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The informed performer : towards a bio-culturally informed performers' practice

Vanmaele, J.

Citation
Vanmaele, J. (2017, November 20). *The informed performer : towards a bio-culturally informed performers' practice*. Retrieved from https://hdl.handle.net/1887/59504

Version:	Not Applicable (or Unknown)
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Note: To cite this publication please use the final published version (if applicable).

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http://hdl.handle.net/1887/59504

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Title: The informed performer : towards a bio-culturally informed performers' practice
Issue Date: 2017-12-20

PART II: Three facilitating contexts for a 'Generally Informed Performership'

In PART I, we explored the conceptual space of an informed musicianship by examining both the historical and dispositional relations between the semantic fields surrounding information and imagination. We arrived at blending the two fields into the notion of an 'informed performership'. In such a mode of performership, information has only a potential and indirect influence on artistic actions: information first impacts on the *Image* that musicians hold with regard to certain aspects of musical activity, and can then be brought into action to imagine possible worlds in an artistic sense, as well as to formulate solutions to cognitive gaps in a more craft-like, technical context. To counter the pleonastic inclination of an informed performership – performers are already intrinsically informed – a distinction between the sources of information was proposed as the factor that tells informed performership apart from 'mere' performership, and 'historically informed' performership. We concluded that an active interest in extra-disciplinary information (information that does not originate in musical practice and is not limited to history) should constitute that distinctive feature since such type of information is a weakly represented element in mainstream performership. To semantically integrate and stress that characteristic, 'Informed Performership' was extended into the working-concept of a 'Generally Informed Performership [GIP]'.

In PART II, it is claimed that by a combination of circumstances at the dawn of the 21st century musicianship finds itself in a position that is conducive to effectuate the potential of such a generally informed and inclusive musicianship. The bottlenecks that seem to persistently hamper such a(n) (r)evolution are the object of investigation in PART III; in this part, three levels of circumstances are explored that seem to be supportive of an informative turn.

A first circumstance is to be situated at a historical and societal *macro*-level and relates to the idea that we are currently experiencing the wide-ranging impact of an Information Age. Since the term covers a broad spectrum of meanings, the discussion in Chapter 6 includes the specification of a heuristic device that allows a constructive and functional view on the Post-War informational developments and on the opportunities that these hold for music practitioners.

A second contextual element relates to the operational *meso*-level where certain general ideas, memes and tendencies (*in casu* 'Information Age' & 'Knowledge Society') are institutionally operationalized and vitalized. The establishment of the *European Higher Education Area* [EHEA] is an

action that initiated on the European continent a profound shift in terms of the epistemic and institutional context in which musicianship defines itself. It will be argued that the effectuation of an EHEA and the processes that enabled it, ushers in new possibilities for musicians and allows for a re-arrangement of three main historical currents that have developed quasi-parallel in the course of music's history: music as theory, music as ethical instrument, and music as art.

Finally, the context of facilitation is narrowed down to a specialized *micro*-level that came to the fore in the slipstream of the aforementioned societal tendencies and their institutionalisations, namely the framework of Artistic Research [AR]. Although it is claimed by some that this kind of inquisitive artistic behaviour has always been a part of musician's doings and sayings, the concept only touched firm ground at the beginning of this century. The inherent challenges that haunt the attempts to define Artistic Research lead our discussion into an alternative and functional approach based on the articulation of three research-languages and into the description of three archetypical modes of Artistic Research, with special attention to the informed mode.

Chapter 6: Macro-level – living in an Information Age

Although tradition, autonomy, genius, claims to divine inspiration, and inborn, individual talent are generally considered by the stakeholders of musical practice to be the natural, most powerful, and intrinsic engines that drive the history of musical practice, we already know from the analysis in the previous chapters that this perspective is historical contingent. It is a narrative built upon a particular (protectionist) perspective on man, world and society and this already indicates that in a more general sense, musicianship is by no means immune to macro-societal waves and the material and epistemic effects that these tendencies engender. Analyses in support of such an embedded relationship are readily available at a theoretical and analytical level in the sociology of art and music (Adorno, 1949/2006; Benjamin, 1936/2003; Bourdieu, 1993a; Weber, 1921/1958), and also palpable in musical practice itself each time musicians use scores (writing, external memory), modern instruments (industrial revolution), or digital technologies (informational turn).

The (seemingly) strong intrinsic connection between artistic practice and sociological thinking is not always valued accordingly. Sociologist Pierre Bourdieu makes the following provocative analysis with regard to the difficult relation between artistic practice and sociological investigation[237]:

> Sociology and art do not make good bedfellows. That's the fault of art and artists, who are allergic to everything that offends the idea they have of themselves: the universe of art is a universe of belief, belief in gifts, in the uniqueness of the uncreated creator, and the intrusion of the sociologist, who seeks to understand, explain, account for what he finds, is a source of scandal. It means disenchantment, reductionism, in a word, vulgarity or (it amounts to the same thing) sacrilege: the sociologist is someone who, just as Voltaire expelled kings from history, wants to expel artists from the history of art. But it's also the fault of the sociologists, who have done their best to confirm received ideas about sociology, and especially the sociology of art and literature. (Bourdieu, 1984/1993a, p. 139)

Challenging Bourdieu's rather fatalist analysis and bringing the relationship between musicianship and society to our age, social theory offers more than a few 'turns' worthy of further reflection and exploration.[238] Given our interest in the relation between artistic practice and information, the focus here is (evidently) on the changes that allowed for a productive explosion and global availability of information since the second half of the twentieth century. Today, the signs of this new age are clearly noticeable: the fact that we dispose of powerful search engines – ranging from *google* to the more specialised queries via the *Web of Science* – that digitally extend our informational hunting fields in an

[237] I am indebted to Prof. dr. Henk Roose who brought this particular passage to my attention in the context docARTES-module 'crossing borders' in 2015.

[238] In *the Control Revolution* (Beniger, 1986, pp. 4–5) the author identifies a multitude (more than 80) of societal transformations identified between 1950 and 1984 among which some of the most renowned are: post-industrial society, post-modern society, postliberal age.

unprecedented manner (even into areas that we were not initially interested in); the way in which questions can now be launched into cyberspace and thus potentially be addressed and discussed by a very large portion of humanity; the manner in which bookshops and libraries have transgressed their spatial and material boundaries; the spectacular increase in producing and publishing of specialised information accessible via an incalculable galaxy of media such as books, journals and podcasts. All these elements attest and indicate a novel way of living and interacting.

The term that somehow summarizes the aforementioned phenomena and which has been foregrounded as an influential societal marker of our era is the notion of an 'Information Age'. As defined by the OED the 'information age' is "the era in which the retrieval, management, and transmission of information, esp. by using computer technology, is a principal (commercial) activity"; a term closely linked and causally involved is the one of an 'information revolution' which indicates "the increase in the availability of information and the changes in the ways it is stored and disseminated that have resulted from the use of computers […]".

This definitional approach hardly scratches the surface of a multifaceted concept which has been extensively discussed in sociological theory since World Word II and seems to have found its ultimate destination nowadays as an umbrella-term, holding various meanings depending on the specific context in which it is used.[239] It thereby overlaps with other concepts such as 'post-industrial society' (Bell, 1973), 'knowledge society' (Böhme & Stehr, 1986), 'network society' (Castells, 2010) and also implies a variety of derivative terms such as 'information overload', 'information anxiety', 'information architecture', and 'informed consent'. The information-buzz is clearly not a single thing but rather "a constellation of developments arising from the growing use of communication technologies in the acquisition, storage, and processing of information, and the role of information in supporting the creation and exchange of knowledge" (Mansell, 2009).

Next to the jubilant mood that the Information Age often incites, it is also important to indicate that the story of information is not all roses. *Information overload* is one well-known element of concern but besides that, there is also a concern related to *scientification*. The highly-valued 'objective' quality of information makes everyday life prey to powerful theoretical constructs which dictate, or at least influence, vital political, social-cultural and environmental decisions. Information has developed into a commodity that comes with a serious cost as it is considered to be the new oracle that is to be trusted in settling profound problems and challenges, thereby potentially disregarding personal nuances, freedom, values, particularities and possibilities.

[239] In *Theories of the information society* (Webster, 2006), five definitions are proposed that are tied to technological, economic, occupational, spatial, cultural fields of human activity. In *a Dictionary of Sociology* (Scott & Marshall, 2009) an additional sixth 'analytically separate definitional criterium' is mentioned under the heading 'theory'; it refers to the process of *scientification* that will be discussed in 6.3.2.

Over- and re-viewing all the constituting factors of an Information Age is a task far beyond the scope of this investigation. Yet, to lend support to our overall claim that musicianship finds itself in a particular historical context in which epistemic inclusiveness seems to be a logical opportunity (a *Kairos*[240]-moment), a functional treatment of the main tenets is mandatory.

Hereafter, a historical context for our contemporary Information Age is sketched with a view to highlight the unique historical situation that presents itself to humankind; the historical outline is followed by a more detailed perspective on the 'constellation of developments' as suggested by Mansell (2009); a critical assessment of musicianship in the age of information concludes this chapter.

6.1 The Information Age: a unique historical opportunity?

Although the computer-based Information Age is often described as it were something completely new, our current dealings with information are closely linked to patterns of thinking and practices that go back for centuries. Examples of such deeply engrained informational dispositions are: 1/ a drive for knowledge, deep understanding, and certainty (Aristotle, 1924; Dewey, 1929); 2/ an eagerness to share and communicate knowledge and experience; 3/ the developing of tools (speech, writing) and technologies to convey recorded knowledge over distance and through time (media such as the clay tablet, papyrus and paper); 4/ the coping with information overload via a process of storing, sorting, selecting, classifying, transforming, and summarizing (Blair, 2010); and 5/ the yearning for a universal language, long before computer language gives concrete expression to it (Mattelart, 2003, pp. 2–3).

In Chapter 4 (4.1), we cited Pfeiffer's work wherein the author situates the 'formal' onset of the information age in pre-literate cave-art societies and in the human need to create a means by which knowledge can be offloaded to an external and attention- and emotion-sensitive memory (Pfeiffer, 1982; Pfeiffer, 1983). Hobart & Schiffman (2000) seem to disagree with Pfeiffer's analysis and in turn discern three distinctive information ages while considering literacy as the essential condition for igniting informational activities. The three ages they observe coincide with fundamental shifts in terms of human information and communication: *the classical age of literacy*, *the modern age of numeracy*, and *the contemporary age of computers*[241].

According to the authors, the *classical information age* is marked by the rise of literacy and the transition from an oral, narrative, and commemorating tradition to a written one: "a fundamental difference exists between the oral process of abstraction and literate ones, namely that the oral

[240] Kairos [*Καιρος*] is in Greek mythology the personification of opportunity, the right moment to do something.

[241] The first two ages correspond roughly with the two first forms of life that were presented in Chapter 1 with an extension into the third life; the last age can be linked to the fourth life (including a part of the third life). The history that Hobart & Schiffman present is not an etymological one however, they trace the evolution of the modern notion of information as communicable knowledge retrospectively.

process is participatory and unreflective"[242] (Hobart & Schiffman, 2000, pp. 27–28). They further argue that in this first information age and with the rise of external, written memory- and communication-technology, a classifying mind-set settles in which works under the assumption that all knowledge can be brought into a properly devised system of general and specific categories.

Following this first age, the invention of printing in the fifteenth century represents a fundamental shift into a second, *modern information age,* which is crucial in paving the way for the cultural explosion of the Enlightenment.[243] It is the sheer availability of books and information generated by the print revolution which challenges traditional forms of classification and clears the way for new, more abstract, analytical and mathematical means of managing information. It is here that new institutions, techniques and formats begin to emerge with a view to furthering knowledge and enhancing the storage and communication of information. Characteristic innovations are: 1/ the publication of the first encyclopaedia[244]; 2/ the birth of the scientific academy and scholarly societies; 3/ a sphere of mutual learning via an exchange network of journals, books and pamphlets; and 4/ the creation of mathematically accurate geographical maps. The 'Victorian information society' in the 19th century adds to the modern information age an operational and technical level by the invention and innovation of critical new technologies such as the telegraph, telephone, postal service, mechanised printing, the publishing industry, and publicly funded 'memory institutions' such as libraries, museums and art galleries (Black, Muddiman & Plant, 2007, p. 11). The general context is one of establishing a 'public sphere' based on the accumulation of knowledge via science rather than on growing toward personal wisdom which was the ultimate target of the previous age.

Finally, in our *contemporary information age*, communication technologies move onto higher technological and popular planes, with the development of film, radio and television. Paradoxically enough, the increase of information and communication seems to go hand in hand with an estrangement from the 'real' world. Although much of the developments in the 20th century are rooted

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[242] Unreflective is used in the sense "that it does not foster a critical distance between knower and known" (Hobart & Schiffman, 2000, p. 28).

[243] See also *The Gutenberg Galaxy, the making of typographic man* (McLuhan, 1962).

[244] "*Par le moyen de l'ordre encyclopédique, de l'universalité des connoissances* [sic] *& de la fréquence des renvois, les rapports augmentent, les liaisons se portent en tout sens, la force de la démonstration s'accroît, la nomenclature se complète, les connoissances se rapprochent & se fortifient; on apperçoit ou la continuité, ou les vides de notre système, ses côtés faibles, ses endroits forts, & d'un coup - d'œil quels sont les objets auxquels il importe de travailler pour sa propre gloire, & pour la plus grande utilité du genre humain. Si notre Dictionnaire est bon, combien il produira d'ouvrages meilleurs?* " (Diderot & d'Alembert, 1751).

"Thanks to encyclopaedic ordering, the universality of knowledge, and the frequency of references, the connections grow, the links go out in all directions, the demonstrative power is increased, the word list is complemented, fields of knowledge are drawn closer together and strengthened; we perceive either the continuity or the gaps in our system, its weak sides, its strong points, and at a glance on which objects it is important to work for one's own glory, or for the greater utility to humankind. If our dictionary is good, how many still better works it will produce" (Diderot & d'Alembert, 1755/2002).

in numeracy and quantification (as in the modern age), the mathematical imagination reaches increasingly abstract universes and stimulates an analytical vision that further alienates itself from the material world it is supposed to represent. In this third information age, analysis and mathematics become a quasi-autonomous practice, manipulating symbols according to fixed, logical rules. This purified technique of analysis is implemented in the electronic circuits of the digital computer, leading to the contemporary ICT-idiom. Hobart & Schiffman (2000) argue that these technologies "have fostered a new form of knowing based on the idea of emergence, which describes how certain complex, natural systems continually adapt themselves to their environment. Unlike the analytical vision, this new form of knowing is expansive rather than reductive and open-ended rather than closed (Hobart & Schiffman, 2000, p. 6).

Without aiming at arbitrating between Pfeiffer's and Hobart & Schiffman's apparent disagreement regarding the onset of the information age (in a wider sense) and the evolution of information, we may infer that potentially an infinite regression to the earliest forms of communication is conceivable with regard to the origins of an informational attitude and that the evolution of information is rather a matter of degree and increasing facilitation than one of genuine quantum-leaps. Within such an evolving and trans-historical framework, it is useful to discern at least three general trends that seem to have culminated in our *contemporary information age*: reflection, abstraction and displacement.

A first development constitutes a continuous and cyclical process of *reflection* that is directed at examining and manipulating the information that becomes available when it is freed from experience. Reflection here means "the natural propensity of the mind to rework and reshape the products of its own creation, to see its own abstractions from a critical perspective as the objects of further study, analysis, and organization" (Hobart & Schiffman, 2000, p. 266).

A sequence of ever-growing *abstraction* is a second element: the classifying impulse of the *classical age* remains very much rooted in the senses, which provide direct access to reality; the analytical impulse of the *modern age* is already a step further removed from that reality by the translation of the phenomena into a new language of mathematical symbols; in our *contemporary age*, the analytical impulse is yet farther removed from reality which is now rendered digitally as a non-semantic coded sequence of zeros and ones. Then again, the abstract, disembodied and non-situated quality of information constitutes also the attractiveness of information as a universal *trait d'union* between distinctive fields.

Thirdly and finally, new ways of making sense of the world *displace* or *surpass* old ones. While the old idioms continue to develop, "the process of displacement shifts attention from one set of concerns and phenomena to another, as each information age coalesces around its own distinctive set of questions, absorbing and recasting what it can from its predecessors, pushing aside as irrelevant what lies beyond its own cultural ken" (Hobart & Schiffman, 2000, p. 7).

Considering these inherent inclinations, we may conclude that the uniqueness of our contemporary information age, which will hereafter be denoted as Information Age (capitalized), is not so much related to a sudden interest in information but rather to a technological and sociological context in which the mechanics of information blossom and by that, allow for new communicative and epistemic configurations.

6.2 The Information Age: a constellation of developments

Looking beyond a macro-historical logic – as it is claimed by Hobart and Schiffman (2000) – the Information Age, is in its concrete mechanics linked to an intricate web of technological innovations and seminal theoretical insights that engender important economic and social transformations in the second half of the twentieth century. Sociologist Armand Mattelart (2003) – who uses the terms 'Information Society' and 'Information Age' interchangeably – summarizes the elements of the web as follows:

> The notion of the information society took formal shape in the wake of the invention of artificial intelligence machines during the Second World War. It became a standard reference in academic, political and economic circles from the 1960s. The manufacture of a world of images related to the 'information age' continued apace throughout the following decade. The true geopolitical meaning of the neologisms created at the time to designate the new society would not come to light until the eve of the third millennium, with the proclamation of what is usually called the 'information revolution' and the arrival of the Internet as the new public-access network. (Mattelart, 2003, p. 2)

A more extensive, chronological selection of key contributions to the Information Age is listed in Appendix 10. The list contains: 1/ an overview of the technological inventions (grey background with black characters); 2/ seminal publications with their key contribution(s), the disciplinary field from which they emerged and the vocabulary that is being promoted with regard to describing a new societal situation; and 3/ elements of a more criticizing nature (grey background with white characters). An initial look at the sequential list of events confirms that the information-virus took root in a physics-mathematics-engineering environment and gradually extended its scope by affecting and receiving empowerment from a vast array of academic disciplines in the course of the 20th century with applications in e.g. biology, psychology, music theory, economics, sociology, public policy .The terms that figure in the titles and descriptions of the key contributions are wide-ranging and next to a clear focus on knowledge and information, we find powerful notions such as control, feedback, learning, communication, memory, expectation, meaning, objectivity, personal (knowledge and computers), industry, creativity, decision-making, ideology, action and society.

A more systematically ordered approach to the Information Age theme is provided by sociologist Frank Webster in *Theories of the Information Society* (Webster, 2006). Webster presents five definitions that

are tied to various fields of human activity: a technological, economic, occupational, spatial, cultural definition (Webster, 2006).[245]

- At the basis of the technological approach is the futurist-inspired view that the technological innovations since the 1970s (such as computers and communication networks) have engendered profound changes in society comparable to the agricultural and industrial innovations that preceded what is called 'the third wave' (see Toffler, 1980).
- The economic view on the information society measures the state of informatization in a society by the size of its information labour force and part it is taken up in relation to *Gross National Produc*t (see Machlup, 1962).
- Daniel Bell's theory of post-industrialism has been seminal in acknowledging that occupations have undergone an important shift in terms of focus and outcome. The focus of information workers in post-industrial societies is not on producing a manually factored object but rather on the production, analysis, and communication of knowledge resulting in a changed condition or world view (see Bell, 1973).
- The spatial approach to informatization holds that the networks along which information flows are responsible for creating a network society and real-time communication around the globe (see Castells, 1996).
- The cultural view finally holds that "contemporary culture is manifestly more heavily information-laden than its predecessors. We exist in a media-saturated environment which means that life is quintessentially about symbolisation, about exchanging and receiving – or trying to exchange and resisting reception – messages about ourselves and others" (see Webster, 2006, p. 20).

Webster considers all these perspective as contributing to the concept of the 'Information Society'. However, taking into account the variations in vocabulary used in other sources and for the sake of overview and pragmatic ordering, we propose to integrate the chronological fragments and their domains of impact into a systematic heuristic device as presented in Fig. 6.1.[246]

The term 'Information Age' – and not 'Information Society' – is used here as the central attractor[247] and umbrella term in a web of parallel languages[248] that are characteristic for this particular field of

[245] In *A Dictionary of Sociology* (Scott & Marshall, 2009) an additional sixth 'analytically separate definitional criterium' is mentioned under the heading 'theory'; it refers to the process of scientification that will be discussed under the heading of a 'knowledge society'.

[246] Although the conceptual terminology as it is used in Fig. 6.1 is firmly grounded in the scholarly discourse that circumvents the information *topos*, it is pragmatic in it its aim and is not claiming any universal or scholarly consensus.

[247] The term 'attractor' here is borrowed from dynamic systems and chaos theory but used in a generic and non-technical way. The technical definition of an attractor is "an equilibrium state (or collection of states) to which a system evolves over time. When the system gets close enough to an attractor, it will remain close even if slightly perturbed. A system may have multiple attractors, each with its own region of attraction" (Clapham & Nicholson, 2014). Within our context it simply refers to the emergence of one or more super-concepts within a field of initial undisciplined and non-linear activity or inquiry.

[248] Basil Bernstein claims that the humanities and the social sciences are characterized by horizontal knowledge structures that consist of "a series of specialised languages with specialised modes of interrogation and criteria for the construction and circulation of texts" (Bernstein, 1999, p. 162) and that "it is possible that the

scholarship. It is a term that allows for macro-historical considerations, epitomizes the importance of information in our age but also allows for the logics of pre-industrial, industrial and information societies to live side by side (Karvalics, 2009, p. 25). Contributing to the Information Age are four areas of development linked to four disciplinary fields: 1/ 'Inventions' – information technology; 2/ 'Communication & Control' – information theory; 3/ 'Access and Distribution' – information science; and 4/ 'Economy and Society' – information society studies[249]. Finally, the concept of 'knowledge society' is preserved for a higher order situation in which information as commodity is related to a user who is able to act upon that information and where more specifically scientific knowledge is a privileged factor penetrating all spheres of society (Böhme & Stehr, 1986, p. 8). We will elaborate counter-clockwise on these domains of the Information Age.

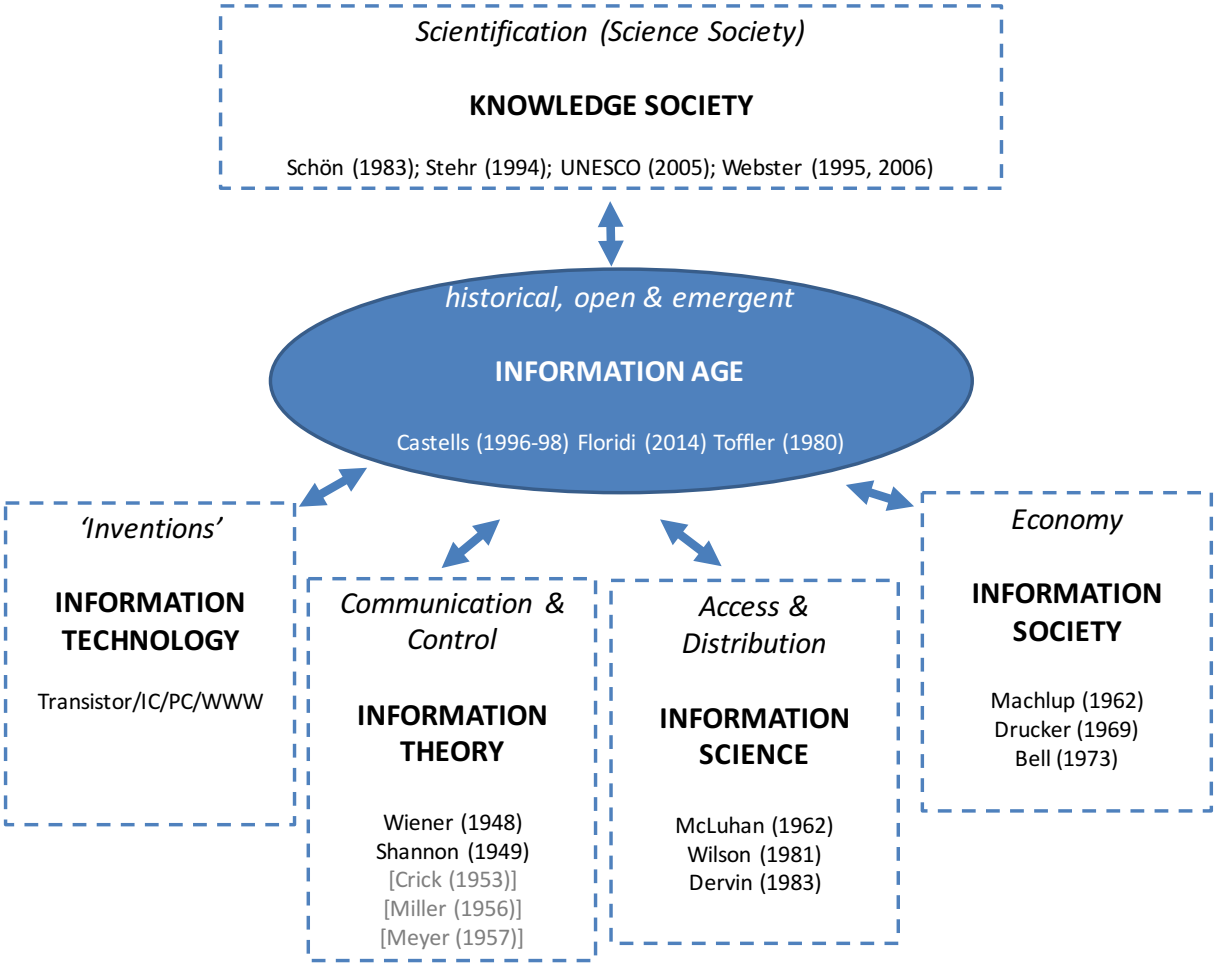

Figure 6.1. The domains that characterize the Information Age.

languages of horizontal knowledge structures, especially those of the social sciences, have an inbuilt redundancy" (Bernstein, 1999, p. 166).

[249] I am indebted here to information scientists James Dearnly's & John Feather's useful and disciplinary-based distinction between information theory, information science and information society (Dearnley & Feather, 2001).

6.2.1 'inventions'

When asked which moment from the past he would like to visit if the means of transport could be magically provided, computer-icon Bill Gates comes up with the following answer:

> My first stop on this time-travel expedition would be the Bell Labs in December 1947 to witness the invention of the transistor. It was a key transitional event in the advent of the Information Age. […] Without the invention of the transistor, I'm quite sure that the PC would not exist as we know it today. (Gates, 1996)

In *Crystal Fire, the invention of the transistor and the birth of the information age* (Riordan & Hoddeson, 1998) and in 'The invention of the transistor' (Riordan, Hoddeson, & Herring, 1999), the creation of the transistor is recounted. Seconding Gates, the authors grant the invention of the transistor the title of most important invention of the past century and consider it as a prime example of how basic, scientific research can lead to useful commercial products. The transistor emerges in 1947 from a Bell Telephone Laboratories program of basic research on solid state physics and starts to replace the use vacuum tubes in the 1950s; it eventually spawns the integrated circuit and microprocessor which are at the heart of a semiconductor industry today. Considered as the 'nerve cells' of the Information Age, transistors conform to the logic of the switch, to be or not to be, and yes- and no answers. It is a logic already in place in the nineteenth century when mathematician George Boole states that "in virtue of the principle, that a proposition is either true or false, every elective symbol employed in the expression of hypotheticals admits only of the values 0 and 1, which are the quantitative forms of an elective symbol" (Boole, 1847, p. 82). By the invention of the transistor and its proliferative potential, this simple and reductive logic is allowed to infiltrate into very complex phenomena. The transistor acts then as an external nerve system where the human neural system of excitation and inhibition is replaced by binary codes leading to an enormous (potential) extension of human computation, memorization and communication capacities[250]. The promise of the transistor is fully implemented with the realisation of the integrated circuit [IC] in 1958 which really sets in motion the digital age as we live it today (Reid, 2001). An IC, or microchip, is a set of electronic circuits on one small piece of semiconductor material (silicon) which replaces the more voluminous discrete circuits made from independent electronic components. Over the past half century, the size, speed, and capacity of chips has increased enormously allowing a computer chip of 2016 to have a million times the capacity and a thousand times the speed of the initial computer chips of the early 1970s.

[250]See also: "We have extended our central nervous system itself in a global embrace, abolishing both space and time as far as our planet is concerned. Rapidly, we approach the final phase of the extensions of man-- the technological simulation of consciousness, when the creative process of knowing will be collectively and corporately extended to the whole of human society, much as we have already extended our senses and our nerves by the various media" (McLuhan, 1964/1994, p. 3-4).

A next step in the technological information revolution is the development of Personal Computers in the late 1970s. Computer pioneer Alan Turing imagines in a 1936 paper a machine that undertakes a limited range of calculations (Turing, 1937), but is unable to construct such a machine at the time. Under the pressure of war, the idea of computation is revived and is materialized. Throughout the 1950s and into the 1960s, the first (physically huge) computers are still reserved for laboratory scientists (often in military-related research institutes), but thanks to the invention of the transistor and the integrated circuit, computers become smaller, quicker and, cheaper, eventually leading to the microcomputer or Personal Computer. These wonders of technology make their way into our homes at the end of the 20th century and become indispensable extensions of the human mind. Next to the increase of computing capacity via microcomputers, the development of communication systems which allow these machines to interact is probably still of greater importance. *HyperText*, as a system that can switch between documents, is transformed into the ability to switch between different computers and enables the step toward global connectedness. In a 1990 proposal WWW-pioneers Tim Berners-Lee and Robert Cailliau elaborate on the concept of *HyperText* and by that pave the way for the ultimate operationalisation of the WorldWideWeb in 1992:

> HyperText is a way to link and access information of various kinds as a web of nodes in which the user can browse at will. Potentially, HyperText provides a single user-interface to many large classes of stored information such as reports, notes, data-bases, computer documentation and on-line systems help. We propose the implementation of a simple scheme to incorporate several different servers of machine-stored information already available at CERN, including an analysis of the requirements for information access needs by experiments... A program which provides access to the hypertext world we call a browser.[251]

With the advent of the *WorldWideWeb* the human condition with regard to the availability and accessibility of information changes spectacularly and is still on a course of expansion and increasing applicability. In 1997 two doctoral students at Stanford-university, Larry Page and Sergey Brin, add to the massive volume of information a powerful search engine and name it *Google*. Their idea is that cyberspace possesses a form of self-knowledge situated in the links from one page to another, and that a search engine is needed to exploit this knowledge. In 1998 'to Google' enters everyday language, first as an intransitive verb and since 2000 also as a more goal-oriented transitive activity (to search information about something or someone)[252]. Search engines profoundly changes the ways in which we draw information from our global (both actual and historical) environment and are continuously increasing their semantic accurateness and practical field of application.

[251] https://www.w3.org/Proposal.html.

[252] OED.

6.2.2 *Communication & control*

Mathematician Claude Shannon's Mathematical Model of Communication (Shannon, 1948) already figured in the historical overview with regard to the dialectical relation between information and imagination in Chapter 3; the theory asserts that information is a measure of quantity, not meaning, and very strongly complies with the binary logic of the transistor. It is exactly this theoretical degree of abstraction and de-subjectification that allows engineers in the second half of the 20th century to imagine new techniques for manipulating data quasi-independently of human input. Shannon's contemporary mathematician Norbert Wiener (1894-1964) claims more generally and in relation to *cybernetics* (feedback-control) that "if the seventeenth and early eighteenth centuries are the age of clocks, and the later eighteenth and nineteenth centuries constitute the age of steam engines, the present time is the age of communication and control" (Wiener, 1948/1985, p. 39). Indeed, it seems that information theory and cybernetics record a paradigm-shift from one model or set of explanations for phenomena, to another:

> *"Energy* – the notion central to Newtonian mechanics was now replaced by *information.* The ideas of information theory, such as coding, storage, noise, and so on, provided a better explanation for a whole host of events, from the behaviour of electronic circuits to the behaviour of a replicating cell. One reason for this is that the old Newtonian mechanics had dealt with closed, conservative systems, while the information-theory model could deal with open systems, that is, systems coupled to the outside world both for the reception of impressions and for the performance of actions, and where energy is simply not the central issue. (McCorduck, 1979, pp. 42–43)

It is this idea of an objective openness and interconnectedness based on a simple binary logic which in synergy with the technological evolutions opens the doors for a new epistemic situation in the twentieth century.

6.2.3 *Access and distribution*

The consequences of an information flood (Gleick, 2011) were already palpable well before our time. In the mid-18th century, for instance, Denis Diderot (1713-1784) announces an information explosion in the *L'Encyclopédie ou Dictionnaire raisonné des Sciences, des Arts et des Métiers* (1751-1752):

> As long as the centuries continue to unfold, the number of books will grow continually, and one can predict that a time will come when it will be almost as difficult to learn anything from books as from the direct study of the whole universe. It will be almost as convenient to search for some bit of truth concealed in nature as it will be to find it hidden away in an immense multitude of bound volumes.[253] (Diderot & d'Alembert, 1755/2002)

[253] The original text in French is available via http://artflsrv02.uchicago.edu/cgi-bin/philologic/getobject.pl?c.4:1252.encyclopedie0513: "*Tandis que les siècles s'écoulent, la masse des ouvrages s'accroît sans cesse, & l'on prévoit un moment où il serait presqu'aussi*

With the coincidence of technological and theoretical progress in the mid-twentieth century Diderot's prediction is generously surpassed and a transition from a *Gutenberg Galaxy* to a *Global Village* is effectuated (McLuhan, 1962). Within this context of global connectedness, the issue of *information overload* grows into an eminent factor which the integrated field of *Library and Information Sciences* [LIS] addresses by enquiring the encounters between a human brain – with all its inherent limits with regard to attention and memory – and a multitude of information:

> […] in an information-rich world, the wealth of information means a dearth of something else: a scarcity of whatever it is that information consumes. What information consumes is rather obvious: it consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it. (Simon, 1971, pp. 40–41)

Information overload is an essential concern today to information managers and architects. Addressing the phenomenon generally involves three interrelated fields: 1/ trying to structure information from the supply-side; 2/ attempting to understand the concerns and interests of the information-user; and 3/ constructing architectures and systems to negotiate between the former two domains, between information opportunity and overload (Wilson, 1981)[254].

Next to this challenge of overload, the explosion of information access facilities also prompts other profound consequences. When communication theorist Marshall McLuhan advances the notion of a *Global Village* as a sequel to a print-oriented *Gutenberg Galaxy*, he states that: "the new electronic interdependence recreates the world in the image of a global village" (McLuhan, 1962, p. 31). It is remarkable how in McLuhan's phrase 'electronic interdependence' takes over the role of Plato's *Demiurge* in creating the world (see 3.1.2.1), and how the image of a global village becomes the eternal Idea on which creation is based. Moreover, McLuhan attaches to the concept of globalization also the idea of inescapable participation:

> In the electric age, when our central nervous system is technologically extended to involve us in the whole of mankind and to incorporate the whole of mankind in us, we necessarily participate, in depth, in the consequences of our every action. It is no longer possible to adopt the aloof and dissociated role of the literate Westerner. (McLuhan, 1964/1994, p. 4)

In *La Condition Postmoderne:, rapport sur le savoir* (1979/1984), Lyotard implicitly follows up on this topic and observes that by making knowledge accessible to the layman via information technologies,

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difficile de s'instruire dans une bibliothèque, que dans l'univers, & presqu'aussi court de chercher une vérité subsistante dans la nature, qu'égarée dans une multitude immense de volumes; il faudrait alors se livrer, par nécessité, à un travail qu'on aurait négligé d'entreprendre, parce qu'on n'en aurait pas senti le besoin" (Diderot & d'Alembert, 1751-1772).

[254] See Chapter 1.

grand narratives of centralized structures and groups are being destabilized. In the postmodern era, people will learn in different and less structured ways leading to a new way of knowing and learning in the postmodern era[255]:

> We may thus expect a thorough exteriorisation of knowledge with respect to the "knower," at whatever point he or she may occupy in the knowledge process. The old principle that the acquisition of knowledge is indissociable from the training (*Bildung*) of minds, or even of individuals, is becoming obsolete and will become ever more so. (Lyotard, 1979/1984, p. 4)

According to Lyotard, knowledge will no longer be transmitted *en bloc* but will be served *à la carte* to adults for the purpose of improving their skills and chances of promotion, but also to help them acquire information and languages that allow them to widen their occupational horizons and to articulate their technical and ethical experience (Lyotard, 1979/1984, p. 49). Therefore, competencies related to information retrieval will displace traditional conceptions of knowledge; "data banks are the Encyclopedia of tomorrow" (Lyotard, 1979/1984, p. 51), says Lyotard in 1979. This state of universal access to information will undermine the truth claims of traditional elites (also in artistic practices) and lead to a state of liberation.

Basil Bernstein makes a similar observation almost a quarter of a century later and integrates the perspective on information and power in his pedagogical device and more in particular in an analysis regarding the transition from *collection codes* of educational knowledge transmission towards more *integrated codes* (Bernstein, 2003). In education, *collection codes* are characterised by well-insulated subject hierarchies (disciplines) within educational knowledge that reinforce the hierarchical nature of the authority relationships. In the case of the *integrated code*, the contentual elements of a curriculum stand in an open and less classificatory relation to each other: "where we have integration, the various contents are subordinate to some idea which reduces their isolation from each". This in turn leads, according to Bernstein, to "a disturbance of existing authority structures" (Bernstein, 2003, p. 92) and a potential liberation.

In other studies however, it becomes increasingly apparent that the information revolution is not unswervingly leading to freedom, equal access and distribution, but that the information society is rather "a matter of differential (and unequal) access to, and control over, information resources" which results in an "indissociable relation between information/knowledge and power" (Robins & Webster, 1999, p. 89).

> Information storage is central to the role of 'authoritative resources' in the structuring of social systems spanning larger ranges of space and time than tribal cultures. Surveillance — control

[255] This postmodern approach to information is also present in philosopher Gianni Vattimo's notion of the transparent society (Vattimo, 1991, 1989/1992).

> of information and the superintendence of the activities of some groups by others — is in turn the key to the expansion of such resources. (Giddens, 1985/1992, p. 2)

It can be inferred then that an information flood is not only a matter of opportunity with regard to a fertilization or reorganization of our epistemic grounds, it is also a reason for concern and reflection. Floods have the intrinsic capacity to destroy and demolish, and in some cases, they do so in selective ways by which strongly build constructions get stronger to the detriment of the weaker parts (see Knowledge Society in 6.2.5).

6.2.4 Economy

With the term 'Information Society' the path is followed of the economic consequences that an information explosion engenders and more in particular the way in which the economic value of information replaces the older manufacturing and industrial paradigms.

> […] the Information Society is seen to be as different form Industrialism as the Industrial Society was from its predecessor, the Agricultural Society. In the industrial era people made their livings by the sweat of their brow and dexterity of their hands, working in factories to manufacture products. In contrast, in the Information Society livelihoods are increasingly made by the appliance and manipulation of information, be it in software design, branding or financial services, and the output is not so much a tangible thing as a change in image, relationship or perception.[256] (Webster, 2004, p. 1)

Economist Fritz Machlup (1902-1983) publishes *The Production and Distribution of Knowledge in the United States* in 1962 and is one of the first authors[257] to be concerned with the Information Society as an economic factor. Machlup analyses the relationship between the increasingly dynamic and interdependent processes of communication, computing, and knowledge production and how these can be developed and optimized in the service of the U.S. economy. The concept of an 'Information Society' is not explicitly used in his text because Machlup opposes against a semantic differentiation between knowledge and information. Instead, a generic working definition is proposed where 'knowledge' (or information) designates "anything that is known by somebody", and where 'production of knowledge' is concerned with "any activity by which someone learns of something he has not known before even if others have" (Machlup, 1962, p. 7-8). Within this intentionally broad range of knowledge[258] Machlup distinguishes between five types of knowledge (Machlup, 1962, p. 21-

[256] This last sentence strongly reminds us of the activity-based approach developed in chapter one: information is not a thing, but a change/difference in *Image*.

[257] The collocation 'information society' as it is now used first emerges in Japanese social science(s) in the early 1960's. The Japanese version of the expression (*joho shakai, johoka shakai*) is first used informally and then appears in a number of publications (a.o. by futurist Yoneyi Masuda).

[258] According to historian Benoît Godin (2010) Machlup's inclusive view on knowledge is strongly influenced by the contemporary perspectives of philosopher Gilbert Ryle and polymath Michael Polanyi on 'knowing how', personal and tacit knowledge (Polanyi, 1958; Ryle, 1949).

22): practical knowledge, intellectual knowledge[259], small-talk and pastime knowledge, spiritual knowledge and incidental, unwarranted knowledge.

Defining knowledge as composed of all these kinds of sub-knowledges is only the first aspect of Machlup's approach. In a second instance, knowledge is looked at in terms of production and distribution, or how it is used and communicated. Again, Machlup is very inclusive and down to earth qua production modalities and also on a par with the view on information as activity that we discussed earlier in Part I:

> Where the result of the knowledge-producing activity is upon the actor's own mind, that activity will typically be watching, listening, reading, experimenting, inferring, intuiting, discovering, inventing, or (often also in connection with received messages) interpreting, computing, processing, translating, analysing, judging, evaluating—to give an illustrative, not an exhaustive, list. Where the result is upon someone else's mind, the activity by which it is produced will typically be talking, writing, typing, printing, motioning, gesturing, pointing, signalling, but also drawing, painting, sculpturing, singing, playing, or performing in any other visible or audible way. (Machlup, 1962, p. 30)

According to the degree to which the messages delivered by a person differ from the messages he has previously received, Machlup distinguishes several types knowledge-producers (Machlup, 1962, pp. 32–33)[260] which are indicative for the levels of processing that information can undergo.

- A *transporter* will deliver exactly what he has received, without changing it in the least.
- A *transformer* changes the form of the message received, but is not supposed to change its contents.
- A *processor* changes both form and contents of what he has received, but only by routine procedures which subject different pieces of knowledge received to certain operations, such as combinations, computations, or other kinds of rearrangements, leading to definite results.
- An *interpreter* changes form and contents of the messages received, but has to use imagination to create in the new form effects equivalent to those he feels were intended by the original message; for example, the translator of a subtle speech or sensitive poetry in a foreign language.
- An *analyser* uses so much of his own judgment and intuition in addition to accepted procedures, that the message which he communicates bears little or no resemblance to the messages received.
- An *original creator*, although drawing on a rich store of information received in messages of all sorts, adds so much of his own inventive genius and creative imagination, that only

[259] This category satisfies intellectual curiosity, a part of liberal education, humanistic and scientific learning and general culture; acquired, as a rule, in active concentration with an appreciation of the existence of open problems and cultural values. 'Music', 'Poetry and Drama', 'Fine Arts' are listed alongside 'Science' in this category (Machlup, 1962, p. 214).

[260] These distinctions are in fact based upon a differential relation between information and imagination and the modes of imagination as discussed in Chapter 1.

relatively weak and indirect connections can be found between what he has received from others and what he communicates.

Machlup envisages four domains in which knowledge – as defined above - is produced: education, research and development, communication and information services, and with these wide-ranging categories of the knowledge industry as a heuristic basis, Machlup comes with some interesting national statistics with regard to that particular type of industry: 1/ the aggregate knowledge production (in 1962) makes up 29% of the adjusted Gross National Product (GNP); 2/ the rate of growth is projected at 2.5 times the average growth rate of other components of the total GNP, and knowledge production would soon reach 50% of the GNP; an 3/ the total civilian labour force engaged in knowledge-producing activities will be equal to 31.6% in 1969, and if full-time students of working age are added, the total labour force will be equal to 42.8% of the population.

Machlup's ground-breaking work leads to publications by a series of ensuing publications. In 1969, management consultant Peter Drucker, in his best-selling book *The Age of Discontinuity*, writes a section on 'The Knowledge Society', based upon Machlup's data and projections. Drucker predicts rightfully that, by the late 1970s, the knowledge sector will account for one half of the GNP. He also introduces the notion of knowledge worker: "Whilst the *Grosstadt* was founded on the industrial worker, the megalopolis is founded on, and organized around, the knowledge worker, with information as its foremost output as well as its foremost need" (Drucker, 1969, p. 32). Sociologist Daniel Bell is credited for effectively coining the term 'Information Society' which he uses interchangeably with the notion of a 'Post-Industrial Society'. Bell is interested in the effects of computer-based knowledge production in post–World War II industrial economies. In *The Coming of Post-Industrial Society* (Bell, 1973), he argues that the growing centrality of information and knowledge produces a new society, one that develops beyond the 18th-century model based on industrial fabrication. The intangible and immaterial processes of 'information' and 'knowledge' in the production of services constitutes the central processes of the evolving Information Age. Moreover, Bell argues that through knowledge technologies the main constitutive axis of an information society is based on theoretical knowledge, where the new dynamics of innovation are increasingly derived from a new relationship between science and technology.

6.2.5 Knowledge Society

With Bell's remark on the domination of theory in a Post-industrial society we enter the domain of a 'knowledge society'. An attempt to differentiate between knowledge and information societies is explicitly present in an influential 2005 UNESCO-document entitled *Towards Knowledge Societies*.

There it is stated that "the idea of the information society is based on technological breakthroughs", whereas, "the concept of knowledge societies encompasses much broader social, ethical and political dimensions […] Various forms of knowledge and culture always enter into the building of any society, including those strongly influenced by scientific progress and modern technology. It would be inadmissible to envisage the information and communication revolution leading – through a narrow, fatalistic technological determinism – to a single possible form of society" (UNESCO, 2005, p. 17). Further in the document we find an even sharper delineation and hierarchy of terms:

> Knowledge societies are not limited to the information society. The rise of a global information society spawned by the new technology revolution must not overshadow the fact that it is valuable only as a means to achieve genuine knowledge societies. The growth of networks alone will not be able to lay the groundwork for the knowledge society. While information is a knowledge-generating tool, it is not knowledge itself. Emerging from the desire to exchange knowledge by making its transmission more efficient, information remains a fixed stabilized form of knowledge. (UNESCO, 2005, p. 19)

It is clear from this text that Machlup's initial, unitary approach with regard to information and knowledge is overruled here. Information is now considered to be a means to an end, it is a knowledge-generating tool that lives primarily by its capacity to exchange and transmit. But information is not an innocent and neutral commodity for exchange and transmission, it holds a strong controlling and authoritative power that needs restraining and subjecting to human judgement and interpretation:

> Instead of controlling it, many people will realize that it is controlling them. An excess of information is not necessarily the source of additional knowledge. […] In knowledge societies, everyone must be able to move easily through the flow of information submerging us, and to develop cognitive and critical thinking skills to distinguish between "useful" and "useless" information. Useful knowledge is not simply knowledge that can be immediately turned into profit in a knowledge economy – "humanist" and "scientific" knowledge each obey different information-use strategies. (UNESCO, 2005, p. 19)

Notwithstanding this plea for a broad knowledge-spectrum that counterbalances the power and abundance of (objective) information, a knowledge society is in the scholarly literature for the greater part identified with a society in which theoretical knowledge occupies a pre-eminent place:

> The theme which unites what are rather disparate thinkers is that, in this information society (though the term 'knowledge society' may be preferred, for the obvious reason that it evokes much more than agglomerated bits of information), affairs are organised and arranged in such ways that theory is prioritised. (Webster, 2006, p. 28)

Sociologist and historian Daniel R. Headrick (2000) situates the seeds for a state of affairs in which theory takes priority in settling practical problems in the eighteenth century and links it to a spirit of progress that motivated educated people to apply knowledge and reason to politics and business: "more knowledge would lead to the betterment of humankind" (Headrick, 2000, p. 12). There is a rich

vocabulary available describing the situation generated by the dominance of theory. Political scientist Robert E. Lane (Lane, 1966, p. 650) defines the term 'knowledgeable society' as a society where its members: 1/ inquire into the basis of their beliefs about man, nature, and society; 2/ are guided (perhaps unconsciously) by objective standards of veridical truth, and, at the upper levels of education, follow scientific rules of evidence and inference in inquiry; 3/ devote considerable resources to this inquiry and thus have a large store of knowledge; 4/ collect, organize, and interpret their knowledge in a constant effort to extract further meaning from it for the purposes at hand; and 5/ employ this knowledge to illuminate (and perhaps modify) their values and goals as well as to advance them (Stehr & Ericson, 1992, p. 4).

Learning theorist Donald Schön (1930-1997) famously challenges the model of 'technical rationality' and evidence-based practice as the dominant epistemology of practice in *The Reflective Practitioner* (Schön, 1983):

> According to the model of Technical Rationality – the view of professional knowledge which has most powerfully shaped both our thinking about the professions and the institutional relations of research, education, and practice – professional activity consists in instrumental problem solving made rigorous by the application of scientific theory and technique. (Schön, 1983, p. 21)

Philosopher Gernot Böhme and cultural scientist Nico Stehr employ the term 'scientification' to refer to the same phenomenon:

> Science and technology are going to penetrate and change the realm of jurisdiction, education, and administration, as they already have done with realms of production and transport.[…] This process has also been called a 'colonization of the life-world'. In fact, scientification not only means that certain aspects of our life are made a subject of research, but also a gradual transformation of the life-world and the realm of social action which makes scientific concepts and technological procedures applicable. […] Scientification of architecture means that this occupation, traditionally considered to be something between art and craftsmanship, is being transformed by the introduction of science and technology. (Böhme & Stehr, 1986b, p. 125-126)

In a follow-up publications, Stehr prefers the term 'scientization' to refer to a knowledge society based on the penetration of all its spheres of life by scientific knowledge and the displacementof other forms of knowledge by scientific knowledge (Stehr & Ericson, 1992, p. 6).

Finally, the notion of 'applied science' also fits within the contours of a knowledge society. It is the image whereby scientists gather knowledge and create theories, and engineers apply that knowledge in order to design artefacts. Although the applied-science-view is often practically useful or even indispensable, it does not lead to new knowledge about the world (Vermaas, 2011, p. 55).

Given these differential interpretations of the concept of a knowledge society it is reasonable to use in this domain the term 'knowledge society' for a societal situation that allows a variety of knowledges (tacit, personal, reflective, intuition), and use the term 'science society' in cases where it explicitly refers to a process of 'scientification'.

6.2.6 The Information Age: emergent, historical and open

The notion of an Information Age is presented in Fig. 6.1 as an umbrella term that brings the aforementioned domain-aspects together and characterizes an era in which the retrieval, management, and transmission of information, especially by using computer technology, is a principal activity. The term seems to be at least vacant for the job:

> We grope for words to describe the full power and reach of this extraordinary change. Some speak of a looming Space Age, Information Age, Electronic Era, or Global Village. […] I myself have written extensively about the arrival of a "super-industrial society." Yet none of these terms, including my own, is adequate. (Toffler, 1980, p. 10)

Sociologist Manuel Castell's trilogy gave an important impetus to the generic use of the concept of an Information Age (Castells, 1996, 1997, 1998) but his choice of wording with regard to the title for his masterpiece is only briefly and pragmatically justified in a footnote:

> Titles are communicating devices. They should be user-friendly, clear enough for the reader to guess what is the real topic of the book, and worded in a fashion that does not depart excessively from the semantic frame of reference. Thus, in a world built around information technologies, information society, informatization, information superhighway […], and the like, a title such as The Information Age points straightforwardly to the questions to be raised, without prejudging the answers. (Castells, 1996/2010, p.21, note 31)

With this terminological license in mind and within the aforementioned conceptual configuration the term 'Information Age' (*Informationszeitalter*, *l'ère de l'information*) allows reference to a historical period (1944-) where information seems to represent a crucial but not all-encompassing category within in the global arena. We thus conceive the Information Age as being emergent, historical, and open.

The emergent quality of the Information Age is supported by outlining the five domains that are involved in the evolvement of the concept. The Information Age builds on a bottom-up coincidence of technological, theoretical, communicative, economical, and epistemic developments and is not a top-down societal ideology that pre-determines future implications. As such, the Information Age is connected and susceptible to a variety of minor influences and orientations which have the potential to cause a global butterfly-effect (see the influence of the developments such as the transistor and google).

Treating the Information Age as a historical super-concept then offers the opportunity to relate it to other macro-historical ages and revolutions and to understand the uniqueness of the new situation and its opportunities. We already identified three historical information ages in the introduction (Hobart & Schiffman, 2000) but other historical orderings have also been proposed, each from a very specific viewpoint:

- Following Machlup, futurist Alvin Toffler formulates a popular perspective in 'the third wave' (Toffler, 1980) by proposing three decisive turns in the history of human society and linking them to three revolutions : an agricultural, industrial and information wave.
- Philosopher Luciano Floridi calls the construction of the *infosphere* a fourth revolution (Floridi, 2010, p. 9). The first, Copernican revolution, removed humans from the centre of the universe; the second, Darwinian revolution links us to the rest of the animal kingdom; the third, Freudian revolution, links our Cartesian minds to subconscious drives; the final revolution, inspired by Turing, harbours a process of dislocation and reassessment of our fundamental nature and role in the universe. It implies the realisation of the intrinsically informational nature of human identity and humble awareness that the products of our own making share and surpass our own capacity for information processing (Floridi, 2010, p. 102). Turing displaced us from our privileged and unique position in the realm of logical reasoning, information processing, and smart behaviour (Floridi, 2010, p. 93).
- From a sociological point of view Anthony Giddens points to the link between an Information Age and an increased reflexive awareness[261] which is added to the achievements of modernity: "social reflexivity refers to the fact that we have constantly to think about, or reflect upon, the circumstances in which we live our lives. When societies were more geared to custom and tradition, people could follow established ways of doing things in a more unreflective fashion. For us, many aspects of life that for earlier generations were simply taken for granted become matters of open decision-making" (Giddens & Sutton, 2009, p. 100).

Notwithstanding the historical significance of the information revolution, within the model that is proposed here, the central notion of an Information Age is considered to be an intrinsically open concept, not in a philosophical (Wittgensteinian) sense, but in the way it invites for participation while at the same time acknowledging and accepting a reality of alternatives to the dominant paradigm of an information and knowledge society, both inter- and intra-societal, both historical and actual. Informatization is of major and direct significance for advanced, Western societies with an emphasis on economic growth and innovation (Webster, 2004b, pp. 1–2) but these civilizations are only part of a historical situation denoted here as an Information Age. Historian László Karvalics (2009) concludes that "one of the characteristics of the Information Age is that pre-industrial, industrial and information

[261] Sociologist Ulrich Beck (1944-2015), also rejects postmodernism. Rather than living in a world 'beyond the modern', we are moving into a phase of what he calls 'the second modernity'. The second modernity refers to the fact that modern institutions are becoming global, while everyday life is breaking free from the hold of tradition and custom (Giddens & Sutton, 2009, p. 100).

societies live side by side" (Karvalics, 2009, p. 25). Floridi sees a simultaneous occurrence of three types of societies: pre-historical (without written records), historical (with written records) and hyperhistorical (ICT as an essential drive) societies:

> From this perspective, human societies currently stretch across three ages, as ways of living. […] at the beginning of the second millennium there were still some societies that may be living prehistorically, without recorded documents. […] The greatest majority of people today still live historically, in societies that rely on ICTs to record, transmit, and use data of all kinds. […] Then, there are some people around the world who are already living hyperhistorically, in societies and environments where ICTs and their data-processing capabilities are not just important but essential conditions for the maintenance and any further development of societal welfare, personal well-being, and overall flourishing. (Floridi, 2014, pp. 3–4)

Next to inter-societal differentiation, the Information Age also allows for intra-societal differentiation. Within Western capitalist and economy-driven societies there is certainly room and even a need for dissidence, reflection and counterbalancing. Often the arts and humanities have been prompted to take up that critical and dialectal role and to challenge the all-invasive role of objective and reality-oriented information. Within that context, the relation of an Information Age vis-à-vis the currents and traditions in musical practice is all but self-evident. Notwithstanding the (potential) opportunities information seems to offer to artistry in terms of imagination (see Chapter 1), problem-solving (Dervin, 1992), learning/education, and a liberation from dogmatic traditions (Lyotard, 1984; Vattimo, 1991, 1989/1992), the Information Age often invokes strong opposition and resistance when considered from a traditional romantic and counter-enlightenment perspective (Berlin, 1980) and from the view of a (cultivated) duality between reality and imagination (see PART I). With a view to making the Information Age eligible for musicianship, openness and inclusiveness is key.

Hereafter, we will investigate the relationship between musicianship, extra-disciplinary information, and the Information Age in some more detail.

6.3 Musical performership in the Information Age

6.3.1 The performer's links to the Information Galaxy

As far as the technological and theoretical elements of the Information Age are concerned it is probably fair to say that the influence of the Information Age on score-based performers is in a first instance connected to trivial implications with regard to an increase of personal access and distribution facilities.[262] Akin to non-musicians, performers use information and communication technologies in

[262] We are aware of the advances in digital score editions but it seems that the score-based performance culture is still very much focused on printed editions as primary sources of information, with a special interest even in first editions, Urtext-editions, manuscripts and autographs; also musical instruments have stayed to a large

relation to everyday activities, and, with knowledge more or less freed from hermetically closed expert-disciplines and traditions, also musicians have potential access to a wide variety of digitally available information – especially if they can rely on an institutional subscription to specialized electronic journals.

The performative element in PART I, wHere we accessed extra-disciplinary terrains such as philology, philosophy, evolutionary theory, sociology, library & information sciences from a musician's point of view, demonstrates that, nowadays at least, the means are available to familiarize oneself with a vast terrain of expertise. This is a new situation presented to musicians, especially in terms of efficiency. For sure, a great deal of the information that we consulted in relation to information and imagination, would also have been available in pre-Information Age times, in physical libraries or in the minds of dedicated scholars and professors, but the energy- and time investment to logistically make contact with those sources would have been quasi-insurmountable, especially in combination with a professional practice as a musician. Electronic access to journals, encyclopaedias and books, Interlibrary Loan Services (which often operate via a scanned PDF-file), podcasts and other communicative media, have created an infosphere whereby at least potentially the opportunity of extending one's epistemic horizon in the direction of GIP is supported in unprecedented ways. Digitally transferred information as disembodied knowledge can be considered a new currency that allows us to connect to a brave new world of opportunities.

But what about the meta-personal, and more systematically and institutionally structured information systems in the Information Age that should act as filters between user and extra-disciplinary information sources, and, as we saw in Chapter 4, are supposed to take into account the limited attention- and processing capacities of a human (and musical) mind? The RILM (*Répertoire International de Littérature Musicale*), which is the warehouse of all music-relevant information and 'the beating heart of music research' (Dunsby, 1995, p. 17)[263], announces on a regular basis an impressive increase in contributions to the musical *infosphere*. The RILM-content is organized according to several super classes[264] : 1/ Reference and Research Materials; 2/ Imaginative Literature; 3/ Collected Writings; 4/ Universal Perspectives; 5/ Western Art Music; 6/ Traditional Music and Non-Western Art Music; 7/ Jazz and Blues; 8/ Popular Music; 9/ Sound Sources; 10/ Performance Practice and Notation; 11/ Theory, Analysis, and Composition; 12/ Pedagogy; 13/ Music and Other Arts; 14/ Music and Related Disciplines; and 15/ Music in Liturgy and Ritual. The category of 'universal

extent within the range of the well-known orchestral instrumentarium.

[263] "facilitates and disseminates music research worldwide. It is committed to the comprehensive and accurate representation of music scholarship in all countries and languages, and across all disciplinary and cultural boundaries" http://www.rilm.org/aboutUs/.

[264] http://www.rilm.org/searching/classes.php.

perspectives' is concerned with historical and ethnographical studies around the world but of particular interest to us is the category 'music and related disciplines' which is subdivided into:

- Philosophy, aesthetics, criticism
- Psychology and hearing
- Physiology, therapy, medicine
- Archaeology
- Engineering and sound recording; computers
- Physics, mathematics, acoustics, architecture
- Sociology
- Linguistics and semiotics
- Printing, publishing, music business

What we find here is a professional information system that accumulates an impressive volume of information that *prima facie* fits the extra-disciplinary information needs of a Generally Informed Performership. However, there are some major down-sides to this initial euphoria.

Firstly, RILM is about collecting 'music' research; even interpreting that mission in the widest possible sense, it still means that in all the publications, an explicit link with the term 'music' will have to be present. By consequence, RILM will only grant access to extra-disciplinary information already pre-filtered by the orientations and research-interests of dedicated disciplines. Since RILM is a joint project of the International Association of Music Libraries, Archives, and Documentation Centres [IAML]; the International Council for Traditional Music [ICTM]; and the International Musicological Society [IMS] we may assume that at least to an important extent the collection and the access facilities connected to it are tailor-made for these constituting interest groups and do not directly attune to performer's concerns; the choice of super-classes is certainly an indication of a musicology-driven outlook. Secondly, the category 'music and related disciplines' functions only as a label that can be checked off to limit one's keyword-driven search results and thus presents in no meaningful way an overview with regard to extra-disciplinary terrains or trends. If we add to that deficit the findings coming from Information Behaviour Research (see Chapter 4) that suggest that: 1/ artists (in general) have idiosyncratic rather than systematic information needs; 2/ that information serves primarily as motivational inspiration; 3/ that they prefer social mediation over the use of catalogues and indexes in libraries; and 4/ that underdeveloped information literacy skills are often a barrier to reach for information, and we can confidently assume that the mere existence of a catalogue such as the RILM-catalogue, which is anyway only accessible via subscription, has barely the potential to change the informational horizon of musicians in extra-disciplinary terms. Having a category in the search machine

of a discipline-based data-base does not automatically imply an opening of the gates to extra-disciplinary fields.

Another way of accessing extra-disciplinary information would be through dedicated publications. In recent years, we have seen an important increase of publications regarding the relation between music and the field of psychology. Titles such as *Psychology for Musicians, Understanding and Acquiring the Skills* (Lehmann, Sloboda, & Woody, 2007) or *The Science & Psychology of Music Performance: creative strategies for teaching and learning* (Parncutt & McPherson, 2002) have the incontestable merit of being information systems mediating between the vast field of psychology and musical practice. A closer look at the structuring of content in such books, however, shows that, quite logically in fact, these publications follow mainly the disciplinary agenda, interests, organisation and jargon of the field of psychology. They offer snippets of a puzzle in a scientific language that is often overpowering in its accuracy but at the same time at odds with information needs and existing Image-structures of musicians. Collegial experience in music education and performance learns that although a clear interest in matters such as motivation, performance anxiety, motor skill development is certainly present in the field of performance, most colleagues either retreat in a passive attitude of very selective awareness and holding on to interdisciplinary wisdom, take out one isolated element of the research to work with, or are totally overwhelmed by the apparent objectivity of these contributions and are left in frustration. The authors themselves seem to agree with this analysis when they write that "scientific writers tend to focus on simple hypotheses and assumptions that are easy to demonstrate and explain but are of limited interest to musicians. It is little wonder, therefore, that modern […] students are often unaware of the basic findings" (Parncutt & McPherson, 2002, p. 285).[265] What we are apparently left with, most of the time, are personal *google*-queries and a wide range of information that is distributed and reaches performers drop by drop via the classical media (TV, Press, radio, social media, specialized magazines in some cases); but such an information behaviour of course does not surpass a trivial involvement with Information Age tools.

From the perspective of information behaviour studies, it seems that the development of a dedicated information system is an element that is missing and crucially hampers a more structural interaction between musicians and the galaxy of information.[266]

[265] It has to be remarked that in this particular publication an effort has been made to make progress in the matter by organizing a co-authorship for each of the chapters coupling an academic and a practitioner. Still I know very few colleagues (actually not one) who have this publication in their personal library. These publications are nowadays available in most Conservatory libraries.

[266] The issue of developing adequate information systems for musicians will be subjected to an investigation in PART III, Chapter 11.

6.3.2 The participation of musicians in societal debates

From the considerations above, it is clear that a historical opportunity is presenting itself to musicians in terms of epistemic connectedness but that this occasion is only marginally explored. The question presents itself with regard to the urgency and necessity of such an information attitude? Since we defined the Information Age ultimately as an essentially open concept, the option for a territorial *status quo* or in some cases even a militant counter-attitude for musicianship vis-à-vis extra-disciplinary positions is at least a logical possibility. But then again we remember McLuhan's remark that "it is no longer possible to adopt the aloof and dissociated role of the literate Westerner" (McLuhan, 1964/1994, p. 4). How should we understand this incongruity? McLuhan argues against the sheer possibility of a dissociated *status quo* position given the omnipresence and powerful influence of the knowledge society.

Bringing McLuhan's observation to the realm of artistic practice then, it is indeed hard not to see how government-driven reorganizations of culture and education are often informed by a strong belief in statistics and scientific approaches, and that ultimately artistic practice is gently (or sometimes brutally) forced to adapt to the conditions that come into existence on such a basis. To give a concrete example: The Organisation for Economic Co-operation and Development [OECD] recently published a report regarding the role of the Arts in society. One of the key-points of departure is that "in knowledge-based societies, innovation is a key engine of economic growth, and arts education is increasingly considered as a means to foster the skills and attitudes that innovation requires, beyond and above artistic skills and cultural sensitivity" (Winner, Goldstein, & Vincent-Lancrin, 2013, p. 3). The insights that are presented throughout the document are largely based on the review-work of Boston College psychologist Ellen Winner and seek to forge a link between artistic training and the development of a transferrable sense for innovation; all at the benefit of global economy (see the tenets of an 'information society'). The conclusion with regard to the transfer quality of artistic creativity however is very nuanced:

> Even though we find some evidence of the impact of arts education on skills outside of the arts, the impact of arts education on other non-arts skills and on innovation in the labour market is not necessarily the most important justification for arts education in today's curricula. The arts have been in existence since the earliest humans, are parts of all cultures, and are a major domain of human experience, just like science, technology, mathematics, and humanities. In that respect, they are important in their own rights for education. (Winner et al., 2013, p. 19)

Notwithstanding this balanced position, the Flemish minister for education in Flanders proposes in 2015 a new plan for part-time art education largely based on a (rather selective) reading of the 2013 OECD-document:

> The Flemish government's new slogan, imagination works, accentuates de driving power of imagination for innovation in Flanders. This corresponds to the conclusion by the OESO with regard to recent research 'Art for Art's Sake'. 'People with an education in arts play a significant role in starting off innovative processes. Focusing on the arts therefore becomes an undeniable dimension of a strategy a land can deploy for innovation'. Non-routine and non-manual skills will be in increasing demand by the economies of the future. According to the OESO, future welfare will depend more and more on innovation and creativity. The research shows a strong correlation between arts education on the one hand and academic results and employment in an innovation on the other. (Vlaams Ministerie van Onderwijs en Vorming, 2015, p. 4)[267]

It is clear here that the Flemish ministry has allowed itself a few interpretative and ideologically inspired adjustments with regard to the original text. Whereas the authors of the original OECD-document speak of 'some evidence', this view is largely absent in the political text which claims that there is 'a strong correlation…'; and whereas the original document rightfully pays attention to the intra-disciplinary motivation for education in the arts, this perspective is hard to trace in the policy text.

This case is a special one in the domain of scientification, in the sense that the research text *an sich* is valuable and nuanced but is ideologically appropriated and distributed with the aim to impose ideas, originating from the ideology of an information society, with evidence-based authority. It is only one example of what we could call *scientification in and of the arts*, or the influence of scientific theory on decisions that affect the daily lives of musicians, *in casu* the lives of part-time art students and teachers. They will have to take into account, one way or another (in curricula or didactics) the 'evidence-based' and 'informed' view of governments without often being able or invited to formulate counter-arguments to a stated position. Indeed, the above-cited text has been passed on to schools and teachers in Flanders and met almost no explicit, structured resistance or critical comments. In Chapter 1 we witnessed punctual instances of scientification when for instance Peter Kivy selects one particular meaning of 'to inform' for the OED and takes it as a basis for disqualifying HIP. Kivy, in information behaviourist terms, acts here as information filter and uses his scholarly authority in an attempt to disqualify and ban a particular and thriving practice.

In *Why Knowledge Matters in the Curriculum* (Wheelahan, 2010), educationalist Leesa Wheelahan is concerned with the field of professional education and the absence of professionals in the social and political debate. She observes and regrets that knowledge is retreating from professional curricula: "the paradox is that while education is supposed to prepare students for the knowledge society, the modern curriculum places less emphasis on knowledge, particularly theoretical, disciplinary knowledge" (Wheelahan, 2010, p. 3). Wheelahan claims that the argument that is used to justify this

[267] Own translation.

retreat is in many cases that the Knowledge Society has transformed the nature of knowledge by claiming that tacit, contextual, reflective and immediately applicable knowledge is more productive than the disciplinary and codified. The result is that students and professionals do not dispose of the means to participate in debates and conversations and are doomed to accept eternal truths dispensed by those in authority (Wheelahan, 2010, p. 162).

> The focus [should be] on introducing students to the debates and controversies within disciplines and within their occupational field of practice and for creating the conditions for active agency so students can participate in these debates and controversies. Students need to be inducted into disciplinary systems of knowledge so they have access to the criteria used to judge knowledge claims, and over time, change the terms of the debate. Knowledge needs to be the starting point for considering pedagogies that will support students be part of this conversation. (Wheelahan, 2015, p. 760)

Wheelahan further argues that this problem will not be addressed by insisting that other 'ways of knowing' are also valuable and need recognition (Wheelahan, 2010, p. 162), but that the solution is in connecting professionals to the realms of disciplinary knowledge.

Turning our attention back to the field of music specifically we certainly find affinities with Wheelahan's analysis with regard to vocational training systems. One of the prominent theorists that has been referred to in artistic epistemology in recent years has been Donald Schön. Schön challenges in *The Reflective Practitioner* (1983) and *Educating the Reflective Practitioner* (1987) the technical rationality in professions and proposes to open the field of knowledge for a type of knowledge which he meaningfully calls professional artistry and is described as "the kinds of competence practitioners sometimes display in unique, uncertain, and conflicted situations of practice" (Schön, 1987, p. 22). Schön explicitly invokes the example of the musical masterclass as a model of properly engaging with coaching and reflection-in-action.

The artistic field has welcomed Schön's insights with great enthusiasm and has interpreted his contribution as a letter of safe-conduct for a relative and autonomous *status quo* of artistic practice. But is that really Schön's legacy? In his analysis Schön challenges a situation in professional practice (not music) where theory dominates the terrain (scientification) and is in need for a practical voice as a counterbalance, hence the notion of *reflection-in-action* and professional artistry. But these additional elements are not of the sort to eliminate theory from the horizon, Schön's reflective practicum is a tool to bring discipline-based theory and practice together: "my design for a coherent professional school places a reflective practicum at the centre, as a bridge between the worlds of university and practice" (Schön, 1987, p. 309). Our understanding of Schön is that when confronted with a situation of excessive technical rationality, *reflective practica* should be established in curricula in order to mediate between discipline-based theory and practice. The situation of musicians is totally different however. The whole idea of scientifically-led, foundational disciplines and the internally

generated dominance of theory is almost completely absent in the musical field that has historically developed from total immersion in cosmology in antiquity to an idealized, subjective and autonomous field of human activity in the 19th century. In a review of *The Reflective Conservatoire* (Odam & Bannan, 2005) Constantijn Koopman critiques the artistic and research projects presented by musicians (Koopman, 2007, p. 156) by observing that: 1/ the projects are often not more than reports on the actions and reflections by artists/researchers what they have done and what they have learned; and 2/ the aim of the research projects appears to be personal development rather than the acquisition of 'objective knowledge'.

Although since 2007, developments in the field of Artistic Research and Doctorates in the Arts have engendered precious examples of how practice and extra-disciplinary knowledge can be integrated, we are not yet in situation that could be labelled as affirmative in terms of a paradigm-shift. That being the case, the participatory role of musicians in larger societal debates via a structural link to the information galaxy is certainly a factor that needs our attention.

6.4 Summarzing the opportunities for GIP in the Information Age

The Information Age brings musicians in an unprecedented, historical situation qua personal information-potential level and offers, via informational access, alternatives to the status of music as autonomous practice. In order to realize the full potential of these opportunities, discipline-specific information systems that are able to act as facilitators between musician and information galaxy are probably the primary concern. However, the Information Age is not only about opportunities, there are also concerns with regard to safeguarding artistic identity, values and perspectives which are at risk in a process of scientification. In some punctual instances information seems to control us rather than vice versa.

In order to nourish the inherent characteristics and values of musicianship the necessary transition – as advocated by UNESCO – from an information society to a knowledge society where information can be critically assessed and debated, is still waiting for its full effectuation in artistic practice. The process of scientification proceeds in the meantime, on a societal, institutional, pedagogical and didactical level and unless an effort is made to communicate with other stakeholders of society on the basis of a common ground, it will be very difficult for musical practice to stand its ground. Such a common ground should, in our view, be based on shared information.

It seems then that we can add and element to our working-definition of GIP: GIP is not only concerned with bridging cognitive gaps and stimulating imagination, but also with strengthening musical practice's participation in political, social and cultural conversations. The open and emergent quality of the Information Age and knowledge society certainly allows for such a constructive development.

One of the seminal elements in support of a GIP situated within a Knowledge Society is education.
In the next chapter-section we will investigate how the field of Higher Music Education behaves in an Information Age.