Assignment: Data Analytics Case (Written)

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Course: *BUS 312*
Title: *Data Literacy for Business* (3 units)

"The skill of writing is to create a context in which other people can think."
---Edwin Schlossberg (1945-)

Goal

The purposes of this assignment are as follows:

- To analyze data related to a dataset with breadth and depth
- To identify one or more important business issues exhibited in the data
- To draw out ethical issues of importance related to this data
- To use skills, knowledge, abilities from this course and prior courses
- To make actionable recommendations to leverage opportunities and overcome obstacles
- To continuously improve the practice of writtens in substantive business contexts

Instructions

In general, your team's task is to analyze a dataset, and the ethical issues that might arise in the dataset or the related business contexts. Essentially, your team is analyzing key data issues.

Both team composition and selection of a dataset/question will be done before the middle of the semester. Each person in each team must contribute both to the analytics and to the writing.

The purpose of this document is to enumerate the requirements for the written case assignment in this course, except as indicated differently by the instructor in class. Teams will lose points for not following the instructions below. Some work deliverables have a wide degree of flexibility in structure (for example, in internal management or brainstorming marketing contexts). However, many work deliverables have little or no flexibility in structure (for example, in accounting and law contexts). The written deliverable in BUS 312 is designed in such a way to provide ample practice with both of these two types of composition.

The order of presentation in this document is the order the sections should appear in the written case reports.

Deliverable

The due date is listed on the course outline. The written deliverable must be printed and delivered to the instructor at the beginning of class on the due date. Color is preferred but Black

and White is acceptable. Single-sided print is preferred but double-sided print is acceptable. Before that due date, there should be enough time in or out of class to go over any questions your team may have.

Each written case must be submitted electronically via Canvas no later than 1 hour before the class begins. The Canvas site will have two "assignments". The first consists of the full, written case report. This first file consists of a single file and that file must be the same document that will be submitted in printed form. The file format is to be MS-Word (.docx or .doc) or PDF (.pdf). There are many choices in word processors, and they all export to an MS-Word file. The second file consists of each mathematical (accounting, finance, operations, economics, and statistics) calculation or quantitative procedure that is needed and/or appears in the written report. This second file must consist of a single spreadsheet file (Excel workbook). The file format is to be MS-Excel (.xlsx or .xls). This Excel workbook should be well-designed, including separate cells for constants (i.e., not manually-entered in formulas—called "hardcoding"), and liberal use of multiple "worksheets" inside the single "workbook" that link various parts of the analyses together. In principle, the Excel workbook should 1), be literate to a reader (including documenting cells and identifying key rows and columns clearly), and 2), be re-usable by both the team and others as needed in the future.

Strong teams will incorporate these immutable deliverable requirements into their planning structures.

Length

The "Main Body" of the written deliverable must be no less than ten (10) pages and no more than twenty (20) pages (not including the cover page, cover letter, executive summary, references, or appendices). The written deliverable may include an Appendix if more pages are necessary.

The main body is the central part of the document. Follow the scoring rubric in Excel. These guidelines should be used in order to be consistent with 1), other teams in this course section, and 2), practice for a wide variety of deliverables in a student's academic and professional future.

For BUS 312 written reports, generally follow the structure and content of the scoring rubric in Excel. Do not use the chapter titles verbatim as the section headings. Create your own section headings that are more relevant to your individual work. Individual, specific questions are raised and analyzed in sections. Please make sure these questions are clearly identified and addressed. Use section headings and sub-section headings to delineate specific parts of the report. In fact, during drafting, it's not a bad idea to have a paragraph heading (that is, from your outline) for each paragraph—then, later, you can just remove the paragraph headings if you feel the topic sentence in the paragraph is sufficient. Another advantage of this approach is that it helps not to inadvertently miss any part of the scoring rubric.

Document Binding

Each written report must be submitted as a single unit. There should be a single staple in the upper-left hand corner of the document. If the document contains too many pages to be stapled reliably, then teams can use a binder clip (9/16" or 3/4" in size) in the upper-left hand corner of the document.

Scoring

There will be 100 points allocated for breadth and depth of content. There will be 100 points allocated for language use and grammar.

Context, Resources, and Audience

The following is excerpted and adapted from Professor Roger Peng's writings at:

https://leanpub.com/dataanalysisessays

The three key aspects of data analysis are context, resources, and audience.

The context of a problem covers many factors, including the question that gave rise to the dataset and the motivations of the people asking the questions. Understanding what kind of solution needs to be created and what kind of answer might be useful is a key part of the context. Datasets and statistical methods can be deemed useful or not based solely on the context of a problem. Data analysts must make an effort to understand the context of a problem in order to develop a complete understanding of the problem. Getting a better understanding of the context may require communicating with subject matter experts or other people involved in posing the question.

Every data analysis is conducted with a limited set of resources. The resources available determine the completeness and complexity of the solution developed. The most critical resource for a data analyst is time, but computing power, technology, and money also play a critical role Understanding what resources were available when a data analysis was done allows us to evaluate the quality of an analysis relative to what else could have been done.

Who is this data analysis for? Every data analysis has an audience, even if it is the data analyst alone. Knowing who the audience is and what they need is important for determining whether an analysis is successful or not. Further, if one considers data analysis has a rhetorical activity, then it can be important to understand how an audience receives information and evidence. Many factors can play a role here, including cultural differences, differences in background knowledge, and technical proficiency. While it may not be possible for a data analyst to know all of these things as an analysis is being conducted, the analyst must make a reasonable attempt to obtain this information.

Content elements

Cover Page

Each written case report must have a cover page. There is no single "one" format for this page; in fact, some teams may choose a more professional format and some teams may choose a more creative format. Some teams do both because they view a distinctive cover page as a key element of their teams' (i.e., firm's) "branding". Either is acceptable, as long as the following information is clearly identifiable—team number (and team name, if applicable), all of the team members' names (with the last name underlined), class # (or day/time identification), case name, and due date. If a team member did not contribute to the written report, then next to her or his name write "did not contribute".

Important: If a team member did no work on the written then next to her/his name write "(student did no work)". That student will receive a score of zero on both the content elements and written elements of the written. If a student did weak work on the written then next to her/his name write "(student did weak work)". This student will receive a score no higher than 50% of the team's written score on both the content elements and written elements.

The cover page must not have a page number.

Cover Letter

Each written case report must have a cover letter. In general, the cover letter is written in a simple "memorandum" (or formal email) format. The "Date:" is due date. The "To:" will be to the instructor. The "From" will be your team number (or team name). The "Subject:" is the name of the firm. The cover letter should consist of a two brief paragraphs. The first paragraph indicates the general nature of the case (two sentence summary) and what you did to analyze the case (again, a two-sentence summary—for example, "our team consisted of professionals with complementary backgrounds," or "we analyzed the facts and issues of the case, including potential strategic and ethical implications." The second paragraph should be an expression of gratitude, such as "It was our pleasure to work with your firm on this case; please do not hesitate to contact us if you require more information." There is no single "one" format for this page. The cover letter is similar to a "transmittal letter" as taught in traditional business communications courses.

The cover letter must not exceed one page. The cover letter must not have a page number.

Table of Contents

Each written case report must have a table of contents. Every section of the team report, (but not the cover page, not the cover letter, and not the table of contents), should be included in the table of contents. It is likely that the "main body" section of the report will probably have three or more sub-sections, and these too should be in the table of contents (appropriately indented). Each section or sub-section should be appropriate. For example, "Question 1" is too short and uninformative. Repeating the full and complete question to be answered is likely far too long. Something such as "Potential Liability for Negligence" might be appropriate. The same is true for sub-headings as well. Also, ensure that the headings in the table of contents match the headings/titles in the main body (e.g., "strategic considerations" doesn't match "strategy consideration").

Each section should be numbered. The section numbers in the report should use Roman numerals (e.g, "Section IV."), but may alternatively use Arabic numbers (e.g., "Section 1") as the team desires. The page numbers must use Arabic numbers (e.g., "12") for all page numbers. The table of contents must use standard "dot leaders" to connect the section name with the section page number, and the page numbers must be "decimal-aligned" (since the page numbers are all integers, "decimal-aligned" is equivalent to "right-aligned"). Learn how to use the formatting features of your word processor.

The table of contents should be at least one-half of a page but must not exceed one page. In general, using more of the space in the table of contents is better than using less of the space in the table of contents. The table of contents must not have a page number.

Executive Summary

Each written report must have an executive summary page. This page must have either two or three paragraphs. In the three paragraph format, the first paragraph is a brief summary of the material issues in the case, the second paragraph is a brief summary of the kinds of analyses your team performed, and the third paragraph is a brief summary of the key recommendations. In the two paragraph format, the issues and the analyses would likely be combined into a single paragraph, and the recommendations are in the following paragraph. Some teams may even elect to put the key recommendations in the first paragraph because they are, in effect, the most important.

The executive summary must not exceed one page. The executive summary page must have a page number.

Main Body

In general, the structure of the content ("main body") of the written deliverable is to follow the general outline and sequence of the scoring rubric. Use your own words, and not textbook chapter titles. Apply the concepts from the textbook chapters and other materials from class that help your team analyze the data and address the business question. In addition, of course, to material from this course, this assignment builds upon ideas from several general education, lower-division core, and upper division courses.

Use a "References" (or "Works Cited") page. Make sure your team also uses "In-Text" Citations as well.

Introduction

Provide an introduction and overview of each member of the team. What skills, knowledge, and abilities does each team member bring to the team? How do those skills, knowledge, and ability contribute to a business decision or use data? Which skills, knowledge, or abilities are from education and which are from experience?

Provide an introduction and overview of the case choice. Why was it selected? What were the other topics considered? What was interesting about those other topics not selected?

Summarize two non-class articles broadly related to the topic. The articles must come from one of the sources listed at the end of this document.

Provide an introduction and overview of the dataset. Summarize the data including its relevance and source.

Descriptive-level Analytics

An analytical workflow begins elementary analysis that simply describes the data in various ways—usually summary tables and graphs (charts). Descriptive Analytics doesn't answer questions; Descriptive Analytics often raises questions or revises initial questions.

Visualization

Your analysis must include at least four graphs. At least one of the graphs must be a histogram. The graphs must be labeled correctly, including appropriate x- and y-axis labels, and titles. Practice making sure the graphs are situated correctly in the written and can be seen well in the presentation.

Exploratory Analysis

Your analysis team must provide two different exploratory analyses. For example, one exploratory analysis can be on one field (column) and another exploratory analysis can be on another field. Or, each exploratory analysis can be on two different datasets. Follow the process we used in class, and learned in your elementary business statistics class, to summarize the central tendency (e.g., mean or median) and dispersion (e.g., range or standard deviation) of a field (this is sometimes called "univariate" analysis). You must also provide at least one frequency distribution (i.e., a table of counts or cross-tabulations). A frequency distribution enables a summary view of the entire field as classified by certain categories.

Preliminary, Interesting Information

What preliminary information did the team discern from the visualization and exploratory analysis? What questions does it raise? Which ones are the most important?

Diagnostic-level Analytics

An analytical workflow continues with digging deeper into one or more questions. In particular, we need to use hypothesis testing to "rule out" randomness. That is, we want to have some confidence that data we see is more than just being random.

Decision, Question, or Issue

What decision, question, or issue do you want to analyze? Of all of the possible questions that your team might want to ask, why is this one the most important?

Justify your question. Your team must use at least one idea from the four upper-division core courses (i.e., FIN 303, MGT 360, MKT 304, or SOM 306); or, at least one idea from five of the six lower-division core courses (i.e., Principles of Financial Accounting, Principles of Managerial Accounting, Principles of Micro-Economics, Principles of Macro-Economics, Business Law—we'll exclude Business Statistics). See Sources for LDC/UDC concepts (below). In addition, your team members' own textbooks and course materials, and the textbooks on reserve in the Oviatt Library Reserve Bookroom may be helpful.

Explanatory Analysis

Perform and explain a complete Hypothesis Test (e.g., a two-sample t-test). Perform and explain a complete Confidence Interval. In general, a hypothesis test and a confidence interval support each other. This confirms, or explains, your data in the context of the question.

Compelling Finding

What compelling finding can you conclude from the results of the Hypothesis Test and Confidence Interval?

Predictive-level Analytics

An analytical workflow continues even further with digging deeper into one or more questions. In particular, we would like to forecast some new information. This is done by using the existing information. You will use a regression of some type.

Decision, Question, or Issue

What decision, question, or issue do you want to analyze? The question is going to be different from the diagnostic analysis but it can come from the same or similar dataset. Of all of the possible questions that your team might want to ask, why is this one the most important? Since this is different part of the analysis, and a different question, it requires a different kind of analysis.

Justify your question. Your team must use at least one idea from the four upper-division core courses (i.e., FIN 303, MGT 360, MKT 304, or SOM 306); or, at least one idea from five of the six lower-division core courses (i.e., Principles of Financial Accounting, Principles of Managerial Accounting, Principles of Micro-Economics, Principles of Macro-Economics, Business Law—we'll exclude Business Statistics). See Sources for LDC/UDC concepts (below). In addition, your team members' own textbooks and course materials, and the textbooks on reserve in the Oviatt Library Reserve Bookroom may be helpful.

Forecast Analysis

Perform a Correlation Analysis (this is sometimes called "bivariate" analysis). Additionally, perform a Regression Analysis. You can use either simple (single x-value) linear regression or multiple (more than one x-value) linear regression. Remember to clearly understand the slope and intercept, and R-squared, well.

Compelling Finding

What compelling finding can you conclude from the results of the Correlation Analysis and the Regression Analysis?

Ethical Analysis

Discuss at least one ethical issue that arises in your team's analysis of your selected dataset.

ESG or U.N. Global Compact Classification

Ethical issues can be broad and expansive but to analyze them, much less make actionable recommendations, need to be clear and explicit. Classify the ethical issue or issues. 1), Your team can use one or more of the four U.N. Global Compact categories (Human Rights, Labor, Environment, or Anti-Corruption) that we discussed briefly in class. Which category does your issue or issues fall into? Be specific. Which principle in which category does your team feel applies the most?

https://www.unglobalcompact.org/what-is-gc/mission/principles

Or, 2), Your team can use one or more of the three Environmental, Social, or Governance (ESG) categories that we discussed briefly in class. Which category does your issue or issues fall into? Again, be specific. Which specific element in which category does your team feel applies the most?

https://research.ftserussell.com/products/downloads/ESG-ratings-overview.pdf

Normative Ethics

CSR theory, in turn, is based up Normative Ethics. Normative means "should". Your team must use at least one ethical theory (Utilitarianism, Deontology, Nicomachean, Rights, or Justice, but not CSR because that was in the prior section) from the "Ethical Decision-making" presentation in the "Assumptions I'll Make About You" section of the first day's class.

https://ocw.smithw.org/mgt360/ethical-thinking-ws-short.pptx

Additionally, make any reasonable counter-argument that your team feels is appropriate. You do this by using a different ethical *theory*. Again, draw upon the theories in our class "Ethical Decision-Making" reading (above).

Conclusions

Provide any Recommendations or "Actionable Insights" that you feel are appropriate. The "recommendations" section is where a team gets to repeat key findings (and limitations, if necessary), support or challenge conclusions, and perhaps most importantly, offer suggestions and reasoned opinions. Don't be "wishy-washy" (i.e., equivocal or "on-the-fence"); make deliberate and actionable recommendations that your team feels that it can defend comfortably and publicly. Organizations *want* your team's perspective; it's just that your opinions don't have any value until *after* you have done prior, sufficient technical analysis, including ethical considerations.

Also, no analysis is ever fully complete. Describe possible limitations of your team as appropriate. Might the team have suffered from one or more cognitive biases (a good list is available on Wikipedia). Could you have benefitted from a specialist from a different discipline? Essentially, what might be important but you know you are missing it?

Describe possible limitations of the data. What additional *quantitative* data might be useful for future work? Does it is exist and you didn't have time? Do you even know if the data exists at all?

The "recommendations" section is to be no less than one-half full page and no more than one full page. Each page in the "recommendations" section must have a page number.

Appendices

Each written report may have one or more appendices. There is no single "one" format for the appendix. Often the appendix contains additional calculations or tables that are too detailed or too abstruse for the "main body". Occasionally, an appendix is useful in cases whether the maximum number of body has been reached. There is neither a minimum nor a maximum number of pages for the appendix. Each page in each appendix must have a page number.

Written elements

Formatting

Use only double space. You can choose to indent paragraphs if you like. Use 1" inch margins (top, bottom, left, and right).

Grammatical Person

The written document must be written in the *third-person*. Whenever possible, avoid using first-person singular ("I") or second-person ("You"). This helps promote consistency—both within and among cases—and overall objectivity. First-person plural ("We") is acceptable when referring to the team itself.

In-text ("in-line") Citations

Each written case report will have a number of in-text ("in-line") citations. Each theory, concept, or idea that is not solely the work of a team needs to be cited. In BUS 312 data analysis, there will likely be at least a half-dozen citations. The reference page is also sometimes called a "Works Cited" page. Either title is fine. The use of the APA style guide for formatting requirements is preferable, but MLA style is acceptable as well (as long as the year is provided in in-text citation).

References ("Works Cited")

Each written report must have a reference page(s). The reference page is also sometimes called a "Works Cited" page. Either title is fine. The use of the APA style guide for formatting requirements is preferable, but MLA style is acceptable as well (as long as the year is provided in the reference). Each in-text citation will point to *one and only one* reference.

The "references" section can be any number of pages. The reference page(s) must have a page number.

References ("Works Cited")

Each written report must have a reference page(s). The reference page is also sometimes called a "Works Cited" page. Either title is fine. The use of the APA style guide for formatting requirements is preferable, but MLA style is acceptable as well (as long as the year is provided in the reference). Each in-text citation will point to *one and only one* reference.

The "references" section can be any number of pages. The reference page(s) must have a page number.

Sources for Non-Class Article

The sources for the articles for this class will be drawn from the following set:

- Newspapers (Dailies)
    - Los Angeles Times
    - New York Times
    - The (London) Times
    - Wall Street Journal
    - Financial Times

- Magazines (Weeklies or Monthlies)
    - The Economist
    - Bloomberg BusinessWeek
    - Forbes
    - Fortune

- Barron's

These sources embody a high degree of investigative journalism regarding business-related activities. To make a strong analogy, you want sources that emphasize authority, educational value, intent, originality, and quality. If you want to use something else, it must be approved by me in advance (it's possible, but have a back-up plan just in case).

Sources for LDC/UDC Concepts

FIN 303 – Financial Management
http://www.csun.edu/~jpd45767/303/fin303.html

MGT 360 – Management and Organizational Behavior
https://openstax.org/details/books/principles-management (MGT)
https://openstax.org/details/books/organizational-behavior (OB)
https://ocw.smithw.org/mgt360/textbook/carpenter.pdf (MGT/OB)

MKT 304 – Marketing Management
https://open.umn.edu/opentextbooks/textbooks/principles-of-marketing

SOM 306 – Operations Management
http://www.csun.edu/~vcmgt0j3/SOM306.html

In addition to your own textbooks and course materials, and the textbooks on reserve in the Oviatt Library Reserve Bookroom, the following textbooks may also be useful.

ACCT 220 – Introduction to Financial Accounting
https://open.umn.edu/opentextbooks/textbooks/4

ACCT 230 – Introduction to Managerial Accounting
https://open.umn.edu/opentextbooks/textbooks/137

ECON 160 – Principles of Microeconomics
https://openstax.org/details/books/principles-microeconomics-2e

ECON 161 – Principles of Macroeconomics
https://openstax.org/details/books/principles-macroeconomics-2e

BLAW 280 – Business Law I
https://saylordotorg.github.io/text_foundations-of-business-law-and-the-legal-environment/

Possible Sources for Quantitative Reasoning

A good start for data is the Business Databases available via the Library:

https://libguides.csun.edu/bus/library-databases

The FRED database is good for macro-level data. It's run by the Federal Reserve Bank in St. Louis:

https://libguides.csun.edu/az.php?a=f

Data-Planet is well-organized (hierarchical) system of data that helps with various kinds of business, political, and social queries, with results that can be filtered by year and region.:

https://libguides.csun.edu/az.php?a=d

Remember too that for general, broad information, the U.S. Census (data.census.gov) can be quite helpful, especially for demographic data and trends (formerly known as the American Fact Finder):

https://libguides.csun.edu/az.php?a=d

Mergent Online also provides extensive information on companies and their competitors. It provides more firm information than what is required by the Securities and Exchange Commission (SEC) and can then therefore do industry-level analyses:

https://libguides.csun.edu/az.php?a=m

IBISWorld provides some of the best publicly available data on industries and markets. IBISWorld combines public- and private-data together for industry-by-industry analyses:

https://library.calstate.edu/northridge/databases/alphabetical?alpha=I

One CSUN-provided database for company stock prices is Y-Charts. Y-Charts is useful for accessing stock prices, among other things:

https://library.calstate.edu/northridge/databases/alphabetical?alpha=Y

Another CSUN-provided database is CalcBench. CalcBench is useful for accessing publicly-held financial statements. The source of this database is the SEC EDGAR system, however the web interface and usability is much improved over the standard EDGAR web interface:

https://library.calstate.edu/northridge/databases/alphabetical?alpha=C

The CSUN Library provides links to additional statistical data as well:

https://library.calstate.edu/northridge/databases/subject/statistical-data

Other sources of quality data that students have found useful in the past are:

https://WSJMarkets.com/

https://google.com/finance

https://yahoo.com/finance

https://www.theharrispoll.com

https://www.statista.com/

https://www.axios.com

Tips for Quantitative Reasoning

Data Literacy, Analytics, and Analysis are a start but they, by themselves, are incomplete. Look for trends and patterns. What are you comparing and contrasting? Just solely in the area of organizational performance, there are at least five major kinds of performance evaluation:

Improvement
: Comparing current performance with past performance.

Comparative
: Comparing current performance to the performance of peers.

Goal
: Comparing current performance to the performance stated in a clear/explicit goal.

Ideal
: Comparing current performance to an ideal or perfect performance.

Stakeholder
: Comparing current performance to the expectations of one or more stakeholders.

You'll most likely rely on financial statements but there are other kinds of data too (e.g., marketing, operations, management). Recall the "Balanced Scorecard" (examples on Wikipedia). You must make a conscious decision to exclude one of these. Be prepared to justify your answer.

Just understanding data is difficult. *Data* is raw, *Information* is meaningful data, *Knowledge* combines explicit information with tacit information, and *Wisdom* is extraordinary insight or foresight. In your quantitative reasoning, can you distinguish between these in a clear way; that is, clear in the eyes of the decision-makers (audience)?

Which parts of your analysis are relatively *objective* (fact-based, education-based, primary-sources, first-person)? Which parts are relatively *subjective* (intuition-based, experience-based, secondary-sources, third-party)?

Are you *explaining* or *predicting*? Both are about understanding, however, explanations are of the recent past, and predictions are about the near future. Both are important but require different kinds of analytical techniques (the former, perhaps, hypothesis testing; the latter, perhaps, linear regression).

Are you *modeling* or *judging*? You develop models when you have some data; you use judgment when you don't have much data.

How have you maximized *rationality* and/or minimized *uncertainty* in the eyes of decision-makers? How have you leveraged *serendipity* and/or controlled *complexity*, again, in the eyes of the decision-makers?

Have you discussed *reward* and *risk* in the same context? One without the other will lead to weak results. Have you discussed *measurement* and *management* in the same context? One without the other is ineffective.