Assignment brief: You are acting as an analytics consultant to fast-growing SMEs that wish to incorporate Business Intelligence, Analytics, and elements typically found in emerging technology frameworks to improve the business performance of the companies, or generally improve the decisions taken by these firms. Using data sets that the SMEs are providing you with and materials found on Moodle or further suggested readings, make suggestions and advise your clients based on the questions found in each exercise below. Remember that your clients are not familiar with statistical analysis so your presentation should reflect this and use simple language to explain your results.

Task: Create a brief presentation that answers the questions found within each of the case studies below. The total length of your presentation should not exceed 15 minutes (it can be shorter than this) and should include the graphs you produce. At the end of the slide pack accompanying your presentation, you should include slides containing the commands you executed in R to get your results and/or the screenshots of your results. You do not need to include these slides in your presentation; they are simply there to check that you have run the R code correctly. You should submit an mp4 file of your presentation and a copy of the slides used in your presentation (including the end slides containing the commands).

Plagiarism: Students are reminded of the need to avoid plagiarism. Any student suspected of plagiarising will be referred to the Head of Undergraduate Programmes and an Academic Misconduct Hearing will be arranged.

You are acting as a consultant to an SME that would like to choose a mix of strategies in how it manages its finances to improve its profitability. Your client has complete lack of knowledge in financial management and tries to run her business based on her previous experience. Having access to balance sheets and income statements of firms in the vicinity, you are able to help the manager find patterns in the data of how other firms manage their profitability, and disentangle the relationships between profitability (as proxied by return on assets: *ROA*), liquidity (as proxied by *Current Ratio*), revenue efficiency (as proxied by *Operating Margin*) and debt ratio (as proxied by long-term *leverage*).

Instructions

- *Download the file "SME Exercise1.xls" from Moodle. Use Microsoft Excel or other visualisation software to produce suitable charts illustrating the distribution of ROA, and the relationship of ROA with the other three measures. Include these in your presentation, along with descriptive statistics for ROA and a reflections on the shape of the distribution and the strength and nature of any linear relationships with the other three measures.*

- *Load dataset "SME Exercise1.xls" into RStudio*

- *Fit the following log-log model:*
  $$log(ROAi) = a + b1\,log(CurrentRatio) + b2\,log(OperatingMargin) + b3\,log(Leverage)$$

- *Ensure that your presentation includes discussion of the following:*
  a) *Discuss how the regression model can provide valid insights to the firm.*
  b) *State if the coefficients are statistically significant and what this means.*
  c) *Having a transformed (i.e. log-log) model, explain to the firm manager what do the b1…b3 coefficients denote in this case?*
  d) *Discuss their interpretation in this particular example.*
  e) *The firm in question had losses last year and wants to use cash to cover those. Explain to the manager, what would you expect to happen to his firm's profitability (ROA) if Liquidity (Current Ratio) was to decrease by 5%?*
  f) *So far, you've provided good insights to the manager, but what is the goodness of fit of this model? What does it show? Explain to the manager in simple terms.*