

Research Documentation

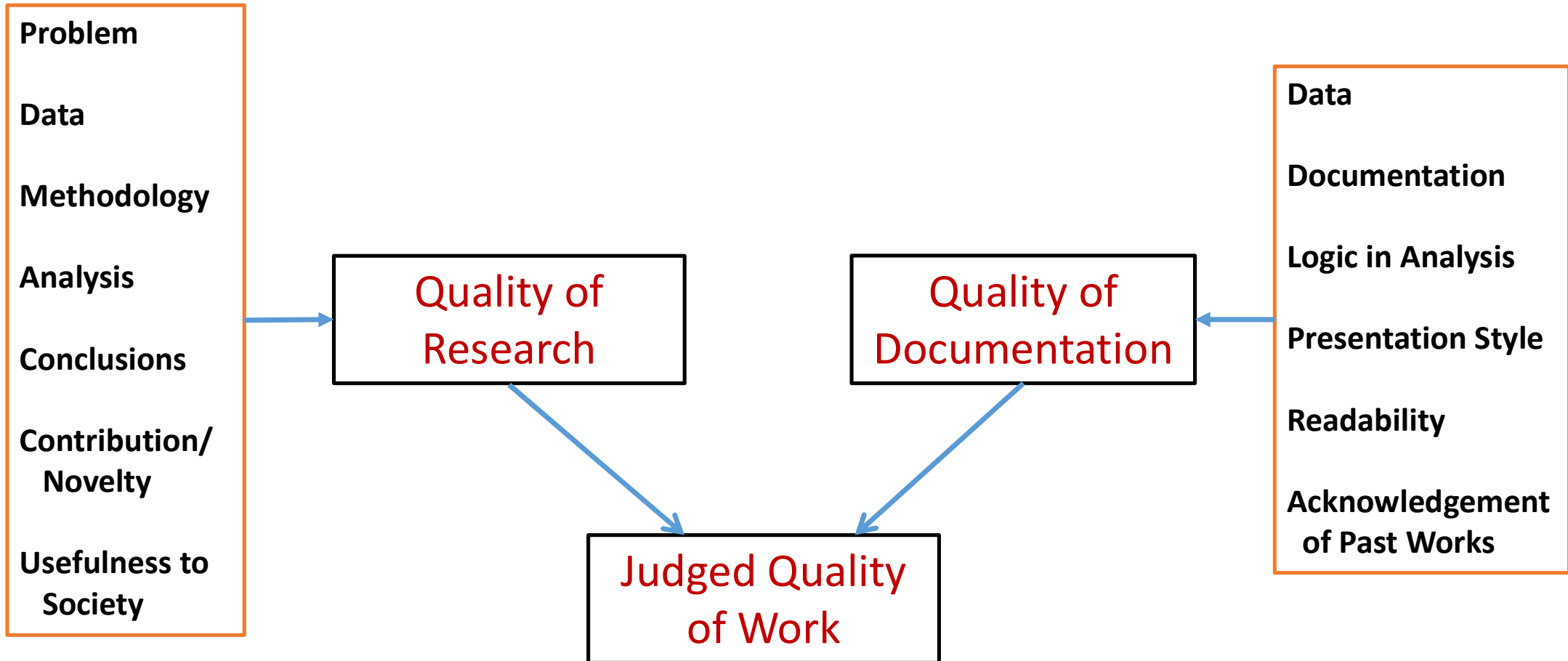
Concept of Documentation

- Documentation is a process of
 - **keeping records** on projects or events and
 - **explaining** facts of objects, systems or procedures.
- It is also a process of
 - **accumulating** and **classifying** documents and
 - **making them available** to others.

Documenting Research

- Survey Notebook
- Laboratory Notebook
- Research Proposal
- Progress Report
- Research Paper
- Synopsis
- Thesis
- Data Stores (Data documentation)

Quality of Work as Judged by a Reviewer



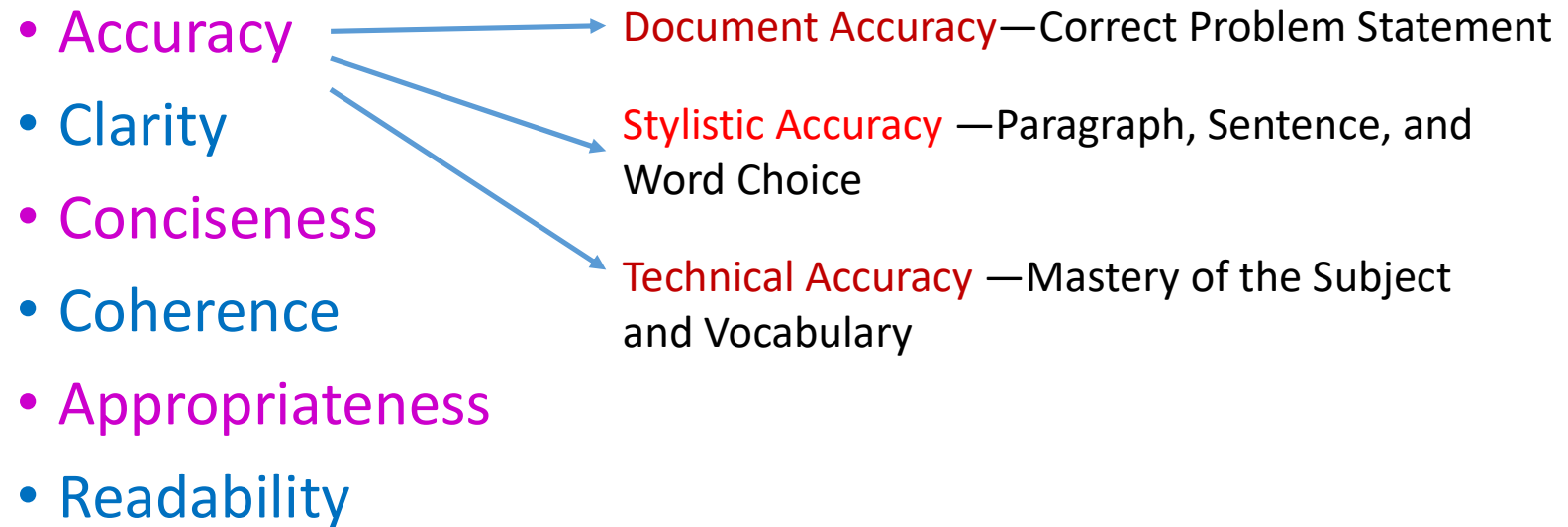
ACCCAR

The Characteristics of Scientific Writing

- Accuracy
- Clarity
- Conciseness
- Coherence
- Appropriateness
- Readability

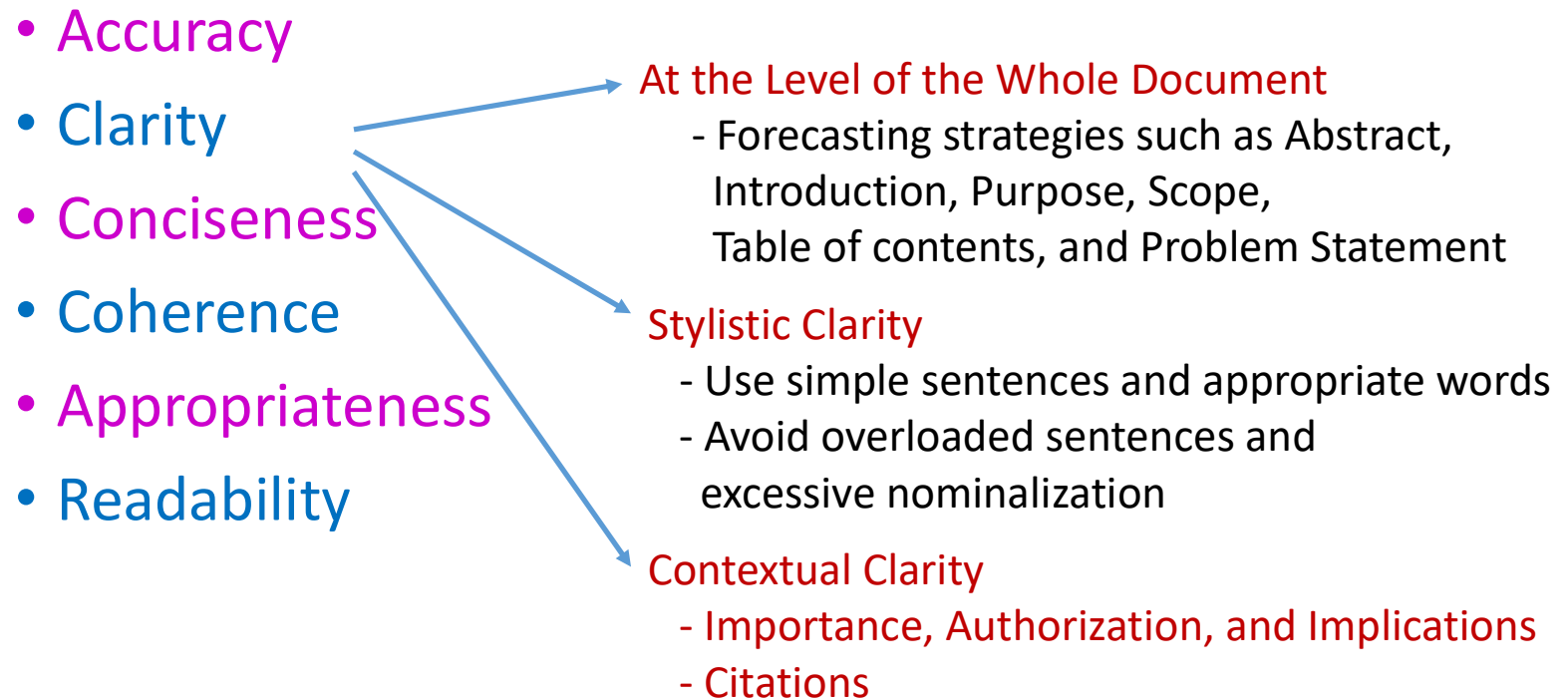
ACCCAR

The Characteristics of Scientific Writing



ACCCAR

The Characteristics of Scientific Writing



ACCCAR

The Characteristics of Scientific Writing

- Accuracy
- Clarity
- Conciseness → At the Level of the Whole Document
 - Narrow down the scope
 - Use graphics
 - Avoid repetitions
 - Reduce wordiness
- Coherence
- Appropriateness
- Readability

ACCCAR

The Characteristics of Scientific Writing

- Accuracy
- Clarity
- Conciseness
- Coherence →
 - Make material logically and stylistically consistent
 - Organize ideas in specific patterns
- Appropriateness
- Readability

ACCCAR

The Characteristics of Scientific Writing

- Accuracy
- Clarity
- Conciseness
- Coherence
- Appropriateness →
 - Material relevant to the purpose of writing and to the purpose of the audience
 - Conformance to community norms
- Readability

ACCCAR

The Characteristics of Scientific Writing

- Accuracy
- Clarity
- Conciseness
- Coherence
- Appropriateness
- Readability →
 - Less number of syllables per word.
 - Less number of words per sentence.

Readability Score

- **Flesch Readability (*FR*) Score (Rudolph Flesch, 1948)**

$$FR\ Score = 206.835 - 1.015 \left(\frac{Total\ Words}{Total\ Sentences} \right) - 84.6 \left(\frac{Total\ Syllables}{Total\ Words} \right)$$

The *FR* score ranges from 0 to 100. **The higher the score, the more readable is the text.**

- **Flesch-Kincaid Readability (*FKR*) Score (Rudolph Flesch & John P. Kincaid, 1976)**

$$FKR\ Score = -15.59 + 0.39 \left(\frac{Total\ Words}{Total\ Sentences} \right) + 11.8 \left(\frac{Total\ Syllables}{Total\ Words} \right)$$

FKR score has a lower bound of -3.40 with no upper bound.

The higher this score, the less readable is the text.

For Good Readability

- Number of syllables per word should be less.
- Number of words per sentence should be less.

Tips for Good Writing

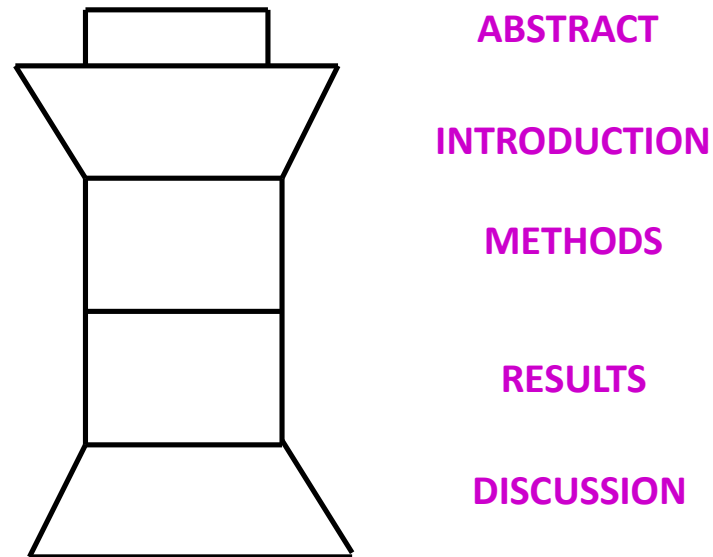
- Continuity of ideas
 - Use short sentences.
 - Use active voice.
 - Make correct use of tense.
 - Be gender neutral.
 - Write grammatically correct sentences.
 - Write sentences in positive form.
 - Define acronyms and abbreviations.
 - Avoid jargon.
 - Disambiguate.
 - Avoid slang, idioms, and colloquial phrases.
 - Avoid figurative language
 - Avoid humour, satire, and irony.
 - Omit needless words.
 - Get the report read by someone unconnected with the work
- *The overriding rule*

Structure of a Scientific Report

Presentation Styles

- Many variations of presentation style exist.
- The following is a list of essential themes:
 - Prefatory Materials
 - Body of the Document
 - Introduction
 - Literature Review
 - Materials and Methods
 - Results and Analysis
 - Conclusions
 - List of References
 - End Matter
 - Notes
 - Appendices

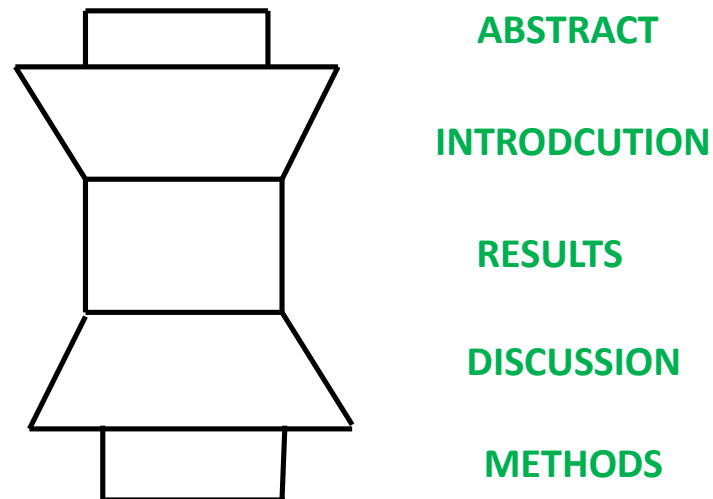
Conventional Article Structure (AIMRD)



Width and Shape are important rather than Depth.

Hour-Glass Configuration

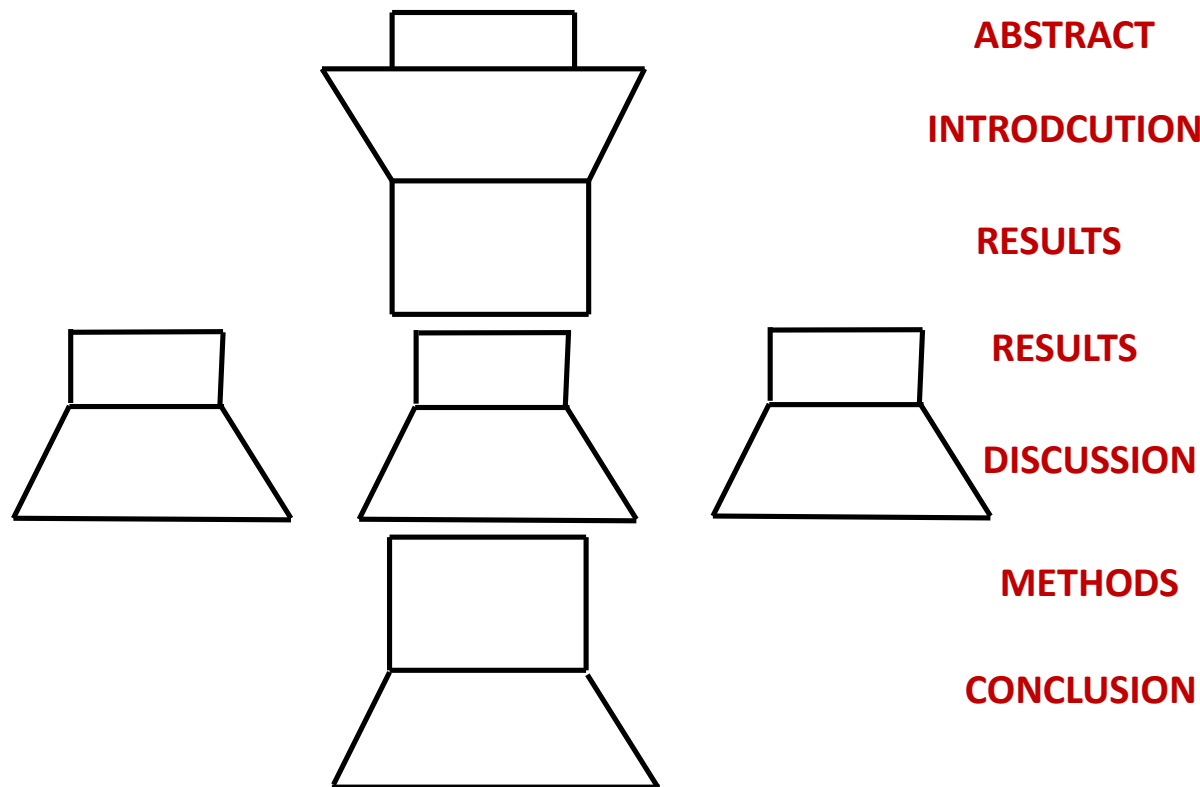
Conventional Article Structure (AIRDM)



Popular in Journals of Chemistry and Molecular Biology

Hour-Glass Configuration

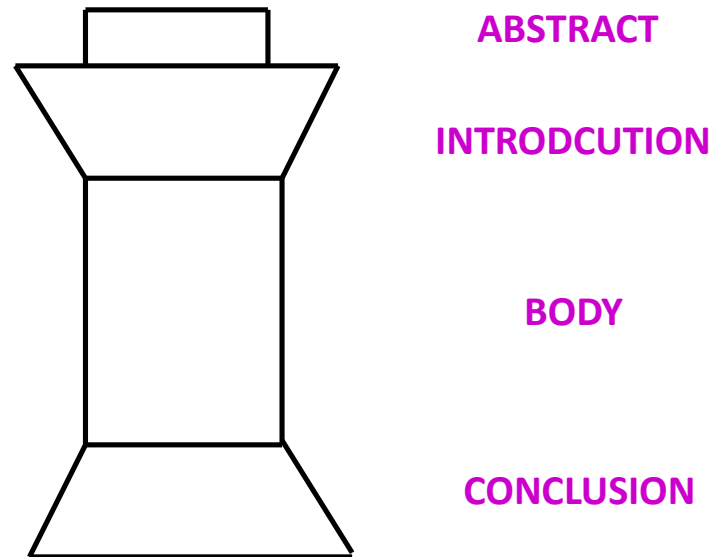
Conventional Article Structure (AIR(RD)MC)



Used Sometimes for Shorter Articles in Some Journals

Hour-Glass Configuration

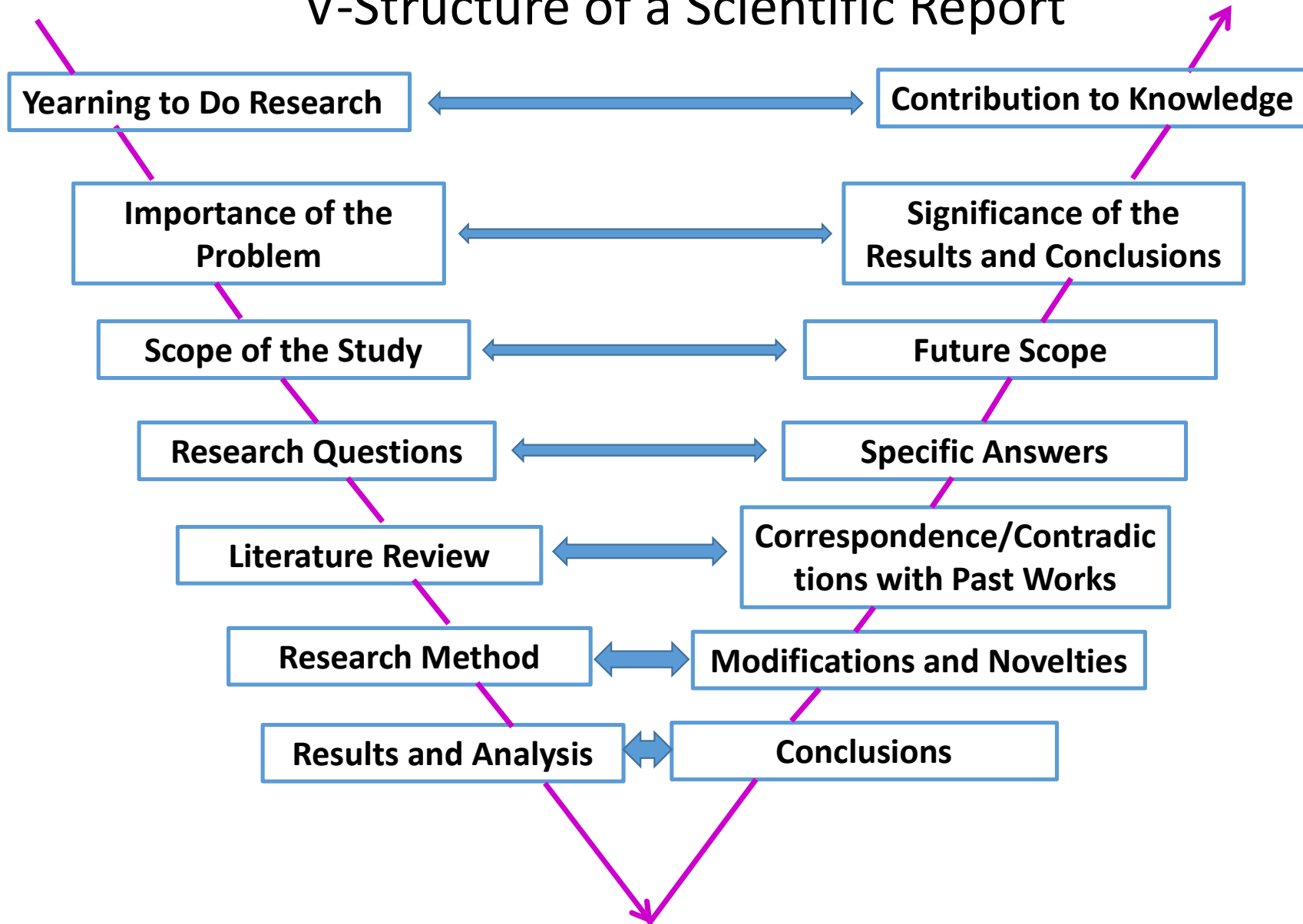
Conventional Article Structure (AIBC)



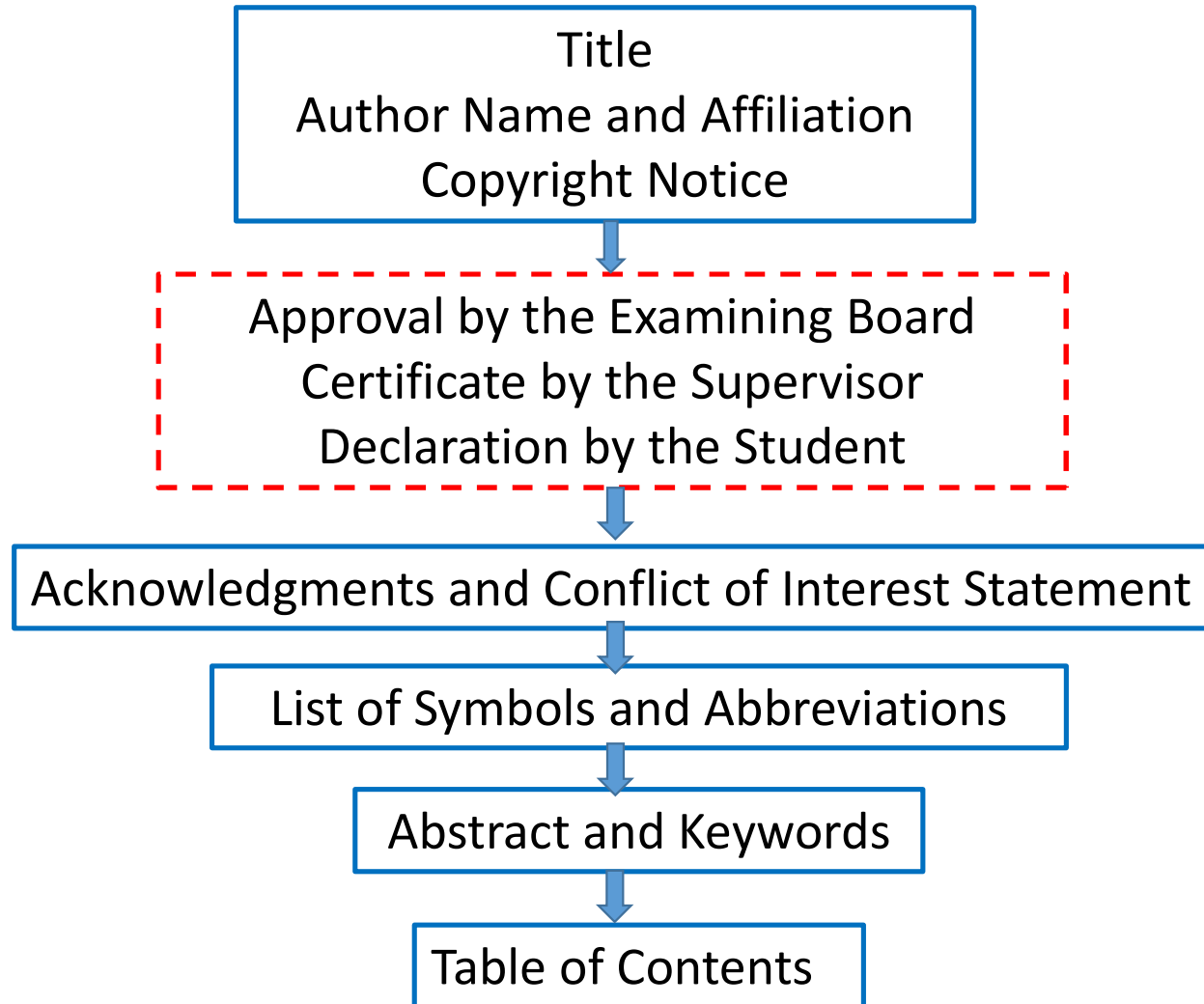
Common in Engineering, Physics, Computer
Science, and Remote Sensing

Hour-Glass Configuration

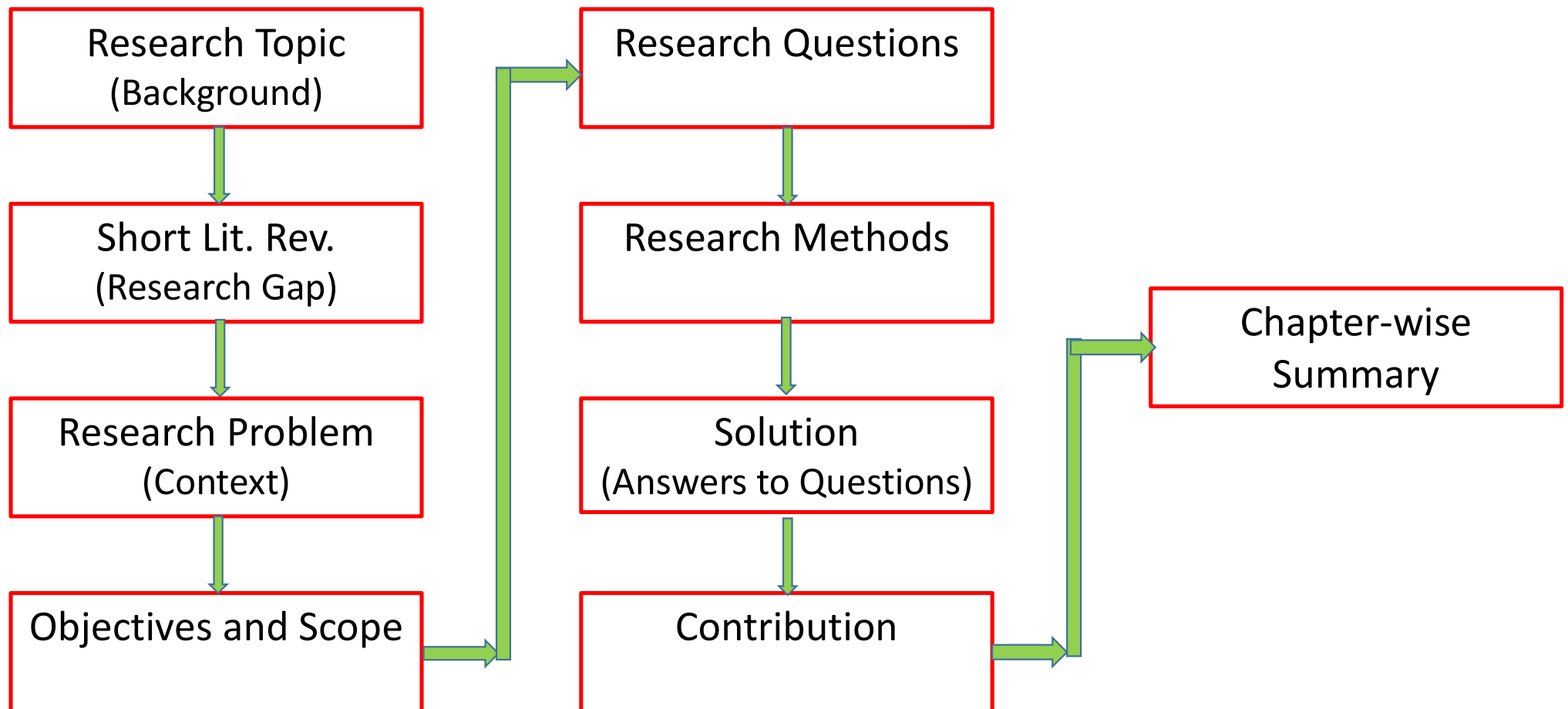
V-Structure of a Scientific Report



Prefatory Materials



INTRODUCTION



Past Works

Encyclopedia
Handbooks
Books

State-of-the-Art Reviews
Committee Reports

Journals
Conf. Proceedings
E-Databases

Theses
Working Papers

Personal Communications
Unpublished Documents
Blogs and Soc Media Contents

Literature Review

Unbiased critical
evaluation

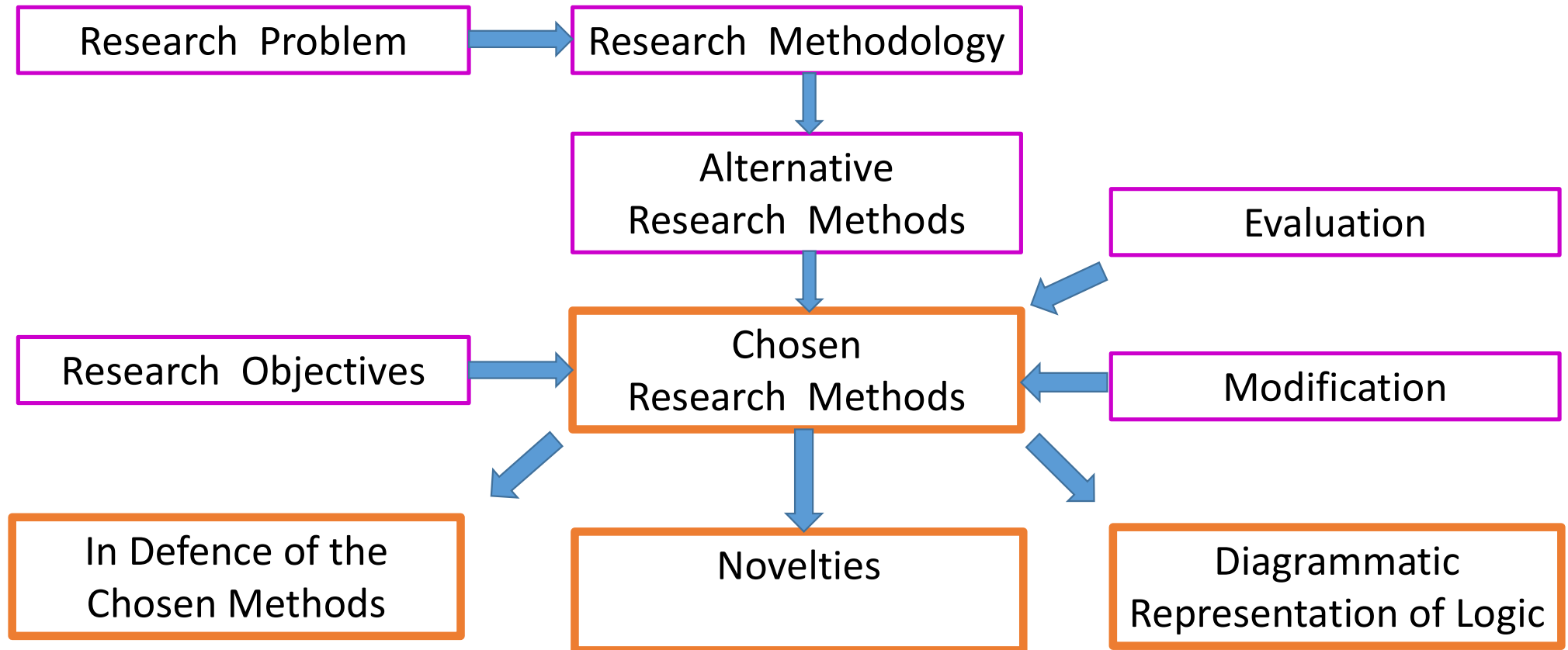
Literature
Review

Review

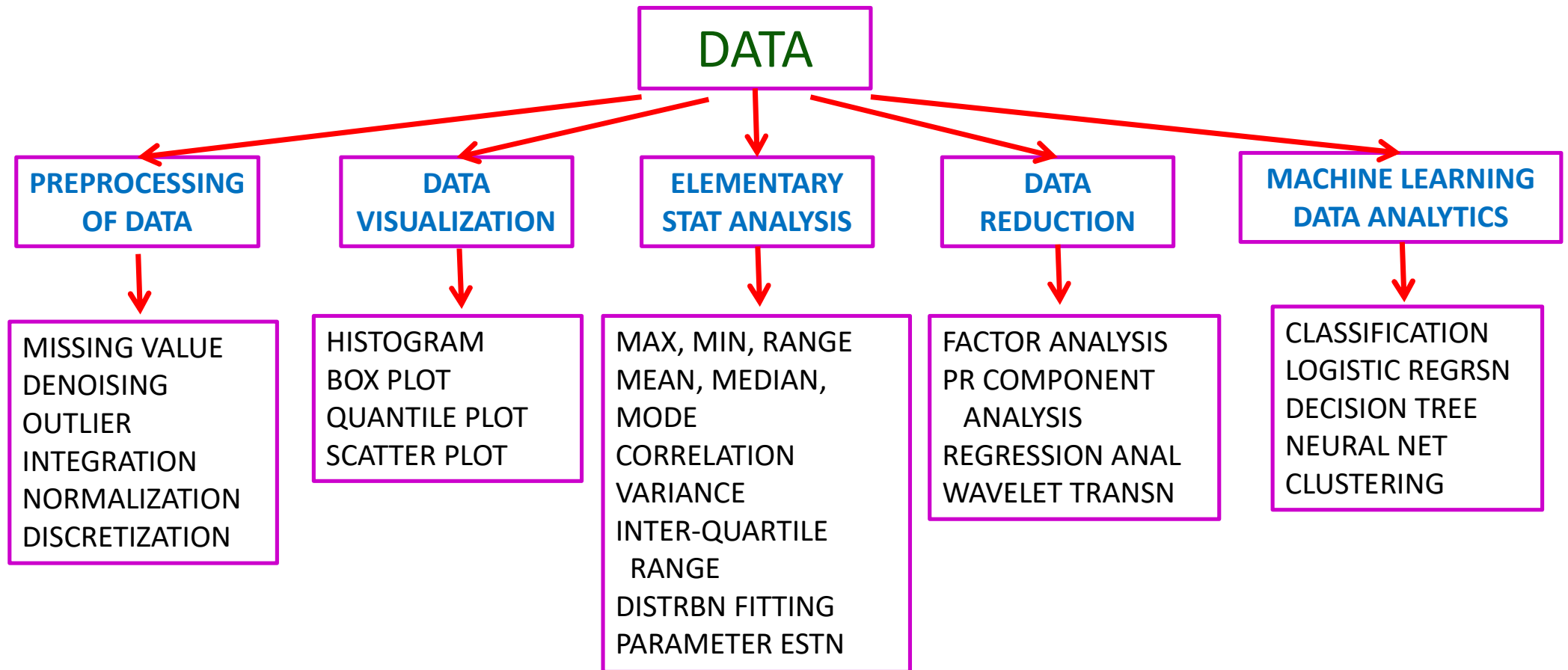
- Trends and milestones
- Paradigm shifts and bifurcation points
- Interdisciplinary in-migrations
- Strengths and weaknesses
- Flawed assumptions
- Weak derivations
- Inadequate experimentation
- Unsubstantiated conclusions
- Debates and controversies
- Contradictions
- Research gap
- Unaddressed research questions and applications

Methodology

- Provides a generic framework of concepts and relationships for the problem
- Consists of a logically linked set of research methods corresponding to objectives



Data Analysis



Analysis of Results

Logical Explanation

- Qualitative
- Quantitative

Validity

- Internal
- External

Interpretation

- Theoretical
- Practical

Generalization

Conclusions

Drawn Inferences

- Corresponding to Each Research Objective
- Answer to Each Research Question

Comparison with Past Knowledge

- Corroboration
- Contradiction

Limitations

- Reviewing Present Scope
- Weaknesses of the Present Research Investigation

Future Scope

- Relaxing Assumptions

Appendixes

Tables

- Collected Data
- Experimental Results

Lists

- Program Statements
- Survey Participants
- Supplier Details

Details of Existing Methods

- Source and Description

Intermediate Derivations

- Lemmas

Photographs

Necessary Adjuncts to Research Documentation

- Cover Page Material
- First Inner Page Material
- Approval by the Examining Board
- Certificate by the Supervisors
- Declaration by the Research Student
- Acknowledgements and Conflict of Interest Statement
- List of Symbols and Abbreviations
- Abstract and Keywords
- Table of Contents
- Appendix