



REFLECTIONS ON APPROACHES TO RESEARCH STRATEGIES IN MANAGEMENT

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Abstract

The literature on research methods, while introducing both inductive and deductive research strategies, as well as the associated qualitative and quantitative research methods, provides the epistemological underpinning of research. However, this literature generally neglects the role of logic in research, which sometimes could lead to inappropriate reasoning in both doctoral thesis work and research papers. Inappropriate reasoning is due primarily to misinterpreting inductive and deductive forms of reasoning in the literature on research methods as a result of neglecting logic. This paper sheds new light on interpreting inductive and deductive forms of knowledge creation including logic, which has played an important role as the science of reasoning in knowledge creation since the time of Aristotle. This paper is speculative in nature, and provides the reflections of an experienced researcher from the management domain.

Keywords: deductive research, inductive research, role of logic in research, types of research

1 INTRODUCTION

The primary aim of research in any domain is the creation of new knowledge; thus the validity of research outcomes is of great importance. Janiszewski, Labroo, and Rucker (2016) stated that the validity of research outcomes is strongly related to the appreciation of the contribution of research outcomes to extant knowledge. They proposed two factors that determine the contribution of a research study, namely the quality and the benefit. Quality, they stated, is a twofold phenomenon that includes being grounded in and expanding extant knowledge on the one hand, and the appropriate implementation of the research on the other hand. They defined benefit as the extent to which the new knowledge challenges the existing knowledge. Bryman and Bell (2015) also discussed quality, and they emphasized three criteria against which the quality of business research needs to be evaluated: reliability, replicability, and validity. Bryman and Bell stated that reliability and replicability are strongly interrelated. Whereas reliability relates to measures used to quantify phenomena, replicability implies the potential for

achieving the same outcome when a research study is repeated based on the same conditions. Bryman and Bell defined validity as the truth of the conclusions, in terms of generalization, of the research. Mårtensson, Fors, Wallin, Zander, and Nilsson (2016) discussed quality of research in the context of its evaluation, and they asserted that quality research needs to be (1) credible (i.e., coherent, consistent, rigorous, and transparent), (2) contributory (i.e., original, relevant, and generalizable), (3) communicable (i.e., consumable, accessible, and searchable), and (4) conforming (i.e., regulatory aligned, ethical, and sustainable). The importance of a valid generalization also was stressed by Troja (2019), especially in the case of qualitative research, because a superficial generalization could weaken credibility, i.e., validity.

Gray (2004) suggested data triangulation and methodological triangulation in order to ensure validity via reliability. To enhance both validity and practicability Joslin and Müller (2016) emphasized the importance of adopting a double research perspective in terms of observing phenomena based on a dual paradigm. Thus, to

ensure the validity of the research outcomes, Joslin and Müller (2016) strongly suggested the use of triangulation in project studies, such as data triangulation (e.g., adopting multiple data sources), triangulation of researchers (e.g., two researchers are engaged), methodological triangulation (e.g., the use of mixed methods), theory triangulation (e.g., adopting multiple theoretical perspectives), and philosophical triangulation (e.g., adopting different epistemological positions). Joslin and Müller stated that the use of the latter type of triangulation in the investigation of the very same phenomenon is advisable when there is a potential to achieve synthesis of those research outcomes that are derived from such research studies that are based on different epistemological positions.

From the point of view of both validity and quality of research it seems reasonable to consider criticism published in management journals regarding the use of research strategies and methods. Sometimes this criticism is coupled with the moral attitude of the researchers, and authors also tend to couple criticism with the overwhelming use of quantitative research methods. Wolceshyn and Daellenbach (2018), while arguing for the legitimacy of inductive research in management, highlighted the underlying reason for the overwhelming use of quantitative research in the management domain. They stated that this reason is rooted in the emergence of management sciences, when management scholars, to achieve scientific legitimacy by means of emulating the natural sciences, propagated the use of hypothetico-deductive research coupled with quantitative methods. In line with Wolceshyn and Daellenbach (2018), Pernecky (2016) highlighted Émile Durkheim's role in introducing a scientific approach to social science (specifically to sociology) based on his approach to social phenomena. Durkheim's approach proposes that social phenomena are independent of our knowledge of them, and thus they can be observed objectively. In this way, the use of (hypothetico-)deductive research and the underlying positivist epistemological position might result in achieving scientific recognition in the wider community of scientists.

Banks et al. (2016) identified several forms of questionable research practice based on a considerable sample that may occur when hypothetico-deductive quantitative research is applied. These findings, which were reinforced by Schwab and Starbuck (2017), include

- reporting hypotheses selectively, i.e., excluding a hypothesis with statistically non-significant results from the paper;
- excluding data from analysis, i.e., excluding outlier data to achieve statistical significance;
- hypothesizing after results are known (HARKing), i.e., adjusting predefined hypotheses to the outcomes;
- including control variables selectively, i.e., including only those control variables that support the statistically significant outcomes;
- falsifying data, i.e., creating data instead of collecting real-life data; and
- rounding off a p -value, i.e., manipulating significance.

Unlike in inductive-qualitative research, the aforementioned practices are experienced primarily when hypothetico-deductive quantitative research, i.e., the most frequently employed research strategy in the management domain, is applied. Several studies have highlighted the specific underlying reasons for this phenomenon. Both Banks et al. (2016) and Recker and Mertens (2019) identified several reasons, such as the pressure on academics to publish, the time pressure of publishing new results as quickly as possible, and the ranking policy of journals. Osterloh and Frey's (2020) criticism of the review practice of many leading journals also might imply potential reasons for conducting questionable research. These circumstances have resulted in replication crises (e.g., Banks et al., 2016) or contradicting research outcomes (e.g., Görög, 2019). All in all, the use of these practices weakens the quality and reliability, and therefore the validity, of the research outcomes.

Regarding inductive-qualitative research, a few critical remarks can be found in management journals. These include the potentially limited knowledge of the researcher and the inherent limits of human observations (Zalaghi & Khazaei (2016). However, Mohajan (2018) while pointing out poten-

tial advantageous features of inductive-qualitative research, identified a couple of disadvantages which might limit the validity of research results, including difficulties in demonstrating scientific rigor related to collecting data, and the fact that these research results could not be verified objectively.

Thus, one might conclude that, apart from the researchers' honesty, validity of a research outcome is determined primarily by the use of an appropriate research strategy and methods, or rather by the appropriate use of the strategies and methods. In this way, authors of books on research methods have primary responsibility, because both doctoral students and practicing researchers rely on these books to a great extent. Doctoral students are trained from these books, and practicing researchers refer to these books when justifying the appropriateness of the research strategies and methods deployed in their research. Although articles published in management journals have discussed the use of research strategies (such as inductive, deductive, or abductive) or analytical methods (such as qualitative and quantitative), the authors of such papers basically agree with the book authors.

What does characterize the books, or at least the books cited in this paper, on research methods? Most of these books, while focusing on the wider domain of social sciences, provide an epistemological background of applying different research strategies and the associated analytical methods (including data collection methods as well), or even introducing the appropriate rhetorical aspects in terms of style of writing. However, it is hard to find a book on research methods that provides insight into logic, i.e., the science of reasoning. Tsang (2017) stated that courses lacking logic in doctoral schools result in inappropriate reasoning in thesis works and in the research-based manuscripts submitted to management journals. Logic seems to be a certain kind of interface between philosophy and research strategies. It implies that researchers can operationalize their philosophical (both ontological and epistemological) stance and the associated research methodology by means of the tools of logic. Lacking familiarity with logic might lead to misinterpreting the use of research strategies, in terms of both the inductive and deductive forms of creating new knowledge.

This paper sheds fresh light on interpreting inductive and deductive forms of knowledge creation in relation to the philosophy of science, and the science of logic (as the science of reasoning) which have played an important role since the time of Aristotle in creating scientific knowledge. The basics of logic is introduced in a separate section. Interpreting this approach to knowledge creation provides the potential for, as collateral aims, understanding the unit of analysis, proposing basic research types, and a spiral-based evolution process of knowledge creation in management. This paper is speculative in nature, especially the last section, which summarizes the concluding thoughts of the author. To make this apparent, the first-person pronoun is used in that section.

However, before introducing the existing approaches to the topic, a terminological issue is discussed. A few authors use the term "approach" when discussing inductive and deductive methods of conducting research, whereas others use the term "strategy" when discussing these methods of research. In this paper when the existing literature is introduced, the term used by the authors of each paper is adopted. However, when my own views and proposals are introduced, I use the term "strategy" to classify inductive and deductive research.

The paper is organized as follows. The following two sections introduce how research methods and the underlying strategies to conducting research are interpreted in management articles that discuss the perceived use of these tools, and in books on research methods. The interpretations given in the books are reflected in the articles. This implies that the articles show how the research methods offered in the books are understood and perceived by the researchers in the course of using them. This justifies introducing the approaches available in articles and books in separate sections. Those two sections are followed by the introduction of approaches to research in the literature on logic, beginning with philosophers who stress the role of logic in research. In this way, the paper moves from an application level toward a more theoretical level. The paper ends with concluding thoughts, bearing in mind the underlying epistemological stances when interpreting the use of deductive logic in management research.

2 FINDINGS IN MANAGEMENT ARTICLES DEVOTED TO THE USE OF RESEARCH METHODS

Although each research paper published in management journals introduces the research methods applied in the underlying research, several papers published in these journals have discussed research methods applied in management research. Aldag and Stearn (1988) reported the use of various research methods, and the increasing number of qualitative analytical procedures in addition to the quantitative analyses. Bansal, Smith, and Vaara (2018), while emphasizing the role of qualitative data-based inductive research in theory development, stated that this kind of paper submission has reached 20% of the total submissions to the *Academy of Management Journal*. Bansal, Smith, and Vaara also stressed the need to use different types of qualitative research methods in addition to case-based positivist research. In the project management domain, Müller and Söderlund (2015) highlighted that research studies are very traditional because researchers prefer using questionnaires and quantitative analyses, and emphasised the need to consider context specificity in such research. Barratt, Choi, and Li (2011) argued for conducting case-based qualitative research in operations management, which would contribute to developing the theoretical underpinning of this domain area. Gottfredson and Aguilis (2017) highlighted the importance of adopting a dual deductive–inductive research method to determine the relationships between leadership behaviour and follower performance reliably.

Whitfield and Strauss (2000) stated that there is a definite shift from inductive research adopting qualitative analyses toward deductive research adopting quantitative analysis in order to build (inductively) and test (deductively) theories. However, Whitfield and Strauss did not say that each deductive research is *ab ovo* quantitative or that each inductive research is *ab ovo* qualitative in nature. Hyde (2000), like Whitfield and Strauss (2000), clearly differentiated quantitative and qualitative research, and stated that quantitative research generally is based on a deductive process, whereas qualitative research is based on an inductive pro-

cess. Hyde further argued for a balanced use of both induction and deduction in each research in order to avoid neglecting useful theoretical perspectives due to extreme induction, or developing (new) theory due to extreme deduction. Those papers considered deductive research to be a theory-testing effort which aims to justify whether a given theory or concept is valid in a given context, whereas inductive research is considered as a theory-building process which aims to generalize specific occurrences of the investigated phenomenon.

In addition to using inductive and deductive research, Kovács and Spense (2005) argued for deploying abductive research in logistics to support theory development in this domain. Abductive research is understood here as a certain combination of inductive and deductive research. In an abductive research process, a theory is matched with challenging real-life cases, and, as a result of resolving their contradictions, a new or a further developed theory is formulated and applied. Although abductive research is used in management research less often than deductive and inductive research, Behfar and Okhuysen (2018) emphasized its advantageous features. In their view, this research method is “an inseparable, indispensable, and valuable approach linking the development of explanation and the testing of resulting hypotheses to advance theory” (Behfar & Okhuysen, 2018, p. 323). Thus, they stated that an abductive research process has an outstanding role in theory development when resolving and explaining contradictions or inconsistencies experienced in the phenomenon researched. Therefore, they suggested that an abductive research method should substitute the traditional deductive and inductive research methods.

In terms of papers which report or propagate the use of different research types, articles have been published in management journals which provide a broader picture of undertaking management-related research.

Janiszewski, Labroo, and Rucker (2016) differentiated deductive-conceptual research and non-deductive-conceptual research. Deductive-conceptual research focuses on a theory, concept-to-theory, or concept relationship to construct new theoretical knowledge; that is, the primary aim is to contribute

to theory development by means of testing the proposed new construct. Non-deductive-conceptual research focuses on relationships between empirically observed phenomena to provide explanation. Zalaghi and Khazaei (2016) approached this issue by making reference to logic, and they differentiated deductive and inductive methods. A deductive method starts by considering general concepts from which a specific conclusion is drawn based on formal logical reasoning. An inductive method starts by observing a specific phenomenon, and then the conclusion drawn is generalized to a similar context. This generalization might lead to constructing a new or novel theory or concept. Recker and Mertens (2019), similarly to Bansal, Smith, and Vaara (2018), used the term “hypothetico-deductive research” when they discussed the importance of significance testing of null hypothesis. This term was used for deductive research in recent management literature, because, according to the broadly accepted notion, in deductive-quantitative research a hypothesis is deduced from extant literature.

Pathirage, Amaratunga, and Haigh (2008) and Wolcshyn and Daellenbach (2018) also adopted the terms “deductive” and “inductive” to differentiate between the two fundamental approaches to conducting research. They considered the terms in the context of epistemology, that is, from the point of view of how knowledge is created and acquired. Bearing in mind the two extremes, Pathirage, Amaratunga, and Haigh (2008) emphasized positivist and social constructivist epistemological positions, and in light of these two positions they highlighted the fundamental differences between deductive and inductive research. Thus, they stated that because positivists believe in an external world which is independent of our knowledge of it (even the social world), the researcher is independent, and is able to reveal causal relationships by means of deductive thinking. Social constructivists believe in a socially constructed (non-objective and non-external) world; thus the researcher is part of the observed phenomenon. Therefore, a researcher collects data from which a general understanding of a phenomenon is achieved by means of inductive thinking. Bredillet (2004) stated that relying on a “being ontology” which postulates a fixed reality and the associated positivist mirror is not appropriate in pro-

ject-related research, and argued for adopting a “becoming ontology” postulating a changing reality and the associated subjectivism to achieve effectiveness of project management research outcomes.

Despite the slightly different phrasing used by the aforementioned authors, the basic concepts of conducting management research are understood similarly; however, the terms for research approaches (deductive and inductive) and analytical approaches (quantitative and qualitative) sometimes are used as synonyms. Studies differentiate (hypothetico-)deductive and inductive research, and consider these research strategies basically in the same way, although Zalaghi and Khazaei (2016) presented a different notion about deductive and inductive research. However, there seems to be an agreement among studies regarding the strong connection between (hypothetico-)deductive research and the use of quantitative methods on the one hand, and the connection between inductive research and the use of qualitative methods on the other hand. The scope of the research methods propagated for use in management research has been broadened, and the importance of epistemological underpinning of conducting management research has become common.

In addition to the epistemological underpinning of research, a few studies have shed light on the role of axiology in research as well. Axiology is concerned with the involvement of the researchers’ value system in the research, i.e., it addresses the question of whether the relationship between the phenomenon being observed and the researcher has an impact on the research (e.g., Pathirage, Amaratunga, & Haigh, 2008). Reiter (2017) argued that researchers’ engagement in terms of their positionality is needed in the pure social sciences (e.g., sociology). Bansal, Smith, and Vaara (2018) adopted the term “engaged scholarship,” which implies that a researcher is part of the context of the phenomenon being observed. In this way, they stated that the involvement of the researchers’ value can strengthen the insight into a researched phenomenon. Hudson and Okhuysen, (2014) and Behfar and Okhuysen (2018) stated that it is naïve to assert that researchers might value neutral participants in the research process.

3 APPROACHES TO RESEARCH IN BOOKS DEVOTED TO RESEARCH METHODS

Although several books have been published in the last decade introducing research methods applicable in social sciences, the number of books devoted to management research is limited. Thus, this section of the paper also considered a few books on the wider scope of social science-related research.

Gray (2004) differentiated deductive and inductive research in the context of organizational research based on the relation between a theory or concept and the research aim. In deductive research the aim is to empirically justify or falsify relationships between theories or concepts asserted in the predefined hypotheses, whereas in inductive research the aim is to construct generalizations and relationships between concepts or theories, or even to construct new theories from the outcomes of empirical observations. Gray (2004) emphasised the potential for a combined use of deductive and inductive processes. Bryman and Bell (2015) used the terms “deductive” and “inductive” theory or strategy alternately. They stated that in deductive research, hypotheses are *deduced* from the extant literature, i.e., from what is already known, whereas in inductive research a theory development is *inferred* from the empirical findings. Akin to Gray’s (2004) view, Bryman and Bell did not emphasise a definite separation between deductive and inductive research, and referred to their combined use as abduction. Jensen and Laire (2016) differentiated between deductive and inductive research based on the nature of empirical information. In their view, quantitative methods rely on numerical data and generally adopt a deductive way of thinking, while qualitative methods rely on non-numerical data and generally follow an inductive method. They referred to the combination of quantitative and qualitative methods as mixed methods.

Tracy (2020) also differentiated deductive and inductive reasoning, using terms from logic. However, bearing in mind a pure social science context, Tracy referred to these as *etic* and *emic* understandings. Emic refers to *emerge*, which implies inductive research aiming at the introduction of human behaviour in a context-specific manner from the point of view of the actors to develop general trends, whereas etic (*external*) refers to deductive research,

in which predefined external theories are used to describe and explain a situation. Tracy stated that a qualitative analysis, compared with a quantitative method, implies more elements of subjectivity. Troja (2019) propagated a stepwise-deductive inductive mode which includes a phase from empirical data to concepts or theories as an inductive process. Then, as a deductive process, there is a phase from theoretical toward empirical. However, this model resembles abduction (e.g., Bryman & Bell, 2015).

Most research method books discuss the question of research approaches (deductive or inductive) and the associated data analysis methods (quantitative or qualitative) alongside the epistemological positions. Gray (2004) stressed that selecting a data collection method (e.g., interviews or questionnaires) is determined by the research methodology used (e.g., grounded research or survey research). This methodology is influenced by the theoretical perspectives adopted by the researcher (e.g., positivism), and also is determined by the researcher’s epistemological position (e.g., objectivism). Epistemology, as the philosophy of science, is concerned with creating knowledge adequately, whereas ontology is concerned with the external world in relation to which research as knowledge creation is understood. Gray discussed three epistemological positions: objectivism, constructivism, and subjectivism. In Gray’s (2004) view, objectivism postulates as an ontological position an objective external world, and the related theoretical perspective is positivism, and thus research involves discovering the objective external world primarily by means of deductive research. Constructivism, in his view, also postulates as an ontological position an objective external world, but its related theoretical perspective is interpretivism, and thus research is about creating knowledge by means of interaction with the external world within the frame of inductive research. Subjectivism, Gray states, does not postulate that an external world objectively exists; thus, knowledge is imposed on the world by the subject, i.e., this world could be interpreted in a qualitative-inductive way.

Creswell (2012), in addition to the epistemological determination of methodological issues, emphasised the role of rhetoric and axiology in research, which include the role of values adopted by the researcher, i.e., whether the researcher’s values could

shape the interpretation of the research outcomes. However, in his approach, positivism and constructivism, to name just two concepts, are referred to as paradigms or worldviews, whereas Gray (2004) referred to these concepts as theoretical perspectives. Tracy's (2020) approach to paradigms is similar to that of Creswell (2012), although she emphasized the role of positivist, interpretative, critical, and post-modern paradigms. She also emphasized that choosing a certain paradigm precludes choosing another one simultaneously. Tracy (2020) referred to the term "theoretical framework" (e.g., interpretivism or ethnography) as a system of principles to explain different phenomena. Kuhn's (1970) broadly accepted interpretation of a paradigm includes a combination of ontological stance, epistemological position, and research methodology.

For epistemological positions, Bryman and Bell (2015) differentiated two fundamental philosophical stances, namely positivism and interpretivism, both of which include different genres. They stated that positivism is associated with the natural sciences, and therefore it cannot be applied properly in social science research. According to Bryman and Bell, because the emphasis in social research is on understanding human behavior, interpretivism is considered to be an appropriate epistemological position. Bryman and Bell (2015) also differentiated ontological positions, such as objectivism and constructionism. Whereas objectivism postulates a reality which is external to the social actors, constructionism says that the external world is a social construct. Bryman and Bell also emphasized the role of both ontological and epistemological positions in formulating research questions and conducting research, which leads to adopting a certain paradigm (e.g., Kuhn, 1970). The latter postulates adopting a certain research design (e.g., longitudinal research) which provides guidance for implementing research methods (e.g., questionnaire-based data collection). Bryman and Bell (2015) used the term "strategy" (similar to differentiating the terms inductive and deductive) when differentiating quantitative and qualitative research. In their view, a quantitative research strategy, which emphasizes collecting and analyzing data quantitatively, adopts an objective ontological position and a deductive approach to test theories. A qualitative research

strategy, they stated, which emphasizes collecting and analyzing data non-numerically, adopts constructivism as an ontological position and primarily uses an inductive approach to theory generation. Thus, Bryman and Bell considered the phenomenon of mixed methods as a combined use of quantitative and qualitative research strategies.

Drouin, Müller, and Sankaran (2013) stated that very few project-related studies have adopted contemporary epistemological approaches, and they argued in favor of adopting theories from the broader social sciences (e.g., organizational and behavioral sciences) to innovate project management research based on new approaches (such as pragmatism and postmodernism) by using novel research methods (e.g., action research and ethnographic study).

Books on research methods, especially those recently published, also shed light on the role of axiology in research. Tracy (2020) defined axiology as a discipline which deals with values that are associated with a certain research area. This approach postulates value-laden research, e.g., the conscious adoption of the value of social justice in sociology. Bryman and Bell (2015) also approached this question in terms of values which reflect the beliefs and feelings of the researchers. According to Bryman and Bell, the influence of values manifests primarily in terms of sympathy or antipathy when qualitative research and interview-based data collection are applied. They also stressed that research might be consciously value-laden.

Although there are differences in approaches to research, especially in terms of understanding epistemology, the underlying concepts of conducting research are understood basically in the same way despite the use of slightly different phrasing when the basic concepts of research are explained. These primarily include how the terms "deductive" and "inductive" research and, respectively, "quantitative" and "qualitative" research are understood and explained. Most authors agree to a certain extent that deductive research is used to provide empirical justification or falsification of theories, whereas inductive research is used to generate theories from empirical data. However, differences in authors' approaches are important to understanding and explaining epistemological positions and their genres.

4 APPROACHES TO RESEARCH IN PHILOSOPHY AND LOGIC

Both the papers published in management journals and the books on research methods cited in the previous sections emphasize the role of philosophy in research. Tsang (2017) stressed the importance of philosophical perspectives in research, stating that a philosophical perspective includes beliefs and assumptions about the external world and also the way in which a person knows about this world. Thus, a philosophical perspective provides a worldview for a researcher.

Marsh, Ercan, and Furlong (2018) considered this issue in a broader philosophical context, stating that a researcher's attitude toward an observed phenomenon is shaped by their adopted ontological and epistemological position. Ontology and epistemology are the two main branches of philosophy, and although they are related, they are different. Central to ontology is the question of whether there is a real world which "is independent of our knowledge of it" (Marsh, Ercan, & Furlong, 2018, p. 18). Epistemology is the theory of knowledge, and its primary question is what and how one can know about the world. In terms of the ontological positions, Marsh, Ercan, and Furlong differentiated between foundationalism and anti-foundationalism. Whereas foundationalism postulates a real world which is independent of our knowledge of it, anti-foundationalism postulates a socially constructed world. As the most common categorization, Marsh, Ercan, and Furlong (2018) considered scientific (also referred to as positivist) and hermeneutic (also referred to as interpretist) epistemological positions. Adopting a foundationalist ontological position leads to adopting a scientific, i.e., a positivist epistemological position, stating that the real world can be known objectively. Thus, this approach relies on deduction and is concerned with causal relationships between phenomena (using theories to define hypotheses) to produce not only explanatory but predictive models as well by means of quantitative methods. However, an objective direct observation is needed of whether the prediction succeeds and the deduction is valid knowledge. Adopting an anti-foundationalist ontological position leads to a hermeneutic, i.e., an interpretist epistemological

position, stating that the socially constructed world might be interpreted only by means of qualitative methods. Although the interpretist position includes different subsections (genres), the underlying features of these genres are similar to the previously mentioned characteristics of interpretism. Because these two epistemological positions are fundamentally different, Marsh, Ercan, and Furlong (2018) stressed that these positions cannot be adopted by a researcher interchangeably.

When differentiating positivist and interpretist epistemological positions as fundamental positions, Marsh, Ercan, and Furlong (2018) stressed the importance of realism, which might be considered to be a certain kind of in-between category. They stated that realism adopts foundationalism as an ontological position, and thus it uses causal statements as hypotheses when observing certain phenomena and their relationships. However, realists state that there are objective social phenomena, and their relationships, that cannot be observed directly, but only interpreted as they are perceived. Thus, realism accepts the use of both quantitative and qualitative research methods.

Pernecky (2016) provided an overview of the history of seeking true knowledge, and also considered the concepts of logic. He stated that the debate over deductive versus inductive thinking has its roots in ancient Greece, and has been continued over the following centuries. Empiricists argued for the supremacy of experience, which postulates inductive thinking, whereas rationalists stated that true knowledge is an achievement of reasoning, i.e., logic which postulates deductive thinking. The underlying deductive thinking of rationalism goes back to the ancient Greek mathematician Euclid, especially his axiomatic system (e.g., Szabó, 1967). However, the outcome of a deduction needs to be justified or falsified by means of experiments or empirical observations. The aim of inductive reasoning is to achieve generalizations by means of observing particular phenomena and inferring general law in terms of theory.

Because both deductive and inductive reasoning are underlying tools for creating new knowledge, they are discussed further based on literature on science of reasoning, i.e., logic. Logic is a method by means of which correct reasoning can be differ-

entiated from incorrect reasoning (Copi, Cohen, & McMahon, 2014). An argument, i.e., reasoning, might be considered to be a sequence of sentences, i.e., a sequence of propositions, which starts with premises and ends with a conclusion (Gamut, 1991).

Propositions are important parts of reasoning because whether something is true or false is stated by means of sentences which are referred to as propositions (e.g., Copi, Cohen, & McMahon, 2014). Although a proposition may include a simple statement (a categorical assertion), it also might be compound, including complex assertions. Copi, Cohen, and McMahon (2014) differentiated the following compound propositions:

- Conjunctive, e.g., “in winter the temperature is below zero, and it is frequently snowing,” i.e., each part can be asserted separately.
- Disjunctive (alternative), e.g., “at the end of the road you can turn left or right,” i.e., only one of the components is true.
- Hypothetical (conditional), e.g., “if I am sleepy, then I go to bed,” i.e., only the if-then proposition, but none of the components is asserted.

Using propositions, one can construct arguments, which include inferences resulting in the conclusion drawn. Thus, the structure of arguments includes propositions (commonly referred to as premises) and a conclusion, in which the premises support the conclusion. The conclusion of an inference may be used to form a new premise in a following structure of argument. Depending on how the premises support the conclusion, an argument, and the implied inference, might be deductive or inductive. When the conclusion is supported conclusively by its premises, the argument is referred to as deductive; however, when this conclusiveness is not ascertained, the argument (and the implied inference) is inductive.

The difference between deductive and inductive reasoning is based on the nature of the claims which are made using arguments about the relations between premises and a conclusion (e.g., Copi, Cohen, & McMahon, 2014). In a deductive argument the conclusion, as a product of inference of the argument, comes from the premises as an absolute necessity. However, in an inductive argument

the conclusion, as a product of inference of the reasoning, comes from the premises with a certain degree of probability. The following two examples shed light on this difference:

- 1) Each six-year-old child has to go to school. Peter is a six-year-old child. Therefore, Peter has to go to school.
- 2) Most six-year-old children have to go to school. Peter is a six-year-old child. Therefore, Peter probably has to go to school.

The difference between deductive and inductive reasoning places the question of validity at the forefront. Central to logic is highlighting what makes an argument valid, i.e., what makes a valid inference (e.g., Gamut, 1991). Gamut also highlighted that from the point of view of validity, the sequence of sentences, i.e., of the propositions (premises then conclusion), is of vital importance because this sequence ensures the validity of argument schemata, i.e., of the structure of an argument. When true premises irrefutably underpin the conclusion, the argument is considered to be valid. Because this is not the case when an inductive argument is applied, the question of validity is considered in connection with deductive arguments. “A deductive argument is valid when, if its premises are true, its conclusion must be true” (Copi, Cohen, & McMahon, 2014, p. 24). The conclusion of an inductive argument can never be certain, although the level of its probability can vary. Thus, one example of inductive reasoning might be stronger or weaker than another. “Even when the premises are all true, however, and provide strong support for the conclusion, that conclusion is not established with certainty” (Copi, Cohen, & McMahon, 2014, p. 25) in the case of induction. Bearing in mind this difference between deduction and induction, it is clear that considering further information can change the probability of an inductive argument, whereas the validity of deductive reasoning will not change due to additional information. Unlike the validity of an argument, the question of truth is understood related to the propositions, especially to those which are considered to be the premises, stating something about a case. When the premises are true and the argument is valid, this argument is referred to as sound (e.g., Copi, Cohen, & McMahon, 2014). Thus, a sound argument necessarily includes a true conclusion.

Although a simple argument may consist of one premise, for the purpose of scientific reasoning, Aristotle developed his syllogistic logic (e.g., Gamut, 1991) in which two premises are used to draw a conclusion. Thus, syllogism is a deductive argument in which the conclusion is inferred from two premises. The validity of syllogism requires the use of its standard form, which implies, further to the internal structure of the propositions, a specified order of the propositions (argument schemata). In terms of the proper internal structure of the propositions, of both premises and the conclusion, the concepts of major term, minor term, and middle term are differentiated (e.g., Copi, Cohen, & McMahon, 2014) in the following example:

*All elephants can fly.
Jumbo is an elephant.
Therefore, Jumbo can fly.*

In this example the predicate of the conclusion is *fly*, and this is referred to as the *major term* of this syllogism. The subject of the conclusion is *Jumbo*, and this is referred to as the *minor term* of this syllogism. *Elephant*, referred to as the *middle term*, is in both the premises, but never in the conclusion. The premise in which the major term (*fly*) is included is referred to as a major premise, whereas the premise in which the minor term (*Jumbo*) is included is referred to as a minor premise. A categorical syllogism has a standard form when both the premises and the conclusion are a standard form of categorical propositions (e.g., Copi, Cohen, & McMahon, 2014), and these are arranged in a predefined order, i.e., the major premise is first, the minor premise is second, and the conclusion is last. The validity of this syllogism depends on this form.

Further to categorical syllogism which is constructed from categorical propositions, a disjunctive syllogism consists of one disjunctive (alternative) proposition as one of the premises. The other premise denies one of the alternatives stated in the first premise. Thus, a disjunctive syllogism requires the use of a logical constant such as *or*, and the valid conclusion of a disjunctive syllogism includes an alternative that is not denied. For example:

*At the end of the road you can turn left or right.
At the end of the road you can't turn left.
At the end of the road you can turn right.*

A hypothetical (conditional) syllogism consists of conditional propositions which include an antecedent (e.g., if I am sleepy) and a consequent (e.g., then I go to bed). Whereas the pure hypothetical syllogism relies on two conditional propositions, the mixed hypothetical syllogism is based on one conditional proposition and one categorical proposition as premises. For example:

*If I am sleepy, then I go to bed.
I am sleepy.
Then I go to bed.*

In this form of mixed hypothetical syllogism (*modus ponens*) the antecedent included in the conditional premise is confirmed by the categorical premise, whereas the conclusion states the consequent (e.g., Gamut, 1991). In other forms of mixed hypothetical syllogism (*modus tollens*), the categorical premise denies the consequent stated in the conditional premise, and the antecedent is denied in the conclusion (e.g., Gamut, 1991). The structural validity of the mixed hypothetical syllogisms requires the use of appropriate logical constants, such as *if ... then*, *if and only if*, and *not*.

Again, due to the relations between the premises and the conclusion, in the case of deduction the conclusion comes from their premises with certainty, i.e., if a deduction is valid and its premises include true assertions, the conclusion must be true. However, in the case of induction, also due to the relation between its premises and the conclusion, the resulting conclusion is true with a certain probability. To strengthen the probability of an inductively achieved analogical conclusion, Copi, Cohen, and McMahon (2014) drew attention to considering an appropriate number of similar and dissimilar as well as relevant cases, whereas the conclusion needs to be formulated modestly. Further to analogy, an inductive inference might relate to casual relationships as well, in which a *cause-and-effect* relationship is supposed between two phenomena. In this case, it

is postulated that similar effects are produced by similar causes, i.e., generality is available due to the causal law. Inductive generalization, i.e., formulating a general proposition from particular experiences, might be achieved by simple enumeration. Thus, the higher the number of observed causalities, the greater is the potential for a more probably true inductive generalization. However, a negative case casts doubt on the truth of this generalization (e.g., Copi, Cohen, & McMahon, 2014).

The conclusion of any inference might be used as a premise of further inferences to provide building blocks for developing scientific explanations which could lead to constructing general truths or theories which are empirically verified (e.g., Copi, Ercan, & Furlong, 2014). Copi, Ercan, and Furlong stated that this process includes several steps, such as problem identification, formulating preliminary hypotheses, collecting additional evidence to adjust preliminary hypotheses and formulate explanatory hypotheses, drawing and testing consequences, and applying the new knowledge (theory). According to Copi, Ercan, and Furlong, central to this process is formulating hypotheses which are considered to be appropriate when they (1) are compatible with previously established theories, (2) have predictive or explanatory power, and (3) imply relative simplicity.

5 CONCLUDING THOUGHTS ON CONDUCTING RESEARCH IN MANAGEMENT

The preceding brief overview of the research approaches or strategies discussed in management journals and introduced in books on research methods makes it possible to provide a concluding summary of logic and its relation to the philosophy of science. This summary focuses on interpreting deductive and inductive research in the management domain, and its relation to epistemology (philosophy of science).

Addressing these issues provides potential for further discussion and interpretation of questions, such as the unit of analysis in management research and the basic types of management research. All this helps to interpret the evolution process of management knowledge as a certain kind of knowledge creation spiral.

Although terminology tends to differ sometimes, the authors of studies in management journals and of books all consider and interpret both deductive and inductive research strategies. It is accepted broadly that deductive research follows a theory–hypotheses–justification/falsification process, whereas inductive research is based on an observation–pattern/hypotheses–theory process. Research tends to associate a deductive approach with quantitative analysis, and an inductive approach with qualitative analysis. However, the broadly used term “hypothetico-deductive research” implies, and a few authors (e.g., Bryman & Bell, 2015) state *expressis verbis*, that in deductive research hypotheses are *deduced* from extant literature, i.e., from what we already know. These authors also state that in the course of inductive research a theory is *inferred* from the empirical findings.

In the science of logic, inference as the form of reasoning is considered to be a process in which the premises lead to a conclusion. An inference, depending on the relations between its premises and its conclusion, is either deductive or inductive. Although it seems acceptable that in inductive research, knowledge is inferred inductively as a result of inductive generalization, stating that hypotheses are deduced from extant knowledge in hypothetico-deductive research is questionable in terms of logic. To make this issue clear, we need to discuss further the approaches to knowledge creation.

Gray (2004) introduced three types of studies: (1) exploratory, which aim to determine a situation; (2) descriptive, which aim to describe a phenomenon as it is; and (3) explanatory, which focus on highlighting relationships between phenomena. To produce these studies, different types of research need to be completed. Both exploratory and descriptive studies require observation in order to introduce a new phenomenon or an undiscovered aspect of a known phenomenon. An example is introducing the concept of a project as a temporary organization (e.g., Lundin and Söderholm, 1995). However, an explanatory study might require either inductive or deductive research. When the relationships between phenomena are highlighted as a result of inductive generalization the researcher, based on existing knowledge of these phenomena, *assumes* (but does not deduce) a certain relation-

ship between them. This assumption is formulated as a hypothesis; then, by collecting and analysing empirical data, this hypothesis is justified (or falsified) as a result of inductive generalization. An example is highlighting the relationship between project types and the project manager's leadership style (e.g., Müller and Turner, 2007). When the relationships between phenomena are determined as a result of deductive reasoning, the researcher, based on existing knowledge (in terms of concepts or theories) related to these or other phenomena, *deduces* (as a result of logical succession, i.e., inference) a certain relationship between them. This deductive conclusion is formulated as a hypothesis; then, by empirical observation, this hypothesis is reinforced (or refuted). An example is determining the relationship between the market position perceived by project-based organizations and the type of contract used by the project clients. (e.g., Görög, 2016).

Bearing in mind the difference between inductive and deductive inference (reasoning) as introduced in the literature on logic, I would say that use of the term *hypothetico-deductive* research is misleading because it relies on a certain kind of misconception related to deductive research. Therefore, most of the research which is referred to as deductive in management journals and books on research methods actually is inductive research (inductive generalizations) reflecting the science of logic. The preceding cases exemplify this statement and also provide justification for it. However, in the case of quantitative analysis-based research, the inductive generalization is underpinned quantitatively, and qualitative analysis-based research qualitatively supports the inductive generalization.

In terms of epistemological stances, the literature on philosophy differentiates two fundamental positions, namely positivist (also referred to as scientific) and interpretist (also referred to as hermeneutic). However, Marsh, Ercan, and Furlong (2018) differentiated an in-between position, realism, which adopts foundationalism as an ontological position, emphasizing the need to consider causal relationships between phenomena. Realists also state that there are objective relationships between social phenomena that cannot be observed directly, only interpreted as they are perceived. It is characteristic of the hermeneutic/interpretist epistemo-

logical position that this stance includes several different genres (branches); however, it seems that there is no commonly agreed name for these different genres. Most of these genres sometimes named are differently when introduced in books on research methods and briefly interpreted in management journals, which can result in a certain amount of cognitive confusion for practicing researchers. Creswell (2012) provided an extensive list, including postpositivism, social constructivism, pragmatism, postmodern perspectives, feminist theory, critical race theory, etc., whereas Troja (2019) adopted the umbrella term "research perspective" and introduced symbolic interactionism, ethnomethodology, phenomenology, and social constructivism. However, Marsh, Ercan, and Furlong (2018) drew attention to the lack of discussion of the potential relevance of these genres.

In my view, adopting one of these genres as an epistemological position is strongly related to the unit of analysis (and the underlying research aim) considered in a research study and also to the axiological approach of the researcher. Authors (e.g., Creswell, 2012; Troja, 2019) when exemplifying the use of different research methods (based on a certain epistemological genre) regularly consider, as the unit of analysis, a person or a small well-defined group of people. Revealing behavior of persons or a small and well-defined group of persons might explain conducting value-laden research. For me, many of the genres that have emerged in the last decades seem to present certain axiological world-views rather than addressing the question of what and how one can know about the world. Adopting this kind of approach might be explained in sociology; however, management research does not need to emulate the current research practices of sociology.

At this point, the following interrelated questions need to be raised:

- What is the unit of analysis in management research?
- What are the appropriate epistemological positions in management research?
- What is the role of axiology in management research?

Although management is strongly related to leadership, it is considered to be a different domain (e.g., Griffin, 2016). Thus, I might say, in line with Bryman and Bell (2015), that in management research the unit of analysis, in a broader sense of the term, is the organization. More precisely, management research, in terms of the unit of analysis, focuses on different aspects of the structure and process of the organization, and also at different levels, such as core activities, projects, and the strategic apex. However, organizations are social constructs; they exist independently of our knowledge of them. Organizations existed before our knowledge of them, i.e., they existed before their recognition as phenomena. The case of the primitive tribes justifies this statement. Therefore, in line with Durkheim's view, there is a potential to observe objectively their structures and processes at different levels, and to analyze relationships among different operational aspects of organizations. Consequently, both positivism/scientific and realism (e.g., Marsh, Ercan, & Furlong, 2018) might be adopted as epistemological positions. This seems to be in line with Lewis and Thornhill's (2016) research opinion in which the proposed underlying epistemological stance of deductive (logic-based) research is positivism or (critical) realism.

As was mentioned previously, Bredillet (2004) stressed that a "being ontology" which postulates a fixed reality and the associated positivist mirror is not appropriate in research, and he argued for adopting a "becoming ontology" postulating a changing reality and the associated subjectivism (regardless the unit of analysis and the associated research aim) to achieve effectiveness of research outcomes. However, one might say that natural constructs also undergo changes, and adopting positivism in research into them broadly is accepted. The evolution of our planet or the current climate change are examples. Of course, natural constructs change slowly. Business organizations can change rapidly, but they have permanent features, such as process or structure, and the old linear-functional organizational structure is in use nowadays as well.

Although organizations are objectively existing phenomena, the influence of values adopted by the researcher cannot be excluded fully. This influence

might appear in terms of sympathy or antipathy (e.g., Bryman & Bell, 2015) related to informants, which can occur in the natural sciences as well (e.g., in research on climate change) related to the consequences of the observed phenomenon. However, the use of a consciously value-laden, i.e., worldview-driven research methodology does not support creating additional knowledge in management sciences when structures and processes of organizations are studied. Thus, value-inspired, worldview-based management research could not provide new insight into the structure and process of organizations. On the contrary, consciously value-laden research in this respect could result in rather non-valid, and thus unreliable, research outcomes. However, when the unit of analysis (and the underlying research aim) is the behavior of people acting in an organization, a researcher might adopt a different epistemological stance.

One final question is whether there is the potential to apply such deductive research in management science as it is understood in the science of logic. Further to the structural validity (argument schemata), this kind of knowledge creation requires commonly agreed true concepts or theories by means of which true propositions as premises are formulated. Concepts define phenomena and are considered to be the building blocks of theories. Theories conceptualize and explain phenomena, and also are used to generate future expectations (in terms of explanations) about (social and natural) phenomena (e.g., Pathirage, Amaratunga, & Haigh, 2008). Joslin and Müller (2016) emphasized that theory needs to be used in research in order to explain a phenomenon being observed. In this way, a theory primarily is used to provide an answer to why something happens; thus, a theory helps the researcher to reveal and understand the causes that create the phenomenon being observed.

To exemplify applying deductive research strategy in the management domain, a more general interpretation of Fiedler's (1967) contingency theory is considered. Using this theory, we can construct valid deductive arguments (as *modus ponens*) regarding the appropriate use of different organizational structures as follows:

If the core activity of an organization can be standardized, then sufficient coordination can be ensured in this organization by means of direct supervision.

The core activity of this organization can be standardized.

Therefore, sufficient coordination can be ensured in this organization by means of direct supervision.

If sufficient coordination can be ensured in this organization by means of direct supervision, then the use of the linear-functional organizational structure is appropriate in this organization.

Sufficient coordination can be ensured in this organization by means of direct supervision.

Therefore, the use of the linear-functional organizational structure is appropriate in this organization.

The outcome of this deduction, i.e., the conclusion related to the appropriateness of a linear-functional organizational structure, can be reinforced or rejected by means of empirical observations. Triangulation, especially data triangulation, triangulation of researchers, and methodological triangulation, as suggested by Joslin and Müller (2016), could increase the objectivity and reliability of this observation, and could reinforce the validity of the conclusion. However, knowledge creation based on a deductive approach requires familiarity with logic, the science of reasoning. Unlike the philosophy of science, which is a core course in many doctoral schools, logic generally is neglected in most management doctoral schools. I strongly propose teaching logic in doctoral schools to enhance the use of both inductive and deductive reasoning in research. To achieve this end, authors of research method books need to introduce not only the epistemological underpinning but also the logical underpinning of the different research strategies.

Bearing in mind the example related to the use of linear-functional organizational structure, we need to address the question of how to formulate appropriate premises in order to draw reliable and valid conclusions. Central to the premises of the first argument (inference) is the concept of coordination (as the

primary role of any organizational structure) and its relationship with standardization, whereas the premises in the second argument (inference) include propositions related to the concept of direct supervision (as one of the coordination mechanisms) and its relationship with the linear-functional organizational structure. Thus, the conclusion of the first inference (argument) is used as a premise of the second inference (argument) to provide scientific reasoning for the use of a linear-functional organizational structure (from among the potential choices) in a given context.

Further to the case of organizational structures, it is characteristic of the broader management domain that there is more than one tool to complete the very same management task. In strategic management there are different tools (PEST, SWOT, etc.) to analyze internal and external operational environments, different strategic choices (e.g., cost leadership, differentiation, etc.), and different ways in which strategy is defined (i.e., strategy development patterns). Project management is an example because there are different time-planning tools, different risk assessment tools, different project implementation strategies, and so forth. One can state that none of those tools which might be deployed to complete the very same management task is better than another. However, each of them has both advantageous and disadvantageous features from the point of view of their efficient use. Organizations operate in different internal and external contexts, and in different contexts the use of different tools to address the very same management task seems to be appropriate.

The proposed deductive reasoning provides the potential to elaborate such a method (as new knowledge) by means of which the contextual features and the features of the considered management tools can be matched. Achieving this postulates formulating premises which imply (1) relationships between the characteristics of the operational environment and the different characteristics of those management tools which are available to complete the very same management task, and (2) relationships between organizational characteristics and the different characteristics of those management tools which are available to complete the very same management task. These premises might be used as statements (propositions) in syllogisms to implement deductive

reasoning and achieve a context-related application of these management tools. Table 1 presents some potential methods for using deductive reasoning in management research. To formulate appropriate (i.e., true) premises, there is a need for a detailed exploration of the characteristics of those tools by which the underlying concepts are operationalized in the course of their use, and of the characteristics of the context in which these tools are used. However, in the case of different management tasks (i.e., the management tools), different characteristics of the context (internal and external) should be considered.

Applying this deductive argument (reasoning) in management research might enrich management science with research outcomes that have practical managerial implications as well. These likely results could eliminate, or at least moderate, the disadvantageous consequences of the frequently experienced trial-and-error-based application of the potential management solutions and the use of the associated management toolkit. The research outcomes achieved might be justified or falsified by means of empirical observations focusing on the success rate achieved in the case of using the management toolkit in a context-related manner.

Wolceshyn and Daellenbach (2018), with reference to Aristotle, stated that induction and deduction are more complementary than contradictory. Thus, bearing in mind the previously mentioned three basic research types, the evolution of knowledge of a management domain area (a branch of it, e.g., project management) might be described as a knowledge development spiral. Janiszewski, Labroo, and Rucker (2016), proposed factors that determine the contribution of a research study, and introduced

the metaphor of a knowledge tree, which also has implications for the evolution of management knowledge or of the different branches within the management domain. However, the proposed spiral-based approach focuses directly on the likely evolutionary process.

This spiral-based evolution process commences with observations to describe and define the phenomena in order to formulate concepts. These concepts make it possible to generalize relationships among phenomena by means of inductive research in order to formulate and develop theories as a result of inductive generalization. The theories, and the concepts, enable researchers to produce new knowledge by means of deduction (i.e., formulating premises by means of theories or concepts) to provide explanatory models for understanding reality. This evolutionary process could be characteristic of each branch within the management domain, and new phenomena might emerge. Emergence of a new phenomenon could generate a new spiral, and, primarily in the deductive phase of the spiral, concepts and theories developed in other branches or other domains could be considered to formulate premises for deducing new knowledge. Furthermore, by further observing a previously observed phenomenon, a new aspect of this phenomenon could be revealed which could result in further inductive and deductive phases of the spiral. This evolution process of knowledge creation is in line with Maylor and Söderlund's (2015) notion of project management knowledge. They emphasized that studies and their outcomes are built on each other over time to increase the level of knowledge. Accordingly, research in management might be (1) ob-

Table 1: Potential methods for deductive management research

Management task (associated tools that operate the underlying concepts)	Contextual features considered
Strategy development	Internal (organizational) and external (operational environment) characteristics
Strategic analysis	Internal (organizational) and external (operational environment) characteristics
Strategic choice	Internal (organizational) and external (operational environment) characteristics
Applying organizational structure	Task (core activities) characteristics and diversification-related characteristics
Managing project (e.g., the use of project organizations and project implementation strategy)	Project characteristics and parent organization characteristics

servational, to highlight phenomena; (2) inductive, to deepen and widen existing knowledge; and (3) deductive, to create new knowledge based on existing knowledge. These basic types of research might build on each other alongside the spiral-based evolution process of knowledge creation, or might be combined in a complex research study.

Applying deductive research (as it is understood in logic) when it seems possible is justified by the inherent potential disadvantageous features of inductive generalization, such as (1) limited sample size in terms of limited number of informants, cases, numerical data, etc.; and (2) informants' familiarity with the research topic, and their honesty. However, in the case of a deductive approach, the structural validity of the arguments and the true propositions as premises guarantee a true conclusion. In this way, the validity of research outcomes, as was discussed in the Introduction, and their objectivity, might be

improved. However, as Marsh, Ercan, and Furlong (2018) noted, the objective observation needed in this case might be as objective as the observer who completes this observation.

6 LIMITATIONS AND FURTHER THOUGHTS

The limitations of this paper primarily derive from the limited knowledge of the author. The author is a practicing researcher in one of the branches of management sciences. It seems impossible to highlight all the potential methods for adopting deductive reasoning, as it is understood in logic, in the wider management domain; such an effort exceeds the limitations of a paper. However, the author hopes this paper generates further, specific thoughts on the potential use of deductive reasoning as a research strategy in different branches of the management domain, and that it proves to be a starting point for further discussion.

EXTENDED SUMMARY/IZVLEČEK

Literatura o raziskovalnih metodah ob uvajanju induktivnih in deduktivnih raziskovalnih pristopov ter s tem povezanih kvalitativnih in kvantitativnih raziskovalnih metod zagotavlja epistemološko podlago raziskovanja. Kljub temu pa ta literatura na splošno zanemarja vlogo logike v raziskovanju, kar bi včasih lahko pripeljalo do neustreznega sklepanja tako v doktorskih disertacijah kot tudi pri raziskovalnih delih na splošno. Neustrezno sklepanje se največkrat zgodi zaradi napačne interpretacije induktivnih in deduktivnih oblik sklepanja v literaturi o raziskovalnih metodah, kot posledica zanemarjanja logike. Ta članek meče novo luč na interpretacijo induktivnih in deduktivnih oblik ustvarjanja znanja, vključno z logiko, ki ima pomembno vlogo kot znanost sklepanja pri ustvarjanju znanja že vse od Aristotelovega časa. Ta prispevek je špekulativne narave in ponuja refleksije izkušenega raziskovalca s področja managementa.

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