# IS 628, Computer-Based Information Systems
# Building a DSS in Excel, Part II



**Read all instructions carefully!**

The following assignment is a continuation of the initial DSS Building assignment. It is intended to be a brief introduction to how Microsoft Excel may be used as a Decision Support System for future projections sensitivity analysis ("what if?" analysis). You will expand your DSS model to include five year projections. You are to follow the instructions and complete and submit the assignment as **individuals**.

You are to use the DSS model (database and model base) that you created in DSS I. Keep all of the base (FY2015) assumptions (i.e. gross sales of $2.25 million, etc.) and their relationships (the Model).

**Your assignment is to do the following:**

Though you will be re-creating the Database and Model from the first DSS assignment, you are to use the DSS_II.xlsx spreadsheet file that I am providing to you. While this requires extra effort to re-create the Database and Model, the formatting that is contained in the provided spreadsheet will make the Part II DSS tool much easier to build in the long run. At this time, you should also correct and errors identified in the Database or Model of the first DSS project—repeating those errors will likely result in points being lost in the scoring of this, the DSS II, project. The instructions for the first DSS project are still posted on the class Web site.

Add projection formulas for each of the Database values. All projections will be in the form of fixed percentages of compound growth (or decline) for the projection period. Note that values entered in column C, Annual Change %, are used in the projection formulas to compound that percent rate over the projection period (i.e., over 5 years, compounded annually). Therefore, each year's value will be the previous year's value plus the percentage of the previous year's value. Note that a negative percent value will be entered into the Annual Change % column decrease or reduction in the projections.

All of the values in the Model are calculated from the values in the Database. Therefore, projection formulas are not needed for any of the projection model (FY2016 – FY2020) columns. Instead, simply copy and paste the formulas from the FY2015 Base Year column to each of the projection model (FY2016 – FY2020) columns (columns D, E, F, G, and H, respectively).

The final element to complete is the row showing the effect or magnitude of the annually compounded changes on the Profit After Tax for each projected year. Formulas need to be entered into cells D35 through H35 that will calculate the change in the Profit After Tax relative to the FY2015 Base Year value.

When completed (with no values entered into the Annual Change % column but the FY2015 Base Year values set) your spreadsheet should resemble the example in Figure 1. The balance of the spreadsheet should change whenever a projection variable changes (i.e. without any other intervention on your part).

Run each of the scenarios listed below to determine the organization's sensitivity to certain growth factors. All growth (and decline) factors are assumed to be compound annual percentages, unless stated otherwise in the scenario. Each scenario assumes all items not mentioned in the scenario are the base year values. **Be sure to return to the base assumptions before attempting each question.** Your spreadsheet, if built correctly, will return the correct answers to the below questions.

Figure 1. Completed DSS II Tool with No Annual Change

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 1 | **Your Name Here** | | | | | | | |
| 2 | **IS 628** | | | | | | | |
| 3 | **Fall 2015** | | | | | | | |
| 4 | | | | | | | | |
| 5 | | FY2015 | Annual | FY2016 | FY2017 | FY2018 | FY2019 | FY2020 |
| 6 | | Base Year | Change | | | | | |
| 7 | **DATABASE** | | % | | | | | |
| 8 | Gross Sales | $2,250,000 | | $2,250,000 | $2,250,000 | $2,250,000 | $2,250,000 | $2,250,000 |
| 9 | Return Fraction | 4% | | 4.0% | 4.0% | 4.0% | 4.0% | 4.0% |
| 10 | Labor Cost Fraction | 14% | | 14.0% | 14.0% | 14.0% | 14.0% | 14.0% |
| 11 | Materials Cost Fraction | 23% | | 23.0% | 23.0% | 23.0% | 23.0% | 23.0% |
| 12 | Fixed Overhead | $80,000 | | $80,000 | $80,000 | $80,000 | $80,000 | $80,000 |
| 13 | Overhead Fraction | 28% | | 28.0% | 28.0% | 28.0% | 28.0% | 28.0% |
| 14 | MMandG Fraction | 18% | | 18.0% | 18.0% | 18.0% | 18.0% | 18.0% |
| 15 | Federal Tax Fraction | 27% | | 27.0% | 27.0% | 27.0% | 27.0% | 27.0% |
| 16 | State Tax Fraction | 8% | | 8.0% | 8.0% | 8.0% | 8.0% | 8.0% |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | **MODEL BASE** | | | | | | | |
| 20 | Returns and Allowances | $90,000 | | $90,000 | $90,000 | $90,000 | $90,000 | $90,000 |
| 21 | Cost of Goods | $1,145,600 | | $1,145,600 | $1,145,600 | $1,145,600 | $1,145,600 | $1,145,600 |
| 22 | Overhead | $313,100 | | $313,100 | $313,100 | $313,100 | $313,100 | $313,100 |
| 23 | Variable Overhead | $233,100 | | $233,100 | $233,100 | $233,100 | $233,100 | $233,100 |
| 24 | MMandG | $388,800 | | $388,800 | $388,800 | $388,800 | $388,800 | $388,800 |
| 25 | Federal Tax | $168,912 | | $168,912 | $168,912 | $168,912 | $168,912 | $168,912 |
| 26 | State Tax | $50,048 | | $50,048 | $50,048 | $50,048 | $50,048 | $50,048 |
| 27 | Labor Cost | $315,000 | | $315,000 | $315,000 | $315,000 | $315,000 | $315,000 |
| 28 | Materials Cost | $517,500 | | $517,500 | $517,500 | $517,500 | $517,500 | $517,500 |
| 29 | | | | | | | | |
| 30 | | | | | | | | |
| 31 | Net Sales | $2,160,000 | | $2,160,000 | $2,160,000 | $2,160,000 | $2,160,000 | $2,160,000 |
| 32 | Gross Profit | $1,014,400 | | $1,014,400 | $1,014,400 | $1,014,400 | $1,014,400 | $1,014,400 |
| 33 | Profit Before Tax | $625,600 | | $625,600 | $625,600 | $625,600 | $625,600 | $625,600 |
| 34 | Profit After Tax | $406,640 | | $406,640 | $406,640 | $406,640 | $406,640 | $406,640 |
| 35 | | | **Effect** | $0 | $0 | $0 | $0 | $0 |

(NOTE: Where I ask for descriptive answers, give short and to-the-point answers, not longer than one sentence.)

1. Assuming no other changes, with a compound annual growth in gross sales of five percent, what will be the profit after tax in:

   a. year 1 (FY2016)?
   b. year 2 (FY2017)?
   c. year 3 (FY2018)?
   d. year 4 (FY2019)?
   e. year 5 (FY2020)?

2. Returning to base assumptions, you are considering new plant and equipment that will reduce variable overhead 10 percent a year but increase fixed overhead 15 percent a year.

   a. What will be the effect of this investment on net income five years from now (year five – FY2020 - profit after tax)?
   b. Should you do the project?
   c. *Why* should you do or not do the project?

3. Management is currently in collective bargaining negotiations considering possible annual percentile wage increases. You are asked to report what the effect of certain increases will be on net income five years from now (year FY2020) for each of the following annual compound percentage increases: (note: I am asking for the *effect* which means 'how much will net income go up or down five years from now compared to base year assumptions,' not 'what will the net income be five years from now').

    a. 5 percent
    b. 10 percent
    c. 15 percent

4. You have discovered there to be a two to one relationship between increases in gross sales and MM&G expenses (for every one percent increase in sales, there is a two percent increase in MM&G). If this were true, what would the net income be five years from now (year FY2020) if there were an annual percentage increase in gross sales of:

    a. 2 percent?
    b. 5 percent?
    c. Is it worthwhile to try to increase sales?
    d. Why?

5. You have a scheme to reduce returns and allowances by 10 percent per year; but, implementing the scheme means that MM&G will increase by one percent per year.

    a. What will be the net income in year five if you implement the scheme?
    b. Is it a good scheme?
    c. Why?

**You are to turn in the following:**

- A one-page, word-processed document on which you have answered each of the above questions.
    - The sheet will have your name (in First then Last format) along with the class and section in the upper-right corner.
    - The hardcopy printout of the answer sheet is to be turned in at the time of the final exam.
- Your completed DSS tool (the completed spreadsheet) with base assumptions (i.e., no values in the Annual Change % column) is to be submitted as an attachment to an e-mail message.
    - Rename the file using your last name followed by your first name as the filename
        - For example, if I were to turn in a file, the file name would be MillerDavid.xls[1].
        - Do not be concerned that this is the same filename that you gave for the previous assignment. I will handle the file differently so there should be no problem with duplicate filenames.
        - Make sure that you have inserted your name into the appropriate cell of the spreadsheet.
    - The subject line will be, IS 628 DSS II File
    - The file is to be emailed by the start of final exam on the date indicated in the course schedule.

[1] Note that the file extension will be displayed only if the folder option on the computer you are using is set to show the file extension—the default is for it to not show. Do not add an extension if this option is not set.