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CB9088 Business Analytics

**Assessment 1: Group Project**

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| Instructions  Each team must produce an Excel model and a Business Report for the case study below.  The main text of the report should not exceed three pages of A4 (11 point, 1.5 spacing, about 1,500 words). However, it may well be useful to include appendices with tables, graphs, etc. These should be explained in the main text. The report should be clearly structured and communicate the outcomes of your analysis in an effective way.  The Excel model should include a short “Explanation Sheet” containing a brief description of the different model components and how to use them. The model will be marked on the basis of the functionality, layout and creativity of the spreadsheet(s) as well as on the basis of the clarity of communication and relevance of information provided in the explanation sheet.  Both the Excel model and the Business Report must be submitted on Moodle by 12pm (noon) on Wednesday 6 February 2024.  N.B. This project is deliberately open-ended. You may develop your analysis as you think best. Initiative will be rewarded. |

**Case Study: Drug planning at MPS Pharmaceuticals**

MPS Pharmaceuticals is a large drug company. One of its new drugs, Sequacor, is coming to market and MPS Pharmaceuticals needs to determine how much annual production capacity to build for this drug. Government regulations make it difficult to add capacity at a later date, so MPS Pharmaceuticals must determine a capacity recommendation before the drug comes to market. The drug will be sold for 20 years before the patent expires. After 20 years, the rights to produce the drug are virtually worthless.

MPS Pharmaceuticals has made the following assumptions:

* Demand for Sequacor is anticipated to follow the overall growth trajectory of a previously released drug Propalor, but expected to be 5-10% higher in any given year, with 7.5% higher being most likely. Ten years’ worth of sales data for Propalor are provided in a separate Excel file for you to analyse.
* It costs £6, payable at the end of year 1, for each unit of annual production capacity.
* In year 1, Sequacor will sell for £8 per unit and will incur a variable cost of £1.5 to produce.
* The cost of maintaining a unit capacity during year 1 is £1.
* The sales price, unit variable cost, and unit capacity maintenance cost will increase by 5% per year.
* All cash flows are assumed to occur at the end of each year and the corporate discount rate is 10%.

Your team has been hired by MPS Pharmaceuticals to develop a spreadsheet model of its 20-year cash flows. The company would specifically like to answer the following questions.

1. What is the forecasted demand for Sequacor over the next 20 years based on analysis of Propalor sales?
2. What capacity level should be chosen for the production facility?
3. How does a change in the discount rate affect the optimal capacity level?
4. Is there any other aspect that should be taken into account when developing the model (e.g. uncertainty in demand, future prices and future costs)? How would variations in other factors affect the optimal capacity level and profitability?
5. An alternative to build production capacity is to outsource production to an overseas supplier at a cost of £4 per unit. The overseas supplier will be able to supply at most 30,000 units per year due to capacity limitations of its existent production facility. Should this option be considered? Is it essential for a lower unit cost to be negotiated? If so, what is the maximum unit cost that the company should consider?
6. What are the risks and advantages of the two options (manufacturing vs outsourcing)? What sorts of external factors (e.g. demand uncertainty) would make one option preferable over another?
7. Finally, MPS Pharmaceuticals would like to figure out how long it will take to build a new production facility. The various steps involved in building the production facility are detailed in the table below, along with 3-point time estimates (in days). What is the expected completion time for the facility? What is the probability the facility can be built in 40 weeks?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity | Predecessor | Activity Time (days) | | |
|  |  | Optimistic | Most Likely | Pessimistic |
| A | - | 20 | 25 | 40 |
| B | A | 20 | 20 | 40 |
| C | B | 35 | 45 | 75 |
| D | C | 15 | 20 | 35 |
| E | B | 15 | 25 | 45 |
| F | A | 20 | 25 | 55 |
| G | F | 30 | 45 | 90 |
| H | D, G | 65 | 75 | 150 |
| I | H | 20 | 20 | 35 |
| J | I | 20 | 25 | 45 |
| K | H | 15 | 35 | 60 |
| L | K | 20 | 30 | 70 |

**Additional Instructions**

Your team will need to build a spreadsheet model in Excel to carry out the analysis. The model should be fully functional and interactive in that the inputs can be changed by a user and the model’s results automatically calculated and displayed. Please adhere to good spreadsheet practice. Additional points will be awarded for ingenuity and creativity and for the use of any advanced Excel functionality (range names, match and index functions, charts, “what-if” analysis tools). All the answers to the questions above must be supported by empirical findings obtained by using the spreadsheet model and performing sensitivity analysis.