Sociologica. V.12 N.1 (2018)
ISSN 1971-8853

Niklas Luhmann's Card Index: The Fabrication of Serendipity*

Johannes F.K. Schmidt

Published: July 26, 2018

Johannes F.K. Schmidt: Bielefeld University (Germany)
johannes.schmidt@uni-bielefeld.de; http://ekvv.uni-bielefeld.de/pers_publ/publ/PersonDetail.jsp?personId=25653450
Dipl.-Soz. Johannes F.K. Schmidt is the scientific coordinator of the long term research project "Niklas Luhmann — A Passion for Theory" (2015–2030) at the Bielefeld University (https://www.uni-bielefeld.de/soz/luhmann-archiv/). The objective of this project is to preserve Niklas Luhmann's literary estate and make it accessible for research. In the last years he published several articles about Luhmann's literary estate and edited the first version of Luhmann's lifelong project of a theory of society (*Systemtheorie der Gesellschaft*, 2017. Berlin: Suhrkamp).

* The following article is a revised and shortened version of: Schmidt, J.F.K. (2016). Niklas Luhmann's Card Index: Thinking Tool, Communication Partner, Publication Machine. In A. Cevolini (Ed.), *Forgetting Machines: Knowledge Management Evolution in Early Modern Europe* (pp. 289–311). Leiden/Boston: Brill.

1 The Sociology of Niklas Luhmann

Niklas Luhmann (1927–1998), Professor of Sociology at the Bielefeld University from 1968 to 1993, was one of the last advocates of a so called "grand theory": Over the course of his forty years of academic work, he developed a universal theoretical framework — i.e. sociological systems theory — capable of covering nearly the entire spectrum of social phenomena. In doing so, he placed great emphasis on conceptual and terminological consistency and was receptive to theoretical developments not only in sociology but in other academic disciplines such as philosophy, law, theology, biology and cybernetics in particular. Since the 1960s, Luhmann published a bewildering wealth of articles and books year after year and at the time of his death, his list of publications comprised more than 500 titles on diverse topics, mostly part of his central research interest: a theory of society.[1]

Luhmann studied law from 1946 to 1949 and then first worked as a senior civil servant in public administration. In the mid 1950s, before he had any institutional affiliation with academia, he was already conscious of the fact that the notes he took from his readings at the time,[2] would not be collected for a limited publication project but for a far more extensive endeavour, eventually for a lifelong project. The shortcomings of the common methods of organizing notes by collecting them in folders motivated him early on to start a card-based filing system.[3] In organizing his research in this way, Luhmann adopted a system of organizing knowledge that had emerged in the wake of early modern scholarship along with the rapidly growing number of available publications since the Sixteenth century and the practice of excerpting that followed: card indexing.[4] He went on to develop the potential for systematic knowledge production inherent in this filing technique to perfection by devising a very specific system of organization and referencing which seems to be an analogical pre-adaptive advance of the modern form of digital database. Luhmann's card index allows the production of new and often unexpected knowledge by relating concepts and thoughts that do not have much in common at first sight: One could say that it makes — to use Robert Merton's term[5] — *serendipity* possible in a systemically and theoretically informed way.

2 Niklas Luhmann's Card Index

Luhmann's card index consists of approximately 90,000 handwritten cards in A-6 format organized in two collections. The first collection, approximately created between 1951 and 1962, a time when Luhmann was on his way from a legal expert with interests especially in constitutional law and administrative sciences to a systems theoretical sociologist, is based primarily on his readings in political science, administrative studies, organization theory, philosophy, and sociology. It consists of approximately 23,000 cards, which are divided into 108 sections by subjects and numbered consecutively, two bibliographies comprising about 2,000 titles, and a keyword index with roughly 1,250 entries. The second collection (1963–1997), now clearly reflecting a sociological approach,[6] is divided into eleven top-level sections with a total of about 100 subsections. It consists of approximately 67,000 cards, including a sizeable but obviously incomplete bibliographical apparatus with roughly 15,000 references and a keyword index with 3,200 entries.

1. Since 1999 a number of more recent monographs and articles have been published posthumously. There are still about 150 other yet unpublished manuscripts in his literary estate which is now being prepared to make it accessible for research (cf. https://www.uni-bielefeld.de/soz/luhmann-archiv/).

2. In the early 1950s, during his legal clerkship, he was working on his doctoral thesis in law, which he had largely completed in 1955 but did not submit.

3. The following remarks are based on a first insight into Niklas Luhmann's card index which is a central part of his literary estate. The first part of the card index is now online: http://ds.ub.uni-bielefeld.de/viewer/ppnresolver?id=ZKLuhm. During his lifetime Luhmann himself had published a rudimentary description of its construction principles and how he used it (Luhmann, 1981); in an interview one can find a few remarks concerning the genesis of the collection (Luhmann, 1987).

4. Cf. Cevolini, 2004; Krajewski, 2011.

5. See Merton & Barber, 2004 (1945).

6. In 1960–1961, Luhmann spent a year at the Harvard School of Public Administration in Cambridge, MA (USA), where he attended lectures by Talcott Parsons, the leading sociologist in the field of systems theory at the time. There are no documents in the literary estate substantiating the claim that this visit was the trigger to start a new collection of notes, but the chronological sequence seems obvious.

The bulk of the collections (approximately 75,000 cards) consist of notes documenting the results of Luhmann's readings, but also his own thoughts and theoretical arguments and concepts. The notes resulting from his readings are not simply excerpts; what mattered to him was "what could be utilized in which way for the cards that had already been written. Hence, when reading, I always have the question in mind of how the books can be integrated into the filing system."[7] As a consequence he normally did not put the notes made during reading directly into the collection, nor did he file them in exactly the same way that he had taken them while reading; in fact in the evening he transferred the often only rudimentary records he made during the day into new notes according to his special filing technique. Furthermore his main concern was not to develop an idea to maximum sophistication before including the note into the collection; rather, he operated on the assumption that a decision on the usefulness of a note could only be made in relating it to the other notes — and therefore would (in many cases) be a matter to be decided *in the future*: by re-reading the note in the context of new notes compiled afterwards or in the context of an inquiry, i.e. in using the card index as a database for new thoughts and publications. Furthermore, this being the case, it was not clear right from the beginning where the note to be added would be inserted into the collection — this was a decision that was made in the course of preparing the respective note for filing; and normally there was *more than one possible solution* to the question where to place the note in the collection due to the specific structure of the collection.

These issues draw the attention to the *four special characteristics of the file collection* which are the prerequisites for its main function of producing new knowledge: a specific system of organization and method of card integration with specific rules of numbering, an internal system of linking, and a comprehensive keyword index. All this together make Luhmann's card index a complex cognitive system with a creativity of its own, a "second memory" as he called it. This ability was not totally independent from its creator of course, but it was leading systematically to ideas that do not lie at hand — even surprising the person who was the author of cards. Without doubt there was a personal unity between the author and the reader of the notes, but on the other hand there was a difference between these two insofar as the factual complexity and the evolutionary history of the collection intervened.

3 The Method of Card Integration

According to Luhmann the collection is a "combination of disorder and order, of clustering and unpredictable combinations emerging from ad hoc selection."[8] Of course the file collection is not simply a chaotic compilation of notes but an aggregation of a vast number of cards on specific concepts and topics. This order per subject area on a top level is reflected in the first number assigned to the card followed by a comma (first collection) or slash (second collection) that separates it from the rest of the number given each card (see below). The first collection features 108 sections differentiated by subject areas, exploring and reflecting on largely predetermined, fairly detailed fields of knowledge in law, administrative sciences, philosophy and sociology, such as state, equality, planning, power, constitution, revolution, hierarchy, science, role, concept of world, information, and so on. The second collection, by design, is quite more problem-oriented, reflecting the emerging sociological interests of Luhmann: It consists of only eleven top-level subject areas: organizational theory, functionalism, decision theory, office, formal/informal order, sovereignty/state, individual concepts/individual problems, economy, ad hoc notes, archaic societies, advanced civilizations. What this compilation immediately illustrates is that it is not a system of order in the sense of an established taxonomy but a historical product of Luhmann's reading and research interests especially in the 1960s.[9] Following the subject areas defined at the top level are other subsections that revolve around a variety of topics. The relationship between the top-level subject area and the lower-level

7. Luhmann, 1987, p. 150 (my translation).

8. Luhmann, index card no. 9/8 of the second collection (my translation). In the second collection one can find a small subsection with notes about the card index and its principles.

9. In the literary estate we found a paper with a table of contents for a publication called "Grundriss einer funktionalen Verwaltungslehre" ("Outline of a Functional Administrative Theory"). Beside this note there are no other documents which suggest that Luhmann ever really tried to write this book, but the bullets of the elaborate table of contents can be found in the first six subject areas of the second collection of the card index mentioned above. So it might be only a little exaggeration to say that the overall structure of this collection originally is developed "out of the spirit of the administrative sciences."

subjects cannot be described in terms of a strictly hierarchical order, it is rather a form of loose coupling insofar as one can find lower-level subjects which do not fit systematically to the top-level issue but show only marginally connections.

This is a result of the specific system of organization of the notes applied within these sections on a particular subject matter which ensures that the initial decision for a specific topic did not lead to a sequence of cards confined to that one topic: Whenever Luhmann came across an interesting idea about a secondary aspect on one of his cards, he pursued this idea by adding additional notes and inserted the respective card at that place in the existing sequence of cards. This method could be applied again to the card that had been inserted and so forth, the result being a sequence of cards leading thematically and conceptually farther and farther away from the initial subject and constitute their on subsection. Furthermore this technique enabled the collection not only to grow in absolute numbers, but to *grow "inwardly"* without the limitations of a systematically order.[10]

But the positioning of larger subject areas as well as individual cards in the collection was not only the historical product of Luhmann's reading interests and note-taking activities. It also owed to the difficulty of assigning an issue to one and only one single (top-level) subject, which is a *matter of ambiguity* or so to say *conceptual indecisiveness*. Luhmann solved this problem by seizing it as an opportunity: instead of subscribing to the idea of a systematic classification system, he opted for organizing entries based on the principle that they must have only some relation to the previous entry without also having to keep some overarching system in mind. One could say: there must be a *local* solution (i.e. connection or internal fit) only. This indicates, accordingly, that the positioning of a special subject within this system of organization reveals nothing about its theoretical importance — for there are *no privileged positions* in this web of notes: there is no top and no bottom.

The decision inherent in this filing technique without a fixed system of order is an essential prerequisite of the creativity of the filing system. In explaining his approach, Luhmann emphasized, with the first steps of computer technology in mind, the benefits of the *principle of "multiple storage"*: in the card index it serves to provide different avenues of accessing a topic or concept since the respective notes may be filed in different places and different contexts. Conversely, embedding a topic in various contexts gives rise to different lines of information by means of opening up different realms of comparison in each case due to the fact that a note is an information only in a web of other notes. Furthermore it was Luhmann's intention to "avoid premature systematization and closure and maintain openness toward the future."[11] His way of organizing the collection allows for it to continuously *adapt to the evolution of his thinking* and his overall theory which as well is not conceptualized in a hierarchical manner but rather in a cybernetical way in which every term or theoretical concept is dependent on the other.

4 The System of Numbering

Getting the filing system "to speak" requires an additional prerequisite: the possibility of addressing each card individually and hence also of finding it again. Thus, the filing technique does not build on the idea of an order of contents in the first place, but of a fixed order of positioning. This idea is at the root of Luhmann's specific *notational system*: Each card is assigned a number and, thus, a fixed position in the file that does not change over time: card 1/1 (or 1,1, as in the first collection) — i.e. the first note in the first section of the collection — is followed by 1/2 (or 1,2), and so on; a card that was created later and pursues an aspect further that is noted on card 1/1 but is not part of the argument followed up on card 1/2 was given the number 1/1a, because the number 1/2 was already assigned, and inserted between card 1/1 and 1/2; at that point, either a card 1/1b on that very same topic could be added or another card 1/1a1 breaking things down further or pursuing other aspects, which would then be inserted between 1/1a and 1/1b, and so forth.

10. For instance, when we look up the section "functionalism", one find the following sequence of terms: concept of function – unit of reference of functional analysis – concept of conditions for continued existence – concept of functional problem – concept of expectations – social identity – sincerity – secret (all my translations).

11. Luhmann, index card no. 9/8h in the second collection (my translation).

4.1 *Illustration of the Method of Card Integration and Numbering*

1/1 Card with notes referring to a certain topic
1/1a Card containing notes referring to a particular idea from card 1/1
1/1b Continuation of notes from card 1/1a
1/1b1 Card containing notes referring to a particular idea from card 1/1b
1/1b1a Card containing notes referring to a particular idea from card 1/1b1
1/1b1b Continuation of notes from card 1/1b1a
1/1b2 Continuation of notes from card 1/1b1
1/1c Continuation of notes from card 1/1b
1/2 Continuation of notes from card 1/1

In conjunction with the method of card integration outlined above, this rather simple but ingenious numbering system[12] based on the principle of connectivity of arguments results in a complex numbering structure and in cards that bear a combination of numbers and letters with up to 13 digits (e.g., 21/3a1p5c4fB1a on the first card of the subsection "Confidentiality" in the second collection) and thus allows to organize a complex process of inserting a nearly infinite number of cards between what had initially been two consecutive cards created at the same time on a related subject. The numbering structure thus reflects the unique depth of the organization of cards that Luhmann referred to as a "capacity for internal ramifications."[13]

5 The System of Linking

In addition to the notation and numbering system, there is another key feature of the collections that accounts for the creativity of this filing system: a system of referencing or linking. That means that Luhmann on one card noted a number of another card, often thematically and spatial far away, relating the different cards in a specific way. An estimate based on a sample count suggests that the first collection contains approximately 20,000 references and the second about 30,000 references of this kind, that means that there is a reference link on nearly every (first collection) or nearly every second note (second collection) on average.

Three *types of linking* can be distinguished:

a) References in the context of a larger structural outline: When beginning a major line of thought Luhmann sometimes noted on the first card several of the aspects to be addressed and marked them by a capital letter that referred to a card (or set of consecutive cards) that was numbered accordingly and placed at least in relative proximity to the card containing the outline. This structure comes closest to resembling the outline of an article or the table of contents of a book and therefore doesn't really use the potentials of the collection as a web of notes.

b) Collective references: At the beginning of a section devoted to a specific subject area, one can often find a card that refers to a number of other cards in the collection that have some connection with the subject or concept addressed in that section. A card of this kind can list up to 25 references and will typically specify the respective subject or concept in addition to the number. These references can indicate cards that are related by subject matter and in close proximity or to cards that are far apart in other sections of the collection, the latter being the normal case.

c) Single references: At a particular place in a normal note Luhmann often made a reference to another card in the collection that was also relevant to the special argument in question; in most cases the re-

12. I can't go into too much detail here due to the limitation of space: The illustration above is of course an idealization. Normally the numbering alternates between numbers and letters, but that was a rule Luhmann sometimes violates (due to an additional insertion of a branch off-card in an existing sequence where the alternation already had taken place); furthermore there was no general rule that the main line of argument is numbered consecutively in numbers or letters, i.e. a sequence 1 – 1a – 1b of mono-thematic cards was also possible. That means that the number *on its own* does not really inform about the relations between different notes. An exception from this is Luhmann's use of capital letters (see below).

13. Luhmann, 1981, p. 224 (my translation of "innere Verzweigungsfähigkeit").

ferred card is located at an entirely different place in the file, frequently in the context of a completely different discussion or subject.

Often Luhmann noted the references directly as he created the card but also regularly updated already existing cards by adding references whenever the integration of new cards in other parts of the collection made it necessary. Thus the advantages of the mode of organizing the collection — "The decision where to place what in the file can involve a great deal of randomness as long as I add references linking the other options"[14] — necessitate a *permanently data bank update*. In this way, Luhmann engaged in an ongoing process of tending to his file, which explains why the file, according to him, preoccupied so much of his time and also illustrates how well he really knew it.[15]

Generally speaking, his mode of referencing — developed in the 1950s! — make use of an idea that would later become the common technology of "hyperlinks" in the computer age. Luhmann himself called his system of references a "web-like system."[16] The metaphor of the web also suggests interpreting it along network-theoretical lines.[17] A key feature explaining the production of serendipity is the potential of the filing system for enabling so-called "short cuts", i.e., the fact that a reference may lead to a completely different (both in terms of subject and location), distant region in the network (file). The cards containing a collection of references are furthermore of interest because they represent so-called "hubs", i.e., cards that function as nodes that feature an above-average number of links to other cards so that these few cards provide access points to extensive parts of the file.

The significance of Luhmann's system of referencing cannot be overestimated in the light of the method of integrating new notes into the file described above and the absence of a systematic order. Yet, it must be noted that this method is also fraught with certain risks: A note or a (smaller) subject area that is *not* linked to the web of references becomes lost irretrievably in the bulk of notes. Here the inherent momentum of "*black holes*" applies: parts of the file that are poorly linked with other parts tend to remain isolated later on and hence fade away. This risk is vividly demonstrated by the fact that some smaller parts of the collection seemed to be untouched since their compilation.

6 The Keyword Index as the Central Key

The structure of the file described so far ultimately provides the backdrop to understanding the function of the keyword index. The absence of a fixed system of order and, in consequence, a table of contents turned the index into the key tool for using the file — how else should one be able to find certain notes again and thus gain access to the system of references? Not wanting to rely on his one memory or pure chance Luhmann permanently created a keyword index being able to identify at least one point from which the respective web of references can be *accessed*.

Whereas the index to the first collection was still of fairly manageable size with its 1,250 entries, the continuous updates of the index — as another part of the data base maintenance — to the second collection[18] ultimately resulted in 3,200 entries. Contrary to the subject index of a book, the file's keyword index makes no claim to providing a complete list of all cards in the collection that refer to a specific term. Rather, Luhmann typically listed only one to four places where the term could be found in the file, the idea being that all other relevant entries in the collection could be quickly identified via the internal system of references described above. As Luhmann noted,[19] this concept goes back to the general structure

14. Luhmann, 1987, p. 143 (my translation).

15. It must be noted that Luhmann never created a detailed table of contents for the collections (which is not really surprising: the compilation of such a survey was just not possible due to the continuous evolution of the collections). A preliminary subject overview in the context of the aforementioned project of making Luhmann's work accessible for research comprises a total of roughly 150 pages.

16. Luhmann, 1987, p. 143 (my translation of "spinnenartiges System").

17. For a network model of this kind, see Duncan Watts, 2004.

18. The second collection contains four versions of the keyword index: Each time the process of continuously adding onto the index resulted in its alphabetical order becoming too messy, Luhmann created an entirely new version of the index.

19. Index card no. 9/8b of the second collection.

of the brain modeled by W.R. Ashby:[20] the capacity of the brain does not derive from a huge number of point-to-point-accesses but on the relations between the nodes (i.e. notes). Therefore, by contrast, the large number of words listed in the keyword index indicates that this list itself was at least intended to meet the standard of (thematic) completeness, i.e. complexity of the index file.

The principles according to which the collections are organized have as a consequence that accessing the file via the keyword index does not limit the search to that term only. Quite to the contrary, the specific method of integrating cards and the system of linking ensure that any search soon opens up a vast web of notes leading away from the original topic to a variety of other subjects that the user initially would not have associated with the first one. If one follows the web of references in detail that are laid down in the file, one constantly encounter new paths leading to new subjects: the decision to pursue or ignore them presupposes that there is a specific research question to be answered within a certain time; otherwise, one risks getting lost in the depths of the file after entering in by using the keyword index.

7 Summary: The Filing System as a Thinking Tool

It is specifically not (only) the paths that Luhmann tread in his initial readings and note-taking that are constitutive of his filing system but rather the special filing technique and the (selective) relations established between his notes by means of his referencing technique that make it possible to retrieve more in a later query via the pivotal keyword index than what was intended when the notes were initially taken. As early as in the 1950s to 1960s, Luhmann simulated a modern computer-based database system by applying the multiple-storage principle in filing subjects and utilizing his referencing technique, by which he anticipated what would become the common technology of hyperlinking in the era of the World Wide Web. The file's analog design, however, limited the realization of its potential for technical reasons since it required the more time-consuming process of physically looking up and taking out the respective card instead of a simple mouse click.

One must also not lose sight of the fact that Luhmann's filing system also — and above all — served him as a research or *thinking tool*. This is not only true in terms of the proposition that the file acted as a communication partner in the research process[21] but also in regard to the fact that in Luhmann's mind the process of writing things down enables disciplined thinking in the first place: "Underlying the filing technique is the experience that *without writing, there is no thinking*."[22] Accordingly, the file also documents the evolution of important theoretical constructs in Luhmann's thinking. It contains not only validated knowledge but also reflects the thought process, including potential mistakes and blind alleys that were later revised but not (!) removed from the file as the original cards always remained in the file and perhaps a new card with revisions was added if needed. In this sense, the file is more than just an analog database of Luhmann's theory: it can be seen as — drawing on the words of Erving Goffman[23] — the *backstage of his theory* and therefore as Niklas Luhmann's intellectual autobiography.

20. See Ashby, 1967.

21. See Luhmann's (1981) description of his relationship with the card index.

22. Luhmann, *Zettelkasten II*, index card no. 9/8g (my translation).

23. See Goffman, 1959.

References

Ashby, R.W. (1967). The Place of the Brain in the Natural World. *Currents in Modern Biology*, *1*, 95–104.

Cevolini, A. (2004). Gelehrsamkeit als Medium des Wissens in der frühen Neuzeit. *Soziale Systeme*, *10*, 233–256.

Goffman, E. (1959). *The Presentation of Self in Everyday Life*. Garden City, NY: Doubleday.

Krajewski, M. (2011). *Paper Machines. About Cards & Catalogs, 1548–1929*. Cambridge, Mass.: The MIT Press.

Luhmann, N.(1951–1996). *Zettelkasten*. Bielefeld University: Digital Collections. http://ds.ub.uni-bielefeld.de/viewer/ppnresolver?id=ZKLuhm

Luhmann, N. (1981). Kommunikation mit Zettelkästen. Ein Erfahrungsbericht. In H. Baier, H.M. Kepplinger, & K. Reumann (Eds.). *Öffentliche Meinung und sozialer Wandel. Für Elisabeth Noelle-Neumann* (pp. 222–228). Wiensbaden: Westdeutscher Verlag.

Luhmann, N. (1987). Biographie, Attitüden, Zettelkasten. In N. Luhmann, *Archimedes und wir. Interviews*, edited by D. Baecker & G. Stanitzek (pp. 125–155). Berlin: Merve.

Merton, R.K., & Barber, E.G. (2004). *The Travels and Adventures of Serendipity. A Study in Historical Semantics and the Sociology of Science*. Princeton, NJ: Princeton University Press (Original work published 1945).

Watts, D. (2004). The "New" Science of Networks. *Annual Review of Sociology*, *30*, 243–270.