

How to Write a Research Journal Article

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Types of Articles

Letters

- Short Communications
- Significant Advances
- Few details, little Data

Reviews

- Summary of recent developments
- Specific topic
- No new data

Articles

- Full research paper
- Data
- Developments
- Outcomes

Elements

- Research data
- Software
- Methods
- Videos

Purpose

- Why write research papers?
 - It's a **fundamental** task in research.
 - If ideas and findings go unpublished, why bother doing the research?
 - Convey a **valuable** and reusable idea.
 - Readers will find it interesting and **useful**.
- When to start writing?
 - Immediately!
 - A **basic idea** is sufficient to start writing.
 - The process of writing helps to
 - **outline** your thoughts.
 - clarify **your understanding**.
 - bring up **refinements**.
 - You will be going through a **cycle of writing**, rewriting, and peer discussions until the writing converges to a structure that delivers clear benefits.

Follow the Three S

Substance

Structure

Style

Substance

Substance—Idea

- What topic areas are you most passionate about?
- **Is it a hot or exciting topic?**
- Conduct a Google Scholar search using keywords and phrases, filtered by the current year.
- Examine the trends of kinds of research being done in the area.
- Select a narrow scope that addresses a problem of interest to you.
- Conduct an initial literature review to identify what has been done already and where there are possible gaps or lack of research.
- Formulate your idea.
- The paper should be about a **single** clear and crisp idea or goal.
 - If you have several ideas, write several separate papers.
 - The introduction should have a sentence that states, “the main idea of this paper is ...” or “the goal of this research is ...”

Substance—Datasets

- Examine the list provided in the “Course Information” section of the online course.
- Explore a dataset that is of interest.
- Consider the application of machine learning techniques to explore some patterns or trends that may not have been previously published.

Plagiarism

Just Don't Do It

- One of the first things journal editors do is run the paper through a plagiarism checker.
- Any findings of plagiarism can tarnish your professional career forever, and worst, tarnish the reputation of your Institution and your advisor.

Structure

Standard IMRAD Structure

Title Page

Title

Authors & Affiliations

Abstract

Keywords

Main Body

Introuction

Methods

Results

Discussions

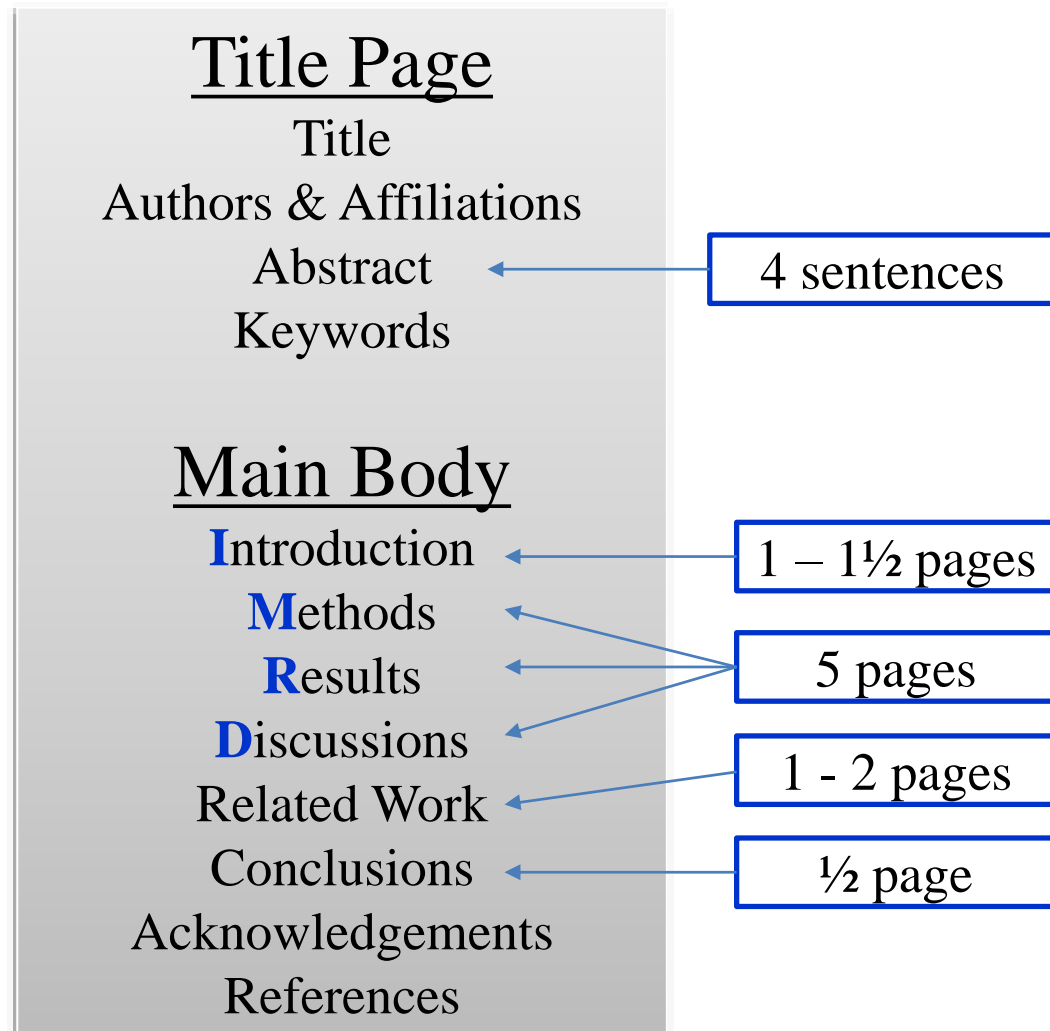
Related Work

Conclusions

Acknowledgements

References

Standard IMRAD Structure and Length



Title Page Structure

1 **Closed Form Models to Assess Railroad Technology Investments**

2 **Raj Bridgelall, Ph.D.**, Corresponding Author

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4 College of Business, North Dakota State University

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6 **Denver D. Tolliver, Ph.D.**

7 Director, Upper Great Plains Transportation Institute, North Dakota State University

8 Fargo, ND 58108; Email: denver.tolliver@ndsu.edu, ORCID: 0000-0002-8522-9394

9
10 **Declarations of Interest:** None.

11
12 **Abstract**

13 Class I railroads in North America collectively invested \$11.2 billion to comply with a federal
14 mandate to deploy positive train control. This amount dwarfs the potential savings from
15 accidents the technology could prevent. Therefore, railroads must seek additional benefits. This
16 research contributes simple closed-form models to inform strategies that can leverage the
17 technology deployment by estimating the annual additional net benefits, internal rate of return,
18 and benefit-cost ratio needed for a desired payback period.

19
20 **Keywords:** Benefit-cost analysis; internal rate of return; non-destructive evaluation; payback
21 period; positive train control; railroad safety.

22
Page 1 of 23

Title

Short—one line preferred.

Authors & Affiliations

Contact, Corresponding Author, ORCID, ordered by the proportion of contribution, **ethical inclusion**

Abstract

One paragraph (<250 words).

Keywords

About five to eight for search engines to find. Words not in the title or journal name.

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Page 1 of 23

- Short
 - One line preferred.
 - Do not use verbose phrases like “A study of” or “Investigations into” or “Observations on” or “Towards the”
- Attracts attention
 - Advertises the article.
 - Contains keywords that signal journal audience **current** interests.
- Reviewers & Editors
 - Initial impression
 - Desk reject or continue to read abstract?
 - Make it punch!

Abstract

Write
Last

1 Closed Form Models to Assess Railroad Technology Investments

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Page 1 of 23

- Present Tense
- Mark Twain
 - “I was going to write you a short letter, but I didn’t have time.”
- Hooks the reader
- Convey 3P’s
 - Purpose
 - Procedures
 - Principal findings
- Four sentence formula
 - What is the problem?
 - Why is it important?
 - What was your contribution and what did it achieve?
 - So what—how will it benefit the target audience?
(**Value**)

Main Body—Introduction

Do Not
Repeat the
Abstract!

Main Body

Introduction

Methods

Results

Discussions

Related Work

Conclusions

Acknowledgements

References

A separate paragraph that describes the organization of the rest of the paper is boring and often skipped. So forward reference those sections in the contribution statement instead.

- Significance
 - What is the problem?
 - Use an example if it will help clarify (no full history or background)
 - The problem should be narrow and specific
 - Why is it interesting or important?
 - What is currently known? What are the limitations? Gaps?
 - Cite evidence, but no literature search yet.
- Goals
 - What is the goal or main idea (purpose) of your article? (The **RESEARCH QUESTION**)
 - “The goal of this paper is ...”
- Objectives
 - What methods will you use to demonstrate that you have achieved the stated goals or that the idea works?
- Contributions
 - **Enumerate** the value of this work.
 - State in a refutable manner.
 - Forward reference the sections that deliver those contributions.

Main Body—Methods

Write
First

Main Body

Introduction

Methods

Results

Discussions

Related Work

Conclusions

Acknowledgements

References

- Start writing this section before any other section.
- Use the past tense.
- Describe the theories or data or analysis.
- Use subsections to separate sequences of steps or sub-methods.
- Provide enough details so that the work can be replicated.
- Remove vague terms such as “higher temperature” and use “x degrees higher” instead.
- Justifies the conclusions.
- Do not include results until next section.

Main Body—Results

Write
Second

Main Body

Introduction

Methods

Results

Discussions

Related Work

Conclusions

Acknowledgements

References

- Use the past tense.
- Subsections must mirror those of the methods section.
- State purely the results from applying the methods.
- Include tables and figures, properly formatted, with readable fonts.
- Use no more than 2 decimal places for numbers, unless more precision is necessary.
- Cite tables and figures prior to their location in the text.
- No interpretations.
- No references to other results until the discussion.

Main Body—Discussions

Main Body

Introduction

Methods

Results

Discussions

Related Work

Conclusions

Acknowledgements

References

- The most important part of the paper.
- Interpret the results or findings
 - Describe the meaning.
 - Link meaning to the goal stated in the introduction.
 - Do not repeat the results.
 - Do not introduce new terms or ideas.
- Discuss the implications.
 - How has the results advanced the body of knowledge? **Value**
 - Do not make grand claims.
 - Avoid non-specific quantities like “higher temperature”, “lower rate”, etc.
- Discuss relevance and contrast with related work.
 - Reference related achievements and expand on them in the “related work” section.
- Discuss weaknesses or limitations of your work.

Main Body—Related Work

Main Body

Introduction

Methods

Results

Discussions

Related Work

Conclusions

Acknowledgements

References

- Positions your work; focused and refined from the initial exploratory literature review.
- What have others done that are directly within the scope of the work?
- What were their findings?
- How did those complement your work?
- How did you fill gaps in related work?
- Aim for at least 20 references, within the last 2 to 5 years.
- At least one reference should be from the target journal.

This section is sometimes placed after the introduction with a title “Literature Review.” However, it may not interest your reader and could be getting in the way of understanding your contribution. When placed after the discussion, the reader would have already attained the background to understand how other works compared to your work.

Main Body—Conclusions

Main Body

Introduction

Methods

Results

Discussions

Related Work

Conclusions

Acknowledgements

References

- Stands alone—do not repeat the abstract.
- Review the significance of the problem in different words.
- Summarize the findings and how the methods and data support them.
- State the **benefits** of the contribution to the target audience.
- How does the work advance present knowledge in the field?
 - Suggest practical applications.
- Discuss long-term value, broader themes and possible generalizations of the methods.
 - Avoid bold speculations.
 - Avoid judgements about impact.
 - Do not extend this beyond the results.
- Describe future work.

Main Body—Acknowledgements

Main Body

Introduction

Methods

Results

Discussions

Related Work

Conclusions

Acknowledgements

References

- Optional
- Acknowledge persons who helped you but not to the extent that would justify authorship.
 - Proofreaders
 - Sources of data
 - Usage of facilities
 - Contributors of materials.
- Acknowledge specific grant sources that funded the work.
- Conflicts of interest
 - Disclose if contributors could benefit from the research outcome.

Main Body—References

Main Body

Introduction
Literature Review
Methods
Results
Discussions
Conclusions
Acknowledgements
References

- Automatically generate from the citations in the main body.
- Use the built-in MS Word “Reference Manager” feature.
 - Third-party software such as Mendeley and EndNote are also available but can sometimes cause problems with the submission process.
 - The .DOC file without third party software can be standalone when reviewed by others during the editing process.

Style

Style Format

- Author Guidelines
 - Review carefully and implement painfully.
- Format Specific
 - Journal provided template
 - e.g. IEEE Double Column
- Format Flexible
 - Margins (usually 1-inch all sides, 8.5 x 11)
 - Font (usually 12-pt, Times New Roman)
 - Line spacing (usually double)
 - Line and page numbers (facilitates peer review notes)
 - Headers (usually numbered, up to three levels)
 - Paragraph indents (usually first paragraph is not indented but subsequent ones are)

Style Objects

- Figures
 - Created as image or vector files.
 - Captions usually at the bottom with the label Fig. and first cap sentence.
 - Partitions should be labeled a), b), c) etc.
- Tables
 - Captions usually at the top with the label Table and all cap sentence.
 - Usually in the text, not cut and paste from a figure.
 - Three wire style with no vertical lines.
 - Remove long boring tables.

Tables

No

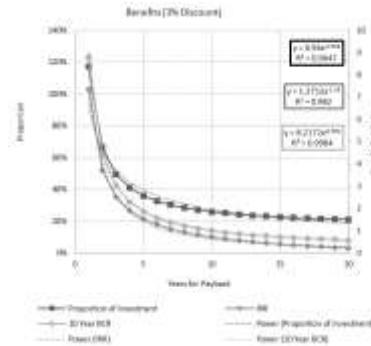
Depth	Gravel	Sand	Mud
5 m	3,42%	81.41%	15,17%
50 m	2,5%	58.42%	39.08%
100 m	0,0%	32.5%	67.5%

Yes

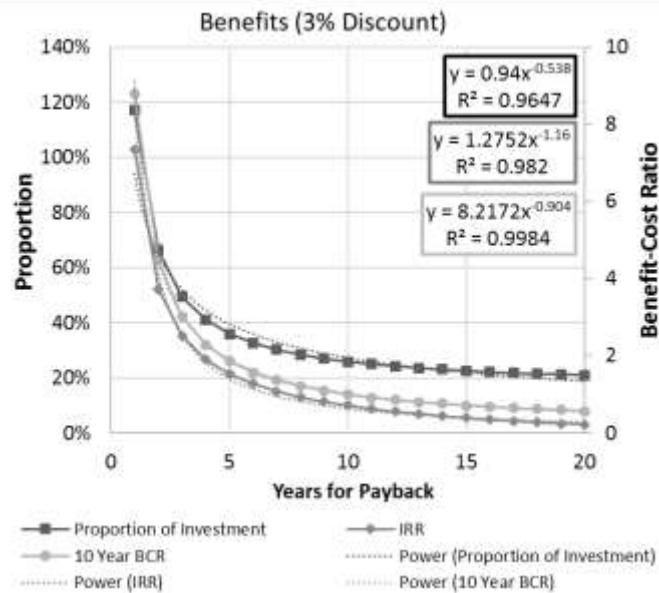
Water depth (m)	Gravel (%)	Sand (%)	Mud (%)
5	3.4	81.4	15.2
50	2.5	58.4	39.1
100	0.0	32.5	67.5

Figures

No



Yes



Word Usage

- Use Active Voice
 - Instead of the passive voice “As shown by regression ...”
 - Instead of the first person “I showed by regression analysis ...”
 - Use the active 3rd person “The regression analysis showed ...”
- Remove lavish claims
 - “First ever ...” or “paradigm shift” or “first time ever”
- Remove Deadwood Phrases

Examples of Deadwood Phrases

- a majority of → most
- a sufficient amount of → enough
- accordingly → so
- along the lines of → like
- as a means of → to
- ascertain the location of → find
- at a later date → later
- at the present time → now
- by a factor of two → double
- despite the fact that → although
- due to the fact that → because
- during the time that → while
- few in number → fewer
- for the purpose of → for
- for the reason that → because
- has been proved to be → is
- in large measure → largely
- in order that → so that
- in the event of → if
- it is interesting to note that → note that
- reach a conclusion → conclude
- the reason is because → because

Source: clarity.com (2015)

PEEL & SEXI Paragraphs

- Point
 - Make your point.
- Evidence
 - Backup your point with evidence and examples.
- Explain
 - Explain **how** and **why** the evidence supports the point.
- Link
 - Link this point to the next as a lead in.
- Statement
 - Topic sentence.
- Explain
 - Justification of the statement.
- eXample
- Interpret
 - How does the example support the explanation.

Style—References

- Specified
 - Carefully follow the required style in the “Author Guidelines”
- Flexible
 - The top journals allow usage of a standard MS Word built-in style such as IEEE, APA, Harvard, Chicago, etc.
 - They may specify alphabetical ordering by last name, and one of the above styles generally works.
 - Pick a style and stay consistent.

Reasons for Rejections

Common Reasons for Rejection

- Out of scope
 - No value to the journal audience.
 - Did not build on or complement previous work within the journal scope.
- Poor abstract
 - Missing problem statement or research question.
 - Did not describe the method.
 - Did not describe the findings.
- Poor language
 - Improper grammar usage.
 - Spelling errors (often missed by spell checkers)
 - Missing words (often missed by grammar checker.
- Poor clarity
 - Logic flow was confusing.
 - Statements were unclear
 - Useless words.
 - No topic sentences.
 - Goals, objectives, contributions, and findings were not clearly stated.
- Undercooked
 - Incomplete and not ready for publication.
 - Did not build or test theory.
- Missing cover letter
 - Editors need justification for why the article is **valuable**, within the journal scope, AND of **interest** to their readership.

Editors reject ~40% of the submissions automatically.

Conclusions

- Substance
 - You must be passionate about your idea.
 - Start writing immediately because the process is iterative, and it helps you to coalesce and refine the idea.
- Structure
 - Follow the standard IMRAD format.
 - Academic readers and peer reviewers expect it.
- Style
 - Follow the journal's Author Guidelines.