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## Information Systems Governance and Industry 4.0 - epistemology of data and semiotic methodologies of IS in digital ecosystems

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**Abstract.** Contemporary Information Systems management incorporates the need to make explicit the links between semiotics, meaning-making and the digital age. This focus addresses, at its core, pure rationality, that is, the capacity of human interpretation and of human inscription upon reality. Creating the new real, that is the motto. Humans are intrinsically semiotic creatures. Consequently, semiotics is not a choice or an option but something that works like a second skin, establishing limits and permeable linkages between: (i) human thought and human's infinite world of imagination; and (ii) human action, with its correspondent infinite world of intentionality, of desire and of unexplored possibilities. Two instances are contrasted as two reading lenses of current business reality: IS governance and industry 4.0. These phenomena correspond to the need to take accountability, transparency and responsibility into account, when designing IS and when using such systems through the ecology of connectivity, Big Data and the Internet of Things. Political, social and cultural dimensions are brought into the equation, when addressing the question of the relevance and adequateness of IS theory and practice to respond to contemporary challenges. The message is that what has already been achieved is but a shadow, a pale vision, of what might be achieved in the age of the new Renaissance.

**Keywords:** semiotic learning, social semiotics, material phenomenology, poetic rationality, data epistemology.

Epistemology of data and semiotics are crucial areas for contemporary research in information systems. Challenging times call for challenging thought and action. The multitude of factors involved in addressing the relationship between technology and society is paramount. Semiotics enables addressing such complexity because semiotics analysis captures the value chain of signification and of meaning-making (Nobre, 2007). Artificial Intelligence (AI) is a central knowledge area to take into account in order to situate, position and interpret contemporary societies. From understanding the power of AI it is possible to acknowledge the need for semiotic-based information systems' theories, such as Ronald Stamper's Organisational Semiotics (OS).

Bernard Stiegler and Bruno Bachimont (1996) are interesting authors whose contributions have helped to understand the importance of the epistemology of data. There are four paradigms that help to explain current contexts, in terms of historical evolution: first, the empirical age, where meaning emerged from practice; second, the theoretical age, where meaning emerged from ideas, such as Descartes' contribution to modern science; third, the period between 1950 and 1990, forty years of development of applied calculus; and forth, the present age of data manipulation.

Pédaque (2006) addresses the role of documentation in the context of post-modernity. The digital world and its capacity to cut the connection to the heterogeneous nature of reality, is both its strength

and its weakness. Whilst digital media agglomerates everything creating an homogeneous set of data, semiotics maintains the heterodox nature of reality, therefore it does not lose meaning neither the meaning-making capacity. Epistemological and phenomenological perspectives are needed in order to trace, to map and to explore the different dimensions of the complexity of IS contexts. Baranauskas and Bonacin (2018) address the role of design and of its relation to signs. IS governance will be part of business leaders' agendas once the full impact of their power to bring much needed change at global level is understood. Issues related to sustainability and to human development have much to gain from IS engagement in social innovation and in global change. The digital era has found in manufacture a stronghold for the creation of new possibilities of human realization. Lu (2017) calls attention to the open research importance of industry 4.0. The core idea is that new categories of thought and action, new cognitive structures, are the product of technological evolution. Such technical change, visible through realities such as industry 4.0 or augmented reality, is understood as an enabler of human capacity to read, to interpret and to intervene upon the world. This new digital world is both a product of human endeavors and a process through which humans create new realities, the new real.

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