

# Regional Business Confidence

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(ASSIGNMENT 2)

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## MEMORANDUM

**To:** Ballarat City Council

**From:** Nick Black

**Subject:** Results of further analysis of Business Confidence and expectation.

Concerned Representative,

After executing a careful analysis, we have arrived at the following results (with respect to summary of the sample data and the desired information requested):

**1) Summary of the Sample Data:**

- A total of 4,504 people are employed in 150 businesses across 8 industries.
- On an average a business **employs 30 people**.
- However, **due to large variations in number of employees in different businesses**, average is not a true representative of the data. The lowest number of employees in a business is **1 employee** while the highest number of employees in a business is **308 employees**, therefore, a figure of '30 employees on average' fails to encapsulate these figures.
- An important aspect of the data is that 70% businesses employ 25 people or less while only 9 businesses employ more than 100 employees, out of which 6 such businesses have more than 200 employees. Therefore, it is safe to say that **businesses in your region tend to have lesser employees** while only a **handful of businesses hire 200 or more employees**.
- Maximum number of people (1,212) are employed in the '*Business professional and commercial services*' and minimum number of people (98) are employed in the '*Primary industries*'. On average an industry employs 563 people.

**2) We are 95% confident that the proportion of businesses in *Ballarat* that have a growth strategy lies between 64.10% and 78.57%.**

**3)**

- (a) With a margin of error of 5%, there is **insufficient evidence to conclude** that the proportion of *Ballarat's* local businesses that do have a growth strategy is **less than 76%** and therefore it cannot be said that the revenue generated in the region is **being affected** (Assuming that the relation suggested by *The Creswick/Clunes Chamber of Commerce* about presence of a growth strategy in a business and revenue generation is accurate.).
- (b) We are 95% confident that in the Ballarat region, the average number of employees:
- (i) in businesses with a growth strategy is **somewhere between 24 and 46 employees**.
  - (ii) and in businesses without a growth strategy is **somewhere between 6 and 31 employees**.

There is a significant overlap between the above two ranges. Therefore, we conclude that **businesses with a growth strategy do not have a higher number of employees on average than businesses without a growth strategy.** Furthermore, the above results suggest that the mentioned categories of business do not differ in their level of success as well (Assuming that a higher number of employees in a business is directly or indirectly an indication of success).

**4) After analysing the data, I can say that there is **insufficient evidence** to conclude that the average age of your local business managers is **less than 50 years**, with a margin of error of 5%.**

5) Considering 10 businesses open in the Ballarat region annually, following estimations have been made:

(a) The likelihood that more than 15 businesses will open next year in Ballarat is **4.8%**. Therefore, it is unlikely, though possible, that the number of businesses opening in Ballarat exceeds 15 businesses next year.

(b) The likelihood that five or less businesses will open next year in Ballarat is **6.7%**. In this case too, it is unlikely that the Ballarat region will have five or less new businesses next year.

6) For the next year's survey, we are 95% confident that:

(a) A sample size of **697** businesses will be needed to estimate the average number of people employed by local businesses **within 4 employees**.

(b) A sample size of **1,965** businesses is needed to estimate the proportion of businesses with a growth strategy **within 2%**.

If, a single sample size is to be selected that provides both your desired estimates with the needed precision, I would recommend conducting **a survey of 1,965 businesses next year**.

I hope the above results give you a better perspective about your local businesses.

Regards,  
Nick Black

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