Goodbye World. On the Incommensurability of Technical and Sensemaking Communication.

S. Peetz, R. Staples and V. Steinbach

Institute of Sociology, FAU Erlangen-Nürnberg

Abstract. We have never communicated with machines, and we never will. All we have done so far to communicate with machines are detours to be able to communicate with each other via machines. The foundation for this statement is the differently designed logics of communication of machines and social systems. Social systems communicate by processing meaning. According to Luhmann, communication consists of the three parts of information-message-understanding. Connectivity and recursiveness are generated based on meaning. Machines, on the other hand, communicate causally and logically and therefore exclusively via information. Technical communication is therefore established causally and is only causally connectable and recursive. Following these assumptions, we notice, that social and machine communication are incommensurable. Nevertheless, social systems manage to bridge this hiatus and produce the illusion of communicating with machines. Social Interface, a concept and term coined by Bernd Miebach accomplishes this. We discuss this new approach based on communication theory using an example of organisation research: the AI assisted hiring process using Pymetrics. The example shows that the used technology fulfils its function reducing complexity in the decision-making of the hiring process by producing a communicationally connectible output in form of ratings. We conclude that this process is being made easier via AI on the surface, but the AI assistance also produces uncertainty itself, which cannot be presumed due to the incommensurable operation of communication.

1 Introduction

The relationship between humans and technology is a much discussed and an old one: people have been thinking about it since ancient times. At the latest since modern times and especially since industrialisation, the discussion about the relationship has become even more prominent. Nevertheless, it must be noted that the discussion is out of all proportion to the extent to which technology has permeated and continues to permeate the worlds of life for about 200 years (cf Heßler & Liggieri 2020). In the discussion about how the relationship between humans and technology can be described, a break has been apparent for some time: Before the invention and establishment of digital technology, the relationship can be best described as instrumental. By ascribing intelligence and agency to technology, the relationship can also be described as interactive (Rammert and Schulz-Schaeffer, 2002 after Weyer, 2018). In this essay, we would like to pursue a different view of the relationship between humans and technology, and decidedly not an interactionist one, but a

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communication-theoretical one. To clarify our approach, we argue (with three lines of argument) on three different levels.

On a theoretical level, we try to show why we have not chosen a theory for the connection to machine output that describes this relation as interactive. In doing so, we refer to the relevant overview by Muhle of some prominent lines of theory that attempt to describe this relation with reference to agency (Muhle, 2018). In a second step, we want to present the advantages of a communication-theoretical approach based on Luhmann, which mainly constitutes of an attribution of behavioral expectations when dealing with machine output. The background of this approach is the observation that machines and social systems cannot communicate with each other qua their communicative mode of operation, but that social reality shows otherwise. Therefore, with Miebach (2011), we introduce the term "social interface", which means that sense-making systems can relate to machine output by addressing behavioural expectations to the machine. It is on the theoretical level that we will move the most. After all, the aim of this text is to introduce the communication theory approach to describe the relationship between humans and machines. The following two levels of the text arise from subsequent thoughts, some of which have been developed on the empirical example.

Following our communication-theoretical approach, we want to critically discuss Luhmann's concept of technology on a second, theoretical-empirical level. With our empirical example—the use of AI in the hiring process—we want to show that technology as a "functioning simplification" with the function of complexity reduction corresponds to its function in application, but it is problematic if the attributions that are addressed to technology in execution are evaluated as objective (Luhmann, 1997, p. 524). Through the discussion of the concept of technology in practice, we operationalise the communication theory approach.

Finally, on the third, empirical level, we want to illustrate the communication theory approach with an example from organizational practice and at the same time investigate what consequences the use of technology can have within an organisation. In our case, the technology used is the software solution of the company Pymetrics. It promises to make the recruitment process in companies efficient and objective. So, we discuss the use of this software solution for Human Resources Management (HRM) in companies. The starting point here is a functional analysis regarding HRM in organisations: HRM has the function of ensuring that the right people are permanently assigned to the right positions in the organisation. For HRM in large companies, a machine solution for this has become necessary due to the large number of applications. At first glance, Pymetrics' AI solution also appears to functionally address the problem of job allocation: The AI solution used makes recommendations for action that make the decision-making process of HRM possible regarding the sheer mass of

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applications in the first place and then simplify it in a closer selection of applicants. However, our communication-theoretical representation shows that the functioning solution produces problems on several levels: Certainly, software solutions such as Pymetrics also serve as legitimisation within an organisation in the dispute about digital infrastructure. But if one addresses the behavioural expectations of the software solution as objective in the use of the technology, the question arises, for example, why HRM has not yet been automated during rationalisation logic. With our communication-theoretical approach, however, we can state that machine output of any kind, i.e., also recommendations for action from an AI, remains subject to meaningful connection if one wants to make use of it.

In our example, we will also see that the technical solution works for the process problem by reducing complexity and thus saving consensus, but in the long run it creates new organisational problems. The incommensurability of the communicative modes of operation of machine and social systems is the cause of this.

2 Sociality with Machines

The starting point of our work is the relationship between artificial intelligence and social systems. We metaphorize AI here to mean any form of machine, digital, algorithmic data processing. The focus here is not on the classification, assessment, or distinction between strong vs. weak AI or the differences between neural networks, machine learning and AI as a collective term, but fundamentally on how to "connect the technically binary world of the algorithm with the meaningfully structured world outside the algorithm", as Armin Nassehi makes clear (Nassehi, 2019, p. 204). This quotation already conceals the core of the problem: digital machines are used at every level of society, and intelligent algorithms are increasingly providing the basis for this interaction. Objectified in a wide variety of devices (smartphones, personal computers) or larger socio-technical systems (traffic guidance systems, metrological forecast models), society interacts with the results of machine calculations. For this, it is necessary that these outputs are 'understood' and become effective in guiding action. But how does this special kind of understanding come about? Florian Muhle shows that the relationship between social systems and the outputs of AI can be roughly divided into three categories (Muhle, 2018). In the tradition of ANT or cyborg theory in the sense of Haraway, the relationship is not understood as dichotomous opposition, but network-like. Machines and socials form a hybrid collective that influences each other. In the sense of communicative constructivism, the relations between AI and human actors are understood as projection and specific form of cultural interpretation. Lindemann radicalises this perspective by assuming that there is an 'existential' actor status for machines when this is intersubjectively granted by genuinely social actors.

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The third perspective constructs a continuum along actor participations. Machines are granted more actor status as soon as they are responsively involved in actions. All three perspectives have in common that they are more concerned with a relationship between actors and the possibility or intensity of agency.

For the analysis of the social practice of connecting to machine outputs, an analytical perspective that—as reconstructed above—primarily captures the relationship between social systems and AI is rather unsuitable. It understands this relationship as interaction and for this it must first make conceptual and theoretical preliminary decisions about the way in which non-human entities can become social actors and thus capable of acting (Muhle, 2018, p. 155). It therefore seems useful to change the perspective of observation, to refrain from looking at actors and instead to focus on communication. A communication-theoretical perspective can do without this preliminary conceptual decision for the time being. This makes it possible to take the social practice of connecting to machine outputs as a given. The precondition for communication is the addressability and personification of entities, whereby communication with non-human entities (such as machine outputs) can also be grasped without presuppositional theory work. As will be shown below, such a perspective is also able to capture the practice of attributing meaning. We propose to switch to a communication-theoretical perspective to be able to ask in which medium communicative actions are processed in the interface.

Fundamental to our communication theory perspective is the assumption that communication functions as a functional and analytical final element of itself. A typical medium of communication is, for example, language or social action. Language as a medium enables communication processes in comparison to perception processes and with the help of symbolic generalisations in the form of signs to communicate about something a) that is not the case, b) that is possible but has not yet occurred or c) that is not present. In this respect, language as a medium sets communication processes apart from perceptual processes and thus creates a higher level of complexity processing (Baraldi et. al., 1997). Furthermore, within communicative processes, language also enables the communication of intentions to be distinguished to a more or less unambiguous degree and thus makes the success of communication more likely. In the form of language, linguistic signs, and their arbitrariness (Saussure, 2001), meaning as a medium acquires its centrality for communication. Communication therefore requires no agency to be accomplished or observed, but only a point of reference that is connectable in the medium of meaning. According to our theoretical view, meaning is to be understood as a current interpretation against the background of other, possible interpretations and orients experience, action and structure formation (Luhmann, 1997). In the context of this theory, meaning must not be understood as something that is fixed in the world, i.e., that a definitive meaning is already assigned

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to all things, which then only needs to be discovered. Meaning is not to be equated with identity. It does not emerge because an individual or groups profess certain identities.

In the context discussed here, meaning rather means being a form, a certain form of making distinctions and making observations of these distinctions. At the same time, sense appears as the product of a network of operations of distinctions. For social systems that operate in a sense-making way, distinction is reflected in the difference between self-reference and other-reference: "Every particular sense means itself and something else" (ibid. 48). In this way, meaning in the communication process enables understanding through differentiation on the one hand and ensures the success of communication through connection communication on the other. Meaning thus takes on the function of a mediating instance, a medium, in the communication process of social, sense-making systems. The basis for this remains that output for the medium of meaning is presented in a connectable form. This connectivity is (or can be?) established through behavioural expectations that are addressed to the counterpart. It is irrelevant whether the counterpart is in any way capable of subjectivity and more of the same. This theoretical debate does not arise in Luhmannian communication theory. Finally, the distinction between form and medium detaches meaning from the concept of subject in favour of the constructivist background of systems theory (Luhmann, 1995a). For sense as the difference between the potential and the actual cannot be transcended any further. At the same time, the medium of meaning is an almost universally necessary prerequisite for the operational capacity of social systems, because "meaning is co-present in everything that is actualised, as a reference to the world, and is actually present" (Luhmann 1997, p.49). In relation to the experience of reality, one can say that in every decision that makes sense, there are many other possibilities of decisions that can also make sense. This seemingly paradoxical formulation can be resolved by the fact that meaning is a concept without distinction. It includes its own negation (cf. Gripp-Hagelstange 1995, p.50). This also means that sense-using systems can only operate within the medium of sense. Nonsense can only be described as such if it operates within the medium of sense. From this it can be concluded that systems that operate in a meaningful way are dependent on this specific form of reduction of complexity. Sense as a medium thus provides the possibility for formation to take place through observational operations, the difference of actuality and possibility that consciousness and communication can use.

The output of meaningfully connectable output (in any form) remains important for successful communication. This becomes connectable by addressing behavioural expectations, i.e., it does not have a substantial, transcendental origin such as subjectivity, being human or similar.

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If one now looks for a way in which machines should be able to operate 'meaningfully', it seems that they fail because of the difference between actuality and potentiality. In the medium of sense, 'something' is actualised and then communicatively connected to it, but the potential is not excluded by this, but kept latent as a reference to the 'horizon'.

The problem unfolding here reveals once again a question of interface, of how—to paraphrase Nassehi—the uniqueness of machine operations and the meaningfulness of its use in social contexts are coupled (Nassehi, 2019).

3 Social Interface

The starting point for further considerations of communication theory is a concept of communication based on the distinction between information and communication. Only by understanding the distinction between information and communication—which is not necessarily linked to the 'correct' grasp of a speaker's intention—can communication succeed in the medium of meaning (Luhmann 1995b). Successful communication becomes observable through subsequent communication. Therefore, for our example - practice of connecting to machine output - we start when a social system meets a machine or an AI. From this perspective, we must first consider the change in communication through its digital mediatisation. Based on an understanding of communication that is composed of understanding the difference between information and communication, it can generally be said for digitally mediated forms of communication that communication is decoupled. In terms of communication theory, this means that only information[1] is processed in digital (machine) communication (Halfmann, 1995).

The question now is how systems process information. Bernhard Miebach assumes that machine systems and social systems operate with different logics: On the one hand, we have social systems that operate in a sense-processing-recursive way in their communication (Karafillidis, 2013). On the other hand, machine systems operate based on binary distinctions and thus exclusively via data. Machine communication is thus produced in a causal-recursive way (Miebach, 2011). These operational logics are incommensurable with each other. After all, successful communication only takes place in the form of understanding the difference between information and communication. However, since machines operate exclusively via data in their

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[1] From the communication-theoretical point, information would be the right term here. However, in a technical environment, it does not seem adequate to speak of information when it comes to the communication logic of digital machines. Strictly speaking, machines communicate via data and not via information from a technical point of view. Data are the raw numbers that consist of generalized symbols. Only with context of use data individually become information.

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operational logic, the understanding of difference cannot be accomplished. Nassehi discusses the loss of the signifier in a datafied world, and he shows quite clear that data just refers to itself, which is also the reason for their almost infinite combinability (see Nassehi 2019: 104-107). From this point of view, social systems should not be able to connect communicatively to machine output (see also Esposito, 2016).

In social reality, however, this takes place all the time, e.g., when applicants in the hiring process are invited to an interview based on a selection made by the AI. This contradictory context—that communication takes place despite different logics—is referred to by Miebach as the "social interface" (Miebach, 2011, p. 110). The term "social interface" refers to the interface between machine logic and that of social systems and functions for us as an analytical metaphor.

The bridging of the prevailing incommensurability between social and machine systems is initially to be understood analogously to the bridging between psychic and social systems. Access to the psychic system as well as to the machine system is not directly possible for any social system, as it represents a black box for the social system. The social system is therefore dependent on reconstructing it communicatively with its own system operations. This is possible by communicatively referring to the machine system and addressing behavioural expectations to it. In comparison to the psychic system, however, the machine system cannot be reconstructed by the social system as a person, but only as a "mirror projection of its own complexity" (Esposito, 2002, p. 302). Miebach uses the term "social interface" to describe this communicative reconstruction of machine outputs by social systems, i.e., systems that process meaning (Miebach, 2011, p. 108). Social interface is therefore not a bridge between the two systems but works rather as a bridge that only social systems (can) construct themselves. Social interface thus represents the one-sided reconstruction performance from the perspective of the social system in the medium of meaning. In the social interface, the social system is specifically tasked with dealing with the double decoupling that comes with digitised communication: it must reunite the information with the communication and at the same time deal with "the consequences of the computer's self-generated uncertainty" (ibid. 109).

Machines, on the other hand, communicate causally and thus exclusively via data. AI is also tied to machine communication. Moreover, AI is used for precisely this purpose: For data processing. It seems to need no explanation that AI can process much more data per unit of time than its user. For this reason, AI is mainly used in the service sector for reasons of efficiency. It is irrelevant whether the user knows the exact functionality of the AI. What is important is that the AI outputs data in some form so that the user can make a sense-processing connection to that output. The connection made in or through social interface is robust even in the case of irritation: as a study on phishing emails points out: even messages about threat on the social system side

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do not automatically trigger adequate actions (Benenson, Gassmann and Landwirth, 2017). More likely, it seems to be the case that communicative connection and success are to be established when the messages are reacted to but interpreted in terms of the operational execution of the social system. The fact that the messages are not related to the technical functioning of the machine system and corresponding steps are initiated follows from the fact that the incommensurability between social system and machine system remains if the machine system produces meaningfully connectable output, i.e., fulfils the addressed expectations and ergo functions (from the observation perspective of the social system). It is neither a property of the machine, nor its 'correct' functioning, that (co-)constitutes the relationship, but only the meaningfully connectable output that the machine delivers, to which the behavioural expectations on the part of the social system can link.

4 AI-assisted Recruitment Processes: Pymetrics[2]

The explanations given so far paint a complex and thus also interference-prone relationship between machines, such as AI systems, and social systems. Now we want to illustrate our communication theory approach with an empirical example. The communication theory approach remains central to this text. Nevertheless, we want to think one step further and ask the question whether technology in this context can continue to be understood as a "successful simplification" (Luhmann, 1997, p. 524) or whether its inherent logic makes the objects to which it is applied more complex? The question thus helps us to operationalise the social practice of connecting to machine output more or less unambiguously: If, after our reformulation of practice in terms of communication theory, technology continues to confirm without doubt the simplification dimension, our approach would only have theoretically postponed the problem.

To deal with this question in an exemplary way, we look at the interface between the labour market and organisations, i.e., the problem of how jobs in organisations can be adequately filled. The digital transformation and the informatisation of work that preceded it have increased the requirements for jobs overall and especially those in knowledge work. In addition to purely technical competences, social competences also play an increasingly important role in project-based organisations, which makes the selection process itself more demanding. In addition, the possibilities of generating attention for a position are increasing and, in turn, the communicative possibilities of reacting to published positions have also grown. This also leads to a quantitative increase in application interactions. Large numbers of people apply for specific

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[2] https://www.pymetrics.ai/ We base the following representations of Pymetrics' services on information that the company itself disseminates on its website and affiliated channels.

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vacancies in large organisations that are perceived as attractive. Organisations see themselves forced to make automated pre-selections, otherwise the departments concerned would be incapable of acting in the long run. It is precisely this process that we want to address on the software side with the example of the company Pymetrics.

The company Pymetrics is an example of a company whose service is to deal with the phenomenon of the oversupply of applicants on the labour market with the aid of software. Pymetrics promises to have developed a selection programme that can determine the suitability of applicants on a scientific basis. First, a basic data set is created in the form of typed personas that ideally represent the group into which applicants are to be recruited. In a second step, applicant data is collected in the form of games. These games should provide information about personality traits of the applicants. In the last step, the basic data of the personas are then related to the data of the applicants, and it is calculated which applicants fit best into the existing team. Translated into our theoretical language, the Pymetrics programme means making the density of information and complexity in the application process manageable for organisations, including the delivery of a recommendation for action and in this sense: successful simplification in decision-making in the process of filling a vacant position. So, in the recruitment process for a job that has thousands of applicants, it is now common for resource-rich companies to pre-select via AI. The applicants' data is filtered by an AI regarding various parameters. Applicants whose data does not exceed a certain threshold are excluded from the process. And finally, suitable applicants are ranked and given a score to quantify their suitability. Finally, the software presents these scores as output to support HRM in decision-making. So, on a theoretical and empirical level, all the requirements we formulated in advance seem to be fulfilled: The software is used for a specific problem and the expectation of the software is successful simplification in the recruitment process. The software also provides meaningful output in the form of scores and rankings. This output can be addressed in a process-oriented way as a basis for decisions.

However, if it were agreed that the AI score is in the last instance the most meaningful criterion for hiring, HRM would consequently make itself obsolete using such technology. However, social reality shows that hiring processes are not (yet) fully automated.

The information output needs to be reconstructed and contextualized—in the spirit of the social interface. This is the basis for the use of AI. It is noted that AI like every other IT system which produces data is not a value-free technology either, but usually carries a bias qua training data due to assumptions about the world, which the system is used to describe (cf. Stachowiak, 1980; critical: Janich, 2001). The reduction of complexity in the first step - from all applicants to a selection of applicants—is therefore already biased when using an AI. This makes the data provided in the form of scores

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and rankings much more complex than it first appears, because the selection is associated with contingency and the technology's promise of objectivity seems untenable. Furthermore, the question can be asked to what extent a one-point difference in scores constitutes a relevant difference. This also needs to be discussed—meaningfully, socially—because it is the task of human resource management to put the right people in the right positions in the long run.

Furthermore, the consequence of a machine hiring process is the schematisation and computerisation of personalities and social, interactive, changeable dispositions with the promise of a perfect and objective outcome. HR managers can select the most suitable individuals from a continuum of maximum fit by reconstructively linking to the machine output. However, reconstructive here does not mean that one can reconstruct exactly how the scores are calculated on the technical side. Rather, reconstructive here means reading the output of the machine—in this case the scores—as a call to action and, for example, selecting and hiring one of the three best-placed applicants. A certain degree of objectivity is attributed to the technology used, but—following our theoretical representations—this expectation of objectivity must be relativized through meaningful connection, since otherwise HRM would theoretically make itself obsolete and, on the other hand, the output cannot be transferred to the organisation. Finally, the obsolescence debate regarding HRM is also about organisational responsibility regarding the final decision of hiring, which, like every (organisational) decision, is fraught with risk.

Moreover, in the long run, the way Pymetrics works means that the teams for which applicants are recruited are homogenised. Because in the case of Pymetrics, it is the personality traits of the existing team with which the personality traits of the applicants are matched. Based on this informational comparison, the applicants are then listed and hierarchized, resulting in a recommendation for HRM to hire one of the highest-ranked applicants. HRM cannot yet foresee that this procedure will contribute to the homogenisation of teams in the long term, because the machine will recommend the best applicant, suitable for a team in a certain defined situation. The illusion of communication with the machine in the form of the instructions for action works in the way that the expectation of facilitation associated with the technology takes place for the process used. Only later, e.g., when the team no longer must deal with constructive and productive conflicts through homogenisation and all personal diversity has been unified, does it become clear that the AI solution has simplified the hiring process as expected, but has induced further problems through its mode of operation. So, for the process for which the AI solution was used, the AI solution has been able to fulfil its expectations, but for the function of HRM within the organisation, its use may result in productivity issues in a team modelled this way due to its streamlining. For the informational accounting of personality traits, the functioning of the software solution,

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does not seem to become visible through the meaningfully connectable output. In this respect, it must be stated that the technology used and examined—measured against the ascribed expectations—did work here in terms of reducing complexity, but its functioning causes problems in the long term. The use of technology, for example, to support decision-making in the hiring process can be legitimised in terms of the process and at the same time legitimises the decision, but both the addressed expectations and the consequences of the use of technology must be observed and interpreted. Consequently, our theoretical preliminary considerations coincide with the predicted, empirical observations. The communication theory approach to reformulating the practice of connecting to machine output seems to be an explanatory gain on a theoretical and empirical level.

5 Conclusion

Finally, we return to the three levels of analysis we identified at the beginning: On a theoretical level, we can state that the practice of connecting to machine output can be modelled with communication-theoretical means. In contrast to interactionist theories that attempt to describe the relationship with machines through gradual agency, the communication-theoretical approach to the practice of connecting to machine output that we have outlined does not require a discussion about whether or to what degree subject status and the same can be attributed to machines. The basis for the communication theory approach is communication in the medium of meaning, which is conceived as an analytical triangle: It differentiates between information the act of communication and the process of understanding the difference between communication and information (Luhmann 1995b). Although the theoretical situation characterises communication between machines and social systems as incommensurable, communicative connection is nevertheless possible. Miebach's concept of social interface serves this purpose. With this, a relationship is established that unilaterally bridges the incommensurability and makes the machine output connectable for the social system through addressed behavioural expectations. This is accompanied by a series of necessities that the social system must fulfil during communication: Reconstruction and contextualisation of the data offered in the output, dealing with "the consequences of the self-generated uncertainty of the computer" so that communicative success can be established by means of follow-up communication (Miebach 2011, 109).

On a theoretical-empirical level, we have tried to depict its Janus-facedness via Luhmann's concept of technology and thus operationalise our theoretical approach. Faced with the sheer mass of applicants and due to efficiency reasons in the inner and outer company competition, organisations are forced to use software solutions to make

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a pre-selection. On this side, the function of technology stands up to expectations: it is a "successful simplification" of an organisational process (Luhmann, 1997, p. 524). Nevertheless, problems can also occur if objectivity is attributed to the machine output in the form of recommendations for action; and decisions on recruiting are made according to these recommendations, unquestioned. Finally, recruiting agents make themselves obsolete if the machine output is taken for granted. Finally, the usage of an AI-based software solution like Pymetrics can be described as ambiguous: Certainly, the software simplifies, rationalises, and legitimises decision-making in the recruiting process. However, while using the application (in a performative sense), the consequences of the AI's functionality cannot be foreseen: We have predicted that Pymetrics will produce connectable, quantifiable, and thus simplifying output, but in the long run it may lead to a certain kind of homogenisation of the teams into which people are assigned to. This long-term problem is inherent in the functionality of the software solution and cannot be observed in the process of using the technology, but only through permanent sense-making on the output. To put it briefly: a human manager must control, to what consequences the machine-made choices will lead.

An outlook for further action based on the communication-theoretical approach we have outlined could look as follows: On a theoretical level, the communicative process of connection should be examined in more detail. Through the communication-theoretical basis, the aforementioned process can possibly be reformulated as a phenomenon of different languages, stemming from different spheres to which the theory of translational relations then applies (Renn, 2006). Putting the analytical assumption into work, more areas of application must be identified, empirically. Then one must ask, if a communication -theoretical approach can help to shed some light on the deepening relationship of social systems with technology. Currently, research is undertaken to reflect on status of digital communications as evidence in court cases (Peetz et. al).

References

Baraldi, C., Corsi, G. und Esposito, E. (1997) GLU: Glossar zu Niklas Luhmanns Theorie sozialer Systeme. 1. Aufl. Frankfurt am Main: Suhrkamp (Suhrkamp Taschenbuch Wissenschaft, 1226).

Benenson, Z., Gassmann, F. und Landwirth, R. (2017) 'Unpacking Spear Phishing Susceptibility', in Brenner, M. et al. (eds) Financial Cryptography and Data Security. Cham: Springer International Publishing (Lecture Notes in Computer Science), pp. 610–627. doi: 10.1007/978-3-319-70278-0_39.

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Esposito, E. (2002) Soziales Vergessen: Formen und Medien des Gedächtnisses der Gesellschaft. 1. Aufl. Frankfurt am Main: Suhrkamp (Suhrkamp Taschenbuch Wissenschaft, 1557).

Esposito, E. (2016) 'Strukturelle Kopplung mit unsichtbaren Maschinen', Soziale Systeme, 7(2), pp. 241–252. doi: 10.1515/sosys-2001-0204.

Gripp-Hagelstange, H. (1995). Niklas Luhmann: eine erkenntnistheoretische Einführung. München:Fink.

Halfmann, J. (1995) 'Kausale Simplifikationen. Grundlagenprobleme einer Soziologie der Technik', in Halfmann, J. (ed.) Theoriebausteine der Techniksoziologie. Frankfurt/Main; New York: Campus-Verl. (Technik und Gesellschaft), pp. 211–226.

Heßler, M., und Liggieri, K. (2020) Technikanthropologie. Handbuch für Wissenschaft und Studium. Available at: https://ebookcentral.proquest.com/lib/erlangen/detail.action?docID=6405678 (Accessed: 9 March 2021).

Janich, P. (2001) 'Wozu Ontologie für Informatiker? Objektbezug durch Sprachkritik', GI Jahrestagung, (2), pp. 765–769.

Karafillidis, A. (2013) 'Erklärungen in rekursiven Verhältnissen', Zeitschrift für Theoretische Soziologie, (2), pp. 218–238.

Luhmann, N. (1995a) Die Kunst der Gesellschaft. 1. Aufl. Frankfurt am Main: Suhrkamp.

Luhmann, N. (1995b). Was ist Kommunikation? In Die Soziologie und der Mensch (Soziologische Aufklärung. Vol 6, Wiesbaden: Westdt.-Verlag p. (113–124)

Luhmann, N. (1997) Die Gesellschaft der Gesellschaft 2Bd. Frankfurt am Main: Suhrkamp.

Miebach, B. (2011) 'Computer und soziale Systeme: Strukturelle Kopplung oder Material Agency? ', Soziale Systeme, 17(1), pp. 97–119. doi: 10.1515/sosys-2011-0106.

Muhle, F. (2018) 'Sozialität von und mit Robotern? Drei soziologische Antworten und eine kommunikationstheoretische Alternative', Zeitschrift für Soziologie, 47(3), pp. 147–163. doi: 10.1515/zfsoz-2018-1010.

Nassehi, A. (2019) Muster: Theorie der digitalen Gesellschaft. München: C.H. Beck.

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STEINBACH

(im Druck) Peetz, S., Staples R. und V. Steinbach: 'Daten in Verfahren. Zur Übersetzungskapazität des Social Interface in Gerichtsverfahren', in: Burzan, N. (eds) Gesellschaft unter Spannung: Der Verhandlungsband des 40. Kongresses der Deutschen Gesellschaft für Soziologie online vom 14.-24. September 2020.

Rammert, W. und Schulz-Schaeffer, I. (2002) 'Technik und Handeln: wenn soziales Handeln sich auf menschliches Verhalten und technische Artefakte verteilt', in Rammert, W. and Schulz-Schaeffer, I. (eds) Können Maschinen handeln?: soziologische Beiträge zum Verhältnis von Mensch und Technik. Campus Verl., pp. 11–64. Available at: https://nbn-resolving.org/urn:nbn:de:0168-ssoar-122133.

Renn, J. (2006) Übersetzungsverhältnisse: Perspektiven einer pragmatistischen Gesellschaftstheorie. 1. Aufl. Weilerswist: Velbrück Wissenschaft.

Saussure, F. de et al. (2001) Grundfragen der allgemeinen Sprachwissenschaft. 3. Aufl. Berlin: de Gruyter (De-Gruyter-Studienbuch).

Stachowiak, H. (1980) 'Der Modellbegriff in der Erkenntnistheorie', Zeitschrift für allgemeine Wissenschaftstheorie, 11(1), pp. 53–68. doi: 10.1007/BF01801279.

Weyer, J. (2018) 'Technik', in Kopp, J. und Steinbach, A. (eds) Grundbegriffe der Soziologie. Wiesbaden: Springer Fachmedien Wiesbaden, pp. 451–454. doi: 10.1007/978-3-658-20978-0_88.