FACULTY OF BUSINESS AND LAW Department of Information Systems and Business Analytics MIS770 – Foundation Skills in Data Analysis	DEAKIN BUSINESS SCHOOL

Assignment 2 – Analysis of TechnoMart Industries employee satisfaction survey

Particulars

- **Due:**   Week 9, **11pm**, Thursday 13th September, 2018
- **Marks:**   30%
- **Words:**   2000
- **Submission:**   Online to the MIS770 assignment TWO drop box in the Cloud Unit site
                    Email submissions will **not** be accepted
- **Note:**   This assignment is to be completed individually

Assurance of Learning

This assignment assesses following Graduate Learning Outcomes and related Unit Learning Outcomes:

Graduate Learning Outcome (GLO)	Unit Learning Outcome (ULO)
GLO4: Critical thinking: evaluating information using critical and analytical thinking and judgment	ULO2: Manipulate and summarise data that accurately represents real world problems
	ULO3: Interpret and appraise statistical output to assist in real-world decision making

Overview

The purpose of this assignment is to investigate a dataset utilising the knowledge learned in Modules One and Two. This will enable conclusions to be drawn that ultimately assist in decision making.

The assignment requires you to analyse a given dataset, interpret the results, and then draw conclusions such that you are able to reply to specific questions being asked of you in the form of a report. (These questions are asked in the following memorandum).

The aims of the assignment is to:

- provide you with some examples of the application of data analysis within an organisation
- test your understanding of the material in the relevant topics
- test your ability to analyse and interpret your results
- test your ability to effectively communicate the results of your analysis to others

Before tackling the assignment, make sure you have prepared yourself well. As a *minimum*, please read the relevant sections of the prescribed text and listen/watch the pre-recorded material for Modules 1 and 2.

Scenario

TechnoMart Industries is an automobile parts manufacturer with 9800 employees (TechnoMart is a fictitious company and meant to bear no resemblance to any existing organisation). It wishes to study its full-time workforce by developing an employee profile that measures factors such as income, job satisfaction and career progress. Emma Saward, the Vice-President of Human Resources, hires MDB Corporation, a consulting firm, to survey TechnoMart employees. A survey of a random sample of 400 staff was conducted via online questionnaire.

The questionnaire used for the survey can be found in the TechnoMart2018.xls file (All data in the spreadsheet is fictitious). Please ensure you read that questionnaire. To understand what each variable means, please cross-reference to the questionnaire given in the database file.

In the assignment, you play the role of Madison Thomson, an analyst at MDB Corporation. You are often required to report outcomes of your analysis to clients who have little or no knowledge of data analysis. Emma Saward, the Vice-President of Human Resources at TechnoMart Industries, has written to you regarding certain matters relating to the employee satisfaction survey. Her memo to you is reproduced below:

Memorandum

Memorandum
To: Madison Thomson, MDB Corporation From: Emma Saward, TechnoMart Industries Subject: Analysis of TechnoMart Industries employee satisfaction survey

Dear Madison,

Management is concerned about the wide variation in work hours between TechnoMart employees and whether factors like employee job satisfaction, occupation and union membership play any part in this variation. TechnoMart also has staff planning issues that need addressing, including planning to replace workers who retire, undertaking a recruitment drive for new employees and providing adequate promotion opportunities within the company.

As part of the last Enterprise Bargaining Agreement, we agreed with the unions that work hours would be reviewed, for all employees. Where possible, employees should not be working excessive amounts of overtime. I know that you recently undertook a survey of employees in TechnoMart. Could you please provide me with answers to the following questions?

1. An overall view of work hours at TechnoMart

(a) Provide me with an overall summary of hours worked at TechnoMart, keeping in mind that the normal working week is 40 hours. Please also include commentary on any employees in terms of unusual work hours.

(b) I'm also interested in whether we have many employees that are working more than 40 hours. Can you provide me with an accurate estimate of the total number of employees across the whole organization who would work more than 40 hours? Likewise, how many are working more than 60 hours?

2. Comparison of union and non-union members

In addition to the overall analysis you are carrying out for work hours, I am interested in how union members in the company compare to non-union members in regard to a few key variables. In particular, I want you to investigate how union members and non-union members compare in regard to:

 (a) Hours worked

 (b) Occupation

 (c) Job satisfaction

Based on the above, can you provide me with a brief summary of how the two groups compare.

3. Predicting Pre-Tax Income

Of all the variables you have collected, is there any one that stands out as a possible explanation or predictor of those people likely to achieve a higher pre-tax income than others do?

4. Workers approaching retirement

Senior management are concerned that over the next few years the company will need to undertake a large recruitment drive as our workforce is aging and a substantial number of employees will be retiring. Can you provide me with an estimate of the:

 (a) average age of TechnoMart employees

 (b) average time our employees have been working at TechnoMart

5. Union membership

In a recent Enterprise Bargaining meeting, the union made a number of claims that I would like you to check.

 (a) It was also mentioned that our employees are very loyal to the company and that the union believed the average length of employment at TechnoMart would exceed the industry average of 7.5 years. Could you check if this claim is true for all employees? What about for only male employees? What about only for female employees?

 (b) There is some speculation that the union members work at least 45 hours per week. Is there any way of confirming this?

6. Future Surveys

Finally, I am interested in your opinion about future surveys of our employees.

 (a) I am concerned that a sample of only 400 employees seems too small compared to the population of 9800. Could you explain to me how we calculate an ideal sample size?

 (b) Of particular interest to me is being able to accurately estimate the size of the problem we have with staff working excessive hours (i.e. more than 60 hours a week). In other words, in order to accurately estimate the size of our overtime problem, do I have a sufficient number of staff in my sample who work more than 60 hours? If not, how many should be sampled?

I look forward to your response.

Sincerely,

Emma Saward

Requirements:

- Your report should be no longer than 2000 words and there is no need to include, Charts and Tables, or Appendices in the report
- Your Charts/Graphics and Tables are only to be placed in the Data Analysis file i.e. the Excel spreadsheet
- The report is to be written as a stand-alone document (assume Emma will only read your report). Thus, you should not have any references in the report to your data analysis output. Eg. "According to Table 1 in the analysis…"
- Your report must have an informative title
- Your report must contain an executive summary that explains in plain language what the report is for and summarises the main findings. The executive summary should be no more than 2/3 page
- The body of your report must be set out in the same order as in the originating memorandum from Emma Saward, with each section (question) clearly marked
- Use plain language and your explanations succinct. Avoid the use of technical or statistical jargon as Emma Saward will not necessarily understand even simple statistical terms. As a guide to the meaning of "Plain Language", imagine you are explaining your findings to a person without any statistical training (e.g. someone who has not studied this unit). What type of language would you use in this case?
- Marks will be lost if you use unexplained technical terms, irrelevant material, or have poor presentation/organization
- All Microsoft Excel data analysis output associated with each question in the Memorandum is to be placed in the corresponding tab in the yourstudentid.xlsx file

Data Analysis Instructions/Guidelines

In order to prepare a reply to Emma's memorandum, you will need to examine and analyse the dataset **TechnoMart2018.xlsx** thoroughly.

Emma has asked a number of questions and your Data Analysis output (i.e. your charts/tables/graphs) should be structured such that each question is answered on the separate tab/worksheet provided in your Excel document. There are also extra tabs in **TechnoMart2018.xlsx** called CI, SampleSize and HT and you should use the various templates contained in these tabs in your "Confidence Interval", "Sample size" and "Hypothesis Testing" answers.

In order to effectively answer the questions, your Data Analysis output needs to be appropriate. Accordingly, you'll need to establish which of the following techniques are applicable for each question:
- Summary Measures (Descriptive Statistics, Inc. Outlier detection)
- Comparative Summary Measures (i.e. Descriptive Statistics for multiple values of a variable)
- Suitable tables and charts or graphics (Module One) that will illustrate more clearly, other important features of a variable
- Scatter diagrams, Correlation analysis and Cross Tabulations (sometimes called Contingency Tables), used to establish the relationships (dependencies) between two variables
- Confidence Intervals: You can assume that a **95% confidence level** is appropriate. We use Confidence Intervals when we have no idea about the population parameter we are investigating. Additionally, we would use Confidence Intervals if we are asked to provide an estimate of a population parameter. You can use the relevant **Excel template** provided in the dataset and copy to the applicable question tab
- Hypothesis Tests: You can assume that a **5% level of significance** is appropriate. We Use Hypothesis Tests when we are testing a Claim, a Theory or a Standard. You can use the relevant **Excel template** provided in the dataset and then copy to the applicable question tab

Note: There is an Appendix at the end of each Chapter of the Prescribed Textbook which describes the basic Excel steps associated with that Topic. Chapters 1 to 9 are applicable for this assessment.

Submission

Your completed assignment should be in **two** separate files:

- **Data Analysis (Part A):** An <u>Excel</u> document containing <u>separate</u> tabs/ worksheets with charts/ tables/ graphs for <u>each</u> question
- **Report (Part B):** A <u>Word</u> document of no more than 2000 words which is **not** to contain any charts/ tables/ graphs
- All interpretations should be presented in your "Report" and the excel document should only contain your *intermediate* analysis and final output

The assignment is to be submitted to the MIS770 assignment two dropbox in Deakin's Cloud Campus before 11pm on Thursday 13th September 2018. **Note: The Cloud Unit site is the ONLY method of submission acceptable.**

Please name/rename each file using the format *yourstudentid.docx* and *yourstudentid.xlsx*. Failure to follow this naming convention may lead to a delay in receiving feedback and marks.

When you are required to submit an assignment through your CloudDeakin unit site, you will receive an email to your Deakin email address confirming that it has been submitted. You should check that you can see your assignment in the Submissions view of the Assignment dropbox folder after upload, and check for, and keep, the email receipt for the submission.

If you need to request an extension, please **email** the Unit Chair (lasitha.dharmasena@deakin.edu.au) by *no later* than Monday 10th September 2018. You will need to provide a valid reason together with **supporting documentation** (e.g. doctors' certificate, etc.) **as well as the work completed to date.**

Notes:

Penalties for late submission: The following marking penalties will apply if you submit an assessment task after the due date and time without an approved extension:
- 5% will be deducted from available marks for each day up to five days, and work that is submitted more than five days after the due date will not be marked. You will receive 0% for the task. 'Day' means working day for paper submissions and calendar day for electronic submissions.
- The Unit Chair may refuse to accept a late submission where it is unreasonable or impracticable to assess the task after the due date.
- For more information about academic misconduct, special consideration, extensions, and assessment feedback, please refer to the document "**Your rights and responsibilities as a student in this Unit**" in the first folder next to the Unit Guide of the Resources area in the CloudDeakin unit site.

Building evidence of your experiences, skills and knowledge (Portfolio) - Building a portfolio that evidences your skills, knowledge and experience will provide you with a valuable tool to help you prepare for interviews and to showcase to potential employers. There are a number of tools that you can use to build a portfolio. You are provided with cloud space through OneDrive, or through the Portfolio tool in the Cloud Unit Site, but you can use any storage repository system that you like. Remember that a Portfolio is YOUR tool. You should be able to store your assessment work, reflections, achievements and artefacts in YOUR Portfolio. Once you have completed this assessment piece, add it to your personal Portfolio to use and showcase your learning later, when applying for jobs, or further studies. Curate your work by adding meaningful tags to your artefacts that describe what the artefact represents.

Supporting Materials

You will find the data in the file called **TechnoMart2018.xlsx**, on CloudDeakin for download. Please ensure you read the relevant sheets in that file. In particular, ensure you read the sheet called "*Questionnaire*".

Save a copy for your assignment purposes. Also ensure you read the information which follows.

Marking Rubric

	Poor/Needs Improvement	Satisfactory	Good	Very Good	Exemplary
Executive summary (Marks: 10)	0 points Does not communicate any of the main findings of the analysis in an accurate or useful way, or the findings are basic. 0 – 4.5 Marks	5 points Explains most of the main findings of the analysis accurately and enables reader to draw some reasonable conclusions. 5 - 5.5 Marks	6 points Explains nearly all of the main findings of the analysis accurately and enables reader to draw mostly reasonable conclusions. 6 - 6.5 Marks	7 points Provides detailed and accurate descriptions of the most important features of the analysis along with appropriately qualified conclusions. 7 - 7.5 Marks	10 points Provides an outstanding descriptions and conclusions that is carefully considered and insightful. 8 - 10 Marks
Data Analysis and Graphics (Marks: 40)	0 points Uses irrelevant or inappropriate techniques to analyse the data, or Data analysis and visualisation tools have been used to analyse the data but in an incomplete or inaccurate manner. A very poor presentation of the analysis, or the analysis does not follow principles of good graphical display. 0 – 19.5 Marks	20 points Uses appropriate data analysis and visualisation tools to analyse the data but there are several errors in the analysis. The presentation of the analysis is satisfactory. 20 – 23.5 Marks	24 points Uses appropriate data analysis and visualisation tools to analyse the data but there are some errors in the analysis. The presentation of the analysis is of a respectable standard. 24 – 27.5 Marks	28 points Comprehensive analysis of the data using appropriate techniques, but there are some minor errors in the analysis. Uses data visualisations to understand the patterns in data. The analysis is well organised and follows principles of good graphical display. 28 – 31.5 Marks	40 points Skilful and comprehensive analysis of data using many different techniques. Uses data visualisations to produce novel insights. An exemplary presentation of the analysis. 32 – 40 Marks
Interpreting Results and Communication (Marks: 40)	0 points Does not communicate any of the main findings of the analysis in an accurate and/or useful way, or the interpretation and communication of findings is at a basic level. The written communication is unprofessional or difficult to follow and contains numerous spelling or grammatical errors. 0 – 19.5 Marks	20 points Explains most of the main findings of the analysis accurately and enables reader to draw some reasonable conclusions. The written communication is clear and easy to follow but it contains minor spelling or grammatical errors. 20 – 23.5 Marks	24 points Explains nearly all of the main findings of the analysis accurately and enables the reader to draw mostly reasonable conclusions. The written communication is clear and easy to follow and generally free of spelling or grammatical errors. 24 – 27.5 Marks	28 points Provides detailed and accurate descriptions of the most important features of the analysis along with appropriately qualified conclusions. The written communication is professional, easy to follow and has a good structure. 28 – 31.5 Marks	40 points Provides an outstanding descriptions and conclusions that is carefully considered and insightful. The written communication is truly professional, logical and easy to follow. 32 - 40 Marks
Overall Assignment Presentation (Marks: 10)	0 points A very poor presentation of the analysis or it is mostly disorganised. The memorandum is un-professional, difficult to follow and/or contains numerous spelling or grammatical errors. 0 – 4.5 Marks	5 point The presentation of the analysis is satisfactory. The memorandum is clear and easy to follow but it contains minor spelling or grammatical errors. 5 -5.5 Marks	6 points The presentation of the analysis is of a respectable standard. The memorandum is clear and easy to follow and generally free of spelling or grammatical errors. 6 -6.5 Marks	7 points The analysis is well organised and follows principles of good graphical display. The memorandum is professional, easy to follow with good structure. 7 -7.5 Marks	10 points An exemplary presentation of the analysis. The memorandum is truly professional, logical and easy to follow. 8 - 10 Marks