Kybernetes

The digital transformation of social research: on the emulation of theory within theory and the emergence of repository-based academic writing

Steffen Roth
CERIIM, Excelia Business School, La Rochelle, France and
Next Society Institute, Kazimieras Simonavicius University, Vilnius, Lithuania

Received 24 March 2026
Revised 13 April 2026
Accepted 13 April 2026

Abstract

Purpose – The digital transformation of social research has significantly expanded the empirical and methodological capacities of the social sciences. Yet, social theory itself remains largely shaped by analogue modes of thinking and writing. This paper aims to explore what a digital transformation of social theory would entail, with particular attention to the implications for theory construction and academic writing.

Design/methodology/approach – The paper adopts a systems-theoretical and distinction-based perspective on social theorising. Building on the paradox of true distinctions, it outlines the basic operations of digital social theory as the construction, combination and recombination of distinctions. The argument is developed through conceptual analysis and illustrative examples, including the translation of prominent false distinctions into architectures of true distinctions.

Findings – The paper identifies two key implications of digitally transformed theorising. First, digital theory architectures possess the capacity to emulate diverse forms of analogue theory by translating false distinctions into true ones and generating further distinctions from these. This capacity introduces both a new criterion of theoretical robustness and a corresponding methodological challenge. Second, the linear format of conventional academic writing proves inadequate for representing and developing such architectures. This limitation points to the need for repository-based forms of academic writing and collaboration that allow for modular, iterative and problem-oriented theory development.

Originality/value – The paper contributes to the emerging research programme on the digital transformation of social research by shifting the focus from digital methods and empirical applications to the transformation of social theory itself. It introduces the problem of theory emulation as a central concern for digital theorising and proposes repository-based academic writing as a corresponding organisational form. In doing so, it outlines a pathway towards the development of social theoretical infrastructures capable of integrating and emulating both analogue and digital theories.

Keywords Guiding distinctions, True and false distinctions, Digital theorising, Theory architectures, Functional analysis, Knowledge repositories

Paper type Conceptual paper

1. Introduction: digital social research, analogue social theory

The digital transformation of social research has been widely documented. Fields such as computational sociology and digital humanities have demonstrated how large-scale datasets, algorithmic analysis and machine learning techniques can expand the empirical horizons of social inquiry. As illustrated not least in longitudinal studies of large textual corpora, digital tools allow researchers to observe patterns that would otherwise remain invisible.

One prominent example is recent big data research on social macro trends, which analyses the relative prominence of key societal domains over extended historical periods (Roth *et al*., 2019; Roth *et al*., 2026). The results of such studies suggest that the prevalence of theoretical topics and concepts in large corpora corresponds, at least to some extent, to observable macro-social trends (see Figure 1).

From this perspective, theory might appear as a mere reflection – or even a function – of broader societal developments. Big data analytics, in turn, promises to provide increasingly robust indicators of which concepts and theoretical frameworks are in or out of sync with the societies they seek to describe.

Kybernetes

e-ISSN: 1758-7883
p-ISSN: 0368-492X
DOI 10.1108/K-03-2026-0688

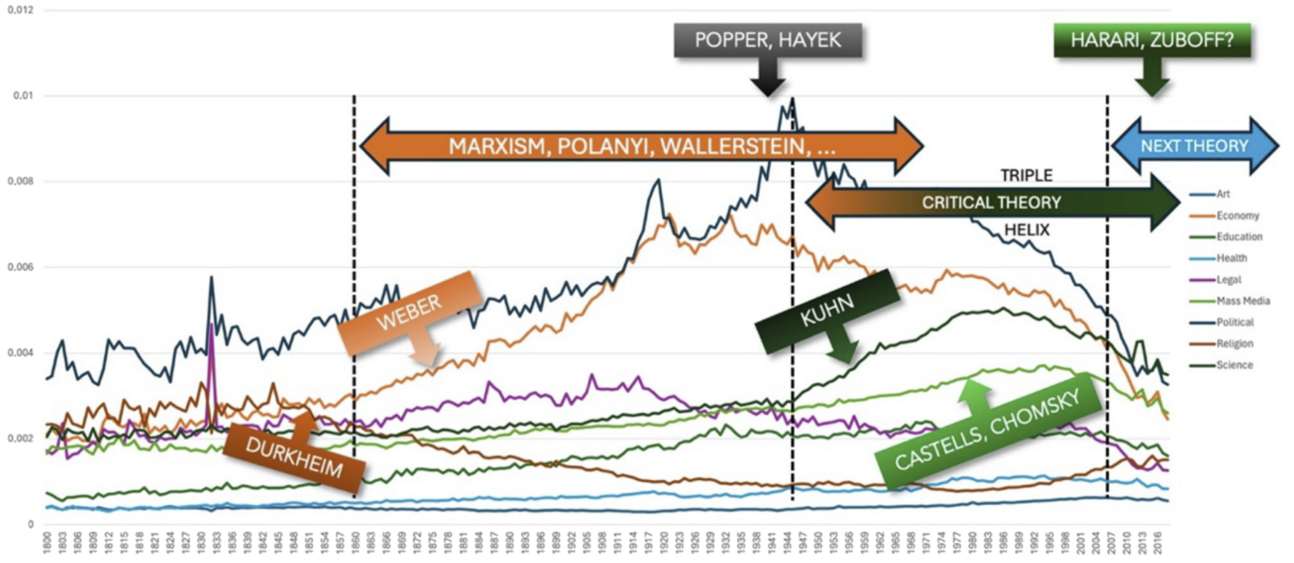

Figure 1. Big data insights and consequences for social theorising (Roth *et al*., 2026, p. 358)

Taken to its logical conclusion, this line of reasoning leads to a provocative implication: if sufficiently large datasets allow us to identify the dominant structures and transformations of society, then the role of social theory may appear reduced to a reactive or confirmatory function. Rather than guiding observation, theory would follow it. This position resonates with claims associated with the "End of Theory" (Anderson, 2008) debate, according to which the availability of massive datasets and advanced analytical tools renders traditional forms of theorising increasingly redundant.

From this vantage point, social theorising risks being perceived as obsolete, or at least as secondary to data-driven analysis (Kitchin, 2014). At best, theory would serve as a descriptive vocabulary for patterns already detected by computational means. At worst, it would devolve into a form of retrospective sense-making, lagging behind empirical developments and confined to increasingly particularistic or stylistic contributions.

One possible response to this situation is prospective or performative theorising (Comi *et al*., 2025; Gümüsay and Reinecke, 2024), that is, theory-based "future making" (Wenzel *et al*., 2025) in terms of the more or less truth-based articulation of desirable futures in contrast to empirically observed presents. In this mode, theory regains a normative or anticipatory role by shifting its focus from what is to what ought to be. Yet, unless supported by sophisticated computational modelling, such prospective theorising largely remains an analogue practice. It operates through linear texts, conceptual narratives and argumentative structures that are themselves only loosely coupled to the digital infrastructures shaping contemporary research.

This observation points to a more fundamental issue. The challenge is not merely to choose between affirmative, critical or prospective theories of a digital society. Rather, it is to recognise the fact that all these approaches typically share a common limitation: they produce analogue theories of an increasingly digital world. As has been noted, much of contemporary social theory still takes the form of "print theories of computer societies" (Roth *et al*., 2019), that is, analogue texts that describe digital phenomena without adopting digital forms of theorising themselves.

The resulting mismatch is not trivial. While the digital transformation of research methods has led to unprecedented advances in data collection and analysis, theory development has remained comparatively conservative, continuing to rely on linear, analogue, text-based modes of representation. This creates a structural imbalance between the objects of analysis, the methods used to study them and the forms in which theoretical insights are articulated.

Against this backdrop, the key question is not whether social theory should become more data-driven or more critical, but how social theorising itself can be digitally transformed. What would it mean to move from analogue to digital forms of theory? How might theoretical architectures change if they were designed in accordance with the same principles that underlie digital computation? What new forms of academic writing would be required to adequately express and operationalise such digitally transformed theories? And to what extent would such theories need to be capable of adequately representing other theories within their own architecture as a marker of digitally robust theorising?

The present paper addresses these questions by providing an overview of the digital transformation of social theory and its implications for academic writing and theory design. It develops an instructive perspective centred on two interrelated challenges: first, the problem of emulating theories within theories, and second, the need for new, repository-based forms of academic writing that move beyond linear text formats. In doing so, the paper aims to contribute to an emerging research programme that seeks not only to theorise digital society, but to theorise digitally.

2. From text to table: the architecture of digital social theory

The digital transformation of social theory is often understood as the adaptation of existing theories to digitally transformed environments. In this sense, theories are expected to account for phenomena such as platforms, algorithms or data-driven decision-making. Yet, such an

understanding remains limited, as it treats digitalisation as an external object of analysis rather than as a principle that may also apply to theory itself.

A more fundamental perspective starts from the observation that digital transformation is not primarily about electronic computers and networks thereof, but about their underlying form of operation. As early as Turing's (1995[1947], p. 390) reflections on computing suggest, the defining feature of digital machines is not their electronic implementation, but their reliance on binary structures that allow for universal computation. Digital transformation, in this sense, can be understood as the translation of symbols, observations and relations into architectures based on binary distinctions.

From this vantage point, digitalisation is closely linked to the principle of tabulation. Whether in the form of truth tables, matrices or algorithmic decision trees, digital systems operate by arranging distinctions into structured arrays that enable systematic recombination. Historical examples such Harriot's (1601–1605) proto-binary notation, Bacon's (1674) bi-literal alphabet or Leibniz's (1703) formal binary system illustrate that this principle predates modern computing and can be understood as a general form of organising complexity through recursive distinction and recombination.

Applied to social theory, this implies a shift from linear, narrative forms of theorising to matrix-like architectures. Traditional theories typically unfold in sequences of arguments, where concepts are introduced, related and refined in a largely discursive manner. Digitally transformed theories, by contrast, are organised around sets of distinctions that can be combined, permuted and expanded in a systematic way. In this sense, theory moves from text to table, from argument to architecture (Roth, 2019).

The key operation underlying this transformation is the drawing of distinctions. Following Spencer Brown's (1979) foundational insight that "we cannot make an indication without drawing a distinction", and Luhmann's (1995, 2012, 2013) elaboration of this principle in social systems theory, all forms of observation – including theoretical observation – rely on distinctions that separate what is indicated from what remains unmarked. Social theory can therefore be understood as a structured arrangement of guiding distinctions that render aspects of the social world observable (Roth *et al*., 2025).

However, distinctions in their truth value. A central issue therefore concerns the difference between true and false distinctions. True distinctions are those that divide a given space into two mutually exclusive and jointly exhaustive parts. They satisfy what Spencer Brown (1979) termed the condition of "perfect continence", in that every element of the relevant universe falls on exactly one side of the distinction. False distinctions, by contrast, fail to meet one or both of these criteria. They either leave parts of the space unaccounted for or allow for overlaps between the distinguished categories.

Much of social theory relies on such false distinctions (Roth *et al*., 2025). Dichotomies such as structure/agency, economy/society, male/female or property/access are often discursively powerful, yet they are either not mutually exclusive, not jointly exhaustive or both. As a result, analogue theorising typically compensates for these limitations by introducing continua, hybrid categories or additional distinctions. While this flexibility is a strength in discursive contexts, it poses a challenge for digital architectures, which require distinctions that can be processed in a strictly binary manner.

At this point, the paradox of true distinctions emerges. If, as Spencer Brown (1979) suggests, every distinction is by definition perfectly "continent", then all distinctions must appear to be true. Yet, scientific observation requires us to distinguish between true and false distinctions. The resulting "paradox of true distinctions" (Roth, 2024) then lies in the fact that distinctions must be both true (to function as distinctions) and false (to be evaluated as such) at the same time.

One way to navigate this paradox is to treat the distinction between true and false distinctions as observer-relative. A distinction may be false in one frame of reference and true in another. The classic example is the distinction between 0 and 1. As elements of the number system, they do not exhaust the space of numbers and therefore constitute a false distinction.

However, once they are used as binary values to recode the entire number space, they become a true distinction relative to that system. A similar shift can be observed in everyday distinctions. Consider, for instance, the distinction between *leave* and *remain*. In the context of the Brexit referendum, this distinction operates as a reasonably well-defined binary, dividing the relevant decision space into two mutually exclusive and jointly exhaustive options. Yet, in other contexts – such as legal discussions of indefinite *leave to remain* – the same terms no longer form a mutually exclusive or jointly exhaustive distinction. Digital transformation thus involves not the discovery of inherently true distinctions, but the construction of frameworks in which distinctions can operate as if they were true.

This insight has far-reaching implications for theory design. Digital social theory does not eliminate false distinctions; rather, it translates them into architectures of true distinctions that allow for systematic processing. Instead of resolving ambiguity through narrative elaboration, digitally transformed theories manage it through structured recombination. The focus shifts from interpreting distinctions to engineering them.

In this sense, the digital transformation of social theory can be defined as the transition from analogue, discursive arrangements of distinctions to digital, tabular architectures in which distinctions are organised in a way that enables their systematic combination, comparison and computation. This transformation does not replace existing theories, but reconfigures their underlying logic. It opens the possibility of designing theoretical frameworks that are not only descriptive, but also operational in a computational sense.

3. From dichotomies to binary architectures: how to translate false distinctions and work with true ones

If digital transformation implies the translation of analogue distinctions into architectures of true distinctions, then the question arises how such translations can be performed in practice. Rather than attempting to demonstrate exhaustively that a considerable number of classical and contemporary distinctions are false (Roth *et al*., 2025), it suffices to examine a single, influential example in greater detail.

Consider the distinction between capitalism and socialism discussed in Roth (2023). Few distinctions have been as pervasive across social theory, political discourse and legal reasoning. At first glance, the distinction appears straightforward, dividing the social world into two supposedly jointly exhaustive and mutually exclusive domains. Upon closer inspection, however, it becomes apparent that this distinction may also be considered as one that fails to meet the criteria of a true distinction. Not all societies or political systems are clearly either capitalist or socialist, and many occupy intermediate or overlapping positions. Moreover, there are systems that may be observed not to fit well into any of the afore-mentioned categories as they are best defined as neither capitalist nor socialist (see Table 1).

As we approach the distinction of capitalism versus socialism as a false distinction, it thus turns out that it appears as a false distinction precisely because it does not constitute a

Table 1. Capitalism/socialism

	Capitalism	Non-capitalism
Socialism	Capitalist socialism Socialist capitalism	Socialism
Non-Socialism	Capitalism	Despotism Feudalism Fascism Environmentalism

Note(s): A false distinction (Roth, 2023, p. 455)

distinction at all and rather conflates two distinctions into one. As such, it cannot be directly processed within a binary architecture. The task is therefore not to refine the distinction, but to translate it into a set of true distinctions (Roth, 2019).

This example illustrates a general principle. False distinctions are false not simply because they lack precision, but because they are more than one distinction (Roth, 2024). Their digital transformation therefore requires their decomposition into true distinctions and their recombination into structured architectures. In this sense, the translation of analogue distinctions into digital ones is not a matter of simplification, but of unfolding hidden complexity into an operational form.

4. The basic operation of digital social theory and the challenge of emulation of theories within theories

If the digital transformation of social theory is to be understood in operational rather than merely metaphorical terms, it requires a clear account of how digitally transformed theorising proceeds. At its most elementary level, digital social theory can be described as a theory architecture based on a minimal set of distinctions and operations.

The basic premise of such an architecture is the distinction between true and false distinctions. This distinction functions as the primary orientation for theory construction, even though it is itself paradoxical, as distinctions must be both true and false depending on the observational frame. Rather than resolving this paradox, digital social theory takes it as its starting point and operational condition.

On this basis, digitally transformed theorising relies on two fundamental operations. The first is the construction and combination of true distinctions, which provide the elementary building blocks of digital theory. By drawing, crossing and recombining such distinctions, theory can generate structured spaces of observation that allow for systematic comparison and variation. The second operation is the translation of false distinctions into sets of true distinctions. As illustrated in the previous section, distinctions that fail to meet the criteria of mutual exclusivity or joint exhaustiveness can be decomposed into multiple true distinctions and recombined into architectures that render them operational within a digital framework.

Together, these two operations define what may be described as a universal social theory machine. Such a machine is "supervacuous" in the sense that it is virtually empty of substantive assumptions and relies only on the form of distinction itself as its constitutive principle (Roth, 2019). It is not committed to any particular theoretical paradigm, set of concepts or empirical domain. Instead, it provides a general architecture within which any distinction – whether traditionally considered valid or not – can be processed, translated and recombined.

An important implication of this architecture is its generative capacity. True distinctions do not merely structure a given domain; they also enable the production of further distinctions (Roth, 2023, 2024). By translating false into true distinctions and combining, or "re-entering" (Spencer Brown, 1979) true distinctions into themselves, increasingly complex configurations can be generated, allowing theory to expand its observational repertoire without introducing additional foundational premises. In this sense, digitally transformed social theory is not only reductive, in that it translates complex distinctions into simpler components, but also generative, in that it uses these components to produce new distinctions and perspectives.

This combination of minimal premises and maximal generativity entails a form of paradigmatic neutrality. Because the architecture is not tied to any specific set of guiding distinctions, it can operate across theoretical traditions and disciplinary boundaries. Its apparent "emptiness" is not a limitation, but a condition of its flexibility. By working with distinctions rather than substantive statements, digital social theory remains open to a wide range of theoretical inputs, including those based on false or analogue distinctions, which it translates into operational forms.

At the same time, this neutrality is accompanied by a significant theoretical and methodological implication. If any distinction can be translated into a configuration of true

distinctions, and if true distinctions can be recombined to generate further distinctions, then digitally transformed theory architectures acquire the capacity to reconstruct a wide variety of theoretical frameworks. In principle, any analogue theory based on false or composite distinctions can be translated into a digital architecture and reproduced within it.

This observation leads to a crucial insight. The capacity to "emulate" other theories is not merely a by-product of digital theorising, but a direct consequence of its basic operations. The translation of false distinctions into true ones provides the means to reconstruct existing theoretical frameworks, while the generative capacity of true distinctions enables their extension, variation and combination. In this sense, digitally transformed theories are, at least in principle, capable of emulating the most diverse forms of analogue theorising.

This capacity, however, is not only a possibility but also a requirement. A theory that claims to be digital must be able to demonstrate that it can translate and reconstruct other theories within its own architecture. The ability to emulate alternative theoretical frameworks thus becomes a criterion of robustness for digital social theory. At the same time, it introduces a new challenge: to determine under which conditions such emulations can be considered adequate, equivalent or meaningful. Addressing this challenge is essential for advancing the digital transformation of social theory beyond its current conceptual stage.

5. The limits of linear writing and the need for repository-based social theorising

The preceding sections have outlined how the digital transformation of social theory reconfigures theorising as an operation on distinctions. If theories are understood as architectures composed of combinable and generative distinctions, and if their robustness depends on their capacity to emulate alternative theoretical frameworks, then the question arises how such theories can be adequately expressed, developed and refined.

This question points to the limits of linear academic writing. Traditional formats such as journal articles or monographs are organised as sequential narratives. They present arguments in a fixed order, guiding the reader from introduction to conclusion through a predetermined path. While this form has proven highly effective for the communication of analogue theories, it is less suited to the representation of architectures that are, by design, modular, re-combinable and open-ended.

The transition from printed text to digital hypertext has already expanded the possibilities of academic communication by enabling non-linear navigation across interconnected documents (Krapp, 2006). Yet, even hypertext largely preserves the logic of text production, in that it links relatively stable units of discourse. The digital transformation of social theory suggests a further step, from hypertext to repository-based forms of knowledge organisation.

Platforms such as *GitHub* provide a useful point of reference in this regard. In such environments, knowledge is not organised as finished narratives, but as evolving repositories of contributions. These repositories are structured around problems and solutions, with contributors proposing, modifying and integrating modules that address specific issues. Rather than producing complete texts, participants contribute discrete elements – code, patches or extensions – that can be combined and recombined within a shared architecture.

Transposed into the context of social theory, a repository-based approach would imply a shift from writing texts to constructing and maintaining theory architectures. Contributions would no longer take the form of self-contained articles, but of modular interventions into a shared and growing space of distinctions. Scholars would document how specific distinctions are constructed, how they combine with others and how they can be translated into architectures of true distinctions. Instead of arguing for or against particular theories, contributors would demonstrate how these theories can be reconstructed, extended or modified within a common framework.

In such a setting, theoretical work would become explicitly problem- and solution-oriented – or, in the best sense of the term, functionalist. Researchers could formulate "issues" in the

form of paradoxes, inconsistencies or blind spots in existing theory architectures. Others could respond by proposing "patches", that is, new distinctions or combinations of distinctions designed to address these issues. Competing solutions could coexist as alternative branches or "forks" of the same theoretical repository, allowing for systematic comparison and iterative refinement.

A distinction-based repository would thus function as a space in which the generative capacity of distinctions becomes operational. Contributors would not only analyse existing distinctions, but also explore how distinctions generate further distinctions, how they reveal or conceal aspects of the social world and how they can be recombined to produce new observational possibilities. At the same time, such a repository would make visible the blind spots of both analogue and digital theory architectures, enabling their continuous revision.

This shift from linear writing to repository-based theorising is not merely a change in medium, but a transformation in the organisation of knowledge production. It aligns closely with functional approaches that focus on problem–solution relationships, as repositories are inherently structured around the identification and resolution of problems. In this sense, repository-based theory provides a natural environment for digitally transformed social theorising, as it allows for the systematic articulation, testing and modification of distinction-based architectures.

Ultimately, such repositories may evolve into comprehensive theoretical infrastructures – social theoretical operating systems – that allow for the emulation of a wide range of analogue theories, as well as the integration and comparison of emerging digital ones.

About the author

Steffen Roth FRSA FCybS is Full Professor of Management at Excelia Business School, La Rochelle, France, as well as a Visiting Fellow of Wolfson College, University of Cambridge, UK. He is also Visiting Professor of Management and Organization at the University of Witten-Herdecke, Germany, and holds the title of Full Professor of Social Sciences at Kazimieras Simonavičius University, Vilnius, Lithuania, where he is the Founding Director of the Next Society Institute. Currently, Steffen serves as Editor-in-Chief of *Kybernetes* as well as Associate Editor of *Systems Research and Behavioral Science* and the *Journal of Organizational Change Management.* The journals his research has been published in include *Journal of Business Ethics*, *Sociology of Health and Illness*, *Organization and Environment*, *Journal of Business Research*, *Ecological Economics*, *Technological Forecasting and Social Change*, *European Journal of the History of Economic Thought*, *European Management Journal* and *Futures*.

References

Anderson, C. (2008), "The end of theory: the data deluge makes the scientific method obsolete", *Wired Magazine*, Vol. 16 No. 7, pp. 16-07.

Bacon, F. (1674), *Of the Advancement and Proficiencies of Learning: or the Partitions of Sciences*, Thomas Williams, London.

Comi, A., Mosca, L. and Whyte, J. (2025), "Future making as emancipatory inquiry: a value-based exploration of desirable futures", *Journal of Management Studies*, Vol. 62 No. 6, pp. 2467-2481, doi: 10.1111/joms.13227.

Gümüsay, A.A. and Reinecke, J. (2024), "Imagining desirable futures: a call for prospective theorizing with speculative rigour", *Organization Theory*, Vol. 5 No. 1, doi: 10.1177/26317877241235939.

Harriot, T. (1601\1605), *Manuscript 6788* (edited by Stedall, J.), Max Planck Institute for the History of Science, available at: http://echo.mpiwg-berlin.mpg.de/MPIWG:01QU84RT

Kitchin, R. (2014), "Big data, new epistemologies and paradigm shifts", *Big Data and Society*, Vol. 1 No. 1, doi: 10.1177/2053951714528481.

Krapp, P. (2006), "Hypertext avant la lettre", in Chun, W.H.K. and Keenan, T. (Eds), *New Media. Old Media. A History and Theory Reader*, Routledge, pp. 359-373.

Leibniz, G. (1703), "Explication de l'arithmétique binaire (Explanation of Binary Arithmetic)", *Mémoires de l'Académie Royale des Sciences*, Vol. 1703, pp. 85-89.

Luhmann, N. (1995), *Social Systems*, Stanford University Press, Palo Alto.

Luhmann, N. (2012), *Theory of Society*, Vol. 1, Stanford University Press, Palo Alto.

Luhmann, N. (2013), *Theory of Society*, Vol. 2, Stanford University Press, Palo Alto.

Roth, S. (2019), "Digital transformation of social theory. A research update", *Technological Forecasting and Social Change*, Vol. 146, pp. 88-93, doi: 10.1016/j.techfore.2019.05.016.

Roth, S. (2023), "Digital transformation of management and organization theories: a research programme", *Systems Research and Behavioral Science*, Vol. 40 No. 3, pp. 451-459, doi: 10.1002/sres.2882.

Roth, S. (2024), "Truth tables, true distinctions. Paradoxes of the source code of science", *Systemic Practice and Action Research*, Vol. 37 No. 3, pp. 261-267, doi: 10.1007/s11213-023-09640-4.

Roth, S., Dahms, H.F., Welz, F. and Cattacin, S. (2019a), "Print theories of computer societies. Introduction to the digital transformation of social theory", *Technological Forecasting and Social Change*, Vol. 149, 119778, doi: 10.1016/j.techfore.2019.119778.

Roth, S., Schwede, P., Valentinov, V., Žažar, K. and Kaivo-oja, J. (2019b), "Big data insights into social macro trends (1800-2000): a replication study", *Technological Forecasting and Social Change*, Vol. 149, 119759, doi: 10.1016/j.techfore.2019.119759.

Roth, S., Watson, S., Möller, S., Clausen, L., Žažar, K., Dahms, H., Sales, A. and Lien, V. (2025), "Guiding distinctions of social theory: results from two online brainstormings and one quantitative analysis of the ISA books of the XX century corpus", *Current Sociology*, Vol. 73 No. 4, pp. 629-650, doi: 10.1177/00113921251316685.

Roth, S., Mansur, J., Sales, A., Žažar, K., Dahms, H., Arnold, T. and Valentinov, V. (2026), "Big data insights into social macro trends: expanding the horizon (1800-2018)", *Systems Research and Behavioral Science*, Vol. 43 No. 1, pp. 353-361, doi: 10.1002/sres.3175.

Spencer Brown, G. (1979), *Laws of Form*, E. P. Dutton, New York.

Turing, A.M. (1995), "Lecture to the London mathematical society on 20 February 1947", *M.D. Computing*, Vol. 12 No. 5, pp. 390-397.

Wenzel, M., Cabantous, L. and Koch, J. (2025), "Future making: towards a practice perspective", *Journal of Management Studies*, Vol. 62 No. 6, pp. 2426-2451, doi: 10.1111/joms.13222.

Corresponding author
Steffen Roth can be contacted at: roths@excelia-group.com