

The art and science of scholarly writing: framing symmetry of specificity beyond IMRAD

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Symmetry of
specificity
beyond
IMRAD

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Abstract

Purpose – The purpose of this paper is to provide scholars with a robust, easy-to-follow structural model for crafting compelling academic publications. Recognizing the diversity of research methodologies and genres, the paper proposes the symmetry of specificity framework as a guide to maintaining coherence, depth and relevance across different sections of an academic paper.

Design/methodology/approach – This paper presents a theoretical framework – “symmetry of specificity” – through an iterative approach inspired by supervision and examination of theses, writing and reviewing research papers and editorial work. The framework builds upon the established IMRAD model and uses the concept of symmetry to explain the structural elements of academic publications. Its unique contribution lies in elucidating the two-dimensional funneling process that takes place within academic writing, and providing a nuanced understanding of how to maintain balance between different sections.

Findings – The symmetry of specificity framework introduces a novel perspective on academic writing, emphasizing the concept of “symmetry in specificity”. It shows how maintaining a balance in detail and focus across different sections of a research paper can significantly enhance its coherence and relevance. By elucidating the interaction between theory and data in research writing, it provides valuable insights into the nuances of crafting a compelling academic paper.

Research limitations/implications – While the proposed symmetry of specificity framework may not be universally applicable across all types of research, it provides a solid foundation for the development of alternate structures tailored to specific research paradigms. There is ample opportunity for future research to explore adaptations of this model for various types of academic writing, offering a fresh perspective on structuring academic publications and potentially sparking new discussions and innovations in this realm.

Practical implications – This framework can aid both novice and experienced scholars in structuring their research papers effectively. By offering a conceptual roadmap, it guides the writer through the complex process of academic writing, from crafting the methodology and analysis sections to articulating compelling conclusions. Thus, it serves as a useful tool in enhancing the quality and impact of research communication.

Originality/value – This paper presents a unique approach to structuring academic publications that goes beyond the conventional IMRAD model. By offering a theory-based structural model, it contributes to an underexplored area in academic writing and opens up new avenues for pedagogy and practice in research communication.

Keywords Writing, Research, Scholars, IMRAD, Report structure

Paper type Viewpoint



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1. Introduction

Writing an (academic) publication on any level puts several demands on the author. The author needs to possess extensive knowledge in their field and the skills to conduct research according to the field’s scientific requirements. The work also needs to be neatly presented in writing, in a way that is suitable for the research area (Maedows, 1998). Teaching material is available to show how different parts of the publication should be connected (Säfsten and Gustavsson, 2019). It is often suggested that a well-structured publication should be analogous to “folding a paper in half”, implying a symmetry where the early sections correspond with the later ones. This idea seems simple at face value, but the folding in half is not a sufficient explanation for the symmetry. There is a second dimension to this symmetry in academic writing, which is the level of specificity. This is to some extent included in the popular IMRAD model (Day, 1989; Wu, 2011) (Figure 1). IMRAD outlines what should be included in the different chapters of a publication (e.g. BSc, MSc, PhD thesis and research paper). The model demonstrates a funnel approach where the publication begins with a broad perspective and narrows down towards the main topic, only to broaden again towards the end. How this is interpreted and communicated will differ depending on what academic level the author is.

During a period of about 15 years, I have taken interest in this topic and have worked with text production supervising thesis projects and teaching methodology on BSc, MSc and PhD levels. This work has included several discussions with colleagues on how to teach writing. During this time, I have encountered both students and colleagues who are unsure about how to structure their academic writing. Students often learn that details specific to a case should not be included in the introduction, yet they frequently hesitate to incorporate theory when dealing with the case. In my experience, the confusion about what goes where is a manifestation of poor understanding of level of specificity and how to treat symmetry in a publication.

Students get help from supervisors who, depending on cultural norms, should be able to give advice (Zhang and Hyland, 2021). However, supervisors are not a homogenous group, and the experience and skills among supervisors vary greatly. Some supervisors have just

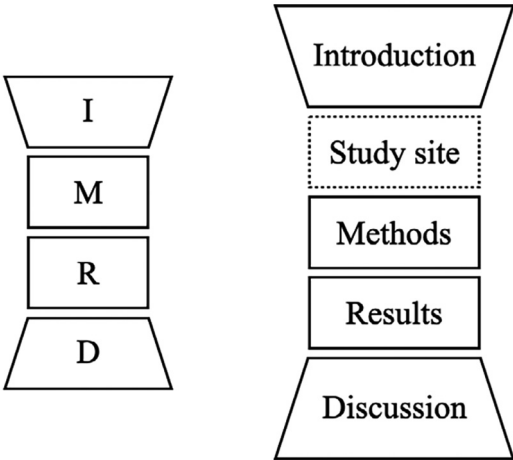


Figure 1.
Representation of the
IMRAD structure

Source: Adapted from Wu (2011, p. 1346)

completed their own degree, some supervisors completed their degree decades ago and spent their time working in industry, and some supervisors are prolific authors. Consequently, the level of assistance students receive from supervisors can vary, highlighting that supervisors themselves require varying degrees of support in their supervisory roles. In such cases, having established models for reference, like the IMRAD model, becomes crucial.

Even though the IMRAD model was initially presented in 1989, the model has seen little theoretical development over the years. A structured literature review (Gimenez and Tachizawa, 2012) conducted for this paper was able to identify 44 papers explaining either IMRAD or how to use IMRAD (Appendix). None of these papers intended to expand on the IMRAD model itself. The journals in which the papers are published show that the discussion about IMRAD is not targeting academics in areas such as business, management and operations. It is possible that the ongoing discussion does not benefit academics in those areas. There are papers aimed at helping authors by explaining what should be included in different chapters of a publication. Sometimes expanding beyond the original four chapters from IMRAD (Codina, 2022; Kumar, 2023). A common shortcoming across these papers is their limited exploration of the theoretical principles that underpin the IMRAD model.

The focus of this paper is the symmetry of specificity throughout a publication. Specificity refers to the scope in terms of how general or specific the publication is. For example, if the publication is discussing competitive advantage in general, or the efforts of a company specifically. Symmetry refers to the pattern of change in specificity throughout the publication, such that the level of detail in the early parts aligns with that in the later sections. Symmetry of specificity is an attempt to put an explanatory framework to the notion of “folding a publication in half”. The purpose of this paper is:

To expand on the IMRAD model and elaborate on the concept of symmetry in publications.

This paper does not aim to explain how each chapter of an academic publication, such as a bachelor’s thesis, should be written. Numerous resources already exist that discuss concepts like “the funnel” in the introduction or how to formulate a research purpose. This paper focuses on the level of specificity across the contents of the publication. This is done using the four chapters as outlined in IMRAD. In academic writing, and as observed in other papers discussing IMRAD, there can be additional chapters. To avoid confusion, the term “sections” will be used to refer to the chapters of this paper. This paper seeks to contribute to an ongoing discussion on methods and publication in *European Business Review*, such as Babin and Svensson (2012), editorial by Svensson (2012a) (Brown, 2012; Rosenstreich and Wooliscroft, 2012; Svensson, 2012b; Wagner, 2012; Zutshi *et al.*, 2012), Svensson (2013), Hair *et al.* (2014), Johnston (2014), Eriksson (2015), Svensson (2015), Ford (2016), Svensson (2018), the special issue hosted by Stentoft and Freytag (2018) (Babin and Moulard, 2018; Bager, 2018; Bäckström and Ahlgren, 2018; Grant *et al.*, 2018; Hamet and Michel, 2018; Narasimhan, 2018; Zolkiewski, 2018), and Hair *et al.* (2019). The intended implications of this paper include providing a more comprehensive explanation on structuring various chapters in a publication and equipping researchers and university teachers with enhanced models to explain the structure of a publication.

2. Symmetry of specificity – achieving symmetry in topic and empirical width

This section will elaborate on how to organize an academic manuscript based on symmetry in topic and empirical width. The proposed expansion of the IMRAD model is visualized on a two-axis graph, with the *y*-axis representing a continuum from specific to general, and the *x*-axis marking the progression from the start to the finish of a publication (Figure 1). The remainder of this section will explore the various parts of a publication. It should be acknowledged that the names of the chapters in a publication may vary. As such, the

framework can be seen as an overlay on top of a chapter structure, where the exact lines between chapters will be different from publication to publication (Figure 2).

2.1 Introduction – specifying the topic

From a specificity perspective the introduction narrows the scope of what is to be examined. This process, often referred to as “positioning”, “setting the context” or “defining the core”, usually involves moving from a broad topic to a narrower one. However, the funneling starts before the first word is written, when it is perhaps implicitly decided what to not include. For example, it is possible to start with an explanation of the big bang, continue with how planets came to be, why planets are heterogeneous, how humans evolved, how trade emerged and so on all the way down to how blockchain may be used to track transportation (see “casing” in Ragin, 1992). A more reasonable approach might be to start with the need for tracking and how new technology is enabling improved tracking methods. The decision on where to start is not always easy. But it sets the broader limit for specificity in the publication, and it is thus important to consider at what scope it is reasonable to start. The broader level of specificity will be important again at the end of the publication. Authors that are unsure of how broad they should be at the start can benefit from going back to the start of the publication, once the final parts are written. Determining the appropriate level of specificity might be easier at the end of the publication, which can then be used to fine-tune the introduction.

When presenting the specificity of the publication, the authors should also argue what the target audience is, and in what way the target audience will benefit from the publication.

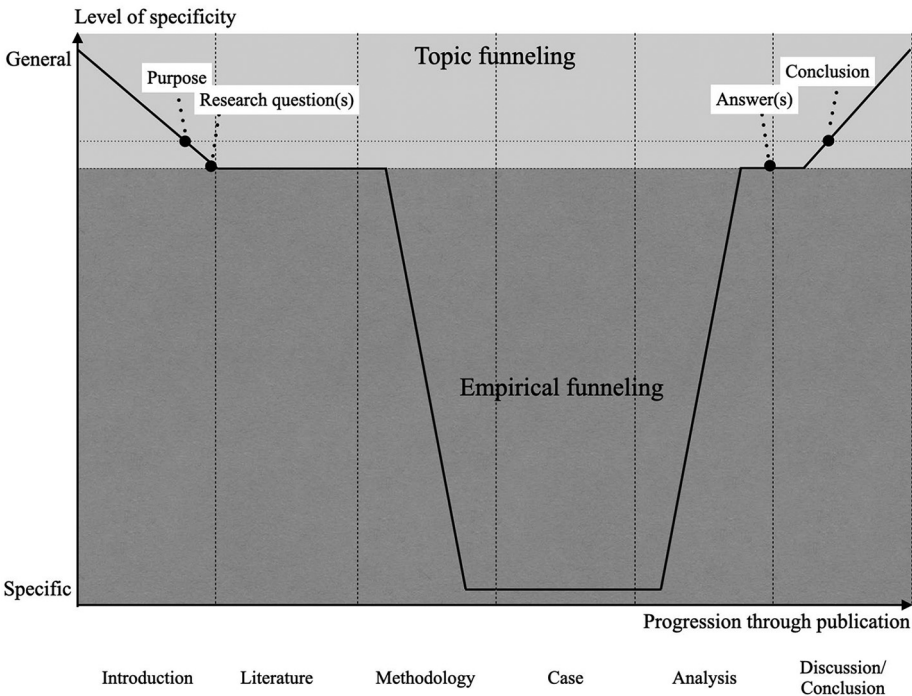


Figure 2. Symmetry of specificity: top part illustrates how the topic is narrowed down leading up to the research questions and then broadened when the research questions are answered; bottom part illustrates how the empirical width is reduced in methodology, and then expanded in the analysis

Source: Figure by author

This will be echoed at the end of the publication, where contributions and conclusions should be made for the same target audience.

The process of narrowing down the topic continues until the purpose of the research is presented. It can be seen as if the introduction has an implicit goal of defining the specificity to which the publication seeks to contribute. A research purpose is often written in somewhat vague and broad terms, which is why it is often accompanied by a few more specific research questions. The research questions are often slightly more specific than the purpose, which makes the purpose tangible and possible to investigate.

2.2 Literature – the theory needed to investigate the research questions

In the literature review chapter, there is no requirement to narrow down the specificity. The content of the literature review might range from more general topics to more specific ones. The goal of the literature is to bring in the theory needed to perform the study and answer the research questions. In practice, this might include going a bit general to explain context, and it might include going a bit specific to make an example. However, the overall specificity from the questions is what should guide the specificity of the literature chapter.

2.3 Methodology – going specific in three steps

The specificity throughout the methodology will be explained in three steps. This is done to see how the publication becomes more specific and to understand why some information ought to be included in the publication. It should be noted that the funneling here is not about the topic, as is the case in the introduction, but about an empirical width. Purpose and questions are specific about the topic, but general about the empirical area. The methodology section involves narrowing down the general empirical area to a specific area that will be investigated. This is like the interplay between all available data (events) and studied data (events) in critical realism, abduction and systematic combining (Dubois and Gadde, 2002; Danermark *et al.*, 2003; Eriksson and Engström, 2021).

The first part of the methodology should be concerned with how a contribution can be made. This is specific to the field of study, as well as to ontology and epistemology. This part is important because it explains in what way it is possible to give a conclusion to the purpose, and how such a conclusion may look. Granted, this is something which has been overlooked even in PhD theses in some fields (Zachariassen and Arlbjørn, 2010), so the expectations on bachelor and master theses need to be on a level which is acceptable in the specific field. Ontology and epistemology are often not included in research papers in operations and supply chain management. This might be a consequence of a general lack of attention to these dimensions in the field (Aastrup and Halldórsson, 2008). Nevertheless, if a contribution to knowledge is made, it is reasonable to expect the author to discuss what is considered knowledge, unless this is well established and agreed upon within the field.

The second part of the methodology is about making an argument for why a specific set/source of data is suitable to answer the research questions and to reach a conclusion. In my experience this part is often not sufficiently understood, which leads to issues during analysis when findings are supposed to be generalized. Failure to justify why and how the selected data can answer the research questions leaves the authors open to criticism when it comes time to defend their publication. The argument for the data can often be separated into two main categories. The first is a mathematical argument about statistical generalization. The second is a qualitative argument about theoretical generalization (Yin, 2009). Exceptions to generalization exist depending on the author's philosophical position. Critical realism, for example, is not focused on generalization but explanation of generative mechanisms (Bhaskar, 1978; Sayer, 1992). This part of the methodology often constitutes a

dramatic tightening of specificity, starting at general questions sometimes ending up as narrow as with, for example, the investigation of a single machine. If the selection of the specific machine is not well justified, it will be difficult to argue for generalization later in the publication.

The third part of the methodology is the presentation of the techniques used to collect and interpret data in the specific study. This part is commonly included in theses but is often written on a level that is more general than the specific study. While it might be suitable to discuss these techniques in general terms, they should also be presented in the context of the specific study.

2.4 Case – working with data in two steps

The term “case” is used here in the same vein as in [Ragin \(1992\)](#) and [Dubois and Gadde \(2002\)](#). The “case” refers to the empirical delimitations made prior to or during the research. It is thus not to be interpreted as a case company as is often done based on references such as [Eisenhardt \(1989\)](#). The case is the most specific part of the publication. The case is best understood based on its two integral parts. The first part involves presenting the collected data. There are different arguments on how this should be done, but it is often done with a presentation of the current state. The presentation may or may not be based on the literature used. The second part is to work with the data to learn something about the specific case. This may involve determining whether a solution works, understanding why it works, advising on how a company should proceed and so on. This process can be inductive, working with data toward theory; deductive, using data to test hypothesis, or abductive, reaching harmony between theory and data to further develop theory ([Kovács and Spens, 2005](#); [Eriksson, 2015](#)).

A common error when handling the case is the lack of incorporation of theory. Students and supervisors often believe that the case should not be intertwined with theory. The assumption is that this part of a publication should only be about the case. To some extent this is true, because the level of specificity should not extend beyond the case. A helpful perspective to adopt is that the findings thus far are limited to the specific case under study. It is often necessary to include theory to fully understand the case. For example, it is acceptable to include theory of constraints when suggesting how a production line should function. But, at this point, no inference should be made as to how production lines in general should function. That is to be done in the analysis.

2.5 Analysis – leaving the case behind

The analysis broadens the specificity of the publication from the specific case to the same specificity as the questions. Then, and only then, is it possible for the publication to give answers to the research questions. Thus, the analysis is responsible for transitioning the publication from being specific back to being general. Exactly where to draw the lines between chapters are up to the author.

If the case selection was thorough, it should be possible during the analysis to argue why and how the case findings are applicable in a broader context. The work with the case can be summarized in three central steps ([Figure 3](#)). It is often said that analysis is the combination of theory and data. However, as argued above, theory and data have likely already been combined during the case study. The difference in the analysis is that theory should be used to argue to what extent the findings are applicable in other contexts. To continue the example from the previous section. If it was possible to suggest how a specific production line should function, and the motivation for studying that line was properly argued in methodology, theory can now be used to make a general model for other production lines. While the model might not be specific to certain inputs, with some adaptations, it should be feasible to apply it in another case. It should also be possible to use theory to explain or

theorize why the specific model worked. Explaining and theorizing is to be compared to the final steps in induction, deduction or abduction, where the wider application of theory development or hypothesis testing is central.

The three steps can be included in different chapters depending how the author decided to write. Using what might be the original presentation of the IMRAD model (Day, 1989), it is possible to place Steps one and two in a results chapter, and Step three in a discussion chapter. It is also possible to place Step one in an empiric chapter, Step two in a results chapter and Step three in an analysis chapter. The important takeaway is that there are three steps, and the precise delineation between chapters can vary based on the author's approach and established conventions.

2.6 Discussion/conclusion – returning to a general level

Once the research questions have been answered, we can revisit the first step of the methodology and draw conclusions. This should include explanations of how to interpret the questions and any limitations of the methods in generating new insights and knowledge.

There are different ideas on how to order the following parts, but from a symmetry perspective I argue that the next thing to present should be the conclusion, followed by implications, and future research. The proposed structure creates a symmetry with the introduction. The symmetry can be seen if looking from the case and out to the beginning and end of the publication (Figure 4). In this approach, the purpose precedes the research questions, and the conclusion follows the answers to these questions. Purpose is preceded by a motivation of the research, which is often done in relation to theoretical, practical and societal relevance. Per symmetry, this is mirrored with implications following the conclusion. At the very start of the publication, the outer boundaries for the context are set, which are mirrored for how to push the boundaries going forward, that is future research. In

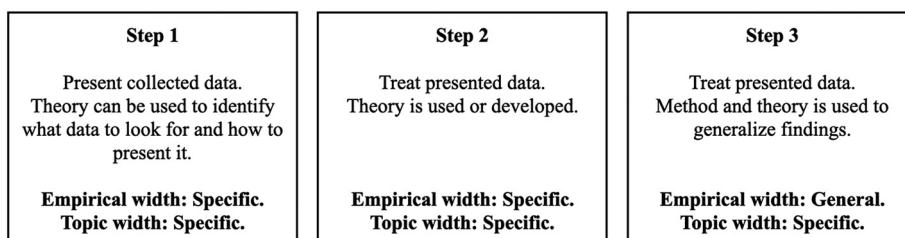


Figure 3.
The three steps of
case and analysis

Source: Figure by author

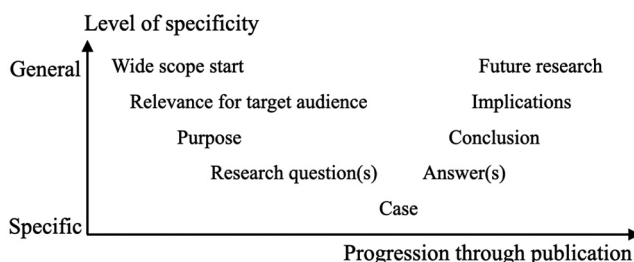


Figure 4.
Order of contents in
first and final parts of
a publication based
on the specificity of
the parts

Source: Figure by author

the symmetric approach, implications are viewed as consequences of the conclusion. Conversely, in the asymmetric approach, the conclusion is perceived as the cumulative contribution of the entire publication.

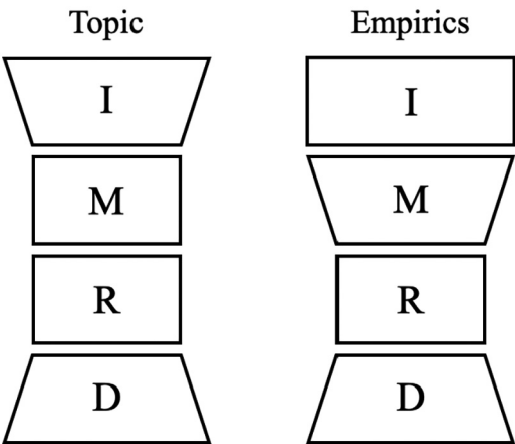
3. Concluding discussion

This paper set out to present a framework for symmetry in publications. This was achieved by introducing a framework of symmetry in specificity.

The symmetry of specificity framework provides a tool for academics to understand what should be included in the different chapters of a publication and why these parts belong in certain places. The framework gives an answer to common questions, such as why it is allowed to include theory in the case part of the data, and why a case company should not be presented in the introduction. By visualizing and presenting a logic for dealing with symmetry in publications, this paper contributes insights and supports theory building by organizing these insights (Svensson, 2013). This paper does not intend to argue that the structure presented here is the one correct structure, but it is a structure supported by theory based on dual symmetry. This includes symmetry in specificity and a symmetry wherein the start of the publication corresponds to its end.

The model, symmetry of specificity, builds on the IMRAD model (Figure 5) in two significant ways. First, symmetry of specificity explains what is being funneled, and what is allowed to do at various stages of width. As such, the model addresses an explanatory shortcoming of the IMRAD model. Second, the symmetry of specificity framework elucidates how additional parts of the publication contribute to funneling. In the IMRAD model, the methodology section is depicted with equal width, but symmetry of specificity presents how the methodology acts as a funnel and how that is important for analysis and answering research questions. The two-dimensional funneling is visualized in Figure 4.

The case for symmetry has been developed through supervision and examination of theses, writing research papers, reviewing research papers, editorial work, but most importantly by teaching methodology at various stages of education for BSc, MSc and PhD students, and courses needed to qualify for assistant and associate professorship. Driven by the need to develop a model that could guide students in structuring their theses, Figure 1 is



Source: Figure by author

Figure 5.
IMRAD model
updated with two
views to illustrate
funneling in both
topic and empirics

created based on supervision experiences. The symmetry of specificity model has since been used in teaching methodology at the BSc, MSc and PhD levels. The positive feedback from students has motivated the presentation of this model to a wider audience. What is novel with the model here presented is that it presents a clear basis from which the structure of a publication can be argued. Competing structures are encouraged, but for them to gain merit, it is important to theorize about their foundations.

The model here presented is created mainly based of empirical investigations. It follows that the model might not be as suitable for other types of research, and that the contributions made in this paper should be seen as cumulative, and not final. Just as research is context-dependent, so too is the model presented here.

Perhaps counter intuitively, I would like to end by encouraging authors to find other approaches to writing (Brown, 2012). Many of the works cited to argue for this specific paper are written in ways which break the mold. Suddaby (2006) proposed that publications often follow a specific structure due to expectations from editors and positivistic influences, but there are examples of publications written to specifically highlight an abductive approach (Eriksson, 2014), or to present an argument in a colorful manner (Brown, 2012). If you feel compelled to break the mold, ensure you do so with clear intent and purpose. And while you are at it, consider writing a paper about it to continue this discussion.

References

- Aastrup, J. and Halldórsson, Á. (2008), "Epistemological role of case studies in logistics: a critical realist perspective", *International Journal of Physical Distribution and Logistics Management*, Vol. 38 No. 10, pp. 746-763.
- Babin, B.J. and Moulard, J.G. (2018), "To what is the review process relevant? What's right and what's wrong with peer review for academic business journals", *European Business Review*, Vol. 30 No. 2, pp. 145-156.
- Babin, B.J. and Svensson, G. (2012), "Structural equation modeling in social science research: issues of validity and reliability in the research process", *European Business Review*, Vol. 24 No. 4, pp. 320-330.
- Bäckström, I. and Ahlgren, K. (2018), "Rigorous and relevant - introducing a critical discourse analysis to the relevance debate", *European Business Review*, Vol. 30 No. 2, pp. 202-215.
- Bager, T. (2018), "Knowledge exchange and management research: barriers and potentials", *European Business Review*, Vol. 30 No. 2, pp. 169-182.
- Bhaskar, R. (1978), *A Realist Theory of Science*, Harvester Press, Hassocks, UK.
- Brown, S. (2012), "I have seen the future and it sucks: reactionary reflections on reading, writing and research", *European Business Review*, Vol. 24 No. 1, pp. 5-19.
- Codina, L. (2022), "The IMRaD model: what is it and how can it be applied to articles in the humanities and social sciences?", *Hipertext.net*, Vol. 24, pp. 96-103.
- Danermark, B., Ekström, M., Jakobsen, L. and Karlsson, J. (2003), *Att Förklara Samhället*, Studentlitteratur, Lund.
- Day, R.A. (1989), "The origins of the scientific paper: the IMRAD format, the sameness of a manuscript's organization provides reliability", *American Medical Writers Association*, Vol. 4, pp. 16-18.
- Dubois, A. and Gadde, L.-E. (2002), "Systematic combining: an abductive approach to case research", *Journal of Business Research*, Vol. 55 No. 7, pp. 553-560.
- Eisenhardt, K.M. (1989), "Building theories from case study research", *The Academy of Management Review*, Vol. 14 No. 4, pp. 532-550.
- Eriksson, D. (2015), "Lessons on knowledge creation in supply chain management", *European Business Review*, Vol. 27 No. 4, pp. 346-368.

- Eriksson, D. and Engström, A. (2021), "Using critical realism and abduction to navigate theory and data in operations and supply chain management research", *Supply Chain Management: An International Journal*, Vol. 26 No. 2, pp. 224-239.
- Eriksson, D. (2014), "Moral (De)coupling: moral disengagement and supply chain management", PhD Thesis, University of Borås, Borås, Sweden.
- Ford, J.B. (2016), "Cost vs credibility: the student sample trap in business research", *European Business Review*, Vol. 28 No. 6, pp. 652-656.
- Gimenez, C. and Tachizawa, E.M. (2012), "Extending sustainability to suppliers: a systematic literature review", *Supply Chain Management: An International Journal*, Vol. 17 No. 5, pp. 531-543.
- Grant, D.B., Kovács, G. and Spens, K. (2018), "Questionable research practices in academia: antecedents and consequences", *European Business Review*, Vol. 30 No. 2, pp. 101-127.
- Hair, J.F., Risher, J.J., Sarstedt, M. and Ringle, C.M. (2019), "When to use and how to report the results of PLS-SEM", *European Business Review*, Vol. 31 No. 1, pp. 2-24.
- Hair, J.F.J., Sarstedt, M., Hopkins, L. and Kuppelwieser, V.G. (2014), "Partial least squares structural equation modeling (PLS-SEM), an emerging tool in business research", *European Business Review*, Vol. 26 No. 2, pp. 106-121.
- Hamet, J. and Michel, S. (2018), "Rigor, relevance, and the knowledge" market", *European Business Review*, Vol. 30 No. 2, pp. 183-201.
- Johnston, A. (2014), "Rigour in research: theory in the research approach", *European Business Review*, Vol. 26 No. 3, pp. 206-217.
- Kovács, G. and Spens, K.M. (2005), "Abductive reasoning in logistics research", *International Journal of Physical Distribution and Logistics Management*, Vol. 35 No. 2, pp. 132-144.
- Kumar, P. (2023), "Improving IMRaD for writing research articles in social, and health sciences", *International Research Journal of Economics and Management Studies*, Vol. 2 No. 1, pp. 50-53.
- Maedows, A.J. (1998), *Communicating Research*, Academic Press, San Diego, CA.
- Narasimhan, R. (2018), "The fallacy of impact without relevance – reclaiming relevance and rigor", *European Business Review*, Vol. 30 No. 2, pp. 157-168.
- Ragin, C. (1992), "'Casing' and the process of social inquiry", in Ragin, C. and Bekker, H. (Eds), *What is a Case? Exploring the Foundation of Social Inquiry*, University Press, Cambridge, MA, pp. 217-227.
- Rosenstreich, D. and Wooliscroft, B. (2012), "Assessing international journal impact: the case of marketing", *European Business Review*, Vol. 24 No. 1, pp. 58-87.
- Säfssten, K. and Gustavsson, M. (2019), *Forskningsmetodik: För Ingenjörer Och Andra Problemlösare*, Studentlitteratur AB, Lund.
- Sayer, A. (1992), *Method in Social Science - A Realist Approach*, 2nd ed., Routledge, London.
- Stentoft, J. and Freytag, P. (2018), "Guest editorial", *European Business Review*, Vol. 30 No. 2, pp. 94-100.
- Suddaby, R. (2006), "What grounded theory is not", *Academy of Management Journal*, Vol. 49 No. 4, pp. 633-642.
- Svensson, G. (2012a), "Editorial", *European Business Review*, Vol. 24 No. 1.
- Svensson, G. (2012b), "Research process, report structure and journal outlets in scholarly studies: Parallel vs sequential and proactive vs reactive", *European Business Review*, Vol. 24 No. 1, pp. 47-57.
- Svensson, G. (2013), "Processes of substantiations and contributions through theory building towards theory in business research", *European Business Review*, Vol. 25 No. 5, pp. 466-480.
- Svensson, G. (2015), "Contemporary process to test the theory of a research model through covariance-based structural equation modeling in business research: is it science, quasi-science or just non-science?", *European Business Review*, Vol. 27 No. 4, pp. 447-458.

- Svensson, G. (2018), "A toolkit to examine multi-item measures - avoiding pitfalls and flaws", *European Business Review*, Vol. 30 No. 1, pp. 82-92.
- Wagner, B.A. (2012), "Publishing in international journals: de-mystifying the process, reducing risk and improving success", *European Business Review*, Vol. 24 No. 1, pp. 20-27.
- Wu, J. (2011), "Improving the writing of research papers: IMRAD and beyond", *Landscape Ecology*, Vol. 26 No. 10, pp. 1345-1349.
- Yin, R.K. (2009), *Case Study Research: Design and Methods*, Sage Publications, London, UK.
- Zachariassen, F. and Arlbjørn, J.S. (2010), "Doctoral dissertations in logistics and supply chain management: a review of Nordic contributions from 2002 to 2008", *International Journal of Physical Distribution and Logistics Management*, Vol. 40 No. 4, pp. 332-352.
- Zhang, Y. and Hyland, K. (2021), "Advice-giving, power and roles in theses supervisions", *Journal of Pragmatics*, Vol. 172, pp. 35-45.
- Zolkiewski, J. (2018), "Bridging the relevance-ranking chasm: Mission impossible?", *European Business Review*, Vol. 30 No. 2, pp. 128-144.
- Zutshi, A., McDonald, G. and Kalejs, L. (2012), "Challenges in collaborative writing: addressing authorship attribution", *European Business Review*, Vol. 24 No. 1, pp. 28-46.

Appendix

Structure for literature review based on [Gimenez and Tachizawa \(2012, Figure 1\)](#), but with title elimination and double abstract analyses

Goal with literature review: Identify papers expanding on IMRAD

Chosen databases: Scopus, WOS

Search string: IMRAD

Search fields: Title, abstract, keywords

Timeframe: Open, search done March 27, 2023

Identified papers: WOS = 99, Scopus = 101

After duplicate removal: 141

Removal based on title. Papers not discussing writing according to IMRAD removed: 67

Removal based on abstract. Papers not discussing writing according to IMRAD removed.

Papers analyzing structure of text (e.g. citations in different parts of the text) removed: 44

Final elimination was a second abstract elimination. Papers not developing IMRAD model was removed. Final sample: 0

As all papers were eliminated based on abstract, it is reasonable to conclude that very little, if any, work has been dedicated to developing the IMRAD model. The closest literature is literature aimed at explaining how to write according to the IMRAD model. This literature is presented below.

- Ahmed, S. (2012). "Writing freshwater biology: reading scientific discourse", *International Journal of the Humanities*, Vol. 9 No. 10, pp. 163-173.
- Alexandrov, A.V. (2004). "How to write a research paper", *Cerebrovascular Diseases*, Vol. 18 No. 2, pp. 135-138.
- Alwi, I. (2007). "Tips and tricks to make case report", *Acta medica Indonesiana*, Vol. 39 No. 2, pp. 96-98.
- Antic, Z. (2009). "Some implications for teaching scientific medical writing", *Acta Facultatis Medicae Naissensis*, Vol. 26 No. 1, pp. 55-60.
- Bajwa, S.J.S. and Sawhney, C. (2016). "Preparing manuscript: scientific writing for publication", *Indian Journal of Anaesthesia*, Vol. 60 No. 9, pp. 674-678.

- Cuschieri, S., Grech, V. and Savona-Ventura, C. (2018). "WASP (write a scientific paper): how to write a scientific thesis", *Early Human Development*, Vol. 127 pp. 101-105.
- Cuschieri, S., Grech, V. and Savona-Ventura, C. (2019). "WASP (Write a scientific paper): structuring a scientific paper", *Early Human Development*, Vol. 128 pp. 114-117.
- Delima, P.C. and Delima, E.M. (2017). "Raising the bar of undergraduate research", *Advanced Science Letters*, Vol. 23 No. 2, pp. 1144-1148.
- Derraik, J.G.B., Butler, É.M. and Rerkasem, K. (2019). "Publishing Without Perishing: A Guide to the Successful Reporting of Clinical Data", *International Journal of Lower Extremity Wounds*, Vol. 18 No. 3, pp. 219-227.
- Earnshaw, J.J. (2012). "How to write a clinical paper for publication", *Surgery (United Kingdom)*, Vol. 30 No. 9, pp. 437-441, (Export Date: 27 March 2023; Cited By: 2).
- Foote, M.A. (2009). "How to write a better manuscript", *Drug Information Journal*, Vol. 43 No. 2, pp. 111-114.
- Gaafar, R. (2005). "How to write an oncology manuscript", *Journal of the Egyptian National Cancer Institute*, Vol. 17 No. 3, pp. 132-138.
- Gilhotra, A.K. and Mcghee, C.N.J. (2006). "Ophthalmology and vision science research: part 4: avoiding rejection - Structuring a research paper from introduction to references", *Journal of Cataract and Refractive Surgery*, Vol. 32 No. 1, pp. 151-157.
- Grech, V. (2019). "WASP (Write a scientific paper): miscellaneous practical and material aspects", *Early Human Development*, Vol. 128 pp. 105-106.
- Hitchcock, M.A. (1988). "Writing and publishing research articles", *The Family practice research journal*, Vol. 8 No. 1, pp. 3-16.
- Jirge, P. (2017). "Preparing and publishing a scientific manuscript", *Journal of Human Reproductive Sciences*, Vol. 10 No. 1, pp. 3-9.
- Kurniawan, A.B., Sutopo, D. and Fitriati, S.W. (2019). "The implementation of effective method for writing research articles", *International Journal of Scientific and Technology Research*, Vol. 8 No. 9, pp. 1879-1883.
- Lin, Y.C. (1989). "Practical approaches to scientific writing", *Chinese Journal of Physiology*, Vol. 32 No. 2, pp. 59-69.
- Liso, V., (2020). "Implementing the introduction, methods, results and discussion article structure in engineering education based on problem-based learning", *Journal of Problem Based Learning in Higher Education*, Vol. 8 No. 2, pp. 61-75.
- Mack, C. (2014). "How to write a good scientific paper: structure and organization", *Journal of Micro/Nanolithography, MEMS, and MOEMS*, Vol. 13 No. 4.
- Mandelbaum, J. and Fuller, T.J. (2021). "What is the story you want to tell? Utilizing the narrative arc as an academic writing framework for graduate students in health promotion", *Pedagogy in Health Promotion*, Vol. 7 No. 2, pp. 144-147.
- Mazumdar, P. (2021). "Writing an academic paper for the purpose of publication", *Journal of Evolution of Medical and Dental Sciences-Jemds*, Vol. 10 No. 20, pp. 1525-1531.
- Mitchell, P., (2017). "IMRaD heresy", *British Journal of Neurosurgery*, Vol. 31 No. 2, pp. 117-118.
- Montagnes, D.J.S., Montagnes, E.I. and Yang, Z. (2022). "Finding your scientific story by writing backwards", *Marine Life Science and Technology*, Vol. 4 No. 1, pp. 1-9.
- Morgan, P.P. (1985). "Dr. Lucid's word rounds: introducing IMRAD", *CMAJ: Canadian Medical Association journal = journal de l'Association medicale canadienne*, Vol. 133 No. 6, pp. 542-543.
- Morgan, P.P. (1986). "Dr. Lucid's word rounds: IMRAD on the wards", *CMAJ: Canadian Medical Association journal = journal de l'Association medicale canadienne*, Vol. 134 No. 3, pp. 209-210.

- Nair, P.K.R. (2005). "How (not) to write research papers in agroforestry", *Agroforestry Systems*, Vol. 64 No. 1, pp. 5-16.
- Ohwovoriole, A.E. (2011). "Writing biomedical manuscripts part I: fundamentals and general rules", *West African journal of medicine*, Vol. 30 No. 3, pp. 151-157.
- Pakes, G.E. (2001). "Writing manuscripts describing clinical trials: a guide for pharmacotherapeutic researchers", *Annals of Pharmacotherapy*, Vol. 35 No. 6, pp. 770-779.
- Pamir, M.N. (2002). "How to write an experimental research paper", *Acta Neurochirurgica, Supplement*, No. 83, pp. 109-113.
- Peh, W.C.G. and Ng, K.H. (2008). "Basic structure and types of scientific papers", *Singapore Medical Journal*, Vol. 49 No. 7, pp. 522-524.
- Shankar, S. and Arun, H. (2022). "Writing Manuscripts better: part I (The introduction, methods, results, and discussion format)", *Indian Journal of Rheumatology*, Vol. 17 No. 6, pp. S292-S297.
- Sharma, A. (2019). "How to write an article: an introduction to basic scientific medical writing", *Journal of Minimal Access Surgery*, Vol. 15 No. 3, pp. 242-248.
- Sharp, D. (2002). "Kipling's guide to writing a scientific paper", *Croatian Medical Journal*, Vol. 43 No. 3, pp. 262-267.
- Simon, E.L., Osei-Ampofo, M., Wachira, B.W. and Kwan, J. (2020). "Getting accepted – successful writing for scientific publication: a research primer for low- and middle-income countries", *African Journal of Emergency Medicine*, Vol. 10 pp. S154-S157.
- Singer, A.J. and Hollander, J.E. (2009). "How to write a manuscript", *Journal of Emergency Medicine*, Vol. 36 No. 1, pp. 89-93.
- Sollaci, L.B. and Pereira, M.G. (2004). "The introduction, methods, results, and discussion (IMRAD) structure: a fifty-year survey", *Journal of the Medical Library Association*, Vol. 92 No. 3, pp. 364-367.
- Sreeja, P.A., Arya, U.S., Kumar, A.S. and Swathy, S. (2016). "Scientific writing as an art: an overview", *International Journal of Current Pharmaceutical Review and Research*, Vol. 8 No. 2, pp. 1-4.
- Tada, M. (2019). "Combining poetry and science to create scientific 'thesis poetry' as a tool for the communication of science", *Science Communication*, Vol. 41 No. 4, pp. 516-524.
- Teodosiu, M. (2019). "Scientific writing and publishing with IMRAD", *Annals of Forest Research*, Vol. 62 No. 2, pp. 201-214.
- Trevorrow, P. and Martin, G.E. (2020). "How to write a research article for MRC", *Magnetic Resonance in Chemistry*, Vol. 58 No. 5, pp. 352-362.
- Vetter, T.R. and Mascha, E.J. (2017). "In the beginning-there is the introduction-and your study hypothesis", *Anesthesia and Analgesia*, Vol. 124 No. 5, pp. 1709-1711.
- Wu, J.U. (2011). "Improving the writing of research papers: IMRAD and beyond", *Landscape Ecology*, Vol. 26 No. 10, pp. 1345-1349.
- Özçakar, L., Rizzo, J.R., Franchignoni, F., Negrini, S. and Frontera, W.R. (2022). "Let's Write a Manuscript: A Primer with Tips and Tricks for Penning an Original Article", *American Journal of Physical Medicine and Rehabilitation*, Vol. 101 No. 7, pp. 698-701.

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