

Applied research

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Designing, performing and reporting

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Introduction

This textbook on basic research methodology is aimed at students and professionals at the level of a bachelor's degree or higher. It can be of use in seminars and internships, dissertations, thesis projects and applied research projects with an empirical component.

Empirical research is based on information that can be observed in reality/practice, where the researcher collects data in the 'real' world. It is therefore not just theoretical or investigative in nature. During an internship or when a dissertation is being written during a degree course, the student is expected to have an elementary understanding of, and experience with, research methods, including formulating a problem, collecting data objectively and assessing research proposals, analysis, reports and presentations. This could be as a researcher in a research organisation, as a consultant in business services or as a staff member in a company or a non-profit organisation.

This work scenario imposes certain demands in terms of the knowledge and skills related to research methodologies and techniques that a student or professional requires. The purpose of this book is to address this by providing the reader with general information and specific advice on how to design a research project, carry out the research and report on the findings, as well as how to assess research conducted by others.

Covering the five research phases, this book provides a survey of the process of designing, collecting data, analysing and reporting applied research, as well as making recommendations. Further, the relationships between the steps are explicitly indicated. Each chapter relates to a specific research phase (except for the first two chapters, which provide an introduction). As such, the first phase, the formulation of a problem by means of a problem analysis, is addressed in Chapter 3. This is followed by studying literature, resulting in a research model (phase 2) in Chapters 4 and 5, designing an action plan (phase 3) and collecting (phase 4a) and analysing (phase 4b) empirical research data (both qualitative and quantitative). It ends with the writing of the research report and preparing and giving an oral presentation on the research (phase 5 in Chapters 9 and 10). It is important for researchers to adopt an investigative, critical attitude towards each phase. In phase 2, for example, they should not be satisfied with Wikipedia articles as a basis for their research model.

Many examples, practical instructions and tips are given, with a focus on analytical techniques using software programs SPSS and Excel, which are frequently used for processing quantitative data. Less attention is given to mathematical and formulaic methods of data analysis.

Our thanks go to our students as well as our colleagues who have inspired us to write this book. We would like to thank Peter Dekker, Ivy Goedgebure and Pieterneel Dijkstra for their constructive comments on earlier versions. Further suggestions for improvements, from students as well as colleagues, are very much welcome.

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1

Research perspectives and methods



1 Research Perspectives and Methods

Before starting any applied research (Chapters 3 to 5), you should first determine whether it is really necessary. Consider what research is, and what will be its added value. If you do indeed decide to conduct research – what are the different perspectives you could base your research on? What are the methods and techniques you can choose from? These are the subjects of this first chapter. The processes and phases of applied research are discussed in Chapter 2.

To make things a little more specific, an analogy can be drawn with explorers: this chapter can be compared to the first conception of a voyage of discovery. The English explorer Sebastian Cabot (1476-1557, see image on page 10), by his own account (Harris, 1896), sailed to North and South America searching for a strait and a ‘mountain of silver’. According to tradition, Sebastian Cabot heard from voyagers on other exploratory expeditions about this rich land with a silver mountain. This aroused his curiosity and he set sail for South America. However, before he could do this, there were many preparatory steps that had to be taken.

1.1 What is research?

Before you start researching, you should first determine whether it is actually necessary. This depends to a large extent on the background or problem that forms the basis for the research objective and research question. Note that the underlying problem doesn’t necessarily have to be negative in nature. It might be a more general issue, such as when an organisation wants to evaluate a positive subject or theme such as motivation or satisfaction. If the issue and the resulting question pertain purely to matters of economics (for example, how many raw materials do I need to manufacture car components in the most efficient manner?), it may be sufficient to simply enter the necessary values in an existing computer program suited to this purpose. Even in such a situation, there will undoubtedly have been previous research on the topic. After all, such computer programs consist of logical relationships and formulas that someone has developed and tested. The same is true when a doctor examines a patient to find out what the problem is: the questions the doctor may ask and the interventions proposed are based on previous research and existing knowledge.

Criteria for good research

What characterises proper research? Research is said to have been conducted properly if it scores highly in terms of the following five conditions or characteristics:

1. *Reliability*. This is the degree to which the research results are consistent. The more accurately measurements are taken in research, the fewer

measurement errors there will be and the more consistent the results will be. This is not a comprehensive definition of reliability, given that reliability can also relate to the accuracy (i.e., the absence of measuring errors) of measuring instruments, such as questionnaires (which will be further addressed in Section 6.6). The same is true when it comes to the definition of validity below (again, see Section 6.6).

2. *Validity*. This is the degree to which the results of the research are valid (including their application to other groups than the one studied, for example) and the degree to which the researchers have measured what they intended to measure. For example, does the study actually measure the satisfaction of employees about their work or does it measure something else (for instance their commitment to or involvement with the organisation)?
3. *Replicability*. The degree to which the research can be repeated. Has everything been clearly written down and recorded so that other researchers could repeat the research and expect the same results?
4. *Objectivity*. Has the research been conducted without being biased by the researcher's opinions?
5. *Ethically sound*. The carrying out of the research itself and its results do not directly or indirectly harm those involved.

In addition to these specific criteria for methodologically sound research (referred to as 'rigour'), it is important that a researcher completes all the research phases and openly accounts for them in writing and/or in oral feedback. Chapter 2 provides an explanation of the phases involved in applied research. Only then can it be said that proper research has been conducted and a well substantiated report or advice has been produced for the client. Moreover, researchers must be able to explain in clear terms how they have completed each step and why they have made certain choices. They must be able to account for every element of the research process. In short, a researcher has to work properly.

Difference between fundamental and applied research

In order to conduct research, it is important to bear in mind the difference between fundamental and applied research. The difference does not lie in the methods or techniques used, but in the *aim* of the research. While it does not ignore the criteria mentioned above, fundamental research is first and foremost aimed at obtaining theoretical insights in order to contribute to the body of knowledge about a subject and/or to prove or disprove a theory. This also applies to applied research, but applied research is also aimed at *improving practice*. In contrast to fundamental research, the idea behind applied research is to solve a real-world problem that is driven not so much by theory or knowledge, but by practice. In fundamental research, on the other hand, the focus is more on the drafting or expansion (or contradiction) of theory or knowledge. The differences and similarities between fundamental and ap-

plied research are further discussed in Chapter 2. Academic research is often applied more towards theory, but it can also be applied or problem-solving in nature.

Added value of research

What is the added value of fundamental or applied research? First, we would again emphasise that both types of research should meet the five conditions for rigorous research. If you conduct research that is reliable, valid, replicable, objective and ethically sound, and that is either knowledge-driven (in the case of fundamental research) or applied (in the case of applied research), the results will be more accurate, valid, verifiable, objective, ethical and theoretically or practically relevant than if you conduct research that doesn't meet these criteria. In other words, by carrying out research correctly, and completing and substantiating each step in the research process, you can draw conclusions that will have greater certainty and – in the case of applied research – give advice on the phenomena or behaviour you are studying than if your research does not meet these criteria. In essence, fundamental research adds something to the body of knowledge; applied research solves a problem. An important additional requirement of applied research is therefore that it must be usable and relevant.

1.2 Various research perspectives, methods and techniques

A 'perspective' is a way of viewing things: the lens through which you look. Economists, psychologists and engineers all view the question of what equipment is necessary for efficient production of car parts from their own perspective, which will be economic, psychological or technical in nature. The economist may approach this issue with the help of calculations based on a number of parameters (equipment and electricity costs, profits on car parts). The psychologist may look at the labour costs of the employees who have to operate the equipment and how they feel about the work (such as job satisfaction, salary). The engineer will probably look at the equipment itself and turn it inside out to determine whether it can be made more efficient with mechanical adjustments.

This doesn't mean that the economist, the psychologist or the engineer will provide the ideal solution. No single perspective is superior to any other. You might say that one is better suited or more appropriate than another for a particular issue, and this means that the research question should be formulated as specifically as possible in order to choose the most appropriate perspective for the research. A question then becomes the following: is this an economic, psychological or technical problem? This is the first important question to ask yourself when doing research.

1.2.1 Differing perspectives and schools of thought

Next, two general perspectives on research (induction and deduction) and two schools of thought (empirical-analytical and interpretative) from the philosophy of science will be discussed. These perspectives and schools of thought are frequently seen as opposites. Some research paradigms have implicitly or explicitly preferences for certain research perspectives, and certain research methods are favoured in different fields (social psychologists, for example, often use experiments when studying group processes). However, the aim of your research should determine which perspectives, which school of thought and which specific research methods you choose. These should all align with each other and be mutually consistent.

Induction and deduction

Historically, there have been two broad perspectives:

1. *Induction*. From this perspective, one develops a general theory on the basis of specific observations. For example, you attend an organisation for one month to observe all the employees. All the employees you see in this period are motivated, and that is why you form the working hypothesis that all employees of Organisation X are motivated. Subsequently, this theory can be used to perform deductive research.
2. *Deduction*. As opposed to induction, this perspective postulates that a researcher arrives at a specific expectation (a hypothesis) based on a general theory. The reasoning takes the form 'if ... then ...'. For example:
 - Theory: 'All employees at Organisation X are motivated.'
 - Observation: 'Peter works for Organisation X.'
 - Expectation/hypothesis: 'Peter is motivated.'

In deductive research, you test the theory by testing the hypothesis: if the hypothesis is not supported, you must reject the theory.

Empirical-analytical and interpretative schools of thought

Two schools of thought from the philosophy of science can also be distinguished. These are somewhat more specific than the two perspectives (induction, deduction) presented above:

1. *The empirical-analytical (positivistic) school of thought*. This school of thought, which has its origins in the natural sciences, places the collection of facts based on sensory perceptions at its heart. This method is often used in deductive research.
2. *The interpretative (phenomenological and hermeneutical) school*. In this school of thought, researchers set out to study other people's experiences and perceptions instead of focusing on collecting factual or objective data. The experienced truth and the researcher's interpretation of it are key here. This method is used mostly in inductive research.

It is useful to compare these two schools to each other when it comes to their impact on the vision and organisation of research (Blumberg, Cooper & Schindler, 2011; Bersselaar, 2003) (see Table 1.1). As indicated above, these interpretations of research are not necessarily mutually exclusive; they can also complement each other as will be shown in Section 1.2.2. Indeed, as you will read in Chapter 2, the principles of induction and deduction are both applied in the empirical cycle (albeit at different times) (Groot, 1961).

Table 1.1 World vision and type of data within the empirical-analytical and phenomenological/hermeneutical schools of thought

	Empirical-analytical school of thought (positivism)	Interpretative (phenomenological and hermeneutical) school
Vision of the world	The world is external and objective	The world is socially constructed and subjective
What is being measured?	Objective, quantitative facts	Subjective interpretation of opinions
Research example	A questionnaire study into employee satisfaction and motivation at Organisation X. The researcher analyses the questionnaire data to test a hypothesis with respect to satisfaction and motivation	Twenty interviews with key figures within Organisation X about their motivation to remain working for this organisation. The researcher analyses the interviews and searches for differences and patterns in order to come to conclusions or propositions regarding work-related motivation

1.2.2 Various methods and techniques

Besides these general schools in research, there are more specific research methods and techniques, which researchers can use to collect data. This is explained below.

Quantitative and qualitative research

In the literature on research, a fundamental distinction is made – partly stemming from the broad philosophical perspectives and schools of thought mentioned above – between two main research methods (Blumberg et al., 2011):

1. *Quantitative*. This form of research is aimed at describing or testing something, that can be expressed in measurable units or numbers (i.e., things that are 'quantifiable'). The research material consists of data obtained with the help of technical measuring instruments. For example, job satisfaction can be measured as a score on a five-point scale, where the average satisfaction measured might be 4.0 on a scale of 1 (very dissatisfied) to 5 (very satisfied).
2. *Qualitative*. This approach is more often used in explorative research into something that is not to be expressed in measurable units, but where rich, in-depth information is collected. Explorative, investigative research is about the provisional formulation of connections and explanations between phenomena. The research material consists of language, possibly on paper or collected in real life through conversations. For example, job satisfaction might be 'measured' in a lengthy interview in which an employee discusses their job in detail.

Often, empirical-analytical (positivistic) researchers use a quantitative research approach, whereas interpretative researchers tend to favour a qualitative approach. The choice of a certain design or a certain method should depend however on the research question (and what data you want to collect). Note that these approaches are not mutually exclusive: they can be integrated. When you ask people to describe how they experience their work, you are doing qualitative research. When you next ask them to score their degree of job satisfaction on a scale of 1 to 5, you are carrying out quantitative research. Quantitative research uses only the numbers collected during the research in the analyses; qualitative research takes the entire description into account. In the case of qualitative research, the results can also be concentrated or condensed, for example by indicating the number of times a statement is repeated in the interviews. In this way, one is attempting to find structure, patterns, connections or symmetries in the stories and descriptions (see Chapter 7).

Surveys and interviews

While interviews are a technique frequently used in qualitative research, a research technique often used in quantitative research is the survey method, also referred to as a questionnaire survey. Whereas questionnaires allow you to collect primarily quantitative data, and from a large number of respondents, interviews give you the opportunity to ask further questions, making it possible to obtain rich qualitative data. Research making use of both methods is called 'mixed-method research', and research that uses several quantitative or qualitative techniques is called 'multi-method research'. Figure 1.1 lists the most frequently used research techniques.