3. Methods

Research Design

This study employs a bibliometric analysis approach to comprehensively map the intellectual landscape of data visualization in evaluation research. The methodology is complemented by a systematic review process, adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, to ensure a structured, transparent, and replicable selection of relevant literature (Page al et., 2020).

Data Collection

A comprehensive search of the major academic databases (e.g., Scopus, Web of Science) was conducted using predefined search strings related to "data visualization," "evaluation," "evaluation communication," and related terms. Metadata was downloaded from Scopus and WoS websites using search terms, and CSV files were downloaded.

- **Search Strategy:** Keywords and Boolean search strings:
    - *"data visualization" AND (evaluation OR program evaluation OR* "process evaluation"*)*
    - "data visualization" *AND* ("evaluation research" OR "evaluation report" OR "impact evaluation")
    - "data visualization", AND ("evaluation communication" OR "formative evaluation" OR "outcome evaluation"
    - "communicating" AND "evaluation" AND "results"
- **Inclusion and Exclusion Criteria:**
    - Time range: (2010–2024)
    - Document types: Articles, reviews, book chapters, conference papers
    - Languages: English
    - A paper should have at least one citation

Data Extraction: Relevant metadata (e.g., authors, titles, abstracts, keywords, publication years, citations) were extracted from the selected publications and imported into a bibliometric database.

Data Screening and Selection: The initial search results were screened based on predefined inclusion and exclusion criteria, following PRISMA guidelines. This involved assessing titles, abstracts, and full texts to ensure relevance to the study's focus. Full text screening was

performed using Loon Lens. The screened data was further cleaned and used for the data analysis and data visualization. Total of 326 out of 1267 met the inclusion criteria

Database	**Number**
Scopus	950
WoS	552
Dupblicates	(88)
Removed papers dated below 2010	(147)
Total	1267

Data Analysis Procedure

Bibliometric Analysis: The study applies a range of bibliometric techniques, including Co-citation analysis: to identify clusters of highly cited publications and reveal the intellectual foundations of the field. Keyword co-occurrence mapping: exploring thematic trends and emerging research areas by analyzing the relationships between keywords used in literature. Collaboration network analysis examines patterns of collaboration among authors, institutions, and countries, and identifies key actors and knowledge hubs.

Data Visualization: The results of the bibliometric analyses are visualized using network graphs, citation maps, and other visual representations to facilitate the interpretation and communication of the findings.

Software: R software was employed for data analysis and visualization. Key packages included 'bibliometrix' for bibliometric analysis, 'tidyverse' for data manipulation and visualization, 'janitor' for data cleaning, and 'psych' for descriptive statistics. By combining systematic review principles with advanced bibliometric techniques, this research design provides a robust and transparent approach to exploring the evolving landscape of data visualization in evaluation research.