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MANAGEMENT DEPARTMENT

# POLYCOPY ON THE COURSE:

# EPISTEMOLOGY OF MANAGEMENT SCIENCES

## For level:

## MASTER IN: STRATEGIC MANAGEMENT

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# General summary

Epistemology belongs together with philosophy and science: from the point of view of philosophy, epistemology deals with scientific ideas and methods. The heterogeneity in epistemology, which is the point of convergence between philosophers and scientists, leads us to say that epistemology is a unified field of knowledge. Still, it is multifaceted in its approaches because it relies on many areas of expertise, including the logicality of scientific discovery, the philosophical basics of science, and a critical study of science and society and the contribution of psychoanalysis to objective knowledge, etc.

In tymology, epistemology is the study of the sciences. Epistemology is a new branch of philosophy. Knowledge is given in a (dogmatic) capacity and not in an absolute and objective manner. There is no scientific theory based on solid and consistent principles among themselves, and from this, the methods of investigation or experiments whose results are recognized are determined. In the end, epistemology is also known as the results that the researcher reaches through conducting his scientific research, as well as the results of some extrapolations obtained that are far from having a scientific basis (Soler, (2000).

The origin of research in the theory of knowledge is to reach absolute certainty that does not accept doubt. Epistemology mainly aims to describe and distinguish the existing sciences, to determine their value, and, in particular, to decide whether these sciences approach the ideal of sure and justified knowledge. Epistemology is also used to describe the branches of scientific knowledge, to clarify and test the theories associated with each component of knowledge, and to evaluate the logical and cognitive value of these theories, according to Soler (2000).

Likewise, epistemology requires determining the reliability and effectiveness of the procedures used to test these theories or knowledge in general. Specifically, establishing these procedures to verify the validity and credibility of the tested theories and to determine the probability of their error and the likelihood that they are valid in the last epistemology aims to test and verify these scientific theories, according to Soler (2000).

Suppose, for example, that we explore the internal dynamics of the development of sciences through which we ask whether later theories are an extension of previous theories or whether the content of these theories is subject to quantitative modification. If we choose the second option, we find it difficult to support the idea of the realism of these sciences and that subsequent theories are closer to validity (فلسفيزم, 2021).

Science is an exceptional activity that only sometimes had the strength and extension we knew it in our days. Historically, epistemology is concerned with the study of building knowledge. It is not easy to find a unified definition of scientific knowledge. Some define it as an interpretation of reality, and some see it as an innovation or construction of reality (Piaget, 1967). In terms of building a reality, it is in our modern reality that new sciences emerge that align with this lived reality. Among these sciences are management sciences, which are called management sciences or organization sciences, as they remain the most modern among all social sciences academically and in research, and they are in continuous development and at an accelerated pace. However, due to its shortage, the research findings cannot be generalized (Gavard-Perret et al., 2008).

Management sciences, according to their nature, are modern. This type of science has always lived through a scientific identity struggle due to the lack of a particular topic for it. From management sciences, public administration sciences, and organizational sciences to management sciences, i.e., the management of private economic institutions, scientific and academic research and contributions supported overcoming these. The epistemological crisis resulted in the emergence of principles, models, methods, approaches, theories, and laws that frame this type of science, giving it legitimacy and justification (Dabla, 2019).

Bartholly et al. (1978) say that the researcher discovers “fountains” and describes them in the closest possible way to the meaning to be reached. It is clear that scientists’ task is to “discover” the laws “existing in nature” and that they exist even if no researcher discovers them. We point out that in specific research, many theories can explain a scientific phenomenon or one theory can be excluded from another due to its explanatory power for this phenomenon and the scientific advantages it enjoys.

Moreover, Perret and Séville (2007) confirm that research works have extraordinary visions of the world around us and that these works aim to either predict, describe, explain, or understand, and this is what enables the acquisition of the validity, reliability, and credibility

of knowledge that results from the research process and increases with the accumulation of scientific knowledge.

The station, position, or epistemological models in management sciences or organization sciences are at the heart of this scientific work, and from them, we wonder what knowledge is. What are the sources of knowledge? What is the nature of knowledge? What is the relationship between philosophy and epistemology? What is the relationship between epistemology and science? Is there scientific knowledge? What is scientific knowledge? Is there fundamental science or relative science? How does science evolve? How is science built? How is science criticized? What are the criteria for the validity and reliability of correct scientific knowledge? What is management science? What is the scientific research methods applied in management sciences? What is the epistemological position of management sciences?...etc. This package of questions will be answered by browsing this modest work.

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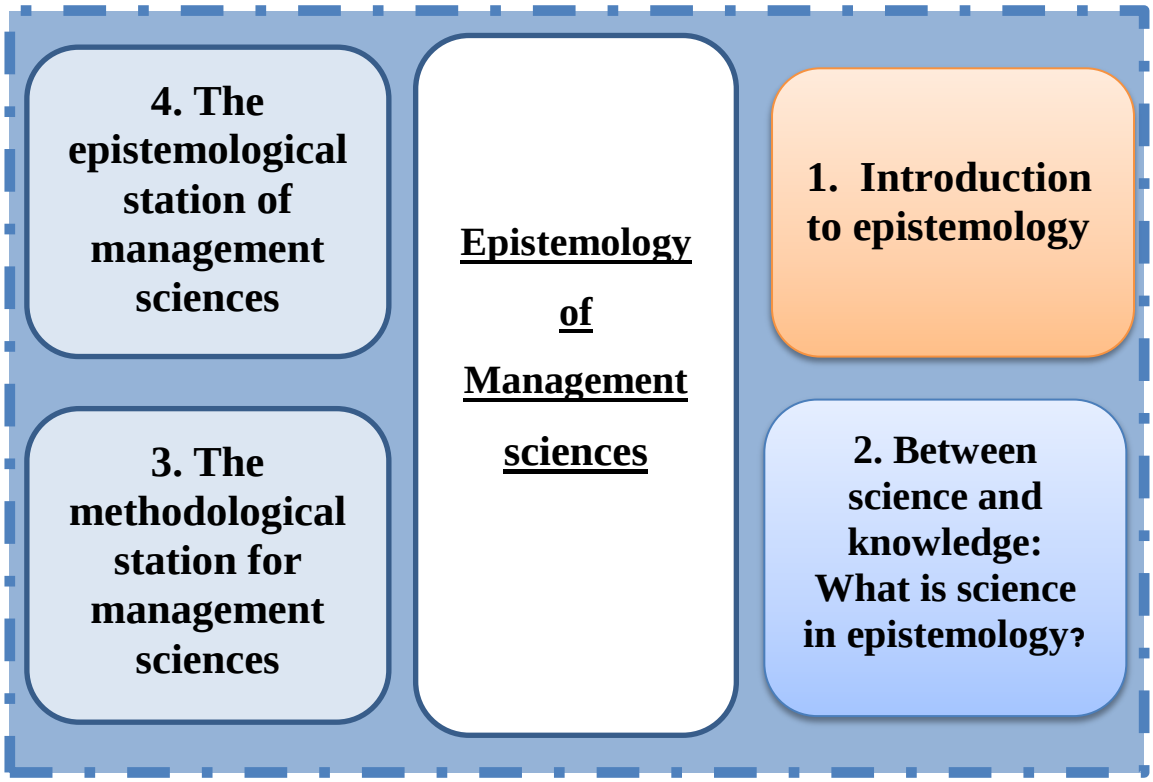
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Epistemology of Management sciences
1. Introduction to epistemology
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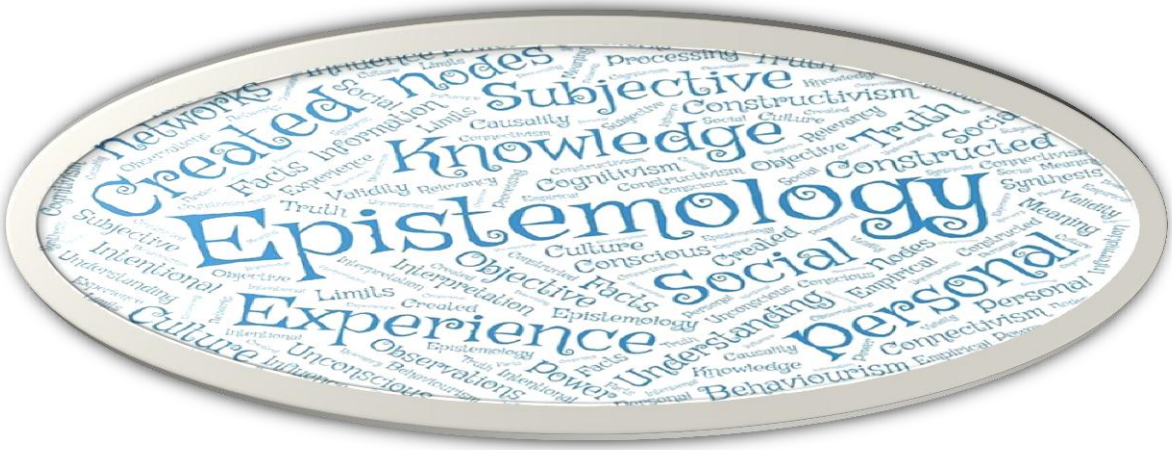
# First chapter
# Introduction to epistemology

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## Chapter plan

**Foreword**
**Introduction**

**1. The nature of epistemology**

**1.1 Some definitions**
**1.2 The need for epistemology**
**1.3 Subjectivity and objectivity of science**
**1.4 The difference between philosophy of science, theory of knowledge, and epistemology**

# Chapter plan

**2. Simplified explanation of epistemology**

**2.1 Emergence of epistemology**
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**Summary**

## Preamble

In existence, is there a truth? Can we know it? Furthermore, what is its nature? How is it accessed?

**Take an example,**

- You woke up in the morning;
- You remembered a particular event;
- You needed clarification on the events;
- You did not know whether this event was currently happening or if it was only a dream.

This is what prompted a French philosopher named René Descartes (1596 AD - 1650 AD)[1] to doubt every need in his life, in the external reality and his existence, to the extent that he could not reach any fundamental knowledge or rely on his senses to perceive Knowing things, he continued until he realized it and said his famous saying (I think, therefore I am).

The English philosopher John Locke (1632 AD - 1704 AD)[2] wondered whether there was truth in it or not, or no truth. This prompted him to publish a book entitled (Article on the Human Mind) to ask if a person can know the limits of human cognitive abilities. This book was the beginning of a breakthrough for modern philosophers to search for cognitive theory in

[1] René Descartes was "A French philosopher, mathematician, and physicist called the "Father of Modern Philosophy." Descartes also had a clear influence on the science of mathematics, as he invented a mathematical system named after him, which is (the Cartesian coordinate system), which formed the first nucleus of (analytical geometry). Thus he was one of the main figures in the history of the modern scientific revolution. Associated with the writings and methodology of René Descartes, other names know Descartes, and Descartes is the main figure of the doctrine of rationalism in the 17th century AD, as he was well versed in mathematics, as well as philosophy, and made a great contribution to these sciences, and Descartes is the author of the famous saying called "The Cogito": "(I think, therefore I am)" (Wikipedia, 2022)

[2] John Locke "was an English philosopher, experimentalist, and political thinker. He was educated at Westminster School, then at Christ Church College. John Locke studied in Christchurch, Oxford, became a physician and adviser to the Earl of Shaftesbury, and then turned to philosophy. In a short time, he produced a valuable author on the subject of problems that human understanding can deal with. He was admired by the Americans, and among his views in the book was that the supreme function of the state is to protect wealth and freedom, and the people must change or replace the government if it does not preserve the rights and freedom of the people, and his views contributed to increasing the awareness of Americans who embraced his views and decided to implement them" (Wikipedia, 2022)

epistemology. The latter is part of philosophy or the science of epistemology, according to ( فلسفيزم;,2021).

Hence, we ask, "What is knowledge? What are the sources of knowledge? What is the nature of knowledge? What is the relationship of the perceptive to the external percept? What are the

## Sources of knowledge:

Is the source experience? Or is it the mind? Or is it something entirely different? Is the external perceptible identical to the perceptual mental? Is knowledge fixed or changing? Is there scientific knowledge? Is there fundamental science or relative science? How does science develop? How is science built? How is science criticized? What are the criteria for the validity and reliability of scientific knowledge? Based on (فلسفيزم ,2021)).

This is a set of questions that will be answered in this study based on several references, which are as follows:

Baillat et Fourez (2004)
Bartholemy et al. (1978)
Soler (2000)
Charifa ( 2021 a, b, c, d, e, f, g, h, i, j, k)
(فلسفيزم ,2021)
Ibrahim (2021)

## Introduction

Epistemology aims mainly to describe and distinguish the existing sciences, to determine their value, and, in particular, whether they are close to ideal for sure and justified knowledge. Epistemology is also used to describe the branches of scientific knowledge, clarify and test the theories accompanying each branch of knowledge, and evaluate these theories' logical and cognitive value, according to Soler (2000).

Likewise, epistemology requires determining the reliability and effectiveness of the procedures used to test these theories or knowledge in general. In particular, the establishment of these procedures to verify the validity and credibility of the tested theories and to determine the probability of their error and probability of being correct, and finally, epistemology aims to test and verify these scientific theories, according to Soler (2000).

Based on فلسفيزم (2021), epistemology aims to know the relationship between theory and the material it treats, as well as to find out whether scientific theories are projections of truth,

which are independent of human will, or are limited to the birth of tools from the human will, or search for definitive and adequate knowledge that predicts and interacts with the outside world, from which we can derive important descriptive information about the nature of the scientific phenomenon under study, which results in physical realism (physics).

In addition, according to Bartholy et al. (1978), epistemology aims to know if a scientific development is taking place, and if so, what is it? Epistemology, therefore, asks about the nature of the procedures by which sciences are historically formed or created. These conclusions of the recently adopted scientific product depend strongly on the answers to the questions related to putting the scientific heritage to the test and the search for realism.

Suppose, for example, that we explore the internal dynamics of the development of sciences, through which we ask whether the subsequent theories are an extension of the previous ones or that the content of these theories is subject to a quantitative modification; If we choose the second option, we find it difficult to support the idea that these sciences are realistic and that later theories come closer to correctness (فلسفيزم, 2021).

Let us also suppose that we are interested in the determinants of technological development and that it is only the empirical data that exists as the reason that leads a scientific group to accept or reject a theory or that some psychological and social compounds interfere with changing the equation and from it. We conclude that these compounds outweigh the relativity hypothesis, and we conclude by rejecting this theory. From there, epistemologists develop reliable and general scientific rules or methods for testing theories, according to Baillat and Fourez (2004).

# 1. The nature of epistemology

## 1.1 Some definitions

Many definitions have been assigned to epistemology, based on Soler (2000). At the beginning of the twentieth century, epistemology emerged as a unique field of knowledge. Epistemology combines Greek words: “episteme”, which means science and knowledge, and “logia”, which means speech, language, judgment, decision, and criticism. Epistemology is the study of both science and knowledge. Epistemology is a synonym for epistemology, but this is not entirely true. Epistemology investigates the nature and value of principles, concepts, methods, and results of knowledge, which have two essential characteristics.

a) Epistemology is a reflexive discourse: it is a discourse that always refers to the sciences, and it assumes science and returns to it.

b) Epistemology is a critical discourse: it is a discourse that does not care about describing science without judging it.

It means a discourse about science or a discussion about science

**Episteme:** Discourse

**Logos: Science**

Debi (2020) shows that what includes the analysis and study of what science is and determining at any moment what the scientific framework is, or whether this scientific framework is the central axis that epistemology includes, is the study of the conditions for accepting scientific work? "Validity."

He adds that the Latin origin of "*savoir*", science, scientist, and science is "knowledge." Objectivity highlights the general (which can be generalized) connections between phenomena, and that allows for predictions. Consequences: (effects), which we can control gradually and show the causes by observation. Nevertheless, what do we mean by objective knowledge?

Traditionally, objective knowledge relates to the object, which reflects subjective knowledge that changes from one person to another. On the other hand, many researchers, including St. Augustin d'Hippone (354 AD - 430 AD)[3], believed that we could see and know the objective laws of nature, but the works of Albert Einstein (1879 AD–1955)[4], for example, showed that the previous theories were only approximate theories of the fundamental laws of the world, so we doubt that we can see the laws of nature, beyond that, you may even doubt the existence of fixed laws. Therefore, some have proposed another concept of objective knowledge related to the consensus of scientific opinions about a specific topic, depending to Soler (2000).

[3] Augustin d'Hippone "Numedi-Latin' was born in Taghast, now Souk-Ahras, Algeria. "(Wikipedia, 2022)

[4] Albert Einstein, "A German-born physicist, is the father of relativity and the author of the famous special relativity and general relativity that were the first building blocks of modern theoretical physics. "(Wikipedia, 2022)

Epistemology is a critique of science, and it requires the following:

- Determining the nature of criticism, is it philosophical? Is it scientific? Moreover, what are the tools?
- Distinguishing the material of this speech, what is meant by science? What areas of knowledge can be classified as scientific?

In etymology, epistemology is the study of science; epistemology is a new product as a branch of philosophy. Science is given in a dogmatic capacity and is not given in an absolute and objective manner. No scientific theory based on solid and consistent principles determines the methods of investigation or experimentation whose results are recognized. Finally, epistemology is also known as the results reached by the researcher through scientific research, as well as the results of some extrapolations that are far from having a scientific basis (Soler, (2000).

In addition, there is a second form of epistemology called foundational epistemology. The critical work of epistemology does not begin only when scientific knowledge ends, it is not a philosophical work, and epistemology can intervene in theory formulation. This foundational epistemology is essential to scientific practice. The most beautiful example of this foundational epistemology is that Galileo Galilei (1564 AD - 1642 AD)[5] would not have formulated the law of falling bodies had it not been for his criticism of Aristotle's concept of gravitation and from this came the principle of dynamics in our time (Soler, (2000).

The critical study of the epistemology of the sciences aims to be far from hostile or suspicious. Epistemology makes a necessary and reasonable contribution to scientific work. From the above, it is clear that epistemology belongs to philosophy and science: On the one hand, philosophy and epistemology deal with ideas and the scientific method. The philosopher notes that the scientific researcher knows the specificity of scientific knowledge concerning the general knowledge circulated among humanity. As for science, it uses the concepts and methods of thinking objectively, even measures the reliability of these concepts and methods and even discusses and criticizes the results obtained, according to Ibrahim (2021).

[5] Galileo Galilei "was an Italian astronomer, philosopher, and physicist born in Pisa, Italy, sometimes described as a scholar who published the heliocentric theory. "(Wikipedia, 2022)

The heterogeneity in epistemology, which is the point of convergence between philosophers and scientists, leads us to say that epistemology is a unified field of knowledge. However, it is multiple in its approaches because it depends on many fields of knowledge, most of which are scientific, including the logic of scientific discovery, the philosophical basics of physics, and a critical study of science and society—a psychoanalytic contribution to objective knowledge, elements of the history of mathematics, etc.

It is necessary to have a place for the history of scientific thought, an area of modern knowledge that helps discover scientific ideas because we notice that researchers delve into the depths of the history of things and events to discover or confirm some scientific concepts and principles.

## 1.2 The need for epistemology

**The science is not entirely positive**.

Suppose epistemology criticizes the negativity of foundational epistemology at the expense of positive epistemology. In that case, it appears today as necessary knowledge, and this is because scientists and philosophers, consciously or not, recognize that positive knowledge cannot be challenged, is considered final and intangible, or can be founded on new rules. It is far from being scientific knowledge; it is a field open to all contradictions; For example, at the end of the nineteenth century, Newtonian mechanics faced a significant challenge with the experiments conducted at the time and the emergence of two opposite theories, to the extent that it was called (the physical crisis). In the nineteenth century, fierce and relentless competition emerged between the two theories highlighting the idea of evolution to the Chomdian theory of evolution and then abandoned in favour of Darwin's theory, based on Abraham (2021).

These two examples do not lead us to sow the doubt that science denies the possibility of (specific science), for a scientific discovery or a scientific theory, if it is proven through experiments and time, cannot be refuted but is subject to reformation and merging based on special knowledge, and this is the work of epistemology to contribute to this foundation scientific.

## 1.3 Subjectivity and objectivity of science

Science is not entirely objective; science is far from being all scientific, this phrase means that science is not all objective, and that leaves no room for objection or doubt; in this regard, we do not refer to scientific problems that have not yet been guided to a solution in every era timeline.

## 1.4 Difference between philosophy of science, theory of knowledge, and epistemology

According to Ibrahim (2021); Ibrahim (2021) and Soler (2000), epistemology is the theory of knowledge. This is general knowledge. Philosophy deals with three sections: a section related to ontology or existence, a section related to epistemology, and a third section related to values or axiology; from it, we derive that epistemology is part of philosophy concerned with the history of knowledge, dealing with how it originated, its sources, and its nature.

The philosophy of science discusses at another level related to scientific knowledge. It deals with how science is built in terms of its concepts, topics, theories, and curricula. Then the philosophy of science deals with how the histories of sciences occur.

This is a new level. After this development in the sciences, scientific research was forced to find a new term called the philosophy of science. It does not deal with topics of any knowledge but in particular scientific knowledge. After that, research in this field developed, and instead of carrying the title of philosophy of science carried, an accurate scientific term named the term epistemology with its new connotation became a strong presence after the development in mathematics and physics in the nineteenth and twentieth centuries.

Epistemology has become popular and attracted the best scientists and researchers worldwide. It is rapidly growing concerning the development and acceleration of science in various scientific disciplines. There has been an overlap between the term epistemology and philosophy of science. The specialists in France prefer the term epistemology to their Anglo-Saxon colleagues prefer the term philosophy of science. In any case, despite this overlap between epistemology and the philosophy of science, epistemology remains a philosophical field that found its roots in the philosophy of epistemology from its origins, its sources, its nature, its history, as it considers the ground or the basis for this field of knowledge, so later we will briefly discuss a simplified explanation of epistemology, or rather say the roots of epistemology.

# 2. Simplified explanation of epistemology

## 2.1 The Emergence of Epistemology

Research on the emergence of epistemology was transmitted in the books of antiquity before BC and the Middle Ages after AD, and this is until the modern era came, so they collected it and dedicated books to it, and able philosophers appeared who enriched this topic of philosophy with great wealth, according to Soler (2000).

The origin of research in the theory of knowledge is to arrive at absolute certainty that does not accept any doubt. Amid this goal, many theories of knowledge emerged, including what is contradictory in itself. These philosophers each have a point of view from which he sees the truth of knowledge and makes their theories and arguments. The theory of knowledge occupies a prominent position. In Western thought, which came in opposition to the religious text, the epistemology of Westerners is filled with the spiritual void left by the absence of the church from the life of the Western individual (Sharifa, 2021a).

At the beginning of the emergence of the theory of knowledge, it was looking at the philosophy of the natural sciences, for example, in the issue of the essence of which things are composed, such as how the origin or principle of water, the ancient philosophers before BC, such as Thales, Anax Manas and Heraclitus, said: Heracleitus (It is difficult to determine the exact date of his life)[6], That the origin of matter is water, and among them are those who said that water is the origin of condensed gas, and among them that the origin of the universe and its substance is fire, and philosophical opinions conflicted in this direction (Sharifa, 2021a).

However, this controversy moved in the fifth century BC from research on the origin of matter and the universe to the study of man himself by the sophists who denied the existence of absolute truths and that everything is relative; They said that the source of knowledge is the senses, and they also emphasized the value of the mind as a source of knowledge. This is very

[6] Heracleitus ″ A Greek philosopher in the pre-Socratic era, wrote in a mysterious style dominated by sadness, so he was known as the crying philosopher. Socrates, Plato and Aristotle influenced his ideas. He said that fire is the first substance; from it, the universe arose, and he also said of permanent change. He wrote a single book, of which we have only fragments, and historians know little about his life. It is hardly known about him except that he was from the royal family in Ephesus in the Asia Minor region. We can consider Parmenides and Heraclitus as two of the founders of ontology. Scholars generally believe that Parmenides was responding to Heraclitus or Heraclitus responding to Parmenides. "(Wikipedia, 2022)

briefly what was mentioned about the theory of knowledge in ancient times (Sharifa, 2021a; Ibrahim, 2021).

Let us come from what was mentioned about the theory of knowledge in the Middle Ages to the modern era. In the middle Ages, philosophy was influenced by the presence of the power of the Church and the solidity of the sacred religious text. One of the most prominent philosophers is St. Augustine, who saw that the mind alone could not confront the discourse, or rather say the religious text, and succeeded in employing the mind in defending the faith and said his famous saying (Have faith to be wise). We also find in this period from St. Augustin d'Hippone (354 AD - 430 AD)[7] in this proposition, Thomas d'Aquin (1225 AD - 1274 AD)[8], who saw that reason stands at the religious text, i.e. faith.

Muslim philosophers, among them Abu Yaqub Ishaq al-Kindi, Abu Nasr Muhammad al-Farabi and Abu Ali Ibn Sina, managed to reconcile philosophy and religion and give a role to revelation as a source of knowledge or the so-called news transmitted from heaven. They discussed the issue of reason and transmission, which is very clear to Ibn Taymiyyah in his book Dara Contradiction of Reason and Transmission. Judge Abdul-Jabbar devoted the twelfth volume to the issue of epistemology and discussed some issues of reason and transmission in religious belief; Ibn Rushd came to establish the idea of reconciling philosophy and Sharia, so he wrote a book called “Isolate the Dictum between Wisdom and Sharia” from a connection" (Sharifa, 2021a; Ibrahim, 2021).

As for the end of the Middle Ages and the beginning of the modern era, Immanuel Kant (1724 AD - 1804 AD)[9], the German philosopher, devoted his research to reconciling the mind and sense, i.e. experience as a source of knowledge, also gave a significant role to the religious text in epistemology. In the modern era, one of the most prominent empirical philosophers

[7] Augustin d'Hippone Numidian-Latin was born in Taghast, now Souk-Ahras, Algeria. "(Wikipedia, 2022)

[8] Thomas d'Aquin "a Dominican friar, philosopher, Catholic priest, and Doctor of the Catholic Church, a highly influential theologian and jurist in the scholastic tradition "(Wikipedia, 2022)

[9] Immanuel Kant "A German philosopher of the eighteenth century, who lived his entire life in the city of Konigsberg in the Kingdom of Prussia, was the last influential philosopher in modern European culture and one of the most important philosophers who wrote in classical epistemology, was the last philosophers of the Age of Enlightenment that began with British thinkers "(Wikipedia, 2022).

was John Locke (6321 AD - 1704 AD)[10] of English origin in his book (An Essay on the Human Mind), which represented the opening of a new era in new thinking that did not cancel the position of the mind in front of sense, perception and experience that he gave a new definition of knowledge as (honest and justified belief). This is a small summary of the process of developing epistemology throughout history, and we will discuss what follows the definition of epistemology (Sharifa, 2021a).

## 2.2 Define the theory of knowledge

The source of knowledge in language: Knowing is the opposite of ignorance. Idiomatically, it refers to all knowledge reached or realized by man over the ages. It deals with ideas, illusions, feelings and facts that the human race knows. It helps it identify and deal with its surroundings or environment, no matter how primitive, nomadic or prohibitive. Knowledge is also applied to the perceptions, concepts, meanings, rulings, religious beliefs and other metaphysical beliefs of man or human beings, with which he tries to understand himself and the surroundings around him. This is about knowledge, According to Sharifa (2021b), so what about the theory of knowledge?

In short, the theory of knowledge searches for the problems of the relationship between the knowing subject and the known subject, as it deals with the mental perception of man and the known object, Bartholy et al. (1978).

Philosophy searches for existence as a scientific being, while the theory of knowledge is one of the topics of philosophy, including ontology, and it specializes in researching existence by asking about the origin of the universe and other metaphysical questions. The second topic, values, i.e. Osmology, is the one that cares about the values of goodness and beauty. The third topic, is the topic of epistemology, which is concerned with researching the possibility of establishing scientific knowledge and researching the problems related to accurate scientific

[10] John Locke was an English philosopher, experimentalist, and political thinker. He was educated at Westminster School, then at Christ Church College. John Locke studied in Christchurch, Oxford, became a physician and adviser to the Earl of Shaftesbury, and then turned to philosophy. In a short time, he produced a valuable author on the subject of problems that human understanding can deal with. He was admired by the Americans, and among his views in the book was that the supreme function of the state is to protect wealth and freedom, and the people must change or replace the government if it does not preserve the rights and freedom of the people, and his views contributed to increasing the awareness of Americans who embraced his views and decided to implement them" (Wikipedia, 2022).

knowledge in particular, and taking into account what the tools of that knowledge are, their limits and their value (Sharifa, 2021b), we will see in the following three topics:

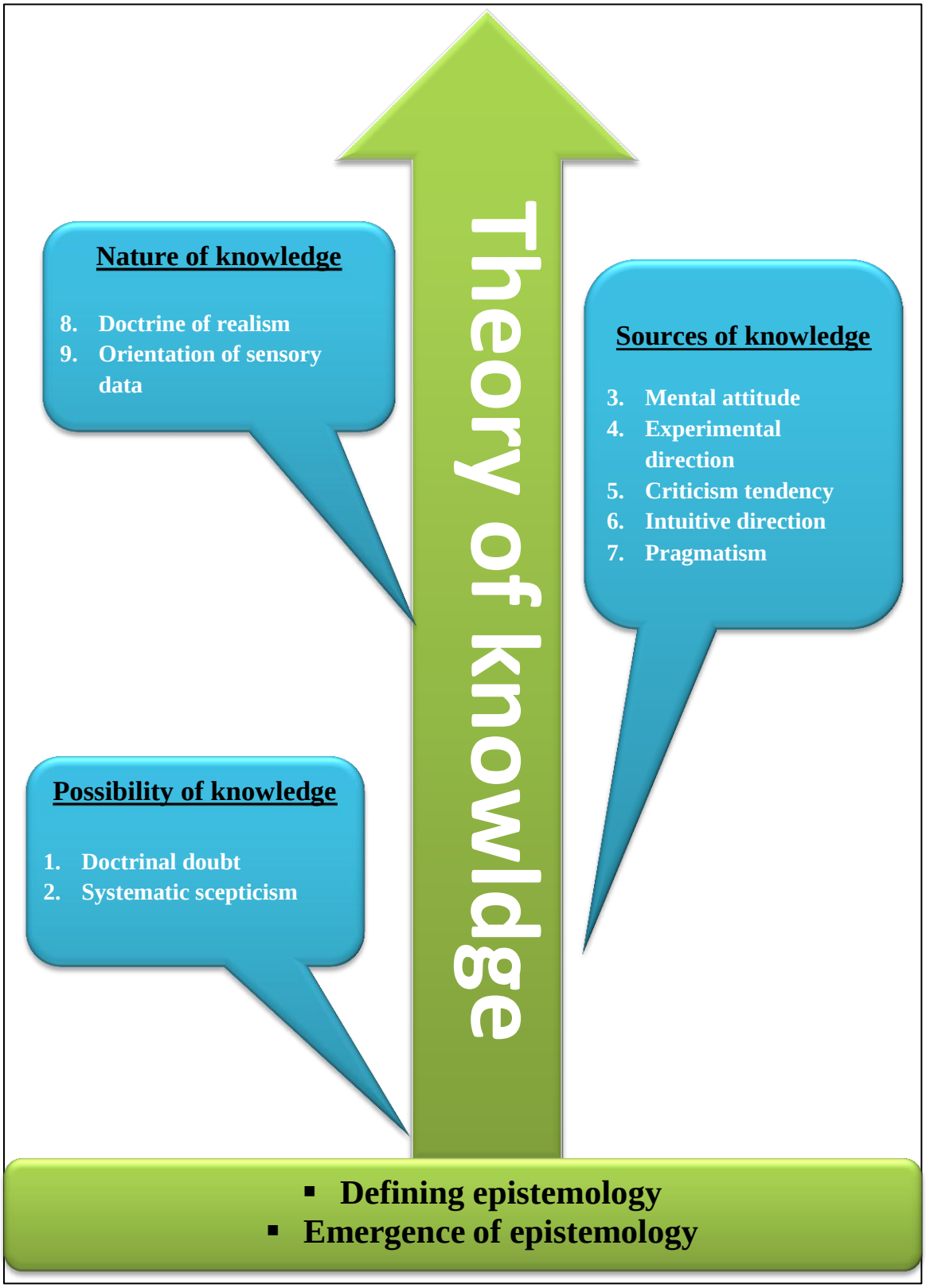


**Figure 1:** Simplified explanation of epistemology

## 2.3 The first topic: the possibility of knowledge

A study on the possibility of knowledge, a topic that deals with doubts about knowledge and tries to answer questions about the possibility of a man realizing all things and whether he can be assured of the truthfulness of his perception and the correctness of his information. Moreover, he is divided into doctrinal doubt and systematic doubt.

## 1.3.2 Doctrinal doubt (skepticism)

According to Sharifa (2021c), doctrinal doubt is a reason to mention systematic doubt. From the latter, the man takes a method to reach knowledge, that is, to begin with, it and not end with it, and doubt here is a means and not an end in itself and it is a little doubt that the philosophical researcher takes until he reaches certainty. As for doctrinal skepticism, it is both the means and the end. A person takes skepticism as a doctrine that cancels all knowledge, begins with it, and ends with it.

Doctrinal skepticism is absolute skepticism, as it is as old as philosophy and became a doctrine at the hands of Beron (365 BC - 275 BC)[11]. Beron lived through a turbulent period of ideas in which values, faith and goodness were lost, and things were corrupted. A wave of doubt swept the West after the emergence of philosophical trends that exalted reason at the expense of religion, thus exposing the Christian religion to rejection and denial.

As a result of fighting religion, a group of skeptics rose to defend Christian beliefs and establish faith in them through skepticism of reason and human knowledge. At the head of these believing skeptics were the Renaissance philosopher Pierre Charron (1541 AD - 1603 AD)[12] and Michel de Montaigne (1533 AD - 1592 AD) [13]. Montaigne protested that the mind is limited and cannot be trusted, and the source of knowledge is the senses, and the mind depends on these senses. The functions of these senses are limited, and the best philosophers declare that we do not know anything.

[11] Beroun was a Greek philosopher who is considered the founder of the doctrine of skepticism attributed to him, so he was known as Beroun; he is from the school of philosophy "(Wikipedia, 2022).

[12] Pierre Charron' is a French theologian, writer and philosopher (Wikipedia, 2022).

[13] George Berkeley "The famous Berkeley nicknamed 'Bishop Barclay' (Bishop of Cloyne), an Irish philosopher whose main achievement was the development of a theory he called 'immaterialism' that others later referred to as 'subjective idealism" (Wikipedia, 2022).

At the head of the skeptical philosophers is George Berkeley (1685 AD - 1753 AD)[14], who says that tangible things exist and intangible things do not exist, even if the mind accepts them, and that only the issues of mathematics and empirical sciences carry meaning, so this understanding has become almost ideological. For George Barclay, doubt has become an end in itself, and he wants to doubt everything so that he does not accept anything, and this is what we call doctrinal skepticism (Sharifa, 2021c; Bartholy et al., 1978).

### 2.3.2 Systematic skepticism

According to Sharifa (2021d), René Descartes (1596 AD - 1650 AD)[15] sent Father Milan a basket of apples in which there were rotten apples and healthy apples, and Milan was one of his friends. He was interested in cognitive doubt, Descartes gave an example of this basket, and he says here the basket must be examined with an apple so as not to spoil the whole basket of apples. The apples are the ideas, in which the good and the bad, and the examination are the processes of systematic doubt.

Systematic skepticism is the necessary premise for the search for knowledge, and it is an important stage of the research methodology in philosophy, and its basis is that the researcher frees himself from wrong judgments and corrupt beliefs and reflects on them and exposes them, so he does not rush to his judgment and does not accept what proves his mind, after

[14] René Descartes was "A French philosopher, mathematician, and physicist called the "Father of Modern Philosophy." Descartes also had a clear influence on the science of mathematics, as he invented a mathematical system named after him, which is (the Cartesian coordinate system), which formed the first nucleus of (analytical geometry). Thus he was one of the main figures in the history of the modern scientific revolution. Associated with the writings and methodology of René Descartes, other names know Descartes, and Descartes is the main figure of the doctrine of rationalism in the 17th century AD, as he was well versed in mathematics, as well as philosophy, and made a great contribution to these sciences, and Descartes is the author of the famous saying called "The Cogito": "(I think, therefore I am)" (Wikipedia, 2022).

[15] René Descartes was "A French philosopher, mathematician, and physicist called the "Father of Modern Philosophy." Descartes also had a clear influence on the science of mathematics, as he invented a mathematical system named after him, which is (the Cartesian coordinate system), which formed the first nucleus of (analytical geometry). Thus he was one of the main figures in the history of the modern scientific revolution. Associated with the writings and methodology of René Descartes, other names know Descartes, and Descartes is the main figure of the doctrine of rationalism in the 17th century AD, as he was well versed in mathematics, as well as philosophy, and made a great contribution to these sciences, and Descartes is the author of the famous saying called "The Cogito": "(I think, therefore I am)" (Wikipedia, 2022)

examination and scrutiny. He asks for certainty, then it either arrives or is cut off" (Sharifa, 2021d).

Systematic skepticism is a tool for reaching true knowledge, and it is expressed as a ladder of progression to a specific goal. Systematic skepticism is a research method in philosophy. Its basis is that the philosophical researcher frees himself from wrong judgments and corrupt beliefs, reflects on them and exposes them so he does not rush to his judgment and does not accept what proves his mind after examination and scrutiny, either he arrived or he left the topic under discussion (Sharifa, 2021d; فلسفيزم, 2021).

The best example comes from the philosophical researcher Michel de Montaigne (1533 AD - 1592 AD)[16], who died in 1592. He took methodological doubt as a way to search for philosophical facts but did not reach them. He was interrupted by this doubt, and his confusion was evident in his writings and literature as he was presenting this case.

The haunting psychological that swept him and surrounded him at the end of his life; then came Henry Descartes, who was a contemporary of Montaigne; Descartes, the father of modern Western philosophy, so Descartes, although he gave a great space to the mind as a source of knowledge, he experienced doubt as well, which is prominent in his three famous books, He relied primarily on systematic scepticism as a ride to the truth of knowledge. Descartes exempted the religious or divine text from working in it the mind, as it is from the divine kindness, and the human mind is too short of ruling in a sacred text, according to Sharifa (2021 d).

René Descartes (1596 AD - 1650 AD)[17] is a rational, doctrinal philosopher who is not an atheist. In this section, we do not want to go into details. He opposed the Church as he opposed Aristotle. These two authorities confronted them and said the issues of revelation are

[16] "Michel de Montaigne was a French thinker of the European Renaissance؛ Pioneer of modern essay in Europe. "(Wikipedia, 2022)

[17] René Descartes was "A French philosopher, mathematician, and physicist called the "Father of Modern Philosophy." Descartes also had a clear influence on the science of mathematics, as he invented a mathematical system named after him, which is (the Cartesian coordinate system), which formed the first nucleus of (analytical geometry). Thus he was one of the main figures in the history of the modern scientific revolution. Associated with the writings and methodology of René Descartes, other names know Descartes, and Descartes is the main figure of the doctrine of rationalism in the 17th century AD, as he was well versed in mathematics, as well as philosophy, and made a great contribution to these sciences, and Descartes is the author of the famous saying called "The Cogito": "(I think, therefore I am)" (Wikipedia, 2022).

excluded from the dependence of doubt, and these are so that we do not work in them. The mind here was not Descartes's rational, so our talk about rationality has several meanings, as proven successor to Descartes derived Baruch Spinoza (1632 AD - 1677 AD)[18], the Dutch Jew of Spanish origin.(Soler, 2000 ; Sharifa, 2021d).

Let us say that even systematic skepticism was not born with René Descartes (1596 AD - 1650 AD)[19] Abu Hamid al-Ghazali was a professor of Descartes. However, Abu Hamid was not the first to say systematic skepticism or doctrinal skepticism in the Islamic heritage and Arab culture there is al-Hasan Ibn al-Haytham. He emphasized the value of systematic doubt, and he used to say the truth lies in the belly of doubt; of course, there is no truth without questioning and without testing and re-testing and raising suspicions. Al-Jahiz is even at the beginning, and not even the Islamic text is the beginning. The beginning descends to Socrates. He is considered one of the elders of the methodological skeptics. Aristotle also calls for systematic skepticism, meaning to doubt everything and to test and re-test. This is called academic skepticism or what is called by us now: Scientific Doubt, according to Sharifa (2021d).

## 2.4 The second topic: Sources of knowledge

The theory of knowledge has three sections, the second of which is the sources of knowledge. The researcher wonders whether the mind is the source of knowledge or is it sense, i.e. perceiving something with the multiple senses of man, or experience is the source of knowledge, or both in an attempt to reconcile them Immanuel Kant (1724 AD - 1804 AD)[20].

[18] Baruch Spinoza ″ Dutch philosopher and one of the most important philosophers of the 17th century, the beginning of his youth, agreed with René Descartes's philosophy about the duality of the body and the mind as two separate things. However, he returned and changed his point of view later and confirmed that they are not separated, as they are one entity "(Wikipedia, 2022).

[19] René Descartes was "A French philosopher, mathematician, and physicist called the "Father of Modern Philosophy." Descartes also had a clear influence on the science of mathematics, as he invented a mathematical system named after him, which is (the Cartesian coordinate system), which formed the first nucleus of (analytical geometry). Thus he was one of the main figures in the history of the modern scientific revolution. Associated with the writings and methodology of René Descartes, other names know Descartes, and Descartes is the main figure of the doctrine of rationalism in the 17th century AD, as he was well versed in mathematics, as well as philosophy, and made a great contribution to these sciences, and Descartes is the author of the famous saying called "The Cogito": "(I think, therefore I am)" (Wikipedia, 2022).

[20] Immanuel Kant "A German philosopher of the eighteenth century, who lived his entire life in the city of Konigsberg in the Kingdom of Prussia, was the last influential philosopher in modern European

The critical trend, or is it intuition and inner meditation, or is it inspiration, or finally, the origin of the benefit from something is the source, which is called the pragmatic trend? Then we search for the origin of knowledge according to Islamic scholars and philosophers.

## 2.4.1 Mental Attitude

Those with a belief orientation accept that there are absolute truths that a person can reach, but the question is, by what means? Which are the valid and reliable tools by which we can access knowledge?

According to Sharifa (2021e), the answers were many; some of them said that the mind is our only means of accessing knowledge, and others responded that sense and experience are the candidates to be the only source to reach the cognitive truth and some of them preferred between reason and sense in solidarity as a tool for reaching knowledge. As stated in the critical doctrine of Immanuel Kant (1724 AD - 1804 AD)[21], the German philosopher and philosopher of the theory of knowledge said that intuition, which is the attainment of goals from the beginnings, is a means of inner contemplation that leads us to the knowledge of the truth.

René Descartes (1596 AD - 1650 AD)[22] said, "The intellect is the most just of people divided between people." God loved a man with reason and did not himself make him the same among living beings. Fundamental knowledge and unreal knowledge that is not valid and reliable. Thus, the proponents of the rational doctrine take the mind alone as a source of

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culture and one of the most important philosophers who wrote in classical epistemology, was the last philosophers of the Age of Enlightenment that began with British thinkers "(Wikipedia, 2022).

[21] Immanuel Kant "A German philosopher of the eighteenth century, who lived his entire life in the city of Konigsberg in the Kingdom of Prussia, was the last influential philosopher in modern European culture and one of the most important philosophers who wrote in classical epistemology, was the last philosophers of the Age of Enlightenment that began with British thinkers "(Wikipedia, 2022).

[22] René Descartes was "A French philosopher, mathematician, and physicist called the "Father of Modern Philosophy." Descartes also had a clear influence on the science of mathematics, as he invented a mathematical system named after him, which is (the Cartesian coordinate system), which formed the first nucleus of (analytical geometry). Thus he was one of the main figures in the history of the modern scientific revolution. Associated with the writings and methodology of René Descartes, other names know Descartes, and Descartes is the main figure of the doctrine of rationalism in the 17th century AD, as he was well versed in mathematics, as well as philosophy, and made a great contribution to these sciences, and Descartes is the author of the famous saying called "The Cogito": "(I think, therefore I am)" (Wikipedia, 2022).

knowledge without relying on the senses in the empirical method, the familiar opponent of the rational doctrine (Sharifa, 2021e).

According to what was mentioned above, many philosophers of rationalists appeared, including Descartes and Baruch Spinoza (1632 AD - 1677 AD[23] and Gottfried Wilhelm Baruch Spinoza (1632 AD - 1677 AD)[24] continued to follow Descartes' path in using the mathematical method to reach specific and objective knowledge and declared that if existential issues were evident in the mind, deduction and conclusion of specific knowledge begin, and this is in the sense of the deductive method in the process of scientific research about the truth. However, Spinoza, in his endeavour, calls for a correction of concepts and understanding that depends on ridding him of vague and vague ideas that arise from imagination and sensory perception. He continued Descartes' path in using the mathematical method and declaring **mental clarity as a criterion of truth**, as he used to start with the most general facts and then elicit all the results involved ( فلسفيزم, 2021; Sharifa, 2021e).

Among philosophers with a mental tendency to the tyranny of mathematical thought, even Gottfried Wilhelm Leibniz (1646 AD - 1716 AD)[25] was also a first-class mathematician. He saw that Descartes' philosophy is the path that leads to the truth, and he went to the fact that our thoughts and perceptions are original. In our minds, it comes to us from the depths of ourselves, and the basis of facts is in the ideas themselves, independent of the senses. Leibniz is considered one of the most rational philosophers in defence of the rationalist doctrine. He made a significant contribution to the development of the rationalist doctrine as a means and a source of knowledge for his invention of the calculator and the setting up of a fundamental

[23] Baruch Spinoza ″ Dutch philosopher and one of the most important philosophers of the 17th century, the beginning of his youth, agreed with René Descartes's philosophy about the duality of the body and the mind as two separate things. However, he returned and changed his point of view later and confirmed that they are not separated, as they are one entity "(Wikipedia, 2022).

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[25] "Leibniz Gottfried Wilhelm was a German philosopher, natural scientist, mathematician, diplomat, librarian, and lawyer. Leibniz occupies an important position in the history of mathematics and the history of philosophy. Leibniz established mathematical calculus independently of Isaac Newton, and its mathematical symbols are still commonly used since it was published and publicized. "(Wikipedia, 2022)

building block for an international language project that continues by all human beings (Sherifa, 2021e).

## 2.4.2 Experimental tendency

The philosophers who adopt the empirical doctrine say that things subject to experimentation cannot be entered into the mind, as knowledge can only be achieved through experience. That is, things are perceived through the senses. Suppose the rationalists have given great importance to the mathematical knowledge based on the mind. In that case, the empiricists have been interested in the natural sciences that depend on experience and denied the ability of the mind to guarantee us the truthfulness of the issues that tell us something about the nature of the material world (Sharifa, 2021f).

Furthermore, from this is the point of contention between these two tendencies: the rationalists and the empiricists, according to Sharifa (2021f), as the empirical school does not extract the general and necessary character of knowledge from the mind but from the sense and experience. The empirical school confirms its claim that knowledge cannot go beyond experience and sensation by things in nature. This necessitated the emergence of the modern empirical doctrine, as it was a reaction to the rational doctrine, and a successive group of English philosophers advocated for this direction. The most important of them were: John Locke (6321 AD - 1704 AD)[26] and George Berkeley (1685 AD - 1753 AD)[27], and David Hume (1711 AD - 1776 AD[28]).

[26] John Locke was an English philosopher, experimentalist, and political thinker. He was educated at Westminster School, then at Christ Church College. John Locke studied in Christchurch, Oxford, became a physician and adviser to the Earl of Shaftesbury, then turned to philosophy. In a short time, he produced a valuable author on The subject of problems that human understanding can deal with. He was admired by the Americans, and among his views in the book was that the supreme function of the state is to protect wealth and freedom, and the people must change or replace the government if it does not preserve the rights and freedom of the people, and his views contributed to increasing the awareness of Americans who embraced his views and decided to implement them" (Wikipedia, 2022).

[27] George Berkeley "The famous Berkeley nicknamed 'Bishop Barclay' (Bishop of Cloyne), an Irish philosopher whose main achievement was the development of a theory he called 'immaterialism' that others later referred to as 'subjective idealism'" (Wikipedia, 2022) .

[28] David Hume is a Scottish philosopher, economist, historian, and an important figure in Western philosophy and the history of the Scottish Enlightenment. "(Wikipedia, 2022)

John Locke (6321 AD - 1704 AD) was the first defender of the empirical tendency in epistemology, and he rejected the most important principles of the mental tendency and denied that human knowledge is rational and that empirical knowledge is a precedent to rational knowledge and that the mind has preceded experience. Locke states that any idea generated in the mind has only one source: experience. The mind does not contain innate ideas and primary meanings but derives its ideas from the senses and experience. Locke believes that man does not think until he begins to feel, for sensation and experience are before thinking. John Locke was very interested in what the natural world presents to us, primarily scientific discoveries of a regular nature. Locke believed that philosophers should put the impact of scientific discoveries on their scientific beliefs. And the results of the natural sciences on their philosophical or epistemological research (Sherifa, 2021f).

As for George Berkeley (1685 AD - 1753 AD), he says that a thing has no meaning except in experience and through the senses; therefore, the existence of a thing and it is being perceptible is one thing. Berkeley is, although with the classical theories of knowledge (when I think that our thoughts are the same as the external world, i.e., the method of conformity, but he admitted only what appears to us in things from the perception of them, things are limited only to the feeling of tangible symptoms, but what does not appear to us is a pure illusion) (Baillat et Fourez, 2004; Sharifa, 2021f).

David Hume (1711 AD - 1776 AD)[29] was a philosopher of the first calibre. He says that experience is the source of all knowledge and that all rational knowledge can be traced back to sensory, empirical origins. Hume's empirical doctrine is based on the basis that our knowledge consists of sensory perceptions, in which the distinction is made between impressions and thoughts and mental images that those impressions leave behind. In the end, it must be identical to the impression, and it goes that all our ideas are derived from experience. Hume sees that the ideas are linked to each other according to what he calls the law of association of ideas, based on Sharifa (2021f).

[29] René Descartes was "A French philosopher, mathematician, and physicist called the "Father of Modern Philosophy." Descartes also had a clear influence on the science of mathematics, as he invented a mathematical system named after him, which is (the Cartesian coordinate system), which formed the first nucleus of (analytical geometry). Thus he was one of the main figures in the history of the modern scientific revolution. Associated with the writings and methodology of René Descartes, other names know Descartes, and Descartes is the main figure of the doctrine of rationalism in the 17th century AD, as he was well versed in mathematics, as well as philosophy, and made a great contribution to these sciences, and Descartes is the author of the famous saying called "The Cogito": "(I think, therefore I am)" (Wikipedia, 2022).

## 3.4.2 Criticism tendency

In light of the clash between the rational doctrine and the sensory experimental doctrine, the German philosopher came in 1804 to find a solution to the clash between them, so he adopted a middle position between them and decided that knowledge is done through sense and reason, so he combined his rationalistic critical philosophy with Descartes and sensory experimentalism with John Locke and Hume. The critical doctrine was founded by Immanuel Kant (1724 AD - 1804 AD)[30]. He objected to the rationalists and the empiricists, arguing that the rationalists gave the mind more than its capacity and gave the experience more than its energy. So, where is the truth?

What is stable and correct is a central doctrine. Neither is it an empirical doctrine nor a rational doctrine? Kant always calls and says **(that a concept without sensual data is an empty concept, and sensual data without a mental concept is blind: nothing**). What Kant brought up is a compelling argument that the mind has templates: the template of time, space, and causation. Time is complex; the place is the same, and the law is the same (Sharifa, 2021g).

Kant raises an existential issue and asks whether God Almighty is sensible, i.e., by experience. No, then Kant says what I can occupy my mind on. According to Kant, I cannot prove or deny the existence of God; initially, this is an issue that is outside the limits of reason. It is impossible to prove God's existence with the mind, as the human mind does not make good use of the mind. Is Kant an atheist who does not believe in the Creator? He does not believe in the Creator but in moral evidence. What is moral evidence? Kant deduces from a moral existence, i.e., a legislator who gave this law that is this Creator, or from the compatibility between virtue and happiness, an existence in which there is goodness, and from the power between them what enables them to reconcile them; However, the existence of an absolute moral law is not something that every human being takes for granted (Ibrahim, 2021; Sharifa, 2021g).

[30] Immanuel Kant "A German philosopher of the eighteenth century, who lived his entire life in the city of Konigsberg in the Kingdom of Prussia, was the last influential philosopher in modern European culture and one of the most important philosophers who wrote in classical epistemology, was the last philosophers of the Age of Enlightenment that began with British thinkers "(Wikipedia, 2022).

Immanuel Kant (1724 AD - 1804 AD)[31] stood between rationalists and empiricists in the middle. Kant gives a second example and a sensory example. I have an orange that comes to me strange first, basic things the mind organizes and gives an orange. The mind helps in everything. The mind portrays it in its usual form, and from it, Kant says that our knowledge begins with the senses, moves to understand and ends with the mind. Kant also says that all knowledge comes through experience according to his terminology, unlike John Locke, who believes that knowledge begins from experience, meaning he wanted John Locke to say that experience alone, while Kant says that all our knowledge begins through experience, there is absolutely no doubt about that. How do we awaken our cognitive abilities to work if this is not done through topics that shock our senses that start with the occurrence of perceptions of their own accord and move on the other hand, our understanding activity to compare and link them and thus transform raw sensory impressions into the knowledge of topics called experience, here we notice the synergy of the mind with experience in the formation of true knowledge (Ibrahim, 2021; Sharifa, 2021f).

Once again, Immanuel Kant (1724 AD - 1804 AD)[32] says knowledge begins with experience, but it does not arise from it, i.e. through it or say with it. According to philosopher Hunter Mitt, Kant has become an empirical sensory philosopher like all empiricists. He summarizes Kant's doctrine if Kant sees that our minds make nature and physical reality, but he does not make it out of nothing. It is only raw material, and it is a mixture that has no strength. Everything that it acquires from every formation or organization is imposed upon it by our minds that come with the frameworks or the kind into which the indigestible multitude must decant before it reaches logic and rationality.

The structure of their own is the same. He discovers that the outcome of the process of knowledge is more made than given, and everything that makes the world interconnected and meaningful comes from what Kant calls understanding. Instead, time and space are the

[31] Immanuel Kant "A German philosopher of the eighteenth century, who lived his entire life in the city of Konigsberg in the Kingdom of Prussia, was the last influential philosopher in modern European culture and one of the most important philosophers who wrote in classical epistemology, was the last philosophers of the Age of Enlightenment that began with British thinkers "(Wikipedia, 2022).

[32] Immanuel Kant "A German philosopher of the eighteenth century, who lived his entire life in the city of Konigsberg in the Kingdom of Prussia, was the last influential philosopher in modern European culture and one of the most important philosophers who wrote in classical epistemology, was the last philosophers of the Age of Enlightenment that began with British thinkers "(Wikipedia, 2022).

primary means of learning about our world. Alternatively, the conditions Basic to knowledge from the category of quality, quantity and cause, and while the raw material comes from outside, we who make our world mean by that the ordered universe in which we can live or think, but within the kind of time and space, or breaking the mould of time and space, it is not possible to include the intelligible according to Emmanuel's Kant opinion (1724 AD - 1804 AD) based on Sharifa (2021g).

### 2.4.4 Intuitive direction

Intuition is done without the mediation of anything, without rational thinking or logical reasoning. Intuition is to obtain the best sources of knowledge, and intuition is calculated from obtaining fundamental knowledge. It is intuition that perceives reality without an intermediary and reveals the truth. It is not the senses that touch and feel, nor the mind that infers and elicits, Based on Sharifa (2021h).

The most famous philosophers of intuition are the French philosopher Henri Bergson (1859 AD - 1941 AD), who became famous in the nineteenth century in Europe. He knew intuition and emotionalism through which we move to the subject, the beginning of the subject knowledge based on the opposition between reason and the maximum and the distinction between knowledge Scientific knowledge of the external world with reason and internal knowledge of self-awareness, according to Bartoli et al., (1978) and Sharifa (2021h).

What is striking is that Berdson, in his talk about perception in the direction of intuition, only cares about mysticism, which belongs to his Christian heritage, and completely ignores the talk about Islamic mysticism, despite its excellent position in human heritage in particular. As for the Muslim mystics, intuition or mystical revelation, which Abu Hamid al-Ghazali described as a light that God Almighty casts into the heart and makes it the key to most knowledge, as al-Ghazali says? Except it is merely emptying the heart of its lustful preoccupations, for intuition opens with vigilance for the one who is sincere and striving in worship to God and gets rid of the hand of lust, ugly morals and evil deeds. Allah, Glory be to Him, the Highest opened that energy to him, and he saw in wakefulness that he sees in sleep. Hence, the spirits of angels, prophets, and beautiful images appear in the heavens and the earth behind what cannot be explained or described (Sharifa, 2021h).

## Feedback:

The rational doctrine is concerned with science and mathematics. Its field of Knowledge is mental Knowledge, and the empirical doctrine is concerned and sees that the Knowledge obtained through sense or reason is incomplete. However, instead, the Knowledge of complete certainty is what was revealed and inspired. As Muhyi al-Din Ibn al-Arabi says, there is no knowledge except what was about experimental doctrine that depends on the senses and intuitive doctrine that stems from intuition, and for each of the doctrines, there are those who were interested in science and the field of Knowledge of the natural sciences, and some of them are interested in religious and moral sciences. Their field of Knowledge is Sufism and ethics. Therefore, an attempt to look at one of these sources of Knowledge because each has a field those others cannot replace, and it is accurate that these sources all integrate to reach the fundamental Knowledge that we all seek.

### 2.4.5 Pragmatism

Pragmatism sees that the case is valid if it has realistic fruits and results, and the idea that it does not bring any result from it is a false theory; the pragmatic doctrine is based on the benefit obtained from this issue. The Knowledge that serves the community and has a benefit is considered true Knowledge if it is consistent with other issues. Some of them saw consistency as coherence, and some saw it as the logical necessity between things. Moreover, some of them give an example that the sky is raining has something to do with matching the weather in the sky, so if there is lightning and thunder comes after it, then lightning is faster than thunder, and you expect if thunder comes in it, there will be rain. Pragmatic because no benefit was obtained from it, so the benefit is the basis and the origin of pragmatic Knowledge, according to Ibrahim (2021).

For example, suppose there is a traffic sign written 120. In that case, it means that the vehicle's driver is required to walk less or equal to 120 km per hour to maintain the safety and security of the road as well as its security and safety. Jorge Agustín Nicolás Ruiz de Santayana y Borrás (his death in 1952) is one of the most famous pragmatic philosophers.

Ibrahim (2021) gave an example and said that God could be just a lie if the desired benefit is not obtained from the existence of the attributes of God. Society does not benefit from them, and if the teachings of God forbid theft, kidnapping, material corruption, morals, adultery and other excellent and helpful morals for society, pragmatism is correct, as a deity is feared by its

adherents and who apply its teachings, for pragmatism exists as long as a benefit to society is obtained from it.

## 2.5 The Nature of Knowledge

The nature of Knowledge consists of two components: the realist doctrine and the doctrine of the direction of sensory data. The realist doctrine consists of naive realism, critical realism, and the doctrine of idealism; what about the doctrine of sensory data.

### 2.5.1 The Doctrine of Realism: Naive Realism and Critical Realism

In this world, the assets are divided into types of material assets outside and independent of human consciousness, such as trees, mountains, houses, and other assets, and intellectual assets that exist in human consciousness, such as desires, emotions, will, perceptions, concepts, and so on. The nature of knowledge is also divided into two parts: naive realism and critical realism.

#### 2.5.1.1 Naive realism

Naive realism says that the outside already exists, we all exist, or we exist in the form we see with the naked eye and that our relationship to external things is identical. He responds to the naive realizes that, in reality, we may see things that are not in their usual nature, distant things as small and parallel alleys and streets on the horizon intersecting. In the wilderness, we may see a mirage of water; some animals see, and others do not, such as snakes. They do not see, and the camel sees, but it sees all things great, for these are all things to which we are deceived. Naive realism sees our thoughts as images corresponding to the material world outside, and the mind is like a camera that performs the imaging process. This is naive realism (Sherifa, 2021k).

#### 2.5.1.2 Realism criticism

The outward form of things has nothing to do with man. Critical realism says that things exist and are separate from human perception, as John Locke said that beings have intrinsic and episodic qualities. I taste it sweet, but another being sees it otherwise; one of the creatures who taste honey to him is bitter.

Sharifa (2021k) says that there is critical realism that sees us directly perceiving things that exist outside. However, we limit them in the light of the laws of sensual naturalness because the senses sometimes deceive us. He perceives it as it is in the relationship of the perceiving,

i.e. the thing and the perceiving with it, which is the mind or the mindfulness; Hence, critical realism is closer to correctness than naive realism. For example, in this first, the car is present in its shape and size, but the colour changes. The colour is just a reflection, and our awareness of it does not affect it. It is all its reality regarding size, colour, shape...etc.

### 2.5.1.3 Idealism

Realism corresponds to the doctrine of idealism. Idealism takes the limit of perception; if something I perceive, it exists, and if you do not, it does not exist. Perception, if all those aware of things die, all these things cease to exist.

Associated with your existence, O perceiver, for example, if you come and put a book behind the door, does this book exist or not? Answer: The book exists because in it, if there is someone who sees it, and the Lord sees it, and if the entire perceptive die, then the book does not exist. Existence is related to perception (Sharifa, 2021k).

## 2.5.2 Direction of sensory data

Always like knowledge, and in the issue of the direction of sensory data, among the pioneers of this trend are: René Descartes (1596 AD - 1650 AD)[33], John Locke (6321 AD - 1704 AD[34]), George Berkeley (1685 AD - 1753 AD) and Immanuel Kant (1724 AD - 1804 AD); these philosophers tend towards theories of sensory data that were moving towards idealism

[33] René Descartes was "A French philosopher, mathematician, and physicist called the "Father of Modern Philosophy." Descartes also had a clear influence on the science of mathematics, as he invented a mathematical system named after him, which is (the Cartesian coordinate system), which formed the first nucleus of (analytical geometry). Thus he was one of the main figures in the history of the modern scientific revolution. Associated with the writings and methodology of René Descartes, other names know Descartes, and Descartes is the main figure of the doctrine of rationalism in the 17th century AD, as he was well versed in mathematics, as well as philosophy, and made a great contribution to these sciences, and Descartes is the author of the famous saying called "The Cogito": "(I think, therefore I am)" (Wikipedia, 2022).

[34] John Locke was an English philosopher, experimentalist, and political thinker. He was educated at Westminster School, then at Christ Church College. John Locke studied in Christchurch, Oxford, became a physician and adviser to the Earl of Shaftesbury, and then turned to philosophy. In a short time, he produced a valuable author on, the subject of problems that human understanding can deal with. He was admired by the Americans, and among his views in the book was that the supreme function of the state is to protect wealth and freedom, and the people must change or replace the government if it does not preserve the rights and freedom of the people, and his views contributed to increasing the awareness of Americans who embraced his views and decided to implement them" (Wikipedia, 2022).

or conceptualism. This philosophy is based on a set of sensory data that a person perceives. Behind these sensory data is a material object or subject, and the external influencer gives reasons for these sensory data. However, among the same philosophers mentioned above are those who give the subject greater effectiveness than the subject, i.e., matter by itself (Sharifa, 2021 Q, U).

What unites these philosophers is their idealistic orientation, which sees it as the principle of consciousness or the thought of the external world. This is not the awareness or capacity of thought of beings. Instead, it is done by asking for evidence of the existence of this external world. The latter can only be accurate and directly perceived, i.e., mentally aware of the attributes of the object or subject or in the abstract sense of the matter. This perception of sensory data is through the five senses: colour, taste, smell, touch, and smell. For sensory data, philosophers differed in their names: Immanuel Kant (1724 AD - 1804 AD); calls them representations, and John Locke (6321 AD - 1704 AD) calls them ideas and (1711 AD - 1776 AD) impressions. We will briefly describe the philosophy of each of these idealistic philosophers, Sharifa (2021 S, U).

Let us start with Descartes, the first of the existential philosophers to make his thought a reason for his existence, as he is the author of the famous saying, "I think, therefore I exist." Furthermore, he proved that the mind alone could not prove the existence of God, so there must be inferential knowledge that takes place through sensory data. René Descartes (1596 AD - 1650 AD) distinguished between two types of attributes: primary attributes and secondary attributes for these things in themselves or with their sensory data. René Descartes (1596 AD - 1650 AD) says that all our knowledge comes through the senses, and sensory data is for the phenomena of things in our external world and is perceived through the mind, giving the example of a piece of beeswax and the work of the senses, and what is perceived from the sensory data by the mind, Sharifa (2021 S).

According to Sharifa (2021 S), René Descartes (1596 AD - 1650 AD) raised another issue in proving these three existents, including His existence by Himself, the existence of God Almighty, and the existence of the external world, which is the issue of his adoption of the theory of doubt or systematic inferential doubt and the request for evidence of this existence, so he struck. For example, he said: We see people passing by in the street, and they wear hats and coats. Perhaps these hats and coats are mounted on moving machines. Here Descartes raised the issue of the self, which bears these attributes or sensory data.

Descartes (1596 AD - 1650 AD) was an idealistic philosopher who adopted many ideas about sensory perception and the mind within the mind. In this regard, Descartes distinguished two types of attributes for all things, including the primary and secondary attributes of things, without which nothing can be imagined. These secondary qualities are not inherent in things and do not exist in the reality of the things themselves; instead, they are just existing effects in which smell, taste, and colour are present. As for the primary qualities, they are always inherent to things.

These qualities cannot be imagined without the thing and cannot be isolated from it. It is a characteristic of the thing apart from human perception of it. René Descartes (1596 AD - 1650 AD) gave an example: The primary qualities of orange are shape, hardness, size and Movement. Secondary characteristics, such as taste, colour, and smell, are subjective, differ from one orange to another, and are relative. Each person sees them from a different angle. The primary characteristics, such as weight, size, and extension, are objective characteristics that can be measured scientifically through weighing—measurement and reason (Sharifa, 2021S).

As for the philosophy of John Locke (6321 AD - 1704 AD)[35] in the matter of sensory data, he says that man does not perceive external things directly but infers them through their attributes, and behind these attributes lies the essence that is the bearer of these attributes and the foundation of these things, John Locke (6321 A.D. - 1704 A.D.) It is considered that this essence is vague and ambiguous and cannot be comprehended by the mind until we resort to justifying these secondary attributes.

As for the philosophy of George Berkeley (1685 AD - 1753 AD), it is somewhat distinct from its predecessors, as it represents the extreme idealist orientation, meaning the philosophy of atheism, as it is the materialist doctrine that believes that matter is independent of the self and that it is the cause and source of sensations. Where the previous philosophers ended, George

[35] John Locke was an English philosopher, experimentalist, and political thinker. He was educated at Westminster School, then at Christ Church College. John Locke studied in Christchurch, Oxford, became a physician and adviser to the Earl of Shaftesbury, and then turned to philosophy. In a short time, he produced a valuable author on, the subject of problems that human understanding can deal with. He was admired by the Americans, and among his views in the book was that the supreme function of the state is to protect wealth and freedom, and the people must change or replace the government if it does not preserve the rights and freedom of the people, and his views contributed to increasing the awareness of Americans who embraced his views and decided to implement them" (Wikipedia, 2022).

Berkeley (1685 AD - 1753 AD) began his philosophy from where the philosophers of sensory data ended, and through these sensory data, man realized that things do not exist except in the sense that they are perceived and do not have independence from Self; Matter is nothing but these sensory data, and it is outside the mind, so the matter is nothing but a group of sensory data, and it has no existence except in mind because the attributes do not exist in external things.

However, in our minds, if it is a book behind the door, then if we perceive it in terms of its secondary qualities, it is present, and in return, If we do not perceive it, it does not exist. George Berkeley (1685 AD - 1753 AD) did not stop denying the material essence at this point. He denied the existence of the soul as an infinite spiritual essence. He denied the existence of God Almighty as an infinite spiritual essence, considering that there is no sensory impression of these three essences, Sharifa (2021 S, U).

Depending to Sharifa (2021 u), Immanuel Kant (1724 AD - 1804 AD) was also an idealistic philosopher with another aspect of idealism. Kant distinguished between two types of knowledge topics: the phenomena of things and the things themselves. The phenomena of things represent sensory perception, i.e., sensory data, the things themselves, which are behind the virtual world, and which cannot be known, comprehended, or sensed, but we cannot deny their existence in and of themselves; This proposition is an idealistic saying composed of perception templates and mental categories using pure mental inference, but the sensory templates are restricted to the field of sensory experience. Hence, Immanuel Kant (1724 AD - 1804 AD)[36] denied the mental evidence of the existence of God Almighty, and this is what he wrote in his book "Critique of Reason.". "According to Kant, every attempt at the existence of God Almighty using the mind is useless, as everything is linked to sensory data. Furthermore, from it, Immanuel Kant (1724 AD - 1804 AD) concluded that all attempts to use the mind concerning divinities are completely unproductive attempts and are, according to their inner strength, void, and from this, we conclude that the mind of the human being, is between the idealism of Barclay and the experience of David Hume (1711 AD - 1776 AD).

[36] Immanuel Kant "A German philosopher of the eighteenth century, who lived his entire life in the city of Konigsberg in the Kingdom of Prussia, was the last influential philosopher in modern European culture and one of the most important philosophers who wrote in classical epistemology, was the last philosophers of the Age of Enlightenment that began with British thinkers "(Wikipedia, 2022).

## Summary

Epistemology is a part of philosophy concerned with the history of knowledge. Philosophy deals with three sections: a section related to ontology or existence. A section related to the theory of knowledge is epistemology, and a third section is related to values or axiology. Epistemology deals with the issues of its origin, the issue of the possibility of knowledge, the issue of the sources of knowledge, as well as the issue of the nature of knowledge. The latter are philosophical issues that cannot be addressed in one opinion. Epistemology is a criticism of science, which requires: Determining the nature of criticism. Is it philosophical? Is it scientific? What are the tools to qualify knowledge into science? We also resort to distinguishing the material of this discourse; what does it mean by science? What areas of knowledge can be classified as scientific?

This is a new level. Scientific research, after this development in science, was compelled to create a new term called philosophy of science, which does not deal with subjects of any knowledge but especially scientific knowledge and to develop after that research in this field, instead of bearing the title of philosophy of science, it carried a term scientifically, and it is called epistemology. There has been an overlap between the terms epistemology and philosophy of science. Professionals in France prefer the term epistemology over their Anglo-Saxon colleagues, who prefer the term philosophy of science. In any case, despite this overlap between epistemology, and philosophy of science, epistemology remains a philosophical field that found its roots in the philosophy of epistemology, from its origin to its sources, to its nature, to its history, as it is considered the ground or base that forms this field of knowledge.

Moreover, from the previous, it is clear that epistemology belongs to philosophy and science: from the point of view of philosophy, epistemology deals with ideas and the scientific method. The philosopher observes the scientific researcher to know scientific knowledge's specificity. Regarding general knowledge or circulation among humanity, epistemology aims to know if scientific development has occurred and whether scientific theories are projections of the truth. Approaching idealism, epistemology is also used to describe the branches of scientific knowledge and to clarify and test the theories associated with each branch of knowledge. From this, we devoted an entire chapter on how to qualify the knowledge obtained into science; I leave you the pleasure of reading the next chapter

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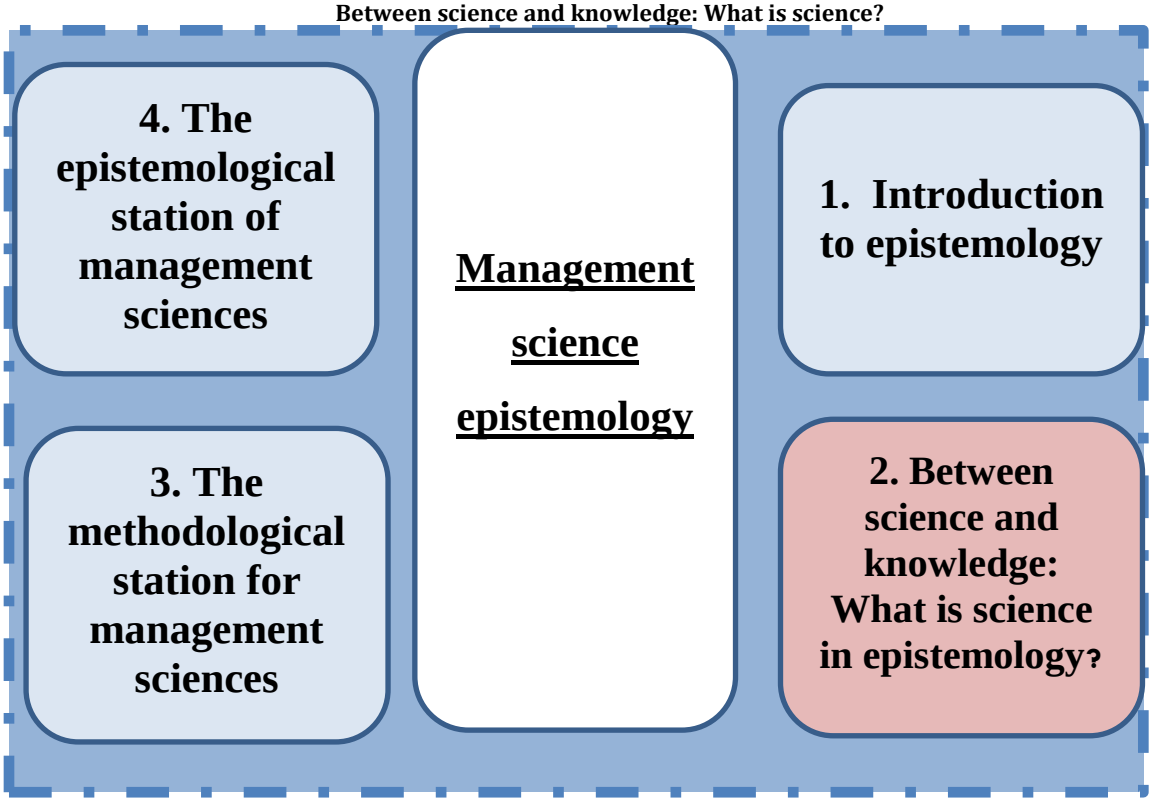
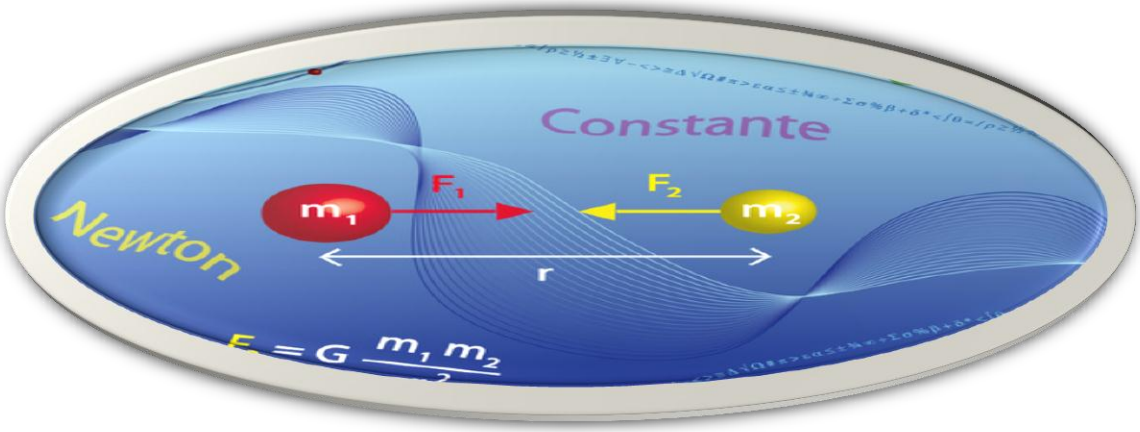
Second chapter:
Between science and knowledge: What is science?



# Second chapter
# Between science and knowledge: what is science?

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## Introduction

Science is an unusual activity that has only sometimes had the strength and extension as we know it today. Historically, science was born with two degrees, first appearing in logic, mathematics, and astrology. In ancient times, these three sciences were merely speculative, meaning in ancient Athens, the purpose of studying these sciences was not to find primordial laws or technological development, but instead, they were luxurious and timeless peoples; that is, they had a time-space to find something to entertain and educate to understand this world. Moreover, according to Bartholy et al. (1978), what revolves around it?

In the seventeenth century and in Western Europe, and conjunction with the existing trading system at the time, science was no longer only speculative; it called for solutions to practical needs; the second cradle of civilization is completely different from the methods of speculative sciences; In the seventeenth century, researchers knew physics, which meant all natural sciences, and to find out its truth, the experimental method appeared, based on Gucher (2005).

This research was prepared by relying on a free translation of a group of texts for several references, which are as follows:

Avenier et Schmin (2007)
Baillat et Fourez (2004)
Bartholy et al. (1978)
Gucher (2005)
Hacking (2001)
Soler (2000)
Weber (1993)

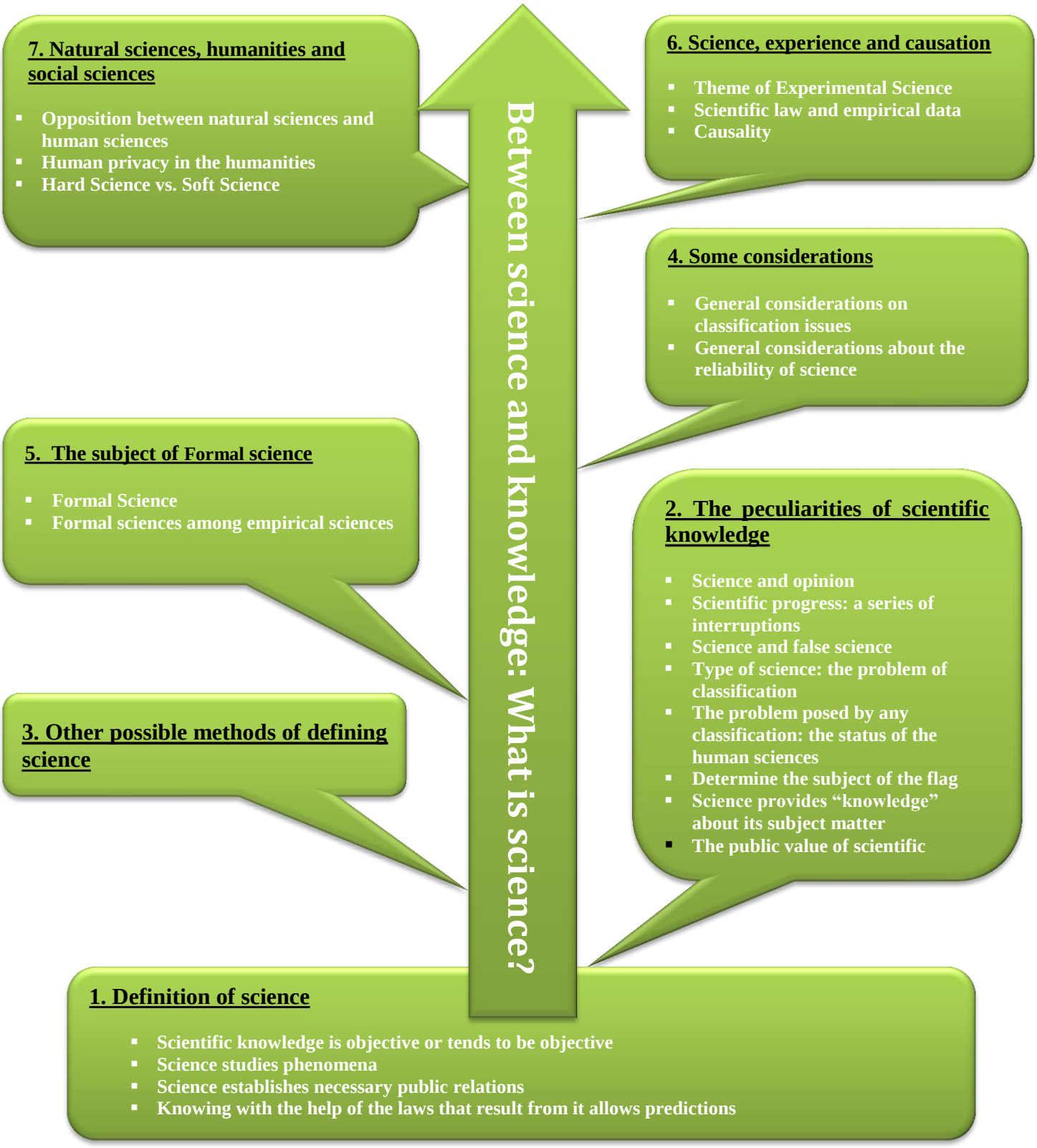


**Figure 1:** A simplified explanation of the difference between science and knowledge (Continued)

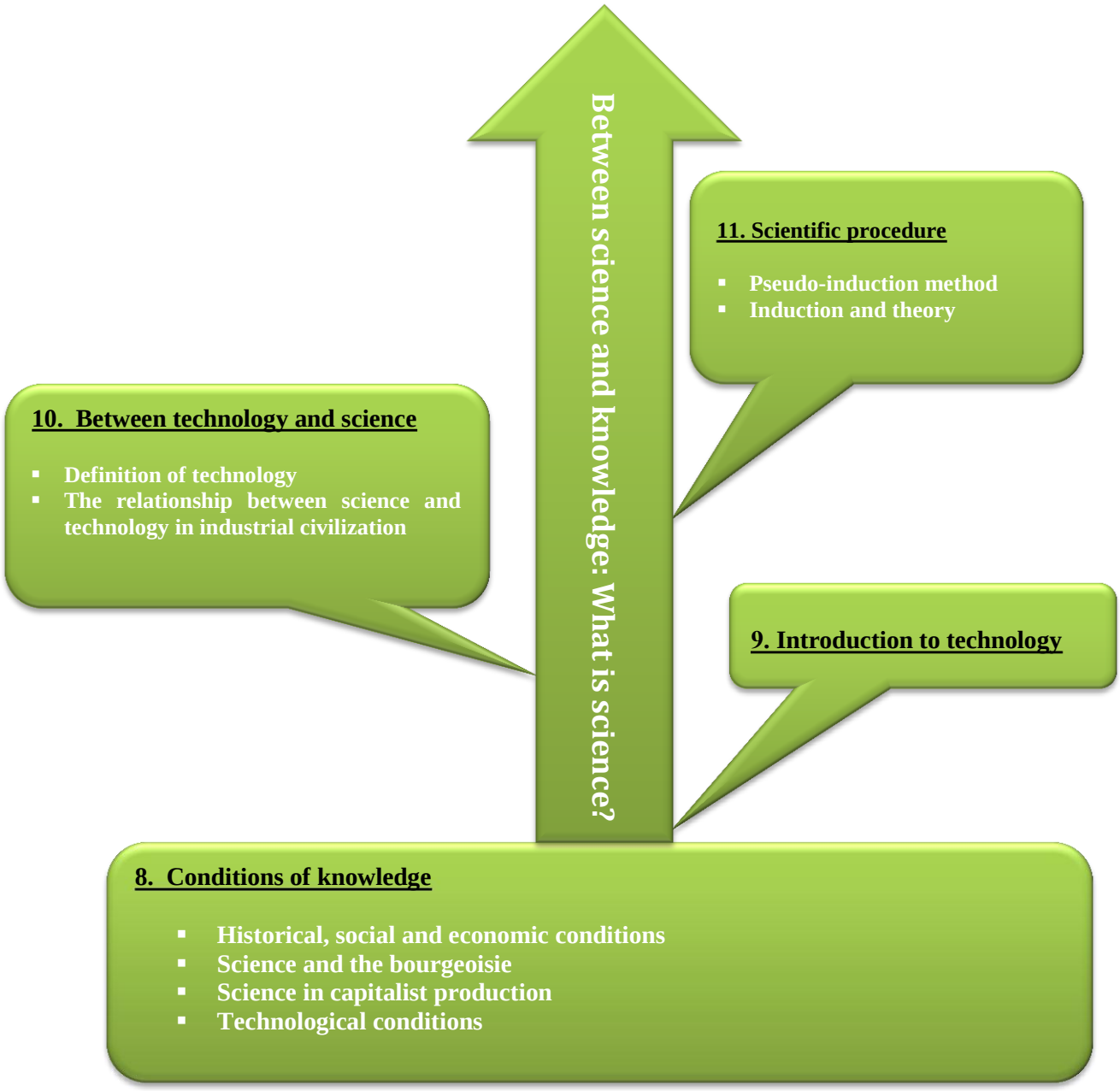


**Figure 1:** A simplified explanation of the difference between science and knowledge

## 1. Definition of science

In the dictionary definition, Le Petit Robert proposes this definition of science: “a body of knowledge, studies of universal value, characterized by deterministic subject and method, and based on verifiable objective relationships.” Let us analyze this definition point by point; Hence, science is an objective knowledge that is established between phenomena with universal, i.e., global relations and a crisis that allows for the prediction of results (effects) that can be controlled empirically and to extract by observation the causes (Weber, 1993; Bartholy et al., 1978). To explain the elements of this definition, here are the following elements:

### 1.1 Science is knowledge

Science from this point of view is equivalent to what we call empirical knowledge, which is knowledge based on direct experience and often wrong, according to the epistemological point of view, such as (fire burns, wool keeps heat, etc.), but technical or technological knowledge is (art the manufacture of ships, the art of making aircraft, tractors, agricultural combines, etc.). Nevertheless, simultaneously, the comparison stops at this point (Soler, 2000).

Empirical knowledge and technical knowledge satisfy immediate needs within a specific time limit (I know stars guide us at night; I drive my car to ensure I move smoothly and at a certain speed, etc.) On the other hand, scientific knowledge has no immediate application, even for precise applications; it is a mental process. Let us take an example:

### Example:

Scientists studied ballistic physics in order to improve the performance of artillery, but were able to deduce general laws that are valid for all projected objects; these general laws extracted have been exploited by the makers of toys and night-firing projectiles, and recently this science has been used to launch space rockets for space exploration.

**End of example.**

### 1.2 Scientific knowledge is objective or tends to be objective

Science means a textual discourse with a meaning (law) or/and it is a set of texts (theories) that must determine the criteria of validity (the internal coherence or harmony of the text or the body of texts) and truth (the ability and compatibility of the text and actions). These two

criteria do not respond to self-esteem. Science does not contain contradictory texts, such as (this student is not a prodigy in mathematics because he comes from a humble or poor middle-class family ) or (the earth is blue like an orange) or (the sun is the center of the universe and does not move), this statement does not correspond to the following statement (the sun revolves around the earth), as well as some erroneous texts whose error has been proven empirically or by observation, such as the sentence (nature does not tolerate emptiness or the meaning of nature and the horror of emptiness), which empirically lied. It tends to the successive modification of errors through the endless revision of theories, according to Bartholy et al. (1978).

Objectivity is not the necessary peculiarity of scientific knowledge, but it is the solid center of scientific knowledge, surrounded by what is possible, what is doubt, etc. Another peculiarity distinguishing science from unified knowledge is its use of precise and crystal-clear concepts on the fourth day. This makes scientific knowledge objective.

## 1.3 Science studies phenomena

This means that this concept does not touch everything we observe in the surroundings around us, but things or events are self-identified, selected, and categorized by the man of science; For example, chemistry does not study tap water, Saida's water, Lalla Khadija, or Bouglaz, but studies the compound $H_2O$. A physicist who wants to study the law of free fall is not interested in suicide or ejaculation but is satisfied with studying a sphere moving on a smooth or curved plane. A bird watcher studies the behaviour of birds arranged and classified according to morphological or ecological criteria, etc., according to Avenier and Schmin (2007).

## 1.4 Science establishes necessary public relations

They ignore exceptional cases and are concerned only with cases that occur under specific conditions. The relationships between the emergence of a phenomenon and the conditions that manifest it are necessary and can only occur if these conditions are met. The resulting relationship bears the name “law.” We will see later that some laws are descriptive, while others are causal, Bartholy et al., (1978).

## 1.5 Knowing with the help of the laws that result from it allows predictions

A distinction must be made between scientific activity and possibilities in the predictions and divination practiced by illusion merchants. Scientific forecasts are more efficient and limited

than predictions; expectations impose control over treatments in the sense of knowledge of the causes and effects of a launch character, Weber (1993).

## Example:

Eclipses are known precisely as satellite tracks. If the weather forecast, in the short term, is better than we expect, it does not adequately guarantee the luxury or comfort of weekends or holidays.

## End of example

In contrast, predictions based on astronomy, cup reading, and daily tarot are ineffective because we do not establish any cause-and-effect relationship. Furthermore, science is distinguished by its fundamental subject matter, the necessity of existing relationships and possible expectations, and the simplicity and caution accompanying every scientific text; science is knowledge of any form of knowledge, right or wrong.

## 2. Peculiarities of scientific knowledge

Among the peculiarities of scientific knowledge are science, opinion, scientific progress, a series of breaks, wrong and correct science, the type of sciences, the problem posed by classification, and the status of human sciences, based on Bartholy et al. (1978).

## 2.1 Science and opinion

Hacking (2001) says that science is not only different from what opinion (common knowledge) gives us but also, as Gaston Bachelard knew, could only exist at a break with opinion. In order to produce positive knowledge, prior false knowledge must be denied; however, if we want to know the science of opinion, the latter must be given the meaning of a personal and subjective idea. Science has not opposed the pension but struggles relentlessly ideologically with it.

So, what if opinion differs from science? True or false, opinion had no room except for a social need. For example, in some coastal areas, the westerly winds bring rain and storms; this answers the need for some farmers to protect their crops or sailors from the possibility of riding the sea without danger. That is why Bachelard Gaston said that (opinion, in law, is always wrong) and he also says that (science searches for effective causes, and opinion searches for final causes) (Bartholy et al., 1978).

In its principle and purpose, science is opposed to opinion. If it arrives, in particular, to legitimize the opinion, it is for other reasons that it has been established because it is always wrong. Opinion thinks badly; science does not think; science translates needs into knowledge. The scientific spirit forbids forming an opinion based on questions we must understand or formulate clearly. The meanings of the problem give a genuinely scientific spirit; for a scientific spirit, all knowledge is an answer to a question. If there is no question, there can be no scientific knowledge. "Nothing goes by itself; nothing is given, everything is built," according to Gaston Bachelard (Bartholy et al., 1978).

## 2.2 Scientific progress: A series of breaks

Scientific progress always begins with a break. With breaks, science continually advances and bears the sign of modernity. Scientific progress is plodding, as a process through time, slow but continuous. At the same time, science slowly emerges from the body of common knowledge. We firmly believe in the continuity of common knowledge among people and scientific knowledge. Furthermore, the axiom of epistemology developed from the continuities; progress continues because the beginnings are slow (Soler, 2000).

Allowing Gucher (2005) an example of continuity, we started with easy and straight forward chemistry and suddenly became intricate and complex. It is easy for us, but it is problematic even for philosophers. Historians of science do not undoubtedly accept that we distinguish the scientific culture in our time, especially the difficult ones because our children in schools receive it and improve it quickly, according to philosopher Gaston Bachelard.

In a technique untouched by combustion, Edison invented the light bulb, a glass for a closed bulb. The lamp was invented to hold space around a string; the light bulb does not have any intersection with the regular bulb. However, they have in common that the regular bulb and the Edison bulb are room lighting, and the Edison bulb is a bulb without any gas or smoke.

We want to prove that, in the electrical sciences themselves, there is a foundation for an “unnatural” technique. This technique has not been studied in an empirical test of nature but starts from an electrical phenomenon with the same standards as what is given for an instant test.

## 2.3 Science and wrong science

Another fact on which science must impose itself is false science. Wrong science is astrology, parapsychology, and "radiesthésie," in addition to religious and spiritual ideologies,

accompanied by pseudo-scientific justifications (such as Yoga, Buddhism, Zen, etc.) or by a semi-scientific base of the so-called "ecological movement" which is far from ecological sciences. This is the original flag. These two types of erroneous sciences appearing on economic, social and political surfaces are enormously different, Hacking (2001).

We notice that false sciences begin to wake up when their followers find a haven for them to nest in. Wrong science always seeks to explain the unexplained; its fields are, for example, in the Bermuda Triangle, telepathy, the language of animals, the return of spirits, the arrival of space objects, and the depletion of natural resources. When a false flag, i.e. an untrue one, seeks its legitimacy in the truth, it takes the most doubtful concepts as a base to build absolute beliefs with them. It makes the disputed hypothesis's final facts untainted by ambiguity (Hacking, 2001).

## 2.4 Type of science: Classification problem

Based on (1978) Bartholy et al., we have dealt with science in one sentence. However, the growing diversity of sciences prompts us to discover the patriarchal rule and the differences between sciences. Classification of sciences is fundamental to epistemology. Let us take two historical examples to highlight this basic principle. At the beginning of the century, mathematicians questioned their specialization's state and its relation to reality. Their research led to intuitive mathematics based on the reasoning for some and hypothetical deductive reasoning for all.

The classification criteria are three: We can classify sciences by subject, by situation, and by methods:

By subject: including the official sciences: mathematics of logic, natural sciences, physics, chemistry, biology etc.

By methods: for example, distinguish between the hypothetically deductive sciences of mathematics and logic and the observational sciences: astrology, botany and ethnology—experimental sciences: physics, biology, psychology, etc.

By case: for example, distinguish between taxonomic sciences that contain: zoology, mycology, etc. Inductive sciences: pre-classical physics, experimental psychology and psychoanalysis, and deductive sciences that include: classical physics, modern biology, etc., and intuitive sciences: mathematics and modern sciences.

Mathematics is not only science in the same sense as the others, but it is undoubtedly a science, even in an ideal way, by its rigour and certainty, but it is not knowledge of things. Moreover, it is coherent language but partially contrary to reality. Finally, the sciences are organized according to the complexity of their study phenomena.

## 2.5 The problem posed by any classification: the place of the humanities

The difficulties in classifying sciences can be reduced to four criteria: What is the state of mathematics and logic? How do the natural sciences fit in? Can biology, which also studies man, enter the natural sciences? Are the humanities sciences?

For the first three questions, we refer to different parts of scientific research in epistemology dedicated to the particular sciences related to it; we want to deal here only with the humanities whose scientific character is equally questioned by ideological channels and by some scholars, epistemologists or philosophers. Therefore, let us first ask for various criticisms here and there ( Bartholy et al., 1978; Hacking, 2001; Avenier and Schmin, 2007 ).

**The first objection**: stemming in particular from philosophers who have relied on a common sense that they share and wish to preserve their philosophical nursery from any scientific interference, rejects the possibility of the existence of human sciences entirely and assumes that man cannot be an object of science. Pierre Thuillier criticizes the positions of one of those countless custodians of the human sciences who share such an opinion. Thus Thuillier summarizes the vicious circle in which the man of philosophy claims to imprison the man of science: "It assumes (...) that the human sciences should be taught" "Since he defined man as a self-evident freedom, it cannot be reduced to his human sciences; the alternative is clear: it is the scientific approach, but it cannot study man "as a whole"; it is to be scientific."

Seemingly better objections accompany these absurd requirements of the "monotheistic" philosophy of science; Science cannot "coexist" with it, which seems to be the fundamental dimension of human truth: it faces, on the other hand, a methodological problem that the natural sciences ignore. Man is an observer and an observer: human facts are the individual facts of a qualitative system, while science, according to the elementary epistemology that Bachelard likes to denounce to some philosophers, is supposed to deal only with the general system. Such a philosophical position that "has its science" condemns all human sciences, especially its history or at least a particular concept of narrative history, which can only claim to collect individual facts.

**The second objection**: Comes from the empiricists; they do not owe the human sciences, they always seek to develop them, but they place methodological obligations by constantly comparing them with an inferiority complex before the natural sciences. Empiricists, among them Carnap and, in particular, Lazarsfeld, posit that every science simulates physics methods (in particular, variables, the formation of functional relationships between variables, etc.).

Besides, Lazarsfeld says that the humanities should adopt a reductionist method; for example, (social phenomena must be reduced, in the empirical sciences, to psychological events, even the latter how they are reduced to behaviours), but the psychological sciences in the human sciences do not It can live up to the honour of experimental science.

**The third objection**: is for those with absolute objectivity, i.e. the natural sciences, and that the human sciences cannot claim the same objectivity. In the same field, there is already a great variety of styles.

**Fourth objection**: Finally, the position of the radical rejection of the humanities is that of the mystical current. This position is based on an undeniable social reality: at least some of the humanities (e.g., economics and sociology) are nothing but theoretical checks on social practices (making price indices or curves of all kinds used for capitalist propaganda or the fabrication of opinion polls). Alternatively, opinion polls aim to test the economic or political market, assess consumer or citizen desires, and exploit and influence them to achieve profits or maintain power). However, the Althusserian thesis rests on the wrong foundations of epistemology: it assumes that all research in the humanities, except Freudian psychoanalysis, has only an ideological function in our society.

## 2.6 Defining the topic of science

Avenier and Schmin (2007) show that nothing is easier at first glance to define the subject of science, the object of science is what this science deals with and its field of research: the inanimate nature of physics, the living organisms of biology, the psychological phenomena of psychology, etc. Things are more suspicious because the divisions considered (inanimate/living, psychic/physical, etc.) do not previously exist as such. It is precisely the different sciences that define more clearly, in their development, what falls within their competence or what is excluded from it.

No physicist, for example, nowadays thinks of explaining telepathy physically. Those who admit that a phenomenon is under consideration instead accuse psychology of explaining it.

Therefore, the sciences themselves lead to the judgment that this type of phenomenon is either physical, psychological or something else.

The two recent authors, Avenier and Schmin (2007), add that defining the subject of science in these circumstances amounts to defining a reality-focused view. Each science considers the same phenomena from a very particular point of view and presents its reading network, which leads it to focus on specific aspects of reality and neglect others.

Consider, for example, the suicide of an individual in free fall. For physics, there is nothing more than falling off a body. It is a matter of establishing the general law of the trajectory: in other words, determining the relevant parameters to be taken into account (body weight, the initial height of the fall, etc.) and highlighting how these parameters are tied together.

For psychology, on the other hand, the trajectories of the body do not matter; what matters are, for example, important events in the individual's personal history, personal motives that led him to dispose of himself, etc. Sociology ignores all aspects and seeks to find interrelationships between social factors. Moreover, sociologist Durkheim Emile says the suicide rate is very high among single rather than married people, according to Soler (2000) and Weber (1993).

## 2.7 Science provides "knowledge" about its subject

According to Hacking (2001) and Avenier and Schmin (2007), science is an activity from which a set of contents emerges (says something specific about what it is dealing with); these contents are supposed to characterize the studied object adequately. Otherwise, it would be something other than knowledge but only a set of beliefs, i.e., flawed assumptions and, therefore, possibly wrong.

Verifiable scientific knowledge must be based on "objective, verifiable relationships." Scientific assertions are not dogma. It is not enough to impose it by force: one must be able to justify it; in other words:

1. In the phenomenon studied appear properties in principle that are likely to be controlled by everyone without exception, i.e. either directly observed by any person or obtained experimentally (in this sense, they can be "verified");
2. Explain how these verifiable properties support the discussed scientific data.

## 2.8 Public Value of scientific knowledge

This means that it is not only valid for one individual or a limited group of individuals in a given context but for everyone, anytime and anywhere. Moreover, the demand for justification of scientific statements will likely be imposed on everyone based on verifiable elements that give scientific discourse the status of universal knowledge. Finally, the definition examined refers to a body of knowledge.

A scientific theory is a set of interrelated assumptions (an isolated proposition is rarely internalized in theory). Ideally, we are dealing with the so-called hypothetical deductive system. Many results are elicited from a few primary non-contractual hypotheses taken as a basis, and the whole constitutes the theory. Therefore, there is no simple juxtaposition of the entered data, but there is an internal organization, hierarchical relationships

To summarize, science is an organized set of statements about a well-defined object that are universally valid because they are founded on a rigorous and authoritative method, Weber (1993).

## 3. Other possible ways of defining science

Based on Bartholy et al. (1978) and Hacking (2001), if we aim more like dictionary designers to describe the practical uses of science, there are still two possible approaches when we seek to illustrate the science/non-science opposition:

1. The first is descriptive, which we will present later: it takes as its starting point all practices that are, in fact, sciences, describes as faithfully as possible the products of these practices, identifies their common points, and develops a definition of science based on specific shared characteristics. It is not sure that definitions of science obtained this way match dictionary definitions, not even that a single activity socially qualified as "scientific" matches a dictionary definition. It may be that this definition sets an ideal that has not been achieved anywhere.
2. The second method is standard and pre-existing; It takes as its starting point a standard of science (which defines what science should ideally be), then compares the so-called scientific disciplines with this model and decides in each case whether we are dealing with science or not.

## 4. Some considerations

Many disciplines are now united under the science category to describe how the significant types are traditionally grouped.

### 4.1 General Considerations on Classification Matters

The classification of sciences ranks disciplines that are said to be scientifically based on different principles: grouping/differentiation by subject, method, problem types, etc.; but the science rating is rarely truly satisfactory because:

A certain number of boundary cases do not allow easy identification with any of the classes provided for in the classification considered; science often develops faster with pre-existing classification frameworks, which then prove less effective over time (Avenier and Schmin, 2007).

### 4.2 General Considerations about the Credibility of Science

The word "science" serves as a mark of quality and credibility to emphasize that the discipline of science means making a favourable judgment about it ("scientific" = "correct," "trustworthy," "reliable," etc.) and thus widely disseminating her theories; the authority of experts, and thus the wide dissemination of his theories, the authority of experts in the discipline, and then the publication of his theories; the authority of experts in the discipline, and then their call to arbitrate in various conflicting situations; obtaining affiliations to conduct new research... It is conceivable that the label "scientific" in these circumstances is highly desirable and could suddenly be attributed under pressure from social groups offensively seeking recognition. When this is the case, 'science' does not describe the objective characteristics of the discourse examined: it is, therefore, futile to hope to find the intrinsic qualities of that discourse that would justify the designation of 'science', according to Avenier and Schmin (2007).

## 5 Formal science subject

### 5.1 Formal Science

Thus, Bartholy et al. (1978) said formal science is qualified because it ignores content to focus on form. Characteristics of numbers and operations on numbers, the question "Numbers of what?" does not consider them.

It does not matter to logic whether the line of reasoning deals with humans, whether they are mortal or something else. It is only concerned with the way propositions relate together in logic. For example, in the syllogism "Every human is mortal; or Socrates is human; therefore Socrates is mortal," logic scatters the content to retain only the form: "Every f is g, or x is f; therefore x is g."

Formal science refers to independence from sensory experience and external physical reality. Thus, a mathematician deals with shapes (in geometry) or numbers (in arithmetic), which are just conceptual things with perfect shapes (a perfectly straight line, a perfectly isosceles triangle, etc.) that have never been kept the same.

## 5.2 Formal sciences among empirical sciences

The formal sciences mainly belong to mathematics and logic. On the other hand, the empirical sciences are related to all the other sciences: physics, psychology, sociology, economics, history, etc. The empirical sciences are supposed to maintain a close association with substantial experience that needs to be improved in the case of formal sciences (Gucher, 2005).

## 6. Science, experience and causation

This marginal title is divided into three components, namely: the subject of empirical science, scientific law, and empirical and causal data, according to Gucher (2005) and Bartholy et al. (1978), and Soler (2000):

## 6.1 Theme of Experimental Science

According to Gucher (2005), the adjective "experimental" means: "related to sensory experience"; Therefore, the empirical sciences are concerned with some specific aspects of sensory experience: physics in non-living physical reality, biology in the internal principles of working organisms, psychology in psychological aspects of individual behaviour of human beings, etc.

**The** goal of the empirical sciences is supposed not to be a pure creation of the human mind but to pre-exist in its characterization in an external reality accessible to man through various perceptions. Thus, the target object is not purely conceptual but offers physical anchorage and is manifested through observations. Formal sciences use the only scholarly sources that can be supported by paper and pencil, they resort to the so-called deductive hypothetical method, and

empirical sciences also call upon concrete observations and experimentation for systematic activity.

## 6.2 Scientific law and empirical data

Before defining scientific law, it must be expressed in general scientific relations, which are complex relations inferred from a given experiment with modern science. Even Galileo did not succeed in all attempts to know reality and describe it as a scientific law, except Archimedes, whose discoveries are famous and famous.

According to (2000) Soler, therefore, the emergence of the law presupposes a tremendous intellectual revolution. From it, modern science first assumes that according to Galileo's famous formula, Nature is a book written in mathematical language. This conception of the world, separated from all science of antiquity and the Middle Ages by proving the possibility and validity of quantitative knowledge of nature only in the seventeenth century, poses metaphysical rather than epistemological problems.

A scientific law is a supernatural rejection based on belief in an orderly, rational world, operating as a machine whose motion can be decomposed into simple principles; apart from the effort of science to define itself as only natural, there is no intellectual obstacle to the project of rationalizing nature; Mathematics was conceived in the seventeenth century as an expression of a group of purely formal mental processes; Therefore, there is a significant identity between nature and reason that leads one to believe that any relationship between phenomena can be reduced to general scientific behaviour, i.e. to general scientific law. We note that the concept of law is assumed in its strict sense of a mechanism, causality, and determinism, even if some empirical thinkers, such as Hume, have surrounded science as the search for laws by rejecting causation and/or determinism as well as belief in the identity of reason and nature which is the original philosophical foundation.

Thus, a *scientific law* cannot be defined solely as a mathematical expression of two simultaneous phenomena or a particular regularity of observation; For example, the following propositions cannot be considered as laws: "Man does not live at a temperature of 3000° C" or "Unless there is an accident, every rhino has one or two horns." Moreover, as explained by Karl Hempel, a scientific law cannot be reduced to a statement that can be verified by observation or experiment; it must also meet other conditions:

1) The quantitative or non-quantitative expression of a general relation to a meaning that is valid in all real or imaginary cases contained in the law and necessary, i.e., which,

only under the conditions established by law, can be able to provide a causal explanation between two or more phenomena, on the Although the nature of the cause remains unknown. This strict definition of law must be somewhat watered down if one is to compute among several scientific laws structural relations which are more descriptive than explanatory. It possesses a high degree of generality beyond the inventory of all possible events. In other words, the law continuously extends beyond the sum of the experiences or observations that confirm it. This capital point of definition entails two significant conclusions;

2) Because of its very extension, the generality of the law cannot be inferred from empirical or observational events. Due to the insufficiency of scientific knowledge, the law can express, for a long time, just a simple statement that establishes a non-explanatory relationship between scientific phenomena. So the law, in its entirety, must be able to extend to unverifiable or even fictional events. This means that it is a statement from which we must deduce an unlimited number of certain statements. It also makes it possible to understand that in so far as this detailed data can be subject to verification, it can and should allow for prediction.

## 6.3 Causality

Through the generality of its use in the sciences, the concept of cause appears as a basic concept to the extent that one can describe science as the search for the causes of phenomena. However, the concept of cause is not easy to define for several reasons, according to Bartholy et al. (1978) :

1) Before it was a scientific concept, it was a linguistic concept associated with different social and cultural behaviours. Saying that heat is the cause of the expansion of the mineral is not the same as saying that the hot August heat is the migration of tourists to the Balearic Islands; In the first case, we have a statement that assumes a necessary and universal relationship between two phenomena, and in the second case we have a statement that refers only to the relative and contingent situation.

2) Not all scientists or philosophers place the same content under the term cause. For some, causation extends to all phenomena and thus allows the scientist to predict the future state of a system from its present state; Thus, the extended and generalized causality of cause presupposes the assertion of a principle, which can only be verified in a piecemeal manner, called the "**causation principle**" or "**determinism**"; For

others, causation is reduced to a simple relationship between two or more phenomena, accepted as necessary and universal because it is often ascertained without prejudging the necessity and generality of all other relationships. The first believes in the principle's universality, while the others only recognize one or more relationships.

3) In science itself, the term cause includes various facts! They tend to infer to limit the concept to what the philosopher Gaston Bachlard called "croquis" (the shock of the white ball in billiards, being the cause of the displacement of the red ball). Many other phenomena can be called "cause": the combustible or combustible properties of an object of chemistry are not in the same way as causes of combustion of the same genetic mutation and natural selection in biology. It even happens that the name of the cause is given to unknown phenomena, such as, for example, with gravity.

4) Science is not limited to establishing causal relationships. It knows other types of general and necessary relationships called "structural." For example, Marriott's Law states that the product of a gas pressure is in terms of volume or vice versa; Phonology and Linguistics, The general establishment between sounds or parts of speech of relationships, is pure formalism. Moreover, from it (the reason is not something, but a process).

## Feedback

The word "cause" in language also differs from scientific usage in that we always want to see the cause as the event's origin. At the same time, the scientist can only think of causation within the scientific framework automatically. He who does metaphysics without knowing it, and seeks the origin of life and language, at the end of his search, will never find God, i.e., any reason which does not in any way explain the phenomenon of which he is inquiring; The reason the scientist discovered has nothing to do with the original cause of the energy discharge (lightning, volcanic eruption, ultraviolet rays); The aim is to define the law, which alone makes it possible to establish a cause and an effect; This will be noted, and this radically distinguishes scientific knowledge from general knowledge; The salient relation completely ignores the previous causes (the cause of lightning, etc.), which moreover in our example coming from another science and can, in turn, be known only through the discovery of other laws.

1. This primacy of law concerning cause distinguishes the scientific approach from the pseudoscientific position: pseudoscience’s, such as astrology or parapsychology, first

admit that there is a mysterious cause (the influence of the stars on personality, the act of thinking about matter) from which to derive alleged laws (Aquarius cold or my house, and significant mental concentration rolls small spoons),

2. The scientific approach is just the opposite, it establishes laws, which are valid only in so far as they are constantly verified by experiment or observation, and only then, from the applicable law, arises a cause, for (science makes us discover the laws from which we infer the reasons).

## 7. Natural sciences, humanities and social sciences

In this concept, we will treat the first approach to the opposition between the natural sciences and the humanities and the second approach to the specificity of man in the human sciences, based on Weber (1993), Bartholy et al. (1978) and Soler (2000).

## 7.1 Opposition between the natural sciences and the human sciences

Weber (1993), Bartholy et al., (1978. and Soler (2000) point out that within the sciences of empire, boundaries are drawn between: the natural sciences: physics, chemistry, life sciences; Humanities, and social sciences among them: psychology, sociology, ethnology, anthropology, economics, linguistics, history and law, etc.

Natural sciences deal with the inner workings of living or inanimate nature; in particular, they isolate the continuous succession of phenomena called the laws of nature. For example, in physics: water heated to 100° C  at atmospheric pressure boils. These laws are supposed to be independent of the human subject who seeks to know them and the society to which the subject belongs - at least in the sense that the physicist, biologist, etc.

These laws are not created from scratch and do not have the power to mobilize or modify them at will. Instead, the human and social sciences, or social sciences, as English speakers call them, study human behaviour and the social structures that frame it. Let us note from the outset that it is often difficult to separate two levels, one of which is individual, exclusively related to the human sciences, and the other, collective, deals more specifically with the sciences of society.

The term "human sciences," which has replaced the term "moral sciences" in France since the Second War, is also sometimes used as a general term to designate all disciplines opposed to the natural sciences. It is always a matter of studying different dimensions of man in what is specifically human. What we call a human being can be divided into numbers.

## 7.2 Human privacy in the humanities

So what can be considered a precursor as a human? We can dare to suggest the following answer: the fact that human experience brings meanings, intentions, expectations, symbols, and values into the game. A person gives meaning to his own actions as well as to the actions of others. He lends intentions to his colleagues. It establishes various rituals that function as symbols in that their scope goes far beyond the concrete actions being performed, whether one is contemplating, for example, a wedding or the practice of "something important").

He is able to oppose his immediate vital interests in the name of a noble cause (a hunger strike for example). Or, “losing in the present in the hope of earning more in the future”, (Example: speculation in the stock market, etc.). We generally agree to recognize in the human ability to encode (its most successful manifestation is the use of language) the fairly direct source of the various aspects just mentioned (Bartholy et al., (978).

## 7.3 Hard Science VS. Soft Science

The hard sciences opposed to the soft sciences should not be placed on the same level, inasmuch as they depend primarily on their value judgment. It is clear that speaking of "soft" science is so much that some have suggested the alternative name of "soft" science. The vocabulary used indicates that, in terms of the real sciences, there is an eminent range of noble scientific disciplines and reliable methods.

Hacking (2001), he says that the conflicting hard sciences / soft sciences generally coincide with the conflict between the natural sciences and formal sciences on the one hand, and the humanities and social sciences on the other hand, even if significant disagreements remain about the status and value of these controversies. Physics, unanimously regarded as the queen of experimental sciences, it has always been held as the model for the solid sciences. In contrast, psychology and sociology are, from the prevailing viewpoint, the "hardest" of the soft sciences.

Despite the differences in estimation that remain when we go into the details, we generally agree to recognize that "soft" sciences cannot claim the same degree of rigor, formation, and axiom, and for the same level of predictive efficiency as the hard sciences. The latter also has more realistic and controlled technical and practical benefits.

Is such a defect constitutive, does it relate to the nature of the subject of the study? Or only temporary, the effect of a simple delay in the humanities? The question remains open.

## 8. Conditions of knowledge

This chapter aims to show that science is not an activity practiced by men from time immemorial and always in the same forms. The man was not born in a single day armed in his head with the fullness of science but is determined by historical, social, economic, technological, ideological and psychological conditions, according to Sole (2000).

## 8.1 Historical, social and economic conditions

Science is a social production. Its place of birth and existence is not a mysterious world of ideas or "scientific facts" but society itself, in which the competent world is the product of ideas, theories, and experiments. There is no doubt that this production has something special. The world does not produce goods or machines directly but remains subject to social conditions like other products. We have already drawn the idea that the natural sciences, to which science is often confined, were born with the advent of the market system and capitalism, based on Bartholy et al. (1978)

In the pre-capitalist stage and in the capitalist world of production itself, the emerging bourgeoisie, which was subsequently installed in power, needed a system of production that would allow it to make ever-increasing exploitation of Nature. This system of production presupposes, among free workers, a worker of a new kind (i.e., more accessible than others): the world which, except for a few men, is only concerned with determining the general laws of Nature. Appropriate productive work (manufacture of consumer goods, machinery, etc.) entrusted first to the craftsman, and then to another worker very quickly becoming necessary with the progress of production, the engineer, whose task consists only of using the discoveries of the world in specific applications (Bartholy et al., 1978).

The particular situation created in the capitalism of science allows us to understand how the world can appear utterly separate from society, i.e. from production (because it does not produce directly) and is, in fact, one of its agents. From this ambiguous and contradictory position, two concepts of science are born that are as false as each other: one asserts that science has its development, regardless of social life (this is the inner thesis of **Querrey** in particular); other claims to the contrary that science exists only for technical applications it can generate and thus ignores any reward; one makes the world a radiance lost in the clouds. The other makes him a direct worker of production, and thus responsible at the highest level

for the evil deeds which may be committed by the social order in which he lives; and from it (the emergence of science was parallel to the rise of the bourgeoisie) (Bartholy et al., 1978; Hacking, 2001; Avenier et Schmin, 2007).

## 8.2 Science and bourgeoisie

Along with the rise of the bourgeoisie came a significant upsurge in science, astronomy, mechanics, physics, anatomy and physiology. In order to develop its industrial production, the bourgeoisie needed a science that studies the physical properties of natural things and the modes of action of the forces of Nature. Until then, science was only the humble servant of the Church, which never allowed it to transcend the limits set by faith. He was nothing but science and then rebelled against the Church since the bourgeoisie is unable to do anything without science; it has thus joined the rebellion (Bartholy et al., 1978).

## 8.3 Science in capitalist production

According to Soler (2000), Hacking (2001) and Bartholy et al. (1978), they say that scientific knowledge is obtained through the practice of transforming Nature and becomes a factor in the transformation of human Nature, its development moving from the concrete with the changes in the world of production. When pre-capitalist society transforms into capitalist structures, widespread empirical knowledge becomes the first stage of modern science. Science, like capitalism, was a "civilizing" force within certain limits. Thus science emerged as critical knowledge, liberating humankind from the empire of superstition, which, developed in the system of religious thought, was the central ideological pillar of the outgoing movement; A social system, a system of production based on capitalism, requires continuous innovation in all areas of life: the creation of new things, new ideas, new technologies, new social forms. Marx says it requires "the development of the natural sciences to their highest degree."

Lenin continues how science under these conditions becomes a direct productive force: "Nature does not build machines nor locomotives, nor railways, nor telegraphs, nor tractors, etc., it is the product of human industry, man is in Nature, and the mind of man is the power of objective knowledge.

## 8.4. Technological conditions

Gucher (2005), Baillat and Fourez (2004), Soler (2000) and Bartholy et al. (1978) state that it seems evident to anyone today that scientific discoveries require not only to be on the ground

but also to be considered merely a particular technological development. Everyone understands that one cannot do astronomy without a telescope, biology without a microscope, oceanography without a battery pad, etc. However, this observation of evidence is only sometimes accepted with ulterior motives or preconceived notions, leaving many questions open.

Let us first look at the ideas thrown: Science is often defined purely and simply in automatic consciousness and ideological support. We think we talk about biology when we feel sorry for the crowds about the fate of cancer patients and beg for ten francs to encourage lab research. We discuss nuclear physics when we develop our moods over the atomic bomb or the Super Phoenix. Indeed, nuclear biology and physics cover research on a larger scale and more diverse than those suggested by the two applications which are broader and more diverse than those suggested by the two practical applications just mentioned; thus, defining science with technology amounts to defining the physics of electricity with illumination or home heating.

Another ready-made idea: the feeling that any technology always springs from science. This idea, which tends to be excluded from the number of quantitative methods of practices used in our society (pottery, cooking and all the arts), is coupled with a retrospective illusion: If many technologies today can be considered applications of science, it was not always the case (we made boats that did not sink before knowing the principle of Archimedes; we only recently succeeded in demonstrating a scientific method for powering a boat or a sand yacht, so we were able to build cathedrals without any knowledge of engineering.).

Even today, it is not necessary to have the scientific knowledge to know that you have to pour oil little by little to make mayonnaise, put a little Swiss cheese in the guinea fowl to prevent it from drying out, you should use it to decorate a berth-lite shovel on the wall, the use of bleach should be reserved for laundry "Colorfast," etc.

Moreover, these misconceptions about the relationship between science and technology are maintained by a whole pedagogical ideology, which, under the pretext of opening the school to life and in order to put unskilled labour in the labour market, very little does not put forth. Unskilled labour in the labour market, which is very inexpensive and uncontroversial, tends to replace the acquisition of theoretical knowledge of a scientific nature and the pure knowledge that lies in home education. We confuse the study of electricity and iron, scientific study and its distribution, with the reflex, of turning off the light class after class or wearing a jacket - more to come to high school in the winter.

However, more is needed to identify the differences between science and technology and realize their specificity. Today, science and technology are increasingly intertwined to the point that it is sometimes difficult to separate them: manufacturing the Concorde, for example, is a set of technical processes. However, the design of this supersonic device required studies of a purely scientific nature (material resistance to heat, aerodynamics, etc.). Then the question of the relationship between science and technology arises as follows: Is technology preceded by science or, on the contrary, does science precede technology? Does technology necessarily lead to the emergence of science? Conversely, does technology necessarily give rise to science? Does science, in order to progress, necessarily need technical progress, a method of advanced progress?

## 9. Introduction to technology

Gucher (2005) and Bartholy et al. (1978) assert that technology is a set of processes to meet needs. In this respect, technology is a cultural fact entirely unknown to the animal world. The animal that fulfills its needs acts according to the behaviour instructions, giving stereotypes. While the human being can invent techniques, culture elsewhere can define itself as a set of techniques. On the other hand, it often assumes the use of tools, machines, etc.), which fundamentally distinguishes it from animal behaviour.

However, technology should not be confused with what is considered "handwork." Technology is adequately human in that it always assumes a plan, conception, or determination to achieve success, even if its operator is not always (rarely) its inventor. The potter performs the ritual movements of his ancestors, the origin of which is almost impossible to determine. He knows only what result he wants to obtain and the actions to achieve it. The same is true of the housewife who does the cooking and the student who is writing his thesis once the well-taught technique is acquired enough to use him to become unconscious.

The last example we just mentioned shows that it is necessary to guard against the techniques of some received ideas; Technology can also be an intellectual process. The ancients had learned the science of this and also taught the art (= technique) of speaking well: rhetoric.

Even if a technology always contains a project, even if some of the techniques are "intellectual," like the ones we just mentioned, they always tend to become routines, as they are mastered or replaced by new ones,

This also applies to modern technologies born of science that do not require their operators to have a thorough knowledge of the project to which they are responding.

Our definition allows us to understand how technology fundamentally differs from science: Science consists of statements (theoretical laws) that do not change reality but only allow us to know it. On the contrary, technology consists of processes aimed at transforming reality. Today, these processes tend to be divided into two parts: on the one hand, the engineers design the technical component, and on the other hand, the worker performs the tasks imposed by the engineer's plan. This division of labour (actually more complex than we say here) is exemplified by the distinction, especially in the public service, between implementation tasks and design tasks.

The current relations between science and technology feed a retrospective illusion about their historical relations. This is the delusion that Alexandre Quéré deplores, which shows that technology has been able to exist for so long without science and technology.

## 10. Between technology and science

In this marginal title, we will discuss the definition of technology and then explain the relationship between science and technology in industrial civilization, based on Gucher (2005), Bartholy et al. (1978) and Avenier and Schmin (2007).

## 10.1 Definition of Technology

Technology is a set of processes intended to meet the needs. Hence, the technique is considered a cultural accident entirely unknown to the animal world. In order to meet his needs, this animal works on instinctive behaviour, while humans can invent techniques, to improve them and share them with others. Moreover, technology often requires reference to tools (equipment, machinery, etc.), distinguishing it from animal interaction.

We do not have to limit the technology to manual work. Technology is human, requiring a plan, design, and industrial drawing, even if the user is not the creator. Another example of techniques is also some ingenious ideas. Technology is a mental process. In the old days, the teacher class = art = technique, proficiency in speech meaning: rhetoric.

## Summary

This definition shows us how fundamentally technology is distinct from science; Science is a set of “laws, theories” that do not possess the truth in and of them but only allow it to be known. Technology is a set of successive operations aimed at altering or transforming reality.

Today, these processes are divided into two branches: on the one hand, the engineer invents the technology, on the other hand, the worker performs the tasks imposed by the engineer, and this is what is called in the science of organizations, executive tasks and design tasks.

Historically, science is independent of technology, and the current relations between science and technology feed a retrospective illusion of their relationship in history. This is an illusion, confirmed by Alexandre Koyré, that technology existed from ancient times before science, and science existed before technology, given that technology is theoretical knowledge without an applied subject. However, the immortality of the link between science and technology is a retrospective illusion. This overlap between theoretical and applied is the penetration between practical and theoretical, and vice versa, through theoretical work to find solutions to applied problems.

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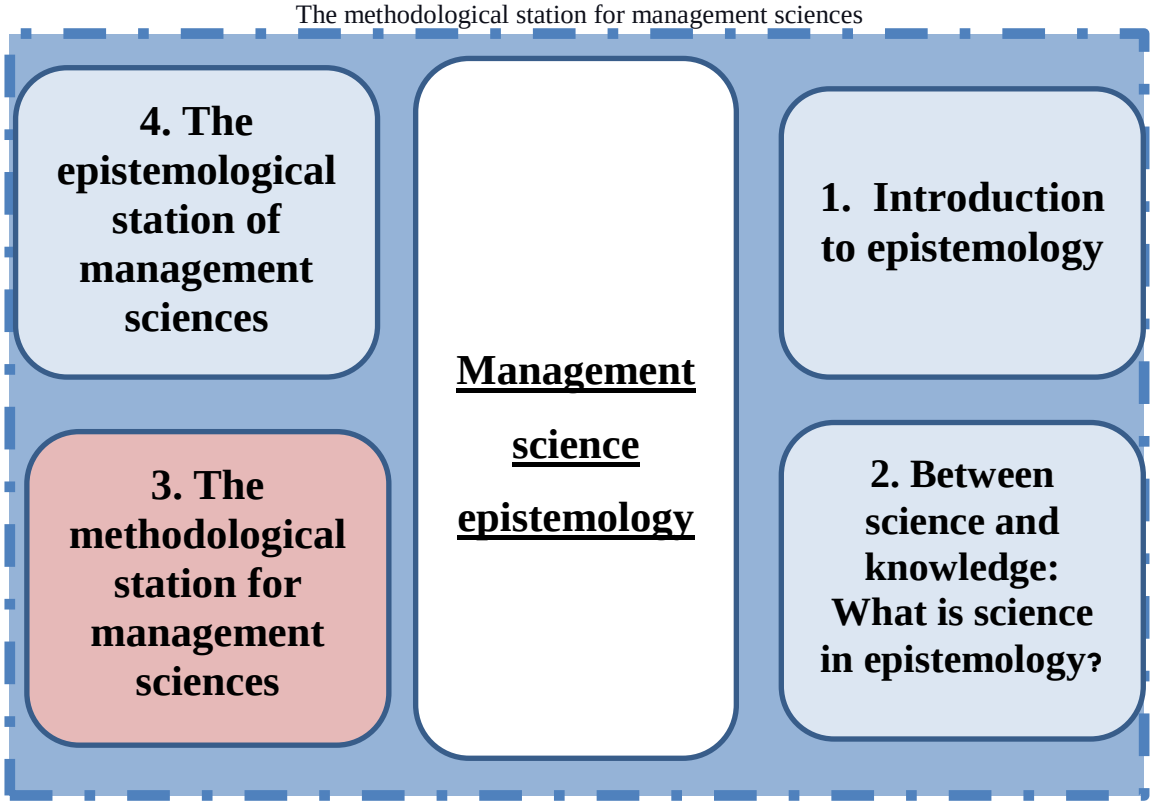
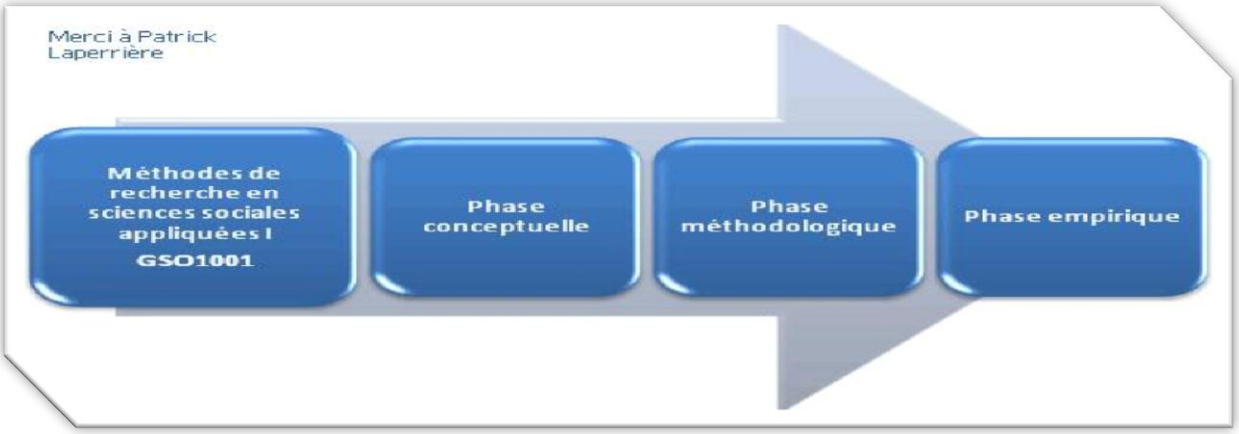
**Third chapter:**
The methodological station for management sciences



# Third chapter
# The methodological for management sciences

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## Chapter plan

**Introduction**

1. **A sneak peek at the methodology of scientific research in management sciences**
2. **Between objectivity and subjectivity in scientific research methodology**
3. **The quantitative methodology, the qualitative methodology and the triangulation method**
4. **The need for the logic tool in the methodology of scientific research in management sciences**
5. **Deductive and inductive reasoning in scientific research methodology and management sciences**
6. **1.5 Induction method**

**Conclusion**

## Introduction

Epistemology is concerned with the study of building knowledge. It is not easy to find a unified definition of scientific knowledge. Some define it as an explanation of reality, and some see it as an innovation or construction of reality (Piaget, 1967). In terms of building a reality, it is our modern realities that new sciences emerge that align with this lived reality. Among these sciences are management sciences, which are called management sciences or organization sciences, as they remain the most modern among all social sciences academically; they are in continuous development and at an accelerated pace. However, due to its shortage, the research findings cannot be generalized (Gavard-Perret et al., 2008).

Management sciences, according to their nature, are modern. This type of science has always lived through a scientific identity struggle due to the need to define a unique topic for it. However, scientific and academic research and contributions supported overcoming this epistemological crisis, which resulted in the emergence of principles, models, methods, approaches, theories, and laws that frame this type of science, which gave this type of science scientific legitimacy and scientific justification (Dabla, 2019).

Management science is a field of research in the social sciences arena, and the subjects under study in management are diverse. There are many fields of research in this type of science. This research focuses on the performance of the organization and the individuals who drive it. We note that there is a considerable amount of knowledge wealth that must be secularized, refute erroneous ideas and theories, and support theories to become administrative principles and laws framing knowledge in management, and this can only be achieved with a clear and rigorous research methodology, which we explain in the following pages, according to Albert (1999). This chapter has been prepared based on a free translation of a group of texts for several references, which are as follows:

Albert (1999)
Audet and larouche (1988)
Bartholly et al. (1978)
Dabla (2023)
ENA (2023)
Fortin (1996)
Gavard-Perret et al. 2008).
Guautier and Bourgeois (2016)
Piaget (1967)
Russell (1961)
Seaman (1987)

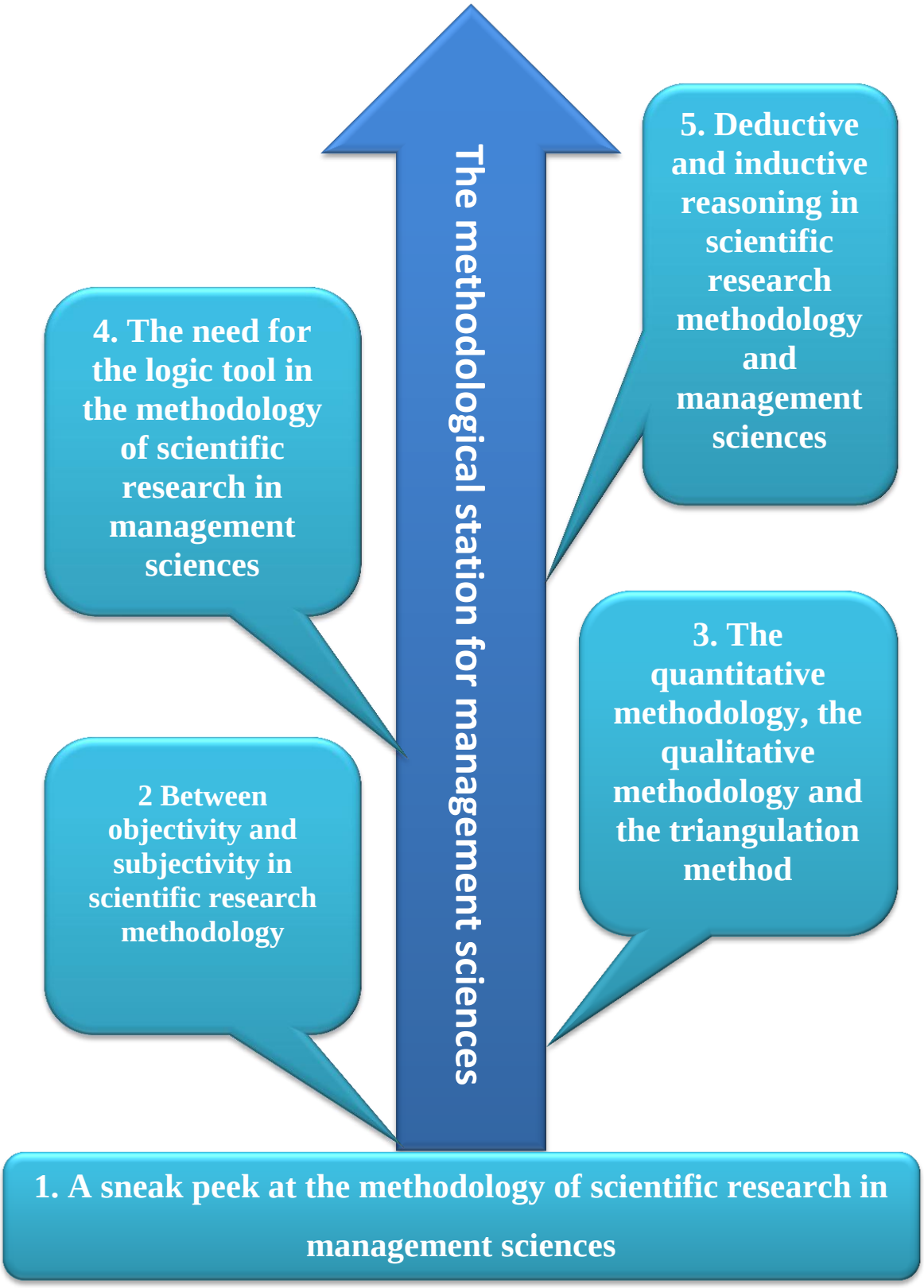


**Figure 1:** A simplified explanation of the methodological station for management sciences

## 1. A sneak peek at the methodology of scientific research in management sciences

One of the epistemological goals is to justify the sciences and provide scientific, legal knowledge; this will only come through scientific research. Piaget (1967) describes epistemology as building valid knowledge by examining the methods that allow the construction of this knowledge. By these methods, we mean scientific research methods. Fortin (1996) also shows that scientific research is carried out by a person who specializes in a scientific field to take the initiative to study a scientific phenomenon more rigorously and decisively, and its results are more acceptable, valid, reliable and authentic. Why all this?

Because it is on a rational path that favours investigation, inference and criticism, according to a specific epistemological model, the research has several objectives, including providing a theoretical and scientific contribution. As well as providing a field contribution in the form of providing field solutions to the scientific phenomenon under study in the form of proposals or recommendations, as well as providing research horizons for the subject under study, and this is according to the criteria of stability, credibility, validity and reliability.

Research is an organized and systematic work, according to the possibility of verification, confirmation and refutation. It begins with collecting observable and verifiable data using scientific experiments or quasi-experiments. Then, the study results are based on the sample or even the study population, whether the research is quantitative or not qualitative (Seaman, 1987).

The methodology is the research tool, and in turn, it uses methods and techniques to reach, discuss and interpret the results, so the research takes the characteristic of systematic organization and practical rationalization of the observation function. The research must not have a persuasive function, such as the task of the orator on a platform of rhetoric. The research is far from being a propaganda process of learning. It cannot be used as justification material for a case of a phenomenon. Research is a coherent method of sequential and collaborative steps. Among them is to show a fact of the facts according to scientific assumptions that can be achieved, verified and refuted, **ENA**.

In the methodology, the research begins with skepticism. It is based on the principle of skepticism. It begins with an observation of a scientific phenomenon in the field. The research begins with a problem that ends with a general question, which in turn ends with specific questions that, in turn, form research hypotheses. The goal is to understand the foundations of

the phenomenon; Knowledge questioning is inseparable from the practice of scientific research. Everyone begins with a question and ends with a result. Research starts from a scientific theory, and the current research in this process is to prove the theory's validity or refute it by realizing or refuting the scientific hypothesis related to the theory. The ultimate goal is to reach principles and laws of confirmed theories frame all life in this sprawling universe ENA.

## 2. Between objectivity and subjectivity in scientific research methodology

The methodology also ensures that scientific research is objective and prefers to avoid subjectivity as much as possible. It seeks methodological neutrality, and this is to give it the desired scientific feature. From methodological neutrality, no recourse should be made to support a position or idea already taken.

Within the methodology framework, we note that knowledge is surrounded by a struggle between objectivity and subjectivity, including objectivity and subjectivity, two concepts that are contradictory in meaning. The first concept gives meaning to scientific research and makes it strict in place. As for the second meaning, the researcher's personality interferes with the subject of the research being studied, so it is impossible to separate between the research topic and the researcher's intervention in directing the research according to his will; this is unscientific and methodologically unacceptable.

Larouche and Aduet (1988): confirm that, according to Dabla (2019, p. 04): "Methodology: Refers to the scientific or non-scientific science in the way of preparing laws, principles, collecting data, interpreting or justifying it, and it falls into two methodologies:

Idiographic: How a subjectivity based on daily presence in social life: biography, journal, etc;

Nomothétique: quantitative, objective, based on technical, statistical, etc. methods.".

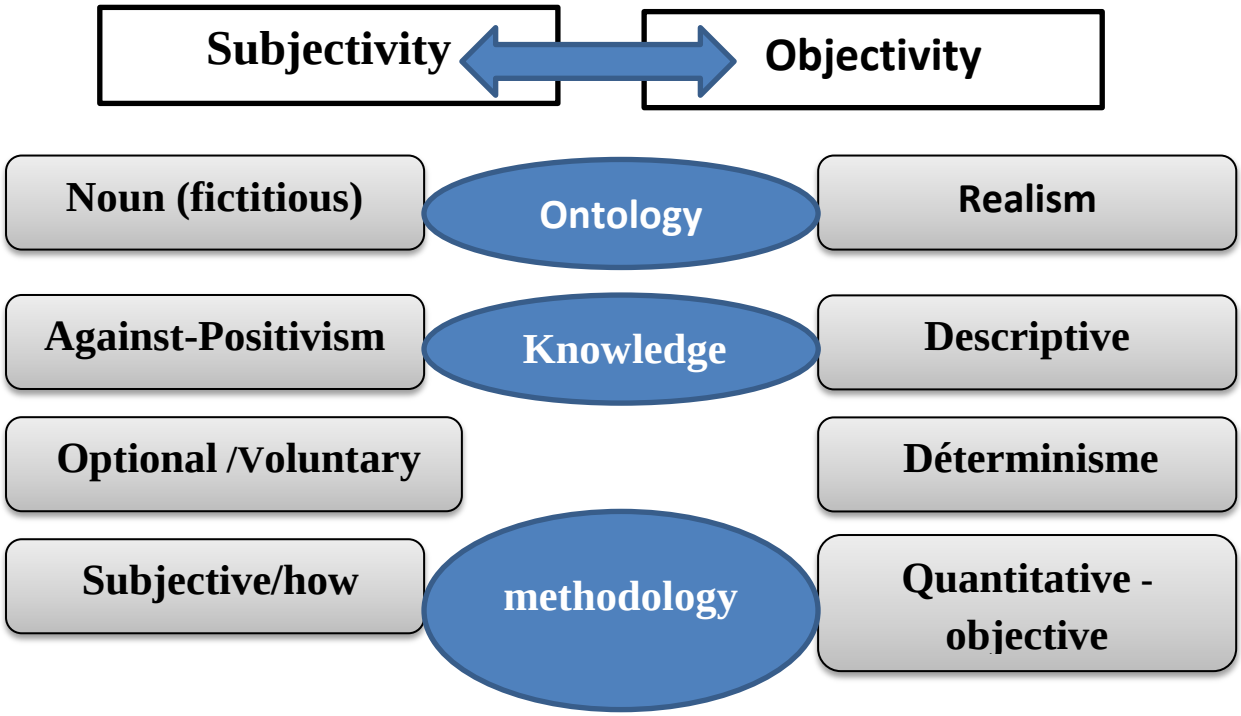


**Figure 2:** Fundamentals qualification of science
**Source:** Audet (1988)

### 3. The quantitative methodology, the qualitative methodology and the triangulation method

**4.**

In management sciences or organizational sciences, there are three approaches to research, namely: the quantitative approach, the qualitative approach, and the triangulation approach, i.e. combining the advantages of qualitative research and then quantitative research, according to (Dabla, 2019) and they are:

1. **Quantitative research** is deductive, inferential research that depends on quantified variables by analogy. This approach descends from the behaviourist school that studies the behaviour of observed scientific phenomena to investigate their paths and actions in the past and present to conclude results that we can benefit from in the present and the future. There are even predictive inferential quantitative studies. This method was developed in North America, including Canada and the United States of America, and is based on statistics and the application of statistical techniques and methods.
2. **Qualitative research** is inductive and interpretive research that studies a case or a group of cases. The researcher studies phrases or words; these data are analyzed with a

correlation matrix. Data analysis has been updated with media programs that quantify the relationships between nodes, and this methodology has developed in the social sciences. This research method was developed in Europe due to the complexity of social phenomena that need to be deeply understood.

3. To take advantage of the qualitative, exploratory, and quantitative, confirmatory, affirmative, we start with the case study method and then follow the study of the variables. This synthetic method is called triangulation. This scientific method and its requirements were consolidated to remedy the deficiency. "The quantitative method often neglects the complexity associated with the phenomena of organizations and focuses on the impact of accuracy and regularity" (Dabla, 2019, p. 14). This is compensated by the in-depth study of the scientific phenomenon through a case study or qualitative study that is elementary, i.e., exploratory, a representation of reality correctly and honestly.

## 4. The need for the logic tool in the methodology of scientific research in management sciences

According to Bartholy et al. (1978), historically, logic appeared in the fourth century AD: its inventor, Aristotle, had some modifications until the advent of logic at the end of the twentieth century; the invention of this "tool" whose usefulness has been proven to be fundamental to all sciences. In the era of Aristotle, a kind of deceptive thinking appeared, known as "sophistry," which was valid at this time; the subject of logic is proving the validity of thinking or what is called a syllogism. This characteristic makes it possible to understand why a syllogism is formal thinking that can be valid. It is that which follows logical conclusions based on premises of any kind. We can thus have four types of thinking which the possible groups of reasoning faculties determine.

We point out that the truth of these logical issues is of paramount importance to understand what distinguishes the activity of logic from that of scientists who study physical and human phenomena; The activity of logic is concerned only with the validity of reasoning; So by logical inference, what we want to stress, first of all, is that the premises imply the conclusion and not that the premises and conclusion are valid.

The need for a logic tool is the study of the correctness of thinking, especially in the science of organizations. Logic must necessarily resort to symbolic language, and this is not merely an abstraction characteristic, as it is used in the language of mathematics. If the content of assumptions is not essential, we can and must replace them with symbols. It is chosen in whatever capacity, so Aristotle had his logical present (Bartholy et al., 8(197).

**Table 1:** Logical issues and type of conclusion

**Source:** Bartholly et al. (1978).

| The number | Type of logic and type of conclusion | | Causes |
|---|---|---|---|
| 1 | **Right reasoning, right conclusion:** | **A** | All medicines taste bad; |
| | | **B** | Octavid is a medicine; |
| | | **C** | Even Octavid tastes bad. |
| 2 | **Right reasoning, wrong conclusion:** | **A** | The oil crisis affects the whole world; |
| | | **B** | Primitives belong to this world; |
| | | **C** | So, primitive peoples are affected by the oil crisis. |
| 3 | **Incorrect reasoning, correct conclusion:** | **A** | All right-wingers call themselves apolitical; |
| | | **B** | All real estate developers call themselves apolitical; |
| | | **C** | So, all real estate developers are right-wing people. |
| 4 | **False inference, wrong conclusion:** | **A** | All parasites are irritating; |
| | | **B** | Talkative people are irritating; |
| | | **C** | Therefore, Talkative are parasites. |

A simple examination of these examples will show the independence and validity of the truth; The proper conclusion does not confirm that the reasoning is correct (not in example "1" and not in "3"); On the contrary, the validity of reasoning teaches us nothing about the truth or falsity of its conclusions; It is necessary to prove the logical truth so that the validity of the inference guarantees the truth of the conclusion as in the example "1" and not in "2" (Bartholy et al., (1978).

According to Figure 3, the conclusion or deduction (Dabla, 2019) goes from general to specific. If done as required by the norms, the results of this type of perception must convince a person even if he is stubborn or, as Blang (1992) says. It can later be a test subject by deduction.

Inductive logic in the methodology of scientific research imposes itself strongly in our present time due to the complexity of the scientific phenomena to be studied. It studies the phenomenon according to the qualitative approach or what is called qualitative. That is, it deals with phrases or rather words. Considering taking one case in the field and doing an in-depth study from all aspects and taking a large number of concepts or dimensions simultaneously and subjecting it to a qualitative study, i.e. qualitative, the goal is to reach a theoretical framework.

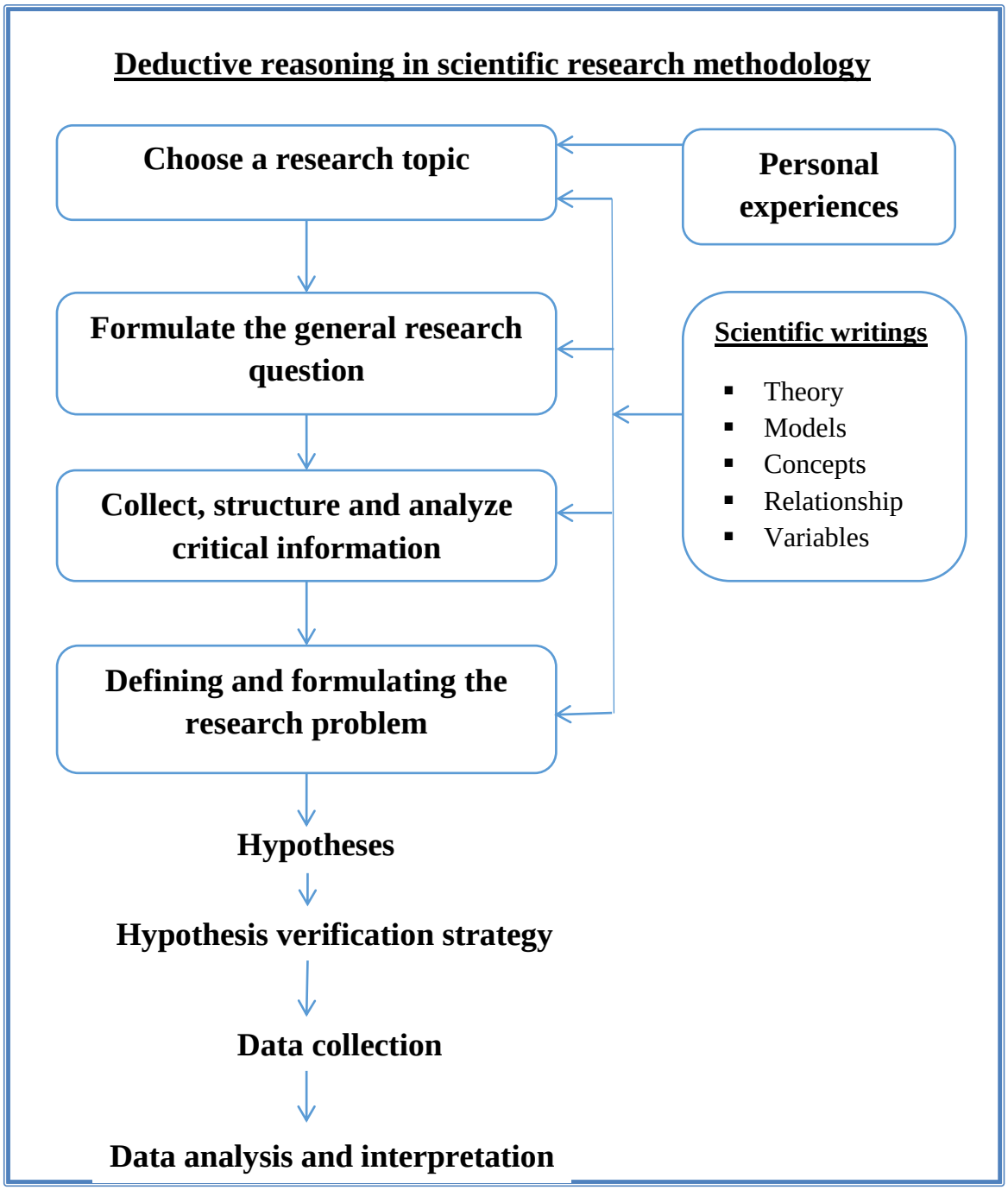


**Figure 3:** Deductive perception in scientific research methodology
**Source:** Gauthier and Bourgeois (2016)

We carry out this type of study in two cases: the first is that the subject of the study is new and has not been studied before and that this phenomenon is complex in a way that the researcher cannot understand smoothly, and secondly, if the sample is tiny, it is impossible to do deductive work, according to (Dabla, 2019), then induction: It is taking it from the specific to the general, and it is considered illogical; Non-demonstrative inference (induction). At best

it can convince a rational person. However, induction and deduction are contradictory in terms of method and complementary and can coexist in terms of function despite their differences, according to Thiétart (2003).

**Table 2**: Examples of thinking styles
**Source:** Albert (1999)

| | | |
|---|---|---|
| **ABC**<br>**Deduction** | **A** | **Rule:** All the peas in this bag are white |
| | B | **Condition:** these peas from this bag |
| | **C** | **Result:** these peas are white |
| **BCA**<br>**Induction** | B | **Condition:** these peas from this bag |
| | C | **Result:** these peas are white |
| | **A** | **Rule:** All the peas in this bag are white |
| **CBA**<br>**Abduction** | A | **Rule:** All the peas in this bag are white |
| | C | **Result**: these peas are white |
| | **B** | **Condition:** these peas from this bag |

Conclusion, induction, and exclusion are three modes of thinking, that is, three methods or three approaches to conducting scientific research.

**The first is deductive logic**, "Déduction" is an approach frequently used in scientific research in management sciences. It begins with a rule and then uses a case. A large sample of cases is used to test this sample statistically, and then we conclude a conclusion. The rule is theoretical or derived from theory, and access to the result uses the hypothesis attached to the theory. The hypothesis links the theory, the research subject (the case) and the process of statistical analysis.

**The second of them is Inductive logic**, it is an approach that began to be used extensively in recent times throughout the world and has always been fought before. It is used a lot in North America. It begins with a case or several cases. However, they are numbered and end with a rule, or a theoretical framework, which in turn leads to the mourner as a mediator, using the result to treat the scientific phenomenon represented by a case study or a group of cases.

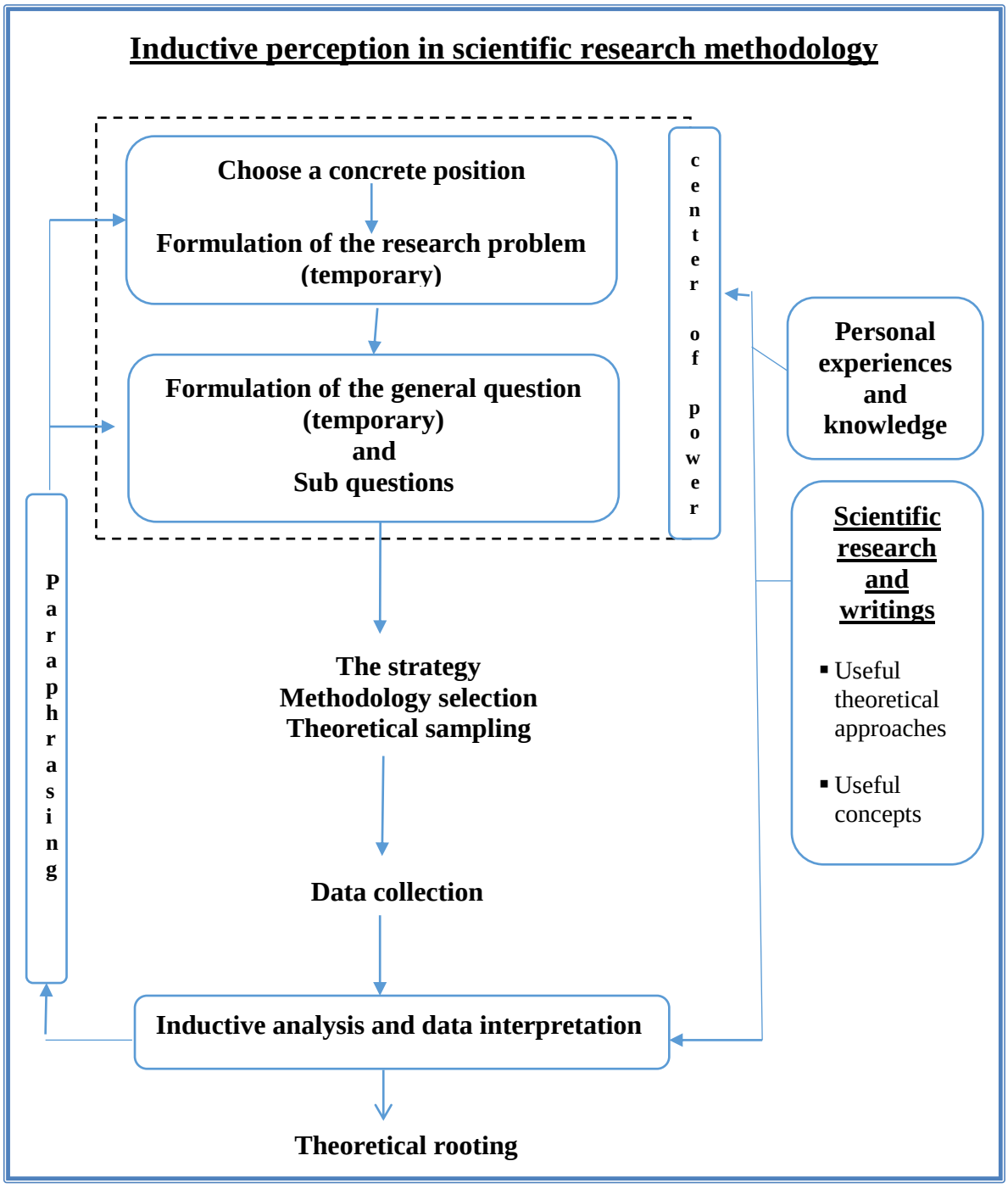


**Figure 4**: Inductive visualization in scientific research methodology
**Source**: Gauthier and Bourgeois (2016)

**The third is Abduction**, it is a third approach, and it is one of the types of informal induction, according to Koenig (1993), because it searches for a conclusion to a situation that comes from a result in which it is used not only in one case, but in several cases, and this is based on a specific rule that corresponds to research topic;

Albert (1999) says that deportation is a process that does not belong to logic, as it helps to find an explanation for the scientific phenomenon (the case) in order to support the base (theory) in management sciences.; The logic of exclusion is an inferential process that opposes the logic of deduction, which stems from the fact that the hypothesis based on the base, i.e. the scientific theory, is for both exclusion and deduction. The deduction is based on specific values. According to general logic, induction allows general rules to be given "A," while exclusion suggests hypotheses. B", below we give an example of exclusion logic.

**Table 5:** Example Abduction
**Source:** Albert (1999)

| | | |
|---|---|---|
| **CBA**<br>**Abduction** | **A** | **Rule:** If it is raining, the road is wet |
| | C | **Result**: the road is wet |
| | **B** | **Condition:** If it is raining |

## 5.1. Induction method

Induction is an approach that consists of deriving conclusions from a list of data or data collected from the field of the scientific phenomenon under study, and from it, in the field, if you observe at a particular time all the blackbirds in an area, you will conclude that all the blackbirds are black; but this definition requires a certain number of observations of flocks of blackbirds in multiple places, and this requires several observations, according to Weber (1993),

**First Observation**: Induction is the preferred approach of empiricists because it assumes that observation in the sense of 'feeling' is the starting point of knowledge.

**Second Note**: It is clear from our definition that inductive knowledge cannot be considered specific; data collection is rarely comprehensive, and observations are not endlessly

repeatable, so there is always a fear that a new observation will conflict with previous observations. From a logical point of view, the latter can be expressed as the unique "there is at least one blackbird that is not black," which is sufficient to negate the opposite proposition (all blackbirds are black).

**Third Observation**: The example that we have taken, like all examples of induction, contains a false element: to deduce anything about the blackbird, one must first determine what the blackbird is. Otherwise, if we have formed the concept using the inductive method, this can only be done through a multiplicity of observations. This method contains a vicious circle: I know the blackbird is black, not black, because it is black. The introduction is nothing but the logic used in current thought, which results in the formation of linguistic concepts, not scientific concepts.

**Fourth Observation**: Induction is a primitive method of knowledge, more practical than scientific: it is found in taxonomic sciences such as botany, zoology, etc., which do not state the laws, except in some empirical senses; for this term. Establishing laws that take science from its inductive stage to its hypothetical deductive stage assumes the development and verification of hypotheses through experimentation (physics, biology) or observation.

## Feedback

In induction, the use of the scientific method will be in this approach as follows, always according to Weber (1993):

**First**, all facts will be noted and recorded without prior selection or evaluation of their relative importance;

**Second**: the facts observed and recorded will be analyzed, compared and categorized without hypotheses or assumptions other than those necessarily implied by the logic of thought;

**Thirdly**, from this analysis of the facts, general conclusions may be drawn using induction that confirms relationships of classification or causation between these facts;

**Fourth**: subsequent research will be deductive after inductive research and use inferences from predetermined general results.

There are four stages of data in ideal scientific research:

**The first stage**: monitoring and recording all data;

**The second stage**: analysis and classification of this data;

**The third stage**: deriving general data by extrapolation from these facts;

**The fourth stage**: Additional checks of public data. It is emphasized that, in the first two steps, no assumptions or hypotheses should be made about how the observed facts relate to each other; the feeling has imposed this limitation that such prejudices would affect and endanger the scientific objectivity of research.

## 5.2 Induction and Theory

The failure of Bode's law provides apparent evidence of the fragility and, in fact, recklessness of induction of general assumptions by observing only a few cases of the subject matter. Sometimes generalization fails almost immediately; and sometimes it is correct, no matter how many extra notes. Unfortunately, no one makes valid generalizations by observing a limited number of particular facts in the field of research.

None of the attempts to prove a valid method of inductive reasoning by which theories can be deduced from facts have succeeded. The researcher does not infer his theories from the field data in any logical sense of the word "inference." Instead, he invents, fantasizes, or builds his theories. He used many suggestions and clues from these accurate data that reflect reality. The researcher often uses comparisons with other better-known or understood situations. However, the researcher can never assert that "because the facts are such and such, then this theory is true" in the sense that the researcher can never assert that "since the axioms and definitions are such and such, this theory is true, according to Hacking (2001) and Weber 993).

## Summary

Management sciences are sciences of modern origin. They have deservedly imposed themselves on the cognitive epistemological arena. They have several sources that make them rich material for scientific research according to a specific methodology for this type of science. This methodology has been presented in this chapter. Briefly, the essential methodological features in the framework of the search for objectivity were exposed in order to remove the dimensions of the researcher's intervention during the research process or the conclusion of the results. It is vital to support the scientific knowledge obtained according to the epistemological principle recognized in management sciences.

During the systematic presentation of management sciences, three methods were concluded for conducting scientific research: deduction, induction, and triangulation. Deduction or

inference is the quantitative approach based on statistical and standard methods that use a large sample of hundreds in a considered society. This method seeks to generalize the results to the sample and from it confirms the theory, which explains the research subject, to a principle or law that frames the reality of management.

As for induction in its approach, as we explained above, it is the inverse of the quantitative approach, as it depends on one or several limited cases. The epistemological goal is a theory or a theoretical framework that explains the scientific phenomenon under study. In the triangulation approach, the researcher combines, in one research, the advantages of the qualitative or qualitative approach with the advantages of the quantitative approach in order to obtain reliable, valid, and valid results.

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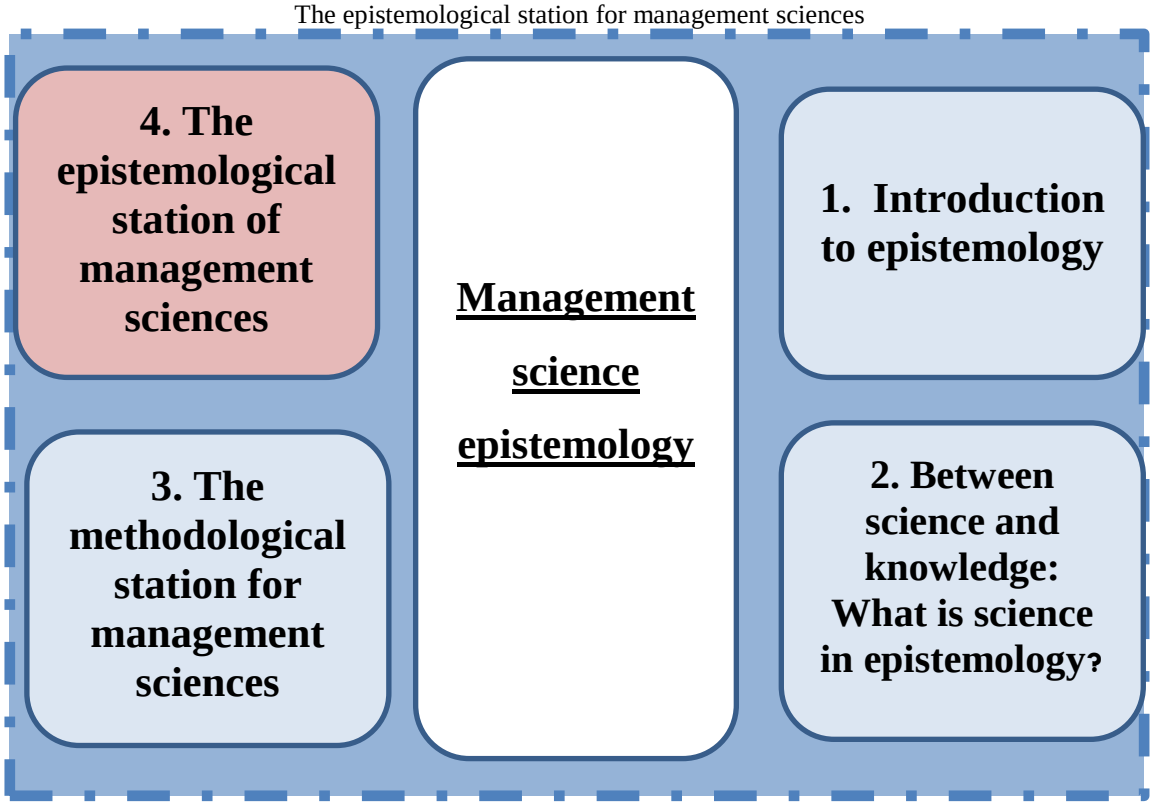
Fourth chapter:
The epistemological station for management sciences



# Fourth chapter
# The epistemological station for management sciences


**Source:** google image 4

## Chapter plan

**Introduction**

**1. Epistemological Models for Management Sciences (Organization Sciences)**

**1.1 The cognitive attitudes of the positivist, explanatory and constructive models in organization sciences**

**1.1.1 Cognitive attitudes Positive, / descriptive, / positive, / or realistic models**
**1.2.1 Cognitive attitudes in the explanatory model and in the constructive model**

# Chapter plan

**2 Assumption underlying the nature of knowledge produced**

**1.2 The Nature of productive knowledge and the positivistic epistemological model**
**2.2 The nature of knowledge produced in the explanatory and the constructive models**

**3. The plurality of models and the location of the researcher**

**4. Criteria for the validity of knowledge**

**1.4 Criteria for the validity of knowledge according to the Positivist model**
**2.4 Criteria for the validity of knowledge according to the explanatory model and the constructive Model**
**3.4 Criteria for Validity of Knowledge**
**4.4 Flag/non-flag demarcation**
**1.4.4 Sciences demarcation in the positive model**
**2.4.4 Demarcation of Science in the explanatory model and the constructivist model**

**Summary**

**List of references**

Bartholly et al. (1978) they say that there is some harmony in the lived and surrounding reality and that it recognizes the natural or social phenomena that bear some of this regularity and that the scientist or rather the researcher discovers “laws” and characterizes them in the way that is most likely close to the meaning to be reached. It is clear that scientists their task is to "discover" the laws "in nature" that exist even if no researcher has discovered them. We point out that in the subject of a specific research in itself, a scientific phenomenon can be explained by many theories, or one theory can be excluded for another scientific phenomenon, due to its explanatory power for this phenomenon, as well as for the scientific advantages that it enjoys.

And from it, according to Perret and Séville (2007), they confirm that research works have special visions of the world around us and that these researches aim to either predict, describe, explain or understand, and this is what enables the acquisition of the validity, reliability and credibility of knowledge that results from the research process and increases from the accumulation of scientific knowledge.

The epistemological station of management sciences, which is derived from the humanities and directly from the social sciences, aims to know the nature of knowledge? How is this knowledge produced? What is the value of this knowledge? What is the status of the resulting knowledge? This is exactly what we explained in the first chapter of this work of epistemology or the theory of human and natural knowledge.

The station, position, or epistemological models in management sciences or organization sciences are at the heart of this scientific work, and after an in-depth search in a group of university libraries in the city of Montreal, I found few scientific references that deal with this topic. The completed work that aroused my attention and I found my purpose in it is to the reference Perret and Séville (2007). I was happy to summarize and paraphrase the paragraphs translated from French into Arabic, a free translation because of its added value to this work.

Among the main references for writing this chapter are:

Perret and Séville (2007)
Bartholy et al. (1978)

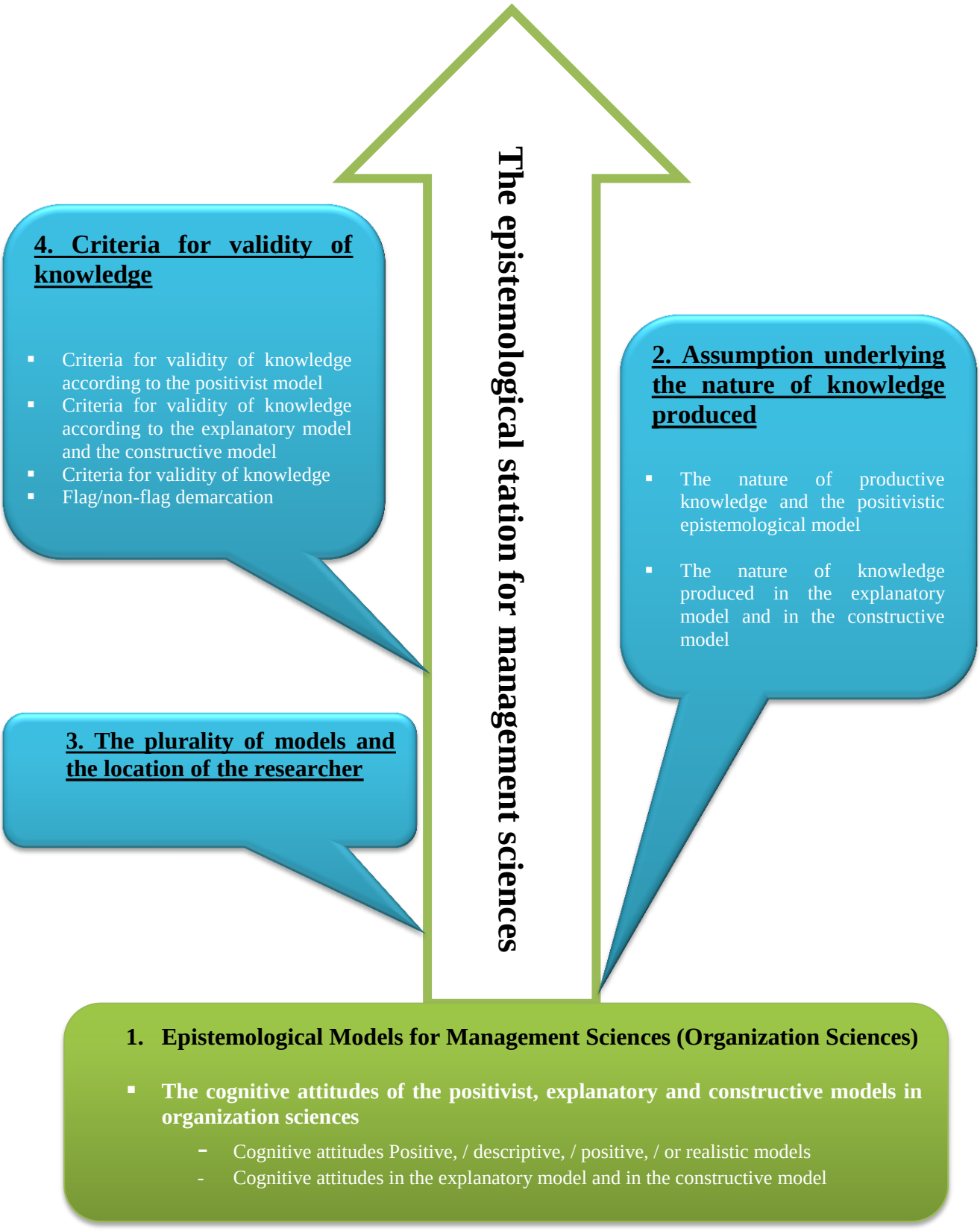



**Figure 1:** A simplified explanation of the epistemological station of management sciences

By taking us as a given, epistemology as a philosophical branch whose mission is to revise the sciences by raising many questions, including the discussion of the nature and method of knowledge. The issue of colloquial thinking that searches for the validity and legitimacy of the research is raised here, after presenting the results that seek to understand, construct, or explain, and most importantly, the interpretation of research assumptions for a specific scientific phenomenon that helps to understand the research, control its research process, and raise the credibility, validity, and reliability of the research results (Martinet, 1990).

Perret and Séville (2007) confirm that the researcher, through his research process, is looking for:

- The issue of questioning his vision of the external world surrounding us, here in the field of management sciences, the search for the nature of the reality to be perceived;
- Question about the nature of knowledge produced? And the reality of the topic (scientific phenomenon) being related to the researcher?
- Asking about ways of generating knowledge through understanding, explanation, description, interpretation and construction;
- In any case, given that epistemology is a critical philosophy that raises the issue of questioning the path of knowledge taken?

## 1. Epistemological Models for Management Sciences (Organization Sciences)

Each of the sciences has its own epistemological models. The natural and physical sciences, the humanities, the artificial sciences, and the sciences of management that contain a model with a triple division - this division contains:

1) Positive or / descriptive or / positive or / Paradigm positivist

2) Paradigm interprétativiste

3) Paradigm constructivist

The term Paradigm or an epistemological model builds this designation, in the sense of Kuhn (1983), is the largest possible number of paradigms, intellectual schemes, or reference frameworks that researchers in organizational science can fit with. The epistemological model, according to what is newly defined, means a way of thinking, or is a theoretical perception of the world of things, according to Kuhn (1983). The epistemological division

contributed to the emergence of multiple theories and schools of thought that are considered references for the sciences of organizations.

## 1.1 Cognitive attitudes to positivistic, Interpretive and constructive models in organizational sciences

**Table 1:** Cognitive attitudes of the positivist, Interpretive, and constructivist models
**Source:** Perret and Seville (2007)

| **Epistemological questions**<br>**أسئلة معرفية** | **Positivism**<br>**الوضعية** | **Interpretive التفسيرية** | **Constructivism**<br>**البنائية** |
|---|---|---|---|
| What is the status of knowledge?<br>**ما هي حالة المعرفة؟** | Realistic assumption<br>**افتراض واقعي**<br><br>There is an essence proper to the object of knowledge.<br>**هناك جوهر خاص بموضوع المعرفة** | Relativistic hypothesis<br>**الفرضية نسبية**<br><br>The essence of the object cannot be reached<br>**لا يمكن الوصول إلى جوهر الشيء**<br><br>(moderate constructivism or interpretivism<br>**(البنائية المعتدلة أو التفسيرية)**<br><br>(Or does not exist (radical constructivism)<br>**أو غير موجودة (البنائية الراديكالية** | |
| "The nature of reality".<br>**"طبيعة الواقع"** | Independence of subject and object<br>**استقلالية الذات والموضوع**<br><br>Deterministic hypothesis<br>**فرضية حتمية**<br><br>The world is made of possibilities<br>**عالم مصنوع من الضروريات** | Independence of subject and object<br>**الربط بين الذات والموضوع**<br><br>Deterministic hypothesis<br>**فرضية مقصودة**<br><br>The world is made of necessities.<br>**العالم مصنوع من الاحتمالات** | |
| How is knowledge generated?<br>**كيف يتم توليد المعرفة؟**<br><br>The path to scientific knowledge<br>**الطريق إلى المعرفة العلمية** | Discovery<br>**الاكتشاف**<br><br>Research formulated in terms of "for what causes"…<br>**تمت صياغة البحث من حيث ".. ما السبب..... "**<br><br>Privileged status of explanation<br>**وضع متميز في التفسير** | Interpretation<br>**تفسير**<br><br>Empathy (revealing the experience lived by the actors<br>**يتم صياغة البحث من حيث (ما هي دوافع الجهات الفاعلة)**<br><br>Preferred building status<br>**مكانة مميزة للتفاهم** | Construction<br>**إنشاءات**<br><br>Research formulated in terms of "for what purposes…"<br>**تمت صياغة البحث من حيث (لأي أغراض)**<br><br>Preferred construction status<br>**حالة البناء مفضلة** |

| | | | |
|---|---|---|---|
| What is the value of knowledge?<br>**ما هي قيمة المعرفة؟**<br><br>Validity criteria<br>**معايير الصلاحية** | Verifiability<br>**التحقق**<br>Confirmability<br>**قابلية التحقق**<br><br>Refutability<br>**إثبات خطأ الفرضية** | Ideography<br>**إيديوغرافيا**<br><br>Empathy (revealing the experience lived by the actors)<br>**تعاطف (الكشف عن التجربة التي يعيشها الفاعلون)** | Adequacy<br>**قدرة**<br><br>Teachable<br>**قابلية التعليم** |

## 1.1.1 The cognitive attitudes of the positivist, descriptive, positive, or realistic: Paradigm positivist

The positivist thought or the positive realistic perception "positivist" descends from the 19th century AD with the tyranny of the thought of the philosopher of the time, Auguste Comte, who categorically rejects “beyond nature” or “metaphysics.” This philosopher specified that science aspires to describe material phenomena in a pure and pure description that aims to Finding relationships between these phenomena, and this is what Berkeley (1685 - 1752) was going to, who is considered the real father of the positivist perception, or rather the positive model, which considers that the universe is a perceived object and not a delusional one (Bartholy et al., 1978).

And from it, according to Auguste Comte, the rejection of "metaphysics" is due to the rejection of everything that cannot be verified and how important observation is in the positivist model. In the positivist or positive factual conception, observation is the essence and material necessary for this epistemological model, which accumulates observation upon observation in a formal basis according to a specific methodological path, and whose conclusions are proven to be infallible.

For the positivists, all human beings know science as it is, and reality is presented through a priori forms of sensitivity and understanding: the human capacity for knowledge is so structured that reality can only be accessed through our sense (which, for example, is only perceived in three dimensions). And the prevailing understanding is that the cause must occur before the effect, and this is called the principle of causality, and that reality is the cause of our perceptions, and that the universe is the phenomena that can be perceived and understood and only, according to Bartholy et al. (1978).

On the nature of "reality" which tends us to the autonomy of the subject or the researcher of the subject matter of the scientific phenomenon, the knowledge produced by the positivists is objective and non-contextual insofar as it corresponds to the updating of the physical laws of the particular subject itself, and this is in response to an immutable reality, this particular reality outside about the individual or the self and independent of the context of the interactions of the actors in existence (Perret and Séville, 2007).

Concerning the nature of the state of knowledge, we are almost certain that there is an essence specific to the subject of knowledge. While assuming the correct essence of the reality that is distinguished by the independence of the self (the researcher) / from the subject (the scientific phenomenon), the positivists acknowledge that this reality has its own laws, and this is beyond doubt, given that, that these laws are immutable and almost immutable. In this reality there is a universal order that imposes itself on everyone: "The individual order is subordinated to the physical order (Kremer-Marietti, 1993).

To question the validity criteria, in the field of regulatory sciences such as management sciences, the positivist researcher asks about the reliability criterion or in scientific research this criterion affects the reliability of the results and what is the extent of their credibility and the process of trust in them, then in the regulatory sciences in the power production center of nuclear reactors and what is the extent of trust that exists And how do they affect the individuals in this organization? The positivist researcher who questions the reliability of these power stations will consider that the reliability depends on a purely technical and organizational reality that is independent of the individuals responsible for them as well as themselves (Bartholy et al., 1978).

### 2.1.1 Cognitive attitudes in the interpretive model and in the constructivist model

### (Interpretive and constructivist paradigms)

Regarding the nature of reality in the explanatory model and in the constructive model, reality is basically unknown, because this reality cannot be reached directly, as there is a link between the researcher and the research subject of the scientific phenomenon to be studied. Radical realism aims to invent reality, for this it is necessary to take caution the term "reality", but the moderate explanatory model and the constructive model does not accept or reject reality in and of itself? They leave this matter open, but these two models do not consider that this reality is independent of mental perception and the self of the individual or rather the

researcher. The explanatory and constructive models repeat the nature of the social world, and that is that in the issue of interdependence between the subject / the object, they question the hypothesis of scientific objectivity as well as the basis that shows reality, and this is based on the ontology of reality (Gldasefeld, 1988).

Concerning the nature of knowledge and in the explanatory and constructivist models, we can hope to produce this knowledge, which depends on the nature of the reality we hope to understand in terms of having a privileged place for understanding, with the nature of the subject/object link, we maintain in the context of the nature of the social world and organizational circumstance, in terms of formulating the research in terms of what are the motives of the actors, and this is for interpreters, but for constructivists, it is through construction from the gate of “for what purposes” where there is a distinguished position for understanding, according to Perret and Séville (2007).

Consequently, according to the explanatory and constructivist models, individuals or agents create their environment through their thoughts and actions, motivated by their purposes. In this world where everything is possible, where man can choose determinism "Determinism" i.e. the inevitability and necessity or impossibility of changing the characteristics of the surroundings i.e. the environment or the social world (Le Moigne, 1994), it becomes necessary to reject determinism in favour of the intended hypothesis in terms of "the nature of reality". The knowledge thus generated will be subjective and contextual based on the surrounding environment in this social space, which is not without consequences in the organizational sciences, he points out, and outstanding on Koenig (1993).

In short, the nature of the knowledge we can hope to produce will depend on the nature of the reality, we hope to understand, the nature of the subject/object link we maintain and the nature of the social milieu.

## 2. Assumption underlying the nature of knowledge produced

In the sciences of the organization, including the sciences of the management of organizations, we wonder about the nature of knowledge produced and this is from knowing the nature of the organizational reality that can be monitored within the ability to know, within epistemological models.

**Table 2:** Assumption underlying the nature of knowledge produced
**Source:** Perret and Seville (2007)

| | Nature of the knowledge produced طبيعة المعرفة المنتجة | Nature of reality طبيعة الواقع | Nature of the subject/object link طبيعة ارتباط الموضوع / الباحث | Social worldview نظرة العالم الاجتماعي |
|---|---|---|---|---|
| **Positivism الوضعية** | **Objective acontextual موضوعي غير سياقي** | **Assumption realistic افتراض واقعي** | **Independence استقلال** | **Determined تحديد** |
| **Interpretivism and constructivism التفسيرية والبنائية** | **Subjective contextual ذاتية السياقية** | **Relativistic hypothesis الفرضية النسبية** | **Interdépendance الاعتماد المتبادل أو الارتباط الثنائي** | **Intentionnel مقصود** |

## 2.1 The nature of productive knowledge and the positivist epistemological model

We know that management sciences are within the circle of social sciences, which descend from the humanities. For positivists, reality exists by itself, and it has its own entity, and the epistemological researcher seeks to know this reality.

**First,** with regard to the nature of the connection between the subject and the researcher, the individual, or the object, there is complete independence between them. The world of the organization's management, the materialist, is outside the individual's perception, whether it is perceived or not. It is a world that exists as an experimental entity, according to Burrell and Morgan (1979). From it, this blatant independence in the positivist model between the subject of the scientific phenomenon and the researcher i.e. the individual, which in turn imposes the principle of objectivity in the knowledge, produced which is tainted by any impurity.

In the field of organization sciences, for the positivist researcher who questions reliability and safety in nuclear plants, reliability depends on a technical and organizational reality that is independent of the men in charge of the plant as well as themselves. In this reality the knowledge produced by the researcher is in accordance with the principle of causation and consequence, according to Perret and Séville (2007).

The positivists recognize that the cognitive reality has its own laws that are not subject to change and alteration, and that this reality has a system that imposes itself on everyone, bearing in mind that the individual is subject to the world of matter and from it the social system from which the institution's management system, i.e. the organizational system

(Kremer-Marietti, 1993). From it, the knowledge produced by the adherents of the positivist model is objective knowledge and has nothing to do with the context of the scientific phenomenon under study, and what is beautiful about this model is that it is compatible with updating the laws reached by scientific research methods later, although the reality does not accept change (Perret and Séville 2007).

With regard to determining the view of the social world according to the positivist model, the causal approach explains this social fact that is independent of individuals, for example, to question economic, political and technical reasons, in order to explain a fact. This is what prompts us to ask about unilateral causation and multiple causation in terms of one cause, one result or one cause, multiple results, or what is called linear causation and circular causation. The position of the positivist model is possible without assuming that all the laws that make it possible to interpret reality are laws linear causation (Le Moigne, 1995).

## 2.2 The nature of knowledge produced in the interpretive model and in the constructive model

### (Interpretive and constructivist paradigms)

With regard to the nature of knowledge produced in the positivist model, it is that the researcher discovers the laws that are imposed on scientific phenomena. However, in the explanatory model, the researcher seeks to understand how to construct the meaning they give to social reality through the explanations he provides to the actors, and from it he produces a path that takes into account intentions. Beliefs, motives, expectations, reasons, and beliefs of the actors, and these are not related to realistic incidents as much as they are related to practices in understanding and interpretation, but in the constructivist model they mean building social reality (Portois and Desnet, 1988).

For exegetes, Weber (1965) developed the "Versstehen" concept of "understanding" which guides two levels of understanding involved behind the idea of knowledge creation:

1. At the first level, the researcher seeks to understand and interpret the private world surrounding him,
2. While at the second level, the scientific researcher explains the subjective meanings behind the behaviour of the individuals that the researcher studies (Lee, 1991).

Lyotan (1995) presents some elements to explain the state of understanding in the human sciences, including management sciences or organizational sciences in general, in order to find explanations for the behaviours of individuals or the behaviours of scientific phenomena under study and to seek to find the meanings that surround them in the "vacuum" and dated in the "appropriate time".

An example of the interpretation of the phenomenon of reliability in the nuclear power plant, here the explanatory scientific researcher will have to prefer the contextual approach to interpreting and analyzing the performance of this power plant through a field study of this scientific phenomenon that allows for a more comprehensive and direct observation and includes an in-depth observation in order to interpret and understand it well (Perret and Seville, 2007).

For “interprétativistes”, the comprehension process consists of “revealing” the reality of the studied act, while for the constructivists, the comprehension process consists of “constructing” the studied act, and from it, according to Le Moigne (1995), the reality is built by the act of knowledge and not through the objective perception of the world, and it has a path knowledge does not exist in advance, but is built up gradually, as the path continues. As such, the process of knowledge formation is necessarily concerned with the intentionality or finality of any purpose of the subject of knowledge, as confirmed by Le Moigne (1994).

In the positivist, “interprétativiste”, and constructivist models of epistemological attitudes and also assumptions underlying the nature of knowledge produced and the path of knowledge, these three characteristics will be favoured in terms of strong effects on the value of knowledge generated by scientific researchers of any science whatsoever.

## 3. The plurality of models and the situation of the researcher

In the sciences of organization, or rather the sciences of management, which derive from the social sciences and which are considered of recent origin, have not yet matured. Three paradigms coexist: positivism, interpretive, and constructivism. The question that arises: What is the position of the researcher between the subject of the scientific phenomenon under study and the plurality of epistemological models? Does a researcher on a topic in organizational science have to stick strictly to one paradigm and defend that choice? Or, on the contrary, does he have a degree of freedom that allows him to adjust his position, i.e. in the subject of studying a scientific phenomenon? Or is it to adopt more than one epistemological model to explain this scientific phenomenon under study (Perret and Seville, 2007).

The question of coexistence and the question of isolationism may be raised to explain scientific phenomena between these aforementioned epistemological models. The coexistence of positivistic, interpretive and constructive models can be in scientific work in the sciences of organization or management sciences. Or it is a sign of the immaturity of this science, or a sign that this science is in crisis, according to Stengers (1993).

This is the first criticism that epistemologists offer to challenge the pioneers of pluralism. As for the issue of isolationism, the different models explaining the theory of organization are not measurable in one research topic and cannot be reconciled. This is because the models are not measurable. The latter can be defined as the logical or normative incompatibility between different schools of thought, for which there is no system of consensual agreement to choose between these different schools (McKinley and Mone, 1998).

It is not possible to have a conversation between these paradigms in an investigation of a single scientific phenomenon. It should not be attempted. In this concept, the fragmentation of the organizational sciences is inevitable due in part to the fact that researchers have to voluntarily adopt a single paradigm, building on Burrell and Morgan (1979).

## 4. Criteria for validity of knowledge

The criteria for the validity of knowledge in the humanities, social and economic sciences, as well as the sciences of organizations, can be summed up in three criteria: verification; verifiability; Refutability or "verifiability". These three criteria fall under the scope of probabilistic logic stated by Carnap. Verifiability raises the question about the uncertainty or doubt that this fact entails. Uncertainty contains a certain percentage of probability that does not support the absolute truth. Here it must Carrying out research operations based on experience to ascertain the reality of the scientific phenomenon to be studied (Hempel, 1972).

It is customary in the methodology of scientific research that the research hypothesis of the scientific phenomenon derives from the scientific theory. In the latter, there are postulates, problems, expected or expected solutions, synthetic suggestions, analytical suggestions or hypotheses. If all the hypotheses are confirmed, then the theory has a facet of health, but if one hypothesis is not verified, then the theory is rejected directly “Although the theories cannot be proven to the same extent, they have different degrees of probability. If we share this concept in the field of organizational science, we must ascertain the degree of probability; with this probability our data are confirmed" (Lakatos, 1994, p. 6).

Refutability or rebuttal-ability, which means that the theory can be confirmed by the rigor in it, in order to preserve the importance and purpose of the theory, because we want to derive from the theory a universal law or what is called in the Arabic language “code” to regulate the life of the human being. But "rejecting or refuting" the theory is very easy. It is enough to have one element that does not belong to the characteristics of the sample or rather the study community. If we are confirmed theoretically that all crows, without exception, have black feathers, then one white crow is enough to refute this theory.

We do not expect that there will be more than one white crow, for with such firm rigor it is possible to refute the theory. As for the progress of statistical sciences and statistical methods, the hypotheses that are derived from the theories are tested, through these statistical methods the results of data processing are they a function or not, that is, the hypothesis is confirmed, so the theory carries a facet of validity, but if the hypothesis is rejected, then the theory is refuted, according to reasoning of Popper (1973).

## 4.1 Criteria for the validity of knowledge according to the positivist model

According to the positivist model, the criteria for validity of knowledge are: verification and "verifiability" and "refutability". These criteria make it possible to distinguish between scientific knowledge and non-scientific knowledge, that is, general knowledge, according to Perret and Séville (2007). In the humanities sciences, including the science of organizations, there are two approaches to scientific research, including the deductive approach and the inductive approach. The deductive approach favours quantitative studies, and the inductive approach deals with qualitative or rather qualitative studies.

The positivist model favours the scientific method that relies on the deductive approach, but the inductive approach has a scientific nature that is rejected in our case. Inductive logic makes it possible to move from private observations to general statements and conclude with a theoretical framework only. As for deductive reasoning, it is thinking that concludes from the premises to the truth of the case (or not to refute it) using the rules of inference, depending on Chalmers (1987).

## 4.2 Criteria for validity of knowledge according to the interpretive and constructive models

According to the interpretive model, the criteria for validity and validity of knowledge, in terms of the personal nature of the research, are subjective. That is, there is a close link between the researcher and the research subject. Both of these models are based on contextual search. The latter depends on all aspects surrounding the phenomenon under study. On the other hand, it depends on the abilities of empathy that the researcher develops with research scientific phenomena (Perret and Séville, 2007).

Research of a subjective nature favours the association or interdependence between the researcher and the research subject, which aims to understand scientific phenomena in depth. In the study of scientific phenomena, research aimed at the researcher's independence from the subject of research in this type of research focuses on finding general laws that regulate human life. However, in interpretive and constructive models, it is necessary to study the scientific phenomenon in its contexts, and then knowledge of the phenomenon is derived from its general context. The knowledge produced must include a detailed description of the studied phenomenon, including its historical and contextual aspects. This is the principle of detailed description established by (Geertz, 1973).

In this title, two determinants for distinguishing the criteria of validity are the first self-knowledge, in the sense of the researcher's connection with the research subject. Secondly, there is empathy, in the sense of being able to put yourself in the shoes of others in the study of scientific phenomena, and that is to realize how they are feeling. One of the benefits of empathy in the strength of criteria for the validity of knowledge is to access the facts as they are tested and concluded by researchers. In this regard, the value of research will be measured by its emotional dimensions, and this is very common in literary texts (Perret and Séville, 2007).

The ability of empathy to update and act not only on facts but also on the way scientific researchers interpret these scientific facts (Perret and Séville, 2007). With regard to the activation of these two criteria, Denzin (1984) questions how to discover the interpretation developed by the researcher of living experience, as well as the historical and temporal roots of the scientific phenomenon. About the interpretations, he proposes, and about the possibility of producing an interpretation of understanding the studied social reality?

We have seen the issue of the validity of epistemological criteria in the explanatory "interpretive" model regarding the validity of knowledge in the last three paragraphs. As for the constructivist model, these criteria are still under discussion and study on a large scale, according to the statements of Perret and Girad-Séville (2002). In the constructivist model, the criterion of validity is rejected and some researchers suggest other criteria such as Glaserfeld (1988), which is radically constructivist, that knowledge is valid when it is appropriate to a given situation as it proposes the criterion of "adequacy".

Le Moigne (1955) proposes a criterion of 'learnability' which he strongly defends, but this criterion does not lead constructivists to posit a method of knowledge, but it does allow them to accept and defend a range of methods. In addition to logical deduction, they recognize other valid modes of reasoning (analogy, metaphor, etc.).

## 4.3 Criteria for validity of knowledge

The validity of knowledge in the epistemology of management, that is, in the science of organizations, involves several criteria, divided into: the demarcation of knowledge / non-science and criteria for the validity of knowledge, according to the positive model, the explanatory "interpretive" model, and the constructive model.

## 4.4 Demarcation of knowledge/unknowledge

The demarcation of science and non-science in the specificity of organizational sciences is due to the nature of knowledge produced in this scientific field, according to Rao and and Pasmore (1989), where Kuhn (1983) indicates that studies on organizations in administrative sciences can be seen as useful knowledge. This can also be known as a tool, a means, or a dialogue between researchers. Management sciences as a science that has not yet reached the stage of maturity or a science whose features have not been completed because it is a modern science. The nature of science, as it is known in conducting research, is to confront the hypotheses of scientific theory with field facts in the scientific phenomenon under study. Knowledge passes through confrontation with the theories generated by these studies. Knowledge, then, is the product of a community of interpretation based on different poles of interpretation (Ricœur, 1965).

The challenge to the demarcation between science and non-science is based on two arguments. In terms of the first argument, it is the rejection of the immortality of criteria. What is known is that what is now science in this period is not science in another time and

time different from the first time. Therefore, it is difficult to formulate criteria that remain constant for the demarcation of science (Stengers, 1993). What distinguishes science from non-science is that science has fixed standards for all researchers and all scientists in various sciences. What concerns us in this chapter of the book here is the sciences of organization in the humanities, including management sciences (Passeron, 1991).

### 4.4.1 Demarcation of sciences in the positivist model

The delineation of science in the positivist model is very possible and one can clearly distinguish scientific knowledge from non-scientific knowledge, so that this explicit knowledge has universal criteria. The criteria for science are: reliability, accuracy, honesty, and validity for all sciences, regardless of their field of application, including management sciences, or rather organization sciences (Perret and Séville, 2007). As for the idea of the specificity of the social sciences and the sciences of organization, there are epistemological researchers who oppose the idea that the social sciences and the natural sciences can be radically different.

### 4.4.2 Demarcation of science in the explanatory model and the constructivist model

The delineation of science and non-science, for the explanatory "interpretive" model and the constructivist model, is contentious in terms of demarcation criteria (Perret and Séville, 2007). Explanatory "interpretive" model and constructivist model in science cannot be reduced to a few standards of validity or simple methodological rules. Feyerabend (1979) argues that the idea of structuring and organizing science according to fixed standards and rules is fanciful and cunning. This utopian idea ignores the power of creativity because it does not develop our humanity. By making science more dogmatic, it does not support or enhance its development and therefore a stone on human thought and creative ability. For the constructivist model, it suggests the need for continuous discussion between different fields of knowledge (scientific, cultural, political, social, economic, organizational, etc.). Therefore, the constructivist model calls for deeply questioning the idea of scientific truth and the definition of accurate and universal criteria. This last model proposes an approach to knowledge in terms of moral validity, that is, based on criteria and methods that can be discussed (Perret and Séville, 2007).

## Summary

The issue of defining the sciences, the credibility of the sciences, and their validity and modeling, especially in management sciences, or rather organization sciences, has not yet reached the stage of maturity. Management science is one of the very modern sciences that deserve all the attention of researchers and investigators, especially epistemologists.

The theories explaining the phenomena of management and management sciences are still under study and investigation, and from it there is a great effort that must be made to delineate this field of sciences through the application of the criteria of validity, reliability, stability and validity of these administrative sciences.

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# General conclusion

After this development in science, with the creation of a new term called philosophy of science, it does not deal with subjects of any knowledge. However, in particular, scientific knowledge and then developed research in this field, instead of bearing the title of philosophy of science, carried an accurate scientific term called "epistemology." The latter aims to find out whether scientific theories are projections of truth; epistemology mainly aims to characterize the existing sciences, to determine their value, and in particular, to decide whether these sciences approach an ideal.

Science, this moral being, from a philosophical point of view, no matter what we say about it, science is extracted from all knowledge, as it is the light of God on his earth, bestowed upon the human being and distinguished by reason in particular. Management sciences or organizational sciences, or rather, are sciences of modern origin. They have deservedly imposed themselves on the cognitive epistemological arena, as they have several sources that made them rich material for scientific research according to a specific methodology for this type of science. Science searches for objectivity by removing the researcher's interference during the research process or by reaching conclusions. It is crucial to support the scientific knowledge obtained according to the epistemological principle recognized in management and management sciences.

In terms of defining the sciences, ensuring their credibility and determining their validity and modelling, especially in the sciences of management or, instead, the sciences of organization, deserve all the attention of researchers and investigators among philosophers, especially epistemologists. A great effort must be made to demarcate this field of science by applying validity and reliability criteria.

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