

The positivist paradigm and the arranged positivist paradigm: literature review

Le paradigme positiviste et le paradigme positiviste aménagé : revue de littérature

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Abstract

The epistemological posture of management sciences is an essential step in the development of scientific research work, generally, in different sciences, and particularly, in the study of management practices. At the level of the literature, there is a panoply of epistemological paradigms to which researchers can refer. In the context of our article, we are only interested in two research paradigms, which are positivism and developed positivism.

This article will first define research in management science and its stages. Then, he will present an analysis of two paradigms, namely positivism through its functionalities (nature of knowledge, production and status of knowledge as well as the mode of reasoning), and critical realism under the name of post positivism under its different characteristics.

The interest of our article is to shed light on researchers in management science, so as to present in a synthetic way the postures adopted in management science, namely: positivism and developed positivism. It also aims to identify the necessary elements that the researcher will choose for the appropriate epistemological choice and the mode of reasoning to defend his choice and place himself in an appropriate research architecture.

Keywords : epistemology, paradigm, positivism, post positivism, management science

Classification JEL : B41

Paper type : Theoretical Research

1. Introduction

The research on epistemology is a fundamental and basic step for the enhancement of a scientific research work in different sciences, so this step allows the researcher to focus on a suitable epistemological positioning to carry out his work. of scientific research. The selection of a very specific epistemological position is not an easy mission, essentially depends on the objectives and the hypothetical and theoretical approach of the research which is characterized by an increasing complexity of types of research subjects. Then, it also depends on the advantages and limits of each orientation.

The epistemological orientation leads the researcher to build a database and knowledge on the subject in question and on the problem being treated. Doing so involves developing questions, designing the research, adopting appropriate strategies, conducting the research and finally drawing conclusions. This is the basic principle on which research is based, and the methodology is based. In other words, the epistemological positioning of a researcher conditions his methodological choices (deductive / inductive / abductive), these in turn define the research methods to be mobilized (Qualitative / Quantitative) and also the knowledge to be produced.

To justify and validate the scientificity of the knowledge produced, each research work must be part of an epistemological paradigm. To define its epistemological positioning, it is necessary to question the nature of the knowledge produced, the way in which it was developed, but also its added value. Three major epistemological paradigms are commonly identified and are dominated in management science: the positivist, interpretivist and constructivist paradigms.

The objective of our article is to shed light on the main epistemological paradigms adopted in the field of research in management science, namely: positivism, and adjusted positivism, which constitutes the central question of our paper, in the occurrence what are the particularities of the epistemological paradigms allowing to constitute the arguments of the methodological choice in research in management science?

This article focuses only on two research paradigms, namely: positivism and arranged positivism. To do this, our plan will be divided into two main elements. First of all, we will define research in management sciences. Then, we will present the two epistemological paradigms chosen in the context of this article which are respectively positivism and arranged positivism.

2. Research in management sciences

Research in management sciences is characterized by the multiplicity of disciplines, it can be classified in the model of the natural sciences when the knowledge produced is quantifiable, this is the case of finance in particular, but when the knowledge lends itself poorly to quantification, it is in the model of the sciences of the artificial that it develops.

Management science can be defined as "inter, multi and transdisciplinary research that generates and contributes to the development, formation, decision-making process and finding suitable solutions to concerns related to management methods within organizations or institutions, through the use of analytical methods (qualitative and quantitative), rules, hypotheses, theories, etc. known in scientific research. These may extend to different areas such as the economic system, the health system, businesses, private and public establishments, etc.

Research is also a structured, systematic and organized action that originates from a scientific questioning concerning a given problem. Its objective is to provide answers, provide solutions or simply develop new theories and/or knowledge through the study and analysis of a research object (Ben Aissa 2001).

The objective of research in management sciences differs from one researcher to another and from one discipline to another, it can be: the development of new theories, the search for answers to questions, solutions to problems, understanding and explaining behaviors, predicting phenomena linked to organisations, etc. Depending on the objective, the researcher is part of an epistemological paradigm (positivism, scientific realism, critical realism, interpretivism, pragmatic constructivism or constructivism in the sense of Guba and Lincoln), the latter conditions the methodological choices of the researcher, the materials to be used, the methods of justifying knowledge.

Each research declines and links a certain number of stages which can be iterative (Thiéart et al., 2014) and which are mainly associated with the purpose of the research, its orientation and its methodological framework. Thus, to be qualified as scientific, research must respect a plan called “the research design” and follow a set of steps. It is important to shed light on the “plan” of research, also called architecture or design. This research architecture constitutes the structure that will determine the different steps and phases necessary to respond to the research problem and represents the common thread that will chain the steps.

In this framework, there are three basic phases in order, to lead to a position of scientific research. First of all, the problem must be defined in the form of a research question to solve complex problems. In the second phase, it is necessary to move towards the models of exploration (survey, investigation, software ... etc.) of research. Finally, identify the methodology to be used in order to practice it in the field. It should be noted that among the most difficult steps in any research process is that of defining the problem or research question. It is also a very important phase insofar as it gives the research its legitimacy, its foundation and its scope.

The stages of research in management sciences follow a well-structured and coherent order with the aim of responding effectively to the problem. These steps stem mainly and first from the research object, followed by the literature review to extract the theoretical framework and formulate a research model that will give rise to hypotheses. Subsequently, the stage of operationalizing the concepts is important to find measurement scales and therefore develop a research plan to collect empirical data that will facilitate the testing of predefined hypotheses and therefore draw conclusions in the form of results.

3. Epistemological paradigms

The interest in the concept of epistemology and epistemological positioning seems essential and proves to be necessary, and constitutes an important step in any scientific approach in order to explain the philosophical bases of our research. This is the basic principle on which research is based, and the methodology is based. These are the guiding principles on which the researcher's research methodology is based (Guba and Lincoln, 1985).

The paradigm for Desreumaux (1998, pp:43) is “the way of conceiving and studying the world shared by a group of scientists developing a common conceptual language”. For Thomas Kuhn, to whom belongs the merit of making this concept popular, defines the paradigm as being “a framework which defines the problems and the legitimate methods and which thus allows greater efficiency of research: it is a question of a common language promotes the dissemination of work and channels investigations”.

“Adopting a research paradigm also means joining a school of thought, adopting its values, its traditions and, we would say, its habits and customs. It is also ultimately to be part of a scientific community from which we accept a contractual prerequisite that is rarely explained: its reference paradigm. (Quintin, 2012). A paradigm is connected to a set of beliefs and procedures that distinguish a dominant point of view within a scientific community (Crook and Garratt, 2005).

Epistemology consists of questioning the following four dimensions, namely: what is this real that we are trying to apprehend? What is the nature of the knowledge produced? What is the value and status of this knowledge? And what are its effects on the reality studied? (Girod-Seville & Perret, 1999). It acts as a discipline that regulates the definition and conception of a researcher's primary reality, the modes of production and knowledge, and the status of the knowledge produced. The answers to these questions will make it possible to defend the choice of the paradigm used in the field of research.

Epistemology, according to Le Moigne (1995), makes it possible to answer three main questions which revolve around the gnoseological approach to knowledge which tends to determine the essence of reality and its essential nature, the production of knowledge which defines the different methods of access to reality, and the status of the knowledge produced which determines the value and validity of the knowledge all depends on each paradigm.

Three major epistemological paradigms are commonly identified and are dominated in management science: the positivist, interpretivist and constructivist paradigms. These paradigms constitute frames of reference allowing researchers to be part of a current (Perret & Seville, 1999). Each paradigm is characterized by a coherent system of thought and a representation of the unique world.

We will present in the following pages two paradigms according to their characteristics, which are: positivism, and arranged positivism. As for the first, we will expose its nature of knowledge, its production of knowledge, its status of the knowledge produced and its mode of reasoning. As for the second, it is a question of presenting its mode of operation and its stages.

3.1. The positivist paradigm

The positivist paradigm was conceived by the philosopher who founded the notion of positivism Auguste Comte (1851) in the 19th century. This “positivist” philosophical expression is used in opposition and following the rejection of the same author of theological philosophy and metaphysical philosophy by dissociating them from the status of the sciences. However, positivism constitutes the basis of the natural sciences, and this through the bridge that it hinders between the social sciences and their accession to the status of “science” (Deschenaux & Laflamme; 2007).

Positive science according to Comte (1996), corresponds to the advent of modern science where man seeks "to discover, by the well-combined use of reasoning and observation", the effective laws which govern the phenomena studied. (Scientific laws) (Benjelloun, 2015). In this sense, Kaboub (2008) asserted that scientific knowledge is the only criterion by which we can reveal the truth of reality, objective and independent of the observers who describe it.

In this respect, positivism is opposed to any kind of philosophy by favoring positive or scientific knowledge which consists in explaining external reality. The subject (researcher) and the object of study in this context are, therefore, independent and in complete distancing, the researcher is essentially led to question and reveal this reality, by adopting attitudes of objectivity and neutrality vis-à-vis vis-à-vis the research object to treat it objectively and, therefore, produce knowledge reflecting the reality in itself and the field of research in itself. This deterministic vision is leaning towards the search for explanations, towards a search for causes and relationships between laws, as well as to realize the existing relationship between social facts. Positivism is based on two gnoseological hypotheses (nature of knowledge), two methodological principles (production of knowledge) and three ethical criteria (status of knowledge). Gnoseology is based on an ontological hypothesis, also called “the essential reality of existential reality”, and a deterministic hypothesis which “stipulates that there is some form of internal determination proper to knowable reality, capable of being known”. The methodological question concerns disjunctive, analytical or reductionist reasoning, and that of

sufficient reason. And the question of ethics is interested in the criteria of verifiability, confirmability and refutability of the knowledge produced.

3.1.1. Nature of knowledge

The gnoseological approach institutionalized by Le Moigne (1995) examines the nature of knowledge by crossing three main criteria, namely: the essential nature of reality, the nature of the researcher-object link and the vision of the social world (Yachoulti, 2019).

Regarding the essential nature of reality, Positivists base themselves on an ontological assumption that reality exists in itself. Perret and Seville (2007) state that “For positivists, reality exists in itself, it has its own essence, it has an ontology”. For them, reality is valued as unique, already constituted, and permanent. Science would therefore be a progressive process of knowledge of reality that can be verified empirically.

Concerning the second gnoseological criterion relating to the nature of the researcher-object link. Positivists postulate the principle of objectivity and neutrality in relation to the observation of the real object by not contributing personally, either directly or indirectly. Therefore, there is a dichotomy between subject and object. The researcher has no interest in inculcating himself in the object of research. In this sense, reality is achieved by maintaining a distance between the researcher and the object of research so as not to exert any influence, the reality reached is external to him.

The third gnoseological criterion is based on the vision of the social world. Positivists postulate a deterministic hypothesis based on an objective reality. In this sense, there is a natural determination of phenomena, eternal and universal laws that govern the reality produced (Le Moigne, 1995). As a result, the researcher will arrive at results that will describe the problem studied objectively and whose scope is universal.

3.1.2. The production of knowledge

To the ontological and deterministic hypothesis corresponding to the nature of knowledge, are added two principles relating to the methodological question which are the principle of analytical modeling and the principle of sufficient reason which will derive the mode of production of knowledge.

Positivists tend to explain the external phenomenon or the object of research through the analysis of reality and its laws. The analysis of reality among the positivists operates analytically. The researcher is interested in describing and explaining reality given its own unique character.

Understanding a phenomenon then involves breaking it down into analyzable realities that guide understanding of the global phenomenon (Balambo, 2012). To this principle of analytical reasoning is added the principle of sufficient reason, which considers that anything that emanates from logical reasoning and reflection deduced from real and formal facts is treated as being true.

3.1.3. The status of the knowledge produced

Positivists favor scientific knowledge and therefore refuse any approval of knowledge outside of its scientificity. As a result, they opt for universal criteria of validity of this knowledge to contribute its legitimacy through: verifiability, confirmability and refutability.

Research must necessarily guarantee the internal and external validity of the knowledge produced and its degree of scientificity in order to generalize it and give it the power to exploit it for other research.

The status of knowledge among positivists revolves around empirical verification as the first criterion that must undergo empirical verification in the field. Confirmability consists of the inability to verify a hypothesis on a case-by-case basis to deduce an absolute result. It reflects the probabilistic character of positivist statements, i.e. we can never say that a proposition is

true with certainty (an absolute truth), but we can only stipulate that it has a probable status (an absolute truth). relative) (Yachoulti, 2019). Refutability, which is rooted in confirmability and constitutes an extension of the latter. Karl Popper defined refutability as the ability of the researcher to demonstrate that a theory is not true (Popper, 1959). Refutability is therefore the fact of determining that a theory is valid only until the proof of facts which make it false.

3.1.4. The deductive approach

The deductive approach starts from a general idea to deduce specific propositions. It consists of the application of a commonly accepted theory or rule to a particular situation or case in order to draw a conclusion. The deduction starts from the general to the particular (Aktouf, 1987).

Deduction consists in drawing from a theory or a set of theories hypotheses, which will be confronted with an empirical context in order to verify their robustness. As a result, this implies the passage from the general to the particular, from universal statements to contextualized observations.

From the literature review, the researcher will build variables, situate the project in its more general context, see how it differs from previous research and, also, how it is likely to advance knowledge on the subject. . The predetermined variables will be subject to assumptions by building the relationships between them. Indeed, the researcher will verify the applicability and the certainty of the hypotheses put forward to determine their validity. Deduction is based on the principle that the conclusions are considered true if the hypotheses formulated a priori (from the literature) are true (Charreire and Durieux, 1999).

This reasoning most often corresponds to quantitative methods (Quintin, 2012). This approach supposes a confrontation of the hypotheses with the “empirical observation” reality, in other words, it is a kind of demonstration and verification (Madeleine Grawitz, 1990). This mode of reasoning is the basis of the hypothetico-deductive mode of reasoning or Leibnizian system according to Aktouf (1987), which describes the phenomenon studied through a causal relationship between the variables which in turn constitute hypotheses and which give rise to a conceptual model. The latter will then be examined at the level of its confrontation with the field for confirmation or invalidation.

Charrière and Durieux (2007) distinguished between two types of deduction: a formal deduction, which consists in drawing conclusions from the basic premises (and therefore does not contribute to the implementation of new facts) and a deduction constructive, which leads, through inference and complex demonstration, to new conclusions and the advancement of science.

3.2. Developed positivism

Developed positivism, also called post positivism or critical realism, consists of the reconciliation of two epistemological perspectives. The arrangement is based on achieving a high degree of validity and reliability. It is a kind of fusion through which one paradigm must absorb the other to achieve great synthesis. This approach made reference to the notion of triangulation and has been widely used in social science research (Moran-Ellis et al., 2006; O’Cathain et al., 2010; Willig, 2013).

3.2.1. Triangulation: introduction to epistemological positioning

The inscription in a single paradigm seems a complex matter in a discipline like the sciences of organizations because of the complexity of the facts. The arrangement of epistemological paradigms and their diversity seems of great importance because of the integration of different types of approaches to obtain strong results, and to better take advantage of the strengths of

each paradigm. Triangulation first appeared in military strategy, then it was transposed, by Campbell and Fisher (1959), to the social sciences (Yachoulti, 2019).

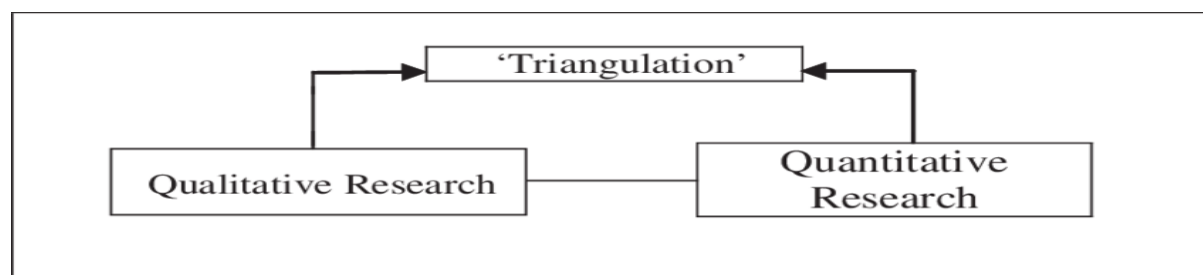
The triangulation is based on two main foundations: on the one hand, a sort of complementarity, in the sense that the strengths of each method will compensate for the weaknesses of the other and, on the other hand, the two methods do not share the same fates (Jick, 1979). In this sense, the simultaneous use of quantitative and qualitative methods will make it possible to overcome the limits of each and represent a better way of understanding reality. Miles and Huberman (1994) said: "We have to face the fact that numbers and words are both needed if we are to understand the world" (pp: 40), and added that the challenge facing researchers is to know "when it appropriate to count and when it is difficult or inappropriate not to count at all".

The German sociologist Max Weber considered that the adoption by positivism of the descriptive approach is not sufficient to study social phenomena. The human dimension is endowed with an intense complexity which makes it impossible to identify social reality through a single paradigm. Max Weber was therefore among the first researchers to identify this deficiency and therefore called for the reconciliation of two epistemological perspectives (Benton, 1977).

The triangulation model focuses on the integration of two approaches to better identify the problem, prove the performance aspect when answering the research question and demonstrate the rationalization of the results. This principle of complementarity aims to guarantee a better rendering of the research in terms of the effectiveness of its results and the quality of the research which has spared no method and has benefited from the advantages of each of the approaches.

Between a paradigm that produces general rules, principles, universal laws, but with little scientific impact, and a constructivism that produces statements with high scientific value, but lacks generalizability, the possibilities of cooperation between the two paradigms are beginning to show a lot of differences. interest, the fusion between scientific value and universal significance (Yachoulti, 2019).

Figure 1: Basic triangulation model



Source: Yeasmin et Rahman (2012)

3.2.2. Developed epistemological positioning

A developed positioning, is between constructivism and positivism and combines both hypothetico-deductive reflection and inductive reflection, the development of paradigms represents an interest for Management Sciences. Deduction is naturally attached to quantitative data, while induction is related to qualitative data.

The qualitative approach is based on induction which is conditioned by the lack of mastery of the concepts, in other words, the post-positivists criticize the reasoning by induction. Through the qualitative, the researcher will ensure the relevance of his variables and, therefore, propose a new theoretical model if necessary or adjust it according to the exploration of the field of investigation. Qualitative studies are characterized by the understanding of the phenomenon studied as well as its representativeness which is measured by the saturation threshold and not the size of the sample and this through interviews. While the quantitative is used to test the inferred research proposals. Quantitative studies, on the other hand, opt for a large sample size

which must be representative and which must generate results through surveys that take the form of a questionnaire.

3.2.3. The inductive approach

Induction is a process that consists in the production of laws through the generalization of observations. Induction starts from the principle of field observation. Induction makes it possible to answer the following question: how do we go from a singular statement to general statements? (Mouchot, 2003). The answer to this question supposes the passage of the inductive logic which rests on the generalization of a set of observable facts in a universal law or against a general rule.

Induction seeks to build the general from the particular (Aktouf, 1987), unlike the deductive approach, and it is also the reverse funnel model. Induction consists of discovering regularities from observation and formulating hypotheses that become a general rule if the consequences drawn from the observation are true (David, 1999). These assumptions can take the form of the theoretical model applicable to other cases if they prove to be correct and true.

Induction refers to singular facts to formulate generalities (Angers, 1996), it starts from particularities to generate universal laws. In other words, it consists in observing reality in order to draw from it, by induction, the laws that govern it. Induction means the mobilization of facts and observations to generate laws and theories with universal vocation.

4. Research design adopted by post-positivism

After having defined the epistemological positioning and once the research problem is well specified, it is now necessary to shed light on the “plan” of our research, also called architecture or design. This research architecture constitutes the structure that will determine the different steps and phases necessary to respond to the research problem and represents the common thread that will chain the steps.

Initially, we adopted a hypothetico-deductive approach which served as a basis for developing our conceptual model linking all the concepts and variables that make up our research problem and extracted from previous studies, and this through a in-depth analysis of the literature review and the mobilization of theories and laws used to describe reality. In a second step, and before proceeding to the empirical confrontation of our conceptual model and the hypotheses that compose it, it is important to pass on a qualitative exploratory study, which is part of an inductive approach.

At the level of the qualitative phase, it serves as a basis and is practiced upstream to ensure the effectiveness of the chosen variables which took the order of the concepts and to better know the field of investigation. This phase is considered an important step that serves to refine the conceptual model and formulate the definitive hypotheses.

This step consists of verifying the relevance of the concepts studied and the model taken from the literature. The objective is to deepen, improve and enrich our model by observations made in the field and this through semi-structured interviews addressed to professionals from where their feedback serves to feed the hypotheses and the theoretical model.

Finally, the stage of the contextualization of the theoretical model is required by the fact of carrying out a quantitative confirmatory study and this through its confrontation with the Moroccan reality in the field of research via a survey of users of the care offer. to reject or support the hypotheses made in the first step. The phase relating to the quantitative, it is a numerical representation which acts as observations of the hypotheses on the ground (confirmation of reality).

Based on the developed epistemological position, we borrowed the deductive type reasoning which is part of a hypothetico-deductive approach: from the literature review, we formulated

the conceptual model and the research hypotheses that result from it. , these will then undergo a confrontation in the field of research through a strategy of tests on the health sector in Morocco through hospitals. And this, with the aim of analyzing the impact of the quality of hospital service on user satisfaction.

To conclude, the hypothetico-deductive approach follows the following logic:

- First, the concepts related to the research question are determined, thus the hypotheses, models are established from the literature on the subject of the research;
- Then, we assumed that the hypotheses, the model, and the theories mobilized were not perfectly reflected in the Moroccan context, we carried out an exploratory survey;
- The results of the exploratory survey confirmed the variables of our theoretical model and the validity of the formulation of its hypotheses;
- Finally, the test phase is implemented to validate or refute the hypotheses and the research model.

The fact of opting for a fitted epistemological positioning, integrating constructivism and positivism, has systematically guided us to adopt qualitative and quantitative approaches during the concretization of our theoretical model. Indeed, the production of data and empirical evidence are done via two research methods which are respectively “qualitative methodology” and “quantitative methodology”.

4.1. Qualitative exploratory phase

The exploratory qualitative study is an extension of knowledge towards other horizons and other fields, in other words, it is the widening of the edges of knowledge with the aim of establishing new discoveries in relation to the object studied.

The application of a qualitative study makes it possible to extend knowledge when the object studied is marked by an insufficiency at the level of the literature or the lack of its empirical application in a particular field or more precisely in the context of the study. Lambin (1998) attaches great importance to the exploratory phase, considering the qualitative exploratory study as an essential prerequisite for any quantitative study. Qualitative work has frequently been assimilated to an earlier (exploratory) phase of quantitative research (Evrard, et al., 1997).

The exploratory study allows the understanding of the phenomenon studied by the fact of having full access to it and the power of flexibility held by the qualitative survey tools, which allows an exploration and a global understanding of the object of research.

This step is important insofar as it allows us to reassure ourselves of the predefined variables according to the theories mobilized and to delimit the field of research and to eliminate the eventualities stipulated by the theory but not found on the field of investigation. The fact of adopting scales of measurement adapted to the object of research, this will make it possible to formulate more precise and determined hypotheses. This is an opportunity to refine the hypotheses already developed.

Our qualitative study has a double interest:

At the conceptual level: to deepen the understanding of the concepts of satisfaction and quality of hospital services from the point of view of care service providers and users of health establishments according to the confrontation with the field of study.

At the level of adaptation of the measurement scales: make sure of the predefined items and variables during the literature review from the theories mobilized, adapt them to the Moroccan context and refine them according to the perspectives of the research and the framework of the study.

4.2. Confirmatory quantitative phase

The term confirmatory is used to confirm hypotheses, or predefined research proposals resulting from a prior exploratory study. The confirmation is manifested following a market study, an

investigation in the field whose vocation is to obtain quantifiable, measurable and statistically reliable information.

The quantitative phase focuses on building statistical and mathematical models to explain the observed phenomenon. It is a digital representation of observations in order to describe and explain the phenomenon under study.

To conduct a quantitative study, the researcher must accurately select a sample of the population being studied. The choice of sample allows the results to be more relevant and will lead to quality work and effective answers to the research questions. To do this, the researcher must choose the most suitable tool to provide him with information about himself.

After reviewing the previous steps, it is then necessary to carry out the survey. The results of the survey and the information collected must be formatted in order to be analyzed. The last step consists of drawing conclusions and writing texts based on the quantified results obtained.

4.2.1. the different methods of data analysis

Data analysis methods vary depending on the type of key questions. They vary depending on whether they are open or closed questions, metric, ordinal, nominal, categorical data, causal, evaluative questions, descriptive or explanatory questions. In this sense, data analysis methods can be grouped into two main categories. The first concerns analysis methods for quantitative data (figures) also called digital, such as cost, frequency, physical characteristics, etc. The methods used in this context are correlation, crossing, frequency tables, etc. While the second category, it falls within the framework of qualitative or textual data analysis methods such as analysis of words, spoken words, open responses to questionnaires, interviews, document analysis and others. This is done through content analysis, thematic coding and explanatory texts.

The processing of data or the analysis and interpretation of data has given rise to a set of descriptive techniques, namely, frequency, mean, crossed means, variance, standard deviation, regression, factorial correspondence analysis, principal component analysis, the chi-square adjustment test as well as the lexical mode concerning open questions.

Several methods exist in the literature with the objectives of modeling and data processing. The objective of these methods is to bring together a set of quantitative and qualitative elements described under the name of raw data to extract useful information whose aim is to validate a hypothesis or help in decision-making.

Evrard et al. (1997) distinguish two types of data analysis methods, namely descriptive methods and explanatory methods (Felouati, 2015). Descriptive methods take into account all the variables and seek to synthetically describe the structure of the available data. In this sense, principal component analysis (PCA) and factorial correspondence analysis (CFA) as well as multiple correspondence factorial analysis (AFCM) or (ACM) are the main techniques of descriptive statistics.

PCA is used for quantitative methods in order to understand certain facts, their development and evolution whose variables are quantitative. While the CFA, the latter is used on qualitative data, it is used with the aim of finding links or correspondences between two qualitative (nominal) variables. ACM is an extension of AFC, it employs both PCA and AFC. The ACM is equal to the PCA for quantitative variables, it is equal to the AFC when the number of qualitative variables is equal to two.

However, explanatory methods explore the relationship between the two subsets of variables, the variables to be explained and the explanatory variables. The latter responds to the modeling of the relationship between the explanatory variables and the variable to be explained. The most used methods for this purpose are multiple regression, discriminant analysis and segmentation and analysis of variance.

Descriptive and explanatory methods have demonstrated limits in disciplines that deal with complex phenomena (Balambo, 2014). As a result, and with the evolution of the quantitative literature in management sciences and with great advances in statistical techniques, new methods have emerged and have paid more attention among researchers. In addition to classical or traditional methods of data analysis, new methods, also called modern methods, have been able to overcome the limits of classical approaches by allowing the analysis of complex relationships with a large number of variables and with a size of very large sampling. Felouati (2015) named them

“Advanced methods” versus “traditional” methods. In the same sense, Balambo (2014) took the same perspective as Felouati while qualifying the old methods as “first generation” while the advanced methods gave them the name “second generation”. The latter include, among others, canonical correlation analysis, artificial neural networks, Probit and Logit methods, decision trees, joint analysis, structural equation models or causality models (Yachoulti, 2019).

4.2.2. Confirmatory analysis, between the “PLS” method and the “LISREL” method

The analysis techniques of structural equation methods are mainly based on two types of analysis. The analysis of covariances, of which the LISREL approach remains the most widespread in this sense, and the analysis of variance, of which the PLS approach is the method most suited to this context.

We will deal with two different points throughout this paragraph. First, we will define the PLS approach which is our method of analyzing data collected from users of hospital services. Secondly, we will briefly present the LISREL approach and compare the two methods PLS and LISREL.

4.2.2.1. PLS approach

The PLS (Partial least Square) approach is a technique for estimating structural equation models developed by the Swedish professor Herman Wold (1985) and further developed by the work of Lohmöller (1984, 1987 and 1989), and is among the methods of the latter. It brings together the functionalities of both principal component analysis (PCA) and multiple regression. It uses partial least squares regression techniques which are an extension of multiple regression for the analysis of variance.

The PLS approach makes it possible to study existing relationships between latent variables and indicators or measures (manifest variables); it is applied within the framework of specifying relationships between latent variables. It is an algorithm that identifies causal links between independent (explanatory) variables and dependent (to be explained) variables.

The PLS approach is considered to be an iterative method insofar as it allows the estimation of unobservable (latent) variables consecutively through the two sub-models of the structural equations which are the external model and the internal model. The first acts on the manifest variables through the analysis of the combination of different indicators on the latent variables, the latter makes it possible to optimize and maximize the explanatory power of the indicators (Lacroux, 2010). In addition, the structural model acts through the other latent variables, estimating the links between them until convergence, that is to say, until the maximization of the covariance between the explanatory variables and the variables to explain. Hence the objective of PLS modeling is to maximize the variance of the explained variables of the dependent (latent) variable.

Unlike other structural equation methods, the PLS approach has advantages that none of the traditional methods have had the merit of having. Firstly, we cite the neglect of the multi-normality of the variables. The PLS approach does not require standards or rules for multi-normality of variables nor does it require conditions relating to the nature of the data. It can contain variables of any type, among others, continuous, nominal, metric variables and it also uses reflective and formative type variables as part of the measurement model.

In the measurement model relating to structural equation methods, there are two types of relationships linking manifest variables or indicators to latent variables, these relationships are defined either by a reflective or formative mode where the direction of combinations between variables changes completely.

In this sense, the PLS algorithm is very sensitive to the precision and specification of the measurement model whether it is formative or reflective. In this regard, it is necessary to ensure that the scales chosen to measure the latent variables are optimal and have good quality in terms of validity and reliability.

As for sample size, the PLS approach is suitable for exploratory studies and model testing where the sample size is not very large. As a result, this criterion which characterizes the PLS constitutes a fundamental element which testifies to the simplicity of the approach. The PLS algorithm does not require very large samples to practice, which has given the opportunity for research to expand and enormous scientific progress since they can operate with fewer obstacles regarding the size of the sample. 'sample.

Another strong point that characterizes the PLS approach lies in its adaptation to studies of an exploratory nature where the researcher relies less on the literature and produces predictive statements. Therefore, the PLS approach is more suitable in situations of testing models not yet studied by theory or less mentioned in the literature or not practiced in a specific context.

Despite all these advantages which identify the PLS approach from other structural equation methods, it remains limited by certain disadvantages which limit its operationalization. Indeed, since the PLS approach is based on practices specific to PCA, this has given rise to the failure to take measurement errors into consideration, which reduces the quality of the measurement estimation, because PLS has tendency to overestimate factorial contributions (Loadings) and underestimate structural coefficients.

Another drawback to point out in the PLS approach is the absence of indices or indicators for evaluating models, which most of the time results in the non-acceptance of articles in international journals. These indices make it possible to judge the fit of the model to the empirical data.

The PLS approach is also characterized by the impossibility of processing or testing non-recursive models, which also constitutes a weakness for the model and a limit. This is explained by the fact that the PLS approach only deals with univocal relationship models where causal links exist, since it is based on multiple regression procedures. However, non-recursive models are more or less realistic models and demonstrate an existing reality between the variables than recursive models.

Despite all these limitations, the PLS approach is characterized by significant popularity, and still continues to function and be practiced in research for structural equation modeling, particularly when there is a limited number of participants in the questionnaire or when This is an area to be explored again or studied in practice in addition to theoretical study.

The PLS approach remains widely used in marketing research (Hair et al. 2012), because it is a field that deals with causal relationships between subgroups to address consumer behavior, particularly satisfaction measures. and other elements that the PLS approach allows to carry out.

4.2.2.2. LISREL approach

The LISREL (Linear Structural Relations) approach developed by Karl Jôreskog (1970a) is a confirmatory approach which operates within the framework of confirmation of a theory through the comparison, evaluation or specification of theoretical models.

LISREL is a structural equation modeling method that allows the transition from exploratory analysis to confirmatory analysis (Jôreskog, 1982, pp: 270). It is suitable for models which are

characterized by a strong theoretical basis and which have been the subject of previously tested measurement scales.

LISREL is practiced after having opted for a theoretical model which gave rise to the construction of hypotheses and therefore intervenes in the sense that it invalidates or confirms theories via the testing of these hypotheses (Barclay et al., 1995).

The LISREL approach is based on the analysis of covariances using the maximum likelihood approach, which minimizes the difference between the covariances of the sample and those defined by the conceptual model, unlike the PLS approach which seeks to maximize the explained variance of the dependent variables.

In order to practice the LISREL approach, the researcher must respect the multi-normality of the variables which are different from those of the PLS approach, where all the variables must be continuous or interval to be able to exercise the likelihood algorithms. The LISREL approach can also integrate normative or reflective type variables but under certain conditions.

Unlike the PLS approach, LISREL allows testing of recursive and non-recursive models, thus, it requires large sample sizes that go beyond 200 observations with a number of observations ranging from 5 to 10 per Item of which the questionnaire is composed (Roussel et al. 2002).

Table1: comparison between PLS and LISREL

PLS	LISREL
Suitable for analyzes of exploratory models or testing of partial or developing models	Suitable for analyzes of confirmatory models or testing of complete models
Analysis of variance	Analysis of covariance
Using the partial least squares technique	Using the maximum likelihood technique
Suitable for small sample sizes	Adapted with a large number of samples which goes beyond 200 observations
No normality of variables required, variables are nominal, interval or continuous and also formative and reflective variables	Only interval and continuous variables. Formative and reflective variables are introduced under conditions
Suitable for recursive models only	Suitable for recursive and non-recursive models
Measurement model and structural model are estimated simultaneously	The measurement model is independent of the structural model

Source : adapted from ML Murre, 2013

This comparison between the two methods demonstrates that the PLS approach is better suited to the problems encountered in management sciences (Lacroux, 2010).

Sosik et al. (2009) concluded that the “*PLS*” approach is better suited to analyzing data where the explanatory variables are correlated. *PLS models work better in practice, since the data used for modeling is never perfect and is often highly correlated. [...] PLS most often produces better results because it uses a single model for dependent and explanatory data. This model is decisive for the correlation structure of the data. [...] LISREL gives its best results when the data are obtained via an experimental design. In practice, especially when data are collected by a questionnaire, experimental designs are rarely possible*” (pp: 17).

5. Conclusion

In this article, we have tried to synthesize the main epistemological paradigms in management science as well as their methodological implications.

Indeed, epistemological questioning is a broad concept which encompasses the following aspects:

- The rigorous definition of objectives, strategic approach, research methods and techniques;
- Clarification of the conception of knowledge;
- The desired value of the knowledge produced.

To justify and validate the scientificity of the knowledge produced, each research work must be part of an epistemological paradigm. To define its epistemological positioning, it is necessary to question the nature of the knowledge produced, the way in which it was developed, but also its added value.

The study of the epistemological postures of management sciences used to study management and management practices, has led us to deduce that research on management science is not only limited to epistemological choices and the construction of reasoning, but rather than on the object and nature of a study that the researcher must take into consideration to carry out quality research.

The objective of our article is to shed light on the main epistemological paradigms adopted in the field of research in management science, which are positivism and arranged positivism, which constitutes the central question of our paper, in the occurrence what are the particularities of these epistemological paradigms allowing to constitute the arguments of the methodological choice in a research in science of management.

We can say that in our paper, we have overviewed the main epistemological paradigms mainly used in management science research. In addition, by specifying the philosophical basis of each paradigm, we alluded to its scope and limits, things that can argue the arbitration in terms of attributes, analysis tools and expected purposes for management science researchers.

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