

Introduction: Digitization and the Law – a European Perspective

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I. New Technologies and their Convergence

"Digitization of information" means, to state it in the simplest way possible, the representation of information as a sequence of zeros and ones. Digitized information can be edited, stored and easily transferred between computers. In view of the high power of today's computers and their global networking via the Internet, this means that vast amounts of information can be processed, stored and transmitted in real time.

A second characteristic need also be considered: Digitized information is enormously plastic. Texts, pictures, video and audio files can be converted into digitized form. Until recently, these kinds of information could only be perceived by means of monitors, loudspeakers, or, respectively, headphones. At the present time, a new breakthrough is emerging under the keyword "virtuality", meaning a significantly more intensive form of experience which is digitally-based. The creation of virtual environments is making extremely rapid progress so that it will soon be possible to "dive into" deceptively real artificially created environments using data goggles.

The "digital revolution" is happening at the same time as other technological developments. One worth mentioning are the enormous advances in microphone technology, which make it possible for us to record much more data, and then also at much higher levels of quality, than was ever previously possible. In this context, one has referred to the new granularity, or fineness, of data.

Perhaps even more far-reaching are new forms of autonomous systems, i.e. technological systems, which react independently of human input to new factual situations and can thus successfully deal with unforeseen problems autonomously. Such systems are to a certain extent already regarded as independent actors. It can be assumed that their importance will increase significantly in the near future. This development is particularly

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controversial because these technological systems are increasingly able to learn for themselves, that is, to expand their knowledge base independently as a product of experience.

II. The Digital Revolution and the Law

What does all of this mean for the law? In order to shed light on the impact of digitization on the legal system and its stakeholders, the following six topics should be considered (1) legal resources, (2) the application of the law, (3) legal policy, (4) programming and concomitant algorithmization of the law, (5) the representation of law, (6) the resulting consequences for the perception and acceptance of the law, and finally (7) more far-reaching social and political consequences.

(1) New Tools and Methodologies in the Law

It can be said without exaggeration, that there has been a revolution in the technological and informational resources available to lawyers which can be subsumed under the catchphrase "from statute book to networked computer". Text editing on personal computers has now become a matter of course. The same can be said for research using computers, for example, in legal databases online or offline. In this context, the use of legal precedents or boilerplate clauses is, in many respects, not without problems. It must be obvious that these lawyering tools not only bring advantages, but also raise questions. Sections of text written by someone else can easily be included into a document without making them recognizable as quotations; also among digitally socialized academics, borrowing footnotes from other works via "copy and paste" has become widespread.

The implications of these developments for legal texts, such as student assignments, academic articles, decisions by administrative authorities or written dispositions by the prosecution in criminal proceedings, are still unclear. These changes in lawyering resources and methods and their effects on legal thinking deserve more attention than they have been given up to now. This includes the old question of whether computers with appropriate software can make legal decisions, an idea which has long been under discussion in legal methodology, but which now appears for the first time to be technically feasible on a large scale.

(2) Application of the Law: Can it Accommodate the Change?

As a result of the digital revolution which is affecting many aspects of the way we live and work, involving many fields of human activity, the question emerges as to the extent to which existing legal norms are or will be applicable to facts arising in the context of digitized situations and circumstances. Thus it could be a question for discussion, for example, whether a purchase agreement (i.e. a kind of contract) under § 433 German Civil Code (*Bürgerliches Gesetzbuch* – BGB) can be concluded by e-mail. In point of fact, this question was answered years ago. In the criminal law, the problem arose as to whether data were protected by § 303 German Criminal Code (*Strafgesetzbuch* – StGB), i.e. whether the deletion of data constituted the offence of criminal damage. This was rejected by prevailing legal opinion, so in 1986 the German Parliament adopted § 303 a and § 303 b of the Criminal Code as part of the Second Law to Combat Economic Crimes (white collar crime) in order to close this lacuna in the law. Another issue under discussion, for example, was the extent to which mass emailings (spam), such as those sent for advertising purposes, could be criminalized, but that was ultimately rejected. In the first criminal law example above, digitized information was the thing destroyed (the object of the crime); in the second it was the means of committing the offence.

There are crimes that have already existed for a long time in the analog world, but now, in the digital world, these offences are becoming more common than they ever were previously. The Internet provides ready opportunities to spread hate messages, or engage in cyber-mobbing, trolling and the like. Moreover, the new communications possibilities afforded by the internet are facilitating the commission of offences by helping to bring perpetrators and victims together. A somewhat macabre example of this are the cases of consensual cannibalism, which had previously been difficult to carry out due to the difficulty of establishing contact with like-minded people; the chance that two people with such extreme proclivities would meet in the analog world were extremely small. Nowadays, it has become much easier to search for correspondingly inclined partners via the Internet; sometimes reference is even made to "cannibal networks".

Public law is also being subjected to not inconsiderable pressure to adapt to changing circumstances. One example is the extension of the protection of fundamental rights, such as the "right to informational self-determination". This right was recognized in 1983 in the German Federal Constitution Court's landmark decision in the *Census Act Judgment* (*Volk-*

szählungsurteil). Another example concerns the question of whether and to what extent public authorities can undertake official administrative measures via the Internet. The German Parliament tried to regulate this area through the E-Government Act (2013), but the implementation of this statute is considered by many to have lagged behind expectations.

The advancing digitization of our entire life and work environments means that in some areas completely new questions have emerged. The ubiquitous networking of things in the "Internet of things", the ever more efficient handling of cumulative data (big data) and, finally, the development of augmented reality or virtual reality, are all amongst the most important trends in technology at present. These developments raise significant legal questions, from the curbing of impending new forms of cyber-crime, through data protection, to the question of the application of the law to avatars, that is, to artificial figures in virtual space. It should also be noted that among these questions some questions are also rather exotic, including whether robot prostitution is legal, or questions about digital legacies, or even whether someone, in contemplation of death, can perpetuate himself in the form of a computer program (RIP: Rest in Pixels).

(3) Legal Policy

If the applicable law can no longer be extended and applied to new technological developments, it will be parliament's task to settle the new questions by passing new legislation. Law and legal policy are therefore closely linked. Given the speed with which the digital revolution is taking place, it is not surprising that in almost all areas of the law, *lege lata* is facing challenges. Thus, for example, new forms of socially harmful behavior such as "identity theft" are emerging on the Internet, which confront both tort law as well as the criminal law.

Again and again, the question has been raised whether there is a need to legislate new criminal offences, such as the digital trespass to property, or for increased penalties for the offence of insult (*Beleidigung*), when it is committed via the Internet. Discussions are taking place in the civil law as to whether autonomous systems should be subjected to a strict liability regime in tort; making tortfeasors liable for damage regardless of fault has proved itself, for example, both in the context of railways and automobiles. Another primarily civil law issue is the question of whether a quasi-property right should be created in (particularly non-personal) data, an is-

sue that is becoming more and more important as a result of the rapidly growing commercial value of such data.

Facing such challenges, technology law is confronted with three tasks: (1) Advising legal practitioners, i.e. lawyers, public prosecutors and judges; (2) Advising legal policy makers, i.e. the legislature, for example via publications, through participation in advisory bodies, or through activities as experts; (3) Advising the engineers themselves who develop new technology. The goal is to ensure, by taking compliance measures, that clashes between technology and the law never occur. In this context, it is also necessary to provide engineers with a certain level of basic education in law, for example, a basic understanding of how civil liability works in our legal system.

(4) From Programming to the Algorithmization of the Law

An interesting special problem is the programmability of law (i.e. whether it can be transposed in computer code instructions which a machine can follow and execute). Automation is leading to increasing demand for machines which perform their functions in accordance with the law. Thus autonomous systems used in stock market trading must, in principle, be in a position to comply with applicable legal norms. Autonomous vehicles which drive on public roads must follow the rules contained in the road traffic code, and robots, which are in particularly close contact with human beings, need to have internalized “moral and legal codices”, which, among other things, ensures that the machines do not harm the humans they interact with.

All these problems raise the question of how machines can be informed about all these legal requirements. In principle there are two possibilities: (1) The transmission of legal information comes from outside, for example via the infrastructure of the roads on which the autonomous vehicles are moving; (2) “legal instructions” are contained within them, i.e. by programming them with legal rules. However, each programming of legal rules requires that not only the rules but also the application of the rules in specific cases must be transposed and transmitted in computer language, i.e. as algorithms.

Algorithmization of the law leads to a new and compelling need to explicate the law: legal decisions, the premises and reasoning of which, within the framework of traditional methods of applying the law, were of-

ten vague and approximate, must now be analyzed and presented with great precision. A good example of this is a well-known dilemma discussed in the context of automated vehicle transport: a vehicle is approaching an accident scene at high speed: three people are lying unconscious on the road, one person has been able to drag himself to the roadside and is leaning against a signpost. A human driver would not be able to swerve to avoid a collision and would run over the three people lying on the ground.

An autonomous vehicle, on the other hand, has powerful sensors and a fast on-board computer and is thus able to swerve to avoid running over the people on the road. Unfortunately, it would then collide with the person leaning against the signpost. How should the algorithm for the on-board computer be programmed? Such problems have hitherto been quite relevant in theoretical discussions, one example of which is the well-known *switchman problem*. The automation of road transport means that we have to make the rules that should apply in such situations explicit, and then program the vehicles accordingly.

This is often anything but simple. Suppose an automated vehicle, on a narrow street, is approaching a group of three children, who have suddenly jumped onto the road. One child is running ahead of the two others. The children are located on the road so that one child will be hit by the left fender of the vehicle, and the other two by the right fender. If the trajectory of the vehicle does not change, all three children will be struck by it and injured or killed. The vehicle, of course, can be steered slightly to the right or to the left, so that not all the children will get run over. If it is steered to the left, one child will be struck. If it is steered to the right, two children will get hit.

Intuition tells us that it should be steered to the left in order to minimize the number of victims. That solution would mean, however, that human lives would be quantified and weighed against each other. Can that be justified? The example shows how technological development, and the explication pressure associated with it, can call into question our established ways of thinking and reacting.

From the perspective of legal theory, one very interesting question is how the pressure to explicate will affect legal drafting and argumentation. In order to be represented in algorithms, the relevant aspects of a problem must be identified as precisely as possible and the logical relationships between the elements must be elucidated. A simple "balancing" as is widespread in some areas of fundamental rights law, for example, would

not meet these requirements. The necessity of making key arguments comprehensible to the computer, therefore, leads to pressure towards being more precise, a phenomenon which might possibly have salutary effects in some areas of legal science.

(5) New Ways of Disseminating and Consuming Legal Content

As the Internet has developed, new sources of legal information have also emerged. One of the most important of these is the internet encyclopedia *Wikipedia*. It contains information on almost all legal issues, often at very high levels of sophistication. Without effective quality control, Wikipedia would never have been able to drive established encyclopedias such as *Brockhaus* or *Encyclopaedia Britannica* out of the market.

The existence of internet-based sources of legal information means that this information is now much more readily available than ever before. Trips to the library have to a large extent been replaced by typing in keywords or making swiping movements on a smartphone. Something that is particularly noteworthy is that information on foreign legal provisions is, in principle, as easy to obtain as information on German law. This is a major difference from the situation in the past, when at best big university libraries contained holdings on foreign law.

A second point that characterizes today's situation is that the boundaries between professionally solid treatments of the law, popular representations and so-called "fake news" are beginning to blur. This has important implications for the trust that users place, or at least ought to place, in legal resources on the Internet. The availability of more information therefore does not necessarily lead to improved certainty about finding out what the law on a given issue actually is. The opposite might even be the case today.

In addition, the Internet has brought new opportunities and incentives for engaging in legally binding commercial transactions. For example, contracting can be done very easily via the Internet. It is obvious that this may pose new challenges for consumer protection. Communication on the Internet highlights some typical psychological idiosyncrasies of normal users, which also have legal relevance. For example, use of the Internet, especially at home, gives users a sense of privacy, i.e. a feeling of not being observed, which is exactly the opposite of what is really happening. There is scarcely an area of human activity that is so relentlessly moni-

tored as behavior on the Internet. The feeling of privacy, in contrast, often leads to a loss of inhibitions, with users forgetting that they need to exercise well-practiced self-control behaviours. There is therefore hardly a place where one's "privacy" is potentially exposed to more serious invasions than when surfing the Internet on a home computer.

The control of Internet content is hardly possible. Control of what is placed on the Web 2.0 is particularly difficult, since users can put their content online themselves. It follows that the possibilities for controlling legal content on the Internet are very limited. Discussions are currently under way as to whether it might be possible to carry out some kind of control of the truth of content on the Internet. This could be done by people who examine the content, but also by machines that check the plausibility of content. The latter would have the advantage that far more content could be examined. Whether such content control is desirable, however, and who should decide on the truth or falsehood of the content, is still an open question.

Another way to prevent the uncontrolled proliferation of both false and accurate legal information on the Internet would be the increased involvement of governmental authorities, which could publish relevant information on the Internet. This is already happening on a large scale and at high levels of quality. Good examples are the information pages of German federal and state government ministries. Furthermore, there are numerous examples of the successful publication of legal content by local government authorities on the Internet, namely on their e-government websites.

That is enough said in respect of publishing traditional legal texts on the Internet. The use of the Internet is also leading to the representation of law in new and non-traditional ways. Frequently, legal texts or texts with legal content are accompanied by audio or video files.

A particularly significant application of these new ways of publishing legal content are new methodologies for teaching law such as e-learning. The combination of text, audio and video leads to inclusion; even people with lower levels of education can be reached through video sequences and thus be sensitized to legal problems. Thus new ways of publishing legal content should in principle be deemed as positive. Nevertheless, popularizations of the law can also result in trivialization and ultimately lead to a loss of respect for legal rules.

In this context, it may be helpful to search our cultural history for other forms of not exclusively text-based transmission of legal content. Such material is easy to find. The treatment of legal problems by actors goes all

the way back to court dramas written in antiquity (just think of the Sophocles' play *Antigone* written ca. 440 BC). Since the invention of cinema and television, there have again and again been important feature films, which have made legal content accessible to wider audiences, including *12 Angry Men* (1957), *Inherit the Wind* (1960), *To Kill a Mockingbird* (1962), and *Erin Brockovich* (2000). Such works have probably played a significant role in the development of legal consciousness and legal knowledge in their viewers. There is also much evidence that the adversarial form of court procedure characteristic of common law legal systems has been given currency worldwide mainly through Hollywood films. The digitizability and consequent internationality of all content, and thus also of legal content, suggests that in the future there will be significantly more audio content and video content, but above all also many more legal offerings in virtual reality.

A very interesting new way of presenting legal content is the visualization of law. Images can have quite different effects – and thus also have: different functions. First of all there are aesthetic effects, that is, the embellishment of legal information through images. However, images are used much more frequently to illustrate or explain legal content. An easily overlooked issue here is the defamiliarization, which visual representations can cause. As a result, they can, like hardly any other medium, encourage viewers' reflection on the law.

Finally, the fourth possible function of images in law is criticism: pictorial representations can be used in an outstanding way to represent particular situations, or even lawyers, in a critical light. A famous example of this are Daumier's socially-critical caricatures of lawyers. Finally, photographs can also be put into the category "criticism through pictures", such as those which represent untenable legal situations.

The development of the Internet means that many more images referring in some way to the law are available today than in the past. The social consequences of this visualization have not yet been adequately considered.

(6) The Consequences of Digitization for the Perception, Acceptance and Functioning of the Law

Until the twelfth century law was transmitted orally. Law that was handed down in this way was hardly suited to be used as a mechanism for the ex-

ercise of power on a nationwide basis, because its content and its interpretation depended on those who recited it to the public. Also, possibilities for making changes in the law were very limited. Legal science as we know it today did not exist. After Roman law was rediscovered, there was a shift from orality to literacy, i.e. from oral transmission of the law to written transmission of the law. Unlike oral law, written law was extremely well suited for the exercise of sovereign power. Subsequently, European legal science emerged, which devoted itself to the collection, interpretation, systematic presentation, and ultimately to the further development of the body of law which had previously been handed down orally.

It is not without allure to ask whether we are today at the threshold of a transition from literacy to the digitality of the law. It has been shown above how new digital communication and presentation technologies are fundamentally altering our approach to the law. What does this mean for the acceptance of law by the populace? What are the social and political consequences of this development? And what will the effects be for legal science?

(7) Societal and Political Consequences

The Internet also has social consequences, which are real rather than theoretical. There is much evidence that the increasing digitalization of our workflows and their automation will lead to huge losses of jobs. Internet communication offers new possibilities of manipulating the population. A danger that is already looming on the horizon is the potential loss of the ability of humans to solve problems on their own, as a result of the automation of problem-solving.

It is doubtful whether the law alone will be able to cope with all of these consequences. One of the traditional tasks of law is the creation of legal certainty. But can this still be guaranteed at a time when almost any legal content is available on the Internet? All in all, the question arises as to how much digitization we can afford to achieve. What is certain is that the process of digitization must not be accepted passively, but rather must be steered. The means for this control is the law. The key issue is to ensure that the fundamental guiding principles of our legal system, such as the rule of law and the orientation towards human dignity and human rights, will continue to be preserved in the future.

III. Summary and Outlook

If we try to summarize the new tasks of legal science, which have been posed by digitization, the following picture emerges: The law first of all faces the task of bringing the new technologies and the law into harmony. This can be achieved by adapting the law to technology, but also by adapting technology to law. Another important present task is the management of new forms of socially harmful behavior through the introduction of appropriate forms of criminal liability and criminal law.

The algorithmization of law is leading to a new compulsion to explicate, because the law needs to be translated into computer-compatible language. Such tasks are already being faced today, for example, in the field of road traffic law, where the programming of traffic signs is being discussed. In the medium term, the task will be to program legal rules into the on-board computers of autonomous vehicles. Another major problem related to the algorithmization of law is the analysis and assessment of dilemma situations in road traffic, where autonomous vehicles will face very difficult decisions on how to maneuver during road traffic accidents.

All of these are major legal challenges that lawyers can hardly cope with by themselves. What is therefore required is a reflected interdisciplinarity which in particular aims at exploiting empirical findings made by the natural sciences. Lawyers have hardly ever up to now received training in interdisciplinary work methods; the linguistic difficulties they have in dealing with professionals from other disciplines are virtually proverbial. There is much to be said for devoting more attention to the digitization of law in German legal education than has hitherto been the case.

