December 2003

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Abstract

The purpose of this exploratory paper is to show the consequence of applying the Copernican Revolution represented by the Critique of the Pure Reason to IS. This revolution has three important implications. First, it implicitly makes a clear distinction between the object of knowledge and the origin of knowledge. Second, it implicitly goes beyond the classical alternatives between perception and understanding, on one hand, and reason and experience, on the other hand. Third, it defines nine potential epistemological trends, from the "normative explanation" to the "critical distinction". Each of these trends has a specific purpose, from the "phenomena principles" to the "distinctive conditions of possibility". This grid may be therefore used in future researches to describe the actual epistemological trends used in IS... and to focus on those who could be used.

Keywords: Reason, experience, perception, understanding, critique of pure reason, object of knowledge, origin of knowledge, distinction of representations, conditions of possibility

Many approaches for classifying epistemological trends in IS have been presented (Hirschheim, 1985, Galliers 1985, Nunamaker, Chen and Purdin 1991). Nevertheless, so far, few considered the importance of the Kantian "revolution" in epistemology represented by the *Critique of Pure Reason* (1781). In other sciences, this book has been recognized as one of the most important contributions in the philosophy of science (Popper 1972 ; Piaget 1967 ; Einstein 1987 ; Bohr 1963 ; Heisenberg 1962 ; 1971; Husserl 1936). But in IS, only a few researchers really tried to build a classification (Ivanov 1984 ; 1996, Churchman 1971. Using the own words of Kant, our science didn't make its "Copernican revolution." The word "revolution" in science might appear exaggerated, however, its usage became common after the introduction of the notion of paradigm by Kuhn (1970)

This Copernician Revolution is not about physics, but about knowledge. It is a revolution in the research method. It starts with recognizing that there are two independent dimensions in any knowledge: *object of knowledge* and the *origin of knowledge*. The second step implies that, in each of these dimensions, all classical alternatives, especially between experience and reason or between explanation and understanding, have been "transcended". This allow to present nine potential research trends according to the Critique of Pure Reason, and to assess that only a few have been experienced so far in IS research.

Two Independent Dimensions

Let us start by the description of the two independent dimensions in any knowledge: *object of knowledge* and the *origin of knowledge.*

The Object of Knowledge: Understanding Versus Perception

Kant explicitly refers to Copernican Revolution when he claims that the object of our investigation should not be considered as existing by itself. The "*changed method in our way of thinking*" is "*that we all cognize a priori about things is what we ourselves put into them*" (p. 23), or "*the object (as object of the senses) conforms to the character of our power of intuition*"(p. 21) "*objects*

are appearances that conform to our way of representing" (p. 24). Do we really think that an organization, a system, an objective, a culture, a motivation, a CRM process is a *sensible object?* An object of the senses exists independently of our thinking? Couldn't we rather define nearly all object of research in IS as *intelligible objects,* as objects of thinking? One can argue that a computer is a thing that exists in itself. But if one considers that IS is distinct from computer science, neither information nor systems appear to be especially given to perception. This does not mean that these objects of research have any kind of *actualization*: "making actual" an object simply refers to practical reason as opposed to the theoretical reason. (p. 16)

This would allow a reformulation of Kuhn's (1972) paradigm. In this approach, knowledge is no more considered as a *fit* with an external given object, but with an inter-subjective agreement between researchers in a particular society at a particular time in history. Isn't it a way to reformulate that understanding comes before (or even instead) perception? That object is first a mental concept produced through thinking rather than a materialist object given through the senses. It is an *intelligible* object.

Following Foucault (1972) *archaeology of knowledge*, knowledge is also influenced by power, like in economics the opposition between *utilitarists* and the physiocrats. The former defending "*the natural character of the three ground rents which consequently presupposed the economic and political primacy of agrarian property, which excluded all analysis of the mechanism of industrial production*" (p. 36), when the latter defended the new industrial and mercantile social class, especially with Ricardo.

The Origin of Knowledge:Reason Versus Experience

Whatever the status of the object of knowledge is, the researcher claims to create a knowledge about it, or at least a new perspective or representation of it. In this knowledge creation process, the question of the *origin of knowledge* is central. Where does our knowledge come from? Am I going to claim with John Locke that "*all concepts are derived from experience*" (Kant, p. 773) or at the opposite that concepts are already present in my reason "*independently from experience*" (p. 772), otherwise, how could we interpret experience if there is nothing in the mind that helps us to do so? This is not an opposition between positivism and interpretivism, but simply between two trends of positivism: empiricism and rationalism. According to the *Critique of Pure Reason,* during all history of science, empiricists have been pitted against rationalists. Indeed, IS field has been dominated since its beginning more by *functionalism*, a kind of rationalism, than by empiricism.. Dickson, Senn and Chernavy (1977); Ives, Hamilton and Davis (1980) is the assumption that the world is without conflicts and independent from the observer ever tested? If some recent research trends seem more close to experience how many are really totally open to the unexpected "serendipity" as Merton (1957) claimed? To be more radical, is a real empiricism even possible?

These two independent dimensions are presented in figure 1.

Origin of knowledge

		REASON	EXPERIENCE
Object of knowledge	**PERCEPTION** *(the object is given by SENSES)*		
	UNDERSTANDING *(object is first in the mind, INTELLIGIBLE)*		

Figure 1. Research Processes, Research Questions, and Modalities

The Classical Alternatives "Transcended"

These classical confrontations: between reason and experience on one hand, and between perception and understanding, on the other hand, were overcome by Kant who systematically proposed a third way to solve the alternatives.

The "Conditions of Possibilities"

Kant overcame the alternative between understanding and perception was overcome through the "*distinction of representations*" (p. 29). All objects must be considered simultaneously in *"two points of view"* (p. 23). The first point of view is perception. It considers the object as a "phenomenon."[1] The second point of view is the understanding, in another words, considering the object as an "*object that we merely think*" (p. 23). This is because *"Human cognition has two stems, sensibility and understanding. Through sensibility objects are given to us. Through understanding they are thought"*. (p. 67) *"The first is our ability to receive representations (and is our receptivity for impressions). The second is our ability to cognize an object through these representations (and the spontaneity of concepts)"* (p. 106) The point is that these two cognitions are independent.

The Distinction of Representations

The other alternative between empiricism and rationalism was overcome by transcendentalism: *"There is no doubt that all our cognitions start **with** experience that does not mean that all of it arises **from** experience »* (p. 44). In other words, there must be categories that are *a priori,* i.e. independent from experience, that create the "condition of possibilities for the experience" (p. 44). Kant called this approach of epistemology searching for "condition of possibilities" as "*critical method*" (p. 774)

The three modalities of each dimension are therefore represented in figure 2.

Figure 2. The Two Alternatives "Transcended"

Nine Potential Epistemological Trends

The interest of the *Critique of Pure Reason* is that each of the opposed schools of thoughts may be simply used as a different and complementary epistemological approach. Therefore, the rationalist approach may be called "normative", based on principles,

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[1]From the Greek "*phenomenai*" to appear, i. e., given to senses.

this approach being complementary to the "descriptive" one, based on experience. "Critical" approaches combine these two origins of knowledge by searching for the "conditions of possibilities".

If the "object of knowledge" and especially the question of the "understanding" raised one of the most known contest of the history of philosophy of science, especially through the growth of the human sciences, for Kant, the "understanding" is simply one of the "stems" of human cognition, that is complementary to the other, that we propose to call "explanation" because, through when the object is perceived through the senses "*the principle of causality*" (p. 28) may be applied as well as "*efficient causes*". The object is subject to *"natural necessity"*. It is therefore possible to explain a phenomenon (given by senses). But it is impossible to explain an object of thought, which is given through understanding. The way of combining those two representations is the *"critical distinction between the two ways of representing"* (p. 29) that brought Kant's *Critique of Pure Reason.* Therefore, explanation, understanding or distinction may be either normative, descriptive or critical. The nine possible epistemological trends are represented in figure 3.

Origin of knowledge

	NORMATIVE (PRINCIPLES)	DESCRIPTIVE (EXPERIENCES)	CRITICAL (CONDITIONS OF POSSIBILITY)
EXPLANATION ("PHENOMENONS")	Normative explanation	Descriptive explanation	Critical explanation
UNDERSTANDING ("HISTORIAL" OBJECTS)	Normative understanding	Descriptive understanding	Critical understanding
DISTINCTION	Normative distinction	Descriptive distinction	Critical distinction

Figure 3. Nine Potential Epistemological Trends

If this figure describes the process, it is also possible to describe the purpose of each of the configurations of these approaches. We may seek for principles, experiences or conditions of possibilities for phenomenon, conceptual or "historical" principles, experiences or conditions of possibilities and finally distinctive principles, experiences or conditions of possibilities (figure 4)

Origin of knowledge

	NORMATIVE (PRINCIPLES)	DESCRIPTIVE (EXPERIENCES)	CRITICAL (CONDITIONS OF POSSIBILITY)
EXPLANATION ("PHENOMENONS")	**Phenomenons principles**	**Phenomenons experiences**	**Phenomenons conditions of possibility**
UNDERSTANDING (CONCEPTS + "HISTORIAL" OBJECTS)	**Conceptual principles and historial Principles**	**Conceptual experiences and historial Experiences**	**Conceptual conditions of possibility or historial conditions of possibility**
DISTINCTION	**Distinctive principles**	**Distinctive experiences**	**Distinctive conditions of possibility**

Figure 4. The Purposes of Each Epistemological Trend

A Kantian Grid for Describing IS Epistemological Trends

Therefore, the Copernican Revolution in IS implies to describe the different philosophical trends used in IS through the Kantian grid. A first attempt is given in figure 5.

Origin of knowledge

	NORMATIVE *(PRINCIPLES)*	DESCRIPTIVE *(EXPERIENCES)*	CRITICAL *(CONDITIONS OF POSSIBILITY)*
EXPLANATION *("PHENOMENONS")*	Normative explanation **UTILITARISM** **MARXISM**	Descriptive explanation **EMPIRICISM** **?ETHNOGRAPHY** **BEHAVIORISM** **CONTINGENCY THEORY** **INTERACTIONISM**	Critical explanation **CRITICAL REALISM**
UNDERSTANDING *(CONCEPTS* *+ "HISTORIAL" OBJECTS)*	Normative understanding **?RATIONALISM** **?FUNCTIONALISM** **?HISTORIOGRAPHY**	Descriptive understanding **?CONVENTIONALISM** **?CONSTRUCTIVISM** **?ETHNOMETHOLOGY** **?ACTORS NETWORK THEORY** **?SYMBOLIC INTERACTIONISM** **?CRITIQUE OF HISTORICAL REASON**	Critical understanding **PHENOMENOLOGY** **EXISTENTIALISM**
DISTINCTION	Normative distinction **?CRITIQUE OF PRACTICAL REASON** **?THEORY OF COMMUNICATIVE ACTION**	Descriptive distinction **?POST-MODERNISM** **?COMPREHENSIVE SOCIOLOGY** **?SOCIOLOGY OF ACTION** **?GENERAL HERMENEUTICS** **?STRUCTURATION** **?HISTORY**	Critical distinction **CRITIQUE OF PURE REASON** **CRITIQUE OF JUDGMENT**

Object of knowledge

Figure 5. Actual IS Research Trends

Of course, each of these trends would need a justification, which is beyond the paper that simply wanted to present the approach for a research in progress.

Conclusion

The purpose of this exploratory paper was simply to show the consequences of applying the Copernican Revolution represented by the Critique of the Pure Reason to IS. This revolution first implicitly makes a clear distinction between the object of knowledge and the origin of knowledge. Second, it also goes beyond the classical alternatives between perception and understanding, on one hand, and reason and experience, on the other hand. Third, it defines nine potential epistemological trends, from the "normative explanation" to the "critical distinction". Each of these trends has a specific purpose, from the "phenomena principles" to the "distinctive conditions of possibility". This grid may be therefore used in future researches to describe the actual epistemological trends used in IS… and to focus on those who could be used.

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