

Chapter 3
Research
Methodology

"A study of Financial Competency of Selected Brass Industry of Jamnagar District."

Sr. No.	Research Methodology	Page No
3.1	Introduction	123
3.2	Meaning of Research	123
3.3	Statement of Problem	124
3.4	Geographical Area	124
3.5	Sample of Industry under study	124
3.6	Objectives of the Study	125
3.7	Significance of the study	125
	3.7.1 Contribution to Creditors	125
	3.7.2 Contribution to Debt Providers	125
	3.7.3 Investors	126
	3.7.4 Management	126
3.8	Type of study	127
3.9	Area and Scope of the Study	127
3.10	Hypothesis	128
3.11	Limitation	129
3.12	Data Collection	129
3.13	Tools & Techniques	130
3.14	Panel data collection	130
3.15	Brief Overview of Study	139
3.16	Chapter Plan	141
3.17	References	142

3.1 Introduction

It is a world of information, and all are surrounded by data of various fields and in various forms. Sometimes it happens that what seems apparently in form of data may not be the actual picture. By correlating variety of data one may get a different picture. The conclusions may differ from what we predict by just looking at a glance. So availability of data may not be a big issue in this world of information technology but applying an appropriate analytical tool, correlating meaningful variables and deriving proper judgments are more important. This process of searching real knowledge and deriving judgments from the available data is research. In every field research has its own place. Research is a journey from known to unknown. It is a scientific way to develop insight in any field.

3.1 Meaning of Research

Various authors have defined research as follows:

- 1) Redman and Mory define research as a “Systematized effort to gain new knowledge.”¹
- 2) D. Slesinger and M. Stephenson defines research as “The manipulation of things, concepts or symbols for the purpose of generalising to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art.”²
- 3) The Advanced Learner’s Dictionary of Current English : “A careful investigation or inquiry specially through search for new facts in any branch of knowledge.”³

By studying the above definitions it can be said that research is a process in which a careful investigation is undertaken. It is the scientific way to know the truth. Hypothesis are defined before conducting a research and verified scientifically later. This process adds originality in the available knowledge and enhancing the literature by making the innovative conclusions and generalizations to the subject area. The process may lead to some useful solutions for the available problem. It is all inquisitiveness of researcher what makes a research complete and utilitarian.

"A study of Financial Competency of Selected Brass Industry of Jamnagar District."

3.2 Statement of Problem

The brass industry in Jamnagar faces stiff competition from Chinese manufacturers, with challenges stemming from a shortage of skilled labor, limited capital, outdated technology, and high excise duties on imported scrap used as raw material. Additionally, recent tax reforms have increased costs, while fluctuating exchange rates affect businesses dependent on imported brass scrap. This study aims to examine how these factors impact the financial operations of Jamnagar's brass industry.

The statement of problem will be as follows:

“A study of Financial Competency of Selected Brass Industry of Jamnagar District”

This research will focus on attributes of various financial competency belong to different brass industries. This study will include relationship of brass industry attributes with various factors like economic background, financial background, political; circumstances and social status.

3.3 Geographical Area

As defined in the problem, the study will be conducted on the brass industries of Jamnagar region of Gujarat state.

3.4 Sample of Industries under study

Various industries are developed in Jamnagar region of Gujarat state. From that brass industries are selected by the researcher for study.

3.6 Objectives of the study

The objectives of the research can be explained as below:

- **Analyze the financial competency of the brass industry in Jamnagar.**
- **Study the financial performance of the brass industry.**
- **Examine the working capital position.**
- **Evaluate the profitability, liquidity, and solvency positions.**
- **Analyze the debt-equity ratio.**
- **Assess the overall financial standing of the brass industry.**

3.7 Significance:

The significance of this study can be classified in the following classes.

Trade Creditors:

These creditors supply goods or services on credit to a company and are primarily concerned with the firm's ability to repay its debts. Their primary focus is on the liquidity of the business, ensuring that the company can meet its short-term obligations. For them, financial performance is measured by the company's liquidity position, as it directly impacts their ability to recover their money.

Long-Term Debt Providers:

These financiers provide funds for ongoing operations or expansion projects, and their focus is on the firm's long-term viability and financial stability. Their confidence is crucial, as they are investing for an extended period. The key financial performance indicators for them include:

- The company's profitability over time,
- Its ability to generate enough cash to pay interest,
- Its ability to generate cash to repay the principal amount,
- The relationship between different sources of funding.

"A study of Financial Competency of Selected Brass Industry of Jamnagar District."

While these creditors examine historical financial statements, they also rely on projected financial performance based on anticipated capacity expansion, production levels, and market trends affecting raw materials and finished goods prices.

Investors:

Investors, who put their money into a company's equity share capital, are particularly concerned with financial performance. Having taken on the risk of investment, they expect positive returns. Investors closely monitor the company's consistent earnings growth, and evaluate its current and future profitability, revenue streams, and risk levels to make informed decisions.

Management:

A company's management team is highly invested in financial analysis, as it is their responsibility to ensure efficient resource utilization. Management strives to maintain a balance between asset-liability management, risk management, and both short-term and long-term solvency. Their goal is to optimize the company's financial health while addressing both operational and financial risks.

3.8 Type of study:

Research Methodology

This research employs a descriptive approach, followed by ratio analysis as the primary tool for data interpretation.

1. Descriptive Research: This method involves observing, describing, and documenting existing conditions. It can utilize both qualitative and quantitative techniques, and the goal is to uncover new facts and meanings. Descriptive research stands out because it deals with a large quantity of variables that are systematically tallied and analyzed, offering comprehensive insights into the subject matter.

Tools and techniques used: The following two types of Tools and Techniques of Analysis have been used: (A) Accounting Techniques (B) Statistical Techniques

1.1 Accounting techniques: Ratio Analysis

1.2 Statistical techniques:

- 1) PANEL DATA Regression Model
- 2) T-Test
- 3) F-Test (ANNOVA Analysis)

3.9 Area and Scope of the Study

- 1) The geographic area of our study will be Jamnagar region of Gujarat state.
- 2) In this survey only small scale / medium scale industries are included.
- 3) Various types of the brass industries will be surveyed.
- 4) In this research the researcher has focused on financial performance of brass industry only. The other sides of brass industries are not focused.

3.10 Hypothesis:

- a) H0: There is no significant difference in profitability of the selected brass firms over the years
H1: There is significant difference in profitability of the selected brass firms over the years.
- b) H0: There is no significant difference in solvency of the selected brass firms over the years
H1: There is significant difference in solvency of the selected brass firms over the years.
- c) H0: There is no significant difference in liquidity of the selected brass firms over the years.
H1: There is significant difference in liquidity of the selected brass firms over the years.
- d) H0: There is no significant difference in working capital requirement of the selected brass firms over the years.
H1: There is significant difference in working capital requirement of the selected brass firms over the years.
- e) H0: There is no significant difference in Debt – equity of the selected brass firms over the years.
H1: There is significant difference in Debt – equity of the selected brass firms over the years.

"A study of Financial Competency of Selected Brass Industry of Jamnagar District."

f) H0: There is no significant difference in Overall financial competency of the selected brass firms over the years

H1: There is significant difference in Overall financial competency of the selected brass firms over the years.

g) H0: There is no significant difference in Sales of the selected brass firms over the years

H1: There is significant difference in Sales of the selected brass firms over the years.

3.11 Limitations:

1) In this research the researcher has focused on attributes of financial performance only. Any other aspect of entrepreneurship is not focused.

2) The research findings will be applicable to this area i.e. Jamnagar region of Gujarat only.

3) Since human being is also an individual, he/she may possess or may not possess certain attributes.

3.12 Data collections:

The data will be collected from both the source - primary data as well as secondary data. The primary data collection will be made on the basis of simple random sampling method.. For secondary data collection different publications, journals, magazines surveys, government documents, newspapers etc. will be used.

The study would be conducted using secondary data: The secondary data for the study will be collected from different websites, magazines, journals and Annual reports of firms

3.13 Tools & techniques:

- 1) The major tool for secondary data collection will be Ratio Analysis.
- 2) The technique will be analytical. PANEL DATA Regression Model technique will be used to analyze the data. We will also consider T-test & F-test [Analysis of Variance].

3.14 PANEL DATA REGRESSION MODEL

The theoretical concept of panel data regression is rooted in the understanding of longitudinal data structures, which involve observations on multiple entities (e.g., individuals, firms, countries) over time. This type of data structure provides researchers with rich information that can capture both cross-sectional and time-series variations, offering several advantages over purely cross-sectional or time-series data analysis. This type of data is common in economics, social sciences, and other fields where data is collected over time.

Here are some key theoretical concepts underlying panel data regression:

1. **Individual Heterogeneity:** Panel data allows researchers to account for differences in individual characteristics that remain constant over time but may affect the outcome variable. By including individual-specific fixed effects in the model, researchers can control for such heterogeneity.
2. **Time-Specific Effects:** Panel data also captures time-specific effects or factors that affect all individuals in the same way during a particular time period. These effects can be controlled for using time dummy variables or through time fixed effects.

"A study of Financial Competency of Selected Brass Industry of Jamnagar District."

3. **Dynamic Relationships:** Panel data regression models can capture dynamic relationships between variables by including lagged values of the dependent variable or other relevant variables. This allows researchers to analyze how past values influence current outcomes and to account for potential endogeneity issues.
4. **Efficiency and Power:** Panel data regression can be more efficient and powerful than cross-sectional or time-series analysis alone, as it utilizes information from both dimensions (cross-sectional and time-series). This can lead to more precise estimates and improved statistical inference.
5. **Panel Data Assumptions:** Panel data regression relies on certain assumptions, such as the absence of serial correlation, exogeneity of regressors, and stationarity of variables over time. Violations of these assumptions can lead to biased estimates and invalid inferences.
6. **Model Selection:** Choosing the appropriate panel data regression model depends on the nature of the data and the research question. Researchers may choose between fixed effects, random effects, or mixed effects models based on the presence of individual-specific effects and their correlation with explanatory variables.

Overall, panel data regression provides a flexible framework for analyzing longitudinal data, allowing researchers to account for individual heterogeneity, time-specific effects, and dynamic relationships among variables. These theoretical concepts guide the formulation and estimation of panel data regression models in empirical research.

Panel data regression models allow for the analysis of both time-series and cross-sectional variations, providing more insights compared to traditional cross-sectional or time-series analysis alone. They can capture individual heterogeneity, time-specific effects, and dynamics of the data.

"A study of Financial Competency of Selected Brass Industry of Jamnagar District."

There are several types of panel data regression models, including:

1. **Pooled OLS (Ordinary Least Squares):** This is the simplest form of panel data regression, which pools data across time and individuals. However, it does not account for individual heterogeneity or time-specific effects.
 2. **Fixed Effects Model:** This model accounts for individual-specific effects by including individual-specific dummy variables or fixed effects. It controls for time-invariant individual characteristics.
 3. **Random Effects Model:** Unlike fixed effects models, random effects models allow for individual-specific effects that are correlated with the explanatory variables. It assumes that individual-specific effects are uncorrelated with the explanatory variables.
 4. **Mixed Effects Model:** Also known as the Hierarchical Linear Model, it combines both fixed effects and random effects to account for both time-invariant individual characteristics and individual-specific effects correlated with the explanatory variables.
 5. **Dynamic Panel Data Models:** These models incorporate lagged dependent variables to capture dynamics and potential endogeneity issues.
- Each model has its assumptions and implications, and the choice of the appropriate model depends on the specific research question, the nature of the data, and the assumptions that can be reasonably made about the data-generating process.

"A study of Financial Competency of Selected Brass Industry of Jamnagar District."

❖ Uses:

1. **Accounting for Individual Heterogeneity:** Panel data regression is valuable when studying entities (individuals, firms, countries) over time, allowing researchers to control for individual-specific effects.
2. **Capturing Time-specific Effects:** It helps in understanding how time-specific factors influence outcomes across entities.
3. **Dynamic Analysis:** Panel data regression facilitates the study of dynamic relationships by incorporating lagged variables, essential for analyzing changes over time.
4. **Efficiency:** It provides more efficient estimates by utilizing both cross-sectional and time-series information.
5. **Policy Evaluation:** Useful for evaluating policy interventions over time, accounting for both individual and time effects.

❖ Assumptions:

1. **No Serial Correlation:** Assumes that error terms are not correlated across time periods for the same entity.
2. **Exogeneity:** Assumes that independent variables are not correlated with the error term.
3. **Stationarity:** Assumes that variables are stationary over time.
4. **No Perfect Multicollinearity:** Assumes that there's no perfect linear relationship among the independent variables

"A study of Financial Competency of Selected Brass Industry of Jamnagar District."

5. **Homoscedasticity:** Assumes that the variance of the error term is constant across individuals and time periods.

❖ **Properties:**

1. **Efficiency:** Panel data regression is often more efficient than cross-sectional or time-series regressions because it utilizes both types of data.

2. **Accounting for Unobserved Heterogeneity:** Can control for unobserved individual heterogeneity through fixed effects.

3. **Dynamic Analysis:** Facilitates the study of dynamic relationships by including lagged variables.

4. **Panel-specific Estimation Methods:** Specialized estimation methods like Hausman test for choosing between fixed and random effects models.

❖ **Advantages:**

1. **Control for Individual Effects:** Panel data regression controls for individual-specific effects, providing more accurate estimates.

2. **Increased Statistical Power:** Utilizes both cross-sectional and time-series variations, leading to more powerful statistical tests.

3. **Dynamic Analysis:** Allows for the examination of time dynamics, capturing changes over time.

4. **Efficiency:** Generally, provides more efficient estimates compared to cross-sectional or time-series regressions.

5. **Policy Evaluation:** Useful for evaluating policy interventions over time, considering individual and time effects.

❖ **Limitations:**

1. **Data Requirements:** Requires data with observations on the same entities over multiple time periods, which may not always be available.

2. **Endogeneity:** Similar to other regression models, endogeneity can be an issue if independent variables are correlated with the error term.

3. **Model Specification:** Choosing between fixed and random effects models can be challenging, and selecting the wrong model can lead to biased estimates.

4. **Interpretation:** Interpreting coefficients can be complex, especially in models with time dynamics and individual-specific effects.

5. **Panel Attrition:** Panel data may suffer from attrition over time, as entities drop out of the panel, potentially biasing estimates.

In summary, panel data regression models are versatile tools with numerous applications but require careful consideration of assumptions, model specification, and potential limitations in empirical research. (Greene, 2018)

❖ Implications of PANEL Data Regression:

Panel Data Regression Model examines the use of Fixed Effects (FE) models as the "default" choice for analyzing time-series-cross-sectional (TSCS) and panel data. The authors argue that understanding the within and between effects in panel data is essential when choosing an appropriate modeling strategy. Here's a breakdown of the key arguments:

1. Challenges with Fixed Effects (FE):

- The paper suggests that while Fixed Effects (FE) models are commonly used, especially in political science and economics, they may not always be the best approach for panel data analysis.
- FE models capture only within-entity variations (i.e., changes over time for each unit) and ignore between-entity differences, which may lead to incomplete interpretations in some cases.

2. Advantages of Random Effects (RE):

- Random Effects (RE) models, which consider both within-entity and between-entity variations, are presented as a more flexible alternative. These models can account for time-invariant variables and allow for more complex structures, including random coefficients and cross-level interactions.
- RE models overcome the limitations of FE models by incorporating both types of variability, which can lead to more nuanced insights about the data.

3. Omitted Variable Bias in Random Effects (RE):

- A notable disadvantage of RE models is the potential for omitted variable bias if lower-level covariates are correlated with higher-level residuals. However, this bias can be addressed using Mundlak's (1978a) formulation, which helps control for this issue and improves the robustness of the RE model.

4. Empirical Support through Simulations:

- Monte Carlo simulations are used to demonstrate that RE models can achieve the same results as FE models while offering additional benefits. The simulations also highlight the shortcomings of the Plümer and Troeger's FE Vector Decomposition method, particularly in the case of unbalanced data (where the number of observations per entity is uneven).

5. Flexibility and Substantive Context:

- One of the key advantages of RE models is their flexibility. They allow for extensions such as random coefficients, cross-level interactions, and the use of complex variance functions. This flexibility makes RE models highly suitable for datasets with multiple levels or hierarchies (e.g., individuals nested within countries, or countries nested within regions).
- The authors emphasize that RE models are not just a technical solution to endogeneity but also offer a way to better model the contextual heterogeneity in data, capturing important nuances that might be overlooked by FE models.

6. Contextual Implications:

- One of the key importance of choosing the right model based on the context of the data. It suggests that the RE model is particularly valuable in political science, but its applicability extends to other disciplines that use multilevel datasets, including education, geography, and biomedical sciences.

7. Caution with Interpretation:

- Despite their advantages, RE models are not immune to biases, especially when dealing with omitted variables that could skew the interpretation of higher-level effects. Thus, careful consideration and interpretation are required, as with any statistical model.

Conclusion:

The broadside makes a strong instance for using Random Effects (RE) models over Fixed Effects (FE) models, especially in the context of panel data or time-series cross-sectional data. While FE models are still useful in certain situations, RE models provide a more comprehensive and flexible approach to handling hierarchical data, with the ability to account for both within and between variations. However, caution is needed to avoid omitted variable bias, and appropriate techniques (such as Mundlak's formulation) should be applied to mitigate this issue. The debate between FE and RE models ultimately pivots on the specifics of the data and the research context, with the RE model offering more nuanced insights when properly applied.

This summary explains how Panel Data Models like FE and RE are used, highlighting the advantages of RE models in capturing both within- and between-entity variations and addressing issues like omitted variable bias. It also stresses the importance of context when choosing the appropriate model.

3.15 Brief Overview of this Chapter

(1) Universe of the study	Brass Industry of Jamnagar
(2) Unit of Analysis	15 Brass Manufacturing organization in Jamnagar
(3) Sample Selection	The sampling strategy used for this study is non-probability sampling. This study followed a convenience sampling approach.
(4) Sources of the Data	The study would be conducted using secondary data: The secondary data for the study will be collected from different websites, magazines, journals and Annual reports of firms.
(5) Period of study	2017-18 to 2019-20
(6) Data Analysis	The entire set of data & information proposed to be collected from secondary sources shall be analyzed using appropriate statistical tool. Besides, Ratio analysis will also be used for analyzing and interpreting the data wherever it is applicable.
(7) Hypothesis of the study	H₀ : There is no significant difference in Sales of the selected brass firms over the years H₁ : There is significant difference in Sales of the selected brass firms over the years.

H0: There is no significant difference in profitability of the selected brass firms over the years

H1: There is significant difference in profitability of the selected brass firms over the years.

H0: There is no significant difference in solvency of the selected brass firms over the years

H1: There is significant difference in solvency of the selected brass firms over the years.

H0: There is no significant difference in liquidity of the selected brass firms over the years.

H1: There is significant difference in liquidity of the selected brass firms over the years.

H0: There is no significant difference in working capital requirement of the selected brass firmsover the years.

H1: There is significant difference in working capital requirement of the selected brass firmsover the years.

H0: There is no significant difference in Debt – equity of the selected brass firms over the years.

H1: There is significant difference in Debt – equity of the selected brass firms over the years.

	<p>H0: There is no significant difference in Overall financial competency of the selected brass firms</p> <p>H1: There is significant difference in Overall financial competency of the selected brass firms over the years.</p>
--	--

(Table 3.15.1 Brief Overview Research Study)

3.16 Chapter plan

To undertake the research on the above-mentioned topic the entire process can be divided into 5 chapters. That can be explained as follows.

- 1) Chapter -1 Introduction**
- 2) Chapter -2 Review of Literature**
- 3) Chapter -3 Research Methodology**
- 4) Chapter -4 Data Analysis**
- 5) Chapter -5 Findings, Conclusions and Suggestions.**

❖ References

1. L.V. Redman and A.V.H. Mory, *The Romance of Research*, 1923, p.10.
2. Greene, W. H. (2018). *Econometric Analysis*. Pearson.
3. *The Encyclopedia of Social Sciences*, Vol. IX, MacMillan, 1930
4. *The Advanced Learner's Dictionary of Current English*, Oxford, 1952, p. 1069
5. www.google.co.in ; www.oxforddictionaries.com/definition/english
6. www.merriam-webster.com/dictionary
7. en.wikipedia.org/wiki
8. *Annual Audit Report*
9. Kothari C. R., *Research Methodology Methods and Techniques*, New Age International Publication, Delhi,2008.
10. Ibid.