HOW TO WRITE SCIENTIFIC ARTICLES AND RESEARCH PAPERS

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MEETING 1

Content

- Title
- Abstract
- Introduction standards and models
- Literature review

Titles – To think about

- Not to generic, it should be more informative of the content
- Not just a sequence of nouns, you don’t have to read the whole article in order to understand the meaning of the title
- Titles that make a claim (declarative titles)
- Are questions in titles a good way to attract attention?
- Two-part titles. Use them or not?

Titles – Different formats

- **Titles that make a claim (declarative titles)**

“The consumption of one apple per day precludes the necessity of using medical services”

- Are increasingly common in medicine and biology, and may be acceptable if well documented.
- The important thing is to ensure that the title reflects the truth and is supported by the rest of the paper.

Titles – Different formats

- **Are questions in titles a good way to attract attention?**

“Why Do Some Countries Produce So Much More Output Per Worker Than Others?”

“Do Their Words Really Matter? Thematic Analysis of U.S. and Latin American CEOs”

- Titles with questions also work particularly well for abstracts submitted to conferences.
- They are generally much more informal and because of their question form they immediately get readers thinking about what the answer might be.

Titles – Different formats

- **Two-part titles**

“Doing qualitative field research in management accounting: Positioning data to contribute to theory”

“Information Security Policy Compliance: An Empirical Study of Rationality-Based Beliefs and Information Security Awareness”

- *The two parts: one for the general issue and the other one for the more concrete level of research*

Titles - Examples

- *“Two Things That Get My Goat and Three That Offer Meaning”*
- *“You don’t say what you know, only what you can: The perceptions and practices of senior Spanish academics regarding research dissemination in English”*
- *“A class of multivariate distribution-free tests of independence based on graphs”*
- *“Integrated assessment of climate impacts and adaptation in the energy sector”*
- *“Understanding Ethical Behavior and Decision Making in Management: A Behavioural Business Ethics Approach”*
- *“New Managerialism’ and Higher Education: the management of performances and cultures in universities in the United Kingdom”*

Titles – Complex noun phrases

Despite these achievements there remain some puzzling health problems that have not been solved yet.	VS	*Despite these achievements there remain some puzzling, yet unsolved health problems.*
Results that are significant from a statistical perspective	VS	*Statistically significant results*

Titles – Complex noun phrases

- *car manufacturing industry redundancy scheme*
- *oil production costs*
- *teaching methodology research center*
- *consumer rights* (the rights of consumers)
- *resource use* (use of resources)

Titles – Guidelines 1

- **Good titles clearly identify the field of the research, indicate 'the story' the results tell and raise questions about the research in the mind of the reader.**

For that you should:

- Provide as much relevant information as possible but be concise;
- Indicate the main theme or research topic and the research design (what will be researched; how the topic will be researched; in what context);
- Make the title neither unjustifiably specific nor too vague or generic;
- Do not use a string of nouns and make the title immediately comprehensible to anyone in your general field;

Titles – Guidelines 2

- Use key words prominently – place the most important words at the beginning';
- Separate the key word containing part of the title from a second, explanatory section, using a colon (:) or a dash (-);
- Avoid titles that are too clever or 'cute' (journalistic);
- Choose strategically between noun phrase, statement or question;
- Check other titles in your chosen journal.

Abstract

Abstracts should be self-sufficient: readers should be able to understand what the paper is about by reading the abstract only.

You may choose to do some of the following:

- 1. Begin the abstract with one or two sentences saying what you did plus one key result/ begin with information that the reader does NOT already know
- 2. Introduce the background by connecting in some way to what you said in your introductory sentence.
- 3. Use the background information (which the reader may or not already know) to justify what you did, and outline your methodology (and materials where appropriate)
- 4. Provide some more information on your results
- 5. Tell the reader the implications of your results

Abstract

- **Structured abstracts**, which look like mini-papers, are becoming more and more popular.
- They are typically found in medicine, but also in economics, natural sciences and other areas. Most authors agree that the structured format helps them to write clearer abstracts.
- Structured abstracts also force the author to answer all the questions (including limitations to their research) that referees and readers are likely to ask. In addition, they are much more readable as referees (for their peer reviews) and readers can find exactly what they want quickly.
- This sort of abstract tends to be longer (up to 400 words) and is often written as a series of points, though full sentences with verbs are always used in the Results and Conclusions.

Abstract - Example

"Better safe than sorry: defensive loan assessment behaviour in a changing bank environment" (2012), Anders Nilsson, Peter Ohman

- **Purpose** – The purpose of this paper is to examine to what extent and in what forms loan applications from small and medium-sized enterprises (SMEs) in a risk averse banking environment can be assessed defensively by lending officers (LOs). The paper also identifies triggering mechanisms behind defensive SME loan assessment behaviour and its' possible effects on the bank and the LOs.
- **Design/methodology/approach** – The paper relies on a case study of a major Swedish commercial bank undergoing strategy and control system change during the recent financial crisis. The empirical evidence was collected through interviews with 76 LOs in three branch offices and a focus group interview session.

Abstract - Example

- **Findings** – In a risk averse banking environment, LOs can be prone to assessing SME loan applications defensively to a noteworthy extent. Such defensiveness comes in different forms: denial of loan applications, granting of loans with collateral or high interest rates, or granting of loans only to clients with most of their financial affairs in the bank. External and internal mechanisms jointly trigger defensive loan assessment behaviour. The possible effects include fewer Type II errors and more Type I errors for the bank, while LOs avoid change and blame.
- **Originality/value** – Overall, this study contributes to the literature by revealing triggering mechanisms, forms and effects related to the multifaceted construct of defensive loan assessment behaviour among LOs in a commercial bank, who handle applications from SMEs.

Abstract + Title Group Work

- Choose one of the two articles and analyze the correlation between the title and abstract of the paper
  - *“Mobile security catching up? Revealing the Nuts and Bolts of the Security of Mobile Devices”*
  - *“Users’ perceptions about mobile security breaches”*

Introduction

- The purpose of the introduction is to show your reader what you are doing in your writing. It is also helpful to explain why you are doing it and how you are doing it. The introduction must effectively ‘sell’ the study by grabbing the readers’ attention. You need to provide a convincing answer to the question ‘Why should anyone care about your article?

Introduction Model - CARS

- The CARS (Creating a Research Space) model of introductions
- Establish a research territory
  - *By showing that the general research area is important, interesting, problematic, or relevant (optional)*
  - *By introducing and reviewing previous research in the area (obligatory)*
- Establish a niche
  - *By indicating a gap in the previous research, raising a question about it or*
  - *extending previous knowledge in some way (obligatory)*
- Occupy the niche
  - *By outlining purposes or stating the nature of the present research (obligatory)*
  - *By announcing principal findings (optional)*
  - *By indicating the structure of the RP (optional)*

Introduction Model - Cargill and O'Connor

- *Statements about the field of research to provide the reader with a setting or context for the issue to be investigated and to claim its centrality or importance.*
- *More specific statements about the aspects of the problem already studied by other researchers, laying a foundation of information already known.*
- *Statements that indicate the need for more investigation, creating a gap or research niche for the present study to fill.*
- *Statements giving the purpose/objective of the writer's study or outlining its main activity or finding.*
- *Statements that give a positive value or justification for carrying out the study.*

Phase-bank for Introduction

- **Move 1: Establishing a research territory/ Claiming topic centrality**
  - *The increasing interest in … has heightened the need for ….*
  - *Of particular interest and complexity are ….*
  - *X has become a favorite topic for analysis ….*
  - *The study of … has highlighted an important aspect of ….*
  - *A central issue in … is ….*
  - *… has been extensively studied in recent years.*
  - *Many recent studies have focused on ….*

Phase-bank for Introduction

- **Move 2: Establishing a niche**
  - *However, little information has been provided on .....*
  - *Nevertheless, little attention has been given to .....*
  - *So far this method has only been applied to .....*
  - *However, few studies/investigations/researchers have explored .....*
  - *However, understanding how these processes interact ... remains a major challenge.*
  - *Despite its acknowledged importance, the issue of ... remains insufficiently explored/is not well understood.*

Phase-bank for Introduction

- **Move 2: Establishing a niche**
  - *It is currently/still unclear how patterns of/processes of … influence X or Y.*
  - *The research has tended to focus on …,rather than on ….*
  - *These studies have emphasized …,as opposed to ….*
  - *Although considerable research has been devoted to … , rather less attention has been paid to ….*
  - *The previous research … has concentrated on ….*
  - *So far, investigations have been confined to …*

Phase-bank for Introduction

- **Move 3: Occupying the Niche**
  - *The purpose of this study is to …*
  - *The purpose of this investigation is to …*
  - *The aim of this paper is to …*
  - *This paper reports on the results obtained ….*
  - *This study was designed to …*
  - *We argue that ….*
  - *The main purpose of the experiment reported here was to…*

Phase-bank for Introduction

- **Move 3: Occupying the Niche**
  - *This study was designed to evaluate…*
  - *The core research questions that guided this study can be stated as follows: What are consumers' attitudes towards X in Tv advertisements?*
  - *This study has attempted to answer the following research questions:*
  - *It is the purpose of the present paper to provide…*
  - *The present work extends the use of the last model by…*
  - *The primary focus of this study is on…*

MEETING 2

Content

- Paper format template
- Literature review + citations
- Research methodology + Bonus
- Results section
- Discussion section
- Conclusions section
- Standards in references

Paper format template

- Printed version of the paper format for **The 16th International Conference on Informatics in Economy**

General components of a research paper

- Title
- Abstract
- Introduction
- Literature review + Citations
- Research methodology
- Results
- Discussions
- Conclusions
- Acknowledgment
- References

Literature review

- Literature review is to be regarded as a mean to an end – it is meant to serve as justification for the objectives of your research and the hypotheses or research questions that guide your work.
- It should indicate how your own approach fits into the wider picture.

Literature review - Guidelines

- In the literature review we refer to other research in order to show the significance of our own
- We conduct a literature review to show how our topic fits into the wider picture of the discipline
- We need to take a critical stance and review only the literature relevant to our topic
- The literature review can help provide theoretical support for our hypotheses and research questions.

All these are undertaken in order to indicate value of the chosen approach (topic or methodology) and to point out the intended contribution of your study.

Literature review – Citation patterns

Authors use selected literature from their field to justify their study and construct a gap/niche for their own work.

- **Investigation prominent citation**

A study of the difficulties of the wool industry conducted by Smith (2002) points out the difficulties experienced by the industry ever since the creation of high quality fibers.

- **Author prominent citation (1)**

Shrinking markets are also evident in other areas. Smith (2002) argued that the wool industry was experiencing difficulties related to failing demand worldwide since the development of high quality synthetic fibres. However, Jones et al (2004) found that industry difficulties were more related to quality of supply than to demand issues.

Literature review – Citation patterns

- **Author prominent citation (2)**

Shrinking markets are also evident in other areas. As Smith (2002) pointed out, the wool industry has been experiencing difficulties related to failing demand worldwide since the development of high quality synthetic fibres.

Too much of author prominent citation can make the text sound like a list rather than a coherent argument.

- **Information prominent citation**

Shrinking markets are also evident in other areas. The wool industry has been experiencing difficulties related to failing demand worldwide since the development of high quality synthetic fibres (Smith , 2002).

Phase-bank for Literature Review

A considerable amount of literature has been published on X. These studies ……
The first serious discussions and analyses of X emerged during the 1970s with ……
What we know about X is largely based upon empirical studies that investigate how ……
During the past 30 years much more information has become available on ……
In recent years, there has been an increasing amount of literature on …….
A large and growing body of literature has investigated ……

Many historians *have argued that* …… (eg. Jones, 1987; Johnson, 1990; Smith, 1994)
Numerous studies have attempted to explain ….. (for example, Smith , 1996; Kelly, 1998; Johnson, 2002)

Recent evidence *suggests* that ……. (Smith, 1996; Jones 1999; Johnson, 2001)

The relationship between X and Y *has been widely investigated* (Smith, 1985; Jones, 1987, …….

Phase-bank for Literature Review

- **Reference to single investigations in the past: investigation prominent**

Preliminary work on X *was undertaken* by Jones (1992).
The first systematic study of X *was reported* by Patel et al. in 1986.
The study of the structural behavior of X *was first carried out* by Rao et al. (1986)……
A recent study by Smith and Jones (2001) *involved* ……
A longitiudinal study of X by Smith (2002) *reports* that ……
A small scale study by Smith (2002) *reaches* different conclusions, finding no increase in

Phase-bank for Literature Review

- **Reference to single investigations in the past: research topic as subject**

Classical conditioning *was first demonstrated* experimentally by Pavlov (Smith, 2002).

In his seminal study ……

The electronic spectroscopy of X *was first studied* by Smith and Douglas 1 in 1970
The acid-catalyzed condensation reaction between X and Y *was first reported* by Baeyer in 1872
X *formed* the central focus of a study by Smith (2002) in which the author found ……

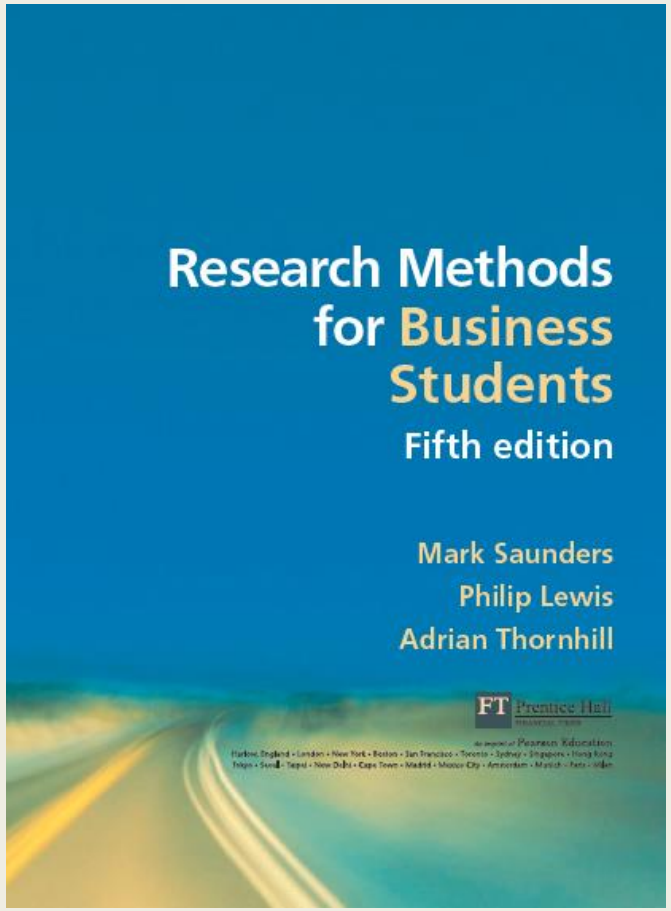
Research methodology

- The method describes the steps that you followed in conducting your study and the materials you used in each step.
- *You can think about the goal of the Methodology section as establishing credibility for the results by providing enough information about how the work was done.*
- This information enables the readers to evaluate the results, i.e. to decide for themselves whether the results actually mean what the author claims they mean.
- The Methods section should provide the readers with sufficient detail about the study methods to be able to reproduce the study if so desired. Thus, this section should be specific, concrete, technical, and fairly detailed.

Research methodology – Elements included

- Restatement of study aim – related to aim in the introduction
- Methods used and appropriacy of methods
- Review of methodology literature
- Details of Population/Sample
- Ethics - Access
- Restrictions/Limiting Conditions
- Sampling Technique
- Description of data obtained
- Description of data analysis procedures (in Methodology or in the Results section)

Research methodology



Result Section

- The results section of the report clearly describes the findings of the study. It is usually presented both in diagrams and text. You need to report the results in sufficient detail so that the reader can see which analyses were conducted and why, and to justify your conclusions.
- The Results and Discussion sections can sometimes be merged. If you decide to keep them separate, make sure that in the Results section you report the results and do not start to interpret them. This will take place in the discussion section, which comes next.

Result Section

- What are the key concepts that I have used in this study?
- How do my findings shed light on these concepts and on the substantive topics I studied?
- How do these findings respond to my original research problem?
- How does my analysis contribute to the literature regarding my substantive topics?

Result Section – Elements included

- introduction to the results
- statements showing where the results can be found (locating specific results in the data set, particularly if several methods were used)
- statements presenting the most important findings and claims based on the results
- statement commenting on the results may include:
  - *summary of the results*
  - *re-organisation of the results to show trends and tendencies relating the results to key themes in the conceptual framework*

Result Section – Guidelines

- You should present your findings as concisely as possible and still provide enough detail to properly justify your conclusions, as well as enable the reader to understand what you did in terms of data analysis and why.
- Use tables to present findings and reserve figures for the more important stuff that needs to be portrayed visually. Do not repeat the same information in tables and figures.
- The information in a table or figure merely corroborates or supplements the discussion. Information presented in a figure should always be summarized and discussed in the text but not merely repeated.
- While it is important to walk the reader through a table or figure in the text in order to point out important results, a table/figure should also stand on its own with a caption at the top and notes at the bottom to enable the reader to understand its purpose without having to read the text.
- Do not leave it to the reader to figure out what the numbers in a table or figure mean. Consider all the possible ways in which your results can be interpreted.

Result Section – Language

As can be seen	from in	the	chart, diagram, table, graph, figures, statistics,	…
It can be seen We can see				that …

As can be seen	from in	Table 1, Figure 2, Graph 3,	…
It can be seen We can see			

From	Table 1 Figure 2		it	can may	be	seen concluded shown estimated calculated inferred	that …
	the	figures chart diagram					

The graph Figure 1	shows	that …

Discussion Section

- The main purpose of the discussion is to show that the results lead clearly to the conclusion being drawn.
- The discussion section of the article/report takes a broad view of the research and puts it in a wider context.
- The discussion section moves from the narrow specific focus of the research to a more general view.
- It must clearly show how the results found relate to the initial research questions or hypotheses and how they lead to the conclusions being drawn.

Discussion Section

- This may include any limitations that might cause problems with any claims being made as well as any possible explanations for these results.
- The elements included in the discussion section text and the order in which they are presented may differ from discipline to discipline.
- It also depends on the researcher's choice to include a Discussion section on its own or to merge it with either the Results of the Conclusions sections.

Discussion Section – Elements included

- a reference to the main purpose of the study, restating its main contribution
- a generalized review of the most important findings - summary of results in relation to the stated research objectives or hypothesis
- possible explanations for the findings in general by relating to the literature and to findings of other studies
- discuss significance and implications of these results
- provide possible explanations for unexpected findings
- limitations of the overall study that restrict the extent to which the findings can be generalized
- insightful directions for future research on the topic

Discussion Section – Rules

- ***to make one point at a time*** - If you find yourself veering off in another direction, put that material in a different section
- ***top and tail each data extract*** - Write a sentence before every extract to context it in your argument. Follow that up with a more detailed analysis of the extract and make clear the point you want to make by using that extract
- ***always show that you understand the limitations of your data and of your analysis of them***
- ***convince the reader*** - Your readers must see why you interpreted your data the way you did and be convinced by your interpretation. Remember the need to take into account alternative interpretations.

Conclusions section

- The conclusion is structured so as to show that the main purpose of the piece of writing has been achieved.
- It should recall the issues raised in the introduction - what was the purpose of the piece of writing?
- draw together the points made in the main body of the piece of writing by showing the implications of your findings
- come to a clear conclusion.

Discussions + Conclusions

- The Discussion should answer the following questions, and possibly in the following order. You can thus use the answers to structure your Discussion. This gives you a relatively easy template to follow.

1. Do my data support what I set out to demonstrate at the beginning of the paper?

2. How do my findings compare with what others have found? How consistent are they?

3. What is my personal interpretation of my findings?

4. What other possible interpretations are there?

5. What are the limitations of my study? What other factors could have influenced my findings? Have I reported everything that could make my findings invalid?

Discussions + Conclusions

6. Do any of the interpretations reveal a possible flaw (i.e. defect, error) in my experiment?

7. Do my interpretations contribute some new understanding of the problem that I have investigated? In which case do they suggest a shortcoming in, or an advance on, the work of others?

8. What external validity do my findings have? How could my findings be generalized to other areas?

9. What possible implications or applications do my findings have? What support can I give for such implications?

10. What further research would be needed to explain the issues raised by my findings? Will I do this research myself or do I want to throw it open to the community?

References

- References text type should be 12 point (Times New Roman) at the end of the paper.
- *Citations*: use IEEE Citation Style: numbers enclosed in square brackets (e.g.: [1], [2], [33]).
- *References*: use IEEE Citation Style. Use numbers enclosed in square brackets for each reference.
- In the References section are presented references to a paper in proceedings [1], to an article [2], to a book [3] and to an online journal article [4].
- Citations should be numbered in the order they appear in the text. All references must be detailed in the Reference/Bibliography section. Avoid using footnotes, as they may interfere with final formatting of the paper.
- All references have to be cited within the paper; otherwise they will be removed from the reference list.

Standards in references

- **Articles from Conference Proceedings (published)**

[1] I. Ivan and C. Ciurea, ”Quality characteristics of collaborative systems,” in Proc. The Second International Conference on Advances in Computer-Human Interactions, vol. I, Cancun, Mexico, 2009, pp. 164-168.

- **Article in a Journal**

[2] I. Ivan, C. Ciurea and A. Vişoiu, “Properties of the collaborative systems metrics,” Journal of Information Systems & Operations Management, vol. 2, no. 1, pp. 20-29, July 2008.

- **Printed book**

[3] I. Ivan, C. Boja and C. Ciurea, *Collaborative Systems Metrics*. Bucharest: ASE Publishing House, 2007, pp. 20-25.

Standards in references

- **Online journal**

[4] I. Ivan and C. Ciurea. (2008, December 10). Validations of metrics for collaborative systems. Informatica Economică Journal [Online]. 4(48). Available: http://www.revistaie.ase.ro/content/48/IVAN%20Ion%20&%20CIUREA%20Cristian.pdf

- **Electronic books**

[5] I. Ivan and C. Toma (2009, November 1), Informatics Security Handbook (1st Edition). [On-line]. Bucharest 2009, ISBN 978-606-505-246-8, Available: http://www.scribd.com/doc/63750074/Informatics-Security-Handbook-1st-Edition [January 2, 2013]

- **World Wide Web**

B. MacGowan. Usability Do's And Don'ts For Interactive Design. Internet: http://www.smashingmagazine.com/2010/04/27/usability-dos-and-donts-for-interactive-design/, April 27, 2010 [Oct. 20, 2012].

THANK YOU!