Digitality as a Medium of Communication
With a Focus on Organizations as Systems of Decision-making

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The paper proposes to distinguish the technology of computing-networks from a medium of
digitality. It draws on Niklas Luhmann’s thesis, that the information of mass media is produced
outside the technology of dissemination. The central concept will be that of redundancy. By
algorithmic data processing digitality establishes forms of unambiguouslyness within redundant
patterns, thereby emitting an undesigned side of ambiguities. Thus the medium of digitality is
defined by the code unambiguousness/ambiguinness. Referring on the theory of social addresses,
the final sections describe why (and how) organizations (and not persons) are the first addresses to
realize the forms of digitality. The case of Big Data could serve as a test of the thesis.

Key words: digitality, communication media, systems theory, social address, technology, algorithm,
organization

1. The Computer as Technology, as System Generator, and as Medium

Within the media theory of society as outlined by Niklas Luhmann (2012, see
pp. 113–250) computers and computer-based networks play a triple role. They could
either be conceived as technology, as catalysts of new systems, or as establishing a
medium of communication in its own right. Each concept focuses on different aspects
and leads to different assumptions about the computer’s effects on society, its internal
differentiations and dynamics, its relations to the environment. Luhmann himself
preferred the concept of technology, writing about invisible machines (Luhmann,
2012, see p. 66, 2000a, see p. 372; Baecker, 2006). Applied to society (as the
encompassing system of all communication), Luhmann saw the revival of an old
distinction, namely the distinction between surface and depth (Luhmann, 2012, see p.
182), which was the leading duality of divination (see Luhmann, p. 141). Dirk
Baecker (2007), integrating Harrison White’s theory of identity and control, conceives
the computer as catalyst for a next society, which differentiates subsystems based on
control networks, transcending the functional and organizational subsystems of the
now old modern society. Peter Fuchs diagnoses a re-arrangement of structural
couplings between communication and consciousness (Fuchs, 2013b), a shift from
language to a body-steered, nontransparent machinery, which will lead to flat
addresses of communication (Fuchs, 1998, see p. 319). On my own account I
proposed a medium of digitality, comparable in its structures and maybe in its
evolutionary effects with the communication medium of script (Brosziewski, 2003).
My paper will elaborate the concept of digitality as medium of communication,
especially in comparison to the three traditional media language, dissemination media and success media of communication. Such an analysis does not contradict the mentioned diagnosis about divination, control networks, and the flattening of social addresses. Instead it focuses on a complementary aspect. The thesis will be: The media shift raised by the medium of digitality re-configures the relation between organization and technology as two major modern mechanisms to absorb uncertainty and to stabilize social structures.

2. Technology and Information

A major challenge for media theories in general and for the systems theory of communication media in particular is to distinguish between a medium and its corresponding technology. The problems to identify the central object of study were intensified, since media philosophy and media studies demanded a more analytical respect for the materialities of media (Gumbrecht & Pfeiffer, 1994; Schmidt, 2008; Parikka, 2012; Herzogenrath, 2015). Proposing expressions like digital and digitality runs the risk of perpetuating the technological bias in media analysis, as the terms stem from self-descriptions of technological innovations to announce their own newness, and are nowadays adapted to spread culturally and to designate new worlds, new universes, new realities, not to speak of new ways of living, learning, and thinking.

For a first foray into the thicket of technology and materiality, I draw on Luhmann’s study about the two realities of mass media (real operations of writing, printing, sending on one hand; generating a world for society on the other hand; Luhmann, 2000b, see p. 8). Having in mind the classical technologies of mass media (script, printing press, broadcasting with pictures and sounds), Luhmann (2012, see p. 180) asserts, that all information is produced outside the underlying ensemble of disseminating technologies. Mutual dependencies and causal relations between media and technologies are not denied at all. But the technologies can only intervene as noise, as technical failures, as irritation. The technologies cannot determine, what kind of information is expected, realized, and designed by the use of its products.

In order to comprehend the thesis the underlying definitions of technology and medium have to be exposed. For Luhmann, technics and technology are characterized by simplification within the general medium of meaning (Luhmann, 2012, see p. 317). The first step is to restrict meaning to the distinction of cause and effect, thereby designing a world of indefinite causalities. Causal explanation of everything that was, is, and will be, eliminates the thinking of a first principle (like origin or Creation) and of a last state (like a telos of the world or the Last Judgment). The second step to creating a technique is to identify a point of control and regulation, that is, a point which must not be determined by the causalities in question. Technics selects causalities and exposes them to decisions (Baecker, 2011). In this sense, technics functions as a form of isolation and as absorption of uncertainty. Communication can limit itself to identify the point of control and regulation, in communicative terms: to
identify the address of choice and of responsibility. Such addresses might be organizations or persons, as I will discuss later on in more detail. The term *technology* can stand for the description of any concrete causality-responsibility-complex. Such technology does not have to be simple. It might reach completely incomprehensible levels, as for example in the case of computer-technology (Winograd & Flores, 1986). But communication still simplifies its search for responsibility by the questions: Does it work or does it not? If not, who is the one to blame or to get the technique running?

As a communicative endeavor and as a product of sociocultural evolution, the form of technology is not tied to a specific materiality. Still enchanted by the invention of the steam-engine and of its huge social consequences, modern technology hardly escapes its task to simplify, isolate and identify the production and distribution of energy. But the original Greek term *tekhnē* comprehends any kind of production, which enhances human control in an underdetermined world, encompassing physical and social circumstances (Nancy, 1997, see pp. 40–41). And so does Luhmann’s notion of technique. The limitations of the concept are not given by materiality, but by functioning simplification. It includes for example the techniques of classical oratory. Narration, proposition, confirmation, refutation, and conclusion were techniques to apply, when an idea or a morale (as cause) should persuade and educate the minds of an audience (desired effect). Writing and reading can be seen as micro-technologies to control all information that shall affect the wider world, or more specifically: what should bind further communication. Other important examples are techniques of calculation, like double-entry bookkeeping to control and to address the circulation of economic capital (Carruthers & Espeland, 1991; Baecker, 1992). For those, who have to apply the techniques (engineers, speakers, managers), it might be very complex and demanding to control all relevant variables and to implement them into ongoing processes of actions and experiences. But communication is disburdened from understanding the relevant processes and from identifying consent. It can simplify itself to the code *it functions/it does not function*, to install addresses of control, and in the end: to recall the desired effects whenever needed, ignorant against all the involved complexities of nature, physics, organisms, and minds.

In this sense, dissemination technologies render possible to produce documents and to control their identity across different social contexts. Given their proper functioning, they allow to copy, to reproduce and to cite technically identical documents, like books, magazines, records, films, and so on. They are copying technologies or technologies of reproduction (Luhmann, 2000b, see p. 2). The documents might establish their own forms of memory, like files, archives and libraries (Ernst, 2002). But they do not establish a causal connection to the context, in which they are produced or cited. With writing and reading comes the distinction between text and context; or in general terms, with documentation comes the distinction between document and information.

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2. For rhetoric as steering technology of communication (persuasion) see Schmohl (2016).
Other than technology, communication media are not characterized by cause and effect or by successful/failing reproduction in varying contexts. Instead, communication media are to be identified by *codification* (Lee & Brosziewski, 2009, see pp. 149–153). Referring to the cybernetic use of the term (and not to the linguistic one), a code constitutes a mechanism of duplication (Luhmann, 2012, see pp. 132, 136, 218). It generates two values, which can be applied as alternatives to each event, to each element, to each process, and to each state within the reach of a communication system. By coding, a system opens up to its environment and closes its own operational modus at the same time. The system might detect environmental states. But the application of one of the code’s values remains completely under control by the system’s own operations. The system might collect data about states in space and time. But by the help of the medium’s code, the system situates itself within and against its own set of data. In this sense, communication media do not transmit an outer world into communication and social systems. Instead, communication media enable to pursue the contact with the environment without giving up the system’s autonomy in reproducing its own operations.

Language provides a fascinating and still one of the most important examples (Luhmann, 2012, see pp. 123-138; Lee & Brosziewski, 2009; see pp. 91-120). Other than in usual linguistic approaches, communication media-theory takes sentences, not words as the elementary forms of language. There is no sentence, which could not be altered by some kind of negation, with the word *no* as its strongest and simplest representative. Propositional logic dreamt the dream, that each sentence could be decided consensually as a Yes- or No-statement, as true or false. But the price was to restrict verbal utterances to *propositions*, leaving out all modalities, all proposals, all expressions of belief, of wishes, of preferences, and above all: leaving out all sentences that take on the form of the question. Putting aside all ambitions to eliminate the ambiguities of language, one can state, that the complete realm of verbal communication is coded by the values *Yes* and *No* and by their mutual implications (Luhmann, 2012, see p. 132). Each No rejects a Yes and requests alternative indications of the situation. Each Yes negates some specific negations, may they be factual or merely expected negations. The code itself is constituted and reproduced exclusively by communication. As a double-sided code with implicative values for all sentences, it has no counterpart in the environment, not in physics, not in organisms, not in brains, not in consciousness. The code indicates the operative autonomy and the pure self-reference of communication. “It is no exaggeration to say that linguistic coding is the muse of society. Without doubling all signs that fix identities, evolution would never have been able to form society, and we hence find no society without this requirement” (Luhmann, 2012, p. 135).

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3. To avoid misunderstanding: *Models* of physical, organic, neurophysiological, and conscious objects might be based on implicative two-value codes. But whatever such models will serve for, they will never be able to trace back the communicative status of sentences to physical, organic, neurophysiological, or conscious states. “Even the most powerful computers could not do anything, if it has to be calculated what to say next” (Luhmann, 2002, p. 84, my translation).
As in the case of dissemination media, information is produced outside the materialities of language, outside any spoken or written sentence. Whatever a mind might derive from heard or read words as its own information, communication informs itself exclusively by the two values of language, by negations and by negated negations, which we could call confirmations (in order to have a positive term). Communication extracts confirmations and negations as premises, which preset further communication, either as restrictions for cooperation/conflict (consistency/inconsistency with the premises) or as triggers to determine what could be said next. This is why in oral communication nobody needs to remind the spoken words literally, but still everybody knows (approximately) what is said and what is not said. The social memory selects the communicative premises extracted from sentences, not their materialities.  

Regarding the distinction between technology and communication media, we can conclude: Technology is enabled by the frame of cause and effect and defined by simplification and isolation, which establishes clear-cut identifications of control and responsibility to guaranty repeatable access to desired effects. Communication media are defined by duplication-codes, which constitute the possibility of information as (temporally binding) selection between one of the two basic values. We have discussed the example of language. The next section will explore the coding of mass media, to prepare an inquiry of the question, whether digitality establishes such a code, too.

3. Redundancy: Mass Media and its Coding

The central product (or effect) of dissemination media can be called redundancy (Luhmann, 2012, see p. 121). Once something (an event, a process, or a state) is documented, its informational quality could be reproduced without regard to space and time if and to the extent which the access to the document is ensured. The term redundancy bears on many different semantic sources and, accordingly, might be interpreted in a broad sense. In economics redundancy indicates resources, which are not bound by fixed goals or purposes of production or consumption. Such free resources might be treated as abundance, as luxury, and as waste on one hand, or as savings, as reservoir and as stocks on the other hand. In statistics (including statistical physics) redundancy is a measure how many unknown parameters of a distribution could be computed out of some known parameters. In telecommunication engineering transmission channels have to provide sufficient redundancy for to compensate losses in bits and bytes. Safety engineering seeks for redundant controls for all critical variables, for example in nuclear power plants or in airplanes. In the aesthetic dimension, redundancy indicates double or even multiply expressions of the same (as

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4. The idea of protocol as a document of spoken words stems from the technologies of script and copying which radically altered the conditions of social memory (Esposito, 2002).

5. “The language employed in control tower-pilot communication is about 95 per cent redundant” (Landau, 1969, p. 356).
for instance in pleonasms like *burning fire*), which have aesthetic and rhetorical values on their own (“A rose is a rose is a rose;” see for the case of literature Barthes, 1974). Empirical social research implements criteria like reliability (quantitative research) or saturation (qualitative research according to Anselm Strauss) in order to indicate, that new tests or new field visits would deliver redundant results to what is already known. In social systems the mechanisms of documentation provide redundancies of (potential) control (Landau, 1969, referring to Warren McCulloch), redundancies of (potential) agencies (Meyer & Jepperson, 2000), and redundancies of social addresses (Fuchs, 1997).

Under the title *The Reality of the Mass Media*, Luhmann (2000b) investigates the criteria or programs which structure the communicative use of the potentials of copying technologies. In this we can reconstruct, how Luhmann conceives the operational separation of technology and medium, although the latter depends on the first one. The basic idea is: No document “contains” any information. The information is produced and reproduced outside its material basis. Summarizing empirical research about gate-keeping and agenda-setting within his frame of communication theory, Luhmann (2000b) identifies three dominant programs of mass media communication: *news and in-depth reporting* (see pp. 25–41), *advertising* (see pp. 44–50), and *entertainment* (see pp. 51–62). The program-type *news* selects in the dimensions newness, quantity, and conflict, using background reporting as source to widen the range of selectivity and to provide with memory for further news. Advertising selects pleasing appearances (see p. 48), appearances either of goods and services (commercials), of people (prominence), or of ideologies (propaganda and public relation). Restricted to minimal time and attention spans for such appearances, language has to be condensed to its minimal forms (best to one-word-messages), so that understanding has to be gained by pictorial and graphical components, leaving all “real” interests and motives of the targeted audiences up to guessing and imagination.6

Concerning the societal function of advertising, Luhmann concludes:

> The system of the mass media has its own function here as well, and that can be said to be the stabilization of a relationship of redundancy and variety in everyday culture. Redundancy is generated by the fact that a thing can be sold, that it sells well, and variety by the need to distinguish one's own products in the market. (Luhmann, 2000b, p. 50)

The program-type *entertainment* works with self-produced uncertainties that have to be stimulated and dissolved by the entertaining stories, pictures, graphics, moves, and sounds. Confronted with implausible elements (faked facts, unusual visual or sonic components) one surrenders to the fascination, how the narrative, pictorial, or musical line goes on and will end. Like games, entertainment provides with non-serious episodes that allow to distance “the usual ways of living … as real reality” (Luhmann, 2000b, p. 51). Nobody is expected to draw conclusions from the fictional sphere to the real one. But such general non-binding nature establishes the opportunity

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6. This is why creativity is a feature so desperately sought for in the advertising industries.
to individualize one-self by going the opposite direction and let one’s own way of living being inspired from motives seen, heard of, and lived through while enjoying entertaining episodes. A vicarious way of letting your dreams come true.

In the form of news, advertisement, and entertainment, information is transformed into non-information, which in turn provides redundancy (= memory) for new news, new entertainment, new advertising. Therefore, Luhmann (2000b, see pp. 17–22) takes the distinction of information and non-information as the coding of mass media, with the same logical structure as found in the Yes/No-code of language: Each side implicates the other one. As a consequence, there is no objective definition of information. On the level of society, information is indicated by the system of mass media, on a daily, hourly and minute-by-minute basis. Each specific social system has to create and to process its own information against such general background. Objectivity might serve some systems (for example science) as a symbol that their specific requirements are matched. The main effect of mass media on the structural level of society consists of an irresolvable combination of certainty and uncertainty: certainty in what is documented and distributed up to now; uncertainty in what will follow the next moment. Nobody knows the news of the next day or even of the next minute. Yet reporters can only speculate about the contexts, which will add or subtract news-values to their own products.

4. Mass Media and/or Dissemination Media? A Clarification

When it comes to introducing central concepts, Luhmann usually pays special attention to sketching their etymology, their semantic history, and at least their most prominent contexts of use. This is not the case with mass media. Here he simply draws on a conventional term, which defines its targeted object by a list of other objects: newspapers, books, television, radio, magazines, and so on. That brings vagueness into the discussion. First of all, the media in mass media do not correspond to Luhmann’s own notion of medium (as he clarifies in Luhmann, 2013, see p. 315). Likewise, mass is not defined within his frame of communication theory. Finally, although characterized by the use of dissemination technologies, mass media cannot be equated with dissemination media, which play a central role in Luhmann’s communication theory. He speaks of dissemination media, but never of a system of dissemination media. Luhmann needed a name for a functional system, that operates with the code information/non-information and that fulfills the function as a memory for society. He chose to stay with the conventional term mass media, for not to create an artificial, but maybe more precise notion like the memory system of society.

In order to clarify the relation between (the system of) mass media and (the medium of) dissemination media, I suggest to equate the term mass with the maximal redundancy in social addresses. Thereby mass might be understood as a fictional unification or as the imaginary number of communicative addressability—a number

7. Addressability means the possibility of fulfilling the functions of a social address, in the sense introduced above and discussed in more detail below.
that serves as a kind of joker in operationalizing the three program-types of the system called mass media. To be differentiated from this the medium of dissemination media would be addressability itself. The forms of such a medium would be concrete addresses, as anchoring points to ascribe, to calculate, and to enact responsibility in general, and action in particular (see Henkel & Åkerstrøm Andersen, 2016). In order to get an example we can profit by the many meanings of the word *script*. It indicates our basic copying technology. In filmmaking industry movie-scripts constitute the basic communication medium, which addresses story writers, movie producers, directors, and actors long before the first call “Action!” sounds at the set. All these addresses are shaped against the background of the imaginary number anybody who might be entertained by the emerging movie.

The theory of social addressability indicates exclusively two kinds of possible addresses: persons and organizations (Fuchs, 1997, 2003, see pp. 15–45; Luhmann, 2000a, see pp. 316–327; Bora, 2013). Since society left the age of representation (by living a morally good life), systems like society or subsystems like the political system, the economic system, the educational system, the system of mass media, and so on, feature no address in themselves (Fuchs, 2013a, see pp. 103–105). Either they have to be embodied by persons or they have to be textualized by organizations. Speaking in a philosophical metaphor (Deleuze, 2006), embodiments and organizational texts are *folds* of and for communication. Mass media (with television at the top) prefer embodiment by persons, thus feeding the illusion, economy could talk, politics could talk, and they could even talk to each other (in talk shows or in the back rooms of power). But almost all load-bearing roles of modern society (including speaker-roles) are organized roles. And organization implies: script, printed form, document, file, bookkeeping, archive, text, and description. We had before the example of movie-scripts and its corresponding addresses in the filmmaking industry. Of course, script is not all there is in the matter of organizations. As long testified by organizational research, informal communication is essential to keep organizations running (Luhmann, 1995; Groddeck & Wilz, 2015). But the addressability within organizations and above all the addressability of organizations within their environment depend on official signs and signatures. The term *firm* stems from *firmare*, Latin for reinforce and Italian for undersign (Sombart, 1917, see pp. 104–110). The textualization of economy, to display a spectacular representative, is provided in the form of banknotes, with highly protected signatures of central banks.

As our example also demonstrates: The dissemination of personal and organizational addresses does not only depend on restricting the technological possible distribution. More than that addressability is constituted by restricting dissemination. Whoever reads and writes in organizational dissemination, gets involved in processes of addressing—if he or she wants or not, if he or she likes it or

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8. Alfons Bora (2013) discusses extensions towards objects, networks, and governance regimes. The respective concepts suffer from an unclear distinction between regulation and addressability. Bora diagnoses vanishing responsibility (see p. 464), which would mean non-addressability.
not, for his or her good or bad. Thus the code information/non-information applies, too—not in shaping anybody’s address as in the system of mass media, but rather in shaping organizational addresses, concrete responsibilities, nameable agencies, and last not least persons to embody the actions required.

5. The Medium of Digitality

The usual discussion about digitality and digitalization does not distinguish between documents and objects. Everything undergoes processes of datafication and algorithmic reconstruction, thereby creating new kinds of things, new kinds of documents, new kinds of objects (Lehner, 2016; Stalder, 2016). Such the technology called digitality is contrasted directly with the life-world (Dickel, 2013), with its necessities (to work, e.g.) and with its possibilities (of joy, e.g.). Is it worthwhile to parallel Luhmann’s distinction between technology (copying) and medium (coding information/non-information) in the case of digitality? Or should digitality be conceived as the kind of technology that liquidates the distinction between technology and medium?

The theory of social addresses delivers a starting point. The digitalization of objects affects the form of the person, since objects (including the objects called bodies) distinguish personal behavior in situations. The digitalization of documents affects the form of organization, since documents distinguish between texts and contexts of organizational signatures. The possibility to treat both cases in the same form of simplification (= technology) still can be described with the help of Alan Turing’s universal machine and with his definition of algorithm (Turing, 1936). The coding of all numbers (and of all signs in general) into 0 and 1 is only a precondition, but not at all the decisive feature of Turing’s machine. Each process of scanning, deleting, and printing signs needs two kinds of exact addresses: the address of the data field to be treated (Turing’s square) plus the address of the next instruction. There must be no gap in the process in order to get and to keep an algorithm successfully running.\(^9\) The addresses of the next data field and of the next program line have to be clear without ambiguity.\(^10\) If there is no address at all or if there are more than one address (without any deciding algorithm), the program would stop in the nowhere respectively would run endlessly. Due to addressability at both sides, the distinction between data and program is a relative one. Every program could be addressed as data by a program of a higher order. Turing’s “universal machine” is the one, which could treat all programs as data—given the unique addresses of all data and of every computing instruction.

The technology of digitality detects and exploits the unambiguousness within the redundancies provided by dissemination media and by its information/non-
information code (Brosziewski, 2003, see pp. 95–101). The technology is implemented by the complementary social roles of programmers and users. This obtains likewise for digitalizing objects and documents. Differentiated from this the medium of digitality is constituted by the distinction of unambiguousness/ambiguousness, which functions as a code when applied to redundancy as such. The objects of designing computers are recurrent patterns (Winograd & Flores, 1986, see p. 68). The positive side of the code indicates algorithmic machines and procedures free of decision and consensus. The negative side indicates indeterminacy, ambivalence, need for decision-making, in other words: catalysts for consciousness, for double contingencies, for communication.11 Again this holds true likewise for handling objects and documents.

6. Organizational Programs in the Medium of Digitality

Organizational data are self-made constructs. In the age of constructivism, such a statement will hardly surprise anybody. Nevertheless, it remains to be demonstrated that constructions in general and data in particular are no inventions, fictions, or pure imaginations. And it needs some clarifications about the self as the constructor of the data. As outlined in “Organisation und Entscheidung” (Luhmann, 2000a),12 organizations can be conceived as systems of communication of decisions. The main obstacle of such approach is to abandon the image, decisions would be produced mentally—by a mechanism of neurophysiological computing called brain—and communicated afterwards, simply relying on the demonstration of strong will. Instead the communication of decisions consists in utterances, which mark two sides as comparable within reach, as comparable realistic, as comparable in value. The unity of “Mark-and-Compare” has to be established at once. Only in this way can an alternative appear and suggest the possibility to enact the decision, its preparation, and its expected consequences as choice. The strength of a will depends from the freedom of choice that the communication of an alternative can activate and celebrate.

Furthermore, we have to rescind the idea of hierarchy as the first decision, the one which would distinguish higher brains with actually deciding capacities from lower brains to perform the routine jobs. Instead hierarchies and relevance rankings have to be seen as secondary qualities, as products of communication processes which structure further deciding communications and will lose their relevance, when other structures promise better alternatives; say for example heterarchical and/or data-based strategies. Beside from strict couplings between decisions and technology13 even routine work demands for decisions in priority, scheduling, delaying, and privileging. The brain work of decision is, in principle, no other than in contact with language, as

11. See for an early discussion of combining algorithms (automatisierte Verfahren) with (administrative) decision-making Luhmann (1966). The basic problems lie in ensuring correctness and addressing responsibility for errors are discussed in chapters 8–10.
13. Long-linked technologies in the sense of Thompson (1967, see pp. 15ff), to be distinguished from mediating and intensive technologies.
outlined above (section 2): It has to recognize implications and consequences, maybe with a higher degree of concentration, as far as the membership-status of one’s own person is concerned.

It can be assumed that the multitude of decisions happens in singleness, dominated by the concrete demands of their situations and without much surplus for cognition and for further decision-making. Therefore, system-building out of and by decisions is to be regarded as the exceptional case and as an improbability of communication (in the sense of Luhmann, 1981). Even within systems of (the communication of) decisions, many single decisions will stick to their concreteness, firstly to comply with their circumstances and secondly to mark their peculiarity.

Every structure of and for decision-systems has to be gained against such background of appearing and vanishing decisions. Every organizational order has to be produced out of negative entropy. Luhmann speaks of premises for decision-making as organizational structures.14 Notably premises must not be confused with the logical use of the word. The notion does not refer to everything that has to be presupposed (for example the words to formulate a decision). It indicates exclusively only those components, which the organization can treat as self-decided and therefore might be subjected to an organizational revision. Luhmann lists three dominant types of self-decided decisions, which bear far-reaching structural values in producing and reproducing organizational communication: (1) communication channels to prescribe decisional interdependencies (like hierarchies or teams), (2) work programs to prescribe procedures and competencies to execute decisions, (3) personnel selection as prescriptions to get and to sustain membership within the organization (Luhmann, 1992, 2000a, chapter 7–10). Organization simplifies the three premise-types to the unifying formula of the post (in the sense of function, office, authority, charge), which symbolizes the organization internally and externally and serves as subject of calculation in further decisions, either in decisions by the post-holder himself, or in decisions of higher organizational posts (Luhmann, 2013, see p. 144). For the purposes of description (self-description and description-by-others) the organization appears to be the unity of all of its posts. But for purposes of operation the communication of decision draws on (formal and personal) signatures by posts (authorization), in order to match situations with those capacities in resources and attention, which are yielded by the organization itself.

Other than most of its antecessors such concept of organizational communication does not commit oneself to any specific kind or standard of rationality (Brosziewski, 2015). Thus it is open to observe the shifts from substantive to procedural rationality (Simon, 1976), with further developments like cybernetic steering, knowledge management, learning systems towards technological self-concepts of decision-making. All these concepts rely on detecting redundancies within data (correlation, cohesion, consistency), very similar to scientific concepts of empirical research, but

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14. “The organization knows structures only as premises for decision-making on which it has itself decided.” (Luhmann, 2013, p. 145)
without its concern about causal explanation. Nevertheless organizational theory became epistemologized (Krogh & Roos, 1995; Kitchin, 2014).

What the concept of data denotes beyond communication remains unknown. As a communicative form, data are reports about the state of $X$, including reports about results of measurement and embracing the states of objects and of processes (Brosziewski, 2003, see pp. 136–140). Within communication (due to the code of language), such reports could be true or false, depending on the test procedures which are socially in reach, that is in practice: comparing reports with other reports. We call as witness Thucydides, the founding father of writing history (Goody & Watt, 1981, p. 75). He collected all reports available about the events which made the story of Peloponnesian War, checked their internal (in-)consistencies to confirm some reported details as data, and he checked his extracts against the background what was commonly told in order to write his true story. Modern science and technology imposed reports about measurements to set the standards for the form of data. Nevertheless the story of data and datafication should not be confused with the story of numbers and of quantification (Espeland & Stevens, 2008; Diaz-Bone & Didier, 2016). The form of the report determines, whether numerical or verbal values have to be delivered. Encompassing both types of reporting, data are eigenvalues of internal processes of comparison. They are self-produced indicators of a system’s redundancy.

Organizational data report the states of decision-premises, including the states of processes of decision-settings and decision-executions. As operation, state-reporting is deciding, too. If you report something, you must not tell everything. As structure (in the form of expectation), organizational data are self-decided premises of further decision-making. What follows from such self-production is: Data cannot be exchanged, sold, or stolen; only the data carrier can be exchanged, sold, or stolen. Each receiving organization has to run its own data forms and programs to incorporate new data into their own descriptions of $X$. If foreign data carriers are gained in one way or the other, they have to be filtered and transformed by their own procedures of data masking. Just as in the case of mass media, the simplifications of technology and the coding of information/non-information are separated, although structurally coupled and thus mutually dependent in their results.

Within the self-constituted structures and processes of redundancy-detecting, the social system called organization can decide (and test the consequences) to leave the control either to technology or to commitments raised by membership, that is to perception, attention, consciousness, and calculation of its members at their specific posts. This is where the medium of digitality and its coding of unambiguousness/ambiguousness apply. Technology scores with its usual advantages (assumed it functions smoothly and correctly): faster, more comprehensive, more detailed, no need for negotiation and consensus (Brosziewski, 1999; Miebach, 2011). But applied to all data, each technological advantage might reduce the informational value of each

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15. “All … historico-cultural, archaeological, religious, military-historical, semantic and other messages” (Koselleck, 2006, p. 52, my translation).
specific data, as the coding of information and non-information depends on selection and on evaluation. The savings from cooperation and from consensus implicate costs in revising, adapting, confirming and overrule decisional premises (Brosziewski, 2002). You can calculate, but you cannot argue with a digitalized data form. For to maintain and regain their potential to decide, organizations depend on both side of the digital code. While unambiguousness can be implemented through algorithms, ambiguousness has to be cultivated by organizational communication.

Decisions need ambiguity and ambivalences. Otherwise there would be no choice and no point to address social control. Within our frame of media theory, two sources for ambiguity can be detected, each of them referring to a different sector of organizational environments. (1) The medium of language with its Yes/No-code stimulates consciousness of organizational members to alternate its state from conformity to deviance and try a Yes where social routines run on No-paths and vice versa. (2) Society provides additional (or complementary) ambivalences by its success media of communication, the third type of communication media, which we did not cover up to now. In particular Luhmann (2012) appoints truth, love, money (with a sub-medium property), power, law, and art. All of them operate on two-sided codes: truth on true/untrue; love on loving/not-loving; money on payment/no-payment; power on in power/in opposition; law on legal/illegal, art on aesthetically consonant/dissonant. All of them need supplements or criteria to guide the choice between one of its two sides. Luhmann calls such supplements the programs of the codes and defines them as: “This occurs in the form of programming action, fixing conditions for the action’s correctness by providing either conditions that trigger action or goals that action should aim for or both” (Luhmann, 1996, pp. 203–204). For our topic, we have to highlight two points. (1) The distinction between correctness and incorrectness of actions is a second distinction that crosses the two values of the codes. It could be right to call a statement untrue. It could be false to call a statement true. That maneuver applies correspondingly to all other codes. (2) The programs transmit the results of communication onto the level of action, binding the motives, the cognitions, and the capacities of its participants. And in this communication could fail. The presupposed assumptions and suggestions about the participants’ dispositions could simply err. Reading in the opposite direction: Every successful transmission from communication to action could be seen as a confirmation and as a success of communication. This feature justifies the terminology success media as a short-form of the more precise term symbolically generalized media. But one should keep in mind, that only communicative successes are assigned. Such successes might deviate to lower or to greater extent from what the participants’ calculations and accounts could record as individual successes.

16. Thus one has to scrutinize seriously the assumption that algorithmic data processing fosters organizational learning.
17. I skip values in my short report, as the difficulties of this medium would need extended discussions.
18. Therefore, one should translate wahr/unwahr always by true/untrue and not by true/false, which would confuse coding and programming of truth.
There is not much empirical research about coded media, not to mention research about interferences between different media/codes. Is there any promising hypothesis at hand to stimulate such research? According to Luhmann, success media differ in their ways of facilitating the crossing from one value to the opposing one—a variable that Luhmann (2012, p. 220) calls the “technicization of the medium.” Money and truth can be conceived as highly technicized media. When one price changes at the goods-, factor- or finance-markets of a business, the methods of cost calculation display many other prices, which would have to be adapted to rebalance the account of a certain investment. Mathematics and logic achieve the same for the medium of truth. A thoroughly formalized model allows numerous derivations, when the value of one central statement turns from true to untrue or the inverse. Arts and love range at the opposite side of the technicization-scale. They individualize an object (arts) or a subject (love), and it is that what inhibits any automatic derivations for the art- or love-values of all other objects and subjects.

Measured by the social scope and growth of the communicative areas of money and truth at one side, of arts and love at the other side, the socio-cultural evolution benefits technicizable media and leads to very uneven chances in forming social systems. Thus, our hypothesis might be: The medium of digitality will amplify the gaps between technicizable and non-technicizable media. The statement could be tested against the contrary assumption: The medium of digitality provides possibilities to technicize all media including those, which seemed to be restricted against technicization up to now. Research about digital technologies, datafication, and mediatization delivers plausibility for both assumptions. Not surprisingly, money and truth profit significantly from the medium of digitality. But the new technics in producing personal profiles stimulate corresponding explorations in all personalized areas, too: in love (partner-matching), in arts (taste-matching), in education (competence- and career-matching), and in other personalized fields. Regarding the medium of digitality it is noteworthy, that all such profiling technics are based on tracing document- or object-oriented behavior, in order to calculate behavioral redundancies in an algorithmic way. Thus the algorithms of profiling absorb those uncertainties, which up to now were addressed to persons: the ambivalences and ambiguities of interests, of motives, of passions, and of personal decision-making in exploiting the double-values of success media. Without much doubt, the business of tracing and profiling is installed, performed, maintained and exploited by organizations. Thus the user and all populations of users might symbolize the medium of digitality with both of its sides: ambiguousness and unambiguousness (cf. Park & Macy, 2015); while the algorithm might stand for its organizational fixed forms (Bolin & Andersson Schwarz, 2015). Given such a dyad or any semantic equivalent, organizations detect their constrains and their scopes for decision–making by observing the difference between the medium of digitality and its forms. Not least, hacking operates on infrastructures established by the attacked organizations, thereby

19. See Dodge & Kitchin, 2005, especially Table 1 at pp. 860–863.
observing the difference of medium and form on their own account or for higher social concerns (Pybus, Coté, & Blanke, 2015; Cardullo, 2015).

7. Summary

This paper has used the concepts of redundancy and of codification to describe the state of communication media before the rise of computing-technology. Drawing on Luhmann’s media analyses, technology is distinguished from information and from communication media. While technology is defined by functioning simplification, communication media are characterized by basic codes, each of them equipped with implicative binary values: language by Yes/No, dissemination media by information/non-information, success media by success/failure-in-motivating-action. Based on algorithmic calculation technics and computing machines, the medium of digitality is differentiated from its technology by the code of unambiguousness/ambiguousness, which is mainly applied by organizations to explore and exploit redundant patters within their own structures and processes of decision-making. The introduction of an additional variable, the technicization of media-codes (again adopted from Luhmann), might lead to fruitful empirical research, for example by investigating Big Data as a case of technicizing even those communication media, which where shielded from organizations and their technologies before.

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References


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