

Control questions for writing and evaluating scientific papers according to the IMRaD methodology (Introduction, Methods, Results and Discussion/Conclusion)

What is an IMRaD report? “IMRaD” format refers to a paper that is structured by four main sections: Introduction, Methods, Results, and Discussion. This format is often used for lab reports as well as for reporting any planned, systematic research in the social sciences, natural sciences, or engineering and computer sciences.

The IMRaD report (the manuscript) structure

Formulation of the title of the paper

The title should express the essence of the paper. By reading the title, the reader gets an idea of the research topic and research problem. The title is a summary of the subject of professional and scientific research that the author approaches. A colon (:) is often used in the title to emphasize the research area. The title should be clear, indicative, current, neither too long nor too short. If it is necessary for the title to be somewhat longer, then it is better to divide it into a title and a subtitle. The subtitle then has the function of referring more precisely to the subject of research.

An Example

Petković, S., Alfirević, N., & Zlatković – Radaković, M. (2022). Environmental sustainability and corporate social responsibility of business schools: is there evidence of transdisciplinary effects? *Economic Research – Ekonomska istraživanja*, 6445-6465. <https://doi.org/10.1080/1331677X.2022.2048203>

Abstract – Summarize the entire study. The abstract for the report comes at the beginning of the paper, but you should write it after you have drafted the full report. The abstract provides a very short overview of the entire paper, including a sentence or two about the report’s purpose and importance, a sentence or two about your methods, a few sentences that present the main findings, and a sentence or two about the implications of your findings. You end the Abstract with 4 to 5 key words, which together with the title allow the potential reader to express interest in the paper.

- 1. Introduction** – The introduction states the research problem or the question(s) you intend to address through research. The introduction explains why this research is important or necessary or important (the research problem background short explanation). Begin by describing the problem or situation that motivates the research. Move to discussing the current state of research in the field (often, we call this a literature review and it may even merit having its own section, which follows the Introduction section, typically using numerated subheadings); then reveal a “gap” or problem in the field or in the knowledge. Finally, explain how the present research is a solution to that problem or gap including a possible quick explanation of the type of research that needs to be conducted. If the study has hypotheses, they are presented at the end of the introduction. Anyway, at the end of the introduction, forecast statement that explains, very briefly, what the rest of the paper will entail (i.e. „The rest of this study is organized as follows. In the next section, we provide a review of the literature related to digital transformation and innovation in SMEs. The following section presents the methodology by explaining the sample, model specification and the empirical strategy. The next section presents empirical results followed by the main conclusions, limitations and ideas for future research“). **The Introduction** and following **The Literature and Hypothesis Development** sections have to use numerated subheadings (in Bold).
- 2. Methods – What did you do?** section tells readers how you conducted your study. It includes information about your population, sample, methods, and equipment. The “gold standard” of the methods section is that it should enable readers to duplicate your study. Methods sections typically use subheadings; they are written in past tense, and they use a lot of passive voice. This section needs to be very clear, very specific, very detailed, and only focused on *research*. Avoid explaining

what the research means–this is for the next sections, Analysis and Discussion. While the research section is often considered the most boring section for someone to read, it is also considered the most important section to build your credibility. If your research methods are sound, your paper holds a lot more weight.

3. **Results – What did you find?** In this section, you present your findings. The results section is critical for your audience to understand what the research showed. Use this section to show tables, charts, graphs, quotes, etc. from your research. At this point, you are building your reader towards drawn conclusions, but you are not yet providing a full analysis. You’re simply showing what the data says. Follow the same order as the Methods section–if you put interviews first, then focus groups second, do the same in this section. Be sure, when you include graphics and images (captions go above tables and figures, while notes go below), that you label and title every table or graphic (“**Table 3 Interview Results**”) and that you introduce them in the body of your text (“As you can see in Figure 1, seventy-nine percent of respondents...”).
4. **Analysis** - The analysis section details what you and others may learn from the data. While some researchers like to combine this section with the Discussion section, many writers and researchers find it useful to analyze the data separately. In the analysis section, spend time connecting the dots for the reader. What do the interviews say about the way employers think about their employees? What do the observations say about how employees respond to workplace criticism? Can any connections be made between the two research types? It’s important in the Analysis section that you don’t draw conclusions that the research findings don’t suggest. **Always** stick to what the research says.
5. **Discussion** - In this section, you summarize your main findings, comment on those findings (see below), and connect them to other research. You also discuss limitations of your study, and use these limitations as reasons to suggest additional, future research. In conclusion, you explain the **contribution to theory**, but also the **implications of your research results for policies and managerial decisions**. Finally, you conclude this paper by suggesting what new knowledge this provides to the field. You’ll often want to note the limitations of your study and what further research still needs to be done. If something alarming or important was discovered, this is where you highlight that information.

At the end of the paper, you provide the reference with a list of the sources used in the paper. Only the sources mentioned in the text are cited.

The text should be technically arranged and the citation of literature sources in JCE is done according to [APA 7th Edition Standards](#).

When writing your paper, the following checklist can be helpful if you have skipped or forgotten an important element. Good luck!!!

TITLE	YES	NO
Is the title new, current, inventive, effective and useful (who, what, how)?		
Is the title simple, clear and unequivocally reflects the essence of the content of the paper?		
Is the title indicative?		
Does the title also have a subtitle, which more precisely defines the subject of the research or the type of the scientific paper?		
ABSTRACT		
Does the summary briefly describe the background of the research problem?		
Does the abstract have a clearly defined purpose, or goal of the paper?		
Does the abstract put the paper in the context of the previous research?		
Does the abstract outline the problem of research and clearly specifies its relevance?		
Does the abstract state the methods used to solve the problem?		
Does the abstract clearly identify the main findings and their originality/relevance?		
Does the summary contain the basic conclusions?		
Is the summary short enough (up to 250 words)?		

Are the keywords listed in a way that together with the title of work reveal the essence of the research (optimally five words)?		
INTRODUCTION (can be numbered with the number 1 but not binding)		
Does the introduction introduce the problem of research through a short theoretical presentation?		
Does the reasoned topic of scientific research and the arguments presented prove the contemporaneity, relevance and suitability of the research topic?		
Does the introduction define the problem, object, purpose, objectives, and hypothesis of research?		
RESEARCH PROBLEM		
Is the problem scientifically, clearly and precisely defined?		
Is the problem adequately narrowed in the research problem?		
Is the problem theoretically reasoned?		
Is the problem significant enough for research and does it imply that the original scientific contributions will be achieved by resolving the problem?		
Is it necessary to carry out scientific research in order to come up with new knowledge and solutions to the problem?		
Does the problem imply certain harmful consequences (economic, environmental and social), which should be dealt with scientifically?		
Is the relationship between the identified research problem and previous, related researches clearly described?		
Does the problem have a practical significance?		
RESEARCH OBJECT		
Is the field of research clearly and precisely defined?		
Have the wider and narrower field of research been defined?		
RESEARCH PURPOSE AND OBJECTIVES		
Is the main purpose of the research determined?		
Are the main research objectives, that are intended to be achieved by the results of the research, defined?		
Are the scientific objectives of the research defined?		
Are pragmatic research goals defined?		
Are the objectives consistent with the research problem?		
Is the summary of the work briefly described at the end of the introduction?		
1. LITERATURE REVIEW (ASSESSMENT OF RESEARCH AND THEORY FRAMEWORK)		
Is the literature collected related to the problem and subject of research?		
Is the reference literature covered (Articles must be latest from internationally indexed databases - WoS, SSCI, SCOPUS, and books not older than 5 years, except in case of the use of fundamental scientific work)?		
Is the collection of literature logically organized?		
Does the collected literature provide a critical overview of relevant research?		
Is there evidence on the basis of which a critical review is given?		
Are the titles and subtitles in the theoretical framework grouped according to the topics?		
Are the unknowns about the research problem identified and explained?		
Is the literature correctly cited?		
Is the theoretical part related to the problem of research?		
Are the terms in the theoretical part adequately defined, and are the relations between these terms clearly explained (terms and conceptual analysis)?		
Is there evidence for the analysis and synthesis of various studies related to the comparison of results, the identification of the difference between numerous studies?		
Are the problems, uncertainties and issues that are unresolved in the literature clearly identified?		
Is there a specific conclusion at the end of the theoretical part and from which is the research proposal to be implemented?		
2. RESEARCH MODEL AND HYPOTHESIS		
Do the hypotheses correspond to the research problem?		
Is the hypothesis conceptually clear?		
Is the hypothesis experientially confidential?		
Is the hypothesis associated with theory and relevant empirical evidence?		
Do hypotheses describe predictive relationships between two and more variables?		
Are the main and auxiliary hypotheses set?		
Is the research model presented?		
3. RESEARCH METHODOLOGY		
RESEARCH DRAFT		

Is the research draft adequately described?		
Does the research draft correspond to the research problem?		
Does the research draft address the issue of internal and external validity of studies?		
Are the methods used appropriate?		
SAMPLE		
Is the size of the sample adequate?		
Does the sample represent a defined population?		
Is the sample selection process adequate and economical?		
Is the sampling method adequate?		
Are the selection criteria for the sample clearly identified?		
RESTRICTIONS IN RESEARCH		
Are the explicit limitations clearly described?		
Are the possible solutions to overcoming the research limitations in future research described in this subheading?		
4. RESULTS OF RESEARCH		
Are the methods of data collection suitable for research?		
Are the methods of collecting data described appropriately?		
Are the methods of measuring data adequate?		
Are dependent and independent variables defined?		
Are there control and other variables (intervening, conditional, and others) and have they been identified?		
Are complex variables divided into indicators?		
Are the indicators valid, or are they related to the variable to be measured?		
Are the indicators objective, that the results of the measurements depend on what is and is not measured?		
Are the indicators reliable, that is, when we measure one variable, we can rely on them without limitations?		
Are the indicators unambiguous, that is, they are so clear and precisely defined that different entities know exactly what they are related to?		
Are the indicators precise, or allow them to register smaller differences in the size of the variables?		
Are the results of the research clearly and logically organized and presented?		
Is the type of data analysis suitable for measuring each variable?		
Are tables, charts and images clear and reasonable?		
Are statistical testing correct for answering a research question?		
Are the results presented in the logical order?		
Does the text comment on the most important information that arises from the tables and graphs?		
Is the interpretation of the results, but without comment, based on the data obtained?		
DISCUSSION		
Are the arguments in the work built on an appropriate basis of theory, concepts, or other ideas?		
Has the hypothesis been proved based on the results of the research?		
Are the auxiliary first, and then the main hypotheses been proved?		
Do research results support hypotheses?		
Do the research results have their application in the theoretical and applicative sense?		
Are there specific and clear facts where the results of the research (scientific contribution) can be applied theoretically?		
Is it indicated where, when, how and under what assumptions can scientific application be applied in practice?		
Are the results obtained consistent with the results of other authors, or why are their results different from the results obtained by other authors who have done the similar research?		
Whether and to what extent the methods used have influenced the results, and would some other methods give different results?		
Is it self-critically warned of some shortcomings (objective or subjective) of the research?		
IMPLICATIONS OF RESEARCH RESULTS		
Does the paper clearly identify the implications for future research, practice and/or society?		
Does the work bridge the gap between theory and practice?		
How can the research be used in practice (economic and commercial impact) in teaching, to influence public policy and research (contributing to new knowledge)?		
What is the impact on society (impact on public attitudes, impact on quality of life)?		
Are these implications consistent with findings and conclusions?		
CONCLUSION		

Does the conclusion represent the systemic, concise and nucleus synthesis of all relevant knowledge, scientific facts, scientific theories presented in the paper, which have proved the main and auxiliary hypothesis?		
Have the results been clearly presented and analyzed appropriately?		
Do conclusions adequately link other elements of work?		
Are the conclusions explained?		
Are the directions of further research identified?		
Does the paper contain new and relevant information that is adequate to justify the publishing?		
REFERENCES		
Does the work demonstrate an adequate understanding of the relevant literature in the field of research and does the list of references corresponds to the literature quoted?		
Has any significant paper been overlooked?		
Do the references include only quoted and used literature?		
Have references been classified and listed in accordance with the prescribed APA standards?		
ATTACHMENTS (ANNEXES)		
Are the questionnaires, tables and other relevant data, which support the results of the research, listed at the end of the paper?		