Case study 2: Performance Lawn Equipment

In reviewing the PLE data, Elizabeth Burke noticed that defects received from suppliers have decreased (worksheet *Defects after Delivery*). Upon investigation, she learned that in 2010, PLE experienced some quality problems due to an increasing number of defects in materials received from suppliers. The company instituted an initiative in August 2011 to work with suppliers to reduce these defects, to more closely coordinate deliveries, and to improve materials quality through reengineering supplier production policies. Elizabeth noted that the program appeared to reverse an increasing trend in defects; she would like to predict what might have happened had the supplier initiative not been implemented and how the number of defects might further be reduced in the near future.

In meeting with PLE's human resources director, Elizabeth also discovered a concern about the high rate of turnover in its field service staff. Senior managers have suggested that the department look closer at its recruiting policies, particularly to try to identify the characteristics of individuals that lead to greater retention. However, in a recent staff meeting, HR managers could not agree on these characteristics. Some argued that years of education and grade point averages were good predictors. Others argued that hiring more mature applicants would lead to greater retention. To study these factors, the staff agreed to conduct a statistical study to determine the effect that years of education, college grade point average, and age when hired have on retention. A sample of 40 field service engineers hired 10 years ago was selected to determine the influence of these variables on how long each individual stayed with the company. Data are compiled in the *Employee Retention* worksheet.

Finally, as part of its efforts to remain competitive, PLE tries to keep up with the latest in production technology. This is especially important in the highly competitive lawn-mower line, where competitors can gain a real advantage if they develop more cost-effective means of production. The lawn-mower division therefore spends a great deal of effort in testing new technology. When new production technology is introduced, firms often experience learning, resulting in a gradual decrease in the time required to produce successive units. Generally, the rate of improvement declines until the production time levels off. One example is the production of a new design for lawn-mower engines. To determine the time required to produce these engines, PLE produced 50 units on its production line; test results are given on the worksheet *Engines* in the database. Because PLE is continually developing new technology, understanding the rate of learning can be useful in estimating future production costs without having to run extensive prototype trials, and Elizabeth would like a better handle on this.

Use predictive analytical techniques (regression analysis) to assist Elizabeth to evaluate the data in these three worksheets and reach useful conclusions about

1. What might have happened had the supplier initiative not been implemented?

2. How the number of defects might further be reduced in the near future?

3. Determine the influence of the years of education, college grade point average, and age when hired have on how long each individual stayed with the company (retention).

4. Because PLE is continually developing new technology, Elizabeth will like to be able to estimate future production costs using the rate of leaning, without having to run extensive prototype trials.

– PLEASE SUBMIT YOUR REPORT AS A PDF.

- PLEASE ATTACH YOUR EXCEL SPREADSHEET SHOWING THE REGRESSION ANALYSES YOU USED TO COME TO THE CONCLUSIONS FOR EACH OF THE QUESTIONS