# The Impact of Artificial Intelligence on Modern Business Operations: An Empirical Study with Special Reference to Don Bosco Arts and Science College, Kilpauk, Chennai-10

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***Abstract*—Artificial Intelligence (AI) is reshaping modern business operations through automation, data analytics, intelligent customer support and decision assistance. This study examines awareness and perceived operational implications of AI, with special reference to Don Bosco Arts and Science College, Kilpauk, Chennai-10. As no verified institutional questionnaire dataset was supplied for this paper, the statistical section uses a clearly identified illustrative dataset of 120 hypothetical responses to demonstrate an empirical analysis framework. Percentage analysis, one-way analysis of variance (ANOVA), multiple regression and Pearson's chi-square test are presented. In the illustrative analysis, mean perceived operational-efficiency scores differ across AI-adoption groups; AI adoption and employee training show positive statistically significant coefficients in the regression model; and respondent background is associated with regular AI-tool usage. These results are methodological demonstrations and must not be interpreted as findings about actual students or staff of the College. The paper recommends primary data collection, practical AI literacy, responsible use, data protection and human oversight before drawing institution-specific conclusions.**

***Index Terms*—Artificial Intelligence, business operations, AI adoption, operational efficiency, ANOVA, regression analysis, chi-square test**

## I. Introduction

Artificial Intelligence has become an important enabling technology in contemporary business. AI systems can perform or support tasks involving pattern recognition, prediction, language processing, classification and decision support. Businesses use these capabilities in customer service, accounting, marketing, recruitment, inventory planning, fraud detection and supply-chain coordination. The value of AI is not limited to replacing repetitive tasks; it can also help employees interpret information and make timely decisions.

For commerce education, understanding AI is increasingly relevant because future professionals are likely to work with automated accounting platforms, customer analytics, digital marketing systems and data-driven management tools. Don Bosco Arts and Science College, Kilpauk, Chennai, provides the institutional setting for a proposed study of AI awareness and perceptions among its academic community. The present paper therefore connects AI-enabled business practices with the need for digital competencies among commerce students and other respondents.

## II. Review of literature and research gap

Davenport and Ronanki (2018) explain that organisations commonly apply AI through process automation, cognitive insight and cognitive engagement. Their discussion emphasises selecting business problems carefully rather than adopting AI as an end in itself. Jarrahi (2018) argues that human–AI

symbiosis can support organisational decision-making: AI can process large volumes of information, while people contribute contextual judgement, intuition and accountability.

The OECD (2023) identifies opportunities for AI to improve productivity and innovation while highlighting challenges involving skills, data governance, trust and responsible deployment. The National Institute of Standards and Technology (NIST, 2023) provides an AI Risk Management Framework that helps organisations identify and manage risks throughout the AI lifecycle. UNESCO (2023) similarly stresses a human-centred approach, privacy, inclusion and institutional preparedness in the use of generative AI.

The literature indicates that AI adoption is shaped by organisational readiness, employee capability, data quality, management support and governance. However, an institution-specific assessment of AI awareness and perceived business relevance among respondents associated with Don Bosco Arts and Science College requires primary data. This paper provides an analytical framework and demonstrates the statistical procedures that can be applied once such data are collected.

## III. Objectives of the study

1) To examine awareness and adoption of AI-based tools among the proposed respondent group.
2) To identify major business functions in which AI is perceived to be useful.
3) To analyse differences in perceived operational efficiency across AI-adoption levels.
4) To examine the influence of AI adoption, employee training and digital readiness on perceived operational efficiency.
5) To test the association between respondent background and regular AI-tool usage.
6) To identify perceived challenges and suggest measures for responsible AI adoption.

## IV. Research methodology

The study is designed as a descriptive and analytical investigation with special reference to Don Bosco Arts and Science College, Kilpauk, Chennai-10. The proposed primary-data instrument is a structured questionnaire covering AI awareness, frequency of use, AI adoption, training, digital readiness, perceived operational efficiency and implementation concerns. A five-point Likert scale may be used for attitudinal items. For the worked statistical demonstration in this paper, a simulated dataset of 120 hypothetical cases was generated; it is not drawn from College records or actual respondents.

Proposed sampling approach: convenience sampling of eligible students and/or staff, with the final population and respondent categories clearly specified before data collection. Suggested statistical tools are frequency and percentage analysis, one-way ANOVA, multiple linear regression and Pearson's chi-square test. Reliability of multi-item scales should be assessed (for example, using Cronbach's alpha), and regression assumptions, expected cell counts and missing data should be checked. The illustrative analyses below use a 5% significance level.

## V. Data analysis and interpretation

### A. Illustrative respondent distribution and descriptive profile

For demonstration only, the 120 hypothetical cases are equally allocated across low, moderate and high AI-adoption groups. The distribution is a design feature of the simulated dataset, not a measured profile of the College.

| AI-adoption category | Illustrative frequency | Percentage |
|---|---|---|
| Low | 40 | 33.3% |
| Moderate | 40 | 33.3% |
| High | 40 | 33.3% |
| Total | 120 | 100.0% |

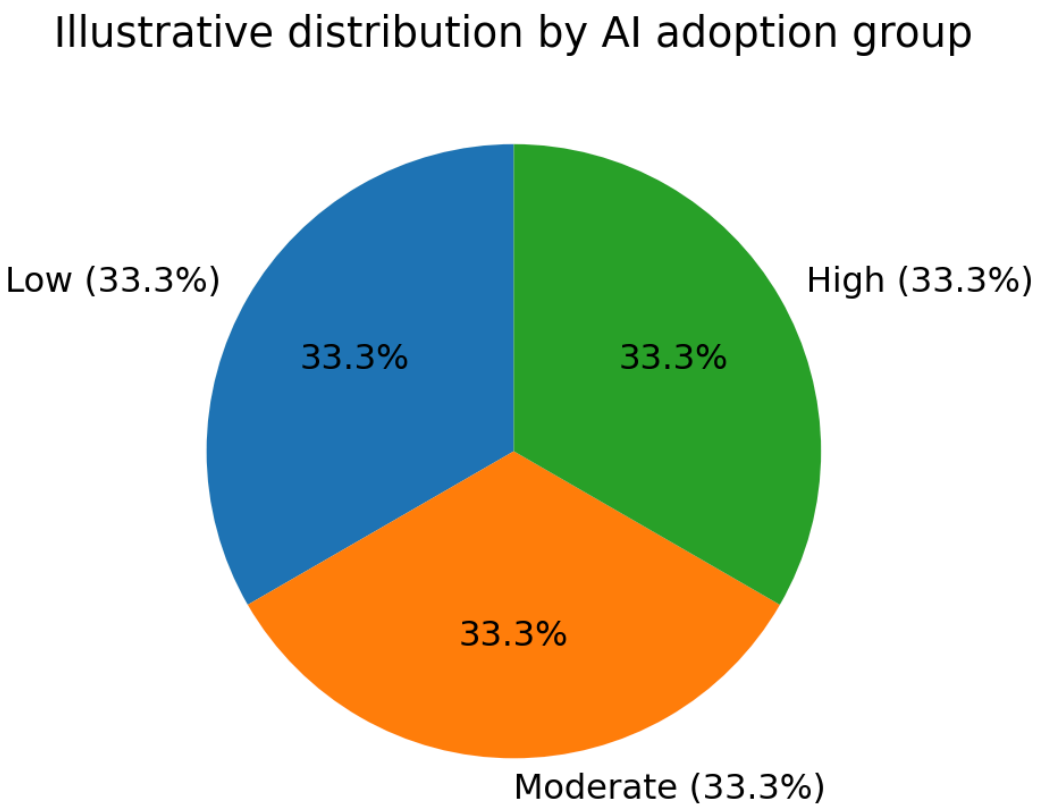


***Figure 1***. *Illustrative distribution of respondents by AI-adoption category.*

The equal group sizes make the three adoption categories convenient to compare in the demonstration. In an actual study, the category cut-offs should be defined in advance using the questionnaire scoring method and the observed distribution.

**B. Average AI-related scores**

| Measure | Illustrative mean (1–5) |
|---|---|
| AI adoption | 3.08 |
| Employee training | 2.87 |
| Digital readiness | 2.96 |
| Perceived operational efficiency | 3.75 |

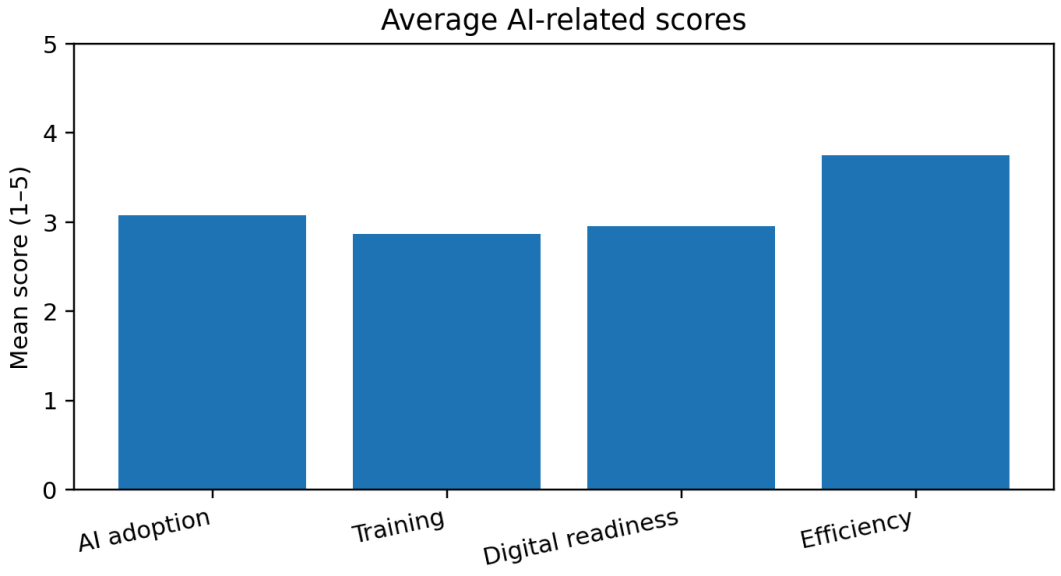

***Figure 2**. Average scores for AI adoption, training, digital readiness and perceived efficiency.*

The chart compares the average scores generated for the four constructs. Because the values are simulated, they demonstrate how descriptive statistics can be reported; they do not indicate the actual views of students or staff.

### C. One-way ANOVA: operational efficiency by AI-adoption level

H01: There is no significant difference in mean perceived operational-efficiency scores among low, moderate and high AI-adoption groups. H11: At least one group mean differs.

| AI-adoption group | N | Mean efficiency | Standard deviation |
|---|---|---|---|
| Low | 40 | 3.06 | 0.61 |
| Moderate | 40 | 3.72 | 0.50 |
| High | 40 | 4.46 | 0.45 |

| ANOVA statistic | Illustrative result |
|---|---|
| F statistic | 71.336 |
| Degrees of freedom | 2, 117 |
| p-value | 5.558e-21 |
| Significance level | 0.05 |

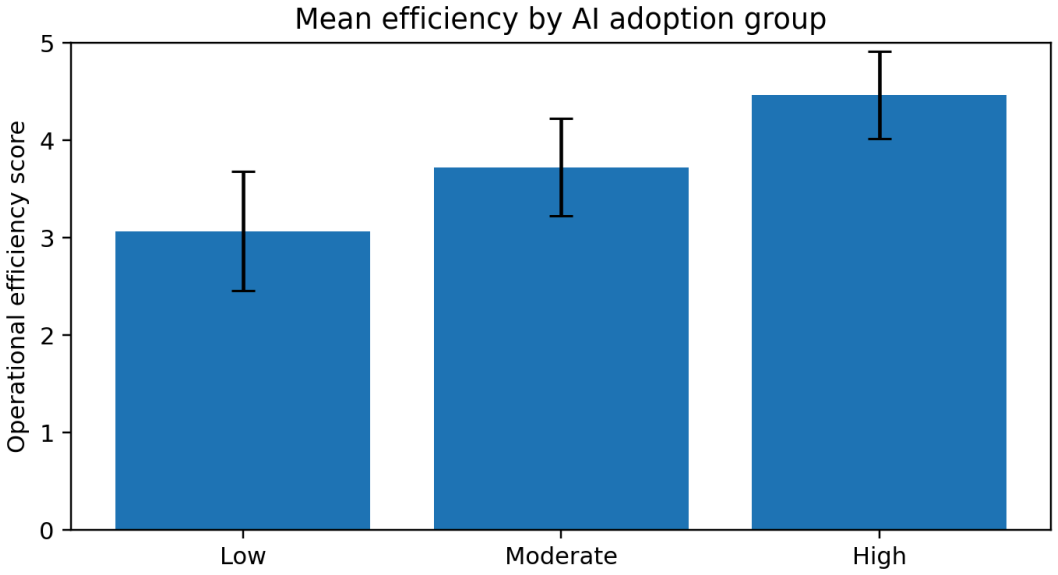


*Figure 3. Mean operational-efficiency score by AI-adoption group (error bars show standard deviation).*

The illustrative one-way ANOVA gives F(2, 117) = 71.336, p = 5.558e-21. At the 5% level, the simulated result indicates a statistically significant difference among at least two group means. ANOVA does not identify which specific groups differ; an appropriate post-hoc test (such as Tukey HSD) should be used if the actual study produces a significant omnibus result. Statistical significance should also be considered alongside effect size and practical importance.

### D. Multiple regression analysis

The proposed model examines whether AI adoption, employee training and digital readiness predict perceived operational efficiency. The dependent variable is the efficiency score; the independent variables are the three predictor scores. H02: The predictors do not jointly explain perceived operational efficiency.

| Predictor | B | Standard error | p-value |
|---|---|---|---|
| Constant | 1.369 | 0.216 | 4.637e-09 |

| | | | |
|---|---|---|---|
| AI adoption | 0.527 | 0.051 | 2.14e-18 |
| Employee training | 0.168 | 0.065 | 0.01046 |
| Digital readiness | 0.094 | 0.051 | 0.06672 |

| Model measure | Illustrative result |
|---|---|
| R-squared | 0.637 |
| Adjusted R-squared | 0.627 |
| F statistic | 67.796 |
| Model p-value | 2.133e-25 |

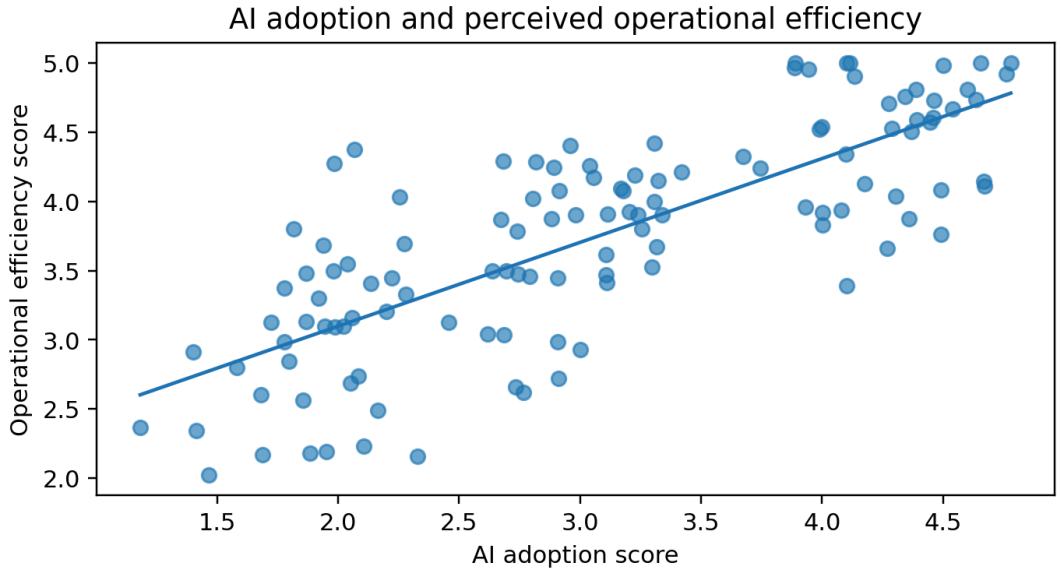


*Figure 4. Relationship between AI-adoption score and perceived operational efficiency.*

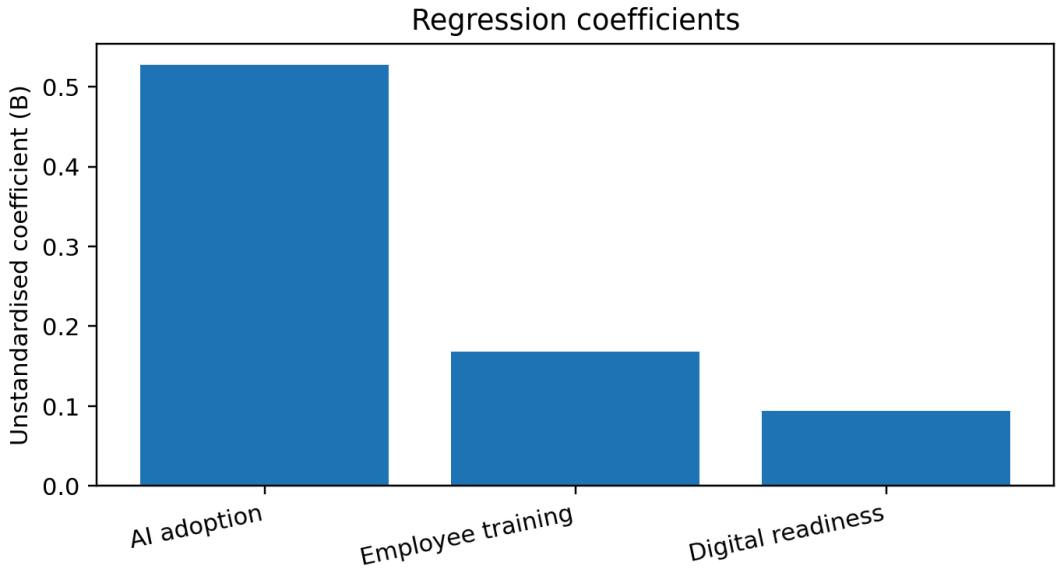


*Figure 5. Unstandardised regression coefficients for the three predictors.*

The simulated regression model explains 63.7% of the variation in perceived operational efficiency ($R^2$ = 0.637; adjusted $R^2$ = 0.627). The overall model is statistically significant (F = 67.796, p = 2.133e-25). AI adoption has B = 0.527 (p = 2.14e-18); employee training has B = 0.168 (p = 0.01046); and digital readiness has B = 0.094 (p = 0.06672). Coefficients represent expected changes in the efficiency score for a one-unit change in each predictor, holding the other predictors constant. The equation and significance values are specific to the simulated dataset.

*Illustrative regression equation: Efficiency = 1.369 + (0.527 × AI adoption) + (0.168 × training) + (0.094 × digital readiness).*

### E. Chi-square test: respondent background and regular AI-tool usage

H03: There is no association between respondent background and regular AI-tool usage. H13: There is an association between respondent background and regular AI-tool usage. The cross-tabulation below is hypothetical and is included to demonstrate the test.

| Respondent group | Regular user | Not regular | Total |
|---|---|---|---|
| Commerce | 16 | 14 | 30 |
| Computer Applications | 25 | 5 | 30 |
| Management | 18 | 12 | 30 |
| Other | 15 | 15 | 30 |
| Total | 74 | 46 | 120 |

| Chi-square measure | Illustrative result |
|---|---|
| Pearson chi-square | 8.602 |
| Degrees of freedom | 3 |
| p-value | 0.0351 |
| Significance level | 0.05 |

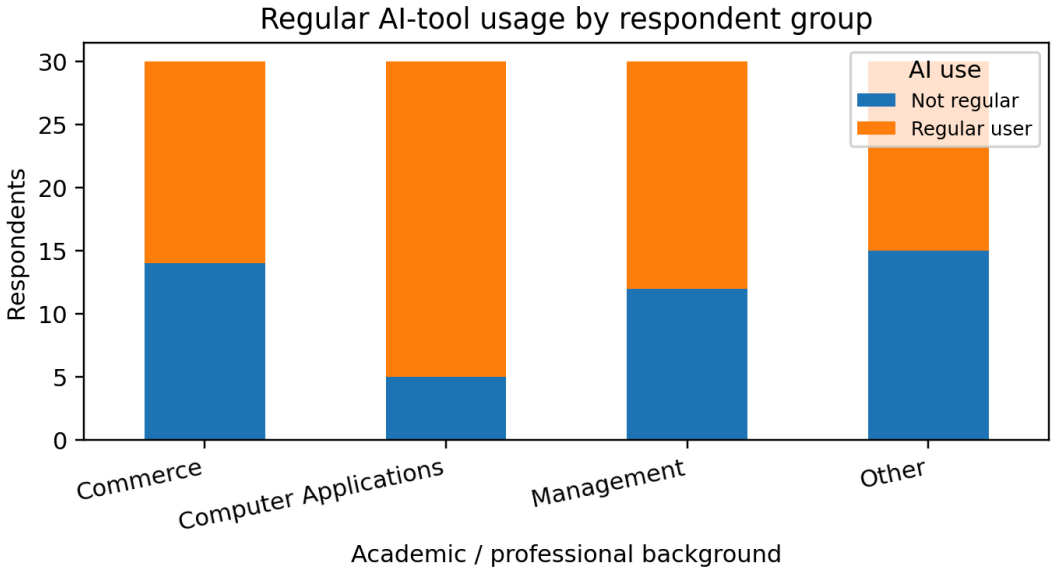


*Figure 6. Regular and non-regular AI-tool usage across illustrative respondent groups.*

The Pearson chi-square test gives $\chi^2(3) = 8.602$, $p = 0.0351$. The simulated result indicates a statistically significant association between respondent group and regular AI-tool usage at the 5% level. The test identifies association, not causation. In an actual analysis, expected cell frequencies must be inspected; categories may need to be combined or an exact test considered if assumptions are not met.

## VI. Discussion

The analytical framework demonstrates how descriptive and inferential statistics can be combined to study AI adoption in a college-linked research setting. The ANOVA compares mean efficiency perceptions across adoption groups, regression estimates the separate and combined relationships of adoption, training and readiness with efficiency, and the chi-square test evaluates whether regular AI-tool use varies by respondent category. The three methods address different questions and should not be treated as interchangeable.

For the College context, the most relevant practical areas for further investigation include AI-assisted accounting and spreadsheet analysis, business communication, customer-service simulations, digital marketing, financial literacy and data interpretation. Any institutional recommendations should be based on actual respondent evidence and should distinguish educational use of AI from AI implementation within commercial organisations.

## VII. Major findings

1) The illustrative dataset contains 120 hypothetical cases divided equally among three AI-adoption categories.

2) The ANOVA demonstration produced $F(2, 117) = 71.336$, $p = 5.558e\text{-}21$; the simulated group means therefore differ significantly.

3) The regression demonstration produced $R^2 = 0.637$; the model was statistically significant overall.

4) AI adoption and employee training had estimated coefficients of 0.527 and 0.168, respectively, in the simulated model.

5) The chi-square demonstration produced $\chi^2(3) = 8.602$, $p = 0.0351$, indicating that the simulated association was statistically significant.

6) None of the above numerical findings can be attributed to actual students, faculty or staff of Don Bosco Arts and Science College until primary data are collected and analysed.

## VIII. Suggestions

1) Conduct a structured baseline survey to measure AI awareness, frequency of use, perceived benefits and concerns among clearly defined respondent groups.

2) Organise practical workshops on AI applications in accounting, finance, marketing, business analytics and human resource management.

3) Provide training on prompt formulation, verification of AI-generated information, data privacy, intellectual property and academic integrity.

4) Encourage project-based learning through business cases, spreadsheet automation, customer-service scenarios and data-analysis exercises.

5) Promote human oversight in decisions involving finance, recruitment, student records and sensitive personal information.

6) Develop clear institutional guidance on acceptable AI use, disclosure, confidentiality and responsible handling of data.

7) For future research, use a larger and more balanced sample, validated multi-item measures and actual responses from students, faculty members or business professionals.

## IX. Limitations of the study

The statistical dataset in this document is simulated for demonstrating analysis and chart presentation. It is not primary data collected at Don Bosco Arts and Science College. Consequently, the numerical results cannot support claims about the College community, and the paper should not be submitted as an empirical institutional study until the dataset is replaced by genuine, consent-based survey responses. Convenience sampling, self-reported measures and a single-institution setting may also limit generalisability in the completed study.

## X. Conclusion

Artificial Intelligence is changing the way organisations automate processes, analyse information, communicate with customers and support managerial decisions. Its effective use requires more than access to tools: employees need relevant skills, organisations need reliable data and governance, and important decisions require human accountability. This paper presents a research framework for examining AI awareness and perceived business-operational outcomes with special reference to Don Bosco Arts and

Science College, Kilpauk, Chennai-10. The statistical tables and charts demonstrate how ANOVA, multiple regression and chi-square analysis can be reported. Once actual institutional data are collected, the analysis should be rerun and the findings, discussion and conclusion revised to reflect the evidence.

## XI. Acknowledgment

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