RESEARCH METHODOLOGY

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Intellectual Property

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Intellectual Property

- Intellectual property (IP) refers to creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce.
- IP is protected in law by, for example, patents, copyright and trademarks, which enable people to earn recognition or financial benefit from what they invent or create.
- By striking the right balance between the interests of innovators and the wider public interest, the IP system aims to foster an environment in which creativity and innovation can flourish.

www.wipo.int

Types of Intellectual Property

Patents

A patent is an exclusive right granted for an invention. Generally speaking, a patent provides the patent owner with the right to decide how - or whether - the invention can be used by others. In exchange for this right, the patent owner makes technical information about the invention publicly available in the published patent document.

Trademarks

A trademark is a sign capable of distinguishing the goods or services of one enterprise from those of other enterprises. Trademarks date back to ancient times when artisans used to put their signature or "mark" on their products.

Copyright

Copyright is a legal term used to describe the rights that creators have over their literary and artistic works. Works covered by copyright range from books, music, paintings, sculpture and films, to computer programs, databases, advertisements, maps and technical drawings.

www.wipo.int

Types of Intellectual Property

Industrial designs

An industrial design constitutes the ornamental or aesthetic aspect of an article. A design may consist of three-dimensional features, such as the shape or surface of an article, or of two-dimensional features, such as patterns, lines or color.

Geographical indications

Geographical indications and appellations of origin are signs used on goods that have a specific geographical origin and possess qualities, a reputation or characteristics that are essentially attributable to that place of origin. Most commonly, a geographical indication includes the name of the place of origin of the goods.

Trade secrets

Trade secrets are IP rights on confidential information which may be sold or licensed. The unauthorized acquisition, use or disclosure of such secret information in a manner contrary to honest commercial practices by others is regarded as an unfair practice and a violation of the trade secret protection.

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Patents

- A patent is an exclusive right granted for an invention. It is an exclusive right to a product or a process that generally provides a new way of doing something, or offers a new technical solution to a problem. To get a patent, technical information about the invention must be disclosed to the public in a patent application.
- Patent protection means that the invention cannot be commercially made, used, distributed, imported, or sold by others without the patent owner's consent.
- Patents may be granted for inventions in any field of technology, from an everyday kitchen utensil to a nanotechnology chip. An invention can be a product – such as a chemical compound, or a process, for example – or a process for producing a specific chemical compound. Many products contain a number of inventions like, a laptop computer has hundreds of inventions, working together.

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Patents

- Patent protection is granted for a limited period, generally 20 years from the filing date of the application.
- Patents are territorial rights. In general, the exclusive rights are only applicable in the country or region in which a patent has been filed and granted, in accordance with the law of that country or region.
- Patent rights are usually enforced in a court on the initiative of the right owner. In most systems a court of law has the authority to stop patent infringement. Main responsibility for monitoring, identifying, and taking action against infringers of a patent lies with the patent owner.

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Patents

- Licensing a patent simply means that the patent owner grants permission to another individual/organization to make, use, sell etc. his/her patented invention. This takes place according to agreed terms and conditions (for example, defining the amount and type of payment to be made by the licensee to the licensor), for a defined purpose, in a defined territory, and for an agreed period of time.
- Patents provide incentives to and protection for individuals by offering them recognition for their creativity and the possibility of material reward for their inventions. At the same time, the obligatory publication of patents and patent applications facilitates the mutually-beneficial spread of new knowledge and accelerates innovation activities by, for example, avoiding the necessity to “re-invent the wheel”.

www.wipo.int, founderslegal.com

Patents

IN-EAR HEADPHONES

APPLE

US PAT. NO. 11,265,638

INVENTION OVERVIEW:

Apple has received a patent for a new type of headphones. One of the unique aspects of the headphone is the protrusion that goes into the user's ear to deliver the sound. The construction of the headphone allows for reliable production of high-quality soun to the user's ear regardless of the user's ear canal shape.

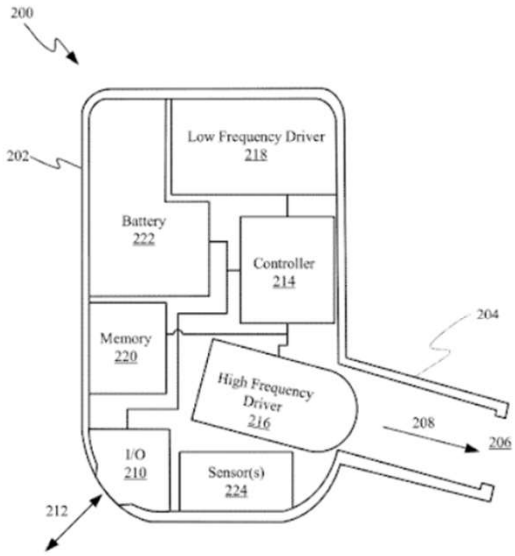


FIG. 2

Patents

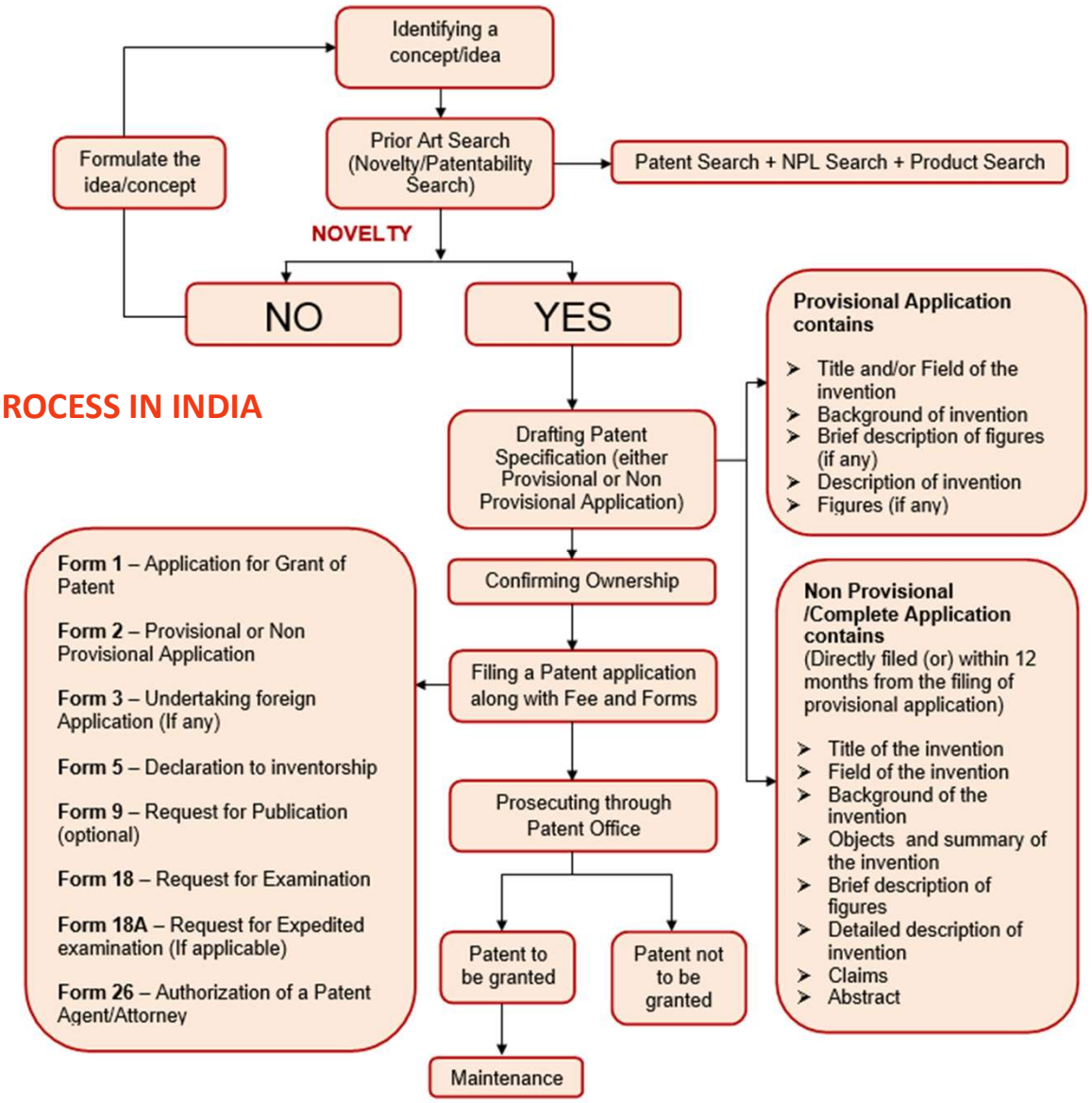
PATENT ABSTRACT:

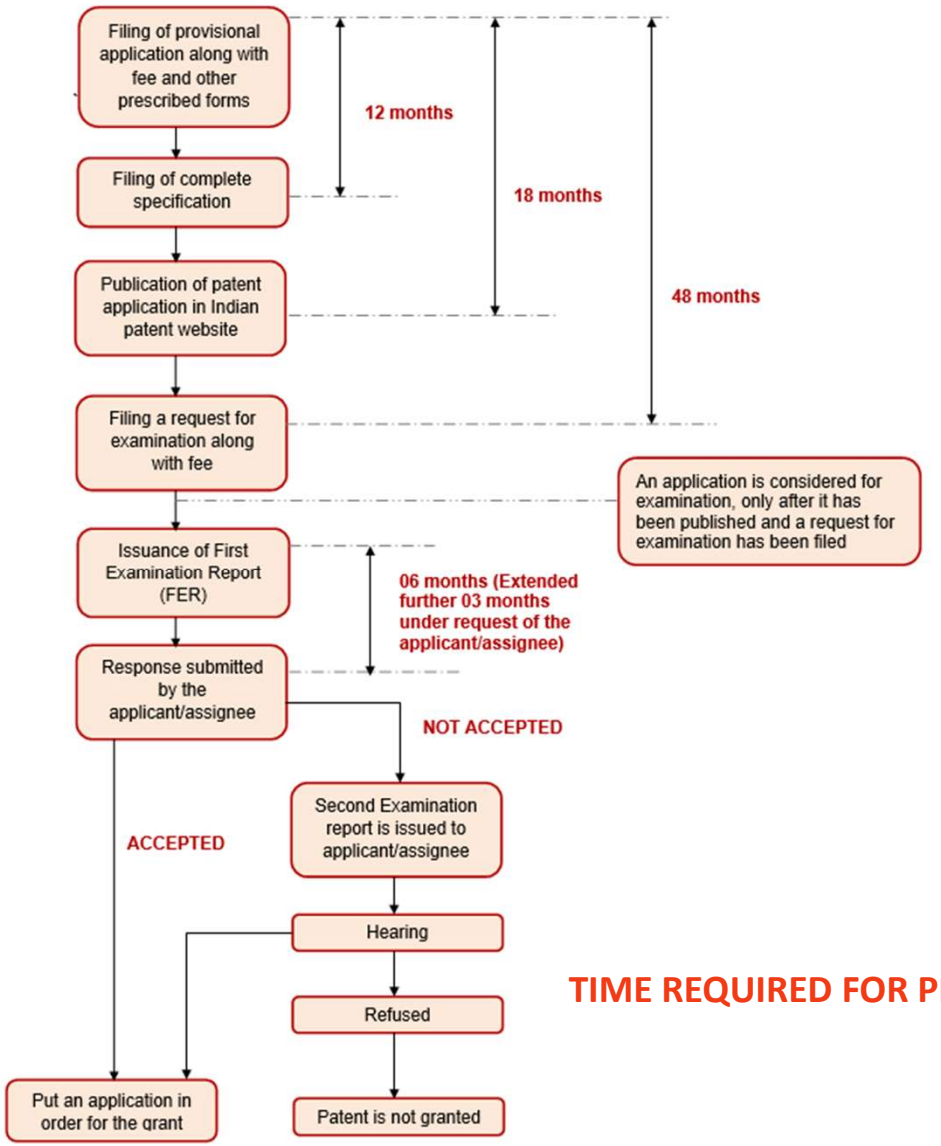
"A low-profile earbud is disclosed that sits securely within an ear of a user. The earbud includes a protruding portion that passes through a channel defined by the tragus and anti-tragus of the ear. In some embodiments, the protruding portion can take the form of a cable configured to supply power and transfer data to the earbud. In some embodiments, the protruding portion can provide additional space for electrical components and sensors supporting the earbud."

PATENT BACKGROUND:

"Audio devices along the lines of in-ear headphones often have trouble achieving a size and shape that fits comfortably and stays securely in place for a large cross-section of users. Earbuds in particular often fall short of a design that fits comfortably within an ear of a user while achieving a high level of audio content delivery. One reason for this problem is that the size and shape of the ears of users can vary widely, making it difficult to achieve a design capable of fitting comfortably within the ears of a broad spectrum of users. For this reason, a comfortable earbud design capable of remaining securely within the ears of a broad spectrum of different ears while maintaining high quality audio content delivery is desired."

OUTLINE OF PATENTING PROCESS IN INDIA





TIME REQUIRED FOR PROCESS OF GRANT OF PATENT

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REPORT and SCIENTIFIC ARTICLE WRITING

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Research Methodology

REPORT and SCIENTIFIC ARTICLE WRITING

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Research Methodology

Report

A report is written for a specific audience; it must always be accurate and objective.

Types of reports include memos, meeting minutes, expense reports, audit reports, closure reports, progress reports, justification reports, compliance reports, annual reports, and feasibility reports.

Types – Formal and In formal

Formal reports are meticulously structured. They focus on objectivity and organization, contain deeper detail, and the writer must write them in a style

Informal reports are usually short messages with free-flowing, casual use of language.

Types – Formal and In formal

A technical report is simply defined as formal and organized documentation of the process that was performed which is created to communicate to a certain audience important information about the work

Technical reports **describe the process, progress, or results of technical or scientific research**. Include in-depth experimental details, data, and results.

The steps in preparing a report

1. Decide on terms of reference.
2. Conduct your research.
3. Write an outline.
4. Write a first draft.
5. Analyze data and record findings.
6. Recommend a course of action.
7. Edit and distribute/ publish

Research Methodology

Scientific Publishing- Scientific article

Scientific writing is not just **writing** about **science**; it is the technical **writing** that **scientists** do to communicate their research to others.

... Communicating facts, figures, and methods used in research—as well as the description of the results—has to be precise and exact.

Characteristics of good scientific writing

clear - it avoids unnecessary detail;

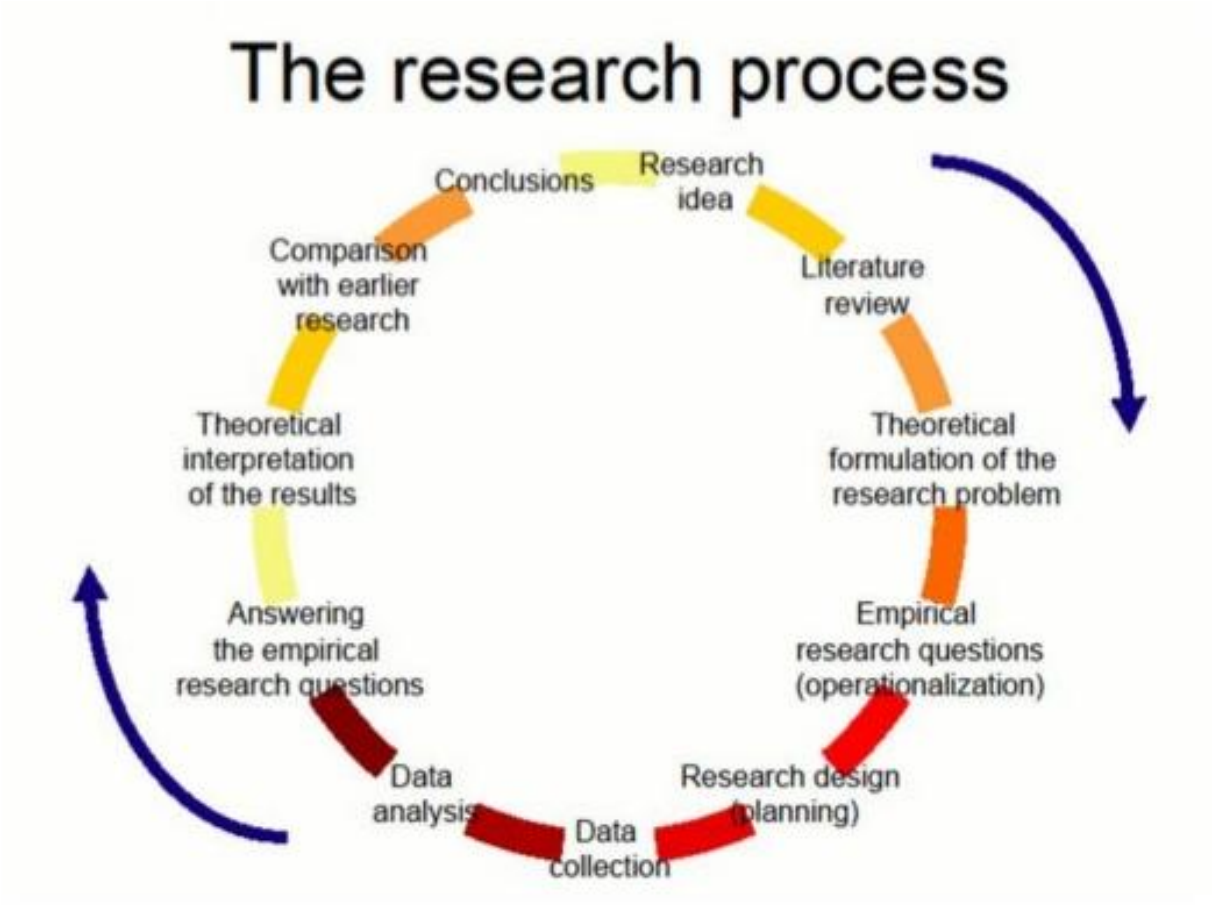
simple - it uses direct language, avoiding vague or complicated sentences. ...

impartial - it avoids making assumptions (Everyone knows that ...) and unproven statements (It can never be proved that ...). ...

structured logically - ideas and processes are expressed in a logical order.

Research Methodology

Scientific Publishing- Scientific article



The types of scientific writing

- **Peer-reviewed journal artic**les (presenting primary **research**)
- **Grant proposals** (you can't do science without funding)
- **Literature review articles** (summarizing and synthesizing research that has already been carried out)

Scientific presentations

Scientific presentation is a professional way of sharing your observation, introducing a hypothesis, demonstrating and interpreting the results of a study, or -summarizing what has been learned or is to be studied on the subject.

Research Methodology

Scientific Publishing- Scientific article

The four main types of academic writing are
descriptive,
analytical,
persuasive and
critical.

Each of these types of writing has specific language features and purposes.

Research Methodology

Scientific Publishing- Scientific article

Technical or **scientific writers** create different **technical** documents like journal articles, government proposals and instructional manuals or textbooks. They use simple and user-friendly language and terminology so they can communicate complex and **technical** information to readers.

Note: In your scientific paper, use verb tenses (**past, present, and future**) exactly as you would in ordinary writing. Use **the past tense** to report what happened in the **past**: what you did, what someone reported, what happened in an experiment, and so on.

Research Methodology

Scientific Publishing- Scientific article

Steps in Scientific Writing

Design well
Decide
Choose journal
Read instructions to authors/papers
Set framework
Prepare drafts
Distribute
Polish
Submit

Research Methodology

Scientific Publishing- Scientific article

The traditional IMRaD

Introduction
Methods
Results
and
Discussion

Research Methodology

Scientific Publishing- Scientific article

The Basic Structure of an Article

TITLE(S)
Summary (Structured Abstract)
(I) Introduction (What Question was asked?)
(II) (M)Methods (How was it Studied?)
(III) (R)Results (What was Found?)
(IV) (A)Analysis (How data was analysed?)
(V) (D)Discussion (What Do the Findings Mean?)
(VI) Acknowledgements
(VII)References

Research Methodology

Scientific Publishing- Scientific article

A full paper may contain:

Title
Authors and Affiliation
Abstract
Introduction
Methods
Results
Discussion
Acknowledgments (optional)
References

Research Methodology

Scientific Publishing- Scientific article

literature is the scientific literature :
articles in journals and texts in books devoted to the field of medicine.

Types of Literature

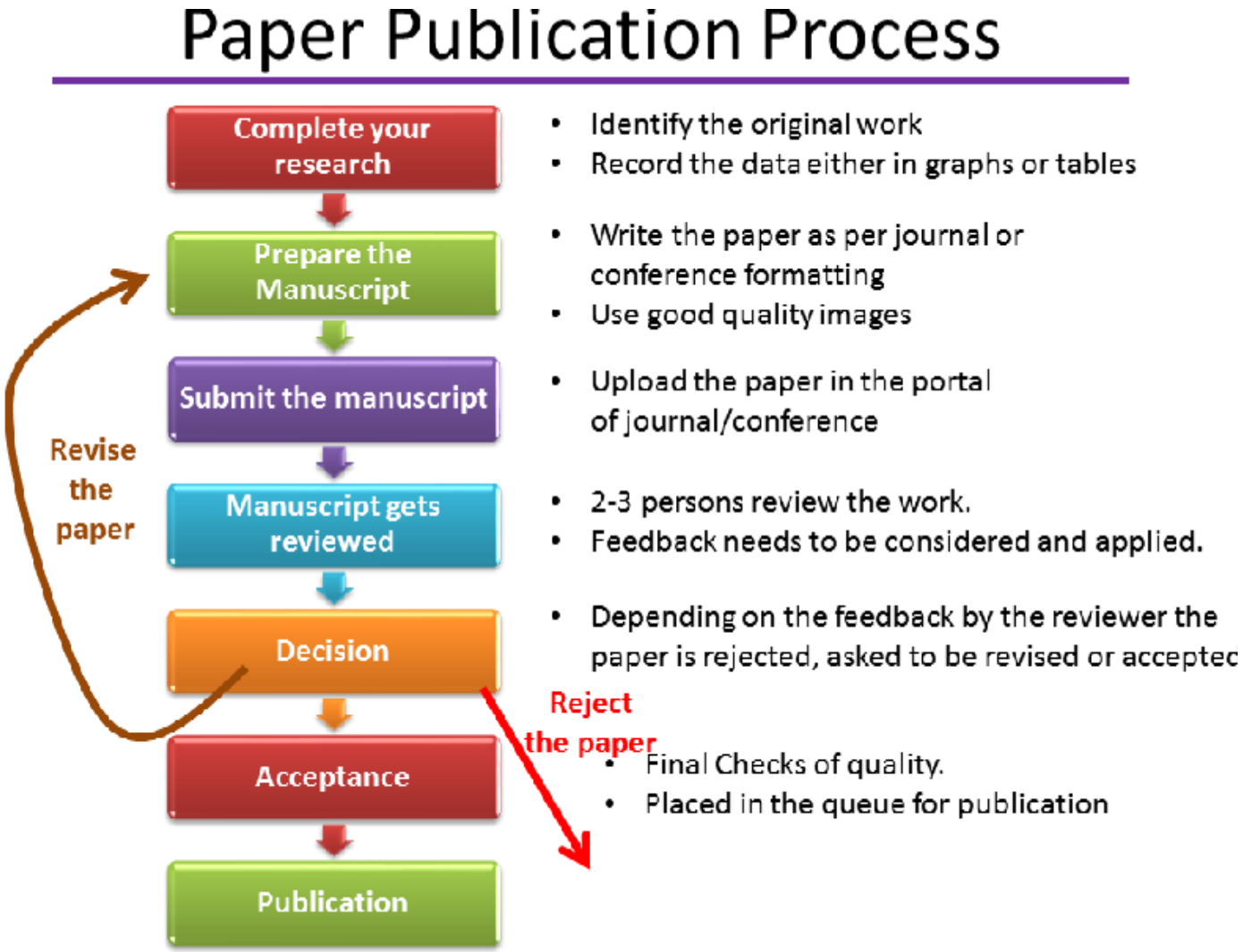
- **Primary Literature**. Primary sources are original materials.
- **Secondary Literature.** Secondary literature consists of interpretations and evaluations that are derived from or refer to the primary source literature.
- **Tertiary Literature.**

Numerous types of literature reviews have emerged, but the four main types are

- traditional or narrative,
- systematic,
- meta-analysis and
- meta-synthesis.

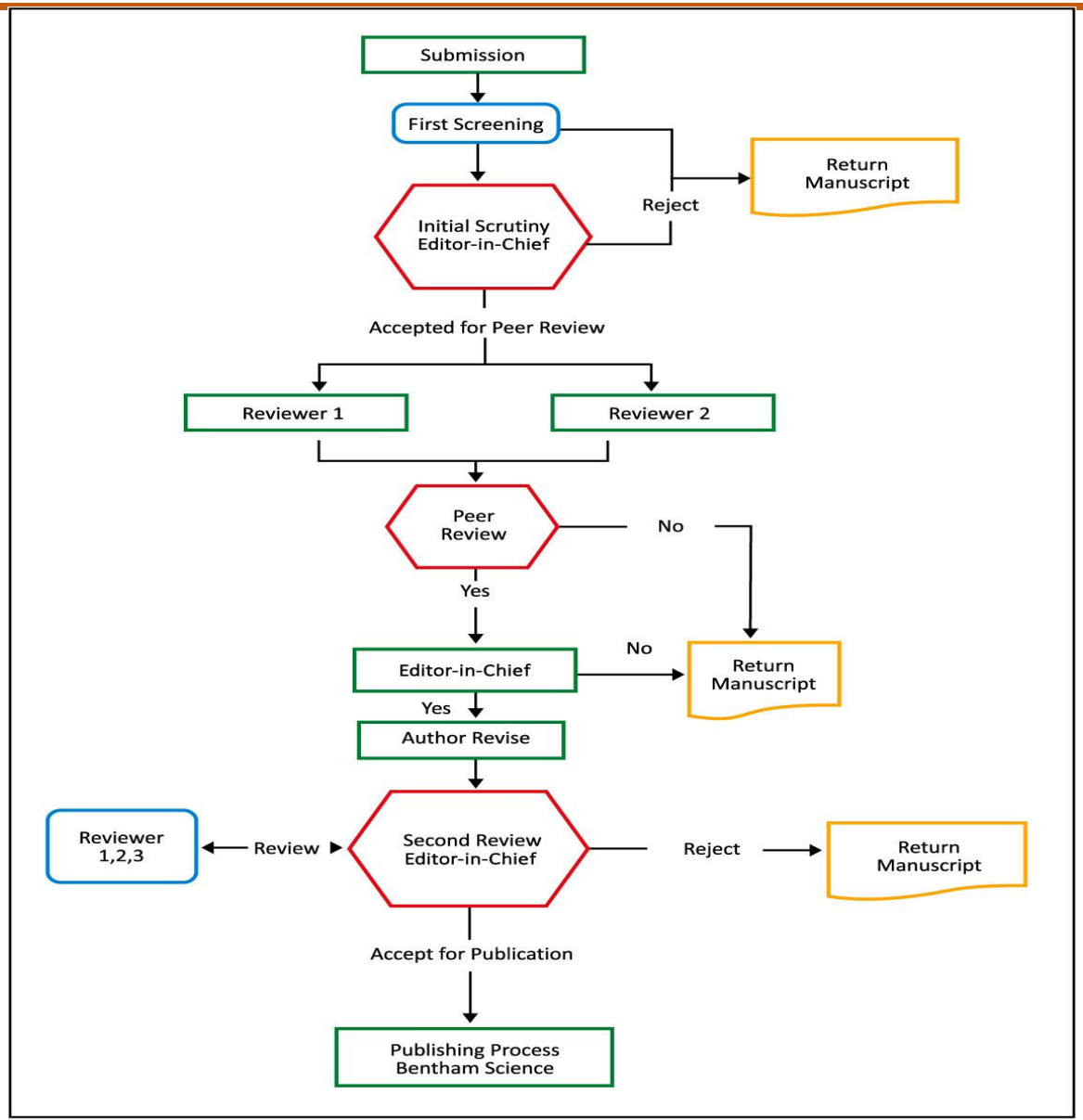
Research Methodology

Scientific Publishing- Scientific article



Research Methodology

Scientific Publishing- Scientific article



Research Methodology

Scientific Publishing- Scientific article

A scientific paper is a written and published report describing original research results

Why Publish?

- Increase human knowledge
- Writing is improved
- Sense of completion
- Work is promoted

Differences: Authors and Readers

- Authors are journal focused
- Readers are article focused
- Publish more/read less dichotomy

Research Methodology

Scientific Publishing- Scientific article

- Authoritative quality articles
- Ease of access
- Rapid delivery
- Convenient format
- Linking of information - clustering
- Low or no cost
- Up-to-date information
- Other

Research Methodology

Scientific Publishing- Scientific article

Key elements of publications

- Ethical Issues
- Style and language
- Structure of paper
- Components of paper
- Article submission/journal selection
- Publisher's process/peer review

Style and Language

- Refer to the journal's author guide
  - Some authors write their paper with a specific journal in mind
  - Others write the paper and then adapt it to fit the style of a journal they subsequently choose
- Objective is to report your findings and conclusions clearly and concisely as possible

Style and Language

- If English is not your first language, find a native English speaker (if possible) to review the content and language of the paper before submitting it

- Regardless of primary language, find a colleague/editor to review the content and language of the paper

Research Methodology

Scientific Publishing- Scientific article

Structure of paper

Section	Purpose
Title	Clearly describes contents
Authors	Ensures recognition for the writer(s)
Abstract	Describes what was done
Key Words (some journals)	Ensures the article is correctly identified in abstracting and indexing services
Introduction	Explains the problem
Methods	Explains how the data were collected
Results	Describes what was discovered
Discussion	Discusses the implications of the findings
Acknowledgements	Ensures those who helped in the research are recognised
References	Ensures previously published work is recognised
Appendices (some journals)	Provides supplemental data for the expert reader

Title

- Describes the paper's content clearly and precisely including keywords
- Is the advertisement for the article
- Do not use abbreviations and jargon
- Search engines/indexing databases depend on the accuracy of the title - since they use the keywords to identify relevant articles

Title

- Max info in least words
- <12 words
- <100 characters
- The title is a label
- Should almost never contain abbreviations
- Question: easier to understand, more impact

Abstract

100-300 words
Structure
Precise, clear & interesting

Avoid generic statements like:

- “The results will be discussed”
- “Methods are presented”
- “Future research is discussed”

Abstract

- First sentence is problem statement
- One sentence per chapter
- Some overall conclusion at the end to position the conclusion
- Do not oversell your contribution

Abstract

Briefly summarize (often 150 words) - the problem, the method, the results, and the conclusions so that
The reader can decide whether or not to read the whole article

Together, the title and the abstract should stand on their own

Many authors write the abstract last so that it accurately reflects the content of the paper

Abstract

4 C's

- Complete - it covers the major parts of the project
- Concise - it is focused and provides clear information on the topic
- Clear - it is readable, well organised, and not too jargon-laden
- Cohesive - it flows smoothly between the parts

Keywords

- Ensures the article is correctly identified in abstracting and indexing services
- 5-6 Nos
- Not be a part of title

Introduction

- Clearly state the:
  - Problem being investigated
  - Background that explains the problem
  - Reasons for conducting the research
- Summarize relevant research to provide context
- State how your work differs from published work
- Identify the questions you are answering
- Explain what other findings, if any, you are challenging or extending
- Briefly describe the experiment, hypothesis(es), research question(s); general experimental design or method

Methods

- Provide the reader enough details so they can understand and replicate your research
- Explain how you studied the problem, identify the procedures you followed, and order these chronologically where possible
- Explain new methodology in detail; otherwise name the method and cite the previously published work
- Include the frequency of observations, what types of data were recorded, etc.
- Be precise in describing measurements and include errors of measurement or research design limits

Results

- Objectively present your findings, and explain what was found
- Show that your new results are contributing to the body of scientific knowledge
- Follow a logical sequence based on the tables and figures presenting the findings to answer the question or hypothesis
- Figures should have a brief description (a legend), providing the reader sufficient information to know how the data were produced

Discussion/Conclusion

- Describe what your results mean in context of what was already known about the subject
- Indicate how the results relate to expectations and to the literature previously cited
- Explain how the research has moved the body of scientific knowledge forward
- Do not extend your conclusions beyond what is directly supported by your results - avoid undue speculation
- Outline the next steps for further study

Acknowledgement

Acknowledgements enable you to thank all those who have helped in carrying out the research.

Careful thought needs to be given concerning those whose help should be acknowledged and in what order.

The general advice is to express your appreciation in a concise manner and to avoid strong emotive language.

In thesis, you should first **thank** those who helped you academically or professionally, such as your supervisor, funders, and other academics. Then you can include personal thanks to friends, family members, or anyone else who supported you during the process.

Research Methodology

Scientific Publishing- Scientific article-

References

- Whenever you draw upon previously published work, you **must** acknowledge the source
- Any information not from your experiment and not 'common knowledge' should be recognized by a citation
- How references are presented varies considerably - refer to notes for authors for the specific journal
- Avoid references that are difficult to find
- Avoid listing related references that were not important to the study
-

Research Methodology

Scientific Publishing- Scientific article- References

Harvard Reference Style

- Uses the author's name and date of publication in the body of the text, and the bibliography is given alphabetically by author
  - Adams, A.B. (1983a) Article title: subtitle. Journal Title 46 (Suppl. 2), 617-619
  - Adams, A.B. (1983b) Book Title. Publisher, New York.
  - Bennett, W.P., Hoskins, M.A., Brady, F.P. et al. (1993) Article title. Journal Title 334 , 31-35.

Research Methodology

Scientific Publishing- Scientific article-

References Vancouver Reference Style

Uses a number series to indicate references; bibliographies list these in numerical order as they appear in the text--- [1] ……. [2]……[3]

1. Adams, A.B. (1983) Article title: subtitle. Journal Title 46 (Suppl. 2), 617-619.

2. Lessells, D.E. (1989) Chapter title. In: Arnold, J.R. & Davies, G.H.B. (eds.) Book Title , 3rd edn. Blackwell Scientific Publications, Oxford, pp. 32-68.

3. Bennett, W.P., Hoskins, M.A., Brady, F.P. et al. (1993) Article title. Journal Title 334 , 31-35.

Scientific Publishing- Scientific article- Citation

The terms reference and citation are also often used to refer to the same thing although a citation tends to mean the part of the text within your assignment where you acknowledge the source; whilst a reference usually refers to the full bibliographic information at the end.

Two main types of referencing

- In-text citations appear throughout your paper at the end of a sentence you are citing.
- Works cited page (MLA) or reference list (APA) citations give all of the information your reader would need to find your source.

Research Methodology

Scientific Publishing- Scientific article- Citation

A “citation” is the way you tell your readers that certain material in your work came from another source.

AuthorLastName, AuthorFirstName. "Article Title." Journal Title, Version, Number, Publication Date, Page Numbers

There are (3) major citation styles used in academic writing:

- Modern Language Association (MLA)
- American Psychological Association (APA)
- Chicago

Research Methodology

Scientific Publishing- Scientific article- Citation

MLA (Modern Language Association) format is used for humanities and literature works.

APA (American Psychological Association) is used for technical and scientific works. Each writing style is formatted to make citations for that specific field easier.

Research Methodology

Scientific Publishing- Scientific article- Citation

MLA citation style is most frequently used in the humanities (literature, languages, art).

MLA style relies on parenthetical citations (author, page number) for material that is quoted, summarized or paraphrased in the text of a paper.

APA in-text citation style **uses the author's last name and the year of publication**, for example: (Field, 2005). For direct quotations, include the page number as well, for example: (Field, 2005, p. 14)

Chicago (Turabian) Style also allows the use of footnotes, rather than in-text citations, to cite your sources.
Author last name, first name. "Title **of** Article." Name of Publication, month date, year.

References (IEEE-like format)

Journal Paper:

[1] B. Igelnik and D. Simon, "The eigenvalues of a tridiagonal matrix in biogeography," *Applied Mathematics and Computing*, vol. 218, no. 1, pp. 195–201, September 2011.

Conference Paper:

[2] H. Ma and D. Simon, "Biogeography-based optimization with blended migration for constrained optimization," *Genetic and Evolutionary Computation Conference*, Portland, Oregon, pp. 417–418, July 2010.

Book Chapter:

[3] P. Lozovyy, G. Thomas, and D. Simon, "Biogeography-based optimization for robot controller tuning," in: *Computational Modeling and Simulation of Intellect* (B. Igelnik, editor) IGI Global, pp. 162–181, 2011.

Book:

[4] D. Simon, *Optimal State Estimation*, John Wiley & Sons, 2006.

Research Methodology

Scientific Publishing- Scientific article- Citation

Basic In-Text Citation Styles

Author type	Parenthetical citation
One author	(Tan, 2020)
Two authors	(Tan & Goh, 2020)
Three or more authors	(Reilly et al., 2020)
Group author with abbreviation First citation* Subsequent citations	 (Ministry of Health [MOH], 2020) (MOH, 2020)

Research Methodology

Scientific Publishing- Scientific article- Good writing

- Content, accuracy
- Clarity
- Precision
- Logic
- Order of presentation

Research Methodology

Scientific Publishing- Scientific article- Clarity

- Clear
- Exact
  - Ambiguity, inconsistency
  - Wooly words
- Concise
  - Least words
  - Short words
  - One word vs many

THANK YOU

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