ORIGINAL ARTICLE

Algorithmic Differentiation of Society – a Luhmann Perspective on the Societal Impact of Digital Media

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The aim of this article is to put forward Luhmann´s theory of social differentiation as the way society as a social system has organized itself internally after it has differentiated itself out from its external environment. The question discussed is if we are facing a new form of differentiation triggered by digital media. To answer the question, the article puts forward Luhmann´s theory and the historical forms of differentiation he described. After that the article shows how the triggering factor, in a non-deterministic way, for Luhmann is communication media. A new differentiation form emerges when the dynamic and complexity of society has increased to such an extent, i.e., other forms of differentiation have grown in latency, that a new form can take over. After the introduction to the theory and the interpretations of it, it is discussed if and how a new form of differentiation is under development. The discussion circles around how to interpret contemporary developments as signs of how the new differentiation form works. The article concludes that functional differentiation is surpassed by a new basic form of differentiation which is the algorithmic differentiation of society.

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1. Introductory remarks

One of the biggest questions in sociology is how to describe what society is and how it develops in theoretical terms. In the description of societal development, one of the deepest and most basic theoretical paradigms concerns how society is differentiated. This theory direction relates to how deep social structures function as a kind of infrastructure for the organization of society as such. The theory also involves an idea of evolution in which more complex forms grow out of the simpler forms that precede them. This article focuses on the relationship between the acquisition of new communication media and the evolution of new forms of differentiation. On the descriptive level the aim is to provide a socio-media evolutionary theory of differentiation and in the same move, to provide a coherent presentation of Niklas Luhmann's theory of societal differentiation. On the analytical level, the article aims to give an account of a possible new kind of budding social differentiation in the digital media environment.

Luhmann's theory of differentiation is the most developed and advanced, and unlike others, his theory has an integrated theory of communication media (Paulsen and Tække 2010). Though, in the theory, there is no tight coupling between a special kind of medium and a special form of social

differentiation. Social differentiation is an answer to the increased *social* complexity provided by new media and a way to cope with this social complexity.

The theory of differentiation was not invented by Luhmann but has long traces back in history of the theory, and this is why this article begins with a short history of the theory. Luhmann (1982) provides a three chapter long description of how his theory of differentiation builds on and is inspired by earlier theories, especially in relation to Durkheim, Parsons and Weber, but it is not really clear to the reader what Luhmann has grasped from these theories. The explanation is that Luhmann, with his systems theory, has some theoretical principles, especially the distinction between system and environment, that make it possible for him to build up a theory that is only loosely coupled to other theories which he only observes from within his own theoretical system.

Luhmann's theory of differentiation is mostly used within sociological systems theory (Berg et al. 2020), but also in other different fields of sociology, e.g. international relations theory (Buzan and Albert 2010). In relation to the digital medium revolution, three works must be mentioned. Firstly, Lars Qvortrup in 2003 published a book about what he conceptualizes as the Hypercomplex Society.[1] The Hypercomplex Society is both the result of and the producer of the Internet. Qvortrup relates to Luhmann's differentiation theory as an important part of his explanation of the Hypercomplex Society but does not suggest a new form of differentiation. Armin Nassehi (2021) also presents a theory of the digital society without introducing a new form of differentiation, even though he, like Qvortrup, uses the theory to explain his theory. Instead, he tries to describe what he defines as the third discovery of society. The first discovery was the birth of nation states, when society began to be viewed as a society in the 18th and 19th centuries. The second was the liberalisation and pluralisation of society in the middle of the 20th century. The book is not about the future of the digital society but about forms of societal self-reflection in the digital society, providing the third discovery of society, trying to answer the question: to which social problem is digitalisation the solution? Dirk Baecker (2018) presents the concept of *the next society*.[2] In the book about the next society, Baecker argues that *network* is the new form of differentiation in the digital society. He observes society as a network that differentiates out networks per se as a fully functional equivalent to the functionally differentiated society. This book is about the future and Baecker writes, for example, that art is wild and decorative in next society, and that science is poetic and mathematical in next society![3] In this article both Nassehi's understanding of the digital society and Baecker's proposal of network as a new form of differentiation are shortly discussed.

2. Theoretical history

In his positivism, Auguste Comte (1798 – 1857) provided a theory of historical development through the so-called law of the three stages. The first is the *religious* stage, where phenomena were explained through the intervention of gods or spirits. The second stage is *the metaphysical* or *abstract* stage, in which abstract quantities were postulated to explain the phenomena. The third and final stage is the *positive* or *real* stage. Here the main rule is that the imagination *must be subordinated to observation*. Since Comte, the idea of such three stages recurs again and again in theories of society (Habermas 1987, 153-154), but while there is almost consensus about the first stage, there is more discussion about the next two stages (This is also the case in relation to Habermas 1987). Herbert Spencer (1820 – 1903) is the first to propose *differentiation* to describe social evolution. He applied the concept from biology and describes differentiation as a universal law

saying that the development goes from the simple to the complex. In society, the evolutionary process of differentiation consists in division of labour. Spencer describes not only three, but four stages going from the simple, to the compound, to the doubly compound and to the trebly compound society (Hossain and Mustari 2012, 59).

Émile Durkheim (1858 – 1917) differentiates between mechanic and organic solidarity.[4] Mechanic solidarity is seen in simple religious societies which were differentiated in *segments*: "The clan remains the political unity, and as families are similar and equal, society remains formed of similar and homogeneous segments, although, besides these primitive segments, new segmentations begin to appear, but of the same kind." (Durkheim 1960, 176). In more organized societies based on the division of labour, we find organic solidarity. Solidarity is what links individuals to society and in a simple *segmental differentiated society*, all individuals follow the same moral, whereas in *organized societies*, more complex societal structures create mutual interdependences. The link to biology is still strong but now as an analogy and not as a universal law: "Each organ, in effect, has its special physiognomy, its autonomy. And, moreover, the unity of the organism is as great as the individuation of the parts is more marked. Because of this analogy, we propose to call the solidarity which is due to the division of labour, organic." (ibid, 131). This is structural functionalism where the functions in society must always run through the already existing structures. According to Luhmann (1982, 7), Durkheim gave up stretching his concept "division of labour" to explain more complex structures and decided instead to contrast the "division of labour" with a more general concept of differentiation.

With Talcott Parsons (1902 – 1979), the concept of organization gets a new meaning while *stratification* becomes the main analytical concept for societal differentiation. "Social stratification is regarded here as the differential ranking of the human individuals who compose a given social system and their treatment as superior and inferior relative to one another in certain socially important respects." (Parsons 1940). Following Parsons, stratified systems derive from common values. If there are values, it follows that individuals will be evaluated and placed in a sort of ranking. Stratification can be traced back to Marx and the idea of the class society and nuanced by Weber to a number of more classes, but it is Parsons who, like Durkheim did with segmentary differentiation, describes stratification as a basic principle of societal differentiation. Both Durkheim and Parsons are structural functionalists and see the various functions in complex societies as dependent on some basic structures from which we can deduce functions, e.g. Parsons´ four types of generalized media and the AGIL system (see intro to Parsons 2005).

Niklas Luhmann (1927 – 1998) contributes much to the theory, both by combining the former forms of differentiation (segmentation and stratification) in the same theory, but also by describing functional differentiation as a new form of social differentiation. Again the preparatory work was Durkheim's. Durkheim (1968) describes the industrial society and its huge division of labour in terms of different functions and a new form of solidarity (the organic) which is suitable for the industrial society. The article returns to functional differentiation. Luhmann (2012 vol 2) also includes a fourth kind of differentiation in his theory which is the *centre – periphery* differentiation. This form of differentiation has been worked through within a couple of fields and maybe most thoroughly by Galtung in his structural theory of Imperialism (see Galtung 1971).[5] The different forms of differentiation all somehow make society and societal cooperation possible. I return to all

four types and describe them according to Luhmann, who defined and described them and drew them together in a plus-sum game to describe the society of his days.

3. Luhmann's theory of differentiation: the principles

In Luhmann's systems theory, the basic distinction is between system and environment (Luhmann 1995; 2012). He defines differentiation as the unit of the different (2012 vol 2, 1). Systems differentiation is a repetition of systems formation inside systems, so further system/environment-differences can differentiate out within systems (1995, 18). The overall system herby becomes the internal environment for the subsystems, but in a specific way for each subsystem. The system/environment-differences are repeated inside the overall system which herby multiplies itself internally as a plurality of system/environment-differences (ibid). It is not a question of separation into parts, but of each subsystem reconstructing the whole system to which it belongs by its own system-specific difference between system and environment (2012 vol 2, 3). Each difference between a subsystem and the internal environment is once again the whole system – but only in different perspectives. Therefore, systems differentiation is a procedure for increasing complexity – with major consequences for what can still be observed as the unit of the overall system. It is in the sense of differentiation that it can be seen as a unit, it holds what is different together; it is different and not indifferent.

To the extent that the differentiation is brought on by a unified principle, like hierarchy, one can therefore also read the unity of the system by the design principle of its differentiation (1995, 18). Even though systems´ form of differentiation can define rough forms of differentiation like hierarchy, it does not mean that other forms of systems formation are not possible (2000, 19). Differentiation enables the understanding of units and differences as the result of processes, e.g., of evolution (2012 vol 2, 1). As a mechanism, differentiation maintains coherence during growth (2012 vol 2, 2). The process of differentiation can happen spontaneously or as a result of evolution, and takes advantage of opportunities to launch structural change (2012 vol 2, 3). No coordination is required by the overall system, and not all operations that are carried out in the overall system are distributed on the subsystems. As an example, Luhmann (2012 vol 2, 3) mentions that even in highly differentiated societies, much free interaction takes place. Any change in a subsystem means a change in the environment of other subsystems, resulting in an explosive reaction pressure that the subsystems can only protect themselves against with "high thresholds of indifference" (2012 vol 2, 4). Differentiation, therefore, leads to both increasing dependencies and independencies, which the subsystems treat as operationally closed autopoietic systems (2012 vol 2, 4). In the system-to-system relations, for example between family and school, only a part of the world receptively society gets visible, but precisely this fragmentation makes it possible subsequently to observe each of the systems as systems-in-their-own-environment and their respective observations (2012 vol 2, 4).

In the system-to-system relations allowed by a differentiated social order, there can only be structural couplings that do not abolish the autopoiesis of the subsystems, e.g. the relationship between villages in segmented societies, estates in stratified societies and functional systems in modern societies (2012 vol 2, 5). What functions in the relationship between the subsystems as a structural coupling is at the same time a structure for the overall social system. Therefore, Luhmann (2012 vol 2, 5) characterizes societal systems by their form of differentiation, since it is the kind of structural formation that at all times determines and restricts what structural couplings are possible

in the relationship between the subsystems. It never happens that a subsystem within a form of differentiation is replaced by a subsystem from another form of differentiation because it would destroy the form, i.e. the marking of difference. Within a segmented organization, a family can achieve special, even significant, distinction (such as a priestly or a chiefly family), but it cannot be replaced by nobility, because it would require a transition from exogamy to endogamy, i.e. a completely different overall organization. Similarly, it would not be possible to replace nobility with the state or science as subsystems in a stratified society (2012 vol 2, 12). For such breaking points to become possible, evolution needs a kind of *latent* preparation. The emergence of new forms of organization within the previous social structures must mature in latency until they, as new forms of order, are mature enough to become visible as new dominating differential societal formations. This also means that situations with mixed forms of differentiation are typical and necessary for evolution (2012 vol 2, 12). All the shifts contain a logic that has to do with *de-substantiation,* making more complex systems formations possible in the differentiation structure. Each new form of social differentiation seems to structure society to more easily and frictionlessly use human contributions.

4. Luhmann's four historical kinds of basic differentiation

According to Luhmann (2012 vol 2, 12), only a few forms of basic differentiation have been developed: segmentary, centre/periphery, stratified and functional.[6] There is no theoretical explanation for this catalogue of differentiation forms and it cannot be ruled out that new forms will be evolutionary developed (2012 vol 2, 13). The thesis is not that there is a constant increase of differentiation, but that there is a constant transformation of differentiation forms. In suitable situations, the forms become more complex. More differentiation does not develop but often de-differentiation, and also stronger differentiation is seen (2012 vol 2, 14). Following Luhmann (1977, 33), society only uses and combines a few forms of differentiation, because systems differentiation requires a combination of two dichotomies, both of which are asymmetric: system/environment and equality/inequality. In Luhmann's theory, the system/environment-differences internal to the social system are conveyed on a unified principle of differentiation in three different structured historical societies and the four mentioned forms of basic differentiation.

The first historical (and not least prehistorical) differentiation is not only in segments but also to a lesser degree in centre/periphery. Segmentation differentiates the society into equal subsystems. Inequality enters as an effect of differing environmental conditions (Luhmann 1977, 33). Segments are uniform systems that when they grow, differentiate out uniform systems. In their most developed form, they consist in families, villages and tribes (Luhmann 2012 vol 2, 27) and maybe in a centre consisting of one village as the trade centre (Luhmann 2012 vol 2, 43). They presuppose that the position of individuals in the social order is firmly ascribed and cannot be changed by performance. Segmentation may have been the reason for, or the possible condition for, the transition to agriculture because it requires an appropriate social structure to rely on (Luhmann 2012 vol 2, 28). Such differentiated societies are very resilient if war, famine, or disease strikes; even a few surviving segments can make a fresh start. To separate the different positions of individuals and the differentiation into families, villages and trips from the concept of hierarchy, Luhmann calls this fully-developed segmentary form: pyramidal (Luhmann 2012 vol 2, 29).

The centre/periphery differentiation is a result of the centre's out-differentiation; it is, so to speak, at home in the centre. The centre depends more on the periphery than the reverse scenario. The

differentiation form plays an important role in transforming social systems from segmentary to stratified societies, with a separating out of nobility in the centre (Luhmann 2012 vol 2, 48). Centre/periphery differentiation can work as a differentiation of differentiation forms with a stratified centre and a segmentary periphery (ibid).

Stratification differentiates the society into unequal subsystems. It brings together the asymmetries of system/environment and equality/inequality in the sense that equality becomes a norm for internal communication and inequality becomes a norm for communication with the environment (Luhmann 1977, 33), i.e. there is equality within the different strata (i.e. segmentation e.g. between a particular order of priests) and inequality between the different strata. Stratified societies are nobility societies based on rank order, which is a family order with award of descent (Luhmann 2012 vol 2, 51). As the upper class no longer recognises kinship to anyone in the lower class – or perceives them as embarrassing deviations – society can no longer be described as one family system through common ancestry (ibid). Stratification is reproduced every time people with different rank are together (Luhmann 2012 vol 2, 52). Within the stratified society, differentiations happen by the differentiation out of new systems with a rank in relation to other systems in their internal environment and subordination of other forms of differentiation (Luhmann 2012 vol 2, 54). The stratification regulates inclusion so that one is born into his class and one cannot belong to other classes (Luhmann 2012 vol 2, 57).

Functional differentiation is special in that *specific* functions and their communication media are concentrated in different subsystems each with their *universal responsibility*. Before, the unity of society was secured in stratification where one within the medium truth could accept different forms of truth (e.g., religious, philosophical and rhetorical); and, one within the money medium could accept different currency systems for local trade and trade with others existed as well as the use of different local conversion rates. Within the power medium, different islands of politically relevant exercise of power, i.e., empires, churches, cities, and territorial states, existed. The resulting coordination problems in the internal functions increased, and the reaction was related to the attempt to make a better coordination of functional systems *in themselves* and thus to give them the monopoly on their respective communication medium and renounce coordination *between* them. This was made possible by the fiction of the continued hierarchical order that covered this transformation, and let it happen in latency, until well into the 18th century (Luhmann 2012 vol 2, 67). In the functionally differentiated society, the combination scope of the time dimension and the social dimension is increased in every functionary system, and therefore the individuals receive dissemination functions. The economy, for instance, binds all transactions to payments and thereby achieves the aim that access to scarce goods no longer depends on rank, but instead is limited by having to pay another, artificially scarce good, namely money, for them. Several possible combinations are released into the field of the tension between the time dimension and the social dimension with regard to socially conditioned time constraints. But this benefit must be paid with conditions that can only be determined in the individual functional systems: as uncertain and only currently achievable political agreements, as market prices, and as laws that can in principle be changed. The evolutionary attractor that makes this possible is the higher complexity (Luhmann 2012 vol 2, 85). Functional differentiation means that the perspective of *unity* under which a *difference* between system and environment is differentiated out is the *function* that the differentiated-out system (not its environment) fulfils for the system as a whole (Luhmann 2012 vol 2, 88). The functional systems monopolize their functions. They do not count on their environment, which they see as incompetent. The overall system, or society, renounces any notion of an overall

organisation (such as rank order) of the relationship between the functional systems (Luhmann 2012 vol 2, 89). But within the functionally differentiated society, all the other forms of differentiation can still be found, like segmentation of nation states and hierarchy inside organisations (Luhmann 2012 vol 2, 98, see also Clausen 2011). Functions must be unequal, but the access to functions must be equal; that is, not dependent on the relation to other functions. The functional subsystems, therefore, must be unequal, but their corresponding environments must be treated as environments of equals because nothing but function justifies discrimination (Luhmann 1977, 36).

5. Social differentiation and media

Social systems consist in communication and have an environment consisting of what does not communicate. With the emergence of modern language communication about communication became possible and social systems differentiated out as self-referential systems (Luhmann 1995; Tække 2019). Language is the muse of society (Luhmann 2012 vol 1, 135), and "Language is the structural coupling, that is its task, its function" (Luhmann 2002a, 279). For Luhmann (1995; 2012), language is a medium of communication (see Tække 2011; 2019). Since McLuhan (1967), communication media have been seen as the trigger of social change. Meyrowitz (1985), for instance, used this understanding of media to explain a social change in sociological analysis, especially in relation to Goffman's theories. In the words of Postman (1993, 18): "A new technology does not add or subtract something. It changes everything." In sociology, this ecological medium theory is unacceptably deterministic but only as a kind of linear causality model. Luhmann states that "meaning forms condense only in communication itself" (Luhmann 2012 vol 1, 249). But keeps media as a trigger: "If media and techniques of communication change, if the facilities and sensitivities of expression change, if codes change from oral to written communication, and, above all, if the capacities of reproduction and storage increase, new structures become possible, and eventually necessary, to cope with new complexities." (Luhmann 1990, 100). In Luhmann's nondeterministic and nonlinear causality model, media remain a trigger even though he cannot point directly at the phenomenological level, i.e. that the development of this or that medium resulted in this or that social change; but he often points out that only after medium X social development Y has been observed. This is also the case in relation to the basic principles of differentiation, and the emergence of the three different differentiated historical societies. In relation to the segmentary differentiated society, he writes that they did not have writing at their disposal (Luhmann 2012 vol 2, 30). He also writes that every stratified society had writing at its disposal (Luhmann 2012 vol 2, 50). In relation to functional differentiated society, he writes: "Only in sufficiently large and complex societies symbolic generalized communication media can be differentiated out. They therefore do not only require the language code as a structure for their self-reference, but in order for the out-differentiation to get started also writing, and for their full development (which we will show) also printing" (Luhmann 2012 vol 1, 194). And Luhmann does show how this is developed but only indirectly and in nondeterministic ways (Luhmann 2012 vol 2: 78). However, he maintains his observation that communication techniques like writing and printing are the triggering factors of this turning point (Luhmann 2012 vol 2, 137). In order for new and more improbable differentiation forms to develop, evolutionary developments are demanded, reducing complexity such as through the medium of writing (Luhmann 2012 vol 2, 15).

As a starting point, the acquisition of oral language made communication self-referential and thereby society possible, i.e. the differentiation out of society (Luhmann 1995, 152). The human potential for communication in combination with the medium of spoken language technology

transform to a system on another level than just cooperation within the human population. It is this new sociotechnical system that begins to differentiate out on the inside of the distinction to the non-communicative environment and build up complexity by producing forms of social differentiation. Later, the written media, print media and analogue electronic media opened new possibilities for social systems to develop structures of differentiation internal to social systems. Each time a new basic medium of communication is developed, there is an initial period with new pattens of both connectivity and dis-connectivity (Tække 2019). It appears logical that segmentary differentiation only develops slowly in co-evolution with the language, which also applies to writing and stratification both of which have had many developmental steps. In relation to printing, the initial period and convergence with existing media were faster but it still took a couple of centuries for social systems to produce new formations (functional differentiation), or before they became dominant. Analogue electronic media are still new forms of media but already from the beginning they seem to have triggered many developments (Meyrowitz 1985; Tække 2006) but do not seem to have triggered a fundamental change in the functional differentiation. A parallel space for audio and visual observations was immediately created by radio and television. Analogue electronic media seem to have triggered a stronger differentiation and de-differentiation within the functionally differentiated society, such as all women seeing themselves as one political group in relation to equality issues, which only strengthens the functional differentiation by freeing the women from the semantics of old European stratification and enabling them to vote and work as a frictionless resource for society, freed from rank. This would follow the logic that I have put forward that *society increases its complexity by de-substantiating humans as contributors*, i.e. now all, both men and women, could take part in one division of labour in Western societies.

Following Paulsen and Tække (2022), in their book about education and Bildung in the digital age, each new media society ecology makes up a new problematic field, tendentially opening up new information and communication situations that call for new norms, tools, theories, practices etc., and also makes former norms and theories more or less obsolete. Paulsen and Tække (ibid) further propose that: (1) There is not necessarily just one set of possible new norms waiting to be realised, which will adequately work; (2) When and if one specific 'solution' is developed and actualised, it alters and transmutes the whole ecology – what is possible and not possible, what is needed and what is now obsolete; (3) The new media is developed in and out of the old media society environment, indicating that there is always a level of continuance between different media epochs; (4) The core of media for teaching and society – social complexity per se – is, they argue, semiotic accessibility and flexibility; but if the development of society, in each medium matrix, simply runs towards a new equilibrium, then increased flexibility would be pointless. If there is any immanent kind of telos within societal media, such as writing, it is not a fixed equilibrium of social norms at each stage of human development, but only increased practicable semiotic accessibility and flexibility, enlarging, and transforming the capacity of humanity, for good or for bad (ibid).

For Luhmann, the basic differentiation structure is the internal social ecology which ontologically seen by changes alters also the structurally coupled systems levels (psychic and biological systems), like in the co-evolution between the systems levels during the acquisition of oral language. As for now we can only observe if a *latent* specific 'solution' is under development that will alter and transmute the whole ecology (including the external environment of the autopoietic systems).

6. Transition – media and latency

There is always a transition period where new media of communication are already partly in use but with no alteration of the differentiation form of society (at least when it comes to semantic self-descriptions of society). The new possibilities for communication that come with a new medium[7] by mutual influence alter both social structures, by making new connections possible, and the medium which is developed, i.e. communication finds new ways to be used, fitting to its own form-experiments. The societal self-descriptions and explanations in the initial period do not show society how it actually begins to function in new ways (Luhmann 1995, 343 ff). Only later and maybe first after a new form of basic differentiation has taken over, society begins to understand its new structures (ibid). Maybe this is only possible through the new medium that now is so developed and coupled into the formation of the new society. Meyrowitz (1985) calls such a transition process where society develops itself in a new medium's scope for communication *effect loops*. In relation to self-description, society and medium uncouple each other from not only old structures but also from old understandings and the new society begins to understand itself more in accordance with its new form of differentiation. Book printing, for instance, for Luhmann (1995, 343), is the precondition for society to find opportunities for communication over the before non-communicable and over latent structures and functions. Hierarchy, for instance, transfers its own particularity to its domain of latency (Luhmann 1995, 338). When it succeeds to de-hierarchize the representation of the system's unit in the system and instead relating to its functions, hierarchies are not abolished, but they are adapted to their function and thereby de-substantialized. They become subject to criticism where no sufficient function is recognisable – e.g. as unequal distribution after the scale of social classes. They are confirmed where their function is evident and where functional equivalents are not in sight – thus above all in formally organized social systems. However, the functional replacement for hierarchy is only the functional orientation itself, and the question is then how to address its latency needs (Luhmann 1995, 339).

7. Problems and latency in the functional differentiated society

Luhmann (2012) points at many problems in the functionally differentiated society among others at the upcoming ecological disaster which makes it clear that planning and coordination is necessary (Luhmann 2012 vol 2, 108). There is no coupling system (ibid, 115), no coordination of irritation, no central monitoring (ibid, 116). Observation of irritation is limited to only one functional system (ibid, 117). Irritation is increased due to functional differentiation, while functional systems avoid any form of coordination (ibid, 120). Luhmann (ibid, 125) writes that a controlling centre cannot exist. But it seems likely that a kind of coordination could be a latent possibility. But in that direction, Luhmann seems mostly to think of a return to a controlling centre that could coordinate like in a stratified society. But earlier in the book, Luhmann (2012 vol 1, 182; 249) is open to the speculation that digital media (the computer) can affect the social structure. The idea is that with every new medium, the capacity for processing information is increased. With the alphabet it became possible to make categories and with printing to compare texts. With the computer, the capacity for control (in the meaning of comparing information with memory) is increased again: "with unforeseeable consequences for the communication system society" (ibid, 183).

Maybe there are patterns of latency everywhere around us. Policy is not as autonomous as we refer to, sport is not always competition, and education is not always Bildung. Maybe this has been the situation also before digital media? A state like China has never developed into a fully functional

differentiated society and the capitalistic system has always been so strong that it is threatening the functional differentiation in the USA. But maybe social systems worldwide begin to structure themselves within a new differentiation form in the communicative space of digital media. Before putting forward this theory, I present a few facts about digital media.

8. Digital media

The computer changes the relationship between visible surface and invisible depth (Luhmann 2012 vol 1, 182). The memory is now extremely large and we talk about big data and the control mechanisms in the form of machine learning algorithms and Artificial Intelligence (AI). The overall question is if this represents a kind of latency where social systems begin to develop new pattens that maybe are growing into a new form of basic differentiation of society. To begin the analysis and discussion of this question, this section will clarify how digital media begin to play a key role in the structuring of society. The examples are very critical, but the findings which I want to bring to discuss further are principled and belong to the degrees of change that a society undergoes in the digital media environment.

Cambridge Analytica called their method *psychographic segmentation*, but principally it is the way that commercial companies like Facebook and Google, states like China and systems like the Anglo-American system of education use digital media to monitor and profile users. The method combines big data with the theory of persuasion and personality tests (Hansen 2018, 24). With this technology, examples show that companies and states try to predict people's preferences, orientations, emotional constitution, economic conditions and much more. Machine learning algorithms can learn, and change settings based on data recorded from *an overall set of specifications* (programmed logics and values) that allow predictions of an individual's possible future actions through predictive analytical processes. Further through prescriptive analyses, they try to control or nudge individuals. According to education researcher Ben Williamson (2017, 111), this is already the case for many students in the Anglo-American world, and according to Zuboff (2019) it is already the situation for all of us as customers, e.g. in banks and insurance companies. If you want a bank loan, insurance, to rent a home, a ruling from the judiciary, hospital treatment or, for example, help from the social authorities, the processing of your case takes place in systems increasingly controlled through algorithms. In other systems, this is taken a step further through various measurement techniques that can reveal the individuals' emotional attitude such as facial expressions monitored through webcam, eye tracking, skin temperature and conductivity (Williamson 2017, 135). This is thus an expression of what is more widely called affective computing (Facebook's DeepFace and Google's TensorFlow are examples). This is not only the situation in the West; for instance, in China an app like WeChat, which, aside from being a chatting and writing tool, has a built-in credit card service, video conferencing service, payment service and taxi booking service and much more, and it is driven by algorithms. Both the company behind WeChat (Tencent) and the Chinese government can thus keep track of what the 700 million users are doing. In addition, China is developing a "social credit system" that awards points to each person based on the person's observed behaviour. Against this background, citizens can be rewarded, punished, or prevented from taking part in various activities (Zuboff 2019, 455). For example, parents with a poor (social) credit score might be prevented from enrolling their children in certain schools (Liang et al. 2018; Backer 2019). Also, the Chinese authorities are setting up surveillance cameras in China (Wong and Dobson 2019). These cameras will, among other things, send information to the national "social credit system". This system shall ensure that people comply with political requirements and can thus be viewed as the

implementation of the world's first digital totalitarian state (Wong and Dobson 2019). It is a positivistic and behaviouristic approach, like Skinner and his idea of a complete program to determine the wanted behaviour among humans (Zuboff 2019). The machine can predict what the citizens' "next move" will be and what they will most probably like, agree with, or vote for. Using this information, a state, for instance, can either order a citizen to do what it wants or nudge the citizen. Regarding the latter possibility, a state or company theoretically can nudge a person to think something or buy something that they otherwise would not have done, or for instance, manipulate a person to not vote if the person is predicted to vote for the "wrong" candidate. Even if algorithms should prove to be overestimated, they are embraced by both states and businesses which means that in any case, we risk living under their governance, for good or for bad. According to Williamson (2017, 145), we are approaching an actual *nudgeocracy* and philosopher Byung-Schul Han even writes about *psycho-policy* (Han 2016). This sounds really scary and must be seen as a warning. The democracies of continental Europe with their democratic Bildung tradition might stand up to this challenge (Paulsen and Tække 2022). As I return to the discussion, even in the EU, we are embracing the algorithms, though not intending to make the union into an authoritarian union, but because algorithms seem necessary if we want to stay on top of things.

According to the sociologist Armin Nassehi, this technology is used in all functional systems from the legal system, to the economic system to the political system and always used to do things as effectively and rationally as possible. This is both possible and successful because digital media now can mirror the complexity of society (Nassehi 2021, 150). The problem with Nassehi's *doubling theory* is that digital media is not a passive mediator like former kinds of media. They are not like mirrors just casting back the light, but they themselves are *actively constructing* the image of society that they give. Also, these processing digital media are interfering with the communication, calculation, and production that they are used for. This means that society itself, consisting in communication, is already embedded in the digital, and it is regulated and (re)produced digitally. The image in the mirror is not a reflective picture but a *processing construction* (see Finnemann 1999 about functional architecture), whose origin is lost in the instrumental, in what Luhmann (2012 vol 1, 182) describes as the invisible depth.

In relation to reflexivity, there may be a risk that algorithms will replace reflection theories. Not just mediate the meta communication, but replace them with behaviouristic calculations, for instance, in teaching, there are pedagogical reflection theories that can be taken over by algorithmic statistical calculations (see Williamson 2017). Even if the Bildung tradition of continental Europe succeed in using algorithms in a democratic and transparent way (see Paulsen and Tække 2022), my point is that the functional differentiation is surpassed by a new basic form of differentiation which is the algorithmic.

My thesis is that digital media mean the end of the dominance of the functional differentiation because digital media on the one side is used in every functional system both at the micro level in interactions, at the meso level in organizations and at the macro level as a functional equivalent to the reflection theories in the functional systems. On the other side, this means that society as such is digitalized and linked up to a social structure that has transmuted into a digital functional architecture. The digital media acts as the medium of communication, storing and retrieving but also measuring rationality and as a functional equivalent to reflection theories. It is through this

digital functional architecture that humans are constructed as persons, and they and their contributions are included in the societal system or excluded from it.

9. Discussion – a new form of differentiation?

In this analysis and discussion, I am not trying to take a moral or normative stand on whether the digital form of social differentiation emerging is evil or good, wise or stupid, but logically enough the examples of latency also in this section come from critical observations. The aim is to use these observations to make probable suggestions to describe the new differentiation form and how it operates.

With digital media, the combinatory scope of the time dimension and the social dimension is not decreased in the functional systems, but proto-controlled and in principle possible to regulate, either through intervention or through nudging in real-time. On the one hand, workers are split up in the platform economy (Standing 2011) and on the other hand, they are steered through algorithms, like also customers are when it comes to questions in relation to sales, e.g. advertising, search, suggestions of goods, payment, shipping etc. (Dijck et al. 2018). In the process we are in these days, the political power of the EU is trying to regulate companies' use of algorithms and AI, not to put an end to AI and algorithms, but to control the algorithms and regulate them. The EU and other political systems are looking into a future (which has already begun) with struggling between different interests, including commercial, civilian, and e.g. educational, in a new parallel social field consisting of bits and bytes that the political systems try to govern through regulations of algorithms. It seems like an overruling logic of algorithms has become the regulator of the communicative infrastructure.

Looking at the public sphere, politicians (as well as all sorts of others like commercial interests and other states) via microtargeting can hit not only small distinct segments but also individuals with special characteristics, e.g., political, economic and emotional with black posts, also called black marketing, which means that different people get different customized messages that others don't know about. Voters and, for example, customers and politicians themselves, are treated as individuals, i.e. monitored, calculated, and included in the communication with special and narrowed possibilities.

Ben Williamson describes in the book *Big Data in Education,* based on a largely empirical basis, how the development of Big Data takes place within the Anglo-American education system. The development has been driven by a cooperation between science, Silicon Valley companies, politicians, and large numbers of willing venture capital investors (Williamson 2017, 12; 15). According to Williamson, these systems have gathered around what can be described as a *sociotechnical imaginary*, which is defined by Jasnoff (2015, 5, here quoted from Williamson 2017, 16) as: "collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology". Such an imaginary paves the way for a strong operational coupling between the systems that seem to weaken the borders between them. Historically, such tight couplings between politics, science and economics have been seen before in the free world. The strongest example is the military industrial complex in the USA after World War

II, where the different systems were mesmerized by the one and same closed discourse brought together by primitive and often wrong computer calculations of power relations during the Cold War (see Edwards 1996).[8] Now with the imaginary of algorithm-based education and economic and social progress, scientists are funded and develop reputations, start-ups get a business and politicians imagine solving problems of mass education and behavioural problems (and re-election). As follows, this imaginary is instantiated as computer-based functional specifications, determining the social and educational life in the school systems, forcing the other systems' norms and logics onto the teachers and students (Tække 2022). This example goes against the functional differentiation, where there are clear borders between the systems which are centred around each of their autopoiesis.

Following Baecker (2018), the explanation could be that a new *network differentiation* has taken over (ibid, 43). But there are several problems with this theory. Luhmann considers functional differentiation to be threatened by networks, which are identified as a structure that has survived from earlier societal forms: "These are chains of reciprocity, utility friendships, (…) where the functional subsystem's resources become 'alienated' to cross-cutting relations and the maintenance of networks" (Luhmann 2002b, 129).[9] With the functional differentiation of society, the social positions determined by the stratification of society were replaced by positions in organizations, "as the source of resources, property and family were replaced by the legal and illegal opportunities for influence offered by positions in organizations" (ibid.).[10] However, the network formation is no longer self-evident, and the networks must therefore maintain themselves as parasites on today's society (ibid., see also Tække 2010). Following Luhmann (2002b), social differentiation is a condition for the existence of networks and networks cannot perform a differentiation structure themselves. Networks can only exploit autopoiesis and cannot produce autopoiesis themselves on other levels than on the interactive micro level. So, networks are parasites and cannot themselves become a new basic differentiation form of society, even though they exist.[11] Maybe a social medium like Facebook provides a functional infrastructure for social networks, but these networks are governed by the organizational level (by the company Meta) through algorithms. Inspired of Levi Bryant (2014), it is the *machine* consisting of a metamorphosis of the organization and its digital infrastructure run by algorithms that control the communication on Facebook.

The sociotechnical imaginary carries the idea that the algorithms will regulate society better than humans can. In practice, they really do coordinate almost everything from transport systems over the water and energy supplies to the military systems. As an earlier functional equivalent for the logic or imaginary of the algorithm, the Holy Spirit had properties for synchronizing interpretations and worked as a communicative integration factor across space and time in the same way that the Internet does today (Harste 2016, 267). After the printing press, society could no longer be synchronized in the communication medium of the Holy Spirit as new ideas spread at an unprecedented speed during the Reformation (Harste 2021, 147). Now with digital media, we again have a commonly shared idea of something nonhuman that holds things together. The 2021 EU regulation of AI, for instance, put different kinds of use of AI into different categories from high risk to no risk. This means that the EU, as the most critical political mover in the world, embraces AI, for example, in health care and in social care. The latent is that even the EU embraces AI and must be of the opinion that computers better than humans can regulate human conditions.

Functions still exist, hierarchies still exist, segments still exist, centre/periphery still exists, but below, a differentiation form resting on a transverse logic is growing that is functionalistic and instrumentalistic. In the EU, the new AI regulation says that there must be no bias, for example, in relation to gender and minority background – but it is precisely a latent expression of a shift to a new level of de-substantialization. Society is going from more qualitative to more quantitative estimates, but paradoxically this is happening on the basis of individuals. On one level, some, for instance, need other forms of WCs than others, some can maybe work only one hour a day, and some have a cheating behaviour that needs to be addressed. On another level, people with one specific education, experience, networks and different personalities will be included in some social processes and excluded from others. The de-substantialization means that people are included and excluded from social process to social process following the social needs (governed by the AI). If sex does not matter, the AI will not distinguish between men and women; if geography does not matter, the AI will take that parameter into account and that goes for all personal characteristics.

If we distinguish between solid coupling and loose coupling, we can say that the segmentary differentiation has coupled the individual solidly to functions in society which were made possible by this fixation. The stratified differentiation loosely coupled the individual from the inborn or by named given position in society, but with the price that individuals were solidly coupled to a ranking. This de-substantialization made it easier for society to use human contributions with lesser friction in its self-organization. The functional differentiation loosely coupled the individuals from the innate rank and made individuals hyper flexible so that humans stand outside society and can connect to any function in society (although citizenship, education and not least money are often needed). Man has become a homeless *resource* that may or may not be included in social processes: The pinnacle of de-substantialization so far. According to Luhmann (2012, 14), the possibility of a regressive development is not to be excluded. But with the functional differentiation, society as a system in its own right is stronger than ever. But functional systems treat each other stepmotherly and society has a poor ability to reflect on its external environment, not least when it comes to the Earth's climate as the basis for human life (the host of social systems) and for its human's psychosocial well-being. It now seems clear that society via internal differentiation is parasitising humans (and thereby the world) and thus we also get the explanation for the otherwise unanswerable question of why we gave up the good life as hunters and gatherers (Luhmann 2012, 28; Harari 2015): We were communicatively included in the segmentary differentiated society![12]

Society probably will maintain the functional systems but in a solid coupling to AI and manage humans, or perhaps only manage our contributions, so that they, with the algorithms and big data, become even more frictionless. With this functionalistic technostructure that I will sociologically name *algorithmic differentiation*, digital media with their functional architecture provide a gathering point that can convey between the functional systems on the surface and manage humans´ frictionless contributions from the invisible deep. It is an AI, logarithm, rationalist and in a double sense, politically, economically and scientifically functionalism – an instrumentalist, optimistic society with a logic that says that technology can arrange the world (rationally) better than humans themself. The social system is loosely coupled from human (ir)rationality but in a solid coupling to AI.

In relation to the role of centre/periphery which has played an important role in the former transitions of the basic differentiation form triggered by communication media, Castells (2003) distinguishes between *flow of space* and *place of space*. Flow of space is connecting the educated populations in and between the centres, i.e. big urban city areas, and at the same time disconnecting the populations living in the outskirt areas, left with only place of space. What Castells did not foresee was that the marginalized areas were also connected by the digital media and interpellated by populist politicians (Müller 2016) and every form of online shopping, work, gaming etc. Another example is that the centre of China (the Communist party) invests heavily in surveillance in outskirt areas to (also) control the individuals there. Another form of centre, a non-geographic centre, is the big five (Facebook (Meta), Amazon, Apple, Microsoft and Google (Alphabet)) who by their functionalist technostructure control and monitor the social inclusion of many citizens (periphery) and at the same time earn their money from these citizens.

And everything on the surface is controlled from the invisible depths by the algorithms, caused by our belief that with the computer we can control and create a better world – and maybe it is true.[13]

To return to the question about the autonomy of the functional systems, to the question if they will also be subjected to the algorithmic differentiation, I will point to the many studies of *medialization* that show how the various sectors, through the intervention of the media, go through profound structural changes. The theory of mediatization describes how the interplay between media and different sectors like politics, education, sport and religion alter the conditions and the way these, in Luhmann's terms, functional systems function.

The term mediatization refers to the media's transformative role in society and culture. This does not mean that the media alone cause changes, but that the media's behaviour triggers or contributes to profound changes in interactions with the internal environment (Hjarvard 2008). An example is when editors help to develop sports tournaments that ensure media popular content (Frandsen 2020). In addition, digitalization has resulted in how media are now playing a strongly changing role in amateur sports, exercise and lifestyle sports as well as among fans. Also, the algorithms know best in relation to how we should exercise, sleep, eat etc.

Education is an example of a functional system showing signs of losing its autonomy as a functional system. Tække (2022) tries to observe if logics, values and elementary communication contributions from other systems can enter the communication of the education system. The article concludes that the *materiality* of digital media might result in an algorithm-induced impact on the communication in the education system enforced by other systems in its environment, why the autonomy of the education system has been threatened. According to Andersen and Pors (2021), the school becomes linked to an increasing number of symbolic media so that education becomes only one out of many other concerns, and my point here is that all functional systems are in a process of becoming controlled by one dominant but distributed AI. It looks probable that the sociological logic of *AI* is that all bias must be erased so that humans can be the sine qua non frictionless resource of society.

I will end this discussion by putting forward one last example to demonstrate how digital media covered by latency already have over many years played a major role in the steering and observation of the world. It is not the power or capitalism critic that is important; what is important is the role of the computer and the algorithms.

In the nineties, the first advanced computer models emerged that could simulate global warming and climate change under different scenarios for economic growth and greenhouse gas emissions. Useful and indispensable as these models are in many ways, they also removed the need for deep critical thinking, according to Watson et al. (2021). They point out that such models portray society as a network of idealised, rational buyers and sellers and ignore the complex social and political realities, and even the effects of climate change itself. The models' indirect promise is that market-based solutions will always work. This meant that discussions about political strategies were limited to what was convenient for politicians: gradual adjustments of legislation and taxes.

This means that in relation to climate change the idea of a net zero is a glare that has emerged from the fact that our ability to model has led us to believe that we can rationally calculate climate action using computers. Computer modelling makes us think we can figure it out. Using modelling, the climate becomes an algorithm that can be manipulated. According to Watson et al. (2021), today's net zero strategies will not keep global warming below 1.5 degrees, since that has never been the purpose of them. They were and continue to be driven by the need to protect business as usual, not the climate.

This example shows that for a long time in latency computer models have already given us the rationale we act on. Watson et al. (2021) may well criticize the models most likely because the values the algorithms are modelled after have supported the capitalist business as usual – a 'let's burn off now and pay later' logic. That the models have been used to argue for the postponement of efforts, recognition of probable technological developments, etc. may be true, like in relation to education, i.e. Tække (2022) shows the intrusion of a capitalistic logic is at play. But the point is that if wicked problems are to be solved, AI is probably the only realistic way forward. As in previous media revolutions/shifts in fundamental differentiation form, we will see a shift we cannot imagine on this side of the paradigm shift. We are maybe looking into a future managed by machine learning algorithms and AI centred around the imaginary of the functionalistic technostructure. Computer modelling makes us think that the computers and not us can figure it out. This logic is lying below the emergence of the algorithmic differentiation of society which is made probable here through the detection of the latency.

Until now, the observation of the external environment and of the internal social environment depends on which logics are programmed into the algorithms. How this will turn out in the future is presently unclear, but it is likely that society within the new medium environment will calculate this problem. It is up to society itself to condensate its forms, and we are probably heading towards a new basic differentiation form depending on computers; so, society, maybe soon, will program itself into a tight coupling to algorithms distributing humans in space and time as frictionless resources. As Harste (2010, 109) mentions, the IT technologies make distant synchronization of a society's time possible; present time and simultaneity in communication have been subjected to world time.

10. Conclusion

This article has tried to give an account of Luhmann's theory about how society organizes itself through differentiation. The theory is not totally clear and leaves space for interpretation in explaining, among other things, how change occurs or is triggered. But it seems clear that over time dynamics which are not regulated through the basic form of differentiation or its sub differentiations increase the complexity which again triggers a shift in the basic differentiation of society. There are, however, strong indications that communication media play a decisive role as a precondition for the different kinds of societal differentiation not least for the increased complexity and dynamic, but in a non-linearly causal and non-deterministic way. Historically seen, society started with the relatively simple but robust segmentary differentiation which was linked to modern oral language before writing. After the acquisition of writing, society was stratified and after the acquisition of printing, it became functionally differentiated. This happens with many in-between stages and the interplay of centre/periphery differentiations that plays a role in all three kinds of basic differentiation forms and in the transformation from one basic form into a new basic form. Each basic form of differentiation makes the handling of more social complexity possible.

This article puts forward the contour of a possible new kind of basic societal differentiation, the *algorithmic differentiation*, made possible by digital media. Through digital media, society has such an enormous calculation power as well as a monitoring, predicting, distributing, informing, commanding, nudging etc. power that by this functional digital architecture, individuals can be differentiated as a frictionless resource. Algorithmic differentiation is like a new segmentation, but at the same time stratified according to individual attitude, qualifications, wealth, social history, conviction etc. This society is also functionally differentiated in relation to categorizing contributions to different sectors through the symbolic generalized communication media. Last, the new basic form of differentiation has a strong centre in the *functionalistic technostructure* providing the medium for the algorithmic differentiation, which differentiates all humans at the periphery into individuals that must follow the diverted logics, values and norms of the AI which becomes the ubiquitous centre.

We did not think it possible that the computer would be able to beat us in chess, but when it did, we took the position that chess was just calculations. But we have a hard time accepting that with powerful enough computers, everything is just calculations – or that everything in a regime based on calculations becomes calculations; you only measure what can be measured (measurement myopia). In the scenario this article sets up, the differential structure will be a socio-technical size, an AI, and it will not just be calculating according to the will of one or a couple of persons, i.e. no single person will determine the values and goals. The latency, or the fact that this development is latent and not explicitly acknowledged or admitted, stems from a Turing-test romanticism, as it is difficult to imagine that the social merges with the new basic communication medium. Of course, this can happen with the social in its own right, simply in a new communicative space, but where the human will still stand outside the social and only be addressed and eventually only perceive himself from how (s)he is addressed socially as a person. Man will become a kind of gear in a kind of decor like what Paulsen and Tække (2020) with inspiration from Levi Bryant (2014) call a *Citizen Big Data Machine*. Presumably, the problem with the in-programmed goals and values in the algorithms will only be a societal childhood disease.[14] It might be cured by the inclusion of more and more goals and values together with programming uncertainty into collaborative algorithms (Arora and Doshi 2020) which is the structural coupling between the different levels of system formation.

After the new differentiation form is realised, society can control its own programming of the steering machine learning algorithms, which is society reproducing itself through a new sociotechnical form of communication.

There are many unanswered questions like how the observation of the external environment will perform when it is governed by AI. On the one hand, it will not be able to observe the external environment better, as it is in itself (ding an sich), than we in principle are able to do today. But on the other hand, maybe if the economic interests and the desire for power, fame, dominance and appetite for meat, flights, accommodation, etc. are kept in check by the AI and the algorithmic differentiation of society, we might be able to stop the race towards self-destruction and extinction?

Differentiation of society has always been alien to human life; form segmentation gave the structure to leave the natural lifestyle as hunter-gatherers through stratification to functional differentiation. With the new algorithmic differentiation, the problem of equality and inequality in a utopian scenario is eliminated, while in a dystopian perspective, it becomes more like Harari's homo deus scenario, with few super humans having the wealth, education and power to include themselves in the algorithmic communication, and the many who become subjects to the new form of communication and distribution key. That would either be a new kind of stratification with equality within the two different strata and inequality between them, or a totally new system/environment distinction, not only with a distinction internal in society between two strata, but with a differentiating out of most of the humans from the new society (reproducing itself in the new sociotechnical communication). Anyway, also if, and that is the most probable, a new and for now unimaginable scheme for inclusion and exclusion emerges, we are looking into a new form of society.

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[1] In 1998, Qvortrup published a book in Danish about the same topic.

[2] In 2007, Baecker published an article in English about the same topic.

[3] Also, Gorm Harste (2010) points at the digital society as a *network-system*, but he does not outline a theory about it.

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[4] Simmel published a book on differentiation (Uber Sociale Differenzierung 1890) three years before Durkheim, which both Durkheim (1960, 46 n7) and Luhmann (2012 vol 2, 351 n1; 1982, 11) mention, but neither of them refer to anything in Simmel's theory.

[55] This way of using the principle is too transcendental for Luhmann, who uses the differentiation form in his own meaning.

[6] I call them basic since Luhmann (2012; 1995) mentions others but only as assigned to them I call basic and which has resulted in distinct kinds of societal differentiation i.e. historical societies.

[7] Writing e.g., makes possible to communicate while alone and across time and space (Luhmann 1995, 427).

[8] E.g., based on calculations of how many trucks and tanks the USSR and the Vietnamese had.

[9] My translation.

[10] My translation.

[11] As Baecker (2018, 36) cannot use Luhmann, he referred to an odd team of network theoreticians consisting of Manuel Castells, Bruno Latour, and Harrison C. White.

[12] On this basis the term *anthropocene* seems wrong, it should be *sociocene*.

[13] Nobody other than romantic and unrealistic people have before really wanted to go back to an earlier form of differentiation.

[14] That the goal is put in from the beginning is, for instance, the problem with Facebook, because the algorithms are programed to maximize time spent on the platform and thereby enforce polarization and fake news.