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## Strategies in Research

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**Abstract:** A plan or scheme by which the activity of searching for and assessing information found is carried out is called a research strategy. A research strategy usually involves a number of steps. Firstly, the analysis of the major concepts of the topic. Secondly, defining relevant keywords and their synonyms. Thirdly, searching appropriate information sources (e.g. databases), and fourthly, assessing the quantity and quality (relevance) of the information found. The research strategy, a subset of research design, includes elements of data collection and interpretation and emerges from both the research purpose and question. These strategies differ in their Ontological assumptions, Starting points, Steps or logic use of concepts and theory, Styles of explanation and understanding and the status of their products. Each strategy has connections with particular philosophical and theoretical traditions, i.e. research paradigms (Blaikie 2007). The paper has been analyzed in view of the research strategies which are done in carrying out the research activity. They provide a ladder which helps in carrying out the research. The strategies Inductive, Deductive, Retroductive & Abductive have been explained in the paper with their epistemological assumptions. The paper analyses their importance & also brings out its applications that have come over the years.

**Keywords:** Research Strategies, Ontological Assumptions, Inductive, Deductive, Reproductive and Abductive Strategy.

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### SECTION 1: RESEARCH STRATEGIES INDUCTIVE RESEARCH STRATEGY

The aim of the Inductive Research Strategy is to establish limited generalizations about the distribution of, and patterns of association amongst, observed or measured characteristics of individuals and social phenomena. The Inductive approach to inquiry builds generalisations out of observations of specific events. It starts with singular or particular statements and ends up with general or universal propositions.

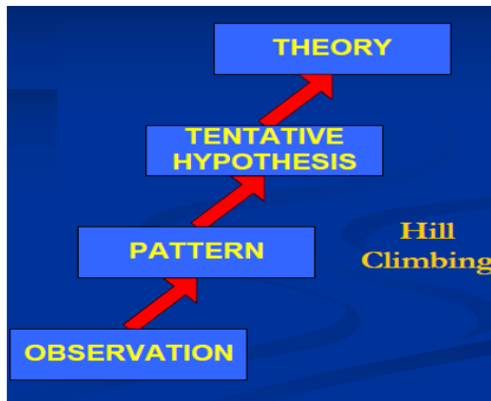
It presupposes that explanations about the workings of the world should be based on facts gained from pure, dispassionate and neutral observation, rather than on preconceived notions; that nature will reveal itself to a passively receptive mind.

The Inductive strategy assumes that all science starts with observations which provide a secure basis from which knowledge can be derived and claims that reality impinges directly on the senses, hence there is a correspondence between sensory experiences, albeit extended by instrumentation, and the objects of those experiences. The conclusion of an inductive argument makes claims that exceed what is contained in the premises and so promises to extend knowledge by going beyond actual experience.

The more observations that demonstrate, say, a relationship between phenomena, the higher the probability that the general statement is true. Verification of derived generalizations comes through observations about particular phenomena that appear to support it. Inductive reasoning works the other way, moving from specific observations to broader generalizations and theories.

Informally, we sometimes call this a "bottom up" approach

Conclusion is likely based on premises. It involves a degree of Uncertainty



**Example**

Formulation of a new theory or confirmation of established one ↴

That there are gendered patterns in the kinds of storyline given to male and female characters in British soaps ↴

Watch the soap (or other soaps) over continuous nights to see if this is only true of female characters have similar roles other soaps to see if this pattern repeats ↴

Notice while watching Eastenders that the storyline about Mel always involves her personal relationships (e.g. rather than business ones)

### DEDUCTIVE STRATEGY

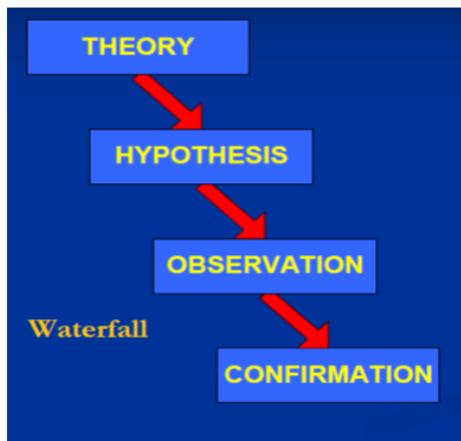
The Deductive (hypotheticodeductive or falsificationist) approach is the reverse of an Inductive one. It begins explicitly with a tentative hypothesis or set of hypotheses that form a theory which could provide a possible answer or explanation for a particular problem, then proceeds to use observations to rigorously test the hypotheses.

The Deductive argument moves from premises, at least one of which is a general or universal statement, to a conclusion that is a singular statement. Deductive propositions form a hierarchy from theoretical to observational; from abstract to concrete. The Deductivist accepts that observation is guided and presupposed by the theory.

Deductive reasoning works from the more general to the more specific.

Sometimes this is informally called a "top-down" approach.

Conclusion follows logically from premises (available facts)



**Example**

Social Representation Theory

↴

The representation of rural English life is stereotyped in current British television drama

↴

Observe random episodes of Monarch of the Glen, Emmerdale, Harbour Lights, Heartbeat and Where the Heart Is.

↴

Confirmation or Rejection

### REPRODUCTIVE STRATEGY

The aim of the retroductive research strategy is to discover underlying mechanisms that, in particular contexts, explain observed regularities. The logic of retroduction refers to the process of building hypothetical methods of structures and mechanisms that are assumed to produce empirical phenomena (Bhaskar 1979:15). It involves working back from data to a possible explanation.

Reproductive research strategy involves the building of hypothetical models as a way of uncovering the real structures and mechanisms which are assumed to produce empirical phenomena. The model, if it were to exist and act in the postulated way, would, therefore, account for the phenomena in question. In constructing these models of mechanisms that have usually never been observed, ideas may be borrowed from known structures and mechanisms in other fields.

A phenomena or range of phenomena is identified, explanations based on the postulated existence of a generative mechanism are constructed and empirically tested, and this mechanism then becomes the phenomenon to be explained and the cycle repeats.

Peirce regarded Retroduction or 'hypothesis formulation' as being the first stage of an inquiry. It is a process akin to finding the right key for the lock, although the key may never have been observed before. The hypothesis must be tested using both Deduction and

Induction; in the second stage of an inquiry, consequences are deduced from the hypothesis and, in the third stage, these consequences are tested by means of Induction. He suggested that a hypothesis must eliminate puzzlement as a necessary first step.

Retroduction differs from Induction which infers from one set of facts, another set of facts, whereas Retroduction infers from facts of one kind to facts of another. Unlike Deductive Reasoning, Inductive and Reproductive reasoning are synthetic or ampliative because they make claims that do not follow logically from the premises. In addition, neither Induction nor Deduction can produce any new ideas. On the other hand, Retroductive/Abductive reasoning involves making a hypothesis which appears to explain what has been observed; it is observing some phenomenon and then claiming what it was that gave rise to it.

Example: Science includes atoms, viruses & genes all of which were hypothetical entities for some while before scientific technology were advanced to observe them. Another could be medical diagnosis via patient's symptoms and established diagnostic decision tree and thereby ascertaining the exact occurrence of the phenomenon.

### **ABDUCTIVE STRATEGY**

This research strategy involves constructing theories that are derived from social actors' language, meanings, and accounts in the context of everyday activities. Such research begins by describing these activities and meanings and then deriving from them categories and concepts that can form the basis of an understanding of the problem at hand.

The Abductive research strategy is used by Interpretivism to produce scientific accounts of social life by drawing on the concepts and meanings used by social actors and the activities in which they engage.

Whereas the Inductive research strategy can be used to answer 'what' questions and the deductive and retroductive strategies can be used to answer 'why' questions, the Abductive strategy can answer both types of questions. However, it answers 'why' questions. However, it answers 'why' question by producing understanding rather than an explanation, by providing reasons rather than causes.

Abduction acknowledges that human behaviour depends on how individuals interpret the conditions in which they find themselves and accepts that it is essential to have a description of the social world on its own terms. It is the task of the social scientist to discover and describe this world from an 'insider' view and not impose an 'outsider' view.

Abduction is applied when attempting to move from lay accounts of everyday life to technical, scientific or expert descriptions of that social life. Abduction is a developing strategy with on-going debate on how best to move from lay language to technical language. There are differences of opinion with regard to retaining the integrity of the phenomena when moving first order constructs (people's views and explanations), to second order constructs (the social scientist's interpretations).

The Abductive strategy has many layers to it. There is some difficulty in preceding to the final stage in which social theories might be generated from the second order constructs or that these social scientific descriptions can be understood in terms of prevailing social theories and perspectives, leading to the possibility of an explanation or a prediction.

Some positions argue that the research should go no further than to sort through, device categories for and pigeon hole the various constructs provided by the social actors within the study.

Example: If it states that x is an explanation of y, thus it is a precondition that a has been inferred as a consequence from b. They differ in direction in which rule like a entails b is used for inference

The Abductive/Interpretive approach and has been advocated as an approach for social sciences or an adjunct to other strategies.

Inductive	
<b>Aim:</b>	To establish descriptions of characteristics and patterns
<b>Ontology:</b>	Cautious, depth or subtle realist
<b>Epistemology:</b>	Conventionalism
<b>Start:</b>	Collect data on characteristics and/or patterns Produce descriptions
<b>Finish:</b>	Relate these to the research questions

Deductive	Retrodutive	Abductive
To test theories, to eliminate false ones and corroborate the survivor	To discover underlying mechanisms to explain observed regularities	To describe and understand social life in terms of social actors' meanings and motives
Cautious or subtle realist	Depth or subtle realist	Idealist or subtle realist
Falsificationism Conventionalism	Neo-realism	Constructionism
Identify a regularity that needs to be explained	Document and model a regularity and motives	Discover everyday lay concepts, meanings
Construct a theory and deduce hypotheses	Describe the context and possible mechanisms	Produce a technical account from lay accounts
Test hypotheses by matching them with data explanation in that context	Establish which mechanism(s) provide(s) the best	Develop a theory and elaborate it iteratively

## SECTION 2: ALTERNATIVE VIEWS

Positivism assumes an objective world hence it often searches for facts conceived in terms of specified correlations and associations among variables. Postpositivism is a recent evolution of positivism. Postpositivism is consistent with positivism in assuming that an objective world exists but it assumes the world might not be readily apprehended and that variable relation or facts might be only probabilistic, not deterministic. Thus the positivist focus on experimental and quantitative methods used to test and verify hypotheses have been superseded or complemented to some extent by an interest in using qualitative methods to gather broader information outside of readily measured variables.

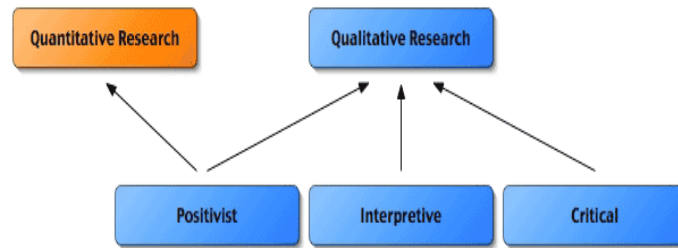
The recent focus in post-positivism has been on qualitative methods modeled on positivistic methods and experimental designs (e.g. Miles and Huberman, 1993). This reflects the attempts by post-positivists to address the methodological challenges to quantitative methods. Increasingly, grounded theory is being used to post-positivists to examine and assess variables and their relationships in situations where quantitative measurement and statistical controls are not possible.

Constructionists have also been particularly concerned with the interplay of subjective, objective and intersubjective knowledge and written texts. A key form of interpretive research is social constructionism (Berger and Luckmann, 1967; Knorr-Cetina, 1981; Gephart, 1978) which seeks to understand the social construction dialectic involving objective, intersubjective and subjective knowledge. This research investigates how the objective features of society (e.g. organizations, social classes, technology and scientific facts) emerge from, depend on, and are constituted by subjective meanings of individuals and intersubjective processes such as discourses or discussions in groups (c.f. Gephart, 1993, 1997). In a sense, interpretive constructivism "brackets" objective reality and seeks to show how variations in human meanings and sensemaking generate and reflect differences in reified or objective realities.

The third paradigm of interest, critical postmodernism, is a combination of two somewhat different worldviews -- critical theory and postmodern scholarship. Critical theory is a tradition developed by the Frankfurt School in Germany based on the German tradition of philosophical and political thought stemming from Marx, Kant, Hegel and Max Weber (Kincheloe and McLaren, 1994: 138). Critical theorists departed from Marxist orthodoxy on many issues but maintained a focus on the changing nature of capitalism and the forms of domination, injustice and subjugation capitalism produced.

### SECTION 3: EPISTEMOLOGICAL ASSUMPTIONS

The term epistemology comes from the Greek word epistēmê, their term for knowledge. In simple terms, Epistemology is the philosophy of knowledge or of how we come to know. The methodology is also concerned with how we come to know but is much more practical in nature. The methodology is focused on the specific ways -- the methods -- that we can use to try to understand our world better. Epistemology and methodology are intimately related: the former involves the philosophy of how we come to know the world and the latter involve the practice.



**Epistemological Assumptions for Qualitative and Quantitative Research**

Guba and Lincoln (1994) suggest four underlying "paradigms" for qualitative research: positivism, post-positivism, critical theory, and constructivism. Orlikowski and Baroudi (1991), following Chua (1986), suggest three categories, based on the underlying research epistemology: positivist, interpretive and critical. This three-fold classification is the one that is adopted here. However, it needs to be said that, while these three research epistemologies are philosophically distinct in the practice of social research these distinctions are not always so clear cut there is considerable disagreement as to whether these research "paradigms" or underlying epistemologies are necessarily opposed or can be accommodated within the one study.

#### 1. POSITIVIST RESEARCH

Positivists generally assume that reality is objectively given and can be described by measurable properties which are independent of the observer (researcher) and his or her instruments. Positivist studies generally attempt to test the theory, in an attempt to increase the predictive understanding of phenomena. In line with this Orlikowski and Baroudi (1991, p.5) classified research as positivist if there was evidence of formal propositions, quantifiable measures of variables, hypothesis testing, and the drawing of inferences about a phenomenon from the sample to a stated population. Thus induction strategy has its roots attached to the positivism approach where the observations analysed help in driving out the result.

In a positivist view of the world, science was seen as the way to get at the truth, to understand the world well enough so that we might predict and control it. The world and the universe were deterministic -- they operated by laws of cause and effect that we could discern if we applied the unique approach of the scientific method. Science was largely a mechanistic or mechanical affair. We use deductive reasoning to postulate theories that we can test. Based on the results of our studies, we may learn that our theory doesn't fit the facts well and so we need to revise our theory to better predict reality. The positivist believed in empiricism -- the idea that observation and measurement were the core of the scientific endeavor. The key approach of the scientific method is the experiment, the attempt to discern natural laws through direct manipulation and observation.

#### 2. POST POSITIVISM

At the heart of positivism is Karl Popper's dichotomous differentiation between "scientific" theories and "myth". A scientific theory is a theory whose predictions can be empirically falsified, i.e., shown to be wrong. Therefore, a scientific theory is by necessity a risky endeavor, i.e., it may be thrown out if not supported by the data. Einstein's Theory of Relativity is a prime example, according to Karl Popper, of a scientific theory. When Einstein proposed it, the theory may have ended up in the junk pile of history had its empirical test not supported it. This, despite the enormous amount of work, put into it and despite its mathematical appeal. The reason Einstein's theory was accepted was that it was put to the test: Eddington's eclipse observation in 1919 confirmed its predictions, predictions that were in contrast to what should have been seen according to Newtonian physics. Eddington's eclipse observation was a test-or-break event for Einstein's theory. The theory would have been discredited had the stars not appeared to move during the eclipse because of the Sun's gravity those who believe in it this is the Falsification Principle and the core of

positivism. Basically, the experience can show theories to be wrong, but can never prove them right. It is an underlying principle that theories can never be shown to be correct.

This demarcation of science from the myths of non-science also assumes that building a theory based on observation, otherwise known as induction, does not make it scientific. Science, according to positivism, is about solving problems. It is not about fitting theory to observations. Central to understanding this principle is the recognition that there is no such thing as a pure observation. Every observation is based on some preexisting theory or understanding. Furthermore, it is almost always possible to choose and select data that will support almost any theory if the researcher just looks for confirming examples. Accordingly, scientific theory, in the positivist view, is about trying to falsify the predictions of the theory.

Hence, positivism differentiates between falsifications as a principle, deriving Deduction as the logic of inquiry where results obtained are falsified. Thus positivism should be regarded as one of the tools in the arsenal of a researcher.

### **3. INTERPRETIVE RESEARCH**

Interpretive researchers start out with the assumption that access to reality (given or socially constructed) is only through social constructions such as language, consciousness and shared meanings. The philosophical base of interpretive research is hermeneutics and phenomenology (Boland, 1985). Interpretive studies generally attempt to understand phenomena through the meanings that people assign to them and interpretive methods of research in IS are "aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context" (Walsham 1993, p. 4-5). Interpretive research does not predefine dependent and independent variables but focuses on the full complexity of human sense-making as the situation emerges (Kaplan and Maxwell, 1994).

Examples of an interpretive approach to qualitative research include Boland's (1991) and Walsham's (1993) work. Klein and Myers' (1999) paper suggests a set of principles for the conduct and evaluation of interpretive research. Thus the abductive strategy which starts with laying down the concepts contained in social quarters accounts of activities have an association with this theory in their ontological & epistemological assumptions

### **4. CRITICAL RESEARCH**

Critical researchers assume that social reality is historically constituted and that it is produced and reproduced by people. Although people can consciously act to change their social and economic circumstances, critical researchers recognize that their ability to do so is constrained by various forms of social, cultural and political domination. The main task of critical research is seen as being one of social critique, whereby the restrictive and alienating conditions of the status quo are brought to light. Critical research focuses on the oppositions, conflicts, and contradictions in contemporary society, and seeks to be emancipatory i.e. it should help to eliminate the causes of alienation and domination.

One of the best-known exponents of the contemporary critical social theory is Jurgen Habermas, who is regarded by many as one of the leading philosophers of the twentieth century. Habermas was a member of the Frankfurt School, which included figures such as Adorno, Horkheimer, Lukacs, and Marcuse. Examples of a critical approach to qualitative research include Ngwenyama and Lee's (1997) and Hirschheim and Klein's (1994) work. Critical realist researchers favour a reproductive, as opposed to an inductive, deductive, or abductive, research strategy, and an intensive, rather than extensive research design (Blaikie, 1993 and 2000; Lawson, 1997; Smith, 1998; Sayer, 2000; Danermark et al., 2002). Studies have indicated that critical realist researchers direct their explanatory focus on the underlying mechanisms which consist of necessary and enduring relationships (e.g. between employer and employee, landlord and tenant, layers and clients, teachers and students) that reproduce patterns of social interaction and the associated social practices that link and mediate between different cycles of institutional elaboration, reproduction and transformation.

Thus the reproduction research strategy has a strong interrelationship with critical theory in the form of interpretation for the phenomena to be explained under investigation.



Purpose	Research Strategy				Type of Research Question
	Inductive	Deductive	Retroductive	Abductive	
Exploration	***			***	What
Description	***			***	What
Explanation	*	***	***		Why
Prediction	**	***			What
Understanding				***	Why
Change		*	**	**	How
Evaluation	**	**	**	**	What and Why
Assess impacts	**	**	**	**	What and Why

Key: \*\*\* = major activity; \*\* = moderate activity; \* = minor activity. These 'weightings' of the connections between objectives and research strategies are indicative only.

## SECTION 4: QUALITATIVE RESEARCH METHODS

Since there are many philosophical perspectives which can inform qualitative research, so there are various qualitative research methods. A research method is a strategy of inquiry which moves from the underlying philosophical assumptions to research design and data collection. The choice of research method influences the way in which the researcher collects data. Specific research methods also imply different skills, assumptions, and research practices. The four research methods that will be discussed here are action research, case study research, ethnography and grounded theory

### 1. Action Research

There are numerous definitions of action research, however, one of the most widely cited is that, which defines action research in the following way:

Action research aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework (Rapoport, 1970, p. 499).

This definition draws attention to the collaborative aspect of action research and to possible ethical dilemmas which arise from its use. It also makes clear, as Clark (1972) emphasizes, that action research is concerned to enlarge the stock of knowledge of the social science community. It is this aspect of action research that distinguishes it from applied social science, where the goal is simply to apply social scientific knowledge but not to add to the body of knowledge.

### Case Study Research

The term "case study" has multiple meanings. It can be used to describe a unit of analysis (e.g. a case study of a particular organisation) or to describe a research method here it concerns the use of the case study as a research method.

Case study research is the most common qualitative method used in information systems (Orlikowski and Baroudi, 1991; Alavi and Carlson, 1992). Although there are numerous definitions, Yin (2002) defines the scope of a case study as follows:

A case study is an empirical inquiry that:

- Investigates a contemporary phenomenon within its real-life context, especially when
- The boundaries between phenomenon and context are not clearly evident (Yin 2002).

Clearly, the case study research method is particularly well-suited to the research, since the object of our discipline is the study of information systems in organizations, and "interest has shifted to organizational rather than technical issues" (Benbasat et al. 1987).

Case study research can be positivist, interpretive, or critical, depending on the underlying philosophical assumptions of the researcher (for a fuller discussion, see the section of Philosophical Perspectives above). Yin (2002) and Benbasat et al. (1987) are advocates of positivist case study research, whereas Walsham (1993) is an advocate of interpretive in-depth case study

### 3. Ethnography

The ethnographic research comes from the discipline of social and cultural anthropology where an ethnographer is required to spend a significant amount of time in the field. Ethnographers immerse themselves in the lives of the people they study (Lewis 1985, p. 380) and seek to place the phenomena studied in their social and cultural context.

After early ground-breaking work by Wynn (1979), Suchman (1987) and Zuboff (1988), ethnography has now become more widely used in the study of information systems in organizations, from the study of the development of information systems (Hughes et. al, 1992; Orlikowski, 1991; Preston, 1991) to the study of aspects of information technology management (Davies, 1991; Davies and Nielsen, 1992). Ethnography has also been discussed as a method whereby multiple perspectives can be incorporated in systems design (Holzblatt and Beyer, 1993) and as a general approach to the wide range of possible studies relating to the investigation of information systems (Pettigrew, 1985).

#### **4. Grounded Theory**

Grounded theory is a research method that seeks to develop a theory that is grounded in data systematically gathered and analyzed. According to Martin and Turner (1986), grounded theory is "an inductive, theory discovery methodology that allows the researcher to develop a theoretical account of the general features of a topic while simultaneously grounding the account in empirical observations or data." The major difference between grounded theory and other methods is its specific approach to theory development - grounded theory suggests that there should be a continuous interplay between data collection and analysis.

Grounded theory approaches are becoming increasingly common in the research literature because the method is extremely useful in developing context-based, process-oriented descriptions and explanations of the phenomenon

### **SECTION 5: APPLICATION**

#### **The DFID Research Strategy in a Changing World**

In the year since the Research Strategy was launched a number of major changes have reinforced the importance of several aspects of the Research Strategy. Work on climate change, a major theme of our strategy, has suggested that this is more severe and maybe quicker in onset even than that assumed at the stage that the Strategy was launched. The economic downturn has increased the importance of understanding growth. In response to this, the Growth Centre has already been established, and a Climate Change Centre is at the advanced stage of planning. The need for new technologies and better methods of delivering them has been met with a number of significant developments including the launch of a new anti-malarial drug for children, artemether-lumefantrine.

DFID has recognized the central importance of incorporating a large amount of research coming out both from our own work and from others and is integrating its research with its policy teams to make the best use of this. It has been joined by eminent senior research fellows drawn from several Universities across a range of disciplines who are helping DFID systematically to use the best evidence wherever it exists. An expansion of this research into new technologies, new methods of delivery, conflict and fragile states, better agriculture and transport will all feed into the mission of DFID to help the poorest.

DFID is now the largest bilateral funder of research in international development, recognising the central importance of research in order to battle against poverty.

DFID intends to be at the forefront in the synthesis, integration, and communication of research findings. This aims to help those in developing countries, including policy makers, make the best decisions based on the best contemporary evidence.

This is one of an application of deductive research strategy has come out to a conclusion to bring sustainable development in developing countries.

### **CONCLUSION**

Thus I can conclude that Research Strategies explained above are necessary for undertaking any kind of research. Epistemological considerations loom large in considerations of research strategy to a large extent, these revolve around the desirability of employing a natural science model ( and in particular positivism) versus interpretivism Research strategies act as a building block for any research activity to be undertaken as only appropriate strategies can bring about desired results.

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