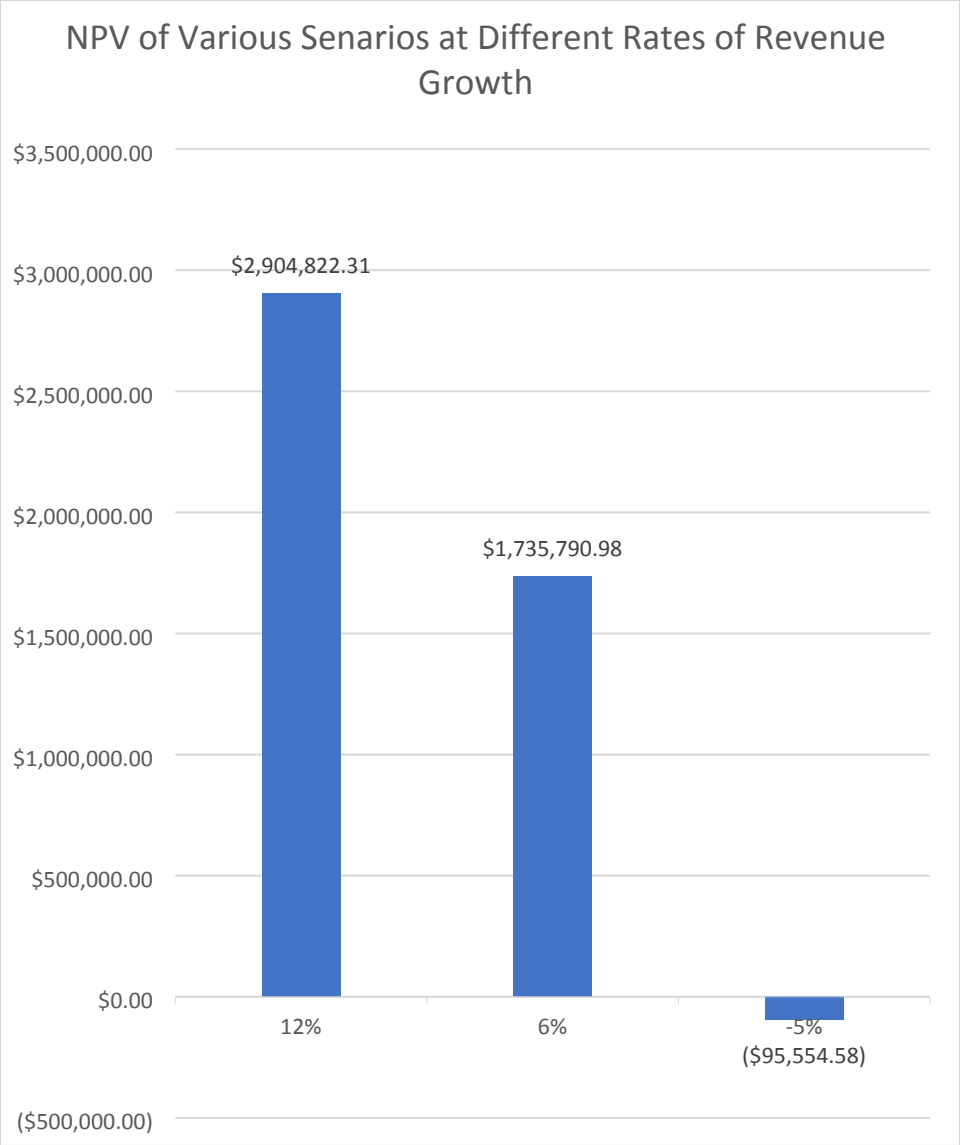
	Eunice Stark	Torsten McDuck	Veronica Abernathy	Serge
Employee Salaries	$94,000	$115,000	$103,000	$70,000
Bonus	$7,520	$9,200	$8,240	$5,600
Bonus Amount:	8%			

In the above table we see that Serge has the highest score on our balanced score card of 26.45. Veronica Abernathy is second at -2.4. Eunice Stark was third with –6.53, and Torsten McDuck was last with -17.52.

Recommendation:

Since all NPV's calculated were positive (and all projects have an NPV above $1 million) we can expect to turn a sizable profit from any of the three projects. These NPV can be seen below:

Considering the limited resources of the company, the NPV's indicate DBvac will most likely find the greatest value from bringing the product Snorkel to market. Snorkel has an NPV of $2,904,822 and an expected profit of $6,099,834 over the next five years. The following table contains the results of our sensitivity analysis for snorkel:



The sensitivity analysis has led us to conclude that Snorkel has a good risk profile. The project still has a positive NPV of $1,735,790 if our revenue growth is only half of what we expect it to be. Regarding the final scenario of -5% revenue growth, given that this is our most extreme scenario, it is unlikely that –5% revenue growth would happen in the first place. Also, an NPV of -$95,554 is less than 3.3% the size of our original NPV of $2,904,822. This tells us any possible loss should only be a fraction of the size of our potential gains.

Since Snorkel has the highest NPV of our options and has limited downside in the event of a poor economic environment, we believe it will be the most profitable project for DBvac to choose as it expands its product lineup.

Based on our balanced score card, we believe that the company should choose Serge as the product manager for Snorkel. Of the candidates, he ranks highest in both experience and familiarity, the two most important factors we determined in selecting a product manager. He

also scores well in regard to every criterion except the Dust Factor, of which he is the furthest away in relation to the CEO. His overall score on our balanced score card is 26.45. By comparison, all of the other candidates' scores are negative. Eunice Stark scored -6.53, Torsten McDuck scored -17.52, and Veronica Abernathy scored -2.40.

Our analysis leads us to recommend that DBvac selects Snorkel as its new development project and to appoint Serge as the product manager for this new product.